Voice Register Fluctuations in the Dynamics of an Inspirational Speech

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Abstract

The paper presents the results of an experimental-phonetic analysis of the voice register fluctuations in the dynamics of a naturally occurring inspirational public address. This research checks the validity of the hypothesis that the prosodic pattern of an oral text correlates with its communicative-pragmatic structure. The study involves communicative pragmatic, auditory, and instrumental-acoustic analysis of the original recording of M. L. King's *I Have a Dream* Address. The data obtained show that the shifts in voice register follow a certain rhythmic pattern, with a higher voice register marking pragmatically dominant, emotionally charged, parts of the speech macrostructure. The results of the study also suggest that prosodic marking of the textual foci correlates with their place and function in the pragmatic macrostructure of the whole speech.

Introduction

In recent years there has been a gradual switch in phonological studies from analyses of individual phrases to examinations of larger units of natural discourse. Correspondingly, salient aspects of intonation beyond the phrase level have come to the attention of researchers (Couper-Kuhlen, 2006). Among them is voice register and pitch range variation. Voice register can be defined as the relative position of an intonation phrase within a speaker's overall voice range (Cruttenden, 1986). Pitch range refers to the distance between the highest and the lowest pitches in the intonation contour (Crystal & Davy, 1969). Studies of natural speech have shown that changes in voice register and pitch range characterize certain patterns of emotional speech, and intonation peaks are associated with emotionally prioritized, evaluative language (Wennerstrom, 2001). In addition, upward register shift and changes in pitch range have been recognized as markers of public, especially inspirational, speaking (Atkinson, 1984). Researchers agree that sentence function and prosody are determined by the genre and macro-strategy of the whole text (Bakhtin, 1986; Gunter, 1972; Van Dijk, 1981). However, there is still rather little research on prosodic macro patterns of naturally occurring oral texts of "emphatic speech" genres (Wennerstrom, 2001).

The goal of the present study is to check the validity of the hypothesis that the prosodic macrostructure of an oral inspirational text reflects the dynamic pattern of its pragmatic structure. We base our research on the assumption that the form of a discourse and its substance are inseparable, and that the prosodic structure of speech units is connected with the purpose they must achieve in the rhetorical argumentation (Perelman & Olbrechts-Tyteca, 1971).

The study involves communicative-pragmatic, auditory, and instrumental-acoustic analyses of the original recording of the inspirational political address "*I Have a Dream*" by M. L. King. The results of the

acoustic analysis (with the application of *Speech Station 2 − 2000* software) are used to provide more accurate description of the prosodic fluctuations in the text. The research mainly focuses on the analysis of the pattern of F_0 maxima and minima fluctuations in speech progression.

Pragmatic and prosodic structure of an inspirational address

Inspirational address pragmatics can be viewed as a resulting positive effect of the psychological progression of feelings, aroused in the audience by the speaker (Cooper, 1989). The emotional pattern of the text is a function of its communicative-pragmatic macrostructure. The pragmatic macrostructure of the address is realized through a hierarchical pattern of its semantic foci that accumulate the meaning and emotional energy of the parts they represent (Novikov, 1983). Since voice pitch is recognized as one of the leading factors identifying the zones of emotional tension (Lieberman & Michaels, 1972) in speech, the study of pitch fluctuations in the whole text can help determine the prosodic macro patterns shaping the emotional dynamics of the whole text.

Basic pragmatic structure of Martin Luther King's Address "I Have a Dream"

Martin Luther King's *"I Have a Dream"* speech delivered at the March on Washington for Jobs and Freedom on August 28, 1963 can serve as a canonical example of an inspirational political speech (Greene, 2002, p. 76). The goal of the speech was to contribute to the unification of "various fractions of the civil rights movement with labor unions and other activists" and to advocate for nonviolent but active and forceful actions. In a broader context it was also aimed at the "Establishment" and prejudiced "white moderate" who was "more devoted to order than to justice" (Greene, 2002, pp. 71−76). The speaker's voice is resonant and powerful. He delivers his address in a public speaking mode with energy and emotion.

The address represents a dynamic pattern of tensions and relaxations. The speaker moves the audience through a series of psychological states: a state of nostalgic hope, despair, injustice, raised hope, urgency, determination, magnified injustice, satisfaction, increased hope, and unrestrained joy (Cooper, 1989, p. 106). Negative images are balanced with the stronger positive ones: fear with confidence, danger with courage, challenge with determination, despair with hope, violence with spiritual power, until the images from the "desired reality" replace the old ones and become "present". Textual tension that results from the "conflicting" emotional energy pulling in different directions develops in curves and reaches its highest point at the climax.

The communicative-pragmatic macrostructure of the address may be reduced to 8 basic parts (Sayenko, 2008):

1. Introduction-Identification (Identification with the audience);
2. Problems/Negative Visualization (Directing attention to the negative situation);
3. Restoration of Confidence (Arguing the right and ability to change the situation);
4. Motivation (Urging to change the situation for the desired one);
5. Restoration of Moral Principles and Values (Strengthening adherence to common values);
6. Inspiration/Visualization (Transformation of the reality into the desired one);
7. Commitment (Mobilization for action; accepting responsibility);
8. Determination/Visualization (Call for action to make the desired future present).

This basic chain structure is similar to the pattern known as Monroe's Motivated Sequence ("attention, need, satisfaction, visualization, and action") (Oliver & Cortright, 1970, pp. 130−132). However, in the case of inspirational speech, motivation is based on high moral principles and common good, inspiration is

supported by common values (brotherhood, freedom, happiness), and commitment is based on the faith in the better future for all. The parts of the text macrostructure are enlarged and enhanced by several parallel and chain substructures with recurring propositions and warrants. The parts of the pattern of reasoning (premises, evidence, conclusion) are repeated through the speech.

According to our hypothesis, the changes in voice register and pitch range in the basic pragmatic parts of the whole speech should reflect its emotional dynamics, and the highest pitch peaks should mark pragmatically dominant and emotionally charged functional parts.

Experimental-phonetic analysis and its results

Prosodically marked focal phrases (or their clusters framed with repetitions) representing each of the basic communicative-pragmatic parts of the address were selected. The *Speech Station 2 − 2000* software was used to analyze the fundamental frequency fluctuations in the extracts from the speech. The sample rate for the data was 10,000 Hz. Spectrograms and pitch contours were plotted, saved, and printed. The frequency values in the files were compared with the frequency curves in the prints, and filtered from the background noise. The data were statistically processed. The maximum and minimum F_0 values for each functional part were calculated. Pitch maxima and minima fluctuations related to the eight basic functional pragmatic parts of King's speech are represented graphically in Figure 1. The research data show that the pitch peaks mark pragmatically dominant and the most uplifting parts of the speech. The widest voice pitch range is employed in the functional parts with complex emotional dynamics marked by fluctuations in melody, tempo-rhythm, and intensity.

Martin Luther King delivers his address in public speaking mode, raising his voice from 100−120 to 150−200 Hz (for the base tone). Prosodic marking of the focal units in King's address varies through the speech. We will use traditional intonation marks (' — static stress," — emphatic static stress, ↘ - emphatic mid-falling or high-falling tone, ↗ - emphatic mid-rising or high-rising tone, → - level tone, ↑ - special rise in pitch, | - short pause, ‖ - long pause) to describe roughly the perceived difference in the prosodic arrangement of the focal phrases through the speech.

The Identification part is pronounced at a base tone level close to 200 Hz, within a narrow pitch range, and with little contrast in pitch between accented and non-accented syllables. The initial phrase in King's address sustains the level of energy and sets the rhythm and key tone for the whole speech:

'I am 'happy to 'join with 'you to ↗ day | in | what will go 'down in ↗ history | as the 'greatest 'demon'stration for ↗ freedom | in the 'history of our ↘ nation. ‖

Strongly and weakly stressed syllables are supported by the voice energy and are pronounced with little fluctuation in intensity and within the pitch range of 200−230 Hz, which makes no more than three semitones. Pronunciation of all the syllables at relatively the same level contributes to the space-filling effect of the speech.

In part 2, prosodically emphasized repetitions of *One hundred years later* introduce and frame the "problem message".

But one 'hundred 'years ↘ later, ‖ the Negro still is not free.

'One 'hundred 'years ↘ later, ‖ the life of the Negro is still sadly crippled by the manacles of segregation and the chains of discrimination.

'One 'hundred 'years ↘ later,‖the Negro lives on a lonely island of poverty in the midst of a vast ocean of material prosperity.

'One 'hundred 'years ↘ later,‖the Negro is still languishing in the corners of American society and finds himself an exile in his own land.

The repetitions in this fragment serve as attention foci. The change of tempo from slowed down to rapid (at a higher pitch level) highlights the seriousness of the problems described and the indignation the situation rouses.

From Part 1 to Part 4, the voice pitch range gradually widens, reflecting the growing emotional tension in the parts Restoration of Confidence and Motivation. Pragmatically dominant parts of the address, i.e. Motivation, Inspiration, Determination/Visualization (parts 4, 6, 8), are marked by the highest voice register and widest pitch range (Sayenko 2008).
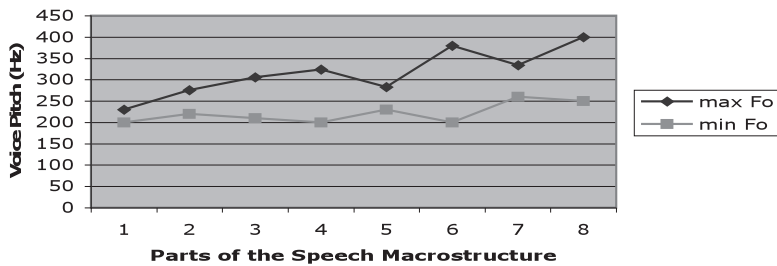

Figure 1: Fluctuations of max and min F_0 in the focal phrases of King's Address "I Have a Dream ..."

In Part 4, Motivation (Urging to change the situation for the desired one), four-repetition *Now is the time* fragment is marked by the shift of the logical stress to the first accented word "now", which makes the repetitions sound more forceful, with power and determination.

"Now is the ↘ time|to make real the promises of democracy.

↘ **Now is the time**|to rise from the dark and desolate valley of segregation to the sunlit path of racial justice.

↘ **Now is the time**‖to lift our nation from the quicksand of racial injustice to the solid rock of brotherhood.

↘ **Now is the time**‖to make justice a reality for all of God's children.

Part 6, Inspiration, is represented by a text fragment with eight repetitions of *I have a dream*. It is the longest, pragmatically most important and most emphasized fragment in the address, with its own complex rhythmic pattern of prosodic fluctuations. The contrast in the sound and "emotion" of the repetitions in this fragment is described by Benjamin Barber and Patrick Watson (1988, pp. 94−96) in the following paragraph:

... Over and over again, King appealed to an America that did not yet exist. "I have a dream," he whis-

pered; "I *have* a dream," he thundered; "I have a *dream*," he promised. And with each ringing "dream" came a murmuring tide from the thousands ... - "Yes, Reverend ... a dream ... we're with you. ... That's right, yes, yes, yes ..."

"Yes, I have a dream", he proclaimed, to an audience beyond the mall, beyond Washington, to the great majority in whose hands the future of justice in America lay ... .

The repeated segment *I have a dream* comes in two clusters and gets the greatest prosodic emphasis towards the end of the fragment (in bold, underlined), with "all flesh" (underlined) marking one of the highest pitch peaks:

I say to you today, my friend, so even though we face the difficulties of today and tomorrow, I still have a dream. It is a dream deeply rooted in the American dream.

'I · **have a** ↘ **dream**│that one day this nation will rise up and live out the true meaning of its creed: "We hold these truths to be self-evident that all men are created equal."

'I · **have a** ↗ **dream**║that one day on the red hills of Georgia the sons of former slaves and the sons of former slave owners will be able to sit down together at a table of brotherhood.

'I '**have a** ↘ **dream**│that one day even the state of Mississippi, a state sweltering with the heat of injustice, sweltering with the heat of oppression, will be transformed into an oasis of freedom and justice.

"I '**have a** ↘ **dream**║that my four little children will one day live in a nation where they will not be judged by the color of their skin but by the content of their character.

"**I** '**have a** ↘ **dream** today.

"**I** '**have a** ↗ **dream**│that one day down in Alabama, with its vicious racists, with its governor having his lips dripping with the words of interposition and nullification, one day right there in Alabama little black boys and black girls will be able to join hands with little white boys and white girls as sisters and brothers.

"**I** · **have a** ↘ **dream** today.

"**I have a** ↗ **dream**│that one day every valley shall be exalted, every hill and mountain shall be made low, and rough places will be made plane and crooked places will be made straight, and the glory of the Lord shall be revealed, and all flesh shall see it together.

The last four, most emphatic, repetitions form a powerful falling-rising rhythm: falling movement of tone on the closing repetitions and rising slowed down movement of tone on the initial ones. Rising-falling patterns of pitch fluctuations allow the gradual growth of energy tension to be almost twice as long as the period of relaxation, which matches the psychological pattern of emotional elevation.

The sharp raise of voice pitch on "all", high-fall on "flesh" (in bold, underlined), emphatic pauses, and closing cadence intensify the climaxing emotion:

... and the glory of the Lord shall be revealed, │and **"all** (0.3 seconds) │ �‌↘ **flesh** (0.6 seconds) │ shall see it together. ‖

In Part 7 of the address, the repeated segment *With this faith* occupies phrase-initial positions and marks the "lows" of the curves of tension. The repetitions are pronounced with mid-falling tone on "this," reinforcing the spiritual tone of the fragment.

With ↘ **this faith,** │ we will be able to hew out of the mountain of despair a stone of hope.

With ↘ **this faith,** │ we will be able to transform the jangling discords of our nation into a beautiful symphony of brotherhood.

With ↘ **this faith,** │ we will be able to work <u>together</u>, to pray <u>together</u>, to struggle <u>together</u>, to go to jail <u>together</u>, to stand out for **<u>freedom together</u>**, knowing that we will be free one day.

The maximum prosodic emphasis falls on the segment *to stand up for freedom together* with *freedom together* (in bold, underlined) positioned at the melodic peak of the phrase. The pitch gradually rises from 250 Hz to 360 Hz (by 6 semitones) at the climax, and then slides down to 250 Hz on the final segment of the phrase.

In Part 8, Determination/Visualization, the first two repetitions of *Let freedom ring* are pronounced with a neutral falling tone. The following repetitions that come in a rapid succession of mid-rising and high-rising tones enhance the feelings associated with joy and emotional uplift (Davitz, 1964, p. 63). The rising rhythm moves the text forward to the climax at the end of the fragment (underlined). Then the tension goes down to get ready for the next rise:

'Let 'freedom ↘ ring │ from the prodigious hilltops of New Hampshire.

'Let 'freedom ↘ ring │ from the mighty mountains of New York.

"Let 'freedom ↗ ring │ from the heightening Alleghenies of Pennsylvania.

'Let 'freedom → ring from the snow-capped Rockies of Colorado.

"Let 'freedom ↗ ring │ from the curvaceous slopes of California.

'Let 'freedom ↗ ring │ from Stone Mountain of Georgia.

"Let 'freedom ↗ ring │ from the Lookout Mountain of Tennessee.

<u>'Let 'freedom ↗ ring</u> │ <u>from every hill and molehill of Mississippi</u>.
From every mountainside, │ **'Let 'freedom → ring.**

In the final, most emphasized phrase of Part 8 (and the whole speech), three repetitions *Free at last!* are interrupted by *Thank God Almighty* that marks the final peak of tension in the whole speech (melodic peak is underlined):

"Free at ↗ last! (0.5 sec pause) │ "Free at ↗ last! (0.5 sec pause) │ **Thank ↑ <u>God "Al ↘ mighty</u>,** │ we

are "free at ↘ last!" ‖

King maintains the "unfading" vocal intensity both on accented and non-accented syllables. Upward register shifts are associated with the arousal of strong, active feelings: positive feeling and inspiring images are associated with pitch peaks, negative or neutral feelings and evaluations are associated with lower areas of the high pitch zone.

Conclusion and discussion

The research results show that the prosodic form of the analyzed address reflects some genre specific features. The climaxing macro pattern of pitch fluctuations is associated with uplifting, inspirational speech. The highest pitch peaks mark pragmatically prioritized parts: Inspiration/Visualization and Determination/Visualization. Higher pitch register is associated with strong, active feelings: "positive" feelings - with pitch peaks; "negative" or "neutral" feelings - with lower areas of the high pitch zone.

Fluctuations of F_0 maxima and minima suggest that prosodic marking of the textual foci correlates with their place and function in the pragmatic macrostructure of the whole speech. Therefore, the type and degree of prosodic emphasis on focal words and phrases may not be the same through the whole speech, and may be realized only within the zones of variation "allowed" for each of its functional parts. In agreement with previous findings in the studies of narrative texts (Wennerstrom, 2001), the research data confirm that the "use of pitch goes beyond the clause-level phonology of intonation," reflecting instead the speaker's emotional priorities in the text as a whole.

This study is limited to the analysis of the changes in voice register and pitch range as the most obvious prosodic markers of expressive speech dynamics. The data offered in the paper do not show the number and "density" of pitch peaks, or the prosodic patterns of foci realization in each functional part of the text. More detailed analysis of the correlation between all "emphasis constituents" (duration, amplitude, voice timbre, pitch movement, etc.) (Wells, 1986; Ladd, 1992) would be necessary to define the prosodic parameters of different types and degrees of emphasis employed in inspirational rhetoric, and to allow more accurate description of the specific prosodic macro patterns used in this speech genre.

Consideration of generic, textual, and rhythmic factors in the study of intonation could facilitate better understanding of the rules regulating the distribution and degrees of emphasis used in naturally occurring whole texts of different genres, and can make prosodic arrangement of individual phrases and their sequences (within a text) more predictable. The research results can have practical application in teaching Public Speaking and EFL Intonation and Phonostylistics.

Acknowledgement

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Audio Recording

1. M. L. King's Address *"I Have a Dream"*.