DELIBERATE MARKEDNESS IN JAPANESE HYPOCORISTICS*

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1. Introduction

A common view in the phonological literature is that phonological alternations typically involve markedness reduction; that is, deviation from an input is basically characterized as a repair of a marked structure. Under the most extreme version of phonological theory, every output constraint is simply a reflection of a markedness hierarchy, meaning that all disparities between inputs and outputs are attributed to markedness reduction (see de Lacy 2007 for relevant discussion; cf. Moreton 1999). While the jury is still out as to whether all phonological alternations should be explained in terms of markedness reduction, it is generally agreed that markedness is the major driving force behind phonological alternations.

However, it is reported that in certain cases, phonological alternations seem to derive otherwise disfavored forms (Benua 1995; Tessier 2010). This paper presents novel data from Japanese hypocoristics which show some peculiar properties that cannot simply be attributed to markedness reduction. We report the results of two experiments designed to shed light on these properties. The implications of the present study are two-fold: first, the constraint *#D is psychologically real albeit seemingly no longer operative in Modern Japanese; second, Japanese speakers can evaluate markedness relative to a particular stratum of the lexicon, which lends support to the lexical stratification hypothesis put forward by Itô and Mester (1995a, 1995b, 1999).

2. Hypocoristic Formation in Japanese

For starters, let us take a brief look at the basic properties of Japanese hypocoristic formation.[1] It is by now a widely accepted view that hypocoristic formation in Japanese is subject to the so-called bimoraic requirement (see Poser 1984, 1990; Mester 1990). The most common way of forming a hypocoristic in Japanese is by truncation to the first two moras of the name and suffixation of a diminutive (including zero affixation), as illustrated below.[2]

(1) a. /<u>mija</u>.zaki/ + /saN/ → mija-saN
b. /<u>jama</u>.guti/ + /tti/ → jama-tti
c. /<u>isi</u>.gaki/ + /ii/ → iss-ii
d. /<u>naka</u>.zono/ + /Ø/ → naka

While the pattern exemplified in (1) is of the most common type, there is also a less common

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[1] Throughout the paper, we restrict our attention to hypocoristics derived from family names.

[2] Here and throughout, the two moras in underlying forms that are present in the corresponding outputs are underlined. We use semi-phonemic transcriptions, and the output forms do not necessarily represent their actual phonetic realizations. Dots indicate morpheme boundaries.

but attested type of hypocoristic formation in Japanese, which is the main topic of this paper. Hypocoristics of this type involve truncation to two moras of the base in non-word-initial position and suffixation of a diminutive (including zero affixation). Thus, the very same combination of a family name and a suffix can give rise to different hypocoristics, as demonstrated by (1), which we just witnessed, and (2) below.

(2) a. /mija.zaki/ + /saN/ → zaki-saN
b. /jama.guti/ + /tti/ → gut-ti
c. /isi.gaki/ + /ii/ → gakk-ii
d. /naka.zono/ + /Ø/ → zono

However, non-word-initial truncation is not always possible. For instance, all of the following examples are unacceptable to the present authors.

(3) a. /mija.hara/ + /saN/ → *[?] hara-saN
b. /jama.kawa/ + /tti/ → *[?] kawa-tti
c. /isi.tani/ + /ii/ → *[?] tani-i
d. /naka.mura/ + /Ø/ → *[?] mura

What is worth noting here is that the derived forms in (2) have a word-initial voiced obstruent, whereas the unacceptable hypocoristics in (3) have either a voiceless obstruent or a sonorant word-initially. To a first approximation, we may thus say that hypocoristics with a word-initial voiced obstruent are preferred over those without. However, this is rather odd in light of the fact that word-initial voiced obstruents are considered to be disfavored in native Japanese phonology. Historically, word-initial voiced obstruents were absent in Old Japanese (Vance 1983, among others), which can be captured if we assume that the constraint *#D (Don't have a word-initial voiced obstruent) was ranked high in Old Japanese. One might argue that this constraint is no longer operative in Modern Japanese (cf. Kuroda 2008), as there are Sino-Japanese words, loanwords, and onomatopoeic words that begin with a voiced obstruent. However, native words with initial voiced obstruents are vanishingly rare even in Modern Japanese.[3] Furthermore, #D is phonetically marked for aerodynamic reasons (Westbury & Keating 1984). Despite these facts, #D seems to be preferred when it comes to hypocoristics of the non-word-initial truncation type. It thus appears that phonologically marked forms are preferred over unmarked ones. Henceforth we call this phenomenon "Deliberate Markedness."

We have seen that hypocoristic formation in Japanese exceptionally tolerates otherwise illicit forms (see Benua 1995 and Tessier 2010 for similar phenomena in other languages). Note, however, that this does not mean that phonologically marked forms are simply preferred over unmarked forms, nor that hypocoristics can be formed without any restrictions. Just because a hypocoristic has a word-initial voiced obstruent, it does not necessarily mean that it is well-formed, as the following illicit example demonstrates.

(4) /naga.tani/ + /saN/ → *[?] gata-saN

This suggests that although hypocoristics seem to be exempt from certain phonotactic restrictions, it is not just that constraints are flagrantly violated without any principles. In the example just given above, morpheme-left-anchoring seems to play an important role. Similarly, changing a voiceless obstruent into its voiced counterpart does not result in a well-formed hypocoristic even though the derived form would have a word-initial voiced obstruent.

[3] Pejorative words and function words constitute a class of exceptions to this generalization.

(5) a. /kawa.kami/ + /saN/ → *[?] gami-saN
b. /kawa.kami/ + /saN/ → *[?] gawa-saN

This indicates that IDENT-BaseTruncatum[voice] (henceforth IDENT-BT[voice]) along lines with Benua (1995) is ranked high.

To summarize the observations so far, Japanese hypocoristic formation comes in two varieties. The two types of hypocoristic formation differ in that one type involves word-initial truncation, while the other involves word-medial truncation. The latter type displays a rather peculiar behavior; seemingly phonotactically disfavored forms are derived via truncation. In the remainder of this paper, we investigate (i) whether Deliberate Markedness is a systematically governed phenomenon, (ii) why marked forms are preferred over unmarked ones, and (iii) why the constraint *#D is selectively violated. As for (i), we report the results of two experiments, showing that the phenomenon is so systematically constrained that it cannot be dismissed as a collection of minor exceptions, and for (ii) and (iii), we suggest two analytical options, one based on distinctiveness and the other based on recoverability.

3. Experiment 1

To confirm that Deliberate Markedness is not just a hodgepodge of random exceptions but rather is constrained in a systematic manner, we conducted a naturalness rating experiment.

3.1. Participants

Seventeen native speakers of Tokyo Japanese (ten female and seven male; mean age: 27.6) participated in this experiment. They received a gift card with a value of JPY 400 for participation.

3.2. Materials

The stimuli used in this experiment were hypocoristics formed from seventy-two attested family names (all having a CVCV.CVCV structure) chosen out of the two thousand most common family names in an online corpus (see References). The selection of the base names was based on the [voice] and [sonorant] feature values of the consonants involved. From each family name, three to five hypocoristics were created with the suffixation of "-saN" in accordance with eight target conditions to be spelled out shortly. Examples are given in (6).

(6) Examples of stimuli[4]

Base	Hypocoristics
mija.zaki:	1. mija-saN, 2. jaza-saN, 3. zaki-saN, 4. saki-saN
taka.kura:	1. taka-saN, 2. daka-saN, 3. kaku-saN, 4. kura-saN, 5. gura-saN
naga.tani:	1. naga-saN, 2. gata-saN, 3. tani-saN, 4. dani-saN

3.3 Procedure

Participants were given a spreadsheet which contains seventy-two distinct family names

[4] Some hypocoristics derived by voicing change or morpheme-medial truncation had two voiced segments or two labial segments (e.g. /siba.hara/ → ziba-saN, /mizu.guti/ →zugu-saN, /hama.saki/ → bama-saN). Since the low acceptability of these hypocoristics might have stemmed from Lyman's Law (Itô & Mester 2003) or a dispreference for labial-labial sequences (Kawahara, Ono & Sudo 2006), they were excluded from the analysis.

and their corresponding hypocoristics (one hypocoristic per family name) with the order of presentation randomized across subjects. They were asked to rate the naturalness of each hypocoristic on a scale of 1 to 4: 4 = "natural," 3 = "somewhat natural," 2 = "somewhat unnatural" and 1 = "unnatural."

Each family name was presented together with an attested first name. The combinations of the first and last names were randomized across subjects. For each family name, only one hypocoristic was provided to each participant, and no participant saw different hypocoristics derived from the same name. They were asked to read out loud the last name, the first name and the hypocoristic before rating each hypocoristic.

3.4. Conditions and Hypotheses

The design had eight target conditions, which are listed in (7) along with exemplifying base names and hypocoristics.

(7) Target conditions of Experiment 1[5]

a.	Non-initial truncation deriving #D	(e.g. /jama.zaki/ → zaki-saN)
b.	Non-initial truncation deriving #T	(e.g. /hama.saki/ → saki-saN)
c.	Initial truncation of the same base names as (a)	(e.g. /jama.zaki/ → jama-saN)
d.	Initial truncation of the same base names as (b)	(e.g. /hama.saki/ → hama-saN)
e.	Non-ini. trunc. deriving #D by voicing change	(e.g. /kawa.kami/→ gami-saN)
f.	Initial trunc. deriving #D by voicing change	(e.g. /kawa.kami/→ gawa-saN)
g.	Morpheme-medial truncation deriving #D	(e.g. /naga.tani/ → gata-saN)
h.	Morpheme-medial truncation deriving #T	(e.g. /naka.tani/ → kata-saN)

Of particular interest to our discussion here is the comparison between Conditions (a) and (b); if Deliberate Markedness is actually at work, hypocoristics in Condition (a) should be rated higher than those in Condition (b). Conditions (c) and (d) are meant to form a baseline because they are the most common type of hypocoristic and are expected to be rated relatively high.

In addition, we also expect that items involving voicing change will be rated relatively low; if we are right in extrapolating from a limited set of data (see the examples in (5)) that IDENT-BT[voice] is ranked high, hypocoristics in Condition (e) should be rated lower than those in condition (a) even though they both have #D. Likewise, hypocoristics in Condition (f) should also receive lower ratings than those in Conditions (c) and (d) alike. Lastly, items in Conditions (g) and (h) involve morpheme-medial truncation, and thus are expected to be rated relatively low if our earlier observation in example (4) derives from a general edge-anchoring requirement.

3.5 Results

Figure 1 plots the average naturalness ratings of hypocoristic formation in the eight conditions, starting with the one that received the highest score. Each condition is accompanied by an illustrative example.

[5] For simplicity, 'non-word-initial truncation' is referred to as 'non-initial truncation', and 'word-initial truncation' as 'initial truncation' unless indicated otherwise. The design also had a condition of non-initial truncation deriving #T by voicing change (e.g. /jama.zaki/ → saki-saN). Since this condition was not our main focus here, we treated it as a filler condition.

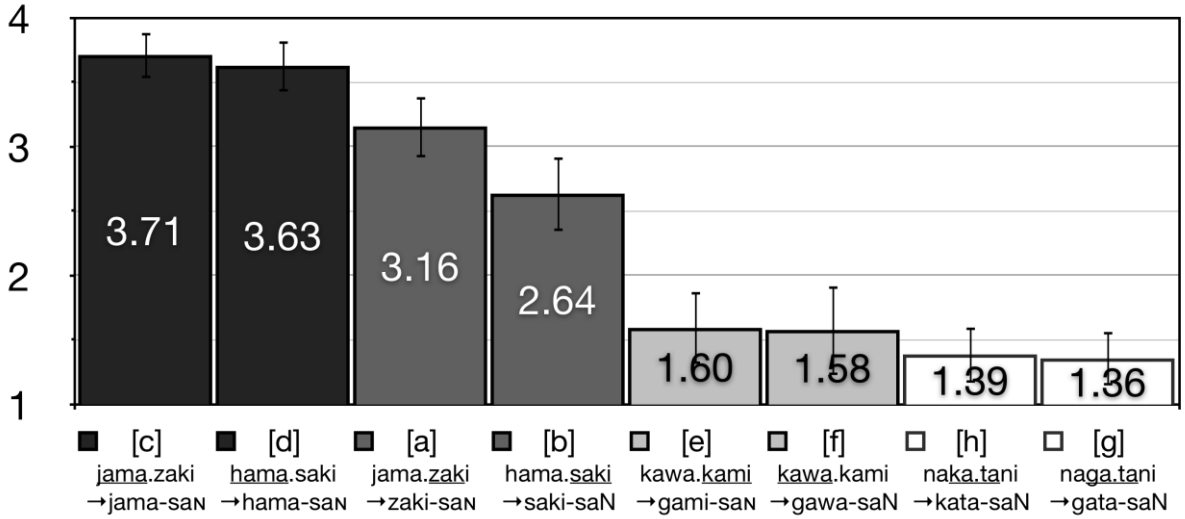

Figure 1: Experiment 1 results - Average naturalness ratings in eight conditions (error bars: 95% confidence intervals)

As can be seen from the figure above, participants rated the hypocoristics in Condition (a) higher than those in Condition (b). A one-way repeated measures ANOVA indicated a significant main effect of Formation Condition on the ratings of hypocoristics ($F(7, 112) = 97.346$, $p < 0.0001$). Post-hoc pair-wise comparisons using Bonferroni's adjustment for multiple comparisons revealed that the average naturalness ratings of the hypocoristics in Condition (a) were significantly higher than those of the hypocoristics in Condition (b) ($p < 0.05$). This means that in the case of hypocoristics involving non-initial truncation, speakers preferred outputs that violate *#D over those that don't, which in turn indicates that Deliberate Markedness is indeed a psychologically real phenomenon.

Also, the difference between Conditions (a) and (e) was statistically significant ($p < 0.0001$). This indicates that non-initial truncation deriving #D is less acceptable when it involves voicing change. Similarly, the hypocoristics in Conditions (c) and (d) were, respectively, rated significantly higher than those in Condition (f) (ps < 0.0001). These results together support the hypothesis that IDENT-BT[voice] is ranked high. The hypocoristics in Conditions (a) and (b) were, respectively, higher than those in Conditions (g) and (h) (ps < 0.0001), indicating that there is also a strong requirement on morpheme-edge-anchoring.

The overall results of the experiment supported our hypotheses. Most importantly, the difference between Condition (a) and Condition (b) indicates that Deliberate Markedness is actually at work.

4. Proposals

The results of Experiment 1 have shown that hypocoristics with an initial voiced obstruent are preferred over those without. In order to account for this peculiar phonological phenomenon, we propose two possible analyses: the distinctiveness account and the recoverability account. In this section, we first outline the two accounts and the predictions they make. We then discuss ways to tease them apart empirically.

4.1. Distinctiveness Account

One way to account for the Deliberate Markedness phenomenon is to claim that it is driven by speakers' desire to derive hypocoristics that sound distinctive. Since a hypocoristic is used to individualize a person special to the speaker, distinctiveness is a key property. As discussed above, there are very few native Japanese morphemes having an initial voiced

obstruent. In fact, most native Japanese family names begin with a segment other than a voiced obstruent, namely a voiceless obstruent, a sonorant or a vowel. This in turn suggests that names with an initial voiced obstruent sound unusual and as such serve the function of being distinctive. Thus, our first proposal is that speakers intentionally violate the constraint *#D in order to derive distinctive hypocoristics.

It might be worthwhile to mention in passing that deliberate deviations from certain standards or norms have been documented in phonology and other areas of linguistics. Some English shortenings in the 80's-90's also run afoul of shortening norms, thereby creating distinctive and catchy names and titles (e.g. *rents* for *parents*, *za* for *pizza*, *blog* for *weblog*, etc.). Likewise, the *Uncola*, which was coined by a soft-drink company, yields a similar effect by violating the selectional restrictions of the prefix *un-*. All these cases can be most naturally viewed as a reflection of speakers' intention to derive distinctive (individualizing) forms. It is therefore quite plausible to claim that the preference for a marked form in Japanese hypocoristic formation discussed in this paper is another instance of distinctiveness-driven phonological phenomena.

This distinctiveness-based explanation predicts that, other things being equal, not only a *#D violation but violations of other 'minor' constraints can in principle achieve the same effect. As stated above, although native words do not usually begin with a voiced obstruent, there are Sino-Japanese words, loanwords and onomatopoeic words that violate the constraint *#D. A simple but, in our view, most viable approach to this heterogeneous nature of the Japanese lexicon is to assume that the Japanese phonological grammar has a stratal structure (Itô & Mester 1995a, 1995b, 1999). On this account, *#D can be analyzed as highly ranked only in the native stratum of the grammar. This approach allows us to entertain the possibility that having an initial voiced obstruent is deviant enough from the Japanese phonotactic standards to derive a distinctive hypocoristic, but not as aberrant as outright phonotactic illegality when the entire grammar of Japanese is taken into account. If this reasoning is valid, we expect that just like a *#D violation, flouting other stratum-specific (and to that extent minor) constraints should be effective in creating distinctive hypocoristics, too. That is to say, a violation of constraints such as *#r (Don't have an initial [r]), which is highly ranked only in the native stratum (Itô & Mester 1995b), should also fit the bill. How this prediction can be tested will be discussed in Section 4.3.

4.2. Recoverability Account

An alternative explanation can be constructed from the perspective of recoverability. That is, there is an avoid ambiguity strategy according to which truncated material must be interpreted as corresponding to the initial segments of its base word if the application of truncation leads to a loss of recoverability. The underlying idea is that a base needs to be sufficiently recoverable from its truncated form. Under this view, we can explain the unacceptability of the use of "saki-saN" as a hypocoristic for "hama.saki" in the following way. Suppose that there is a hypocoristic "saki-saN." Then the possible corresponding base names for this hypocoristic basically take the form "saki.XX" (e.g. saki.guti, etc.) or "XX.saki" (e.g. hama.saki, etc.), both of which satisfy necessary conditions for forming hypocoristics in Japanese. However, this situation has a recoverability problem such that the output form is no longer informative with respect to the original anchoring position of the morpheme "saki." The association of the hypocoristic "saki-saN" with a base name of the form "XX.saki" is thus blocked in order to resolve this issue. It is for this reason that "saki-saN" is a preferred hypocoristic for a person named, say, "saki.guti" but not for "hama.saki."

The major advantage of the recoverability-based analysis is that it provides a lucid explanation for the question of why "zaki-saN", which is derived via non-initial truncation, is exceptionally permitted as a hypocoristic. That is, if *#D is psychologically real, then one can

infer that the truncated element "zaki" cannot be associated with a base name of the form "zaki.XX". This means that the application of truncation does not lead to a loss of recoverability because "zaki" can only be associated with "XX.zaki." Consequently, the avoid ambiguity strategy does not kick in, and the use of "zaki-saN" for "XX.zaki" (e.g. jama.zaki, etc.) is not blocked. Under this analysis, the reason that names like "jama.zaki" can undergo both initial and non-initial truncation receives a straightforward explanation. It should also be noted in this connection that forms like "zaki" have undergone sequential voicing also known as Rendaku - a phonological process whereby the initial segment of the second member of a compound becomes voiced. (e.g. jama + sakura → jama.**z**akura 'mountain-cherry', jama + saki → jama.**z**aki 'mountain-promontory (family name)'). Since "jama.zaki" is decomposed into "jama" and "zaki," but "zaki" does not exist in isolation (while "saki" does), it is fairly obvious that the morpheme-initial voiced obstruent of "zaki" has emerged as a consequence of Rendaku. These properties presumably facilitate the inference with respect to the original anchoring position of truncated material.

This explanation predicts that not only an initial voiced obstruent (in particular that derived via Rendaku) but also other morphemes that do not occur in word-initial position should be equally eligible for non-initial truncation. More specifically, allomorphs or morphemes that appear only as the second member of a compound name should be able to undergo non-word-initial truncation, even if the output form does not have an initial voiced obstruent.

For example, *wara*, which is an allomorph of *hara* 'field', always occurs as the second element of a compound name. In the course of historical sound change, */p/ changed to */ɸ/ and later to /h/ in word-initial and morpheme-initial position (e.g. */para/ > */ɸara/ > /hara/ 'field'), whereas */p/ changed to */ɸ/ and later to /w/ in intervocalic position (e.g. */kapa/ > */kaɸa/ > /kawa/ 'river'). Thus, this sound change split */p/ into two different phonemes (/h/ and /w/) that occur in different positions. However, some proper names such as personal names and place names have applied the latter type of sound change to the morpheme-initial */p/ in the second position of a compound, treating it as an intervocalic */p/ (e.g. */huzi.para/ > */huzi.ɸara/ > /huzi.wara/ 'wisteria-field (family name)', cf. NOT /huzi.hara/). This yielded an allophonic relationship between [h] and [w] in some morphemes, the former being a realization of /h/ in word-initial position and the latter an allophone of /h/ in the initial position of the second morpheme of a compound.[6] If the recoverability account outlined here is correct, it is expected that those names such as "huzi.wara" and "suga.wara" which contain the historical allophone [w] should be able to undergo non-word-initial truncation (e.g. "wara-saN") precisely because associating the allophone [w] with a word-initial position is not possible.

There are also morphemes that always appear as a non-initial element of a compound name. For example, *-no/-na*, which is a possessive marker, always follows a possessor noun. In a family name, it appears between two morphemes, i.e. XX.no.YY or XX.na.YY, where XX is a possessor of YY. Given that these morphemes do not occur in word-initial position, it is expected under this analysis that names such as "iti.no.se", "wata.na.be", etc. should be just as susceptible to non-word-initial truncation (e.g. "no.se-saN", "na.be-saN", etc).

[6] This allophonic relationship is a remnant of a historical sound change and is not attributed to any productive phonological alternation. Also, the sound change of */p/ into its ultimate form /w/ did not occur across the board, and thus family names of the same origin can have [w] or [h] in the same position as in "suga.wara" and "suga.hara". Note, however, that this does not undermine the argument because the historically-driven [w] (as in *-wara*) does not occur in word initial position anyway.

4.3. Testing the Proposals

As we have seen, the distinctiveness account and the recoverability account make different predictions. Our particular concerns here are how to test these predictions and how to determine which explanation captures the Deliberate Markedness phenomenon more accurately.

Let us first look more closely at the empirical predictions of the distinctiveness proposal, according to which not only a *#D violation but also violations of other stratum-specific constraints such as *#r should make non-initial truncation possible. Our job is, then, to find family names that provide an excellent opportunity to test this prediction. There's the rub, however. Finding a native Japanese name with a morpheme-initial [r] is virtually impossible precisely because of the constraint *#r. There are names like "kura.moti" which have a non-initial [r], but deriving a hypocoristic like "ramo-saN" would violate the morpheme-edge anchoring requirement, and we expect it to be ruled out independently of the constraint *#r. For this reason, it is hard to create experimental stimuli against which to test the distinctiveness account directly.

On the other hand, the predictions made by the recoverability account can presumably be tested with relative ease. Unlike the distinctiveness account, this analysis predicts that forming hypocoristics of the non-initial truncation type does not necessarily require phonotactic violations. As mentioned above, there are names such as "huzi.wara", "suga.wara", "iti.no.se", "wata.na.be", etc. that contain an allophone or a special morpheme that is not expected to occur in word-initial position. Although these particular allomorphs or morphemes never appear word-initially in names, word-initial [w] and [n] are phonotactically legal and can occur freely in the native stratum. Thus, the two proposals make different predictions with respect to the acceptability of those hypocoristics of the non-initial truncation type that commit no phonotactic violations. To be more specific, the distinctiveness account predicts that such hypocoristics are ruled out, whereas the recoverability account predicts that they are acceptable.

The next section reports a follow-up judgment task designed to test these predictions.

5. Experiment 2

As a follow-up study, we conducted another naturalness judgment experiment, where Japanese speakers judged the naturalness of hypocoristics derived from various family names. The primary objective of this experiment was to test the validity of the two proposals. The secondary objective was to replicate the results of Experiment 1 with a larger number of subjects in a more natural linguistic setting. For this reason, we used auditory stimuli instead of orthographic representations.

5.1 Participants

Forty-one native speakers of Japanese (twenty-six female, fourteen male and one no response; mean age: 28.0) participated in the study. The recruitment was done via e-mail. They received a gift card with a value of JPY 500 for participation.

5.2 Material

Hypocoristics formed from forty existing family names taken from the same corpus as employed in Experiment 1 were used as the stimuli. Thirty base names had a CVCV.CVCV structure and they were chosen on the basis of the [voice] and [sonorant] feature values of the consonants involved. The other ten were names of three to five moras containing elements that never appear word-initially. These names included, among others, "huzi.wara" (*wara*: an

allomorph of *hara* 'field'), "ja.wata" (*wata*: an allomorph of *hata* 'flag'), "iti.no.se" (*-no*: a possessive marker), and "itu.ka.iti" (*-ka*: a classifier). A complete list of the base names is given in (8). From each family name, three to five hypocoristics were created with the suffixation of "-saN" in the same manner as in Experiment 1.

(8) List of base names for the stimuli used in Experiment 2

1. huku.sima	11. hasi.moto	21. tani.guti	31. wata.na.be
2. kasa.hara	12. take.naka	22. kana.zawa	32. huzi.wara
3. kuma.kura	13. katu.mata	23. same.zima	33. matu.no.o
4. simo.hira	14. hisa.matu	24. tori.goe	34. sio.no.ja
5. hiko.saka	15. hisi.numa	25. sino.duka	35. hati.no.he
6. kita.gawa	16. kawa.saki	26. hira.jama	36. iti.no.se
7. kata.giri	17. haja.kawa	27. kura.moti	37. o.wari
8. saka.gami	18. kami.tani	28. tera.nisi	38. ja.wata
9. kaki.zaki	19. kuro.sawa	29. sawa.mura	39. ja.ka.be
10. taka.gaki	20. sira.tori	30. sumi.josi	40. itu.ka.iti

To make audio stimuli, the hypocoristics were pronounced by two native speakers of Japanese (one female and one male). They produced each hypocoristic in isolation and the utterances were recorded onto a digital recorder (SONY Linear PCM Recorder PCM-D50) through a microphone (SONY ECM-959DT) and were digitized at the sampling rate of 48 kHz. The sound files were saved in the .wav format. The recording was done in a sound-attenuated room in the Sophia University Phonetics Laboratory, Tokyo, Japan.

5.3 Procedure

The task was an Internet-based naturalness judgment task using audio stimuli powered by XHTML5 and JavaScript codes in combination with Google Docs questionnaire forms. Participants were first asked to go to the website for the task. The first part of the webpage showed a consent form for a human subject experiment and general instructions. They were told that the questionnaire was about the naturalness of nicknames formed from family names. They were then asked to complete one practice trial, which contained one story (one rating task) given in the same format as the actual test trials.

In the test session, they were asked to read twenty short stories, each of which contained a character called by a family name and a possible hypocoristic formed from the family name. In the stories, the names and hypocoristics were displayed as clickable buttons saying [NAME] and [NICKNAME]. Participants were instructed to click on the buttons to hear the sounds of the names and hypocoristics.[7] They heard a male or female voice depending on the context of the story. At the end of each story, they were asked a question of the form "What do you think if [NAME] is called [NICKNAME] as in the story?". As an answer to the question, they rated the hypocoristic by clicking a radio button on the screen. They provided their judgments on a scale of 1 to 5: 5 = "natural," 4 = "somewhat natural," 3 = "neither natural nor unnatural," 2 = "somewhat unnatural" and 1 = "unnatural." They were allowed to hear the auditory stimuli as many times as they liked.

A sample image of part of the experiment is given in Figure 2. The actual stimuli were

[7] Since some web browsers do not recognize sound files in the .wav format embedded in the XHTML5 <audio> tag used in the experiment, we also prepared the stimuli in the .mp3 format that had been converted from the original .wav files. It was coded so that the browser plays the .mp3 version only when it cannot read the .wav format. Thus, some participants received the stimuli as .mp3 sounds. For the purpose of our experiment, however, we do not believe that the difference in the sound quality caused by the reformat affected the results.

presented in Japanese.

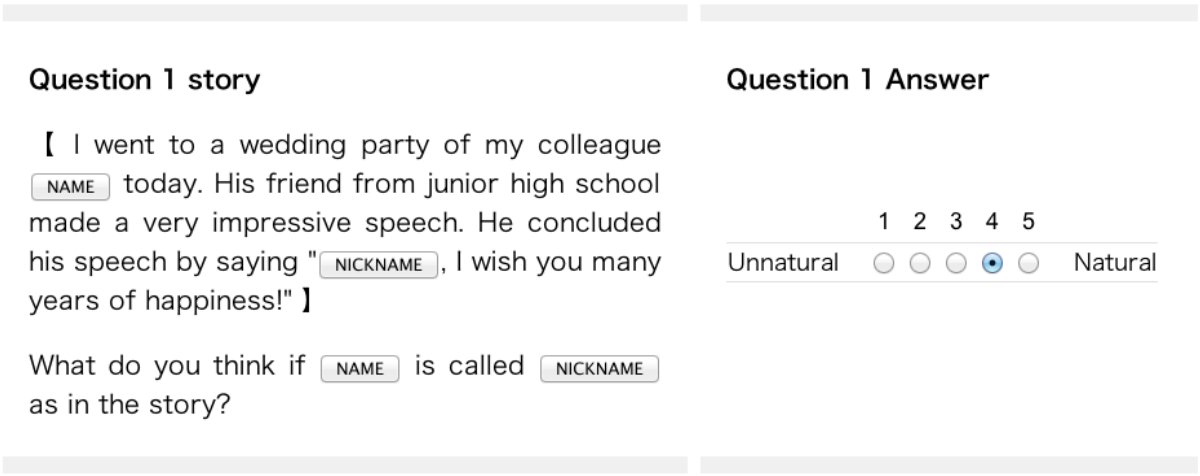

Figure 2: A sample image of a rating task in Experiment 2 (translated into English) http://www.linguistics.ucla.edu/people/grads/yutanaka/expthypocs/sample.html

The hypocoristics presented to each participant were randomly chosen from a set of derived hypocoristics. The combinations of the names and the stories were randomized across subjects. The same stimulus was not presented twice to any participant, and no participant saw different hypocoristics derived from the same base name.

5.4 Conditions and Hypotheses

Experiment 2 had eight target conditions, shown in (9) along with exemplifying base names and hypocoristics.

(9) Target conditions of Experiment 2[8]

a.	Non-initial truncation deriving #D	(e.g. /jama.zaki/ → zaki-saN)
b.	Non-initial truncation deriving #T/#R	(e.g. /hama.saki/ → saki-saN)
c.	Non-initial truncation deriving #wara, etc.	(e.g. /huzi.wara/ → wara-saN)
d.	Initial truncation of the base names for (a)	(e.g. /jama.zaki/ → jama-saN)
e.	Initial truncation of the base names for (b)	(e.g. /hama.saki/ → hama-saN)
f.	Initial truncation of the base names for (c)	(e.g. /huzi.wara/ → huzi-saN)
g.	Non-ini. trunc. deriving #D by voicing change	(e.g. /kawa.kami/→ gami-saN)
h.	Initial trunc. deriving #D by voicing change	(e.g. /kawa.kami/→ gawa-saN)

If Deliberate Markedness operates across the board in non-initial truncation, hypocoristics in Condition (a) are predicted to be rated higher than those in Condition (b). Both the distinctiveness-based and recoverability-based accounts predict that items in Condition (e) should receive higher ratings than those in (b). Hypocoristics in Conditions (g) and (h) arguably fail to satisfy one of the necessary conditions for hypocoristic formation (i.e.

[8] For the purpose of clarity, we use the same base names and hypocoristics as in Experiment 1 for examples, although they were not actually included in the Experiment 2 stimuli. R represents 'sonorants'. For Conditions (b) and (e), we put voiceless obstruents and sonorants into the same category as opposed to voiced obstruents, since they often behave alike in terms of voicing in Japanese (see Mester & Itô 1989 for discussion on the application of Lyman's Law in Rendaku). The stimuli also included morpheme-medial truncation hypocoristics deriving #T or #R (e.g. /naka.tani/ → kata-saN). Since this condition is orthogonal to the purpose of Experiment 2, we treated these words as fillers.

a requirement on voicing faithfulness). Again, both accounts expect them to be rated considerably low. The two accounts make different predictions with respect to the difference between Conditions (b) and (c). If the recoverability-based analysis is correct, hypocoristics in Condition (c) are predicted to be rated higher than those in Condition (b), while such a disparity is not expected under the distinctiveness analysis because there is no immediately obvious reason that non-initial truncation is motivated in either of the two conditions.

5.5 Results

Figure 3 plots the average naturalness ratings of hypocoristic formation in the eight conditions, starting with the most highly rated one. Each condition is accompanied by a representative example.

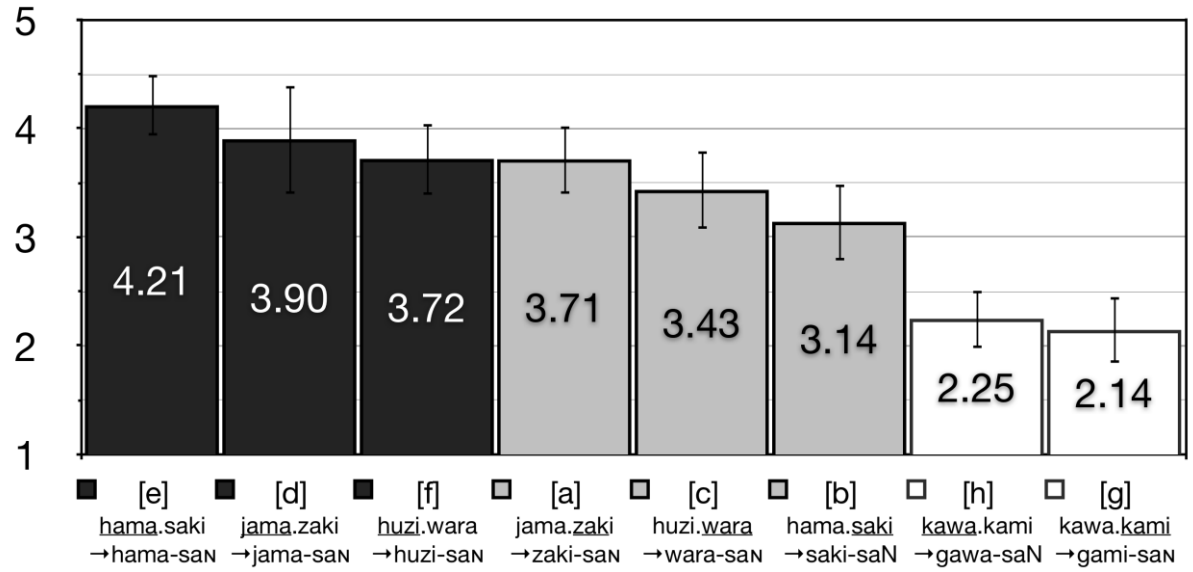

Figure 3: Experiment 2 results - Average naturalness ratings in eight conditions (error bars: 95% confidence intervals)

A one-way repeated measures ANOVA indicated a significant main effect of Formation Condition on the naturalness ratings ($F(7, 280) = 32.529$, $p < 0.0001$). Post-hoc pair-wise comparisons using Bonferroni's adjustment were also carried out. The hypocoristics in Condition (e) were rated significantly higher than those in Condition (b) ($p < 0.0001$), confirming the predictions of both accounts. Although it can be seen that the average rating points of Condition (a) were higher than those of Condition (b), the difference did not turn out to be statistically significant ($p = 0.217$). This means that, although there seems to be a tendency for #D to be preferred, the preference was not robust enough to provide a definite conclusion. The difference between Condition (b) and Condition (c) was not significant either ($p = 1.000$), meaning that the effects of special allomorphs/morphemes were not attested in this experiment.

In sum, the results did not offer us unequivocal evidence favoring one hypothesis over the other. The fact that the effects of Deliberate Markedness were not as evident as in Experiment 1 makes it particularly difficult to draw a valid conclusion from this experiment. In what follows, we discuss possible interpretations of these results.

6. Discussions

6.1 Interpretations of the General Results

The results of Experiment 1 demonstrated a systematic preference for #D hypocoristics over hypocoristics with no *#D violations, providing support for the existence of Deliberate Markedness. In Experiment 2, however, the effects of Deliberate Markedness were not salient, at least not to such an extent as to allow us to conclude that Deliberate Markedness strongly operates. Also, the difference between Condition (b) and Condition (c) in Experiment 2 was not significant, contrary to the prediction of the recoverability account. That said, an interesting fact can still be found in the pair-wise comparisons between the non-initial truncation conditions and their initial truncation counterparts. As we just observed, the hypocoristics in Condition (b) were rated significantly lower than those in Condition (e). On the other hand, the average rating scores of Condition (a) and Condition (c) were not significantly lower than those of Condition (d) and Condition (f), respectively (*p*s = 1.000). This leaves the possibility that non-initial truncation is usually less acceptable than initial truncation, but it ameliorates acceptability if it derives hypocoristics with an initial voiced obstruent or a special allomorph in initial position. Then the reason that the experiment did not yield clear-cut results might possibly be attributed to some confounding factors that are at this stage unknown. Since we cannot simply draw a conclusion from non-significant results, we take these results not as evidence for the recoverability account (let alone for any other claim) but as hints for future research.

Note also that, in both experiments, hypocoristics in non-initial truncation conditions were rated relatively high, sometimes even as high as those in initial truncation conditions. This was rather surprising at least to the present authors in light of the fact that non-initial truncation is of extremely rare occurrence.[9] Perhaps, the relatively high acceptability of non-initial truncation might have been caused by the existence of those hypocoristics that are clearly unacceptable, namely those derived by voicing alternation and morpheme-medial truncation. We thus cannot deny the possibility that the ratings of these extremely unacceptable cases affected those of other hypocoristics in general. That is, due to the fact that hypocoristics derived by voicing alternation and morpheme-medial truncation are completely ill-formed, the general rating scores of initial truncation and non-initial truncation might have been raised so much as to blur the differences within the non-initial truncation conditions. If this scenario is what actually happened, the effects that we expected to show were possibly somewhat masked in our experiments.

We should also consider the possibility that the phenomenon is driven by the cumulative effects of distinctiveness and recoverability; it might be that only when the conditions for distinctiveness and recoverability are simultaneously met (as in /jama.zaki/ → zaki-saN) do we find the phenomenon. We would like to leave all these issues for future research.[10]

6.2 Implications: Psychological Reality of *#D and the Lexical Strata

While certain properties of Deliberate Markedness are still shrouded in mystery, the results of the present study have some theoretical implications. As has been discussed throughout the paper, native Japanese words disfavor initial voiced obstruents, whereas non-native words tolerate them. One way of capturing this fact within the framework of Optimality Theory is to propose that the constraint *#D is ranked high only in the native

[9] Indeed, all of the examples given in Poser (1990) and Mester (1990) are of the initial truncation type, and they do not even deal with non-initial truncation cases.

[10] See Tanaka (in prep.) for proposals and experiments along these lines.

stratum and that it is outranked by IDENT[voice] in other strata. To implement this idea, one needs to assume that the Japanese phonological grammar has a stratal structure and that constraints can be reranked at different strata (see Itô & Mester 1995a, 1999, among others).

However, this lexical stratification hypothesis has been challenged by some researchers. For example, Rice (1997) questions Itô, Mester and Padgett's (1995) argument that *NT (Don't have a voiceless obstruent after a nasal) is active in the native stratum but not in others. Her claim is that, if voicing is contrastive after a nasal in a fair amount of words in the language (i.e. words of Sino-Japanese origin, mimetics, etc. can have a voiceless obstruent after a nasal), leaners should simply conclude that the contrast exists in the entire grammar. On this view, the distributional differences based on etymology might well be attributed to historical factors, which are less of an issue for theories of synchronic grammar, and one would not even need to posit two different strata. We do not go into the details of this particular discussion on *NT here. Interested readers are referred to Itô, Mester and Padgett's (1999) reply to Rice. Turning back to our discussion on initial voiced obstruents, one could also argue that *#D is no longer operative in Modern Japanese (cf. Kuroda 2008), attributing the relative rarity of initial voiced obstruents to historical factors. If this is true, then there seems to be no compelling reason to assume that the Japanese lexicon is stratified into several layers (see Gelbart & Kawahara 2007 for a summary of the relevant discussions on the lexical stratification hypothesis and its competing hypotheses).

As we have seen, however, Japanese hypocoristic formation (of the non-initial truncation type) is sensitive to *#D. This suggests that Japanese speakers know that initial voiced obstruents are marked at a particular stratum. Some recent experimental studies have shown that lexical stratification is psychologically real in Japanese speakers' minds (Moreton & Amano 1999; Gelbart & Kawahara 2007). This study can be taken as another piece of evidence for the psychological reality of the stratal organization of the Japanese phonological grammar.

6.3 Further Issues

The phenomenon also raises an issue as to how to implement Deliberate Markedness within a grammar model. If the phenomenon is driven by speakers' desire to violate *#D as hypothesized by the distinctiveness-based account, we will need a grammar that allows not only violable constraints but also the ones that need to be violated. In a model assuming weighted constraints, one possible approach to purse is to posit constraint weights on both sides of zero, although many models limit weights to a single side (see Pater 2009 for relevant discussion). Notice, though, that the question still remains as to how we can account for the fact that violations of certain markedness constraints are favored only in particular contexts.

Similarly, the recoverability account also leaves us with a question of how we can implement the blocking effects as envisaged under this analysis (aside from the fundamental question of how recoverable is recoverable enough). As we have seen, the core idea of this analysis is that if truncation creates an ambiguity, the occurrence of a form that is expected to be well-formed is obviated. Note that one cannot simply postulate a constraint that directly penalizes ambiguity. Such a constraint does not fall under the jurisdiction of phonology because its violation does not depend on the structure of a form per se. In other words, whether or not a given sequence has a recoverability problem cannot be determined simply by looking at its phonological form alone. All in all, whether the key factor is distinctiveness or recoverability (or possibly both), the Deliberate Markedness phenomenon constitutes an important issue to the current theories of phonology.

7 Concluding Remarks

In this paper, we discussed an unusual phonological phenomenon in Japanese hypocoristic formation which we dub Deliberate Markedness, where marked forms seem to be preferred over unmarked forms. We presented two experiments that were designed to shed light on the properties of this phenomenon. The results of the experiments indicated that the phenomenon is governed in a systematic fashion. Admittedly, the present study as it stands does not provide a deep analysis of why this phenomenon should occur at all, and to that extent it is vulnerable to criticism. Nonetheless, it has important implications; namely, our findings provide empirical support for the psychological reality of the constraint *#D and the lexical stratification hypothesis.

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