Prosodic marking of neutral and non-neutral refusal in Russian: an identification experiment

Pavel Duryagin

Ca' Foscari University of Venice (Italy)
pavel.duryagin@unive.it

As Standard Russian belongs to the group of languages in which the intonational contrast between yes/no questions and statements is marked by pitch accent, the prosodic means of marking this difference were repeatedly studied experimentally. In particular, [1] showed that the perceptual cues for Russian polar questions are steep f0 rise and late peak alignment, while [2] described them as higher f0 peak, peak alignment around the offset of stressed syllable and presence of the low turning point at the onset of the accented syllable. Our earlier experimental study of Russian utterance "*Да ну"* /daˈnu/ (an idiomatic expression with the illocutionary meaning of disagreement or refuse) showed that speakers of Russian consistently used similar prosodic features to mark different forms of negation. Namely, later f0 peak alignment, higher f0 peak frequency and longer stressed vowels were used by the speakers to mark polite, non-categorical negation (e.g., in the context of refusal in response to an offer of help or in a context of disagreement due to positive reasons).

To test whether these means of marking semantic differences can be generally perceived by the speakers of Russian an identification experiment was conducted. Russian phrase "*Не надо*" /nʲiˈnada/ (*'there is no need to'*) was chosen as a stimulus because of its segmental and syllabic structure. First, three different productions of this phrase by native Russian male speaker were recorded: a neutral statement, a "polite" refusal and a yes/no question. The former two tokens served for training session and as control stimuli. The "neutral production" of the utterance served as a base for overlap-add manipulation in *Praat* [3].

Three acoustic parameters were manipulated: f0 peak frequency, f0 peak alignment and stressed vowel duration. As both [1] and [2] reported that the configuration of the slope of the pre-accentual rise contributes to the opposition between different accent types, the temporal distance between the slope low turning point position and f0 peak was fixed (however, minor steepness differences caused by peak height and vowel length manipulations were ignored). The three peak height levels chosen were 150, 180 and 210 Hz, the five peak alignment points were stressed syllable onset (1), stressed vowel onset (2), ⅓ and ⅔ of the stressed vowel duration (points 3 and 4) and stressed vowel offset (5). In addition, every contour was recreated with modified duration of the stressed vowel (with 33% and 66% greater duration).

All 45 experimental stimuli, as well as control stimuli, were presented in random order to 25 native speakers of Russian (18 F, 7 M). A short training preceded every performance. Participants were asked to listen twice to a stimulus and identify it as a question or a statement. In case the utterance was identified as a statement, the listener was asked to evaluate its "politeness" on a 5-point Likert-type scale, where 1 referred to a "very categorical, almost rude refusal", 2 – "rather categorical, rude refusal", 3 – "neutral response", 4 – "rather polite refusal", 5 – "very polite refusal". Informants also could mark phrases as "unnatural" and not interpret them. The experiment was designed in *PsychoPy* software [4].

The results for "question" judgments generally replicate the findings of [1]. Figure 1 illustrates the interaction between manipulated parameters and the number of "question judgments". Chi-square tests of independence confirmed statistically significant relations between the number of "question" judgments and peak alignment (χ^2 (2) = 413.05, $p < .01$) and peak height (χ^2 (2) = 80.09, $p < .01$). Later and higher f0 peaks conditioned more "question" judgments. No significant interaction between vowel duration and the number of "question" judgments was found (χ^2 (2) = 1.24, $p = .54$).

The main scope of the study was to estimate the relations between the three manipulated factors and "neutral" vs. "non-neutral" statement (Likert scale 3 vs. 1, 2, 4, 5) and "rude" vs. "polite"

statement judgments (Likert scale 1, 2 vs. 4, 5). The results for the non-interrogative judgments are presented in Figure 2 (diverging stacked bar charts were created by means of "HH" package in R [5]; responses for late alignment points, 4 and 5, are omitted here).

For "neutral" vs. "non-neutral" opposition, chi-square tests showed significant interaction between the judgments and all three manipulated factors ($p < .01$; χ^2 (2) = 17.72 for vowel length, χ^2 (2) = 32.19 for peak height, χ^2 (2) = 35.76 for peak alignment with points 4 and 5 excluded from the analyses). Post hoc comparisons with Bonferroni adjustments revealed that significantly larger number of "neutral" responses was conditioned by the stimuli with the earliest peak (point 1, as opposed to points 2 and 3) and medium (133%) vowel duration, as opposed to short (100%) and long (166%) vowels. Increasing peak frequency consistently significantly reduced the number of "neutral" judgments.

As for the "rude" vs. "polite" dichotomy, post-hoc tests revealed significant effects of vowel duration (χ^2 (2) = 65.9, $p < .01$) and peak alignment (χ^2 (2) = 20.69, $p < .01$) and marginal effect of peak height (χ^2 (2) = 9.0891, $p = .01062$). Post hoc comparisons with Bonferroni adjustments show strong interaction between vowel duration and "politeness" (stimuli with short vowels were more often considered "rude" and long vowels caused "polite" judgments). The earliest peak position significantly more often caused "rude" judgments than peak points 2 and 3.

The results of the experiment partly support the hypothesis that "polite refusal" in Russian is marked by the combination of peak alignment, peak height and vowel duration. The only parameter that consistently increased the number of "polite" judgments was vowel duration. However, the obtained judgments based on early vs. medial peak alignment and f0 peak height fall in line with the earlier experimental findings showing the common informational interpretations of the "frequency code" [6].

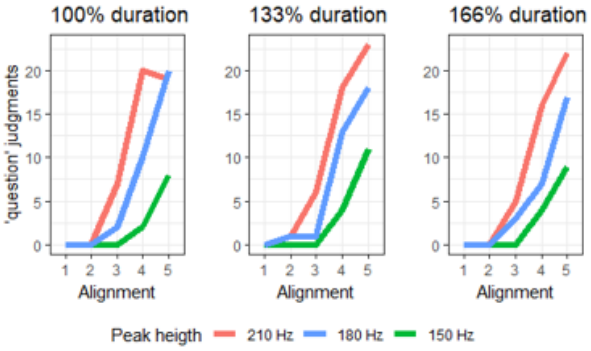

Fig.1 Interaction between 'question' judgments and three manipulated parameters

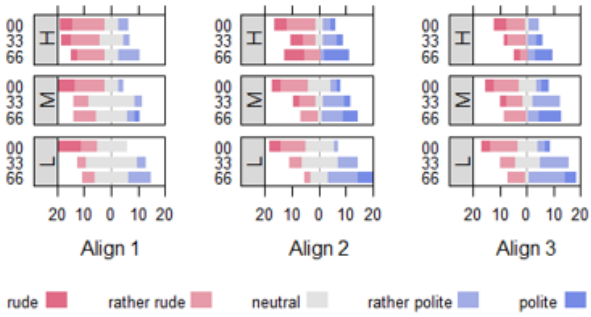

Fig.2 Number of Likert-scale 'statement' responses plotted against the three manipulated parameters

References

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