

## Child Language Development: The Differences between Japanese and English

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### Abstract

In early language development, it is known that Japanese-speaking children acquire words in a more gradual manner and have smaller productive vocabulary sizes compared with English-speaking children. On the other hand, Japanese-speaking children have an ability to learn new words correctly from earlier stages of lexical development than English-speaking children. Why do Japanese-speaking children have smaller productive vocabulary sizes despite this ability to learn words correctly? To explore this riddle, we compared parental input between Japanese and English and examined the relationship between parental input and child vocabulary development.

*Keywords: language acquisition, parental input, cross-linguistic study*

### 1. Introduction

Children begin to produce their first words around one year of age, and their productive vocabulary increases rapidly from about 18–20 months on. Just how children acquire words is a major topic of study in the fields of psychology, linguistics, cognitive science, and education as well as a question of great concern to child rearers.

At NTT Communication Science Laboratories, we have been studying how children learn a language from a human science perspective in relation to information engineering. A key project in this research aims to clarify what types of words children can speak and when they begin speaking them [1]. In this project, we succeeded in creating a child vocabulary development database by having about 1300 mothers fill in a checklist on what words their children could comprehend and produce. On the basis of the checklist data, we estimated the age for children to comprehend/produce each of about 2700 words. In particular, on closely examining the data for words of infant-directed speech (IDS) such as onomatopoeic words

(e.g., *bow-wow* for a dog and *vroom* for a car), it was found that children could speak IDS words quite early compared with words of adult-directed speech (ADS).

We also proposed a picture book search system using the child vocabulary development database to facilitate the retrieval of picture books that match the child's interests and developmental stage [2]. It is well-known that reading picture books to children promotes their vocabulary development [3]. Finding just the appropriate picture book for a child should have the effect of both expanding vocabulary and fostering emotional development.

We have recently come to focus on cross-linguistic studies exploring differences in language development between Japanese and English. The goal of cross-linguistic studies is to elucidate the mechanism that drives vocabulary learning in children by clarifying what is common and different to both languages. In the following, we introduce our latest findings in these Japanese-English cross-linguistic studies.

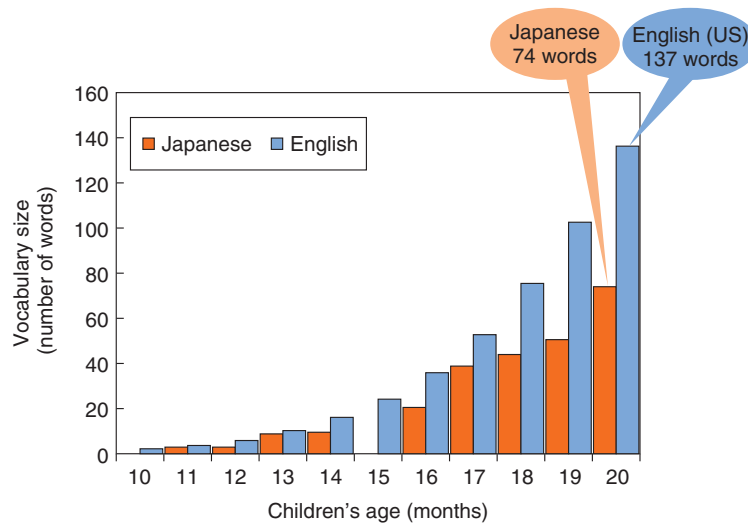


Fig. 1. Children's productive vocabulary size.

## 2. Comparison of productive vocabulary between Japanese and English

With regard to differences in language development between Japanese and English, it has been known that Japanese-speaking children have smaller productive vocabulary sizes than English-speaking children [4]. This tendency was reported in previous research using a vocabulary checklist method in which parents are asked about words that their children can produce. However, the previous cross-linguistic finding on vocabulary development was based on a very small sample, so we resurveyed the vocabulary development by collecting a large sample using an internationally standardized vocabulary checklist called the MacArthur-Bates Communicative Developmental Inventories (CDI) [5, 6].

For Japanese-speaking children, we extracted data for about 1700 children and estimated the number of productive words at the age of 10 to 20 months. For English-speaking children, we used data for about 1800 mother-child pairs obtained from the publically released United States version of the CDI and investigated the number of productive words for the same months. The results of children's vocabulary size are shown in **Fig. 1**. It can be seen that Japanese-speaking children acquired words in a more gradual manner than English-speaking children. At 20 months, Japanese-speaking children were able to produce 74 words on average, while English-speaking children were able to produce 137 words on average, or nearly

twice as many. These results show that Japanese-speaking children have a smaller productive vocabulary than English-speaking children in the early lexical development of one-to-two-year-olds.

## 3. Comparison of word learning between Japanese and English

Can the finding that Japanese-speaking children have a smaller productive vocabulary than English-speaking children be attributed to the differences in their ability to learn new words? To answer this question, we investigated Japanese- and English-speaking 20-month-old children's ability to learn new words by conducting an experiment based on the habituation method that used a child's looking time as an index [7]. Specifically, we investigated whether a child accurately associated a novel verb (i.e., an unfamiliar verb) with an action and not an object. In the learning phase, we presented the child with a movie clip of a rabbit performing action A on object A (knocking down a blue object) together with speech containing a novel verb (it is *seta*-ing a toy) and a movie clip of a rabbit performing action B on object B (jumping on a red object) together with speech containing a novel verb (it is *moke*-ing a toy), as shown in **Fig. 2(a)**.

At first, the child looks at the two movie clips. In a while, however, the child becomes habituated to the repeated movies, and their looking times tend to decline upon repeated presentations. This was the

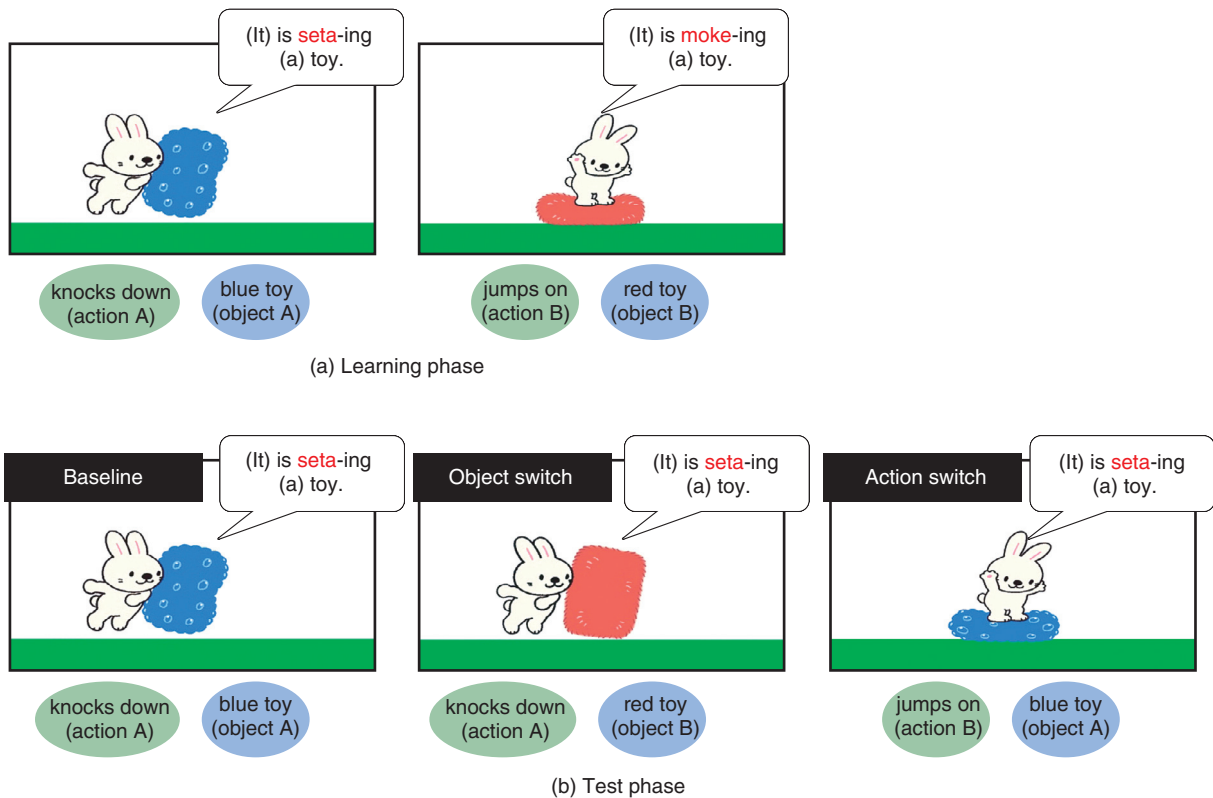


Fig. 2. Word learning experiment.

beginning of the test phase. Here, we presented the child with a movie clip showing the same combination of action and object as in the learning phase (a rabbit performing action A (*seta-ing*) on object A) as a baseline trial plus movie clips switching those action/object combinations: a rabbit performing action A (*seta-ing*) on object B (object-switch trial) and a rabbit performing action B (*seta-ing*) on object A (action-switch trial) (Fig. 2(b)).

Now, if the child has correctly associated the verb presented in the learning phase (*seta-ing*) with action A, it can be predicted that the child will notice a change in the word-action combination in the action-switch trial and that the child’s degree of attention toward the movie clip will increase, resulting in a rise in looking time (dishabituation). Additionally, if the child has mistakenly associated the verb presented in the learning phase (*seta-ing*) with object A, it can be predicted that looking time will likewise rise in the object-switch trial since the word-object combination has changed. Thus, this method can be used to experimentally judge whether a child has associated a novel verb with an action or object.

The results of this word-learning experiment showed that Japanese-speaking children increased their looking time only in the action-switch trial, indicating that they can correctly associate verbs only with actions (Fig. 3). In contrast, English-speaking children exhibited a rise in looking time in both the action-switch and object-switch trial, indicating that they associate verbs with both actions and objects. These results provide strong evidence that Japanese-speaking children have a greater ability to correctly associate words with their referents than English-speaking children at 20 months of age. It is therefore unlikely that the reason why Japanese-speaking children have a smaller productive vocabulary than English-speaking children is that their ability to learn new words is not sufficiently developed.

#### 4. Comparison of parental input between Japanese and English

Despite the fact that Japanese-speaking children develop an ability to learn words more correctly than English-speaking children, why do Japanese-speaking

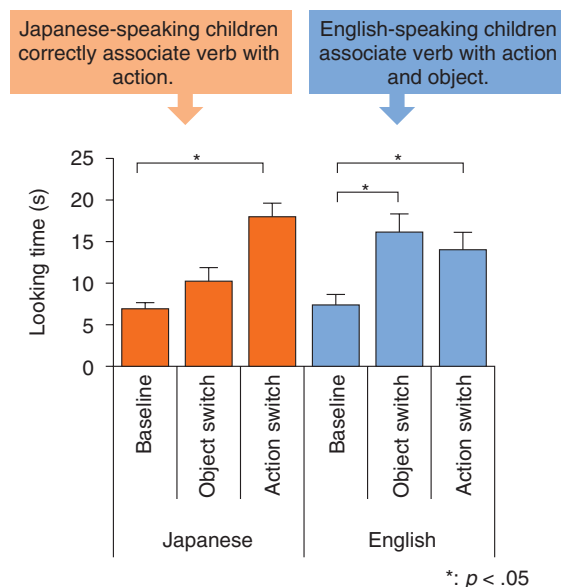


Fig. 3. Results of word learning experiment.

children have a smaller productive vocabulary? It is known that a variety of factors can affect vocabulary development such as the child's social competence (joint attention etc.) [8] and the environment in which the child is raised (family conditions etc.) [9]. Of these, we focus here on parental speech to children. This is because children are thought to gradually acquire words through repeated language input from their parents and because differences in that parental input may have an influence on the vocabulary development of Japanese-speaking and English-speaking children.

With this in mind, we conducted an experiment on parental input in Japan and Canada targeting mothers having Japanese- and English-speaking 20-month-old children, respectively [10]. In the experiment, each mother sat her child on her lap in a laboratory and described to the child scenes from 15 movie clips (a dog eating, a pig tumbling, etc.) shown on a monitor (Fig. 4). On completing this experiment, we prepared and analyzed the full transcript of what the mothers said.

The results showed that Japanese-speaking and English-speaking mothers differed significantly in their use of IDS words. Such words generally refer to onomatopoeic words and repetitive vocal sounds, which constitute a special type of vocabulary that adults use with younger children. In particular, the Japanese-speaking mothers frequently used IDS

words, which occupied 26% of their input on average. In contrast, only 8% of the English-speaking mothers' utterances contained IDS words. In addition, the Japanese-speaking mothers would tend to mix both IDS words and ADS words for a referent in a movie clip, such as "It's a dog. It's a bow-wow! Mr. Doggie is eating some food. Munch-munch!" In this example, Japanese mothers used "dog," "Mr. Doggie," and "bow-wow" to teach her child about the referent "dog," and "eating" and "munch-munch" to teach about the referent "to eat." As a result, they switched labels when referring to the same referent, and their input ranked low in consistency.

In contrast, the English-speaking mothers would tend to use a single word for a referent in a movie clip, such as "Dog! It's eating. The dog is eating." In other words, English-speaking mother's utterances were more consistent rather than using multiple labels. This analysis of parental input revealed that the Japanese-speaking mothers tend to use multiple labels consisting of both IDS and ADS words and that their input is low in consistency compared with English-speaking mothers.

On the basis of the results presented above, we consider that the low-consistency input style of Japanese mothers has an effect on word acquisition in their children and slows down vocabulary development. A conceptual diagram of the relationship between parental input and child's word acquisition is shown

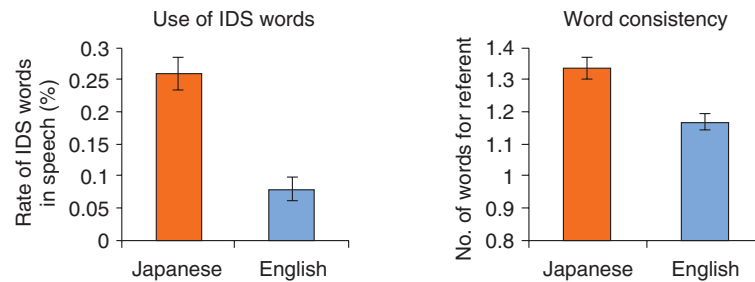
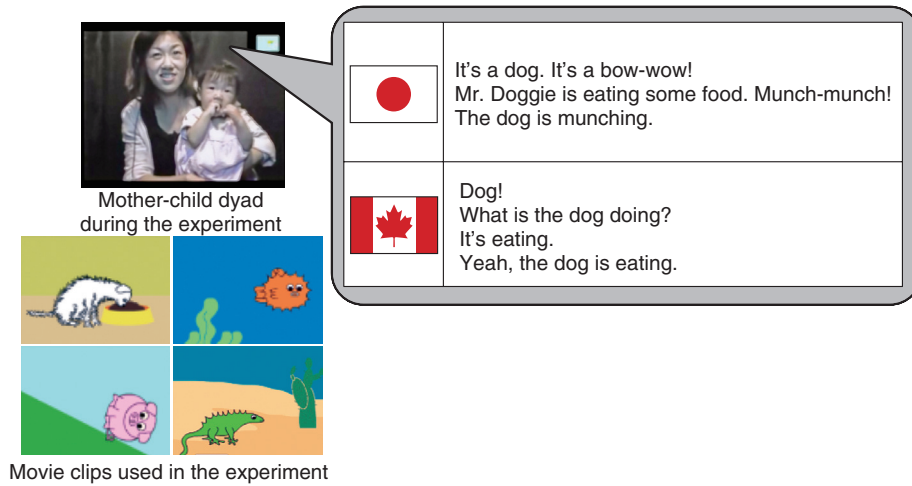


Fig. 4. Parental input experiment.

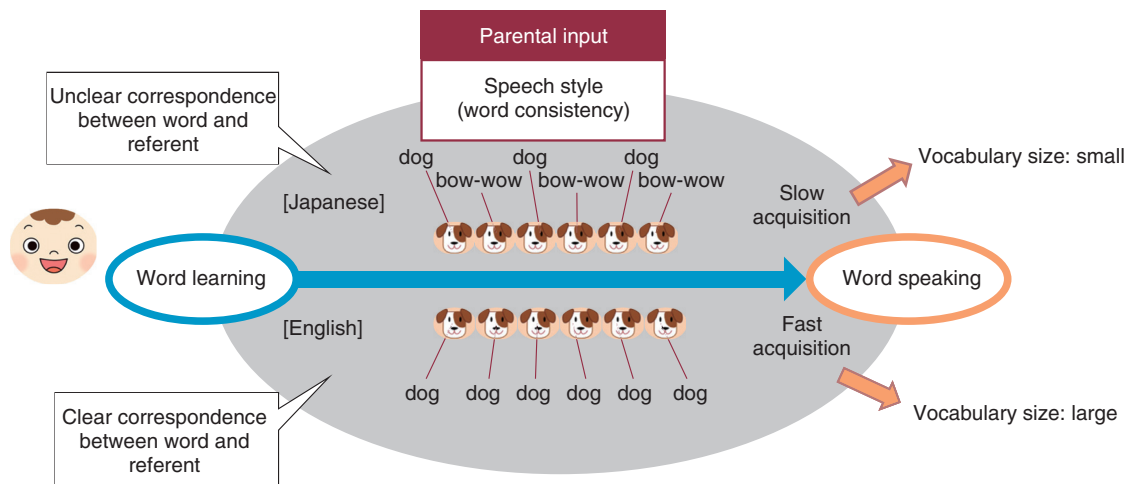


Fig. 5. Parental input and child's word acquisition.

in **Fig. 5**. For Japanese-speaking children, the parent's use of multiple words for a certain referent can make the correspondence between those words and the referent unclear, which could be strongly

related to a delay in word acquisition and a small productive vocabulary. In contrast, for English-speaking children, we consider that the consistent input they receive for a certain referent helps to make

the correspondence between that word and the referent clear, resulting in faster word acquisition and a larger productive vocabulary. These differences in parental input observed by cross-linguistic studies are providing very interesting evidence for elucidating the mechanism of vocabulary development.

### 5. Future outlook

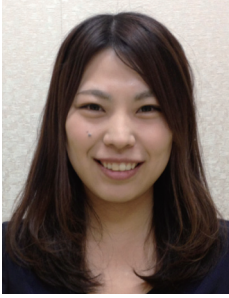
In this article, we introduced research exploring the mechanism of word acquisition in children through a cross-linguistic study between Japanese and English. We described the way in which Japanese-speaking parents use more than one word for a single referent and that such parental input with low consistency may contribute to relatively slow word acquisition in Japanese-speaking children. In contrast, the ability to learn new words develops earlier in Japanese-speaking children than English-speaking children. The reason may be that Japanese parental input with such low consistency has a different effect on the child at the time of learning words than at the time of producing the words. That is, the input style may give the child some sort of positive effect when learning words. In addition, prior research reported that American mothers place value on fostering linguistic competence in their children while Japanese mothers place importance on establishing affectionate communication with their children [4]. This way of interacting with children in Japan makes frequent use of IDS words, which may have positive effects outside of word acquisition. In future research, we aim to provide a comprehensive explanation of the various ways in which parental input can have an effect on a child's development.

If the effects of parental input can be clarified by such a series of studies, it may be possible to derive

more effective methods for supporting the overall development of communication skills. Going forward, our plan is to propose guidelines for communication environments that support the education of children by linking such methods with information and communications technology.

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