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(Citation)

Journal of Child Language, 33(1):1-29

(Issue Date)

2006-02

(Resource Type)

journal article

(Version)

Version of Record

(URL)

<https://hdl.handle.net/20.500.14094/90000406>



The use of nouns and verbs by Japanese children and their caregivers in book-reading and toy-playing contexts*

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(Received 31 October 2002. Revised 11 January 2005)

ABSTRACT

Japanese provides a valuable contrast for crosslinguistic studies of noun and verb dominance in early child language, and the effect of input on the early lexicon. In this study, 31 Japanese children between 1;0 and 2;0 and their caregivers were recorded in two contexts: joint bookreading and play with toys. Context had the largest effect, as nouns were much more frequent in the book context. Noun dominance was constant across development in the book context, but in the toy context there was a shift away as children developed from single words

[*] We extend special thanks to all children and the parents who made this study possible. We would like to thank Yoshihiro Nishimitsu for his help on linguistic issues. This research was supported by a Grant-in-Aid for Scientific Research from the Ministry of Education, Science, Sports and Culture of Japan (Project numbers 08202207, 09207214, 10114214, 11111215, 1201211), Center of Developmental Education and Research and Sato Foundation. Reprint requests should be addressed to: Tamiko Ogura, Faculty of Letters, Kobe University, 1-1 Rokkodai-cho, Nada-ku, Kobe City, Japan 657-8501. e-mail: ogura@kobe-u.ac.jp

through the presyntactic stage to the syntactic stage. Caregiver language was verb dominant in a number of respects across development in the toy context, and thus was not closely related to child lexical balance. We conclude that in early lexical development, all children have a conceptual disposition to learn nouns. With vocabulary growth and the emergence of grammar, the proportion of verbs increases substantially, and at this stage properties of the input language may influence development.

INTRODUCTION

Based on a review of research on early vocabulary in six languages, including English, German, Japanese, Kaluli, Mandarin, and Turkish, Gentner (1982) postulated a universal tendency for children to acquire more nouns than verbs. She proposed two hypotheses to explain this tendency. The first is the NATURAL PARTITIONS HYPOTHESIS, which emphasizes the greater perceptual availability of object referents. The second is the hypothesis of RELATIONAL RELATIVITY, which emphasizes the fact that the assignment of relational terms is more variable across languages than the assignment of nominal terms. Because predicates show a more variable mapping from concepts to words, children must discover how their language combines and lexicalizes the elements of the perceptual field, and this is more challenging for predicates than for nominals.

Both the postulated universality of this noun dominance and Gentner's proposed explanations are provocative, and have stimulated much research on a wider range of languages, larger numbers of children, and additional methodologies of assessment. Noun dominance has been confirmed in the case of English, Italian, and Hebrew through the use of both checklist and diary data (Dromi, 1987; Goldfield & Reznick, 1990; Bates, Marchman, Thal, Fenson, Dale, Reznick, Reilly & Hartung, 1994; Caselli, Bates, Casadio, Fenson, Fenson, Sanderl & Weir, 1995). Recent studies of Mandarin and Korean, however, have provided apparently discrepant results. Tardif (1996) reported that nine out of the ten Mandarin-speaking children she studied used more verbs than nouns in spontaneous speech. Choi & Gopnik (1995) compared nine Korean-speaking children with nine English-speaking children, and found equal proportions of nouns and verbs in the Korean lexicons, in contrast to the more typical finding of more nouns than verbs in 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 approximately 1;6. In contrast, Au, Dapretto & Song (1994) reported that both Korean- and English-speaking infants acquired nouns much faster than verbs, based on maternal checklists. In maternal input, however, far more verbs than nouns appeared in salient positions in Korean, whereas the opposite was true for English.

Kim, McGregor & Thompson (2000) showed that, although both Korean-speaking and English-speaking children had acquired more nouns than verbs at the 50-word mark, the Korean-speaking children learned significantly more verbs than did the English-speaking children.

The possibility of substantial differences across languages in the composition of early vocabulary stimulated new interest in the analysis of the input to young children. Two aspects of input may be distinguished. The first includes the typological properties of the input language, such as whether noun phrases may be omitted when redundant from context ('pro-drop' languages), and which word categories are likely to occupy the highly salient final position of utterances or occur as single-word utterances. In English, noun phrases are generally obligatory, and are more likely than verbs to occur in final position or as single-word utterances. Although the apparently discrepant results from Mandarin and Korean child language do come from languages which are typologically different from English, as they permit substantial deletion of noun phrases as well as frequently placing verbs in final position, those differences cannot be the entire explanation. Italian and Spanish share these properties, and yet young children's vocabularies remain noun dominant (Jackson-Maldonado, Thal, Marchman, Bates & Gutierrez-Clellen, 1993; Caselli *et al.*, 1995). For this reason, attention has shifted to a second aspect of input, namely, actual frequency and other features of use of the two categories in child-directed speech (Goldfield, 1993; Choi & Gopnik, 1995; Tardif, Shatz & Naigles, 1997; Choi, 2000; Kim *et al.*, 2000; Camaioni & Longobardi, 2001). In these studies, naturalistic samples of adult-child speech have been examined in order to determine if variations in the input are consistent with the reported variations in the proportions of nouns and verbs in children's early vocabularies. A number of findings have confirmed a correspondence between structural and pragmatic aspects of caregiver input and the dominance of nouns vs. verbs in children's language. Choi & Gopnik (1995) reported that Korean mothers used more verbs referring to concrete activities than English-speaking mothers, whereas English-speaking mothers provided more nouns referring to objects than the Korean mothers. Pragmatically, Korean mothers focused more on actions and activities than English-speaking mothers. In Choi's (2000) study, English-speaking mothers used more nouns than verbs, and focused more on objects than on actions. In contrast, the Korean-speaking mothers in her study were more balanced in their production of nouns and verbs, and in their focus on objects and actions. Similarly, Tardif (1996) and Tardif *et al.* (1997) explained the verb dominance observed in Mandarin-speaking children as resulting from a combination of frequency in caregiver input, saliency in utterance-final position and morphological simplicity. The simpler the morphological markers on a word, or the less the variety of these markings,

the easier it should be to segment, identify and acquire the word. Tardif *et al.* found there were more morphological variations for nouns than there were for verbs, which combined with the higher frequency of verbs, led to verb dominance. Tardif and colleagues acknowledge that Mandarin-speaking children, despite an overall verb dominance, may still produce higher proportions of nouns than their caregivers. Their observation suggests that a continuous measure of noun–verb balance for children and caregivers, as used in the present study, may be more appropriate than a simple categorization of dominance. Camaioni & Longobardi (2001) reported that Italian mothers also produced verb types and tokens more frequently than noun types and tokens and they frequently placed verbs in salient utterance positions (initial+final positions). Unlike Mandarin-speaking mothers, however, they morphologically marked verb stems more frequently than noun stems; the difference in morphological simplicity between the inputs may explain the difference in child language.

Japanese provides a valuable contrast for these crosslinguistic comparisons. In Japanese, the canonical word order is subject–object–verb, and thus verbs frequently occur at the end of utterances not only in declaratives but also in other types of sentences. Word order is grammatically free, however, and thus other words including nouns can occur in utterance-final position. Core noun phrase arguments are often deleted in spoken discourse when they have been mentioned previously. In these cases, verbs can occur alone as complete sentences. Unlike Mandarin, however, Japanese verbs have a rich inflectional morphology. Interestingly, Kim *et al.* (2000) suggest the opposite hypothesis concerning morphological complexity from that of Tardif, namely, that children learning highly inflected languages may take advantage of inflectional bootstrapping at an earlier age than those learning weakly inflected languages.

In Japanese, verbs obligatorily inflect in tense as well as mood/modality, and therefore never occur in bare form. Modal inflections vary in form and convey different types of discourse-pragmatic meanings, such as new/old information or shared/non-shared information. Shibatani (1990) provided a subcategorization of auxiliaries and conjunctive particles according to the inflectional categories: Mizen (Ireealis) (*nai, n(u)*(Negative); *seru, saseru, reru, rareru* (Voice/Honorific)), Renyoo (Adverbial) (*ta* (Past); *masu* (Polite); *tai* (Desiderative); *soo* (*da*) (Conjectural); *tari, te, nagara* (Conj. Particle)), Syuusi (Conclusive) (*rasii, soo* (*da*)(Hearsay); *to, kara, ga* (Conj. particle), Katei (Hypothetical) (*ba* (Conj. particle))). According to Shibatani, Japanese verbal morphology involves the following composition of elements:

Root + Inflectional ending (+ Auxiliary)	(+ Particle)
stem	

The inflectional endings are considered to be a stem-forming element, and the auxiliaries and particles attach to the verbal stems, never directly to the verb root. Auxiliaries attached to a stem also inflect and form more complex stems to which other auxiliaries may further attach.

Noun morphology includes all nominal case markers, such as the subject marker (-ga*), object marker (-o*), indirect object marker (-ni), possessive marker (-no), instrumental marker (-de), marker denoting starting point, origin or source (-kara, -yori), direction marker (-e*), marker denoting ending point (-made), and topic marker (-wa*, -nara, -ttara). Some of the noun markings are obligatory whereas those marked with * can be omitted.

In Japanese, word order is grammatically free and thus both nouns and verbs can occur in the final position of utterances. We can say the utterances in any word order, for example *neko-ga* (a cat: noun-case marker) *sakana-o* (fish:noun-object marker) *tabe-ta* (ate: past tense of verb) (A cat ate fish) or *sakana-o tabe-ta neko-ga* or *tabe-ta neko-ga sakana-o*. Thus although Japanese has a number of typological properties which might make verbs more salient, such as frequent use of verbs in sentence-final position or as single-word utterances, there are other properties such as extensive verb morphology and variability in final position, whose consequences are not immediately obvious. For these reasons, Japanese is an especially interesting case for examination.

Three other factors may significantly influence the apparent noun or verb dominance in children's language. The first is context. There is much evidence that different contexts lead to differences in both caregiver and child speech (Hoff-Ginsberg, 1991). Tardif, Gelman & Xu (1999) found that children's vocabularies appeared to be significantly dominated by nouns when they were engaged in bookreading, but not in the context of playing with conventional toys or playing with mechanical toys, and this was true in both Mandarin and English. The same shift occurred in caregiver speech to children in both languages. In the context of looking at books, both English-speaking and Mandarin mothers used more noun types than verb types. In the two toy-play contexts (conventional or mechanical toys), both groups used significantly more verb types than noun types. Similarly, Choi (2000) found a significant context effect. Whereas English-speaking mothers emphasized nouns in both the book and the toy contexts, Korean-speaking mothers did so only in the book context. In the toy context, they provided more verbs and focused more on actions.

A second factor which may contribute to noun or verb dominance is the child's age or language developmental stage. Even within a strongly noun-dominant language like English, there are substantial developmental changes (Bates *et al.*, 1994), and it is likely that changes occur within other languages as well. The children studied by Gentner (1982) ranged from 1;2-2;5 months; those studied by Tardif (1996) were 1;8-1;10; and

those studied longitudinally by Choi & Gopnik (1995) ranged from 1;2 to 1;10. Age itself is only an approximation to language stage. The composition and use of children's vocabulary may be influenced by their actual stage.

A final factor which is relevant is the definition of the categories, especially the definition of noun. The nominal category has been criticized as being too broadly defined, in that it contains not only concrete common nouns, for which perceptual-cognitive predispositions are relevant, but also proper nouns and sometimes even abstract nouns, which have no clear object reference. Common nouns and names refer to different types of 'things' in the world, and it is not appropriate to simply group them together in the same category (Tardif, 1996). However, Gentner & Boroditsky (2001) proposed that proper nouns are as relevant as common nouns to test the Natural Partitions claim that children's earliest words are labels for highly individuable referents. Despite this difference in opinion, even when names and abstract nouns were included in a broad category of nominals in Tardif's study, there was still evidence for a clear noun dominance in English, but not in Mandarin.

With these considerations in mind, the present study has been designed to determine whether Japanese children and their mothers are noun dominant or verb dominant, with specific attention to factors which might influence this classification: the context (playing with toys and looking at books), children's language stage (single-word, presyntactic stage, syntactic stage), and counting method for nouns (including vs. excluding words referring to people, and proper nouns). The type and token frequency of nouns and verbs in caregiver input, their morphological complexity and use in salient utterance positions, and the pragmatic emphasis on naming or activity will be examined. By examining these characteristics of child and caregiver language, we will evaluate the extent to which features of the input play a role in shaping the early lexicon.

METHOD

Participants

Thirty-one children (14 boys and 17 girls) between 12 and 24 months and their mothers provided the language samples used in the present study. They were drawn from a larger sample of fifty children, 10 each at 1;0, 1;3, 1;6, 1;9, and 2;0 participating in a study of language and cognitive development. Only those children who produced at least ten different word types in the language samples were included in this study; these included 1, 2, 8, 10, and 10 children each at 1;0, 1;3, 1;6, 1;9, and 2;0, respectively. All children scored in the normal range on a Japanese adaptation of the Denver Developmental Screening Test (Ueda, 1980). All families lived in

a small prefectural capital city in western Honshu, and all children were cared for by their mothers.

Language sample collection and transcription procedure

The caregiver-child dyads were observed and videotaped in a university playroom. One language sample was derived from a 14 minute toy session, which included 7 minutes with nurturing toys and 7 minutes with added vehicle toys. In the nurturing portion, the toys included a doll, a telephone, a blanket for doll, a mattress for doll, and a Mickey Mouse nylon bag which contained a brush, comb, spoon, baby bottle, and mirror. In the vehicle portion, the added toys included an airplane, cars, a boat, passenger figures, a wooden garage for the cars, and colourful plastic blocks in the shapes of a circle, square, and triangle. The toys were presented in a pillowcase. The toys and their sequencing were chosen to facilitate as substantial a language sample as possible by ensuring the presence of materials which would be of interest to all children. For this reason the nurturing toys remained even after the vehicles were introduced, in case the child was not interested in vehicles. A second language sample was derived from a 5-minute bookreading session. Three books were provided: one was a wordless item book of 14 animals in the zoo and the farm, another one was a wordless item book about 16 household objects and the third was a wordless story book which depicted a day of a boy consisting of 17 scenes, such as getting up in the morning and brushing his teeth. Caregivers were asked to look at these books with the child as they would at home. The bookreading session was shorter than the toy session because five minutes corresponded with some children's maximum attention span for that activity. In the interests of maximizing engagement with the books, no control was placed on the order or duration of involvement with each book.

All utterances of children and caregivers during the 19 minutes of observation were transcribed in a modified version of the CHAT format for analysis by the CLAN programs (MacWhinney & Snow, 1990; MacWhinney, 1995; Oshima-Takane & MacWhinney, 1995). The following categories of utterance were excluded from analysis: imitations, self-repetitions, number words in counting, singing, routines, and single exclamation words (*a*, *aa*, and *waa*).

Language measures for children

Noun and verb measures. The main focus of the present report is the balance of noun and verb use by children and their caregivers. Words were defined as approximations of the child's phonetic form to the form of

the adult language, or the consistent production of sounds in relation to objects and/or situations, where the meaning can be identified. We counted nouns in two ways, including or excluding words referring to people. We counted common nouns with conventional form (e.g. *inu* 'dog') and with baby form (e.g. *wanwan* 'doggie') referring to objects. We counted separately words referring to people, including kinship terms with conventional form and baby form (e.g. *okaasan*, *mama* 'mother'), proper names excluding the child's own name, and terms for roles, e.g. 'teacher' and 'farmer.' Verbs were words referring to action/activity (e.g. *taberu* 'eat'), change of location (e.g. *iku* 'go'), and existence verbs (*aru* 'be', *iru* 'be', *naru* 'become' and *suru* 'do').

The number of noun and verb types was determined in the toy context and the book context. We report here only type frequencies and not token frequencies because the primary debate has focused on a predominance of nouns types in children's early vocabularies (Tardif *et al.*, 1999). The pattern of results for tokens was very similar to that reported here for types.

Language stage. Based on the combined, 19 minute language sample, we classified children into one of three language stages: the single-word stage, the presyntactic stage, and the syntactic stage (Kelly & Dale, 1989; Ogura, 1991). Children at the single-word stage produced at least 10 different words, but did not produce any two-word utterances. Children at the presyntactic stage produced a variety of simple two-word or two-morpheme utterances, but did not meet the criteria for the syntactic stage, which required two independent words in a semantic-syntactic structure. Children in the presyntactic stage produced word-chains, which included three main subcategories. When children produced three or more word-chains of any specific subcategory, they were assigned to this stage. One type is conjugate word chains, e.g. *arui-ta* ('walk-ed'), *tabe-ta* ('ate'), *shi-ta* ('did'). Conjugate word chains are combinations of two morphemes, and production of three of them signals the beginning of rule-governed combination. A second type is final attached word chains, e.g. *oishii ne* ('delicious, isn't it?'). And the third is isolated two word utterances, in which an exclamation, interactional, or vocative word is combined with an independent word, e.g. *okaasan hana* ('mommy, flower'). Children at the syntactic stage produced one or more pairs of utterances with positional consistency, e.g. *X+neru* ('X sleep'), *Arichan ga neru* ('Arichan sleep'), and *koko ni neru* ('sleep here'). Children in transition between the presyntactic and syntactic stages were included in the presyntactic group; that is, if a child produced three or more different utterances for two independent words without a positionally consistent pattern, or produced one independent word with a case marker, s/he was placed in the presyntactic stage. In addition to the language stage classification, an overall

MLU was determined for each child, which counted the following as morphemes: nominal suffixes, verbal suffixes, particles attached to independent words, and independent words.

Language measures for caregivers

Noun and verb measures. In the caregiver language samples, both types and tokens were counted for nouns and verbs. We counted common nouns whether in conventional form or in baby form referring to objects, words referring to people in conventional form or in baby form, that is, kinship terms and role terms such as ‘postman’ and ‘teacher,’ and proper names excluding the child’s own name. We did not include abstract nouns, locative nouns, verbal nouns, or formal nouns in the noun category.¹ Verbs were words referring to action/activity, change of location and existence verbs.

Utterance position. As a measure of positional salience, verbs and nouns occurring as single-word utterances, and those occurring in the final position of multi-word utterances were counted.

Morphological complexity (mean inflections). The average number of different inflectional morphemes (i.e. morpheme types) that caregivers use per noun and verb in each context was computed. For example, when the caregiver says *neko-ga* (cat-subject marker), *neko-no* (cat-possessive marker), *neko-o* (cat-object marker), *neko* (cat-zero form), *hana-wa* (flower-topic marker), and *hana* (flower zero form), the resulting average score of complexity per noun was 3 (4 different morpheme types (-ga, -no, -o, and zero form) for *neko* and 2 different morpheme types (-wa, and zero form) for *hana*). For the average score of verb morphological complexity, if the caregiver says, *tabe-ru* (eat-present tense), *tabe-ta* (eat-past tense), *tabe-nai* (eat-negation), *no-ru* (ride-present tense), *no-seru* (ride-causative), *no-tta* (ride-past tense), *ne-ru* (sleep-present tense), *ne-nai* (sleep-negation) and *ne-ta* (neru-past tense), the resulting average score of complexity per verb was 3 (3 different morpheme types (zero form, -ta and -nai) for *tabe-ru*, 3 different morpheme types (-seru, tta, and zero form) for *no-ru* and 3 different morpheme types (zero form, nai and ta) for *ne-ru*).

Pragmatic measure. Utterances were coded as naming- or activity-oriented, following Kim *et al.* (2000). Utterances that were used to elicit an object label or person label from the child, e.g. *kore nani* (‘what is this?’), *ohana tte ittegoran* (‘can you say flower?’), and those providing an object or person label directly or indirectly, e.g. *kore wa kuruma* (‘this is a car’),

[1] In Japanese ‘formal nouns’ are labelled *keishikimeishi*. They do not have referential meanings. For example, *hoo* is formal noun in the following utterance, *tabeta hoo ga ii* (it is better to eat). This is similar to the nonreferential use of the English word *it* in *it is raining*.

otoosan iru ne ('here is daddy') were coded as naming-oriented. Utterances that were classified as activity-oriented may have included action verbs, but they also included the following: utterances attempting to elicit the label for an action, e.g. *boku nani shiyooto shiteru no kana* ('what is the boy going to do?'), encouraging the child to do something either explicitly or implicitly, e.g. *nottegoran* ('get on'), describing impending or completed action, e.g. *kuruma gareiji ni haitta ne* ('you put the car in the garage'), describing on-going action/activity, e.g. *kuruma ugoiteru ne* ('a car is moving'), attempting to elicit the action indirectly, e.g. *oningyoo-san gohan tabetai tte* ('a doll wants to eat'), asking wh-initial questions which describe the potential action/activity, e.g. *doko iku no* ('where do you go?'). Attention getting utterances, and those which were ambiguous as to whether they refer to action/activity or an object, were excluded from this analysis. Naming- or activity-oriented utterances per number of utterances in each context (percentage of naming- or activity-oriented utterances) were computed.

Reliability

Transcriptions were prepared by one person and were checked by a second person. All cases of disagreement were further discussed with a third person in order to reach agreement. One person coded types and morphological complexity for nouns and verbs, and these were checked by a second coder. When there was disagreement over categorization, the matter was further discussed until agreement was reached. For the pragmatic analyses, the transcripts of nine children were independently categorized by two coders. The inter-rater reliability for this measure was 90.4%.

Analyses

The ratio $n/(n+v)$, where n is the number of noun types and v is the number of verb types was calculated for both children and caregivers; it is symbolized here as $n_{\text{typ}}/(n+v)$. The parallel ratio based on noun and verb tokens was also computed for caregivers; it is symbolized $n_{\text{tok}}/(n+v)$. Most analyses reported below use these ratios, particularly the type ratios, as dependent variables. These $n_{\text{typ}}/(n+v)$ ratios are influenced by language sample size (Malvern, Richards, Chipere & Durán, 2004); however, unlike TYPE-TOKEN RATIOS (TTR), which are known to decrease monotonically toward zero with increasing sample size, a type-based ratio such as $n_{\text{typ}}/(n+v)$ has a more complex relationship to sample size, affected by the number of noun and verb tokens per utterance and by variation in word type frequency. The ratio converges to a nonzero limit as sample size increases (Malvern *et al.*, 2004). The fact that the $n_{\text{typ}}/(n+v)$ ratio varies

with sample size means that conclusions drawn from comparisons of these ratios across contexts and/or across language stages must be interpreted cautiously. However, as discussed below, many of the main findings of the present stage are unlikely to be due to this confounding with sample size, as they are in the opposite direction from that expected from sample size changes.

For morphological complexity in caregiver input, we computed the average number of different inflections per noun and verb. For the analysis of positional saliency in caregiver input, the verbs and nouns produced in single-word utterances and in the final positions of multi-word utterances were counted per total utterances. In the pragmatic measure of caregiver input, naming- and activity-oriented utterances were counted as a proportion of total utterances.

ANOVAs with repeated measures were used for the analysis of the $n_{\text{typ}}/(n+v)$ ratios for children and caregivers. Repeated measures multi-variate analyses of variance (MANOVAs) were used for the analysis of the effect of word types (nouns vs. verbs; a repeated measure independent variable), context (toy vs. book; a repeated measure independent variable), and language stage (single-word vs. presyntactic vs. syntactic; a between-subjects variable) on utterance position, morphological complexity, and pragmatic measures in caregiver language.

RESULTS

Children's language

Language stage. Table 1 summarizes the classification of children into the three language stages, and includes descriptive statistics for the major language measures of interest for each stage. The table also provides a cross-classification by age and language stage. The figures in Table 1 are based on the combined language samples from the two contexts. As the Table demonstrates, all measures for children differed significantly by language stage, and in most cases, follow-up tests confirmed significant differences between successive stages. The total number of caregiver utterances is also included in Table 1; this measure did not differ by child language stage.

Effect of context and language stage on noun and verb types. Table 2 summarizes the analyses of $n_{\text{typ}}/(n+v)$ ratios as a function of context, stage, and category definition for nouns. Children who did not produce any nouns or verbs in a specific context are not included. A score greater than 0.50 indicates that children produced more noun types than verb types. In the book context, all means were significantly greater than 0.50 for types for all counting methods. At the single-word stage all means were significantly more than 0.50 for types for all counting methods. Thus

TABLE 1. *Means (standard deviations) of overall measures for children and total utterances (standard deviation) for caregivers, by language stage of the children*

		Single word stage N = 10	Presyntactic stage N = 7	Syntactic stage N = 14	F	p values
Children	Age in months	17.4 (2.7)	20.1 ^a (2.3)	22.0 ^a (1.5)	19.60	***
	12 months	1	0	0		
	15 months	2	0	0		
	18 months	5	3	0		
	21 months	2	3	5		
	24 months	0	1	9		
	Morpheme MLU	1.131 (0.008)	1.240 (0.167)	1.723 ^a (0.265)	28.56	***
	Total types	14.2 (2.4)	33.8 ^a (12.3)	68.6 ^a (18.7)	45.40	***
	Total tokens	29.9 (6.7)	119.4 ^a (59.3)	181.4 (60.6)	27.08	***
	Total utterances	33.9 (8.3)	129.3 ^a (64.8)	149.3 (44.3)	22.35	***
	Common nouns	3.9 (1.4)	9.7 (6.0)	18.1 ^a (5.9)	24.69	***
	Proper nouns and kinship terms	0.7 (0.9)	3.4 (2.3)	7.1 ^a (2.8)	23.52	***
Caregivers	Verbs	0.50 (0.7)	4.71 ^a (2.5)	14.57 ^a (8.1)	19.16	***
	Total utterances	366.0 (89.6)	399.4 (72.1)	334.1 (79.1)	1.56	ns

^a means significantly different from the preceding number at $p < 0.05$ level.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, ns: not significant.

children produced more noun types than verb types at the single-word stage in both contexts, and in the book context at all stages. In the toy context the mean ratio based on the narrower definition of nouns, which excludes words referring to people and proper nouns, was significantly below 0.50 at the syntactical stage. That is, using the narrower definition of nouns, at the syntactical stage more verb types than noun types were produced in the toy context.

Repeated measures multivariate analyses of variance (MANOVAs) were used for the analysis of the effect of context and stage for the ratio $n_{\text{typ}}/(n+v)$ using the broader definition of nouns, which included people and proper nouns. As the figures in Table 2 suggest, the main effects of context ($F(1, 25) = 12.86$, $p < 0.001$), and stage ($F(2, 25) = 12.79$, $p < 0.001$) were all significant. There was not a significant interaction of context and stages. The ratio $n_{\text{typ}}/(n+v)$ was significantly higher in the book context than in the toy context. More noun types were produced in the book context than in the toy context. The ratio $n_{\text{typ}}/(n+v)$ fell significantly from the single-word stage to the presyntactic stage. The scores also fell from the presyntactic stage to the syntactic stage, but this difference was not significant.

TABLE 2. Mean (standard deviation) $n_{typ}/(n+v)$ ratio for types produced by children, by context and child language stage

Language stage:		Single word ($N=10$)	Presyntactic ($N=7$)	Syntactic ($N=14$)
Context	Counting Method	$n_{typ}/(n+v)$ ratio	$n_{typ}/(n+v)$ ratio	$n_{typ}/(n+v)$ ratio
Toy context	Noun in adult and baby form (not including people)/Verb	0.881** ¹ (0.209)	0.534 (0.277)	0.384** (0.117)
	Noun in adult and baby form (including people)/Verb	0.896*** (0.198)	0.692* (0.163)	0.557 (0.102)
Book context	Noun in adult and baby form (not including people)/Verb	0.943*** (0.151)	0.751* (0.207)	0.739*** (0.154)
	Noun in adult and baby form (including people)/Verb	0.950*** (0.141)	0.808** (0.156)	0.768*** (0.142)

¹ A score greater than 0.50 indicates that children produced more nouns than verbs; a score less than 0.50 indicates that children produced more verbs than nouns. The $n_{typ}/(n+v)$ ratio is significantly different from 0.50.
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

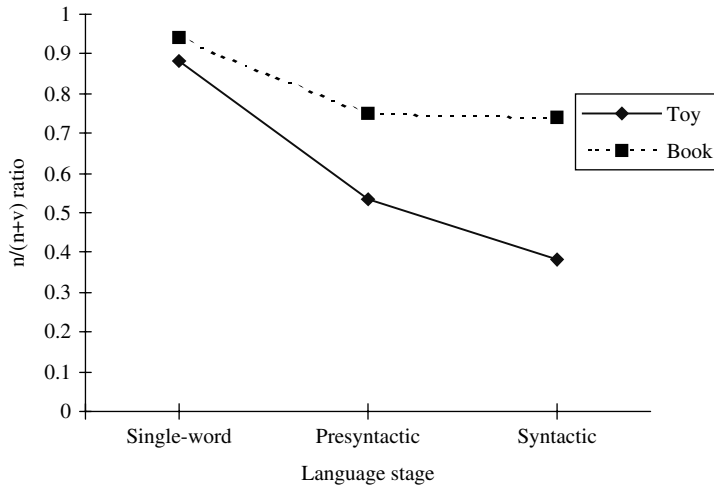


Fig. 1. Children's $n_{\text{typ}}/(n+v)$ ratios (words for people excluded) by context and language stage.

Figure 1 illustrates the same comparisons utilizing the narrower definition of nouns, which excludes words referring to people and proper nouns. Repeated measures multivariate analysis of variance (MANOVAs) was again used for the analysis of the effect of context and stage. The main effects of context ($F(1, 24) = 19.34$, $p < 0.001$) and stage ($F(2, 24) = 16.74$, $p < 0.001$) were both significant. The interaction of context and language stage was also significant ($F(2, 24) = 3.73$, $p < 0.05$). At the syntactical stage the ratio $n_{\text{typ}}/(n+v)$ was significantly higher in the book context than in the toy context ($t(13) = 7.28$, $p < 0.001$). There were no significant differences for this ratio between the toy context and the book context at the single-word stage or the presyntactic stage.

Table 3 shows a categorical analysis which is based on classifying each child as noun dominant or verb dominant based on whether there are more noun types or more verb types. Dominance was classified when the absolute number of noun and verb types differed by at least 1. For completeness, the table also shows the number of children for whom there was not a difference of this size and the number of children who did not produce any nouns or verbs in a specific context. There are significant differences for the frequencies of noun dominance, verb dominance and balanced children with the narrower definition in both contexts. In the book context, there is a very clear and uniform pattern of noun dominance. With the narrower definition of nouns, all children except for three in the presyntactic stage and one in the syntactic stage demonstrated this dominance, and none

TABLE 3. *Numbers of children who demonstrate different patterns of dominance, by context and language stage*

Language stage:		Single word (N=10)				Presyntactic (N=7)				Syntactic (N=14)				χ^2	p
Context	Noun category	n dominant	v dominant	N=v	n=v=0	n dominant	v dominant	n=v	n=v=0	n dominant	v dominant	n=v	n=v=0		
Toy context	Noun in adult and baby form, not including people	6	0	1	3	4	1	1	1	2	12	0	0	17.10	**
	Noun in adult and baby form, including people	7	0	1	2	5	1	0	1	7	3	4	0	5.09	ns
Book context	Noun in adult and baby form, not including people	10	0	0	0	4	0	3	0	13	0	1	0	7.48	*
	Noun in adult and baby form, including people	10	0	0	0	6	0	1	0	14	0	0	0	3.53	ns

Dominance means difference between noun types and verb types of at least 1; n=v means a difference of 0.

** $p < 0.01$, * $p < 0.05$, and ns means not significant for Chi-square test.

TABLE 4. *Mean (standard deviation) $n/(n+v)$ ratios for types and for tokens of caregivers, by context and language stage of their children*

	Language stage	Single word stage	Presyntactic stage	Syntactic stage
Toy context	Tokens	0.433* (0.007)	0.402*** (0.002)	0.419** (0.006)
	Types	0.451* (0.006)	0.420 (0.009)	0.438*** (0.004)
Book context	Tokens	0.634*** (0.006)	0.609 (0.130)	0.545 (0.125)
	Types	0.667*** (0.006)	0.644* (0.153)	0.593* (0.117)

Nouns including words referring to people and proper nouns.

A score greater than 0.50 indicates that the caregiver produced more nouns than verbs; a score less than 0.50 indicates that mother produced more verbs than nouns.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$ for the comparison of the nouns/(nouns + verbs) ratio with 0.50.

demonstrated verb dominance. The results are more complex for the toy context. With the broader definition of nouns, including kinship terms and proper names, there are more children with noun dominance than verb dominance. But with the narrower definition of nouns, at the syntactic stage there are more children with verb dominance than noun dominance. The results for both measures are consistent in suggesting a trend away from noun dominance with increasing language stage.

Caregivers' language

For the analysis of caregiver input we utilized the broader definition of nouns, including kinship terms and proper nouns, as it establishes a more stringent criterion for verb dominance. Following Tardif *et al.* (1997), we examined both types and tokens, as children might plausibly be sensitive to either one.

Effect of context and language stage on noun and verb types and tokens. Table 4 summarizes the noun-verb comparison as a function of context and language stage. On the whole, the results are similar for the type and token measures. Verbs were generally dominant in the toy context and nouns were generally dominant in the book context, but less so at the syntactic stage. Repeated measures multivariate analyses of variance (MANOVAs) were used for the analysis of the effect of context and stage using the broader definition of nouns, which included people and proper nouns. For the token ratio $n_{\text{tok}}/(n+v)$ the main effect of context ($F(1, 28) = 65.67$, $p < 0.001$) was significant but not the main effect of stage ($F(2, 28) = 1.63$, ns). There was no significant interaction of context and stage. The token ratio $n_{\text{tok}}/(n+v)$ was significantly higher in the book context than in the toy context.

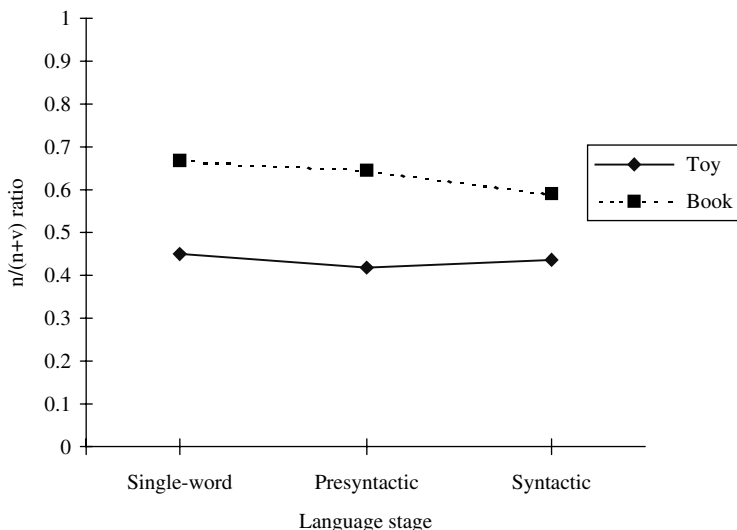


Fig. 2. Caregiver's $n_{\text{typ}}/(n+v)$ ratios (words for people included) by context and language stage of their children.

Figure 2 shows the result of analysis of the type ratio $n_{\text{typ}}/(n+v)$ for caregivers. Statistical analyses showed the same pattern as summarized above for tokens: a significant main effect of context and no significant differences for stage or for the interaction of context and stage.

Table 5 shows a classification of individual caregivers as noun dominant, verb dominant or balanced in each context, utilizing the same criterion as for children, i.e., a difference in types of at least 1. There are no significant differences for the frequencies of dominance by stage in types and tokens in each context. Note especially the strong tendency for noun dominance in the book context, 10 out of 10 caregivers with children at the single-word stage, for both types and tokens. In the toy context verb dominance was found for the tokens of 28 children and for the types of 25 children within 31 children.

Noun and verb use in single-word utterances. Figure 3 summarizes the use of nouns and verbs in single-word utterances. Repeated measures multivariate analyses of variance (MANOVAs) were used for the analysis of the effect of word class, context, and stage in the single-word utterances of caregivers. The main effects of context ($F(1,28)=10.12$, $p<0.01$) and word class ($F(1,28)=13.93$, $p<0.001$) were significant, as well as an interaction for word class and context ($F(1,28)=105.46$, $p<0.001$). As illustrated in Figure 3, in the toy context verbs were more frequent than nouns ($t(30)=2.32$, $p<0.05$), while in the book context nouns were significantly

TABLE 5. *Number of caregivers who demonstrate different patterns of dominance, by context and language stage of their children*

Language stage:		Single word ($N=10$)			Presyntactic ($N=7$)			Syntactic ($N=14$)			χ^2	p
Context		n dominant	v dominant	n=v	n dominant	v dominant	n=v	n dominant	v dominant	n=v		
Toy context	Tokens	2	8	0	0	7	0	1	13	0	2.07	ns
	Types	1	8	1	2	5	0	2	12	0	3.15	ns
Book context	Tokens	10	0	0	6	1	0	8	5	1	6.64	ns
	Types	10	0	0	5	2	0	10	3	1	4.43	ns

Dominance means difference between noun types and verb types of at least 1; n=v means a difference of 0.

Nouns including words referring to people and proper nouns.

ns means not significant for Chi-square test.

USE OF NOUNS AND VERBS IN JAPANESE

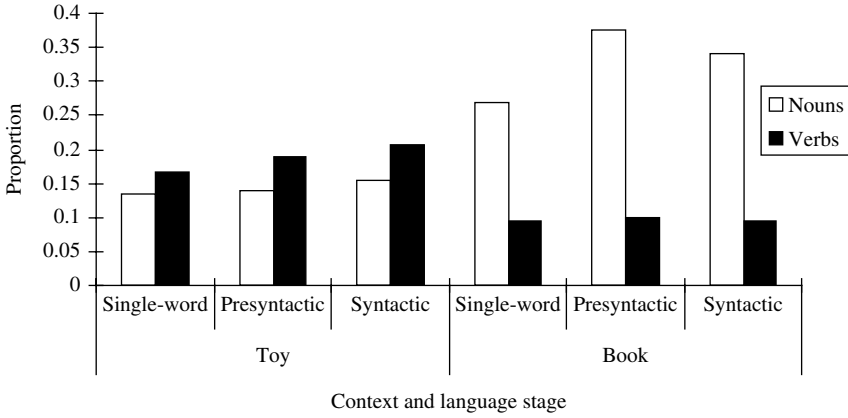


Fig. 3. Proportion of single-word caregiver utterances which are nouns or verbs, by context and language stage of their children.

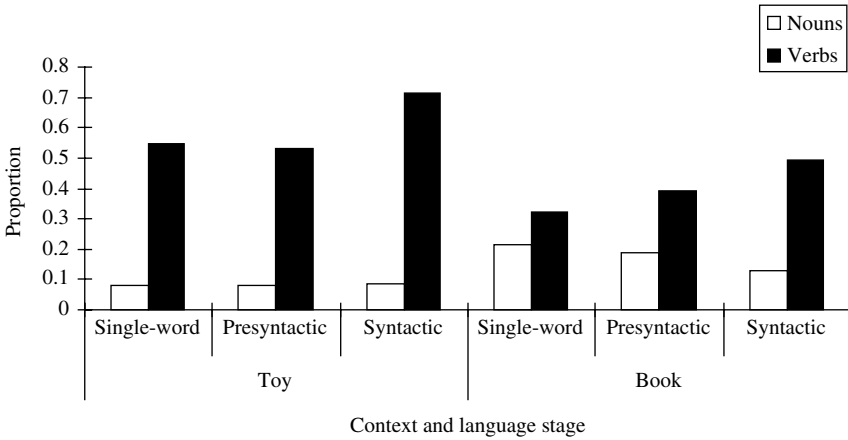


Fig. 4. Proportion of multiword caregiver utterances with nouns or verbs in final position, by context and language stage of their children.

more frequent ($t(30) = 7.02, p < 0.001$). There were no significant differences among stages.

Noun and verb use in final position of multi-word utterances. Figure 4 summarizes the use of nouns and verbs in final position of multi-word utterances. Repeated measures multivariate analyses of variance (MANOVAs) were used for the analysis of the effect of word class, context, and stage in

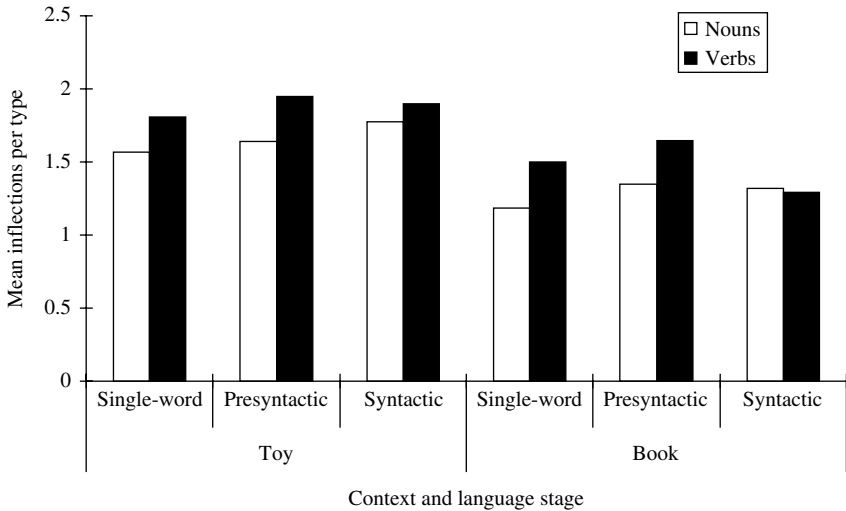


Fig. 5. Morphological complexity of nouns and verbs in caregiver utterances, by context and language stage of their children.

the final words of multi-word utterances. Significant main effects were found for word class ($F(1, 28) = 314.85$, $p < 0.001$), stage ($F(2, 28) = 10.34$, $p < 0.001$), and for context ($F(1, 28) = 10.24$, $p < 0.01$). Verbs were substantially more frequent than nouns in final position in both contexts and at all stages. Significant interactions were found for word class $\times$ context ($F(1, 28) = 61.85$, $p < 0.001$) and stage $\times$ word class ($F(2, 28) = 11.82$, $p < 0.001$). The difference of nouns and verbs was bigger in the toy context than in the book context. Verbs in utterance-final position for caregivers increased between children in the pre-syntactic stage and those in the syntactic stage, but nouns were not different by language stage. Interestingly, the positional cues of use in single-word utterances and use in final position of multi-word utterances diverge in the book context: nouns are highlighted in the former, but verbs in the latter.

Morphological complexity. Figure 5 summarizes the morphological complexity measure (mean inflections per type) of nouns and verbs in relation to context and language stage. Repeated measures multivariate analyses of variance (MANOVAs) were used for the analysis of the effect of word class, context, and stage on this measure. There were significant main effects of word class ($F(1, 28) = 23.64$, $p < 0.001$) and context ($F(1, 28) = 52.56$, $p < 0.001$), but not for language stage. Verbs were more varied morphologically than nouns, and morphological complexity was higher in the toy context than in the book context. There was also a significant interaction of word class and stage ($F(2, 28) = 4.13$, $p < 0.005$).

USE OF NOUNS AND VERBS IN JAPANESE

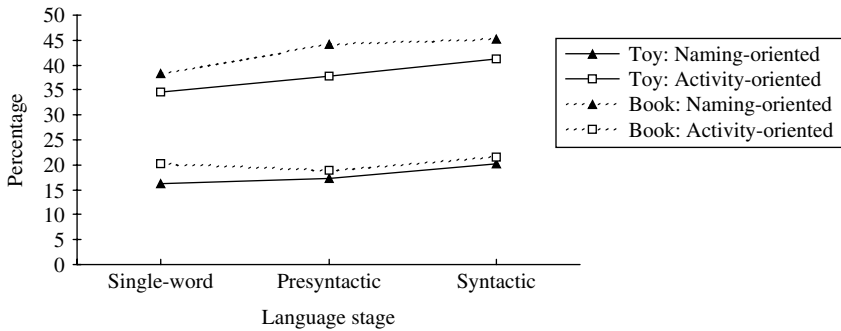


Fig. 6. Percentage of caregiver utterances which are naming- or activity-oriented, by context and language stage of their children.

At the single-word and presyntactic stages, verbs were more varied morphologically than nouns ($t(9)=3.32$, $p<0.01$, and $t(6)=3.77$, $p<0.01$, for the two stages, respectively), but at the syntactic stage verbs and nouns were not significantly different.

Pragmatic function. Figure 6 summarizes the production of naming-oriented and activity-oriented utterances as a function of context and language stage. Repeated measures multivariate analyses of variance (MANOVAs) were used for the analysis of pragmatic types, context, and language stage. There were significant main effects of context ($F(1, 28)=10.25$, $p<0.001$) and of stage ($F(2, 28)=4.11$, $p<0.05$). There were more utterances (naming and activity combined) in the book context than in the toy context, and there was an increasing number of utterances with language stage. More strikingly, there was an interaction of pragmatic type with context ($F(1, 28)=155.4$, $p<0.001$). In the toy context, activity-oriented utterances were more common ($t(30)=10.51$, $p<0.001$), while in the book context there were more name-oriented utterances ($t(30)=6.68$, $p<0.001$).

DISCUSSION

Table 6 provides a summary of the main results concerning noun vs. verb dominance in the speech of children and their caregivers as a function of context and the child's language stage.

Effect of context

For both children and their caregivers, context was a powerful influence on the balance of nouns and verbs. The effect of context was generally

TABLE 6. *Summary of results on the balance of nouns (n) and verbs (v) in the speech of Japanese children and their caregivers*

Measures	Toy context			Book context		
	Single word stage	Presyntactic stage	Syntactic stage	Single word stage	Presyntactic stage	Syntactic stage
Children's word types (people excluded from nouns)	n > v	n = v	v > n	n > v	n > v	n > v
Children's word types (people included as nouns)	n > v	n = v	n = v	n > v	n > v	n > v
Caregivers' word types (people included as nouns)	v > n	v = n	v > n	n > v	n > v	n > v
Caregivers' word tokens (people included as nouns)	v > n	v > n	v > n	n > v	n = v	n = v
Specific cues						
Caregiver saliency (single word)	v > n	v > n	v > n	n > v	n > v	n > v
Caregiver saliency (final word)	v > n	v > n	v > n	v > n	v > n	v > n
Caregiver morphological complexity	v > n	v > n	v = n	v > n	v > n	v = n
Caregiver naming vs. activity orientation	v > n	v > n	v > n	n > v	n > v	n > v

n > v and v > n represent a significant difference between the values for nouns and verbs.

The symbol '=' represents a nonsignificant difference; n = v denotes nonsignificantly more nouns than verbs, and v = n denotes nonsignificantly more verbs than nouns.

the largest effect observed in this study, exceeding the effect of language stage, the definition of noun, or the difference between mothers and children. In the book context of the present study, we used two wordless item-focused books and one wordless story book. It is possible that these books may have contributed to a noun bias in the book context, but Choi (2000) found a noun bias even when using books which gave children a choice of focusing on objects or actions depicted. The production of a higher proportion of noun types in the book context than in the toy context by both children and caregivers appears to be a very widespread phenomenon, occurring even in languages which are claimed to be verb biased (Gelman & Tardif, 1998). Whether this is due to the greater picturability of objects than actions, or to the explicit use of bookreading as a teaching context, is not yet known definitively. With respect to the guiding issue of the present research, the existence and determinants of noun dominance in young children's language, there is an even more important question. Which of the two contexts, toy or book, is more representative of, or at least closer to, the majority of input which children receive? The book-reading context generally biases mothers to be in a 'tutorial situation' as Choi (2000) pointed out. Random sampling of linguistic input along the lines of the Bristol study (Wells, 1985) would be necessary to determine this, but it seems most likely the toy context is a closer approximation than the book-reading context.

Changes with language stage

Although the composition of vocabulary is known to change substantially with development (Bates *et al.*, 1994), the present study is the first to systematically relate the use of nouns and verbs in spontaneous speech by caregivers and children to the child's language stage. There are systematic and substantial changes with development. Children at the single-word stage showed noun dominance in their productions in both contexts, regardless of the definition of noun that was used. This noun dominance remained at the presyntactic and syntactic stages in the book context. In contrast, there was a shift away from noun dominance in the toy context; at the presyntactic stage there was not a significant difference, and by the syntactic stage verbs were dominant if names for people and proper nouns were excluded from the noun category. Thus if we adopt the definition of common noun proposed by Tardif *et al.* (1999), Japanese children are verb dominant in the toy context by the syntactic stage. The shift of dominance might be explained by the need for verbs in combinatorial sentences, but it did not happen in the book context. At the syntactic stage children produced not only single verbs but also word combinations with verb (e.g. *okaasn ga akeru* ('Mother opens'), *oniichan ga kaettekita*

(‘brother came back’), *akachan nemutteru* (‘baby is sleeping’). In any case, these results from Japanese are consistent with Gentner’s (1982) proposal that early noun dominance is universal, reflecting underlying perceptual and cognitive processes that predispose the child to learn nouns.

The use of $n/(n+v)$ ratios

As noted earlier, type–type ratios such as $n_{\text{typ}}/(n+v)$ are influenced by sample size, and therefore changes in the ratio might be partially or entirely artifactual if sample sizes are unequal. As Malvern *et al.* (2004) note, it is not sufficient to set a constant total number of word tokens, because it is the number of noun tokens and number of verb tokens that are relevant. They have developed an adaptation of the VOCD program which may provide a more accurate estimate of noun–verb balance. This adaptation requires the use of the MOR program to produce a grammatically tagged tier which can be utilized by VOCD. A Japanese adaptation of MOR has only recently become available, and requires a somewhat different transcription format than the one that was used in this study. Conversion of the format of all transcriptions was not practical, nor was hand-coding of such a large body of transcripts. The analysis of type–type ratios by Malvern *et al.* (2004; cf. Figures 8.4 and 8.5), however, implies that with noun dominance, $n_{\text{typ}}/(n+v)$ will steadily increase with sample size. Comparison of the main findings of the present study with the sample size information available in Table 1 suggests that sample size is not responsible. The proportion of noun types decreases with development (Table 2), even though the more developed children produce larger language samples. Caregivers provided much larger language samples than children, but their proportion of nouns is similar or less than that of their children (Table 4). The bookreading episode was shorter, but gave higher proportion of noun types (Table 2). Thus we have reasonable confidence in the pattern of results, though the effect sizes may have been influenced by language sample size.

Properties of input language and their relation to child language characteristics

An alternative to Gentner’s hypothesis is that properties of caregiver language predispose children to learning nouns in most cases, and that those crosslinguistic differences that do emerge also reflect caregiver language effects (Goldfield, 1993; Choi & Gopnik, 1995; Tardif *et al.*, 1997; Choi, 2000; Kim *et al.*, 2000; Camaioni & Longobardi, 2001). Both structural properties of the input language, i.e. the pro-drop parameter, positional preferences, and morphological simplicity or transparency, and

interactional styles, i.e. a focus on object naming vs. activity specification, may affect the balance of nouns and verbs in children's language. The increased saliency of words used as single-word utterances, and words occurring in final position, has been hypothesized to facilitate their acquisition. With respect to morphological properties, theories are less consistent. Goldfield (1993) proposed that simpler morphology enhances acquisition of word stems. In contrast, Kim *et al.* (2000) hypothesized that children learning highly inflected language take advantage of inflectional bootstrapping at an earlier age than those who learn weakly inflected languages. It is also possible that the regularity of the inflectional system influences acquisition. Finally, pragmatic factors, such as the extent to which caregivers emphasize that nouns can be mapped onto objects, may also affect development.

Contrary to these hypotheses, on the whole in the present results there is a notable contrast between the caregiver language and the children's language. Caregiver speech in general included more types and tokens for verbs than for nouns in the toy context, and either more nouns or no difference in the book context. In contrast, children in the single-word stage produced more nouns than verbs in the toy context, and in the book context they demonstrated an even larger noun dominance. Examination of specific properties of the input language makes this contrast even stronger. In the toy context, verbs were more likely than nouns to occur as single-word utterances, or as final words in sentences. There were also more activity-oriented utterances than naming-oriented ones. All of these differences would be expected to facilitate the acquisition of verbs, yet the children at the earliest stage were clearly noun-dominant. Verbs were also more complex morphologically than nouns. In the book context, the pattern of results for caregiver language was more mixed. Nouns did receive more prominence with respect to occurrence as single-word utterances, and with respect to an emphasis on naming-oriented utterances. But verbs were more prominent with respect to occurrence in final position, and with greater morphological complexity. Children's language, however, demonstrated a very consistent noun dominance.

Thus caregiver input and child's speech did not correspond closely at the single-word stage. As children develop grammar, the proportion of verbs increased. Caregiver input did not show significant changes across children's language stage with respect to most of the measures, including $n_{\text{typ}}/(n+v)$, $n_{\text{tok}}/(n+v)$, and nouns and verbs in caregiver's single-word utterances. In the syntactic stage, there were more verbs in multiword utterances and equal morphological complexity for nouns and verbs of caregivers. It is, of course, quite possible that other characteristics of input language change in ways associated with children's development, and further exploration of other characteristics is needed.

Comparison of results from Japanese with other languages

Studies of noun vs. verb dominance in European languages (Dromi, 1987; Jackson-Maldonado *et al.*, 1993; Caselli *et al.*, 1995) have generally obtained results that are highly similar to those from English. As discussed earlier, studies of Mandarin and Korean speaking children have offered the greatest contrast. Tardif (1996) emphasized the verb dominance of Mandarin speaking children in naturalistic speech, regardless of the definition of noun. Tardif *et al.* (1997) stressed that multiple characteristics of caregiver input conspired to produce verb dominance, resulting in a pattern of noun and verb use that is quite different from English. The children in Tardif's study (1996) had a mean age of 1;9.24, and their reported productive vocabulary was 73.7. No MLU values were reported in that paper. In Tardif *et al.* (1997), the age of the subjects was the same, and a mean MLU of 1.82 was reported. It is likely that the Mandarin speaking children in Tardif (1996) were at the syntactic stage. In our study, Japanese children at the syntactic stage also demonstrated verb dominance, and thus the two sets of results are fairly consistent. Thus, observational studies controlling contexts showed very similar results for both children and caregivers of Japanese and Mandarin. The $n_{\text{typ}}/(n+v)$ ratio for Mandarin-speaking children (mean age 1;8.5; mean parent-reported vocabulary size of 316) in Tardif *et al.* (1999) was 0.42 in the toy context and 0.73 in the book context. The Japanese children at the syntactic stage (mean age 1;10.9, JCDI vocabulary size=301) are the most closely matched to Tardif's Mandarin group, and their $n_{\text{typ}}/(n+v)$ ratio was 0.384 in the toy context and 0.739 in the book context. The $n_{\text{typ}}/(n+v)$ ratio for Mandarin caregivers was 0.30 in the toy context and 0.55 in the book context. The same ratio for Japanese caregivers was 0.33 in the toy context and 0.55 in the book context. In the book context the $n_{\text{typ}}/(n+v)$ ratios for children and caregivers were virtually identical for Japanese (0.74 for children and 0.55 for caregivers) and Mandarin (0.73 for children and 0.55 for caregivers). In the toy context caregivers' $n_{\text{typ}}/(n+v)$ ratios were also similar (0.33 for Japanese caregivers and 0.30 for Mandarin caregivers) and showed verb dominance. For children, the $n_{\text{typ}}/(n+v)$ ratio of 0.42 in Mandarin was slightly higher than that (0.38) for Japanese. Japanese children were more verb dominant than English-speaking children. Japanese children and caregivers at the syntactic stage demonstrated remarkably similar results to those of Mandarin speakers. Like Mandarin-speaking children, Japanese children and caregivers at the syntactic stage were more verb dominant than English-speaking children and caregivers.

Choi & Gopnik (1995) reported that, whereas English speaking children at the 50 word mark (mean age 1;6.22) produced more nouns than verbs, Korean children (mean age 1;7.24) produced equal proportions of nouns

and verbs, based on a questionnaire plus an interview and spontaneous language. Kim *et al.* (2000) reported that both Korean-learning and English-learning children acquired significantly more nouns than verbs at the 50-word mark, but Korean-learning children learned significantly more verbs than English-learning children, according to caregiver's diaries and checklists. Based on the values reported in Table 2a (p. 237) of Kim *et al.*, the mean $n_{\text{typ}}/(n+v)$ ratio for Korean children (mean age 1;8.8) was 0.644, and for English-learning children (mean age 1;8.20), 0.917. These values are based on the inclusion of kinship terms and proper nouns in the noun category. The corresponding value for the Japanese children in the present study was 0.712 for overall context at the presyntactic stage (mean age 1;8.1 months, MLU = 1.204). Thus Japanese children appear to be slightly more noun dominant than Korean children, but less so than English-learning children.

Based on these ratios, it seems likely that Korean, Mandarin, and Japanese-speaking children all produce a lower proportion of nouns than English-speaking children. As vocabulary and other aspects of language grow, the proportion of verbs increases more rapidly in the Japanese children. The Japanese children at the single-word stage showed a substantial noun dominance, but by the syntactic stage they showed verb dominance in the toy context, similar to the Mandarin-speaking children in Tardif (1996) who may have been in the syntactic stage, and who also showed verb dominance.

It is possible that there is a difference at the earliest stages, however. Tardif *et al.* (1999) asserted that the majority (15 children of 24 children) of their Mandarin-speaking children were reported to have produced one or more verbs among their first words, whereas only one English-speaking child was reported to have produced verbs or verb phrases at this stage. In Mandarin, neither verbs nor nouns are inflected, and therefore children can access verbs more easily according to the hypothesis of Tardif *et al.* (1997) that simpler morphological variation leads to higher accessibility. Japanese verbal nouns in baby form (*nenne* for *neru* 'sleep' and *dakko* for *daku* 'hold'), whose meanings are actions and which are not inflected, can be acquired more easily than verbs with conventional form. Greater morphological complexity in Japanese did not enhance verb acquisition at the single-word stage. But at the syntactical stage Japanese children appear to take advantage of inflectional bootstrapping for verbs. Thus, at the beginning of word acquisition simpler morphology may enhance acquisition of words as Goldfield (1993) and Tardif *et al.* (1997) suggested, but once grammar emerges children learning highly inflected language take advantage of inflectional bootstrapping. Tardif *et al.* (1997) reported that Mandarin-speaking caregivers provide verbs more frequently than English- and Italian-speaking caregivers, and they tend to place verbs at

the ends of utterances, whereas English- and Italian-speaking caregivers do not. Although the results within the present sample of Japanese-speaking caregivers and children are not consistent with such an effect of input, it is possible that, as Gelman & Tardif (1998) suggest, such language-specific properties in the input may affect development.

CONCLUSIONS

The results of the present study, and our analysis of apparent discrepancies among other studies, lead us to the following conclusions. At the beginning of lexical development, all children, regardless of their linguistic community, have a conceptual predisposition to learn nouns easily, probably because objects form coherent perceptual entities which allow a transparent semantic mapping of the object referent terms to the perceptual world. As children increase their vocabulary and develop grammar, the proportion of verbs increases substantially. Language-specific factors in caregiver input come into effect primarily at this time, as children begin to acquire grammar; thus, variation across languages will increase at that stage. Context also plays a substantial role. Joint bookreading provides children an unparalleled opportunity to learn many kinds of words, but especially nouns.

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