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Acoustic Features of Lithuanian Directives

Asta KAZLAUSKIENĖ

Vilnius University, Universiteto str. 5, LT-01513 Vilnius, Lithuania

asta.kazlauskiene@vdu.lt

ORCID 0000-0002-6135-1635

Abstract. The aim of this study is to identify the acoustic similarities and differences among directives. The data consist of specially constructed sentences read by four male actors, representing three subtypes of directive: request, command, and advice (a total of 340 tokens). The following parameters were analysed: mean F0, F0 maximum, F0 range, intonation contour, mean intensity and intensity maximum, as well as the duration of some segments. The results show that the parameters of F0 vary, differ only slightly in some cases, and do not reveal clear tendencies. The intonation contour is falling or rising–falling in the examples containing two intermediate phrases. Intensity is a reliable indicator of active directives – commands and pleas. Phrases expressing advice show the lowest intensity values. Longer duration signals requests.

Keywords: Lithuanian, directive, fundamental frequency (F0), intonation contour, intensity, duration.

1. Introduction

Directives express various degrees of encouragement or prohibition. In Lithuanian, grammatical expression of directive force may be conveyed by imperative sentences employing the imperative verb forms, as well as by declarative sentences containing verbs with a specific performative meaning. For example: *Perrašyk darbą.* 'Rewrite the paper.', *Prašyčiau perrašyti darbą.* 'I would ask you to rewrite the paper.', *Prašau perrašyti darbą.* 'I ask you to rewrite the paper.' In speech, the grammatical and lexical means of expressing directives can be supplemented by phonetic features and non-linguistic means (gestures, facial expressions, etc.).

In many languages, e.g., Romance languages (Frota and Prieto, 2015), German, and Norwegian (Cruttenden, 1997), the intonation patterns of directives resemble those of statements: the pitch either falls at the end of the phrase or remains low throughout the utterance. In some cases, however, the pitch may rise slightly, depending on the function of the directive. In Norwegian (Cruttenden, 1997) and German (Gibbon, 1998), more forceful directives, such as commands, are produced with a falling pitch, whereas milder directives, such as requests, tend to be expressed with a slightly rising pitch. The fundamental frequency (F0) range and register may help to distinguish directives from one another and from declaratives (Falé and Faria, 2007). Directives typically have a somewhat wider F0 range and a higher register. Other important properties for recognising directives include intensity and/or voice quality features (for Swedish, see

Gårding, 1998), as well as the lengthening of certain syllables (for Romance languages, see Frota and Prieto, 2015).

Relatively few studies have been devoted to the acoustic properties of directives in Lithuanian. The findings of P. Bikulčienė's (1978) research show that directives are characterised by: a) a falling intonation contour at the end of the phrase; the intonation contour is either rising–falling (typical of prohibitions, commands, and demands) or falling (typical of requests and advice) with a pitch peak in the stressed or pre-stress syllable (cf. E. Mikalauskaitė (1975, 84), who argued that directive sentences are characterised by rising intonation); b) decreasing intensity towards the end of the phrase, with the intensity peak in the pre-stress or stressed syllable; c) relatively longer duration of stressed syllables; d) variation in the F0 maximum depending on the subtype of directive. On this basis, the following descending order of F0 maximum can be established: command, advice, request.

Kundrotas (2018, 43–116) discusses Lithuanian intonation types, some of which are also typical of directives: a) for polite commands or requests, the pitch rises up to the intonation centre and then falls; b) for commands with an invitational, permissive, or instructive character, the pitch falls up to the intonation centre, the centre itself is falling–rising, and after the centre the pitch rises; c) for wishes, desires, and well-wishes there are two intonation centres; in the first centre the pitch is rising, and it is falling in the second centre; the pitch rises up to each centre and falls after them; d) for emphasised directives and commands, the pitch rises up to the intonation centre, which may be rising or rising–falling; after the centre the pitch falls.

2. Aim and Methodology

The aim of the study outlined in this article is to determine the acoustic similarities and differences between directives. This study is part of a larger project that examines the acoustic properties of Lithuanian functional phrase types. A central tenet of the project is its applied nature, as the goal encompasses not solely the identification of the properties of directives but also their description in a manner that ensures their practical application in the enhancement of speech technology tools. This means that, to facilitate the automatic recognition or synthesis of functional phrase types, it is necessary to identify and model acoustic parameters directly from the speech signal. For this reason, the studies by Lithuanian authors previously referenced offer a useful starting point for further work. However, the direct applicability of their findings is limited (Bikulčienė's due to the analysis of one-word phrases, Kundrotas's due to the absence of acoustic data).

It should be noted that in this part of the research directives are not compared with statements or questions. Consequently, the results are evaluated and interpreted only within the set of directive examples, i.e., by comparing directive phrases with one another. This approach inherently constrains the range of interpretive possibilities, as it does not employ statements as a baseline. However, this methodological choice enables the analysis to concentrate on a specific functional phrase type. Once all three types – statement, question, and directive – have been analysed, it will be possible to provide a detailed description of their similarities and differences in Lithuanian.

The classification of imperative sentences in Lithuanian linguistics is not uniform. Lithuanian researchers in syntax and phonetics (Balkevičius, 1963, 56–64; Vaitkevičiūtė, 1964; 1966; 2001, 166–179; Sirtautas and Grenda, 1988, 18–21; Oginskienė, 1994, 578–

580; Labutis, 1998, 116–119) divide imperative sentences into two groups: imperatives (active directives) and optatives (more passive directives). Bikulčienė (1978), however, divided directive phrases (not imperative sentences) into three groups: requests, commands, and advice. The present study is based on this latter classification when constructing the research material. At the same time, the analysis also considers the degree of directive force, distinguishing between more active and less active directives.

For the purposes of this study, the following sentences were constructed (IP = intonational phrase):

IP1: *Perrašyk darbą.* 'Rewrite the paper.' (pronounced as a request)
IP2: *Perrašyk darbą.* 'Rewrite the paper.' (pronounced as a command)
IP3: *Perrašyk darbą.* 'Rewrite the paper.' (pronounced as advice)
IP4: *Jis prašo* "*Perrašyk darbą*". 'He asks, "Rewrite the paper."
IP5: *Jis reikalauja* "*Perrašyk darbą*". 'He demands, "Rewrite the paper."
IP6: *Jis pataria* "*Perrašyk darbą*". 'He advises, "Rewrite the paper."
IP7: *Prašyčiau perrašyti darbą.* 'I would ask you to rewrite the paper.'
IP8: *Liepčiau perrašyti darbą.* 'I would order you to rewrite the paper.'
IP9: *Patarčiau perrašyti darbą.* 'I would advise you to rewrite the paper.'
IP10: *Prašau perrašyti darbą.* 'I ask you to rewrite the paper.'
IP11: *Maldauju perrašyti darbą.* 'I beg you to rewrite the paper.'
IP12: *Liepiu perrašyti darbą.* 'I order you to rewrite the paper.'
IP13: *Reikalauju perrašyti darbą.* 'I require you to rewrite the paper.'
IP14: *Siūlau perrašyti darbą.* 'I suggest rewriting the paper.'
IP15: *Patariu perrašyti darbą.* 'I advise you to rewrite the paper.'
IP16: *Perrašyk darbą!* 'Rewrite the paper!' (pronounced expressively, as a shout)

From a semantic-pragmatic perspective, a) the request group is represented by IP1, IP4, IP7, IP10, IP11, b) the command group by IP2, IP5, IP8, IP12, IP13, and c) the advice group by IP3, IP6, IP9, IP14, IP15. The phrase IP16, to be pronounced expressively (in a shout-like manner), may be considered a member of the command group. However, in the presentation of the results, it is discussed separately from the command group.

Interrogative sentences are also considered directives (cf. Drukteinis, 2024, 610–616). However, they are not included in this stage of the study described in this article and will be analysed together with interrogative sentences marking the function of questioning.

The sentences used in the experiment were constructed in such a way as to allow the identification not only of semantic-pragmatic factors, but also, to some extent, of the possible interplay between grammatical factors and acoustic properties. For this reason, both the performative verb and its grammatical expression vary: a) imperative, b) subjunctive and infinitive, c) present tense and infinitive (in (a) – imperative sentence; in (b) and (c) – declarative sentences). Due to these different grammatical realisations of directives and because of the focus on acoustic properties, the term *directive phrase* is used in the article instead of *imperative sentence*.

The prepared sentences were read five times each by four male actors (aged 30–33). The recordings were made in a professional sound studio; the technical recording conditions were identical for all material.

The empirical data were extracted using the speech analysis software Praat (Boersma and Weenink, 2018), and several measures (mean and maximum intensity, duration) were obtained using the ProsodyPro script (Xu 2013). For the interpretation of certain

results, a supplementary questionnaire survey, completed by three phoneticians, was also employed.

In the article the results are described not in terms of absolute acoustic parameter values (F0 measured in Hz, intensity in dB, duration in ms), but in terms of their ratios, except for intonation contours, where F0 was measured in semitones (st). This approach is intended not only to highlight the similarities and differences between phrases more apparent and to abstract as far as possible from individual speakers' vocal properties and accidental non-linguistic factors, but also to address the applied aspect of the study mentioned above.

Ratios for the mean F0, mean intensity, and duration were calculated as follows: the mean value of the parameter under investigation was determined for the analysis unit (phrase or part of phrase), the median of the mean values of that parameter for the entire sample for a given speaker was then computed, and the mean value for each phrase (or segment) was divided by this median. For the maximum, the maximum values were divided by the median of the sample means (not by the median of the maximum). Intensity ratios were calculated using the formula $10^{(x-y)/10}$, where *x* is the intensity of the unit under investigation and *y* is the median of the sample.

F0 range[1] was calculated as F0 maximum minus F0 minimum, and range ratios were obtained by dividing this value by the median of the speaker's ranges. The centre of the range, which allows one to evaluate the height of the F0 register, was calculated as F0min + (F0max − F0min)/2, and its ratios were computed by dividing this value by the median of the mean F0 values.

The register of the intonation contour is defined as the interval between the highest and lowest F0 values. It was calculated based on F0 measurements obtained from the target syllables used to construct the contour. The excursion size of the intonation contour was calculated as the difference between the highest and the lowest F0 values along the contour.

The data were statistically evaluated using the *t-test* (significance level 0.05; unless otherwise indicated, the critical *t*-value is 2.02). A cluster analysis was conducted using IBM SPSS (IBM Corp. 2020).

3. Results and Discussion

3.1. Fundamental Frequency and Intonation contour

The results for phrase F0 are not straightforward: among those with a mean higher than the overall median of mean F0 of the speaker (ratio > 1), there are examples from all semantic-pragmatic groups under investigation – advice, command, and request (see Table 1). Nevertheless, some tendencies can be observed: the participants of the study were generally not inclined to produce advice phrases with an F0 higher than the overall median (0.93–0.99), except for IP14 with the performative verb *siūlau* 'I suggest'. Command phrases, except for IP5, tended to be produced with higher F0 values than most advice phrases; however, the interval of ratios is quite wide – from 0.86 to 1.05. Mean F0 values for request phrases also vary; there are examples both above and below the overall median (0.93–1.03). It is noteworthy that the pleading phrase (IP11) has a

[1] On the terms *pitch register* and *pitch range*, see Féry (2017, 21) and Rietveld and Vermillion (2004).

comparatively high mean F0, like that of command phrases, which represent active directives.

Table 1. Ratios of F0 parameters[2]

Phrase	Mean	Maximum	Range	Range centre
IP16	1.15	1.43	1.18	1.11
IP14	1.08	1.59	1.42	1.11
IP8	1.05	1.53	1.39	1.11
IP13	1.04	1.28	0.98	0.97
IP11	1.03	1.28	0.97	0.97
IP12	1.02	1.37	1.06	1.05
IP1	1.01	1.34	0.99	1.02
IP2	1.00	1.25	0.94	0.99
IP10	0.99	1.27	0.90	0.96
IP9	0.99	1.29	0.90	1.01
IP6	0.96	1.25	0.97	1.01
IP7	0.96	1.29	1.01	1.01
IP3	0.94	1.42	1.12	1.04
IP15	0.93	1.23	0.83	0.95
IP4	0.93	1.13	0.71	0.91
IP5	0.86	1.06	0.65	0.86

When the ratios of mean F0 of phrases are summarized by directive group, the group mean F0 can be said not to differ statistically significant[3]: IPcomm (1.00) / IPadv (1.00) > IPreq (0.99). Due to phrases that deviate from the general pattern (IP14, IP5, and IP11), the summarized results should be interpreted with caution.

The results for F0 maximum do not fully correspond to the means F0: IPadv (1.36) > IPcomm (1.28) / IPreq (1.28). The differences between IPcomm and IPadv (t = 2.44) and between IPreq and IPadv (t = 3.33, in both cases with a critical t-value = 1.97) are statistically significant.

Among the phrases with the highest maximum is IP3, which is read as advice and has one of the lowest mean F0 values. In addition, F0 values for this phrase show very large dispersion, reflecting different realisation strategies: starting the phrase with a higher or somewhat lower F0 (see Figures 1 and 2). It is precisely this phrase, together with the already mentioned IP14 with *siūlau* 'I suggest' that produced the high overall value for advice.

Phrases IP10–IP15 are declarative sentences containing performative verbs that convey directives of varying degrees of force: *prašau* 'I ask' (IP10) and *maldauju* 'I beg'

[2] In this and in Table 2, the phrases are ordered according to the ratios of the means, from the largest to the smallest. The phrases are arranged in the same order in the box plots in Figures 1, 2, 7, and 8.

[3] Here and in what follows, unless indicated otherwise, the value given in brackets is the median of the ratios; the symbol ">" is used when the values for the compared phrases differ (although the difference is not necessarily statistically significant), and "/" when they are equal. IPcomm is used as a cover label for command phrases, IPadv for advice phrases, and IPreq for request phrases.

(IP11), *reikalauju* 'I demand' (IP13) and *liepiu* 'I order' (IP12), *patariu* 'I advise' (IP15) and *siūlau* 'I suggest' (IP14). According to the assessments of phoneticians who participated in the questionnaire survey, the second verb in each pair is semantically stronger in terms of encouragement. It could have been expected that not only command phrases in general, but also those containing these semantically more active performative verbs would support Bikulčienė's (1978) conclusion that active directives are characterised by a higher F0 maximum. However, this is not the case: among the compared pairs, only IP14 exhibits a higher maximum than IP15; the maximum of IP11 and IP10 are very similar, whereas IP13 has a higher maximum than IP12. These findings indicate that F0 is neither the sole, nor perhaps necessarily the primary indicator of directive force.

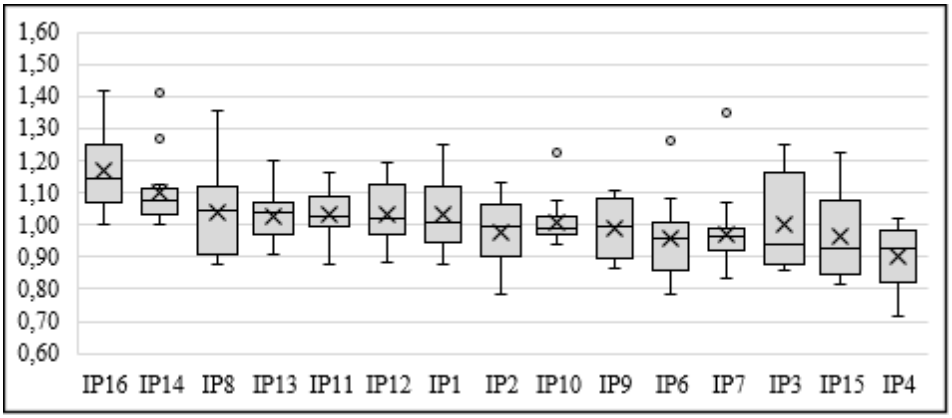

Figure 1. Ratios of mean F0

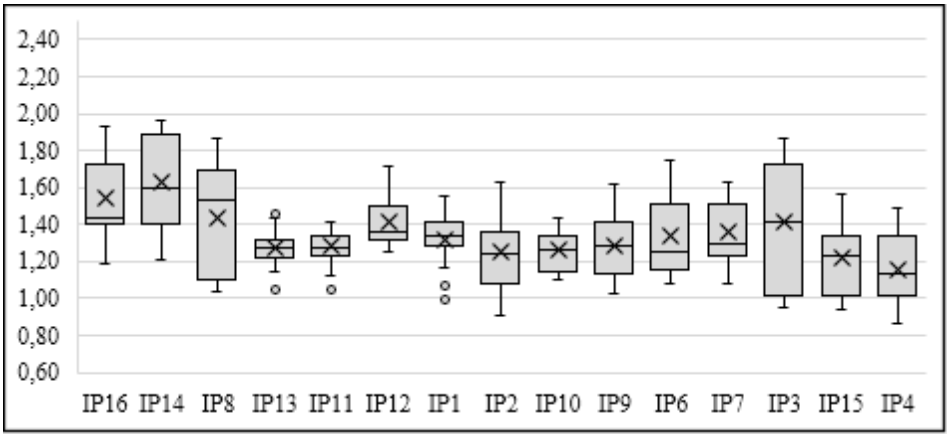

Figure 2. Ratios of F0 maximum

The high maximum of some advice phrases contributed to the widest F0 range among the compared groups (1.06). The differences between IPadv and IPcomm, and between IPadv and IPreq are statistically significant (t = 2.11 and t = 2.95, respectively; critical t-value = 1.97). Request phrases have the narrowest range (0.93), whereas command phrases (0.97) occupy an intermediate position between advice and request.

The overall ratios of F0 range centres for command and request phrases are identical (0.98) and lower than for advice (1.02). The differences between IPadv and IPcomm, and between IPadv and IPreq are statistically significant (t = 2.4 and t = 2.96, critical t-value = 1.97). Thus, in the present material advice phrases are characterised not only by the widest range, but also by a somewhat higher register. A close examination of phrases with high F0 maximum shows that phrases with an F0 maximum at least 1.4 times higher than the mean were produced in a higher register. In this way the participants tended to produce not only the expressive command IP16, but also advice with *siūlau* 'I suggest' (IP14), a command with *liepčiau* 'I would order' (IP8), as well as some individual phrases. However, it cannot be claimed that these phrases were produced with strongly emphasised narrow focus, since in Lithuanian narrow focus is signalled by a complex set of features: not only F0, but also higher intensity and longer duration (Kazlauskienė and Dereškevičiūtė, 2022; Kazlauskienė et al. 2023, 37–86).

Four phrases with the same phonemical structure, *Perrašyk darbą* 'Rewrite the paper', were pronounced differently: expressively (IP16), as a request (IP1), as a command (IP2), and as advice (IP3). All F0 parameters of the expressively produced phrase are comparatively high and therefore stand out from the other three realisations. For the non-expressively produced phrases, the ordering of F0 parameters varies: mean F0 – IP1 > IP2 > IP3; F0 maximum and F0 range – IP3 > IP1 > IP2. Although none of these differences is statistically significant, several observations can still be made. As previously mentioned, IP3 has a lower mean F0 than IP1 and IP2 (the latter two are similar), but it exhibits the highest maximum and range.

This suggests that the acoustic realisation of advice lacks consistency and shows substantial variability; speakers may perceive and produce advice differently, particularly with respect to its degree of forcefulness. At the same time, these findings support the cautious conclusion that the three directive realisations of a phrase with identical structure are unlikely to be distinguishable based on F0 alone[4].

In the material three pairs of phrases contain the same performative verb in the subjunctive and present tense. In one pair (IP10 > IP7, *prašau* 'I ask' vs. *prašyčiau* 'I would ask') the phrase with the present tense shows a higher mean F0, although the F0 maximum is higher in the sentence with the subjunctive form of the verb. In the remaining pairs, both the mean and the maximum F0 are higher in phrases with the subjunctive: IP8 > IP12 and IP9 > IP15 (*liepčiau* 'I would order' vs. *liepiu* 'I order', *patarčiau* 'I would advise' vs. *patariu* 'I advise'). However, neither the individual differences within the pairs nor the overall difference between the two groups is statistically significant. Therefore, only a tentative observation can be made. Directives expressed through sentences containing performative verbs in the subjunctive may be produced with higher F0 than directives with performative verbs in the present tense. If

[4] That these phrases are not easily recognisable in the material is further supported by the results of a brief survey conducted among phoneticians: a) only half of the request phrases were identified as requests, while the others were classified as commands or advice; b) two thirds of the command phrases were correctly identified as commands, while the rest were perceived as requests; and c) nearly three fifths of the advice phrases were identified as advice, while the others were perceived as requests.

higher F0 is taken as an indicator of a more active directive (cf. most command phrases have higher F0 parameters), phrases with performatives in the subjunctive may be selected to express a stronger directive force. Nevertheless, this insight is not supported by the phoneticians who participated in the survey. In their judgement, more active directives are those expressed with present tense performative verbs, although they also pointed to certain contextual factors, such as the influence of social roles on directive realisation: speakers in positions of authority may be more likely to choose the present tense.

Within each directive group, it is possible to compare two additional types of realisations: those without a performative verb and those containing a performative verb in another clause of a compound sentence. The latter constructions are close to direct speech. All speakers produced them as two intermediate phrases, even when no clear pause separated the two. The results of this comparison do not reveal any consistent pattern, except that in both the request and command groups the lowest F0 values occurred in the examples realised with two intermediate phrases:

a) IP1 > IP10 > IP7 > IP4 (read as a request, *prašau* 'I ask', *prašyčiau* 'I would ask', *prašo* 'He asks'),

b) IP8 > IP12 > IP2 > IP5 (*liepčiau* 'I would order', *liepiu* 'I order', read as a command, *reikalauja* 'He demands'),

c) IP9 > IP6 > IP3 > IP15 (*pataršiau* 'I would advise', *pataria* 'He advises', read as advice, *patariu* 'I advise').

This suggests a cautious hypothesis that phrases with the performative verb in the third person are less expressive in terms of F0. In these cases, the directive is indirect – the speaker does not issue the directive personally but reports someone else's directive. However, only a few of the F0 differences between the compared examples are statistically significant: IP4 and IP1 (t = 4.00), IP4 and IP7 (t = 2.08), IP4 and IP10 (t = 4.02), IP8 and IP5 (t = 4.67), IP5 and IP12 (t = 5.26).

The studies reviewed in the introduction suggest that the intonation contour, particularly the F0 height at the end of the phrase, may vary depending on the type of directive. To evaluate whether such assumptions hold for Lithuanian, F0 (measured in semitones relative to 1 Hz) was extracted for specific syllables, and median values were calculated:

a) for IP1–IP3 and IP16, F0 was measured in the nucleus of the first syllable, the final stressed syllable, and the final syllable of the phrase (***P**e**r**rašyk d**ar**bą*** 'Rewrite the paper'; target syllables are indicated in bold).

b) for IP4–IP15, F0 measurements were taken from the stressed syllable of the performative verb and from the corresponding syllables in ***p**e**r**rašyk d**ar**bą*** 'rewrite the paper'.

The results for phrases IP1–IP3 and IP16 indicate (see Figure 3) that they are characterised by a falling contour. IP16 is produced in a slightly higher register than the other phrases (77–89 st, compared with overlapping registers for the others: 75–87 st (IP1), 76–87 st (IP2), 74–85 st (IP3)), yet its F0 excursion is identical to that of the request and advice phrases – 12 st; only the command phrase IP2 exhibits a smaller F0 excursion (9 st).

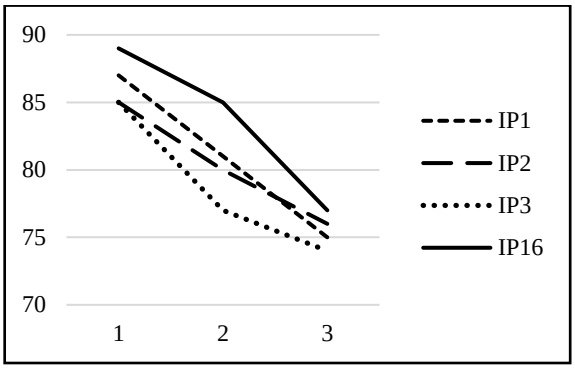

Figure 3. Intonation contour in phrases IP1–IP3 and IP16[5]

For IP4–IP6, which consist of two intermediate phrases and whose second phrase corresponds to that of IP1–IP3, the contour is rising in the first intermediate phrase and falling in the second[6] (see Figure 4). Comparing the contour of the second intermediate phrase (*perrašyk darbą* 'rewrite the paper') with IP1–IP3, it can be observed that the curves for advice and request are similar, differing only in F0 excursion: IP4 and IP6 have excursions more than twice as small – only 5 st. The contour of the command phrase IP5 is not as steep as that of IP2, although both have smaller F0 excursion than the other phrases in their respective groups (4 st for IP5). The request phrase IP4 is pronounced in a slightly higher register (78–86 st), cf. the registers of the advice phrase IP6 (77–82 st) and the command phrase IP5 (78–83 st).

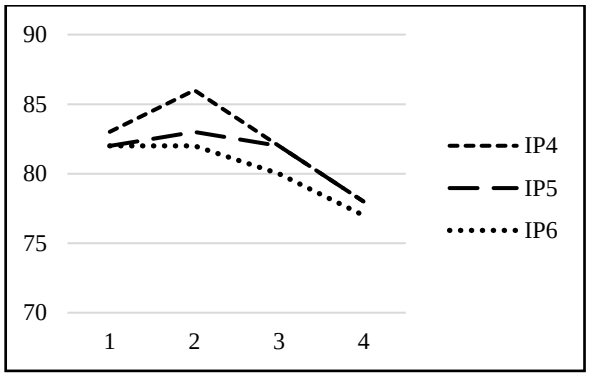

Figure 4. Intonation contour in phrases IP4–IP6

[5] In this figure, the digits on the x-axis indicate the syllables of *P**e**rrašyk d**ar**bą* 'Rewrite the paper' in which the F0 was measured (target syllables are indicated in bold). In Figures 4–6, 1 corresponds to the stressed syllable of the performative verb and 2–4 to the syllables of *p**e**rrašyti d**ar**bą*.

[6] The F0 of the first word *jis* ('he') was also measured, but the values did not differ from those of the performative verb and were therefore excluded from further analysis.

The contours of IP7–IP9, which include performative verbs in the subjunctive, are similar to those shown in Figure 3, differing primarily in excursion: IP8 and IP9 exhibit somewhat steeper excursions (11 and 13 st, respectively, compared with 9 st for IP2 and 11 st for IP3), whereas IP7 has a notably smaller excursion of 7 st (compared with 12 st for IP1). The registers of these phrases vary: 78–85 st for IP7, 76–87 st for IP8, and 73–86 st for IP9.

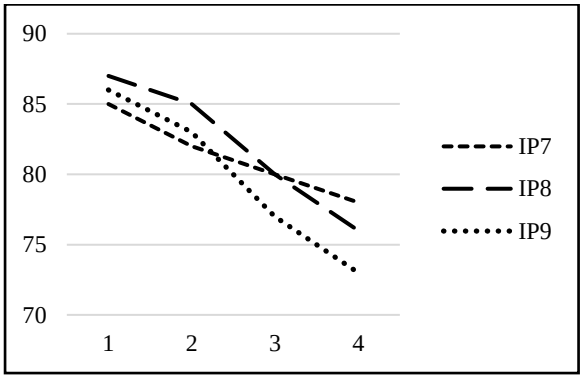

Figure 5. Intonation contour in phrases IP7–IP9

The contours of IP11–IP15 (see Figure 6) differ little from those of the phrases shown in Figure 5. Only IP10 shows a rising–falling contour. The F0 excursions in these examples range from 9 to 10 st, except for the advice phrase IP14, which has an excursion of 12 st. The registers of the command phrases IP12 and IP13 are identical (77–87 st). Whereas the register of the advice phrases varies considerably: 76–88 st for IP14 and 75–85 st for IP15. The register of the request phrase IP11 is 76–86 st.

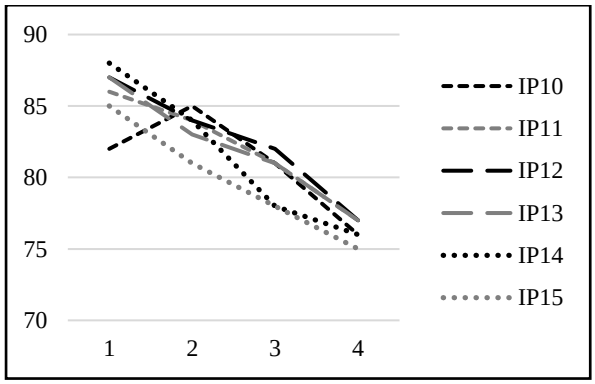

Figure 6. Intonation contour in phrases IP10–IP15

The expressively produced phrase begins with the highest F0 (89 st). Among the non-expressively produced phrases without a performative verb, the request phrases have the highest initial F0 (87 st), while the command and advice phrases start at the same level (85 st). For the examples containing two intermediate phrases, the initial F0 of the request is also somewhat higher, both in the first intermediate phrase (IP4 – 83 st, compared with 82 st for IP5 and IP6) and in the second (IP4 – 86 st, compared with 83 st for IP5 and 82 st for IP6).

Among the phrases with performatives in the subjunctive, the highest initial F0 is found for the command (87 st for IP8, 86 st for IP9 and 85 st for IP7). Commands with present tense performatives (IP12 and IP13) also show a high initial F0 (87 st). However, the highest initial F0 is observed in IP14 (88 st, cf. 85 st for the other advice phrase IP15). For the request phrases of this structural group, the initial F0 is not uniform: IP11 – 86 st, IP10 – 82 st.

Across all structurally different groups, the final F0 is lowest in advice phrases (values in st are given in brackets): a) IP2 (76) > IP1 (75) > IP3 (74), b) IP4 / IP5 (78) > IP6 (77), c) IP7 (78) > IP8 (76) > IP9 (73), d) IP11 / IP12 / IP13 (77) > IP10 / IP14 (76) > IP15 (75).

In a few cases, participants produced a slightly rising intonation contour at the very end of the phrase (approximately 1–1.5 st). However, it is not possible to conclude that this occurred more frequently in any particular directive type; such cases appeared across all groups and are likely related not to directive force, but to non-final (list-like) intonation.

When comparing F0 in the stressed syllables of the performative verbs one tendency can be observed: speakers tended to emphasize present tense verbs in the first person more than those in the third person:

a) *maldauju* ‘I beg’ (86) > *prašyčiau* ‘I would ask’ (85) > *prašo* ‘He asks’ (83) > *prašau* ‘I ask’ (82),

b) *liepiu* ‘I order’ / *reikalauju* ‘I require’ / *liepčiau* ‘I would order’ (all 87) > *reikalauja* ‘He demands’ (82),

c) *siūlau* ‘I suggest’ (88) > *patarčiau* ‘I would suggest’ (86) > *patariu* ‘I advise’ (85) > *pataria* ‘He advises’ (82).

As can be seen, *prašo* (‘He asks’) is an exception, as its F0 is higher than that of *prašau* (‘I ask’); the latter was pronounced most likely as an interjection.

To summarise the F0 results: command phrases tend to be produced with higher F0. However, the main reason for higher F0 is not the type of directive, but rather expressiveness and the height of the phrase-initial F0. When a phrase begins at a higher F0 and the performative verb is somewhat more emphasized, all F0 parameters, especially the maximum and range, are high regardless of directive type. For this reason, there is considerable variability in phrase-initial F0, since the performative verb occurs in phrase-initial position in the material. Thus, phrases expressing a request, a command, or advice may all start with high F0. Advice phrases have the lowest final F0, whereas command and request phrases are more variable, and no consistent pattern emerges.

The intonation contour in the material is predominantly falling; a rising–falling contour was observed in examples with two intermediate phrases, as well as in the phrase *Prašau perrašyti darbą.* ‘I ask you to rewrite the paper.’ These results are fully consistent with the findings of the foreign studies cited at the beginning of the article (Cruttenden, 1997; Simard, 2013; Frota and Prieto, 2015). However, they only partially support Bikulčienė’s (1978) observation that active directives are characterised by a

rising–falling intonation contour, whereas less active ones, such as requests, show a falling contour.

3.2. Intensity

When the ratios of mean intensity are calculated and the phrases are ordered accordingly, those belonging to the command group cluster at the top of the list (see Table 2). Among the phrases with the highest intensity is also a request containing the performative verb *maldauju* 'I beg'. In general, command phrases and this pleading phrase exhibit the largest variability in intensity values (see Figures 7 and 8), indicating that the participants employed quite different strategies for expressing commands: some produced them with substantially high intensity, while others deviated only slightly from their typical loudness.

Table 2. Ratios of intensity

Phrase	Mean	Maximum	Phrase	Mean	Maximum
IP16	2.91	14.30	IP4	0.85	3.96
IP11	2.28	11.13	IP6	0.78	4.35
IP13	2.23	11.38	IP10	0.75	2.81
IP2	1.85	7.91	IP9	0.64	3.38
IP12	1.58	8.47	IP14	0.57	2.78
IP5	1.49	6.17	IP1	0.48	1.77
IP8	1.34	8.21	IP15	0.48	2.65
IP7	1.06	5.50	IP3	0.39	2.03

Participants tended to produce advice with lower than mean intensity, with intensity ratios ranging narrowly from 0.39 to 0.78 (cf. command phrases, where the range, excluding the expressive phrase, spans 1.34 to 2.23).

Except for the phrase containing *maldauju* 'I beg', the intensity of request phrases is below mean intensity. Only the request with the performative verb *prašyčiau* 'I would ask' exhibits intensity close to mean. Overall, the intensity of request phrases is highly variable: they appear among both the high- and low- intensity phrases, with values ranging from 0.48 to 2.28 (for the pleading phrase).

These tendencies are reflected in the summarized intensity results for the directive groups. Commands (excluding the expressive example) exhibit the highest intensity, averaging roughly twice that of requests and three times that of advice: IPcomm (1.80) > IPreq (0.86) > IPadv (0.58). A similar pattern is observed for intensity maximum: IPcomm (8.26) > IPreq (3.96) > IPadv (3.25). All differences in mean and maximum intensity are statistically significant (critical *t*-value = 1.97): means – IPcomm and IPreq (t = 5.17), IPcomm and IPadv (t = 10.33), IPreq and IPadv (t = 4.96); maximum – IPcomm and IPreq (t = 6.50), IPcomm and IPadv (t = 8.72), IPreq and IPadv (t = 2.45).

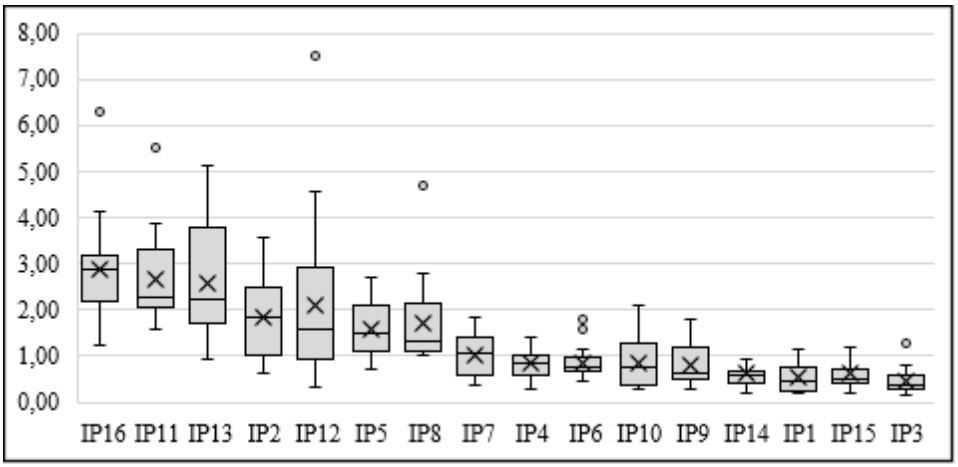

Figure 7. Ratios of mean intensity

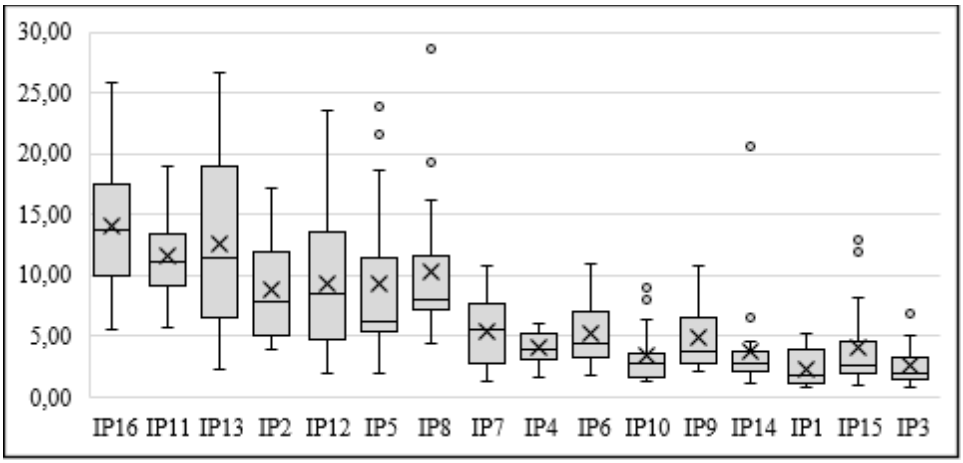

Figure 8. Ratios of maximum intensity

Phrases with the same structure, *Perrašyk darbą* 'Rewrite the paper', without performative verbs can be ordered by decreasing intensity as follows: IP16 > IP2 > IP1 > IP3 (expressive, command, request, advice). The expressive phrase has the highest intensity; and its differences from the other phrases are statistically significant. Intensity differences among the remaining phrases are smaller. However, the differences between the command and request (t = 5.95) and between the command and advice (t = 6.32) are statistically significant. These results indicate that intensity alone is unlikely to distinguish between the request and advice readings of phrases with the same structure.

When comparing phrases with the same performative verb in the present tense and subjunctive, it can be observed that in two pairs the phrases with the subjunctive are pronounced with higher intensity (IP7 > IP10, *prašyčiau* 'I would ask' and *prašau* 'I ask', IP9 > IP15, *patarčiau* 'I would advise' and *patariu* 'I advise'), whereas in one pair (IP12 > IP8, *liepiu* 'I order' and *liepčiau* 'I would order') the phrase with the present tense is more intense; however, none of these differences are statistically significant. Thus, one can speak only of a tendency for requests and advice expressed by performative verbs in the subjunctive to be produced with higher intensity than those expressed in the present tense, potentially softening the directive. Conversely, active directives – commands – are more intensely pronounced in phrases with present tense verbs and are not softened by the subjunctive. This observation should be tested on a larger and more diverse dataset.

The results of comparing fourfold different grammatical realisations of the same directive do not reveal a consistent pattern:

a) IP2 > IP12 > IP5 > IP8 (read as a command, *liepiu* 'I order', *reikalauja* 'He demands', *liepčiau* 'I would order'),

b) IP7 > IP4 > IP10 > IP1 (*prašyčiau* 'I would ask', *prašo* 'He asks', *prašau* 'I ask', read as a request),

c) IP6 > IP9 > IP15 > IP3 (*pataria* 'He advises', *patarčiau*'I would advise', *patariu*, 'I advise', read as advice).

Only the differences between IP7 and IP1 (t = 3.99) and between IP6 and IP3 (t = 4.19) are statistically significant. As can be seen, in one case the phrases without performative verbs have the highest intensity (a), in another, phrases with the subjunctive show the highest intensity (b), and in a third, phrases in the present tense display the highest intensity (c). A cautious hypothesis may be proposed: when a command is expressed without a performative verb, intensity becomes a crucial feature, and the phrase exhibits high intensity, closely resembling a prototypical command; performative verbs then serve to attenuate the directive. In request and advice phrases without performative verbs, intensity is low, and performative verbs function to strengthen the directive. In such cases, acoustic properties play a complementary role.

To summarise the intensity results: mean and maximum intensity serve as a reliable indicator for recognising not only expressively produced phrases but also for command phrases in general, that is, active directives. This conclusion is further supported by the relatively high intensity values for pleading, which also falls within the category of active directives. Moreover, it aligns with the finding that the intensity values for *Perrašyk darbą* 'Rewrite the paper' differ only slightly when produced as advice or as a request, whereas the command reading shows considerably higher intensity.

The directive can also be reinforced by the performative verb (through its semantics), especially when it is emphasized. In this study, this effect is observed for advice expressed with *siūlau* 'I suggest', particularly when the verb bears narrow focus.

A comparison of F0 and intensity maximum shows that the phrases with the highest F0 maximum do not generally coincide with those exhibiting the highest intensity maximum except for IP16 and IP8. The highest F0 maximum are observed in IP14 (1.59), IP8 (1.53), IP16 (1.43), and IP3 (1.42), whereas the highest intensity maximum occurs in IP16 (14.30), IP13 (11.38), IP11 (11.13), IP12 (8.47), and IP8 (1.21). If the phrases with the highest F0 maximum also had the highest intensity maximum, one could argue that these phrases contained very prominent narrow focus, since as noted, this kind of focus in Lithuanian is characterised by both features. The results of the present study suggest a cautious conclusion: the F0 maximum largely reflects the

speakers' tendency to begin phrases at a higher F0, whereas intensity is more closely related to the force of the directive. At the same time, these findings highlight an important methodological challenge in analysing the intonation contours of functional phrase types: how to minimise the influence of other linguistic phenomena, if this is at all possible.

3.3. Duration of Selected Units

Due to differences in composition, it is not methodologically appropriate to compare the duration of all phrases and words. However, the material was designed in such a way that the duration of a constant part of the phrase could be reliably compared. These constant parts are the sequences *perrašyk darbą* 'rewrite the paper' and *perrašyti darbą* 'to rewrite the paper'. The analysis considered not only the overall duration ratios of these units but also which segment type – vowels or consonants – is more sensitive to duration changes. For this purpose, the total duration of syllable nuclei and the total duration of syllable consonants in the word were calculated. For example, in *perrašyk darbą* 'rewrite the paper' the sum of nuclei durations is 674 ms, whereas the sum of consonants is 456 ms. Median and ratio of duration were calculated within the respective datasets (*perrašyk darbą* or *perrašyti darbą*).

Phrases containing *perrašyk darbą* 'rewrite the paper' are of two structural types: a) without a performative verb, b) with a performative verb. The first group can be ordered by decreasing duration as follows: IP1 (1.08) > IP16 (1.03) > IP3 (0.94) > IP2 (0.93). The differences between IP1 and IP2 (t = 2.08), IP1 and IP3 (t = 5.89), and between IP3 and IP16 (t = 2.72) are statistically significant. Thus, the longest phrases are those expressing a request and the expressive command (the latter showing a large dispersion in duration values; see Figure 9), whereas advice and command phrases are shorter. Since these phrases share the same phonemic structure, the number of segments cannot account for the observed duration differences.

In the second group, the greatest duration is again found in the request phrase with its duration closely matching that of the command phrase, whereas the advice phrase is noticeably shorter: IP4 (1.01) > IP5 (1.00) > IP6 (0.94). The differences between IP4 and IP6 (t = 4.71) and between IP5 and IP6 (t = 2.99) are statistically significant.

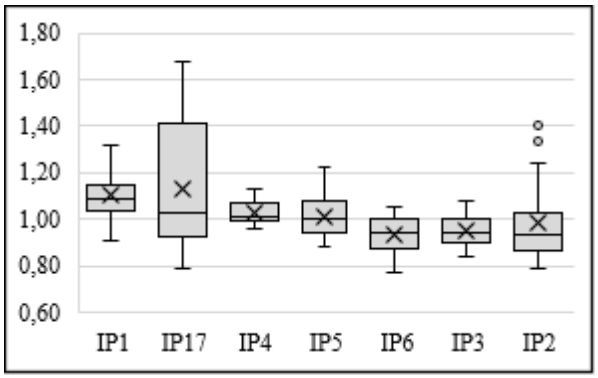

Figure 9. Duration ratios for *perrašyk darbą* 'rewrite the paper'

Based on the duration ratios of syllable nuclei (V), the phrases without performative verbs can be ordered by decreasing duration as follows: IP1-V (1.15) > IP16-V (1.08) > IP3-V (0.92) > IP2-V (0.91). The differences between IP1-V and IP2-V (t = 4.25), IP1-V and IP3-V (t = 7.15), IP3-V and IP16-V (t = 4.02), and between IP2-V and IP16-V (t = 2.85) are statistically significant. For phrases with performative verbs, the ordering is: IP4-V (1.04) > IP5-V (0.98) > IP6-V (0.89), with statistically significant differences between IP4-V and IP6-V (t = 5.47) and between IP5-V and IP6-V (t = 3.61). In both structural groups, the ordering by syllable nucleus duration corresponds to that by the total duration of the analysed part of the phrase.

A similar pattern is observed when evaluating the duration ratios of consonants (C). For phrases without performative verbs, the decreasing order is: IP1-C (1.03) > IP3-C (1.00) > IP16-C (0.97) > IP2-C (0.95); for phrases with performative verbs, the order is: IP4-C (1.01) > IP5-C (1.00) > IP6-C (0.97). The differences in both groups are small and not statistically significant.

Comparing the ratio of duration orderings for individual sounds and for *perrašyk darbą* 'rewrite the paper' shows a general tendency: the highest duration ratios are observed in request phrases (see Figure 10). However, it remains unclear whether the observed changes in phrase (and word) duration are determined by vowels or by consonants.

The ratios for syllable nuclei and consonants indicate that the difference between the largest and smallest ratio of syllable nucleus (IP1-V and IP6-V) is 0.26, whereas for consonants (IP1-C and IP2-C) it is only 0.08. This suggests that the duration of syllable nuclei varies more and may play a more significant role in the realisation of directive phrases. This pattern is also reflected in the nucleus–consonant proportions: in expressively produced and request phrases, syllable nuclei occupy a slightly larger proportion of word duration than in other directive types: IP1 – 59%, IP16 – 58%, IP4 – 57%, IP2 and IP5 – 56%, IP3 – 55%, IP6 – 54%.

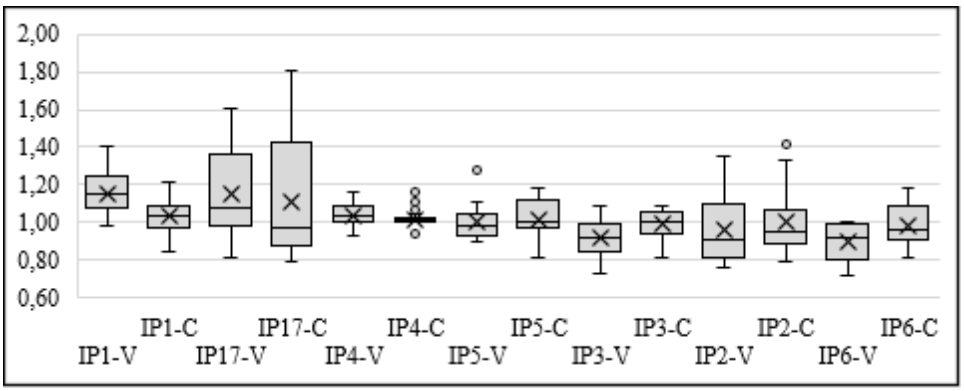

Figure 10. Duration ratios for sounds in *perrašyk darbą* 'rewrite the paper'

Phrases containing *perrašyti darbą* ‘to rewrite the paper’ are also of two structural types: a) with performative verbs in the subjunctive, and b) with performative verbs in the present tense. The results of duration of *perrašyti darbą* are as follows (see Figure 11): a) IP7 (1.02) > IP8 (0.96) / IP9 (0.96), b) IP10 (1.12) / IP11 (1.12) > IP12 (1.04) / IP13 (1.04) > IP15 (0.99) > IP14 (0.95). In both structural groups, the longest examples are observed in request phrases.

In the first group, the duration of *perrašyti darbą* ‘to rewrite the paper’ in advice and command phrases are identical, whereas in the request phrase, the sequence is significantly longer than in advice and command (IP7 and IP8 t = 2.69; IP7 and IP9 t = 2.26).

In the second group, *perrašyti darbą* ‘to rewrite the paper’ in advice phrases are the shortest, while those in commands occupy an intermediate position. It should also be noted that in this group, the durations of the analysed part of the request and command do not differ between phrases with different performatives, cf. IP10 and IP11 (*prašau* ‘I ask’ and *maldauju* ‘I beg’), IP12 and IP13 (*liepiu* ‘I order’ and *reikalauju* ‘I require’). Statistically significant differences are found between: a) IP10 and IP12 (t = 3.10), IP13 (t = 2.53), IP14 (t = 5.46), IP15 (t = 4.67); b) IP11 and IP12 (t = 2.84), IP13 (t = 2.46), IP14 (t = 4.74), IP15 (t = 4.18); c) IP12 and IP14 (t = 4.42), IP15 (t = 2.89); d) IP13 and IP14 (t = 3.54), IP15 (t = 2.57).

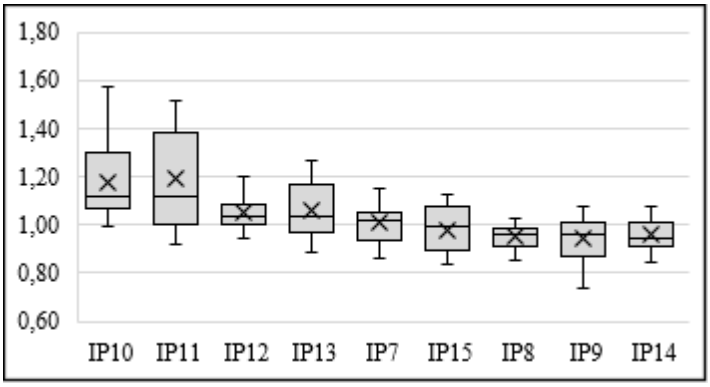

Figure 11. Duration ratios for *perrašyti darbą* ‘to rewrite the paper’

The ordering of phrases by the duration of individual sounds coincides with the ordering by the duration of the entire sequence. For phrases with performative verbs in the subjunctive, the decreasing order of the ratio of syllable nucleus duration is as follows (see Figure 12): IP7-V (1.00) > IP8-V (0.94) > IP9-V (0.90). The nuclei in the request phrase are significantly longer than in advice and command (IP7-V and IP9-V, t = 3.64, IP7-V and IP8-V, t = 3.07). Consonant durations in these phrases differ slightly (IP7-C – 1.00, IP8-C and IP9-C – 0.99), and these differences are not statistically significant.

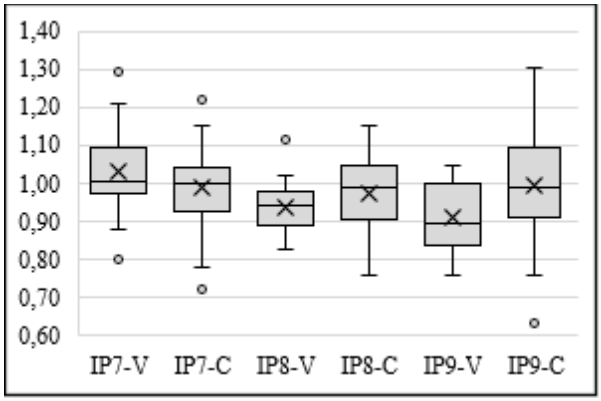

Figure 12. Duration ratios for sounds in *perrašyti darbą* 'to rewrite the paper' (1)

For phrases with performative verbs in the present tense, the decreasing order of syllable nucleus duration is as follows (see Figure 13): IP11-V (1.23) > IP10-V (1.11) > IP13-V (1.07) > IP12-V (1.03) > IP15-V (0.99) > IP14-V (0.98). Statistically significant differences are found between: a) IP10-V and IP12-V (t = 2.14), IP14-V (t = 6.92), IP15-V (t = 3.66); b) IP11-V and IP12-V (t = 2.82), IP14-V (t = 4.11), IP15-V (t = 3.94); c) IP12-V and IP14-V (t = 2.06); d) IP13-V and IP14-V (t = 2.75), IP15-V (t = 2.54). The ordering of phrases by consonant duration is very similar: IP10-C (1.12) > IP11-C (1.11) > IP12-C (1.05) > IP13-C (1.01) > IP14-C (0.97) > IP15-C (0.95). Almost all differences are statistically significant: a) IP10-C and IP12-C (t = 3.33), IP13-C (t = 4.42), IP14-C (t = 5.16), IP15-C (t = 4.78); b) IP11-C and IP12-C (t = 2.22), IP13-C (t = 3.34), IP14-C (t = 4.08), IP15-C (t = 3.77); c) IP12-C and IP14-C (t = 2.76), IP15-C (t = 2.31).

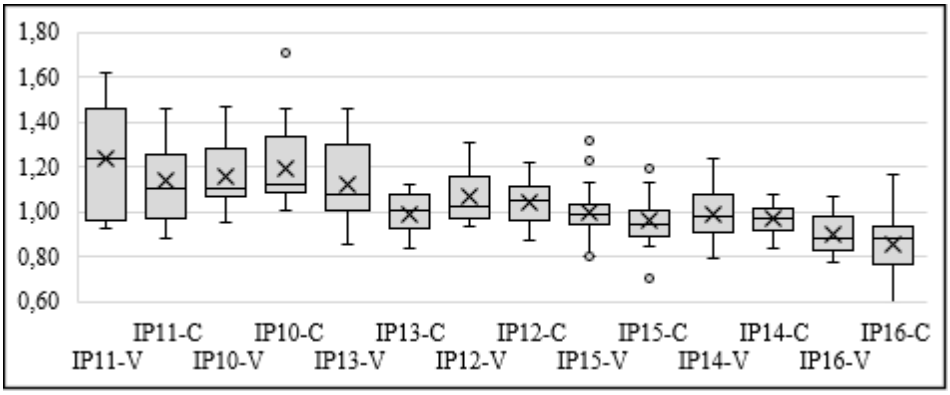

Figure 13. Duration ratios for sounds in *perrašyti darbą* 'to rewrite the paper' (2)

The proportions between syllable nuclei and consonants vary across phrases, with nuclei accounting for 54% to 59% of word duration. In the *perrašyti darbą* 'to rewrite

the paper' dataset, no clear pattern emerges when considering the proportion of nucleus duration. It may appear that syllable nuclei occupy a larger proportion of the total duration in phrases with longer verbs, e.g., trisyllabic verbs: IP13 (59%), IP11 (58%), IP7 (57%); compared with disyllabic verbs: IP12, IP14 (both 56%), IP10, IP8 (both 55%). However, phrases with trisyllabic verbs IP15 (56%) and IP9 (54%) show only a slight predominance of the nucleus.

To summarise the duration results, request phrases are consistently the longest, with all sounds lengthened, although syllable nuclei are extended slightly more. This is a reliable distinguishing feature of request phrases. Command phrases without performative verbs are the shortest, whereas those with performatives occupy an intermediate position between request and advice phrases.

3.4. Comprehensive Summary of Acoustic Features

A cluster analysis was conducted on all phrase tokens based on the relative values of seven parameters. As the results are described in terms of three semantic-pragmatic groups (request, command, and advice), the cluster analysis was set to group the phrases into three clusters. The expressively pronounced phrase was excluded from this analysis.

As shown by the summary of cluster centres and the distribution of phrases (Tables 3 and 4), the most important parameters distinguishing the clusters are intensity and duration, whereas F0 parameters show less variation.

Cluster 1 is characterised by longer duration, moderately higher F0 and range centre, and medium intensity. This cluster accounts for 28% of the data and includes many command phrases (almost half of this kind of phrase) as well as most of the pleading phrases.

Cluster 2 exhibits the lowest ratios across all analysed parameters. It is the intonationally least expressive cluster but the most frequent, comprising 65% of the phrases.

Cluster 3 is characterised by the highest intensity, while the other parameters differ little from those of Cluster 1. Only 7% of phrases belong to this cluster; these consist of isolated command and pleading phrases and one phrase with the performative verb *siūlau* 'I suggest'.

Table 3. Parameters of cluster centres

Feature	Cluster		
	1	**2**	**3**
Mean F0	1,03	0,98	1,02
F0 maximum	1,33	1,31	1,34
F0 range	1,03	0,99	1,04
F0 range centre	1,01	1,00	0,98
Mean intensity	1,98	0,72	3,52
Intensity maximum	10,02	3,45	20,20
Duration of *perrašyk darbą / perrašyti darbą*	1,07	1,00	1,04
Number of phrases (%)	27	65	8

Table 4. Distribution of phrases across clusters

Phrase	Cluster			Phrase	Cluster		
	1	**2**	**3**		**1**	**2**	**3**
IP1		20		IP9	4	16	
IP2	10	9	1	IP10	2	18	
IP3	1	19		IP11	16	1	3
IP4		20		IP12	11	7	2
IP5	4	12	4	IP13	7	5	8
IP6	5	15		IP14		19	1
IP7	7	13		IP15	3	17	
IP8	12	4	4				

Almost three quarters (72%) of request phrases belong to the least expressive Cluster 2, 25% are assigned to Cluster 1, and only individual cases fall into Cluster 3. The vast majority (86%) of advice phrases are assigned to Cluster 2 and 13% to Cluster 1. Command phrases are widely distributed: 44% in Cluster 1, 37% in Cluster 2, and 19% in Cluster 3. These results indicate that the degree of acoustic expressiveness in phrases expressing active directives varies; they diverge more or less from phrases that have relatively neutral characteristics.

4. Conclusions

The study can be summarised as follows (95% confidence intervals for the median ratios are given in brackets):

1. Mean F0: IPreq (0.97–1.01) – IPcomm (0.96–1.01) – IPadv (0.97–1.03),
2. F0 maximum: IPreq (1.25–1.31) – IPcomm (1.24–1.33) – IPadv (1.32–1.42),
3. F0 range: IPreq (0.90–1.00) – IPcomm (0.90–1.04) – IPadv (1.01–1.17),
4. F0 range centre: IPreq (0.96–1.00) – IPcomm (0.96–1.01) – IPadv (1.00–1.05),
5. Mean intensity: IPreq (1.00–1.37) – IPcomm (1.72–2.18) – IPadv (0.60–0.76),
6. Intensity maximum: IPreq (4.54–6.10) – IPcomm (8.77–11.18) – IPadv (3.47–4.69),
7. Duration of *perrašyk darbą / perrašyti darbą*: IPreq (1.07–1.13) – IPcomm (0.99–1.03) – IPadv (0.94–0.97).

The F0 parameters are not straightforward: mean F0 does not show any clear tendencies as the intervals for all phrases overlap. Higher F0 maximum, a wider F0 range, and a higher range centre are characteristic of advice. The intonation contour is either falling or rising–falling in examples with two intermediate phrases.

Intensity appears to be a reliable indicator of active directives, such as commands. Advice phrases consistently show the lowest intensity. It must be acknowledged, however, that the force of a directive is not easily and unambiguously defined. While it is natural to describe commands as stronger than requests or advice when comparing directive subtypes, the results of this study demonstrate that, for instance, a pleading phrase may exhibit more prominent acoustic properties than certain commands.

A longer than usual duration signals a request. In the material, both syllable nuclei and consonants are lengthened in request phrases. Advice phrases are the shortest in the

present data. However, based on this study alone it cannot be concluded that they are generally shortened, as a more detailed analysis of other functional phrase types – particularly statements – is required.

The results of the cluster analysis indicate that, based on a combination of acoustic parameters, it is possible to reliably distinguish between active and less active directives. However, the specific nature of the latter – advice, suggestion, desire, request, invitation to act, etc. – remains difficult to identify.

The comparison of phrases with the same phonemic structure leads to the following conclusions:

1. Expressively produced phrases differ from the other examples in that all F0 parameters are elevated, resulting in a generally high intonation contour, and intensity is high. They are longer than phrases of the same phonemic structure produced as commands or advice, but their duration differs little from that of request phrases. These phrases additionally exhibit a large dispersion in intensity and duration values, indicating that these parameters may deviate considerably from the habitual speaking characteristics.
2. The results for non-expressively produced phrases vary, but certain regularities can be observed:
   2.1. Command phrases are characterised by quite high intensity. Their F0 maximum and range are the smallest, whereas the mean F0 occupies an intermediate position between request and advice. They are shorter than request phrases but differ little in duration from advice phrases. Compared with other non-expressive phrases, commands are distinguished by a smoother intonation contour and a somewhat higher final F0, however, they do not exhibit a rising intonation contour.
   2.2. Request phrases differ from other non-expressive phrases primarily in the longer duration. Their mean F0 is the highest of all three types, whereas F0 maximum, ranges, and intensity occupy an intermediate position between commands and requests. They begin with a high F0, which accounts for the elevated mean F0.
   2.3. Advice phrases show low intensity. Their mean F0 is the lowest, but maximum and ranges are relatively high. They are shorter than request phrases but differ little in duration from commands. It may be hypothesised that these phrases are closest to the speaker's habitual speaking properties.

The comparison of phrases with performative verbs in the subjunctive and present tense yields ambiguous results:

a) Commands and advice tend to be produced with higher F0 when expressed with performatives in the subjunctive, whereas requests, conversely, tend to exhibit higher F0 in the present tense.
b) Requests and advice expressed in the subjunctive are produced with higher intensity, whereas commands are more intense when using verbs in the present tense.

Thus, the study partially supports E. Gudavičienė's (2006, 65) conclusion that the subjunctive denotes a possible or desired action and is therefore employed to express a more gentle and polite request or advice.

The study does not provide a clear answer as to whether acoustic properties are merely complementary when directives are expressed with performative verbs. If the acoustic features were more prominent in phrases with performatives, it could be

predicted that the verb emphasises the nature of the directive. Conversely, if the acoustic features were weaker, it would suggest that the directive is conveyed lexically rather than through acoustic means.

The F0 of request phrases is higher in phrases without a performative verb, except in cases of pleading. Commands and advice, however, tend to be produced with higher F0 when a performative verb is present. Requests and advice were produced more intensely when a performative verb was included, whereas the intensity of commands did not show a clear pattern and remained similar across different structures. Since, according to the results of this study, intensity is a reliable indicator of directive force, it can be tentatively assumed that the verb strengthens requests and advice, while commands are maintained at the same intensity level. Considering that phrases without performative verbs were not well recognised, it may cautiously be concluded that the verb not only reveals the type of directive and strengthens directive force but also highlights the acoustic properties.

Acknowledgment

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References

Balkevičius, J. (1963). *Dabartinės lietuvių kalbos sintaksė* (Syntax of the modern Lithuanian language), Vilnius: Valstybinė politinės ir mokslinės literatūros leidykla.

Bikulčienė, P. (1978). Skatinimo ir konstatavimo intonacijų gretinimas (Comparison of intonation of directives and statements), *Kalbos garsai ir melodika*, 3–11.

Boersma, P., Weenink, D. (2018). *Praat: doing phonetics by computer, version 6.035*. www.praat.org.

Cruttenden, A. (1997). *Intonation*, 2nd ed., Cambridge: Cambridge University Press.

Drukteinis, A. (2024). Sintaksė (Syntax), in A. Balčiūnienė, A. Drukteinis, R. Kazlauskaitė, J. Vaskelienė, *Praktinė bendrinės lietuvių kalbos gramatika* (Practical grammar of the Lithuanian language), Vilnius: Vilniaus universiteto leidykla, 489–755.

Falé, I., Faria, I. H. (2007). Imperatives, orders and requests in European Portuguese intonation. Proceedings of the *16th International Congress of Phonetic Science*s, 1041–1044.

Féry, C. (2017). *Intonation and Prosodic Structure*, Cambridge University Press, Cambridge.

Frota, S., Prieto, P. (2015). Intonation in Romance: systemic similarities and differences, in S. Frota, P. Prieto (eds.), *Intonation in Romance*, Oxford: Oxford University Press, 392–418.

Gårding, E. (1998). Intonation in Swedish, in D. Hirst, A. Di Cristo (eds.), *Intonation Systems: A Survey of Twenty Languages*, Cambridge: Cambridge University Press, 112–130.

Gibbon, D. (1998). Intonation in German, in Daniel Hirst, Albert Di Cristo (eds.), *Intonation Systems: A Survey of Twenty Languages*, Cambridge: Cambridge University Press, 78–95.

Gudavičienė E. (2006). Direktyvai kaip ilokucinių aktų rūšis (Directives as a kind type of illocutionary acts). *Lituanistica* **67**(3), 60–68.

IBM Corp. (2020). *IBM SPSS statistics for Windows*, version 27.0, computer software, IBM Corp.

Kazlauskienė, A., Dereškevičiūtė, S. (2022). Observations on the prosodic marking of narrow focus in Lithuanian. *Baltic J. Modern Computing*, **10**(3), 307–316. doi:10.22364/bjmc.2022.10.3.04

Kazlauskienė, A., Dereškevičiūtė, S., Sabonytė, R. (2023). *Bendrinės lietuvių kalbos intonacija: frazės centras, ribos ir žymėjimas* (Standard Lithuanian intonation: phrase centre, boundaries, and marking), Kaunas: Vytauto Didžiojo universiteto leidykla, available at https://doi.org/10.7220/9786094675782.

Kundrotas, G. (2018). *Lietuvių kalbos intonacinė sistema* (The intonation system of the Lithuanian language), Utena: Indra.

Labutis, V. (1998). *Lietuvių kalbos sintaksė* (Lithuanian syntax), Vilniaus universiteto leidykla, Vilnius.

Mikalauskaitė, E. (1975). *Lietuvių kalbos fonetikos darbai* (Works on Lithuanian phonetics), Vilnius: Mokslas.

Oginskienė, E. (1994). Modaliniai sakinių tipai (Modal sentence types), Ambrazas, V. (ed.), *Dabartinės lietuvių kalbos gramatika* (Grammar of the modern Lithuanian language), Mokslo ir enciklopedijų leidybos institutas, Vilnius, 574–581.

Rietveld, T., Vermillion P. (2004). Cues for Perceived Pitch Register. *Phonetica: international journal of phonetic science*. **60**(4), 261-272.

Sirtautas, V., Grenda, Č. (1988). *Lietuvių kalbos sintaksė* (Lithuanian syntax), Vilnius: Mokslas.

Vaitkevičiūtė, V. (1964). Kai kurios skatinimo rūšys ir jų reiškimo būdai lietuvių kalboje (Some types of encouragement and their expressions in the Lithuanian language), *Lietuvos TSR Mokslų Akademijos darbai*, serija A, **1**(16), 219–229.

Vaitkevičiūtė, V. (1966). Lietuvių literatūrinės kalbos klausiamieji sakiniai (Interrogative sentences in Lithuanian Standardt language), *Lietuvos TSR Mokslų Akademijos darbai*, serija **A**, 1(20), 193–202.

Xu, Y. (2013). ProsodyPro – A tool for large-scale systematic prosody analysis, in *Proceedings of Tools and Resources for the Analysis of Speech Prosody (TRASP 2013)*, Aix-en-Provence, 7–10.

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