



The expression of politeness and pitch height in Russian imperatives

Aleksandra Chikulaeva¹ & Mariapaola D'Imperio¹

¹ Aix Marseille Université, CNRS, LPL UMR 7309, 13100, Aix-en-Provence, France

aleksandra.chikulaeva@etu.univ-amu.fr, mariapaola.dimperio@lpl-aix.fr

Abstract

Based on the theory biological codes [1], the Frequency code [2] claims that pitch height is a universal correlate of politeness. Other frameworks, while taking a pragmatic approach, [3], [4] claim that high pitch can be employed in both polite and impolite contours and argue for the importance of socio-pragmatic variables in the expression of politeness. Work on Russian prosody suggests though that the degree of politeness decreases with higher f0 of falling contours in imperatives [5], [6], [7]. The present study investigates the relationship between f0 height, pitch accent type and conveyed attitude in Russian imperatives when social distance (power relationship) is manipulated. A discourse completion task, in which both speakers' power and attitude were manipulated, was carried out to test our hypotheses. Our results show that higher f0 values are found for both rising and falling polite imperatives, except for downstepped pitch accents. Moreover, speakers' social power did not show a significant effect. Our findings underline the need to take into account pitch accent type and speech act to predict fundamental frequency values in polite contexts.

Index Terms: Prosody, intonation, Russian, Frequency code, paralinguistic meaning, politeness, social distance.

1. Introduction

The metaphor of the Frequency code [1] is based on an analogy between larynx size and body size in the animal kingdom, whereby higher pitched sounds are emitted by smaller creatures. Gussenhoven [2] later proposed a paralinguistic, "affective" interpretation of the Frequency code, in which high pitch serves to express social meanings, such as "politeness", "friendliness" and "submissiveness". Crosslinguistically, high correlations between "perceived politeness" and mean f0 were found for rising contours in English and Dutch [8].

The theory of pragmatic politeness [9] underlines the fact that social variables, such as social distance, power imbalance and degree of imposition, may affect the choice of politeness strategy and ways of softening face threat. Recent production and perception experiments in prosody [10], [11], [12] have also revealed the influence of social distance on fundamental frequency contour and choice of pitch accent in vocatives and questions in Catalan. Hence, social distance can interact with politeness expression in complex ways and affect pitch values and/or pitch accent and contour composition.

Previous studies testing the Frequency code have mainly concentrated on rising contours (yes/no questions, polite

requests, vocatives), while other types of speech acts, especially face threatening acts, have received little attention. For example, imperative acts, allowing both falling and rising contours, have a stronger illocutionary aspect and may be employed with different degrees of politeness. Still, prosodic ways of mitigating or aggravating face threat in imperative sentences have never been systematically studied before.

In Russian, it has been suggested that speaker's attitude and/or relative social power [5] determines the choice of pitch contour direction (rise vs. fall), suggesting that, following [3], [13], imperatives with a rising contour (or *prosodically open*) are employed when a subordinate addresses a superior, while falling contours would express dominance. The use of rising contours in imperatives has also been connected with *friendliness* [14], [5].

However, other body of research points to controversial evidence as to the relationship between pitch height and politeness in Russian imperatives. For example, [6] reports that imperatives only show falling patterns, hence confirming the Frequency code by claiming that higher pitch peaks would soften imperativeness, while ordering imperatives would tend to show lower falls. However, the corpus of Russian intonation [7] lists examples in which higher falls in imperatives are marked as being less polite. Given that the role of the Frequency code in Russian imperatives is controversial, i.e. whether pitch height is affected by politeness in falling contours, we hypothesized that Russian imperatives allow both falls and rises, and that the choice of contour is made by the speaker also according to relative social power.

Specifically, we hypothesized that speakers would employ rising contours when addressing an interlocutor with higher power, while using falls when addressing a speaker with lower power, as claimed by [5]. According to evidence provided by Odé [15], [7] and results of a pilot study [16], we also tested a modified version of the Frequency code. Specifically, we hypothesized that in falling imperative contours higher pitch would be used to convey a less polite attitude and/or higher social distance. In other words, we expected nuclear pitch accent type (rising or falling) to differently interact with the Frequency code, so that higher pitch would correlate with polite attitude only in rising pitch accents and not in falling ones.

2. Method

2.1. Hypotheses

In this study, the following hypotheses were tested: 1) In high power contexts, speakers would produce a falling H+L* pitch accent in directive acts containing imperatives, while

in low power context they would employ a rising L+H* configuration; 2) High f0 peaks would correlate positively with degree of politeness in rising pitch accents, and negatively in falling ones.

2.2. Participants

11 native speakers of Russian (all females, mean age=21.5, sd=3.9) took part in a production experiment. All the participants had spent up to 6 months in France, were all L1 Russian speakers and had spent most of their lives in Russia. All of them were informed about the experimental procedure and data anonymity in advance and signed a participation consent.

2.3. Corpus and procedure

Participants were invited to perform a discourse completion task - DCT [17] containing 18 situations in which they had to roleplay characters with either high or low social power while employing either a polite or impolite attitude for each of these roles. Target phrases contained 9 items built from a quadrisyllabic target word (a verb in imperative form, 2nd person, plural) with stress on the third syllable, plus an object pronoun. Each target phrase appeared in all the four conditions, i.e. high and low power, polite and impolite attitude, resulting in 36 productions per session.

Table 1: *Examples of contexts used in the study and target phrase.*

High-power context
<p>“You are a museum director. During the reconstruction, you find out that the workers left an antique statue lying on the floor. You are calling one of them and saying...</p> <p><i>Polozhite ih!</i> “Put it down!”</p>
Low power context
<p>“You work in a shop selling crystal-made decorations. Once you see that one of the visitors ignored the warning sign and is holding a fragile crystal figure in his hands, you are telling him to ...</p> <p><i>Polozhite ih!</i> “Put it down!”</p>

Contexts and target sentences were presented in the form of a powerpoint presentation and in randomized order. Participants were not limited in time when reading the contexts. The experiment was piloted by Perceval software [18]. Also, we relied on speakers’ awareness of the conscious nature of politeness and impoliteness [19]. Hence, our participants were asked to utter each target phrase either in the most polite or in the most impolite way. This instruction was given before each target phrase.

Each participant repeated the session three times with a pause of 2-5 minutes. Our total data consist of 108 productions by participant, for a total of 1188 stimuli, though only the 2nd and 3rd sessions were submitted to the analysis

¹ We excluded final rising contours because the status of high boundary tones in Russian remains undetermined; [15] claims that

given that recordings from the first sessions had to be excluded because of technical problems during recording. As a result, we had 8 repetitions of the target item by speaker. The total duration of the experiment did not exceed 30 minutes.

2.4. Annotation and measurements

Only utterances with low L-L% boundary tones were submitted to the analysis (663 sound files)¹. The final set of utterances was analyzed in Praat [20]. Each soundfile was annotated with the use of textgrids. Annotations included a manually syllabified tier, stress location, a phonetic transcription [22] and a point tier with pitch accents and boundary tones (see Figure 1). The tonal transcription combined general ToBI conventions [23] with Russian-specific ToRI guidelines [7], [15]. As for the acoustic measures, in order to estimate peak height, we automatically extracted f0 maxima corresponding to the H targets in the nuclear pitch accents.

3. Results

3.1. Descriptive analysis

According to our predictions we expected that half of the elicited contours (the polite renditions) would be produced with a rising nuclear pitch accent, while the other half would show a fall. Unexpectedly, our data yielded a much larger variability. First, only one pitch accent from those listed in Table 2 appears to match a pattern previously described in ToRI for imperative utterances. This is the H+L* accent (Figure 1), which despite claims of being typical for “imperatives and commands” [7], appeared only in one fifth of our data and mainly in the polite condition with low power. Two of the least frequently occurring accent types were excluded from the overall analysis (H+H* and an L*, representing less than 3% of the overall data).

Table 2: *List of nuclear pitch accents with frequency of occurrence frequency according to power context and politeness.*

Pitch accent	Total number	Politeness condition	
H*	215 (34%)	Polite: 58	Impolite: 157
		High power: 34	High power: 83
		Low power: 24	Low power: 74
L+H*	234 (37%)	Polite: 150	Impolite: 84
		High power: 78	High power: 42
		Low power: 72	Low power: 42
H+!H*	56 (9%)	Polite: 17	Impolite: 39
		High power: 7	High power: 16
		Low power: 10	Low power: 23
H+L*	158 (19%)	Polite: 113	Impolite: 45
		High power: 46	High power: 22
		Low power: 67	Low power: 23

High Boundary Tones (HBTs) do not occur in Russian, while [24] mentions HBTs as a part of Russian intonational grammar. Due to this indeterminacy, we excluded HBT data from the analysis.

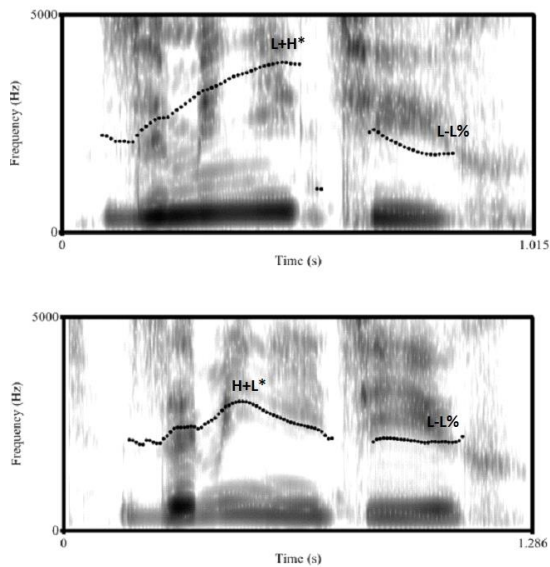


Figure 1: Pitch contour, spectrogram and annotation of two renditions of Zamenite ih “Change!” with polite attitude (top), and impolite attitude (bottom), both with high power.

3.2. Relationship between power context and pitch accent

The data was analyzed in R studio [25] with the packages lme4 [26] and lmerTest [27]. An informal inspection of Figure 2, showing pitch accent type by power condition, indicates high similarity between the accent distribution for both power contexts.

As for the statistical analysis, we fitted a logistic regression (glm) to test if pitch accent type could predict power context. The model had Pitch Accent (PA) as a four-leveled explanatory variable (each level corresponded to one of the accents listed in Table 2). Results show that only the presence of the falling H+L* nuclear accent was marginally significant for low power contexts ($\alpha = .05$, $\beta = 0.4$, $z = 1.8$, $p = .07$). A post-hoc Wald Test further confirmed that the PA variable did not significantly predict the results ($F = 1.31$, $p = 0.3$).

3.3. Politeness effect

We then tested whether PA type could predict politeness/impoliteness (Table 2). We hence fitted a logistic regression with Politeness (2 levels) as dependent variable and PA as explanatory variable. Our data showed that productions with a rising H* accent were mostly likely to occur in the impolite condition ($\beta = -0.9$, $z = -6.2$, $p < .001$), while H+L* and a L+H* were more likely to occur in the polite condition (H+L*: $\beta = 1.9$, $z = 7.3$, $p < .001$; L+H*: $\beta = 1.5$, $z = 7.3$, $p < .001$), while the occurrence of the H+!H* downstepped pitch accent did not reach significance in any of the conditions ($\beta = 0.09$, $z = 0.27$, $p = 0.7$). An additional Wald Test confirmed that PA type was a significant predictor of the politeness condition ($F = 17.17$, $p < .001$).

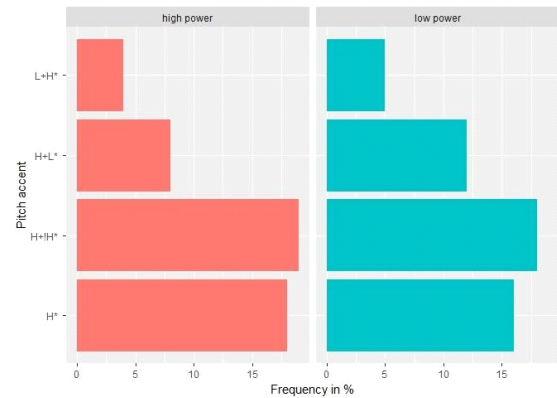


Figure 2: Distribution of the annotated pitch accents according to power contexts, (high power context is marked in red, low power in blue).

3.4. F0 height analysis

We then went on to test if f0 peak height for the H target within each nuclear PA would be affected by politeness across power conditions.

As it can be noted in Figure 3, overall it appears that polite productions were associated to higher f0 values for the target H tone within the nuclear PA. We hence fitted a generalized linear mixed effects model (GLMM) with Speaker and Target Word as random effects, and Politeness, Power and PA type as fixed effects. The retained model included all fixed effects, sum coded, and all interactions. The Politeness and Power factors included two levels each, while the PA factor included 4 levels (one for each of the accents in Table 2). The model included 412 data points.

The model showed that impolite productions were produced with lower f0 peaks than polite ones ($\beta = -17.5$, $t = -7.72$, $p < .001$). H peaks in rising accents appeared to be higher than the grand mean, though the effect was not significant (H*: $\beta = 5.57$, $t = 1.5$, $p = .12$; L+H*: $\beta = 8.7$, $t = 1.3$, $p = .21$). A further test of the interaction between f0 height and politeness using sum coding revealed, though, that the effect of impoliteness was negative for H* ($\beta = -10.3$, $t = -2.9$, $p = .001$) while positive for H+!H* ($\beta = 12.17$, $t = 2.4$, $p = .01$), which is in line with our predictions (politeness correlates with high pitch peaks in rising accents and not in falling ones). Testing interaction terms with other accents revealed a trend for higher f0 peaks in polite L+H* rises and polite H+L* falls, though the effect was not significant (L+H*: $\beta = 8.3$, $t = 1.8$, $p = .06$; H+L*: $\beta = .19$, $t = .5$, $p = .9$).

Different from the Politeness factor, the main effect of Power did not reach significance ($\beta = -2.9$, $t = -1.3$, $p = 0.2$). Also, no interaction was found between Power and Politeness ($\beta = 0.9$, $t = 0.4$, $p = 0.7$). Given that Power did not interact with any of the dependent or independent variables, we omitted it from our final retained model.

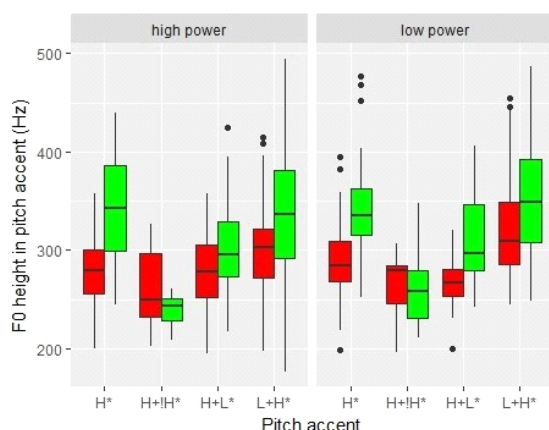


Figure 3: *F0* height for each pitch accent type by power context (high power=left panel; low power=right panel) and politeness (green boxes=polite; red boxes=impolite).

4. Discussion

In the present study, we explored the influence of the social variable of power on intonation realizations of Russian imperatives with either polite or impolite intended attitude, and tested the Frequency code [1], [2] for both rising and falling pitch accent types.

The influence of power imbalance on intonation contours was found to be significant in a number of previous studies for other languages [3], [4], [10]. Our results showed, though, that power context did not predict the distribution of falling and rising pitch accents in our data. What is more, the only pitch accent showing a quasi-significant trend showed a pattern going in the opposite direction relative to our prediction: the falling H+L*, instead of being associated with high power contexts, was more likely to appear in the low power one. Similarly, a study on Catalan [11] did not find an effect of power in vocatives, which was accounted for by the relative unimportance of this social parameter in Catalan culture.

In our study, we can only speculate that the lack of this effect might be due to limitations in the speaker sample composition (only young female speakers), which was conditioned by limited access to Russian speakers in Aix-en-Provence. It is possible that all the subjects, when belonging to the same age and sex group, followed a culturally specific stereotype suggesting that young people, and especially young women, should always come across as polite (see similar sociolinguistic behavior for Korean [28]). If this stereotype has a real effect on speaker's productions, it would mean that our participants could not fully adopt a required dominant behavior and produce differential power patterns which we tried to induce through the experimental task.

The Frequency code was then tested by comparing *f0* peak height of H target tones in polite and impolite imperative contours (for each pitch accent type), hypothesizing that the relationship between fundamental frequency and politeness should take into account tonal direction within the pitch accent. This is because the Frequency code, while originally associating higher *f0* with politeness and friendliness, has different outcomes in rising

and falling accents in some languages, such as Korean [28], in which lower pitch appears to be associated with politeness instead of impoliteness. However, while for languages such as Korean power imbalance appears to affect intonation, this is still controversial for Russian. In fact, our data did not find an effect of power imbalance. On the other hand, the Frequency code was somewhat confirmed by the *f0* peak data, showing higher values for polite utterances, except for the downstepped H+!H* accent. This pattern might be due to a specific application of the Effort code by which a higher *f0* peak in the downstepped accent would be a proxy for a greater pitch excursion, hence being employed to convey insistence and a lower degree of politeness. However, it is also possible that different 'codes' might be applied in the same communicative acts. Our current data do not allow us to choose between these two possible accounts.

In addition, the experiment revealed an interaction between PA type and politeness, with clearest effects for the H* and H+!H* accents (most frequent for impolite attitude) and L+H* (most frequent for polite attitude). The explanation of this distribution possibly lies in the scope of peak tonal alignment, which seems to be employed by Russian listeners when discriminating questions from assertions [29]. Future tests manipulating peak timing in Russian imperatives might reveal if there is a "window" related to meanings of insistence and impatience, which may convey impoliteness within the same speech act. Finally, our findings appear to be in line with [3] for English and [11] for Catalan, showing that downstep (in either the nuclear accent or the boundary tone) was correlated with extreme finality and dominance, whereas a rising L+H* accent appeared to convey politeness addressed to a superior, or to an equal interlocutor. Future work will have to better address language-specific uses of the Frequency code and its interaction with social distance and intonation contour type.

5. Conclusion

A production study on pitch accent type and *f0* height in Russian imperatives showed that neither social power nor politeness have an effect on choice of tonal direction within nuclear pitch accents. Despite previous findings on Russian intonation, our data show that different nuclear pitch accents can be employed in imperatives, though rising L+H* accents appear to be most frequent for polite utterances. This result suggests that the intonation of imperative speech acts in Russian is not influenced by social distance. As for pitch height, our data show that it can be modulated by politeness, in line with the Frequency code. In fact, all pitch accents to the exception of the downstepped H+!H* showed higher *f0* peaks for the polite condition than for the impolite one. Moreover, a variety of tonal patterns produced by our speakers had not been yet described in the literature, underlying the need for providing a more in-depth description of Russian intonational patterns in the future.

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