

# INTONATIONAL RISES AND INTERACTION STRUCTURE IN SYDNEY ABORIGINAL ENGLISH

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## ABSTRACT

Despite their ubiquity in intonational research, high rising terminal (HRT) intonation contours have not been investigated in Aboriginal varieties of Australian English. This paper investigates the form, alignment and use of declarative rises in the Aboriginal English spoken in Sydney. It is shown that Aboriginal speakers used five distinct types of declarative rises: high rises, low and high-range low-onset rises, and low and high-range fall-rises. Rises of the five categories were realised differently both with regard to alignment and  $f_0$  excursion. When tested against discourse context, the rises were found to have longer trajectories in interactions with little competition for dominance, and shorter excursions when either participant was dominating the floor.

**Keywords:** high rising terminal, intonation, discourse structure, Aboriginal English

## 1. INTRODUCTION

The high rising terminal (HRT) is a socially salient intonation pattern which occurs at the end of declarative statements. It is found in varieties of English worldwide, but has been claimed to be especially prolific in Australia [3, 6]. However, although it is often associated with Australian English, its distribution in Aboriginal English has not been studied within a phonetic framework. As with most other prosodic aspects of this dialect group, very little is known about the distribution and phonetic characteristics of the HRT contour in the Australian Aboriginal context.

HRTs have been attested in many varieties of English, with considerable cross-dialectal variation in their realisation. In Standard Southern British English, HRT contours are reported as low-onset high range rises ( $L^* H-H\%$ ) [4]. Ritchart and Arvaniti [12] found that in Southern Californian English, low-onset low-range rises ( $L^* L-H\%$ ) were used with the vast majority of HRT nuclei. However, in Antipodean varieties it has been reported that several types of rises can occur with declarative statements. Fletcher et al. [5, 6, 7] have shown that in standard Australian English, different types of high rises are used for declaratives and

interrogatives, and that the HRT category itself comprises several different types of rises, most prominently the low-onset high rise  $L^* H-H\%$ . They also note that high-range fall-rises behave in similar ways to more conventional HRT rises. Research on New Zealand English by Warren et al. [16, 17] also found that speakers produced a variety of intonational rises, and that statement and question rises were realised differently.

Much work on the high rising declarative pattern has centred on its functions and potential stratification among different social groups. For instance, in New Zealand, [16] and [17] investigated gender differences in the distribution and realisation of HRTs and found a tendency for women to use more statement rises than men, and to realise these rises differently. Similarly, Ritchart and Arvaniti's study shows a clear gender stratification of HRTs in Southern Californian English [12]. For Maori English, Britain and Newman [3] and Szakay [14] show that the HRT is used significantly more among Maori than Pakeha New Zealanders [6]. The hypothesis that HRTs may be used more frequently by ethnic and cultural minorities gains further evidence from findings by Guy and Vonviller [9], Horvath [10] and Jane Warren [15] on non-Aboriginal ethnic minorities in Australia. Here, recent immigrants were found to use higher numbers of HRT rises in comparison with speakers of standard Australian English. In addition, Warren commented on the social salience of the HRT in what she refers to as young, immigrant "wogspeak".

Furthermore, the HRT has been argued to play a role in signalling communicative intent. It has been shown that declarative rises can be used as floor-holding devices, and as a way of seeking verification that the listener is following the conversation [9, 15]. In Australian English, Fletcher et al. [7] report that the different types of rises are used for different communicative functions, so that high-onset rises are used mainly with information requests, low-onset high-rises with forward-looking dialogue acts and low-range rises with backward-looking acts.

The aim of the current investigation was to provide evidence of declarative final rises and their realization and distribution in the variety of

Aboriginal English spoken in Sydney. Firstly, the phonetic form of final rises in this variety was examined by measuring the extent of the  $f_0$  rise. Secondly, measurements were taken of the timing of the rise elbow and peak in relation to the endpoint of the IP-final foot. Thirdly, these findings were correlated with different levels of contextual and discourse variation to investigate potential links between prosodic and sociophonetic variation.

## 2. METHODS AND MATERIALS

### 2.1. Speakers and recordings

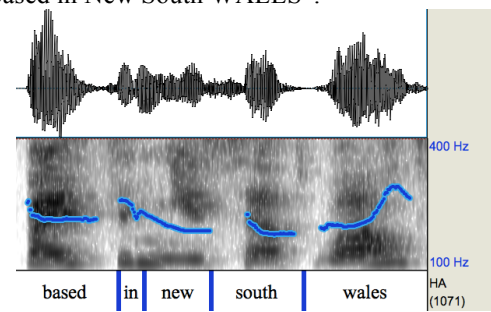
The Aboriginal English data were recorded from online radio broadcasts from Sydney's Aboriginal radio station Koori Radio. The programmes were light entertainment shows consisting of unstructured interviews with socially or culturally prominent Aboriginal persons from Sydney. The topics covered during interviews were mainly related to cultural, community and personal issues. The recordings of 5 males and 2 females were analysed, with about 7 minutes of speech analysed for each speaker. Of the speakers, 3 were categorised as younger (35–40), 2 as middle aged (50–58) and 2 as older (65–70). All speakers were resident in Sydney, and had lived there for a minimum of 20 years.

### 2.2. Labelling and analysis

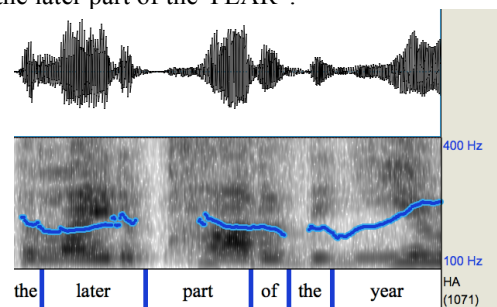
All interview recordings were carried out in Soundflower and Audacity from VLC at a 44.1 kHz sampling rate with a resolution of 32 bits. The .wav files were annotated in Praat [2] at the word level, divided into intonational phrases (IPs), and finally annotated at the tone level using the ToBI transcription system [13]. In all final rise tokens ( $n=248$ ),  $f_0$  values were extracted at the bottom elbow and peak and converted into semitones (benchmark 50). The extent of the  $f_0$  excursion (st) from the bottom elbow was then calculated. To investigate the alignment of a rise with the IP-final foot, various time points were extracted: the time of the bottom elbow and the highest point in the rise, the beginning of the nuclear vowel, and the end of the nuclear foot. From these, the timings of the elbow and rise in relation to the foot were calculated, and expressed as percentages. These measures were chosen as a way of expressing the timing of the rise, as previous research on New Zealand English [17] has shown that the timing of the starting point of HRT rises in this variety is correlated with their distribution.

Figures 1-5 illustrate the five broad groups of rises found in the dataset as produced by HA, a younger female speaker. These consist of low rises

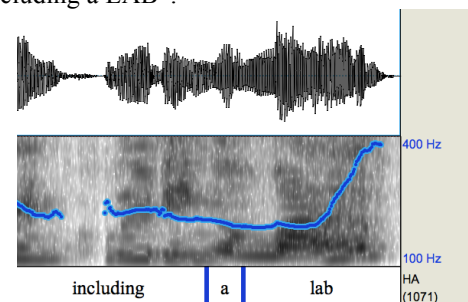
**Figure 1:** An  $H^* H-H\%$  rise on the utterance “based in New South WALES”.



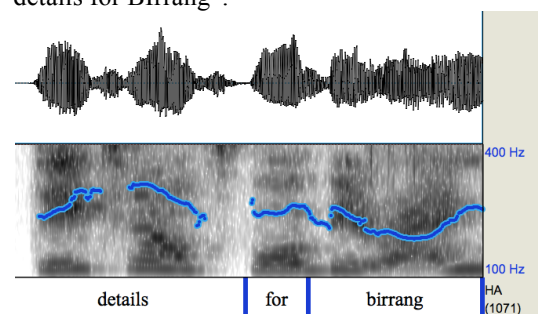
**Figure 2:** An  $L^* L-H\%$  rise on the utterance “the later part of the YEAR”.



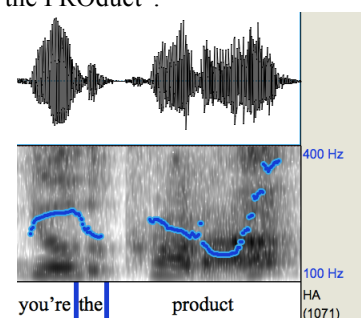
**Figure 3:** An  $L^* H-H\%$  rise on the utterance “including a LAB”.



**Figure 4:** An  $H^* L-H\%$  rise on the utterance “details for BIRRANG”.



**Figure 5:** An  $H^*+L H-H\%$  rise on the utterance “you’re the PROduct”.



(L\* L-H%), high-range low rises (L\* H-H%), high-range high-rises (H\* H-H%), low-range fall-rises (H\* L-H%) and high-range fall-rises (H\*+L H-H%). A very small number of rise-fall-rise tunes was observed in the data, but excluded from the analysis.

This investigation used an adapted version of the Discourse Context Analysis (DCA) framework [8] to conceptualise real-time changes in conversational context. The DCA framework aims to classify the discourse structure of different kinds of speech data, including activity type, interaction structure, speech acts and conversational genres. For this paper, rise tokens were correlated with interaction structure.

### 3. RESULTS

#### 3.1. f0 trajectory

As might be expected, there was a degree of variation in the number and type of rises produced. Of the final declarative rises produced, 39% were low-range low rises (L\* L-H%), 22% were high-range low rises (L\* H-H%), 16% were high-onset rises (H\* H-H%), 14% were simple fall-rises (H\* L-H%) and 9% were high-range fall-rises (H\*+L H-H%). Thus, there seems to be more variation in rises in this data set than was reported for standard Australian English by Fletcher and Harrington [5]. Excluding low-range rises from their analyses, their findings show that 84% of declarative rises were realised as L\* H-H%. In the present study, almost all speakers produced all types of rises, with one notable exception. Although five speakers produced tokens for H\*+L H-H% fall-rises, most (77%) of the tokens were produced by HA, a young, female speaker. The rest of the rises were more evenly distributed among the speakers.

Figure 6: f0 excursion by rise category.

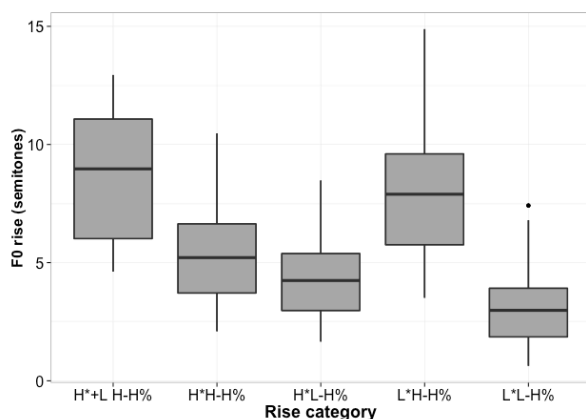


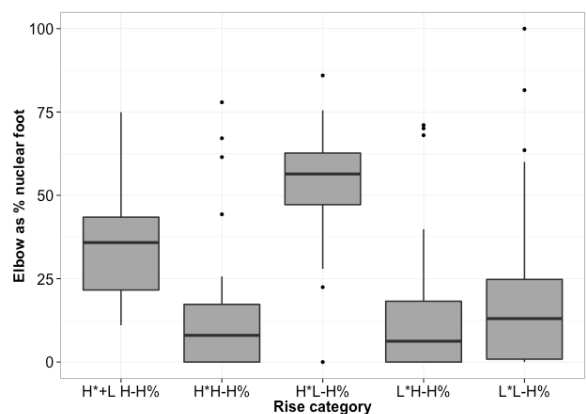
Figure 6 plots the total excursion of the rise trajectories for the five categories of final declarative

rises. The effect of rise category is significant at the .001 level (Welch's  $F(4, 78.34) = 57.76, p < .001$ ), and the only categories not reaching significance against each other in the Bonferroni posthoc test were H\* H-H% and H\* L-H% contours, and H\*+L H-H% and L\* H-H% contours, the two latter rising to approximately the same f0 heights. These results suggest that the different types of rises were realised in a consistently different manner.

#### 3.2. Timing

To investigate the timing of the rise categories in relation to the nuclear foot, two measures of alignment were calculated: the bottom elbow and peak expressed as a percentage of the total duration of the IP-final foot. There were no significant differences between the rises with regards to peak alignment. However, there were differences in the timing of the rise elbows.

Figure 7: Elbow as % foot by rise category.



As is clearly illustrated in Figure 7, the timing of bottom elbows in H\* H-H% rises and both types of low rises was not distinct, but the two fall-rise categories were both significantly different from the simple rises ( $p < .05$ ) and from each other ( $p = .002$ ).

#### 3.3. Interaction structure

The rises were tested against interaction structure, which characterises different kinds of conversational interaction. The four types of interaction categories are M (*Monologue*), AD (*Absence of Dominance*; free conversation), ID (*Interviewer Dominance*) and RD (*Reversal of Dominance*, interviewee in charge). Rises were shown to be more prolific in the ID condition, which accounts for 77% of rises. The M and AD conditions accounted for around 10% of the rises each, and, due to the natural variation of spontaneous speech, only 3% of the rises occurred during the RD condition.

The low number of rise tokens for the RD condition meant that the present data set could not be used to investigate the effect of interaction structure on each individual rise category. However, percentage counts of each rise type showed that H\*+L H-H% and H\* H-H% rises occurred more often in the M and AD conditions than the low-range rises. L\* H-H% behaved similarly to the low rises.

**Figure 8:** Rise trajectory by interaction type.

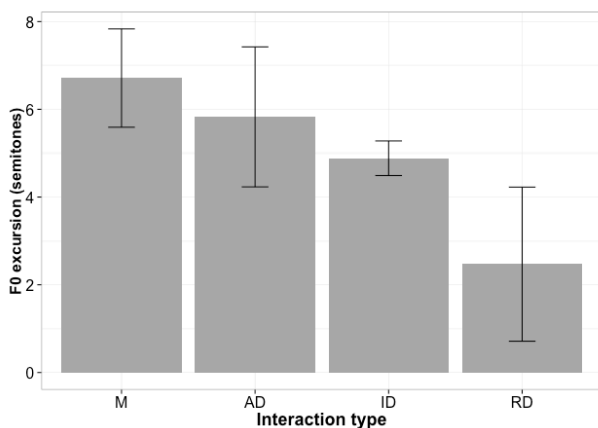


Figure 8 shows the effect of interaction structure on the excursion of all rises. The effect of interaction structure on rise trajectory is significant (Welch's  $F(3,20.33) = 7.8, p = .001$ ). A Bonferroni test showed that rise trajectories during monologues were significantly longer compared to those realized when either the interviewer ( $p = .009$ ) or interviewee ( $p = .006$ ) was taking control of the conversation. Furthermore, the relationship between the AD and RD conditions approached significance (.06). The alignment of each rise type was not influenced by interactional context.

#### 4. DISCUSSION AND CONCLUSIONS

The analyses of intonational rises in Sydney Aboriginal English presented in this paper showed that each rise type was differentiated from the others with regards to either f0 excursion or temporal alignment with the nuclear foot, or both. This suggests that speakers make a systematic difference between the rises. Furthermore, the rises form two groups in terms of f0 trajectories: low-range rises (L\* L-H% and H\* L-H%) have shorter excursions and high-range rises (L\* H-H%, H\* H-H% and H\*+L H-H%) have longer excursions. High-range fall-rises are further differentiated from low-range fall-rises in their alignment to the nuclear foot. Although more data are needed establish the patterns clearly, this adds support to Fletcher and Harrington's [6] findings that high-range fall-rises

are comparable to other HRT rises in terms of phonetic form.

In Sydney Aboriginal English, unlike in other varieties, there does not seem to be a clear candidate for the typical HRT contour. This study did not find significant differences in terms of distribution or use across interaction types between the five types of declarative rises. Moreover, there does not seem to be a reason to exclude any of the rise types from being seen as manifestations of the HRT. Although its name suggests otherwise, it is reported that the HRT can be realised both as high-range fall-rises [6] and low-range rises [12] in other varieties of English. The findings of this study thus lend preliminary support to the reports that both simple and complex rises can have phonetic correlates in common with HRTs.

The result of testing rise excursion against interaction type revealed that high-range fall-rises and high rises occurred more often in the M and AD conditions than high-range low rises and the low-range rises. However, small numbers of tokens for the RD condition meant that no statistical tests could be performed. When considering the effect of interaction type across all rise types, it was shown that the extent of their f0 excursions appear to be influenced by interaction type, with monologues and free conversations featuring longer declarative rises, and interactions where either the interviewer or interviewee was controlling the floor resulting in shorter rise trajectories.

This could partly be attributed to the association between high-range rises and the M and AD conditions. However, the low-range low rises, which account for 39% of the rises in the data set, was found to display a similar pattern to Figure 8 above. Instead, the pattern could be the result of increased speech rate during the more competitive ID and RD conditions. There could also be sociophonetic motivations behind the pattern. Bell's theory of Audience Design [1] predicts that radio broadcasters will try to accommodate to the perceived stylistic norms of their radio audience. Furthermore co-operative, unstructured conversation has been shown to yield a higher number of HRT rises. The M and AD interaction types could thus both require a higher-than-normal amount of co-operation from the speakers, resulting in more exaggerated rise trajectories. Further work needs to be done to determine more accurately the sociophonetic distribution of intonational rises in this variety of Aboriginal English.

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