PITCH RANGE AND REGISTER IN FRENCH POLITICAL SPEECH

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ABSTRACT

The aim of this paper is to present an analysis of pitch range and register of a French politician in two different political contexts. Methodological aspects will be first discussed. A contrast in pitch range and register along the hyper-hypospeech dimension is then proposed.

INTRODUCTION

Macrocontextual constraints such as general turn-taking conditions, dominance relationships between speakers, topic arrangements and rhetoric activity bear in a significant way on the use of a particular speaking style. French political speech is often characterized by a rhetoric use of acoustic-prosodic properties such as focal accent, contrasts in overall pitch and pauses (see [1] and [2]). Furthermore, prosodic correlates of a speaking style seems to be specified by the speaker in such a way that they are easily detected at a macrolevel by the listener (see [3]).

In [4], the issue of rhetorical prosody in political speaking style was addressed by analyzing contrasts in overall pitch as produced by a French politician (J. Chirac). As a result of this analysis, a two-fold categorization of overall pitch variation in French was proposed, one in terms of range and the other in terms of register. In the current study, overall pitch variation of another politician (R. Barre) has been analyzed along the time dimension represented by two different contexts a pre-electoral political speech versus a post-electoral press-conference.

Following Lindblom's H&H theory [5], we should say that this particular contextual opposition optimized a dichotomy between one context – here the pre-electoral political speech – where output constraints dominate and hyperforms are expected and a another context – here the post-electoral press-conference – where system contraints dominate and hypoforms are selected. The results show that pitch range and pitch register obviously contrast along the hyper-hypospeech dimension as defined by Lindblom.

CONTEXTS, METHODOLOGY AND RANGE & REGISTER

There is without doubt a current interest in investigating spontaneous speech. However, the term 'spontaneous speech' covers a considerable range of speech corpora. In this respect, it might be important to establish a difference between a corpus of spontaneous speech elicited *intra muros*, in the context of a phonetic laboratory for experimental purposes and a corpus of spontaneous speech produced *extra muros*, in the context of social interaction and without any experimental purpose. Why not call the former 'spontaneous lab speech' and the latter 'spontaneous speech'? (for a general discussion concerning phonetics and real speech, see [6], for the contrast between spontaneous 'lab' speech and read 'lab' speech see [7] and for an interesting attempt to simulate rhetoric in the lab see [8]).

We would like to suggest that this terminological adjustment seems revelant also insofar as it has impact on data collection, experimental methodology, and modelling paradigms.

Choosing contexts

In controlled laboratory experiments, the researcher's experimental setting can create contextual frames that are not always consistent with the informant speaker's everyday practices. This is hardly the case with *extra muros* conditions, where the context is de facto given by the social interaction. The choice of relevant contexts is therefore crucial when collecting spontaneous within-speaker data under *extra muros* conditions.

Here, the opposition pre-electoral versus post-electoral speech has been chosen because this is when persuasion (when a politician aims to gain votes) gives way to a non-persuasive pathos (when he comments his political victory or defeat). A basic assumption underlying the choice of the broadcasted pre-electoral speech is that every achievement in the referential field directed to the listening public must in reality be translated into conative achievements in the politian effort to persuade listener-voters. We can therefore assume that a pre-electoral context shaped the speaker's speech toward 'hyperform' speech, as opposed to a post-electoral context which shaped the speaker's speech toward 'hypoform' speech.

Methodology

Because we were working with spontaneous speech, the question of the research setting proved to be essential. It has resulted in a methodology where restricted samples of speech material – short and well time-defined discourse events – from conversations, interviews, political debates, political speeches and radio programs have been studied from different angles.

We have conducted four different kinds of analyses (see [9]): (1) analysis of the discourse structure of the speech corpus without specific reference to prosodic information (in order to avoid circularity), (2) auditory analysis (which is implemented as a selective prosodic transcription in Waves+), (3) acoustic-phonetic analysis, and (4) analysis-by-synthesis.

By first focussing our attention on general discourse characteristics on a speech fragment produced in a particular context and by then following a rather classic phonetic analysis, we are meeting basic methodological requirements that allow us to propose a formalized prosodic description of successive individual utterances in their specific *extra muros* context.

Modelling range & register

The majority of studies dedicated to the analysis and modelling of range and register are carried out within the *intra muros* condition where the speaker is asked to read isolate sentences simulating different emotional states or attitudes. In [10], Bruce showed that differences in attitude (detached-involved) involve pitch range variation, achieved by Fo expansion upward, the lower Fo limit being fixed. Even if Bruce noticed that not only the maxima were raised, but the minima also, he was not interpreting these raised Fo minima as changes in local register. On the other hand, Gårding's tonal grid parameters [11] clearly proposed two different types of Fo expansion between parallel lines. One denoted as 'R' which expressed a global range and another, 'r', which is the vertical distance between the grid lines which might be interpreted as change in register. Similar parameters were used by Ladd for his CSTR model [12]. The main difference is that for Ladd register makes reference to target level and not to shape as is the case for Gårding. More prosaically, Swerts & Collier [13] defined register as the mean Fo of a speech fragment (expressed in Hz) and range as the standard deviation from the mean Fo of the speech fragment (expressed in semitones).

Overall pitch variation in spontaneous French speech fragments collected under *extra muros* conditions was observed by Mertens [14]. In order to categorize these changes, Mertens proposed three registers for French: a middle register, a low register and a high register. The middle register is placed in the central part of the speaker's tonal range – it constitues the speaker's usual register. Changes from this central tonal register toward a lower or higher tonal register imply new values for the Fo interpretation of the High and Low turning-points. However, our analysis of overall pitch within the specific setting of a pre-electoral speech [4] provided evidence that we needed a two-fold categorization of overall pitch variation in French – one in terms of range and the other in terms of register. I also proposed an adjustment of the KIPROS transcription system with regard to overall pitch.

PROCEDURE

The recorded material were digitized and analyzed using the ESPS/Waves+ environment which enables transcription and labelling in multiple tiers.

An important step was the auditory analysis which provided an orthographic and a prosodic transcription of what had been recorded. More specifically, prosodic features marked for the purpose of this experiment were phrasing and overall pitch i.e. range and register.

For each transcribed prosodic phrase, a statistical program (see [15]) performs calculations on the Fo file. Fo values were collected for three pitch parameters: a local absolute Fo minimum (Fo_{min} with its temporal location), a local absolute Fo maximum (Fo_{max} with its temporal location), and a global parameter that is an average Fo (Fo_{mean}) over the whole phrase. These values were then directed to a new file and could be viewed for control with xlabel (ESPS). Detected Fo points with erratic values could be assigned manually to a new temporal location.

The values obtained for successive prosodic phrases in each setting were plotted as presented in Figures 1 and 2. All the values were also pooled and presented in Table 1. In order to capture differences in Fo variation between the different contexts, frequency modulation factors (SD/mean in %) as proposed in [17] were also calculated.

OBSERVATIONS

Figures 1 and 2 show Fo_{max}, Fo_{mean} and Fo_{min} values (with average) for successive prosodic phrases produced in the two different contexts. For the three parameters, the Fo variation is larger in the first context than in the second context. In Fig.1 the prosodic phrase 4 is representative of a reduced range but a high register. On the contrary, the prosodic phrase 10 is a good example of an expanded range with a relatively low register.

Table 1 showed that all values for Fo_{mean}, Fo_{min}, and Fo_{max} are systematically higher in the pre-electoral speech. However, the Fo expansion (calculated as Fo_{max}/Fo_{min}) used by the speaker in the two contexts is very similar in proportion across the two contexts (2.2 for the first and 2.1 for the second).

Frequency modulation factors pointed out a particular increase in variation for Fo_{max} in the first context. But it is worth noting the absolute high level of Fo_{min} which indicates also the use of high register in this context.

The Fo_{min} (91 Hz) in the non-emphatic post-electoral speech seemed to serve as a default base value (it is very near the base-value (Fb=93.4) for a male speaker of European languages (see [16])

Table 1. *Average Fo (means and standard deviation; values are in Hz) for Fo_{mean}, Fo_{min}, Fo_{max}, and frequency modulation factors in two different contexts (A: pre-electoral speech, B: post-electoral press-conference).*

	A	B
Fo_{mean}	229.1	139.4
SD	32.8	18.1
SD/mean %	14.3	12.9
Fo_{min}	141.9	91.0
SD	39.5	19.3
SD/mean %	27.8	21.2
Fo_{max}	317 .7	199.7
SD	69.1	19.6
SD/mean %	21.7	9.8

CONCLUDING REMARKS

To conclude, I would like to define two kinds of range: a voice's range which is the Fo distance between the absolute Fo maximum and the speaker's baseline (specified as the usual Fo floor), both reached across contexts, and a context specific range which is the Fo distance between the absolute Fo maximum and the speaker's baseline (specified as the Fo minimum in a specific context). A register would be defined in terms of Fo level given by absolute Fo minimun in actual prosodic phrases.

Obviously, this politician used a bi-modal overall Fo distribution, high-pitched in the pre-electoral speech and relatively low-pitched in the post-electoral conference. The pre-electoral speech, in contrast with the post-electoral speech, seemed to shape the speaker's intonation toward a more hyperform behaviour with larger and more variable Fo excursions and several changes in register.

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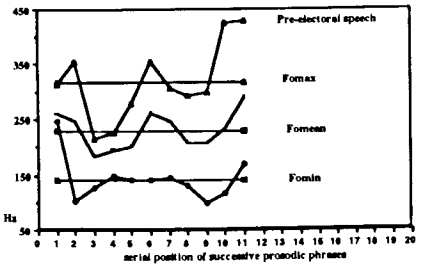

Figure 1. Fo_{mean}, Fo_{min}, Fo_{max} (with average) in pre-electoral speech (values are in Hz).

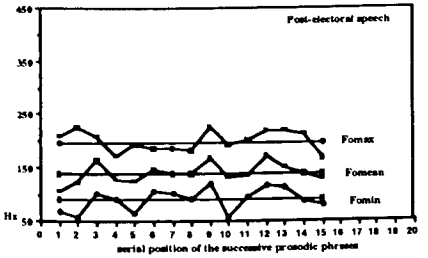

Figure 2. Fo_{mean}, Fo_{min}, Fo_{max} (with average) in post-electoral press-conference; values are in Hz