

CERTAINTY VS. UNCERTAINTY: ANALYZING PROSODIC FEATURES

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Статтю присвячено дослідженню просодичних характеристик упевненості / невпевненості в американському політичному дискурсі. Детально проаналізовано інтонаційні особливості впевненого мовлення на супraseгментному рівні; здійснено спробу порівняти використання вербальних засобів на позначення впевненості та невпевненості в політичному мовленні. Підкреслено особливу роль упевненості політика в ефективній політичній промові.

Ключові слова: просодичні засоби, висловлення, висхідна / спадна інтонація, заповнені паузи, тривалість репліки, політичний дискурс.

Статья посвящена исследованию просодических характеристик уверенности / неуверенности в американском политическом дискурсе. Подробно проанализированы интонационные особенности уверенной речи на супraseгментном уровне; сделана попытка сравнить использование вербальных средств уверенности и неуверенности в политической речи. Подчеркнута особая роль уверенности политика в эффективной политической речи.

Ключевые слова: просодические средства, высказывание, восходящая / нисходящая интонация, заполненные паузы, продолжительность реплики, политический дискурс.

The article is dedicated to the investigation of prosodic characteristics of certainty/ uncertainty in American political discourse. Intonation peculiarities of confident speech are analyzed in detail on the suprasegmental level; an attempt to compare the usage of verbal means that are used to show certainty/uncertainty in the political communication is made. The peculiar role of speaker's confidence in the effective political speech is underlined.

Key words: prosodic cues, utterance, rising/falling intonation, filled pauses, turn duration, political discourse.

The topicality of this article lies in the rising interest of both average citizens and political leaders in what is called "effective communication" and the rules of its existence. Presence of certainty is one of the key conditions of charismatic political speech. The objective of the article is the distinct division of all the scope of prosodic means into those marking certainty and uncertainty, and their detailed description. To reach the objective, it is necessary to fulfill several tasks: 1) prove the necessity of speaker's certainty presence in the effective political speech; 2) find out which prosodic means are used when the speaker is confident/uncertain; 3) compare verbal means used to identify certainty/ uncertainty and draw conclusions.

Prosody plays a major role in political domain because it is the main tool for convincing target audience and reaching political ambitions. In English language it prevails in identifying professional speaking styles, namely political speech style. Having been provided with one minute samples of filtered speech, listeners are able to identify political speaking style in 86.7 % cases. To be more exact, in other cases subjects tend to misidentify it as a religious one, which can be explained by public character and mass audience orientation of both of them [2]. The peculiar feature of political speech is its rehearsed to a greater or lesser degree character. Although, in most cases, political speaking style can be identified as a prepared one, large target audience, new surrounding, great responsibility, high pressure on the speaker can lead to uncontrolled manifestation of his emotions. However, it is far from clear which prosodic means contribute most to the correct identification of the political speech, enabling prosody with a scope of other verbal and non-verbal cues to structure

political discourse interaction. Sometimes they fuse, creating new linguistic notions, like gestural and audiovisual prosody. Gestural prosody is intended to distinguish gestures' form and prosody in relation to spatial performance and force parameters. Audiovisual prosody can provide utterances with "extra" information that is often not explicitly contained in the lexical and syntactic make-up of a sentence [14, p. 25]. Subjects ratings about the level of speaker's confidence are more accurate when they have access to sound and vision. The existence of such notions proves that prosody plays a very important role in human interaction and is not fully autonomous aspect of language.

Undoubtedly, the study of a speaker's level of confidence should be complex as it turns out that observers can make somewhat better estimates of it when they have access to both visual and auditory cues than when they are only offered one of these modalities in isolation [4; 14, p. 28]. Research on visual means revealed that a speaker's emotional state can also be detected from facial expression or gestures. When a speaker is certain, his speech is characterized by a lower number of marked verbal and non-verbal cues (i. e., divergences of the neutral audiovisual expressions), while the reverse is true for uncertain speech [14, p. 25]. Very extensive gesture usage is typical of either too emotional or uncertain speaker. To sum up, prosody is only one of the key linguistic parameters in detecting certainty in political discourse, but to analyze politician's speech thoroughly we have to consider the whole scope of linguistic characteristics.

Prosodic features can be used to distinguish between neutral and emotional state, and furthermore, to identify the expressed emotion. A simple SVM (Support Vector Machine) classifier analyzing only six prosodic features, namely mean pitch, mean energy, pitch variance, skew of logarithmic pitch, range of logarithmic pitch, range of logarithmic energy, reaches an accuracy of 92.32 %, while identifying the emotion [8, p. 496]. It proves one more time that prosody is a sufficient and relevant parameter to determine emotional state of a political speaker.

While studying the theory of political communication, it turns out that prosody plays a crucial role in creation of a positive image of a political speaker. To become popular and get the support of a prevailing part of the electorate, an average politician should possess at least several certain features of character. Definitely, confidence is one of them. The fact that charismatic speaker that can hold audience's attention for a long time tends to sound confident in most cases cannot be denied. Confidence is one of the key characteristics of truly charismatic leader. Political speech, characterized by a high certainty degree, has a lot in common with charismatic speech: 1) the higher density of first-person pronoun, the more certain the speaker is; 2) greater number of mean syllables per word corresponds to higher level of certainty; 3) the louder the speaker sounds, the more certain he is rated; 4) the faster the speech, the more certain the speaker is [10, p. 516]. To sum up, confidence is a very positive personal feature of character that helps speaker to sound charismatic.

It is well-known that confidence refers to positive emotional states. Intuitively plausible correlations between interested and confident speaker has been found; moreover, sadness is negatively correlated with confidence. Although eye-tracking is one of the means to obtain listener's opinion about the level of confidence displayed in the speech without explicitly asking for overt judgment about it, it is still not widely used for linguistic analysis [5]. Higher level of certainty corresponds with a lower number of words, gaze acts, and marked features [14, p. 27]. Self-confidence as a feature of personality belongs to the characteristics of a highly professional political speaker. One commonly expressed type of epistemic disposition is certainty: the degree to which a speaker is committed to a proposition expressed in the particular context. Concerning prosodic characteristics of certainty, we can prove that listeners tend to rate utterances with downstepped contour as the most certain ones, followed by those with the declarative contour, while the yes-no question contour was perceived as highly uncertain. Utterances with high pitch and amplitude are rated as certain [5]. To conclude, certainty helps speaker to get the support of the target audience and, consequently, fulfill his political ambitions.

On the contrary, uncertain speech and behavior of the political leader can undermine the solid base of his electorate support and ruin the future of a definite political force. Uncertainty is inherent in discourse interactions, and gives rise to many discourse strategies for resolving uncertainty [17]. Uncertainty in decision making can be classified along the following dimensions: its location (where it occurs), its level (whether it can be best characterized as statistical uncertainty, scenario uncertainty or recognized ignorance), and its nature (whether uncertainty primarily stems from knowledge imperfection or is a direct consequence of inherent variability) [12; 13, p. 17]. Such types of uncertainty as measurement uncertainty (lack of precision, inaccuracy and analysis errors), data uncertainty (inexactness in input information), model uncertainty (imprecision in numerical solutions), and scenario uncertainty (unreliability of the system under analysis, including past, present and future situations) can occur in political discourse [13, pp. 17-19]. First two types represent inexactness of information provided by the speaker, the last two types – its unreliability. Politician's uncertainty makes his participation in the political life of the country debatable and brings all his further activities under scrutiny.

Certainty / Uncertainty belongs to cognitive-affective human states [16, p. 93; 17]. Interest in detecting human states in conversational speech has emerged only in the past few years. A lot of highly technological computer tools have been created for automatic detection of user affective states [4; 6; 16]. To provide valid information about the state of certainty, we have to study uncertainty thoroughly. Both certainty and uncertainty are being deeply analyzed in the context of intelligent tutoring systems. Those studies are necessary for quick and adequate machine reaction to certain/uncertain student's response. It has been proved by the empirical evidence that Intelligent Tutorial System (ITS) responds differently to students based on their perception of a student's turn certainness [6, p. 1837]. When ITS perceives speaker's turn as uncertain, it may use the following techniques while responding: solving the problem explicitly, providing direct negative feedback, and recapping past discussion [6, p. 1838]. Speakers can signal whether they are uncertain about the correctness of their answer using prosodic cues such as fillers ("uh", "um"), response latencies, a rising intonation contour as well as a marked facial expression or lexical hedges ("I guess", "I think", "maybe") [4; 15; 7; 1, p. 388; 9, p. 14; 14, p. 26]. Uncertainty can be characterized by occurrences of long delay, question intonation, a number of gaze features, funny face and smile [14, p. 28]. To distinguish between certainty and uncertainty, not only the type of smile, but also its combination with other feature settings matters. Those components are crucial in defining uncertain turns. On the basis of such cues, observers can make adequate estimates about the speaker's level of confidence, but it is unclear which of these cues have the largest impact on perception. Although subtle relationship between uncertainty and voice frequency has been found, this question still remains very debatable [16, p. 97]. In statements uttered as questions only the last word(s) typically bears prosodic marks of uncertainty [7]. Rise-fall pitch slopes can exemplify a pattern of uncertainty and acceptance [17]. In addition, we have to distinguish between uncertainty and self-repair, although their representation in speech appears to be very similar. Self-repair usually occurs if the speaker recognizes and corrects a slip of the tongue even before a speech signal is produced [15]. All signals of uncertainty can be divided into three main groups: 1) lexical (hedges); 2) temporal (response latencies, mid-sentence pauses, filled pauses); 3) other (fragmented or incomplete sentences). To summarize, the intonation of affective human states is varied by either rising intonation for expressing uncertainty, hesitation and continuation or by falling intonation for conveying certainty, definiteness and finality [15; 17].

Traditionally, hedges are referred to as linguistic devices that can possibly reveal uncertainty of the speaker. Studies in psycholinguistics have shown that when answering questions, speakers produce hedges ("I guess I just thought that was OK"), disfluencies ("What-what is in this space?"), and rising intonation when they have a lower FOK ("feeling-of-knowing") [9, p. 173; 3, p. 69]. The following surface lexical means, defined as hedges, are used to attenuate strength of utterance: epistemic adjectives,

epistemic adverbs, lexical verbs, auxiliary verbs, tag questions, and verbal fillers. Syntactic markers include if-clauses of condition and concessions, contrastive markers and passivization [12]. Usually, uncertain answers are preceded by fillers (“uh”, “uhm”), uttered with question-like intonation and marked facial expression [4]. While analyzing dialogue speech, it was found out that the mean latency to response was 3.53 s when “uh” preceded the response and 7.82 s when “um” preceded the response [1, p. 391]. It shows that “um” as a filler is used by the speaker when he is more uncertain about the correctness of a possible answer. Listeners are sensitive to the presence of fillers; they rate answers preceded by “um” or “uh” as less likely to be correct than those preceded by unfilled pauses of the same length. According to studies, the presence of a filled pause is associated with a very small though significant increase in certainty perception [4]. Filled pauses are usually dismissed as disfluencies that listeners ignore [1, p. 383]. In addition, the degree of tentativeness or definiteness of an expression is often correlated with the steepness of pitch slope [17]. Listener’s FOAK (“feeling-of-another’s-knowing”) ratings also depended on whether the pause before an answer is long, short, filled, or unfilled. It has been proved that filled 5-s pauses before answers lead to lower FOAK ratings than do unfilled 5-s pauses [1, p. 394]. It shows that filled pauses usually reflect higher level of speaker’s uncertainty.

Scientists have found positive correlation between negatively-valenced affective student states (including uncertainty) and longer student turn durations; also between such states and longer pauses between the end of the tutor’s turn and the onset of the student’s speech (prepause) [16, p. 96]. Correlations among low uncertainty and both short durations and short prepauses respectively have been quickly identified. Though speaker’s turn provides enough information for identifying the utterance as certain/uncertain, breath groups are more appropriate units of analysis for emotion classification [6, p. 1840]. Sometimes a turn can sound uncertain if only one word has an uncertain intonation. Word-level pitch and energy features can outperform turn-level features when classifying uncertainty in spoken dialogues.

It goes without saying that pausing is a prosodic feature which reflects lack of speaker’s confidence. Partly, it is true because every successful public speaker has to use pauses correctly and adopt a proper speech rhythm to sound certain and persuasive. Pauses highlight transition points in the discourse, emphasize significant concepts, give time for thinking – in short, they are persuasion instruments. Excessive pause usage can bring more harm than good for a speech. At the same time, pauses, together with other prosodic devices, can be applied to emphasize new information in the sentence [3, p. 66]. Having studied the newest available pause classifications, we can subdivide them into individual, functional (=grammatical) and hesitation [3, p. 65]. If to speak about spontaneous speech, it is characterized by slightly different pause subdivision. Unfilled pauses (initial delays, juncture pauses, pauses within clauses in the utterance), hesitation pauses, segmentation pauses, rhetorical pauses belong to non-fluencies, namely fluency interruptions that have a precise communicative role. Glottal clicks, audible breaths, vowel and consonant lengthening, filled pauses, corrections, utterance interruptions (repeats, restructurings, and false starts) belong to disfluencies, i. e. irregularities that occur within the flow of speech. To sum up, pauses play a significant role in discourse structuring, speech delivery, and are a perfect prosodic tool to enhance the effectiveness of speech perception by an audience.

There is a very strong interconnection between prosodic characteristics of speech and its correctness. Answers produced more quickly or with falling intonation tend to sound more likely to be correct than ones produced more slowly or with rising intonation [1, p. 395]. Leveling and lengthening effect of hesitation is expressed in the flattened slight rising pitch contour, reflecting the uncertainty and continuation [17]. The inclusion of non-acoustic-prosodic features, most notably lexical features, may also increase certainty prediction accuracy [6, p. 1840]. To conclude, certainty is signaled using normal (more neutral) cues, while uncertainty is signaled using the marked cue settings.

If to be more exact, not in all cases when a speaker sounds uncertain, he is, actually, uncertain. There are a number of scenarios when sounding uncertain is truly beneficial for a speaker, such as the social politeness effect, the psychological effect of non-aggression, the humbling effect of hedged speech [11, p. 73]. Sometimes politicians tend to sound uncertain to save their image; if the information they provide turns out to be incorrect, they will look less incompetent if they indicated little confidence in their speech [14, p. 26].

To conclude, this topic needs further thorough investigations to reveal how confident public speakers use prosody to catch and keep the attention of their listeners, prove their own point of view and reach the agreement on key issues. We have proved that certainty possesses its own peculiar set of prosodic features that improve the perception of speech by the audience. Nevertheless, only the combination of verbal and non-verbal certainty cues provides solid basement for defining some political speech as certain or uncertain.

Literature

1. Brennan S. The Feeling of Another's Knowing: prosody and Filled Pauses as Cues to Listeners about the Metacognitive States of Speakers / S. Brennan, M. Williams // *Journal of memory and Language*. – 1995. – Vol. 34. – P. 383 – 398.
2. Castro L. Listener's Ability to Identify Professional Speaking Styles Based on Prosodic Cues / L. Castro, M. Freitas, J. Moraes, B. Serridge // *Speech Prosody*. – 2010. – Address of access: <http://speechprosody2010.illinois.edu/papers/100326.pdf>.
3. Cecot M. Pauses in Simultaneous Interpretation: A Contrastive Analysis of Professional Interpreter's Performances / M. Cecot // *The Interpreter's Newsletter*. – 2001. – Vol. 11. – P. 63–85.
4. Dijkstra C. Manipulating Uncertainty: The contribution of different audiovisual prosodic cues to the perception of confidence / C. Dijkstra, E. Krahmer, M. Swerts // *Proceedings of the International Conference of Speech Prosody*. – Dresden, 2006. – Address of access: http://www.isca-speech.org/archive/sp2006/papers/sp06_025.pdf.
5. Hirschberg J. Experiments in Emotional Speech / J. Hirschberg, J. Liscombe, J. Venditti // *ISCA&IEEE Workshop on Spontaneous Speech Processing and Recognition*. – Tokyo, 2003. – Address of access: http://www.isca-speech.org/archive_open/archive_papers/sspr2003/sspr_tmo1.pdf.
6. Liscombe J. / J. Liscombe, J. Venditti, J. Hirschberg // *Proceedings of Interspeech*. – Lisbon, 2005. – P. 1837–1840.
7. Litman D. Classifying turn-level uncertainty using word-level prosody / D. Litman, M. Rotaru, G. Nicholas // *Proceedings of Interspeech*. – Brighton, 2009. – Address of access: <http://www.lrdc.pitt.edu/pubs/Abstracts/LitmanProsody.pdf>.
8. Luengo I. Automatic Emotion Recognition using Prosodic Parameters / I. Luengo, E. Navas, I. Hernaez, J. Sanchez // *Interspeech*. – Lisbon, 2005. – P. 493–496.
9. Pon-Barry H. Responding to Student Uncertainty in Spoken Tutorial Dialogue Systems / H. Pon-Barry, K. Schultz, E. O. Bratt, B. Clark, S. Peters // *International Journal of Artificial Intelligence in Education*. – Vol. 16. – Issue 2. – Amsterdam, 2006. – P. 171–194.
10. Rosenberg A. Acoustic / Prosodic and Lexical Correlates of Charismatic Speech / A. Rosenberg, J. Hirschberg // *INTERSPEECH*. – Lisbon, 2005. – P. 513–516.
11. Rubin V. L. Identification in Texts: Categorization Model and Manual Tagging Results / V. L. Rubin, E. D. Liddy, N. Kando // *Computing Attitude and Affect in Text: Theory and Applications (The Information Retrieval Series)*. – New York, 2006. – P. 61–76.
12. Sluijs van der J. Exploring the quality of evidence for complex and contested policy decisions / A. Petersen, P. Janssen, J. Risbey, J. Ravetz // *Environmental Research Letters*. – 2008. – Vol. 3. – Address of access: http://iopscience.iop.org/1748-9326/3/2/024008/pdf/1748-9326_3_2_024008.pdf.
13. Strand R. Risk and Uncertainty as a Research Ethics Challenge / R. Strand, D. Oughton. – Oslo, 2009. – 41 p.

14. Swerts M. Audiovisual cues to uncertainty / M. Swerts, E. Krahmer, P. Barkhuysen, L. van der Laar // ISCA Tutorial and Research Workshop. – Vaud, 2003. – P. 25–30.
15. Wollermann Ch. Accentuation, Uncertainty and Exhaustivity – Towards a Model of Pragmatic Focus Interpretation / Ch. Wollermann, U. Schade, B. Fisseni, B. Schröder // Speech Prosody. – 2010. – Address of access: <http://speechprosody2010.illinois.edu/papers/100063.pdf>.
16. Xiong W. Analyzing Prosodic Features and Student Uncertainty using Visualization / W. Xiong, D. Litman, E. Marai // AAAI Fall Symposium Series. – 2009. – P. 93–98.
17. Yang L. / L. Yang, N. Campbell // 4th ISCA Tutorial and Research Workshop on Speech Synthesis, in CD-Rom proceedings. – Scotland, 2001. – Address of access: <http://www.speech-data.jp/nick/proceeding/4th%20isca%20yang%202001.pdf>.