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Recognition of Accent Patterns across Dialects in Japanese
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I. Introduction

Most studies of Japanese pitch accent, even when discussing dialectal differences, focus on speakers with minimal variation and minimal exposure to other dialects (Sibata 1958 and Sugito 1982 are exceptions). However, contact between speakers of different dialects is extremely common in modern Japanese society. Most sociolinguistic studies of dialect contact, on the other hand, emphasize speech production, not the speaker's perception of other dialects, and investigate segmental dialectal differences, not differences in suprasegmentals. Previous work on speakers' acquisition of new dialects from the perspective of production, as well as the rare work on perception of segmental differences in a non-native dialect (Labov 1989), has identified several factors which influence speakers' and listeners' ability to acquire the features of another dialect which differ from their own dialect. In this paper, I will report on an experiment which investigates the applicability of those factors to perception of a non-native dialect and to suprasegmental dialectal differences. Because the Japanese dialects display important differences in their pitch accent systems, and because there is considerable contact between speakers of different dialects, Japanese lends itself well to this investigation.

When speakers of one dialect talk with speakers of another dialect, to which they have some exposure, how do they use phonetic information from the other dialect which conflicts with what they would have heard from a speaker of their own dialect? Or do listeners use the conflicting phonetic information at all? Labov (1989) proposes three possibilities. Taking the example of how Birmingham listeners understand Chicago speakers, who have a very different vowel system, he suggests that first, the Birmingham listeners "may have already built a pan-dialectal phonology that includes the Chicago realizations of English vowels," second, "they may deduce the systems by observing several correlated changes," or third, "failing to decode the vowels in an appropriate way, they may discard the vowel information and use morphological, syntactic, semantic and pragmatic information to deduce the meaning" (Labov 1989:176). That is, listeners may already know enough about the other dialect's phonology to use the conflicting phonetic information, they may figure out the mapping from the phonemes of the other dialect to their own from "correlated changes," or they may simply ignore the conflicting phonetic information and use higher order information (top-down processing) instead. Labov found that rather than any of these possibilities leading to successful understanding, listeners were surprisingly unsuccessful at decoding words of the other dialect at all.

The case Labov was investigating involved a chain shift in the vowel system, and there was relatively little contact between the two dialects, at least for the subjects who participated in the experiment. The second possibility Labov proposes, that listeners deduce the system of the other dialect while hearing it by noticing the pattern of changes, seems to apply only to chain shifts, where there is such a pattern to notice. In addition, if there is extensive contact between the two dialects, the first and second possibilities (already knowing the phonology of the other dialect and deducing it) would probably not be distinct. Thus, in a situation without chain shifts

and with more contact, there are just two possibilities, namely that the listener knows enough about the phonology of the other dialect to use the phonetic information, or that the listener cannot use that information and must rely on higher order information instead.

The situation in Japan is quite different from the Birmingham and Chicago situation Labov was investigating. The differences between the major dialect groups of Japan are largely in the suprasegmentals, and there is no chain shift. Labov's study also involved a sound change in progress, which is not the case in Japan. Finally, there is far more contact between speakers of different dialects in Japan than between Birmingham and Chicago speakers of the advanced stages of the vowel shifts. Sankoff (1968) shows that the degree of contact has a strong influence on degree of passive understanding between speakers of different dialects, so one might expect passive understanding between Japanese dialects to be more successful than between Chicago and Birmingham based just on degree of contact.

There has been little previous work on this topic. Sugito (1982) reports several experiments on cross-dialect pitch accent perception in Japanese, but she uses synthesized speech continua between different pitch contours instead of natural speech, and she reports her results in terms of where the boundary between categories falls for listeners of various dialects, not as percentage correctly identified. Thus, her purpose and experimental design make it difficult to interpret her results with regard to the question of whether listeners can use phonetic information from another dialect. Sibata (1958) discusses acquisition of Japanese pitch accent in dialect contact situations, but only from the perspective of production, and mostly in an anecdotal fashion. Graff et al. (1986) and Niedzielski (1997) both show that speakers of one English dialect have passive knowledge of another in a contact situation, but do not show whether listeners have enough knowledge of the other dialect to use it in speech perception, for example to identify minimal pairs. Both of these studies also involve only segmental differences.

II. Background on Japanese dialects

The dialects of Japanese are divided into three main groups, the Tokyo-type dialects, the Kansai-type dialects, and the accentless dialects. The differences between these three groups are primarily in their pitch accent systems, not in the segmental phonology. This paper addresses the Tokyo-type and Kansai-type dialects. The Tokyo dialect itself (although not all Tokyo-type dialects) is the prestige dialect for most situations and forms the basis of Standard Japanese. The Tokyo dialect is used for most television programming. However, in the Kansai region, the Kansai dialect has some prestige as the descendant of the language of the ancient court. There is considerable contact between speakers of Tokyo-type and Kansai-type dialects: people are transferred by their employers, go to colleges outside their own dialect area, and travel frequently for business. There is also considerable lexical variation in pitch accent placement even within a dialect (Sugito 1995, Vance 1995, Sibata 1958).

For the Tokyo-type dialects, the only aspect of the pitch accent system which is distinctive is the place of pitch fall within a word. Pitch falls after the accented mora, and the first mora of a word is predictably low unless the word has initial accent, so in a word with an accent somewhere other than the first mora, the first mora is low,

all moras from the second to the accented one are high, and all moras after the accented one are low. Words with no accent remain high through the last mora. Examples (from Vance 1987:89) appear in 1.

1. /ma'kura/	HLL	'pillow' (1st mora accent)
/koko'ro/	LHL	'heart' (2nd mora accent)
/sakana/	LHH	'fish' (unaccented)

The Kansai-type dialects have this same distinction, but in addition, they distinguish between high-beginning and low-beginning words (examples in 2). The Kansai dialects also have surface final contour tones (rising or falling, abbreviated A for ascending and D for descending) which the Tokyo-type dialects lack. Thus, several of the same tone patterns, such as HLL or LHL, can appear in both dialects, as shown in 3, but the Kansai-type dialects also have several patterns which Tokyo-type dialects do not (all examples in 2 except the first)¹.

2. /ke'eki/	HLL	'cake' (high beginning, 1st mora accent)
/keeki/	HHH	'business conditions' (high beg., unaccented)
/kanzi/	LLH	'Chinese character' (low beg., unaccented)
/aka/	LD	'red' (low beg., 2nd mora accent)
3. /ma'kura/ (T)	HLL	'pillow' (1st mora acc.)
/ka'nzi/ (K)	HLL	'manager' (high beg., 1st mora acc.)

In the remainder of the paper, I will give only representations of the surface tones, not the underlying accent pattern, for simplicity.

Both dialects make the distinction of pitch fall location within the word, so there is no question in this case of the listeners being able to perceive the distinction, but that does not necessarily mean that they have enough lexical knowledge of the other dialect to make use of that distinction. As for the high-beginning versus low-beginning distinction and the final contour tones of the Kansai dialects, Tokyo-type dialect listeners do not have those distinctions.

Turning to the question of the mapping between the dialects, some words have the same tones in both dialects (4a), some have opposite tones in the two dialects (4b), and some have some other pattern (4c). Thus, there is no predictable mapping from one dialect to the other for tones, at least not for all words.

4. word	gloss	tones in Tokyo	tones in Kansai
4a. /kanzi/	'manager'	HLL	HLL
4b. /aki/	'autumn'	HL	LH
4c. /kanzi/	'Chinese character'	LHH	LLH
/hi/	'fire'	H	A

Chambers (1992) and Payne (1980) have shown this sort of difference to be relatively hard for speakers learning a new dialect to acquire (from the perspective of production).

Although pitch accent is distinctive both in the Tokyo-type and Kansai-type dialects (but not in the accentless dialects), it has low functional load (Vance 1987:107).

There are quite a few minimal pairs (5a, 5c) and even some minimal triplets, but there are also many homophones (5b, 5d). It is not clear that listeners need to use pitch accent information to understand speech.

5. for Tokyo
- | | | | |
|-----|---------|-----|---------------------|
| 5a. | /kanzi/ | HLL | 'manager' |
| | /kanzi/ | LHH | 'Chinese character' |
-
- | | | | |
|-----|--------|----|------------|
| 5b. | /kaku/ | HL | 'each' |
| | /kaku/ | HL | 'to write' |
-
- for Kansai
- | | | | |
|-----|---------|-----|-----------------------|
| 5c. | /keeki/ | HHH | 'business conditions' |
| | /keeki/ | HLL | 'cake' |
-
- | | | | |
|-----|--------|----|---------|
| 5d. | /kami/ | HL | 'paper' |
| | /kami/ | HL | 'god' |

III. Experimental design

In order to find out whether speakers of Tokyo-type and Kansai-type dialects can make use of pitch accent information from the other dialect, I constructed two word lists, one to be read by a Tokyo speaker and heard by Kansai listeners (6), and one to be read by a Kansai speaker and heard by Tokyo listeners (7).

6. words read by Tokyo speaker, heard by Kansai listeners
- | | word | gloss | tones in Tokyo | tones in Kansai |
|-----|--------|------------|----------------|-----------------|
| 6a. | /hasi/ | chopsticks | HL | LH |
| | /hasi/ | bridge | LH | HL |
| | /kata/ | shoulder | HL | LH |
| | /kata/ | shape | LH | HL |
| | /ame/ | rain | HL | LD) |
| | /ame/ | candy | LH | HH) |
-
- | | | | | |
|-----|--------|---------|----|----|
| 6b. | /isi/ | thought | HL | HL |
| | /isi/ | stone | LH | HL |
| | /kami/ | god | HL | HL |
| | /kami/ | paper | LH | HL |
| | /kati/ | value | HL | HL |
| | /kati/ | winning | LH | HL |
-
7. words read by Kansai speaker, heard by Tokyo listeners
- | | word | gloss | tones in Tokyo | tones in Kansai |
|-----|--------|-------------|----------------|-----------------|
| 7a. | /hasi/ | chopsticks | HL | LH |
| | /hasi/ | bridge | LH | HL |
| | /kata/ | shoulder | HL | LH |
| | /kata/ | shape | LH | HL |
| | /ima/ | now | HL | LH |
| | /ima/ | living room | LH | HL |

7b.	/ito/	string	HL	LH
	/ito/	intention	HL	HL
	/kaku/	to write	HL	LH
	/kaku/	each	HL	HL
	/katu/	to win	HL	LH
	/katu/	cutlet	HL	HL
7c.	/e/	picture	H	A
	/e/	handle	L	H
	/hi/	fire	H	A
	/hi/	sun	L	D
	/haru/	spring	HL	LH
	/haru/	to stick	HL	HH

D=descending tone, A=low ascending tone

The pitch accent dictionary used was Sugito (1995) for both dialects. In the case of the Kansai dialect, the pitch accent dictionary lists the pronunciations used by six speakers (three younger, three older) for each word. I attempted to use words for which all six speakers agreed on the tone pattern.

The first half of the Tokyo speaker's words (6a) have opposite tones in Tokyo and Kansai dialects (with the exception of /ame, ame/ which was later found to have other problems, as well). In Labov's terms, these words have lexical opposition for the Kansai listener: when the Kansai listener hears the Tokyo speaker's pronunciation of one of these words, it is the same as a word in the Kansai listener's own lexicon, but that is a different word from the one intended by the Tokyo speaker. For example, when a Kansai listener hears the Tokyo pronunciation of /kata/ HL 'shoulder,' it is a word for the Kansai listener, but it is the word 'shape,' not 'shoulder.' When the Kansai listener hears the Tokyo pronunciation of /kata/ LH 'shape,' it is also a word in the Kansai listener's lexicon, but it is 'shoulder,' not 'shape.' The words in 7a, similarly, have lexical opposition for the Tokyo listener.

The words in 6b are distinguished in the Tokyo dialect, but are homophones in the Kansai dialect, and there is no lexical opposition for these words. When a Kansai listener hears the Tokyo speaker's pronunciation of /isi/ HL 'thought,' it could be either 'thought' or 'stone' in the Kansai listener's lexicon. For the Tokyo pronunciation of /isi/ LH 'stone,' however, there simply is no such item in the Kansai listener's lexicon. The words in 7b present the same situation for the Tokyo listener. The words in 7c are homophones or near homophones² in the Tokyo dialect, but are distinguished in the Kansai dialect through a distinction which does not exist in the Tokyo dialect. Here, there is also no lexical opposition. Since the Kansai dialect has all the pitch accent distinctions the Tokyo dialect does, there is no such category (of words with a distinction the listener does not have) for the Kansai listeners.

Labov (1989) has shown that lexical opposition makes it more difficult for listeners to acquire forms of another dialect, even for perception. However, when words which are distinguished in another dialect are homophones in one's own dialect, learning the forms of the other dialect requires the equivalent of undoing a merger, and Chambers (1992) has found that this sort of dialectal difference is relatively difficult to acquire (for production). When the other dialect uses a distinction which

is not made in one's own dialect, this also makes it more difficult to acquire the forms of the other dialect. Thus, none of the categories of tone mappings between the Japanese dialects should be easy for speakers of the other dialect to acquire.

The words in 6 were read by one female speaker of the Tokyo dialect, and the words in 7 by one female speaker of the Kansai dialect. 12 to 15 repetitions of each word in isolation were recorded, with the words read in a different random order for each repetition. Both speakers were native speakers from their respective areas of the country, the Tokyo area for the Tokyo speaker, and the Kyoto-Nara area for the Kansai speaker. Before recording, the word lists were checked with the speakers to make sure they used the pattern listed in the pitch accent dictionaries for all the words they were to read. The Kansai speaker was able to produce the word list in the Kansai dialect, despite the extremely formal speech situation. (This was not a problem for the Tokyo speaker, as she spoke the standard dialect.)

Ten different tokens of each word were digitized at 16,000 Hz, randomized, and recorded onto a tape with a pause of approximately 2 seconds between tokens. An additional token of one word from each pair was included to provide an unbalanced experiment, but this eleventh token was not included in the results. In the case of the Kansai reader, there were originally six additional words in the word list, and tokens of these words were included in the experiment, but they are omitted from the results because of an experimental design problem.

Eight speakers of Kansai-type dialects and eight speakers of Tokyo-type dialects participated in the experiment as listeners (hereafter referred to as Kansai listeners and Tokyo listeners). All were employees of ATR, which is in Kyoto (Kansai area). The Kansai listeners had all lived (nearly) their entire lives in the Kyoto, Osaka, Nara, or Wakayama areas³ (the main areas of the Kansai-type dialects), so their exposure to the Tokyo dialect was primarily through television and through working at ATR, which has many employees on temporary assignments from the Tokyo area. Tokyo listeners came from a variety of areas in which Tokyo-type dialects are spoken (Tokyo, Kanagawa, Nagoya, Okayama). The Tokyo listeners were all living in the Kansai area at the time of the test, since all were employees of ATR, and they thus had daily exposure to the Kansai dialect. They had lived in the Kansai area for three months to three years at the time of the experiment, and none could speak the Kansai dialect. None had lived in the Kansai area as children except subject T7, who had lived in Osaka from age 13 to 18 and thus had the most exposure to Kansai dialect of any of the Tokyo listeners.

All of the listeners first took a short pretest (12 items) on their own dialect, in which they heard tokens spoken by the reader of their own dialect. They then took the full length test on the opposite dialect. For both the pretest and the main part of the experiment, listeners were seated in a sound booth and heard tokens over headphones. The answer sheet showed the Chinese characters (which disambiguate meaning) for the two members of each pair, and listeners circled the character of the word they thought had been said. The first page of the answer sheet was for the pretest, and taking the Kansai listeners as an example, the first page was clearly labeled "Kansai dialect" in Japanese. The remaining pages of the answer sheet were used for the main test, and the second page was clearly labeled "Tokyo dialect." Kansai listeners were instructed that the first 12 items would be in the Kansai dialect, and the remaining items in the Tokyo dialect, and the separate parts of the

answer sheet were pointed out. They were instructed that they should respond by circling what the word they heard was in the dialect they were hearing. A translation of part of the instructions to Kansai listeners appears in 8. Listeners were given a written copy of the instructions, and I also read the instructions aloud, except for the portion of the instructions giving examples, which was not read aloud in order to avoid influence from my own pronunciation of the example words. Instructions and methods were identical, in reverse, for Tokyo listeners.

8. Translation of part of instructions to Kansai subjects (presented in Japanese)

"The first 12 words will be in Kansai dialect. After that, you will hear about 130 words in the Tokyo dialect. . . . On the answer sheet, please circle the word you heard on the tape. **When you are hearing the Kansai dialect, please answer what the word you heard was in the Kansai dialect, and when you are hearing the Tokyo dialect, please answer what the word you heard was in the Tokyo dialect.** The order is as in the following example:

Tape:	Answer sheet:			
/ima/ (in syllabary)	今	'now'	居間	'living room'
/hasi/ (in syllabary)	橋	'bridge'	箸	'chopsticks'

The purpose of the pretest was to make sure that that none of the listeners were ignoring pitch accent information completely, even in their own dialect, and to make sure that listeners were able to do the task. After the experiment, I had each listener read both word lists out loud in order to find out whether the forms they produced themselves for these words agreed with the pitch accent patterns expected for their dialect.

IV. Results

The results, in percent correct for the various word types and dialects of listeners, appear in Table 1 and graphically in Figures 1a and 1b.⁴

TABLE 1. Results, in % correct for different word types and listeners.
(K=Kansai listener, T=Tokyo listener)

listener	own dialect	6a words (lex. opposition)*	6b words (no lex. opposition)	*(in parentheses, results without ame/ame pair)
K1	75.0	51.7 (40.0)	73.3	
K2	33.3	83.3 (75.0)	88.3	
K3	58.3	70.0 (67.5)	96.7	
K4	83.3	81.7 (75.0)	93.3	
K5	58.3	18.3 (25.0)	16.7	
K6	75.0	46.7 (37.5)	83.3	
K7	41.7	86.7 (80.0)	86.7	
K8	100.0	100.0 (100.0)	100.0	
average	65.6	67.3 (62.5)	79.8	

listener	own dialect	7a words (lex. opposition)	7b words (no lex. opposition)	7c words (dist. does not exist in own dialect)
T1	100.0	88.3	75.0	55.0
T2	100.0	0.0	83.3	41.7
T3	100.0	48.3	96.7	46.7
T4	100.0	6.7	63.3	58.3
T5	100.0	0.0	25.0	43.3
T6	100.0	6.7	66.7	38.3
T7	100.0	10.0	98.3	78.3
T8	100.0	91.7	71.7	58.3
average	100.0	31.5	72.5	52.49

Figure 1a. Kansai listeners' results.

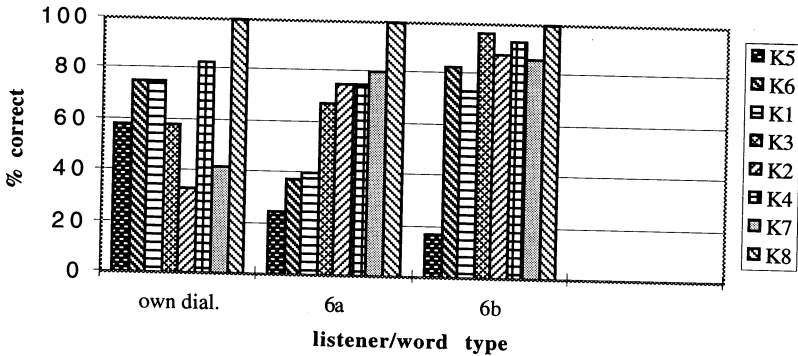
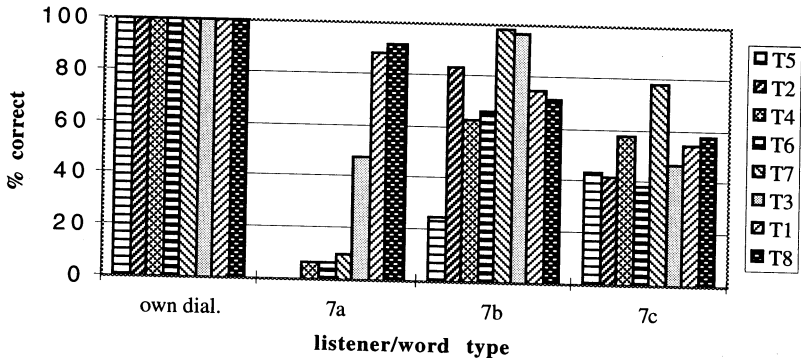


Figure 1b. Tokyo listeners' results.



In the post-test elicitation (in which each listener produced all the forms on the word lists), I found that the Tokyo listeners for the most part produced the same forms the

dictionary lists for the words in question, except for the word /haru/ 'to hang,' which they pronounced LH instead of HL (in agreement with another pitch accent dictionary, NHK 1985). Among the Kansai listeners, some consistently produced Kansai forms, but some produced half or more Tokyo forms. Not surprisingly, it seems that some Kansai speakers use the standard Tokyo forms in the formal speech situation of reading a word list.

V. Discussion

There is a great deal of individual variation in the results shown above, but some patterns do emerge. First, there is a slight tendency for Kansai listeners to be more successful at using pitch accent information from the Tokyo dialect than vice versa. Some Tokyo listeners can identify words in the 7a and 7b groups correctly with more than chance frequency, but more Kansai listeners than Tokyo listeners score above chance. This tendency is not significant, however (between subjects ANOVA for Kansai and Tokyo listeners using the average of 6a/6b and of 7a/7b: $F=2.88$, $p>0.05$).

Second, both Kansai and Tokyo listeners are better able to identify words with no lexical opposition (6b, 7b) than those with lexical opposition (6a, 7a). This difference is significant, as tested by a mixed ANOVA with dialect as the between subjects factor and word type (6a and 7a against 6b and 7b) as the within subjects factor ($F=12.30$, $p<0.005$). This effect matches Labov's (1989) results.

Third, Tokyo listeners score around chance on words with a pitch accent distinction their own dialect does not have (7c words). This group of words is harder for them than the words with no lexical opposition and a distinction they do have in their own dialect (7b), but easier than the words with lexical opposition (7a). For the Tokyo listeners, the difference between the three word types (7a, 7b, 7c) is significant (within subjects ANOVA, $F=5.57$, $p<0.02$). Since the results are not normally distributed, however, this effect should be considered marginally significant.

Finally, the pretest yielded an unexpected result: Tokyo listeners find it easy to identify pitch accent minimal pairs in their own dialect, but Kansai listeners do not. The difference between the two dialect groups' performance on their own dialects is significant ($F=19.51$, $p<0.001$). The surprisingly low scores of the Kansai listeners for their own dialect are not due to regional differences within the Kansai dialects: the Kansai accent dictionary is based on productions by Osaka speakers, but Kansai listeners K4 and K8 are from Wakayama and Kyoto, respectively, and scored quite high on the pretest, while K2 is from Osaka, but had the lowest score on the pretest. There may be some correlation between ability to produce words in isolation in Kansai dialect and high scores on the pretest (K2 and K7, the two lowest scorers on the pretest, both produced many Tokyo forms), but several listeners who were able to produce Kansai forms for the word list also scored rather low on the pretest (K5, K3).

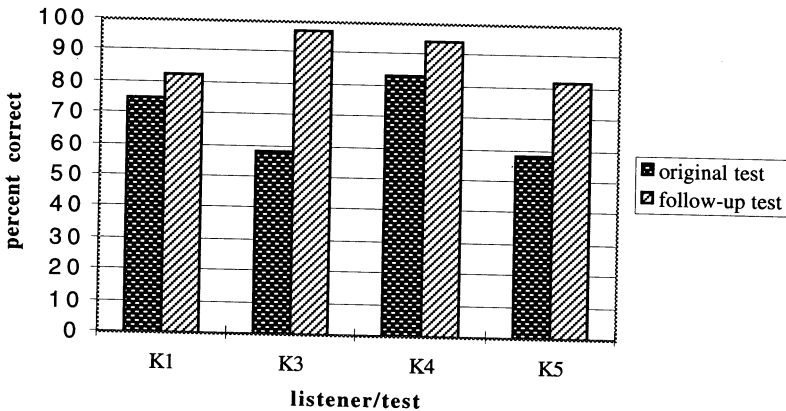
VI. Follow-up test

Because the pretest, on which the Kansai listeners showed poor identification of minimal pairs in their own dialect, was so short, I conducted a follow-up test on a subset of the Kansai listeners. These listeners were given the full length test on the Kansai dialect (all of the stimuli from the Kansai reader originally presented to the Tokyo listeners). The format of the test and instructions were as above, except that the test involved only the Kansai dialect. The results are shown in Table 2, and Figure 2 gives a comparison for each listener of the original pretest and the average for all parts of the longer follow-up test.

TABLE 2

listener	7a words	7b words	7c words
K1	75.0	86.7	86.7
K3	96.7	100.0	95.0
K4	95.0	98.3	90.0
K5	68.3	86.7	91.7
average	83.8	92.9	90.9

Figure 2. Kansai listeners-comparison of original and follow-up tests on own dialect.



One can see that these Kansai listeners are better able to identify minimal pairs distinguished by pitch accent in their own dialect when given the full-length test than they were during the pretest. I do not believe this could reflect confusion about which dialect they were hearing and responding to during the pretest, because of the precautions taken to make clear which dialect was being used for which part of the test, as discussed above. In addition, if Kansai listeners' low scores on the pretest had been due to simple confusion about the format of the test, Tokyo listeners might have shown the same effect of confusion, but Tokyo listeners identified all minimal pairs correctly on the pretest. Instead, I believe that the higher scores of Kansai listeners on the longer follow-up test on their own dialect reflects the additional

practice these listeners had had: by the time of the follow-up test, these listeners had participated in the original experiment, and had been asked to read all the words of the list out loud (at which point they knew that pitch accent and dialect were at issue). The follow-up test gave them further opportunity for practice. However, even in this follow-up test, the Kansai listeners are still less successful at identifying minimal pairs of their own dialect than the Tokyo listeners were on their pretest.

VII. Conclusions

Several conclusions can be drawn from the results of these two experiments. First, the relative prestige levels of two dialects have an effect on how much speakers of one dialect know about the other, for passive understanding of the other dialect as well as for production. This is true despite extensive contact between the dialects.

For speakers of either dialect, it is harder to learn a form of the other dialect which is also a form (of a different word) in one's own dialect. That is, it is harder to learn forms which have lexical opposition. This is true for suprasegmental dialectal differences as well as for the segmental differences Labov (1989) investigated. In the case of Tokyo speakers, it is also harder to learn forms of the other dialect which use a distinction not present in the Tokyo dialect. This result is similar to the findings of Labov (1989) and Payne (1980) for speech production and segmental differences.

Perhaps because the Kansai dialect is not the standard dialect and is less likely to be used in formal speech settings, Kansai listeners appear to need more practice in order to do a task like the one in the experiment for their own dialect than Tokyo listeners do. A listening test probably corresponds to a formal speech situation, and Kansai listeners may try to use the standard dialect for this formal situation, even in listening.

Returning to the overall question of whether listeners in this contact situation have enough knowledge of the other dialect to make use of phonetic information which conflicts with their own dialect (in this case the pitch accent information) in speech perception, I have found that at least some listeners can make use of that phonetic information. I have explored factors which influence the listeners' ability to acquire passive knowledge of the other dialect, and have shown that the same effects hold for suprasegmental dialectal differences and for speech perception as do for segmental differences and speech production.

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¹ In the Tokyo-type dialects, words beginning with a heavy syllable and without initial accent have traditionally been said to begin high, without an initial L, making HHH also a possible pattern for Tokyo-type dialects if the first syllable is heavy. However, Pierrehumbert and Beckman (1988) and Poser (1984) have shown that even these words do have an initial rise in pitch. Also, an initial heavy syllable in a Tokyo-type dialect is not phonetically the same as a high-beginning Kansai dialect form, even if both are represented as having HH on the first two moras.

² The one mora words with H or L as the only tone do not appear to be homophonous in the Tokyo dialect, but it is unclear how an H or L tone is realized on one mora words spoken in isolation in the Tokyo dialect. Sugito (1982) and Vance (1995) have shown that many Tokyo

speakers do not maintain a distinction between such words in isolation, and cannot perceive a distinction even when hearing the speech of a speaker who does make the distinction.

³ Subject K4 had lived in Tokyo for four years as an adult, but had moved back to Nara five years before the time of the experiment. Subject K6 lived in Tokyo until age three, but both her parents were from the Kansai area.

⁴ The pair /ame, ame/ in the Tokyo reader's list presented a problem: after the experiment, Kansai listeners mentioned that that pair is the one used to teach children in school about the difference between Tokyo and Kansai dialects. Therefore, Kansai listeners tended to know the Tokyo pitch accent pattern of these two words very well, and this pair inflated their scores for the 6a words. The results for the /ame, ame/ pair were therefore excluded from all analyses.

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