

THE ACQUISITION OF COMPOUND ACCENT IN JAPANESE

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Abstract: This paper reports some experimental results on the acquisition of compound accent by Japanese children. We analyzed the accent patterns of novel noun-noun compounds produced by 20 normal children aged between 5 and 7, and compared these patterns with the adults' patterns reported in the literature. This analysis has revealed (a) that the subjects have not acquired idiosyncratic patterns in adults' phonology, and (b) that children's phonology differs from adults' in overgeneralizing two basic rules into one and thereby simplifies the adults' phonology. We demonstrate that these data can be properly accounted for within the framework of Optimality Theory.

Keywords: language acquisition, Japanese, compound accent, Optimality Theory, syllable, mora

0. INTRODUCTION

This paper reports the results of on-going research on the acquisition of compound accent (CA) by Japanese children and discusses the data in the framework of a constraint-based theory known as Optimality Theory (OT) (Prince and Smolensky, 1993). The main focus of the research is placed on how and to what extent children's CA patterns differ from adults' and what insight this analysis provides into the ways children acquire CA rules.

This paper consists of three sections. In the first section, we will outline the CA rules in adults' grammar of Tokyo Japanese. We will propose in this section an Optimality-theoretic account of adults' compound accentuation on the basis of our previous work. In the second section, we will be describing the experiment we conducted with Japanese children, with main focus on the

method we employed and the major results we subsequently obtained. In the final section, (Section 3), we will consider some major differences between adults and children with respect to their CA patterns. We will show that the crucial differences between the two groups can be accounted for in a simple manner in the framework of Optimality Theory.

1. ADULTS' COMPOUND ACCENTUATION

Let us first describe the CA rules employed by native adult speakers of Tokyo Japanese. The CA rules in Tokyo Japanese can be formulated as in (1) (Kubozono, 1997).

(1) Descriptive Generalization

- a. The lexical accent of the second member is retained (or parsed) in the resultant compound except when it is on the very final syllable.
- b. If the second member is accented on the final syllable or lexically unaccented, then a default CA emerges on the second foot from the end of the compound.

We will illustrate this generalization using compound nouns whose second member consists of two moras. The two rules in (1) are exemplified in (2a) and (2b-d), respectively. Brackets indicate the boundaries of bimoraic feet and apostrophes // denote accents which are placed immediately after the accented mora.

(2) a. Second member is lexically accented on the non-final syllable:

pe'rusya + ne'ko → perusya)-(ne'ko) 'Persian cat'
ni'waka + a'me → niwaka)-(a'me) 'sudden rain, shower'

b. Second member is lexically accented on the final heavy syllable:

i'ndo + zo'o → indo')-(zoo) 'Indian elephant'
ne'bada + syu'u → nebada')-(syuu) 'The State of Nevada'

c. Second member is lexically accented on the final light syllable:

a'kita +inu' → akita')-(inu) 'Akita dog'
ni'waka + yuki' → niwaka')-(yuki) 'sudden snow'

d. Second member is lexically unaccented:

hitokui + tora → hitoku'i)-(dora) 'man-eating tiger'
ka'buto + musi → kabuto')-(musi) 'beetle'

In (2a), the second member is originally accented on the non-final syllable and this accent is usually retained in the resultant compound. In (2b) and (2c), the second member is lexically accented on the final syllable, whether it is a heavy syllable or a light syllable. In either case, the accent of the second member almost never survives as the CA; rather, an entirely new CA emerges on the final syllable of the first member, or on the second bimoraic foot from the end of the compound. Finally, if the second member is lexically unaccented, as in (2d), a default accent again appears on the penultimate foot.

The descriptive generalization summarized in (1) and exemplified in (2) can be accounted for in a straightforward manner within the framework of Optimality Theory. The relevant constraints we propose are given in (3). We propose that these constraints be ranked as in (4) (Kubozono, 1997; Kubozono, Ito and Mester, 1997).

(3) Relevant Constraints

- Nonfinality-syllable: The accented syllable does not appear word-finally.
- Nonfinality-foot: The accented foot does not appear word-finally.
- Parse-accent: The lexical accent of the second member is parsed.
- Edgemostness: The accent appears maximally at the edge of the word.

(4) Nonfinality-syllable \gg Parse-accent \gg Nonfinality-foot \gg Edgemostness

The constraint hierarchy in (4) accounts for the basic facts in (1) and (2) as shown in (5) and (6).

(5)

| pe'rusya + ne'ko | Nonfin(Syll) | Parse-Ac | Nonfin(Foot) | Edgemost |
|--------------------|--------------|----------|--------------|------------------------|
| Ⓐ a. perusya-ne'ko | | | * | σ |
| b. perusya'-neko | | *! | | $\sigma \sigma$ |
| c. peru'sya-neko | | *! | | $\sigma \sigma \sigma$ |

(6)

| a'kita + inu' | Nonfin(Syll) | Parse-Ac | Nonfin(Foot) | Edgemost |
|-----------------|--------------|----------|--------------|-----------------|
| a. akita-inu' | *! | | * | |
| b. akita-i'nu | | * | *! | σ |
| Ⓒ c. akita'-inu | | * | | $\sigma \sigma$ |

In (5), the first candidate, *perusya-ne'ko*, violates the third and fourth constraints, Nonfinality-foot and Edgemostness. But as compared with other candidates, it satisfies the constraint hierarchy best of all and, hence, it is chosen as the optimal output. Likewise, the third candidate in (6), *akita'-inu*, becomes optimal since it makes the least violation of the constraints among many candidates.

Having generalized the CA rules in this way, we must emphasize that this generalization admits two major exceptions. These are exceptions to the rules in (2a) and (2c). First, some of the compound nouns whose second member is finally accented become unaccented. Some examples are given in (7). There are a considerable number of exceptions of this type, but it is not possible to predict or explain how they occur, either empirically or theoretically.

(7) Exceptions to (2c)

- atago + yama'* \rightarrow *atago-yama* 'Atago, mountain; Mt. Atago'
**atago'-yama*
- ore'nze + iro'* \rightarrow *orenzi-iro* 'orange, colour; orange (colour)'
**orenzi'-iro*

A second and less productive pattern of exception emerges when the second member is accented on the non-final syllable. Some examples are given in (8). This class of exception does not somehow retain its lexical accent but attracts a CA in the default position, namely, at the end of the first member.

(8) Exceptions to (2a)

- ni'ngyo + hi'me* \rightarrow *ningyo'-hime* 'mermaid, princess; Little Mermaid'
**ningyo-hi'me*

b. *yoyaku* + *se'ki* → *yoyaku'-seki* 'reservation, seat; reserved seat'
 **yoyaku-se'ki*

The two types of exceptions illustrated in (7) and (8) turn out to be very important in examining the data of children's compound accentuation, which we will discuss in the next section.

2. EXPERIMENT: METHOD AND MAJOR RESULTS

In our experiment, 20 normal children aged between 5 and 7 served as subjects; they are all native speakers of Tokyo Japanese. We used many pairs of familiar words (e.g. *panda* 'giant panda' and *neko* 'cat') as stimuli, which vary in accent structure. We first showed the subjects pictures describing each of these words and asked them to pronounce the individual words. This has allowed us to confirm that the children have successfully acquired the accent pattern of the individual words. We then asked the subjects to pronounce the noun-noun sequences as a word, of which the second member consists of two moras. The resulting sequences are nonsense compound nouns in Japanese. These can be classified into the four types in (9) according to the second member. The CA patterns shown in (9) are those which would be produced by adults.

(9) a. *ne'ko* 'cat'
 pa'nda 'giant panda' + *ne'ko* → *panda-ne'ko* 'panda cat'
 b. *musi* 'bug, insect'
 ko'ara 'koala' + *musi* → *koara'-musi* 'koala bug'
 c. *yama* 'mountain'
 ko'ara 'koala' + *yama* → *koara-yama* 'Mount Koala'
 d. *hi'me* 'princess'
rakuda 'camel' + *hi'me* → *rakuda'-hime* 'Princess Camel'

(9a) corresponds to (2a), where the second member would keep its non-final accent in the resultant compound. (9b) corresponds to (2d), where the second member is lexically unaccented and a default CA would appear on the final syllable of the first member. (9c) represents the exceptional case described in (7), namely, a case where a finally-accented second member yields an unaccented compound due to its idiosyncratic nature. Finally, (9d) corresponds to the second exceptional case described in (8), where the second member does not somehow keep its non-final accent in the compound.

Returning to the experiment we conducted, we carefully analyzed the CA patterns produced by the subjects and compared them with the adults' patterns as described in (9). This comparison has revealed two crucial differences between adults and children. First, our subjects often replaced the lexically idiosyncratic pattern in (9c) with the rule-governed patterns in (9a) and (9b). One example is shown in (10). This type of replacement indicates that children acquire 'rules' before they acquire lexically idiosyncratic patterns.

(10) *ko'ara* + *yama* → a) *koara-ya'ma*
 b) *koara'-yama*

A second and more important pattern characteristic of children's compound accentuation involves mixing the two rule-generated patterns in (9a) and (9b). Interestingly, the subjects predominantly substituted the less productive pattern in (9a) for the more productive pattern in (9b). This is exemplified in (11).

(11) ko'ara + musi → koara-mu'si 'koala bug'
vs. (9b) Adults: koara'-misi

Not surprisingly, children showed a clear tendency to replace the exceptional compound pattern in (9d) with the productive pattern of (9a). This is shown in (12). This fact, too, suggests that children acquire rules before exceptions.

(12) rakuda + hi'me → rakuda-hi'me 'Princess Camel'
vs. (9d) Adults: rakuda'-hime

All in all, children's preference of the pattern in (9a) over that of (9b) suggests that the non-final syllable within the final foot is the unmarked location of CA in children's grammar, whereas this syllable is disfavored in adults' grammar due to the Nonfinality-foot constraint.

3. DISCUSSION

The data presented so far indicate that children's phonology is slightly different from adults' with respect to compound accentuation. The most crucial difference is found in the most unmarked location of CA. In adults' phonology, a default CA is placed on *the final syllable of the first member* or, in other words, on the second foot from the end of the compound. In children's phonology, in contrast, a default accent emerges on *the initial syllable of the second member*, that is, on the initial syllable of the final foot of the compound (Shirose et al., 1996).

In descriptive terms, this means that the role of the foot is not as strong in children's phonology as in adults' phonology; Namely, in children's grammar, a default CA appears maximally near the edge of the compound while only avoiding the very final syllable.

In the framework of OT, this means that *Edgemostness* is ranked higher than *Nonfinality-foot* in children's grammar. This can be captured by minimally reranking the adults' constraint hierarchy in (4) as in (13).

(13) Children's Grammar:

Nonfinality-syll ≫ Parse-accent ≫ Edgemost ≫ Nonfinality-foot
cf. (4) Adults' Grammar
Nonfinality-syll ≫ Parse-accent ≫ Nonfinality-foot ≫ Edgemost

The effects of the constraint hierarchy in (13) are illustrated in (14)-(17), for the hypothetical compound expressions sketched in (9).

(14)

| pa'nda + ne'ko | Nonfin(Syll) | Parse-Ac | Edgemost | Nonfin(Foot) |
|----------------|--------------|----------|----------|--------------|
| a. panda-ne'ko | | | σ | * |
| b. panda'-neko | | *! | σ σ | |
| c. pa'nda-neko | | *! | σ σ σ | |

(15)

| ko'ara + musi | Nonfin(Syll) | Parse-Ac | Edgemost | Nonfin(Foot) |
|------------------|--------------|----------|----------|--------------|
| ☛ a. koara-mu'si | | | σ | * |
| b. koara'-misi | | | σ σ ! | |

(16)

| ko'ara + yama' | Nonfin(Syll) | Parse-Ac | Edgemost | Nonfin(Foot) |
|------------------|--------------|----------|----------|--------------|
| ☛ a. koara-ya'ma | | * | σ | * |
| b. koara'-yama | | * | σ σ ! | |
| c. koara-yama' | *! | | | * |

(17)

| rakuda + hi'me | Nonfin(Syll) | Parse-Ac | Edgemost | Nonfin(Foot) |
|-------------------|--------------|----------|----------|--------------|
| ☛ a. rakuda-hi'me | | | σ | * |
| b. rakuda'-hime | | *! | σ σ | |

In sum, a constraint-based analysis provides a very simple and satisfactory account of both adults' and children's CA patterns as well as the change from children's grammar to that of adults.

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