DIFFERENTIAL ACCENT DELETION ACROSS PHRASE BOUNDARIES IN TOKYO DIALECT JAPANESE

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ABSTRACT- The subject of accent in Japanese has received substantial treatment from phonologists, but relatively little treatment until recently form phoneticians. The fact of accent deletion in Standard Japanese is universally acknowledged, but the mechanism of its function is not yet completely described. This paper addresses some of the aspects of accent reduction across phrase boundaries in conjoined sentences and concludes that the semantic nature of a phrase boundary needs to be taken into consideration when modelling the sentence declination and its effects on the realisation off a post-phrase boundary accent.

INTRODUCTION

The most thorough treatment of the subject of accent and tone structure in Standard Japanese in recent years has been that presented in Pierrehumbert and Beckmann (1988). There, the effects of phrasal prominence, position and repetition are dealt with on a phonetic level, and the assumption that an accent is simply deleted following another accent in the same phrase, in the same manner as the phonological accounts, is laid to rest. One aspect of the interaction of tone structure and F0 contours that is not dealt with in the book, however, is the effect of semantically different clause boundaries on the second accent, that is, the effect of intervening clause boundary of different strengths on the realisation of the following accent:

$$* \longrightarrow ? \ / \ * \ \$ \ (1,2,...) \ \_\_ \qquad \text{where 1,2 represent different boundary strengths}$$

This shall be the topic of this paper: observations on the effects of different clause boundaries on the realisation of a following accent in the same sentence.

THEORETICAL FRAMEWORK

Phonological accounts such as those of Shibatani (1972) or McCawley (1977) allow for the fact of declination in their autosegmental treatment of accent reduction, but do not really account for a differential reduction of the accent in different environments. Vance, for example (1987), gives the following as an example of this analysis:

$$/@ \ \text{ha ya ku } \% \ \text{na ra N da ho o} + \text{ga } \% \ \text{i i } @/$$
$$\text{H L L} \qquad \text{L M MM M L} \qquad \text{ML}$$

Here, the non-initial accents are realised as M(id) rather than H(igh), as a sequence of minor phrases in a single major phrase. It appears, however, that this will account only for the declination-inspired general reduction of F0 values in a sentence. The nature of accent reduction is not itself addressed by this theory.

METHOD

This paper examines differential reduction of the non-initial accent in this same environment, after a phrase boundary with an accent before it such as the following schema:

$$/@ \ \text{Word Word Word @ Accent } \% \ \text{Accent @/}$$
Topic as a Major Phrase   @ Divided Major Phrase

The sentences were all joined by the -te form of the adjective, but with different senses attached to it when linking the minor phrases determined by the context within which the sentences were elicited. Examples of the sentences with the different senses of the conjunction appear on the next page.

The sentences were recorded using a Nagra 4,2 reel-to-reel tape recorder, and analysed with a Voiceprint Spectograph producing wide and narrow band spectrograms with manually set levels. These spectrograms were later measured by hand, the measuring being done by plotting of the clearest high harmonics for the midpoint of each measured vowel (to eliminate as far as possible the affect of the surronding consonants), and double-checking with another harmonic.

1.   /@ ko no a me wa @ si ro kU te % ni ga i @/
      "This sweet is white, and it's bitter."

2.   /@ ko no a me wa @ ku ro kU te % ni ga i @/
      "This sweet is bitter because it's black."

The sentences were given with instructions to be read in the context of a story in which almost all the black sweets were bitter, so black colouring could be seen as an indicator of the bitter taste, and that almost all the white ones were sweet. Thus a sweet that was both white and bitter would evoke comment - "This sweet is white AND it's bitter", whereas a black, bitter sweet might only provoke the statement "This sweet is bitter because it's black". Of course there was no way of rigidly enforcing this interpretation amongst the speakers, but the data may be seen as an indication of whether the speaker maintained the distiontion between the two interpretations of the '-kU te' conjunction.

There were four participating speakers, three male and one female, all from the same age group and educational bracket, and all native speakers of Tokyo dialect Japanese. They had all volunteered for the experiment, and recordings were made separately embedded within a host of dummy questions to avoid the effects of expectations of the nature of the experiment, of declination pre-empting the end of a set. The four speakers could of course all display different patterns of intonation behaviour, but there could be expected to be three groups depending on the differentiation of the sentence types: strongly differentiated second accent treatment, non-differentiated, and negatively differentiated, that is, treated conversely to the majority of differentiating speakers. As it happened, two of the speakers were of the differentiating type to varying degrees, and one each of the remaining speakers in each of the other categories.

Reduction of the accent was measured along two parameters, F0 and Duration. F0 was measured at the half-way point in all the vowels, so that the influence of pre- or post- vocalic consonants was least, although the corpus was chosen with a view for minimally disruptive consonants in the accented syllables. Duration was measured from the beginning of the vowel immediately preceding the phrase boundary to the end of the vowel immediately afterwards, to take in not only the duration of the pause, but also the effects of lengthening of the vowel before the pause.

RESULTS

Theresults obtained through the experiment are displayed in Figures 1 and 2, Figure 1 showing the duration as measured across the phrase boundary, and Figure 2 showing the Fundamental frequency contours.
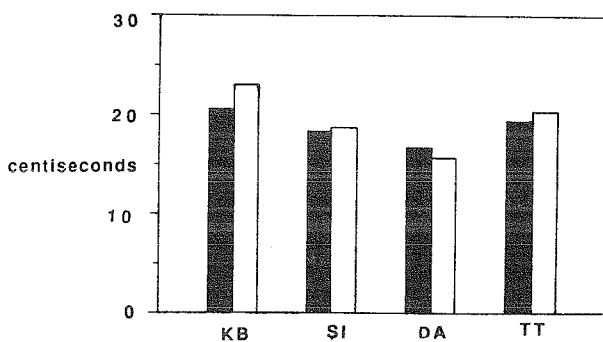

Figure 1 Mean Duration values

"and" - white column
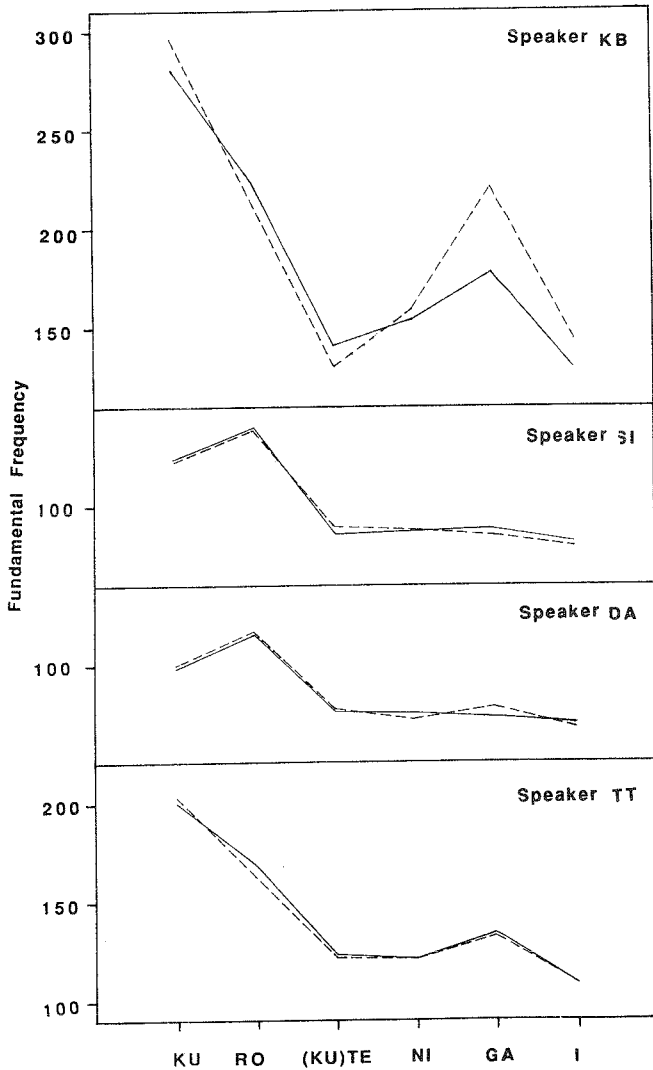"because" - shaded column

Figure 2 Mean F0 values

'and' - dotted line
"because" - solid line

Most Differentiated

The speaker who showed the greatest difference between the two sentence types was KB, the female speaker. She showed marked rises for both of the accents following the phrase boundary, and a much greater rise for the 'and' sentences than for the 'but' sentences. In terms of duration, too, the sentences were differentiated, though not as clearly as they were by the F0 contour. The peculiarity of KB's speech, that was also consistently observed in other experiments, was the shifting of the accent of an adjective when the -ku affix was added, accounting for the atypical F0 contour in the first part of the major phrase.

Speaker DA also showed differentiation of the two sentence types, with the 'and' sentences emerging as those marked by a greater F0 rise and a longer duration measured across the phrase boundary, though the results were not as spectacular as they were for KB. In particular, the post-phrase boundary accents are much more reduced than they were in KB's case, with the because sentences showing no prominent rise after the (putative) phrase boundary, though not dipping as low as did the 'and' sentences, and the second accent displaying no rise whatsoever. The 'and' sentences showed a small rise for the second accent, but interestingly in the duration measurements Speaker DA shows a greater duration measurement for the 'because' sentences than for the 'and' sentences

Non-Differentiated

Speaker TT showed prominent rises in the post-accentual position for both sentence types, unlike DA, but his treatment of the two in terms of the F0 contour was, as can be seen in the graph, nearly identical . The F0 rises showed no differentiation at all, and the duration measurements showed only a small compensatory lengthening to separate the sentence types; TT showed no significant differentiation whatsoever. This could have been due to a misunderstanding of the story that provided the background to the set of sentences, as in other experiments he performed with fairly consistent diffrentiation of different sentence types by the two parameters measured here. THe case of Speaker TT is further discussed below, under 'Discussion'.

Negatively-Differentiated

In the analysis of the two speakers mentioned above who differentiated their sentences, both showed a stronger phrasal boundary, manifested by longer duration and a greater F0 rise on the post-boundary accent, for the 'and' sentences. Speaker SI, however, showed an almost complete reduction of the post-boundary accent for the 'and' sentences, and a reduced realisation of the accent for the sentences with the 'but' conjunction. He did, however, keep the duration acoss the clause boundary longest for the 'and' sentences.

CONCLUSIONS

These results are obviously not completely conclusive, showing no absolute trend across the small body of speakers sampled. The variable treatment afforded the semantically different structures can be partially accounted for by assuming speaker comprehension of the environment (the context) in which the sentences were intended to be read. Speaker TT, who showed no F0 differentiation of the two patterns, also showed confusion when presented with synthesized data simulating the differentiation at the clause boundary found in this experiment, and would not comment on the naturalness of the sentences presented to him, or as tino which semantic class the sentences were prosodically divided. Speaker TT may, therefore, be characterised as one who does not respond well to unusual circumstances, and this explains his "siezing up" and not performing for the experiment, reading the sentences without characteristic differentiation (he had differentiated semantically different sentences in a previous experiment).

The general pattern observed is of the post-accentual position to be treated in one of three ways: a "neutral" amount of resetting of the declination baseline, reflected by a reduced, though not remarkably so, accent realisation in the second minor phrase. Both of the sentences produced by Speaker TT for this experiment show this sort of neutral pattern. There may be a "stronger" phrase boundary, intermediate in strength between Shibatani's typical minor and major phrase boundaries, reflecting a semantically greater distance between the two phrases; this is reflected in a longer pause between the phrases, and a greater F0 rise on the second accent, showing a greater reset of the declination contour at the boundary. This pattern is found in the 'and' sentences of both

Speakers KB and DA, and to a lesser extent in the 'because' sentences of Speaker SI. The last gross pattern found in the data is that of a "less than neutral" amount of resetting across the phrase boundary, resulting in a shorter pause and a reduced F0 rise on the accent following. Of course, this acyually implies that there is a certain amount of resetting of the declination contour present at all phrase boundaries, and that these "less than neutral" resettings are specified as receiving less than that, rather than actually receiving a negative reset.

The question arising from the positive data collected from this experiment, that is from those speakers who did differentiate the sentences, is why Speaker SI showed the 'because' sentences to have a greater effect on the interpretation of the phrase boundary where the other two speakers showed the greatest semantic strength with the 'and' sentences. The answer must be that the 'because' sentence is seen by Speaker SI to be the most marked of the two sentences; he has attached a greater salience to the explanation rather than to the simple listing of facts, which was the case for the other two. Thus there is not an absolute value that can be assigned to a conjunction as far as its effect on intonation goes, but rather a measure of its relationship to other conjunctions, that may be interpreted by the speaker in various ways.

DISCUSSION

In past treatments of the declination phenomenon and attempts to model them, attention has been given to the role of syntactic division as a means of producing differentials of resetting (Ladd 1988). Other features given attention include the phonetic nature of the surrounding segments, and most importantly the intonation contour associated with the particular pragmatic sense of a sentence conveyed by a speaker. This study shows that not only these factors, but also the relative prominence assigned not by the speakers pragmatic view, as reflected in the unique intonation contour, but also the inherent prominence associated with different words assigned on a semantic basis. These may be modified according to the speakers view of a situation, reflected in the intonation, but the inherent differences of these distinctions must also be seen as a factor determining intonational contours in speech production.

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