

# CONTEXT-INDUCED PHONETIC SHIFT IN SILESIAN CZECH SPEAKERS

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## ABSTRACT

We assessed the regional accent of young educated urban-dwellers from Czech Silesia and measured their phonetic accommodation in (in)formal situations. Silesian Czech reduces the vowel length contrast existing in Common Czech. We compared the duration of /a:/ produced by 12 Silesians and 6 Common Czech controls, as well as accent ratings of these speakers by 102 Czech listeners, distinguishing between regionally mobile and region-bound Silesians and, for the mobile Silesians, also between their reading to a native-accent peer and to a standard-Czech senior teacher. Both the /a:/ durations and the accent ratings confirmed that Silesian and Common Czech speakers differ. For the mobile Silesians, the results of /a:/ duration revealed short-term accommodation but neither the acoustic nor the accent-rating data provided evidence of long-term change as compared to the region-bound Silesians.

**Keywords:** Silesian Czech, vowel duration, accent recognition, accommodation

## 1. INTRODUCTION

Instrumental (socio)phonetic studies of contemporary Czech speech in Moravia and Silesia (the east of the Czech Republic) are sparse [1]. As noted already half a century ago [2], traditional dialectal areas in these regions have been undergoing dialect levelling. The reduction of distinct local features has been shown more recently in a survey of Ostrava teenagers' language use [3]. At the same time, Moravian and Silesian teenagers may prefer (broadly) regional features to Standard Czech and to Common Czech, the prestigious, regionally unmarked inter-dialect widely used in Bohemia and west Moravia [4].

Our study focuses on Czech Silesia (north-eastern Czech Republic), specifically on the Ostrava region. Early industrialization and urbanisation of the area promoted in-migration. Contacts between speakers of different dialects from within and outside Silesia resulted in a reduced differentiation of local dialects and the formation of a Silesian inter-dialect that continues to undergo further levelling [5]. Phonologically, Silesia remains a distinct dialectal area [6], its regional accent being easily recognizable by outside listeners [7]. The features distinguishing

Silesians from Czech speakers in other regions include penultimate lexical stress, the absence of contrasting vowel length, the presence of the /i/-/ɪ/ contrast, and progressive voicing assimilation in /tv, sv, kv/ clusters [2, 3, 8, 9]. However, even these features are subject to variation, their instability in contemporary Silesian occasionally commented on (e.g. [10] for penultimate stress). Inter-speaker variation in the Ostrava region seems to be driven, above all, by socioeconomic status and education [5], while an important intra-speaker factor is register: in formal contexts, Silesians tend to switch to Standard Czech [3, 5]. It is the impact of register we are exploring in this study.

In face-to-face verbal exchanges, the interlocutors may adopt phonetic characteristics of each other's speech [11]. According to Communication Accommodation Theory, such adjustments facilitate coherent interaction and allow interlocutors to negotiate social distance [12, 13]. Empirical studies provide evidence of phonetic accommodation during a cooperative goal-oriented exchange [14-16]. However, cooperation may not be a prerequisite for inducing a phonetic shift towards one's interlocutor; e.g. the listeners in [17] needed as little as a visual hint at the speaker's regional background to adjust their perception of vowel sounds.

In our study, we used a non-interactive reading task to elicit speech from young, regionally mobile speakers from Silesia on two occasions: once in the presence of a peer with the same dialect background (Ostrava Mode) and once in the presence of a senior instructor using Standard Czech (Standard Mode). We tested if the speakers would adapt phonetically to the sociolinguistic identity of a passive interlocutor. The study further asked whether the regionally mobile Silesians' accent in the Ostrava Mode would differ from the accent of Silesians who did not leave the region regularly. Since both groups consisted of young university-educated urban dwellers, it was possible that their speech would not contain salient local features. This is why comparison data were collected from a parallel population of speakers of the widely spread Common Czech [18].

We used ratings by listeners as a global measure and vowel duration as a specific acoustic measure of the speakers' accent. The acoustic analysis focused on the vowels /a/ and /a:/. In both Standard and Common Czech phonology, vowel length cuts across

all vowel qualities, producing a vowel system of 5 short and 5 long vowels, including the two low vowels with minimal pairs such as *dal* /dal/ ‘he gave’ and *dál* /da:l/ ‘further’, for which duration is the main cue [19]. Typical for Silesian speech is the absence of the vowel-length contrast, with *dal* and *dál* pronounced as homophones.

Our research questions concern (1) the duration of /a:/, described in Standard Czech as a long low central unrounded vowel, and (2) Czech listeners’ responses to speech of mobile and non-mobile Silesians and Common Czech speakers. With respect to each point, we ask if there is a difference between (i) Silesians and Common Czech speakers, (ii) regionally mobile and non-mobile Silesians, and (iii) mobile Silesians’ speech in the Ostrava Mode and the Standard Mode.

## 2. METHODOLOGY

### 2.1. Speakers

The speakers were 18 young adults: 2 groups of 6 Silesians and one of 6 speakers from central or western Bohemia or western Moravia. One Silesian group, the “mobile” Silesian Czech (mSCz) speakers, included 4 women and 2 men (mean age 21.8 years) from Ostrava who pursue academic degrees at Palacký University Olomouc in central Moravia but maintain a frequent contact with their home region, returning to Silesia for the weekends (1 participant even commuting daily). Another 3 men and 3 women from Silesia (4 from Ostrava, 1 from Frýdek-Místek, 1 from Havířov; mean age 23.5 years) could be described as “non-mobile”, conducting their day-to-day life within the Silesian region; they were university students or recent graduates (University of Ostrava, Ostrava Technical University). We take them to represent the accent of young educated adult speakers of Silesian Czech (SCz). The third group included 3 men and 3 women (mean age 22.5), also students at Palacký University Olomouc; they were speakers of Common Czech (CCz).

### 2.2. Production: vowel duration

These speakers read the Czech version of *The North wind and the Sun* [20]. The mSCz speakers were recorded twice in order to elicit performance in different speaking modes. First, they met with a peer with the same native dialect background (a 22-year-old man from Ostrava, Collector 1), who introduced the session by a 5-minute chat about everyday life at home. At least a week later, they were recorded by a university instructor (a 55-year-old woman speaking in Standard Czech, Collector 2), who inquired about their academic work before the recording. Both sessions took place in a recording studio at Palacký

University. This venue was also used to record the CCz speakers, interacting with Collector 2. The SCz speakers were recorded in a quiet room at home by a native Silesian (either Collector 1 or a 17-year-old high school student). A Zoom H4n recorder at 16-bit and 44.1 kHz without compression was used for all the recordings. The participants practised the passage and then read it twice.

For the analysis we used 22 words from the first reading. When a token could not be analysed, the same word from the second reading was used. Two types of intervals were manually annotated in Praat [21]: the target vowel, /a(:)/, and a CVC interval comprising /a(:)/ and the immediately preceding and following consonants. No word-initial or -final /a(:)’s were analysed. The words *pak* ‘then’ and *tak* ‘so’, typically following a pause, were excluded as the beginning of the CVC sequence could not be identified. In total, 12 long /a:/’s and 12 short /a/’s were measured per reading. We calculated relative V duration as the V-to-CVC duration ratio to attenuate variability due to reading tempo differences. Although there are other variables affecting V duration in Czech, including word length (4 syllable-words were excluded), a vowel’s position in the word, and the word’s position within an intonational phrase [22], these were kept constant between participants since the same words and text were used.

### 2.3. Accent recognition

The sentence that was delivered most fluently by the largest number of participants (*Ujednali tedy, že ten se má považovat za silnějšího, kdo první dokáže, aby si pocestný svlékl plášť.* “They agreed the one who first made the traveller take his cloak off should be considered stronger.”) was extracted from the 24 recordings, yielding 6 CCz clips, 6 SCz clips, and 12 mSCz clips (6 per mode). The clips were assigned in a pseudorandomized manner into 6 sets, each comprising 8 items – 2 from SCz and 2 from CCz speakers, and 2 from mSCz speakers performing in the native mode and 2 from other mSCz speakers in the standard mode. Each clip occurred in two sets but only once in each set. Each set was heard by 17 listeners, i.e. each clip was judged by 34 listeners.

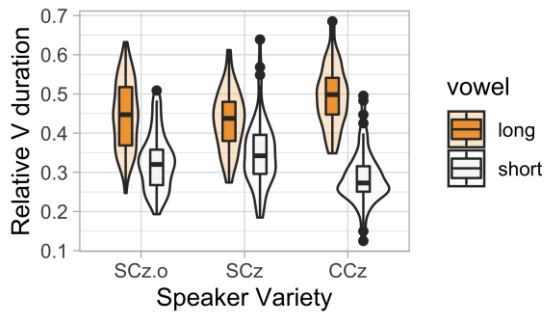
In a Praat MFC experiment, listeners heard a clip and responded to the question ‘Do you think this person comes from the Ostrava region?’ on a 6-point Likert scale (1 = definitely not, 6 = definitely yes). They could replay each sentence twice.

The listeners were 102 young adults, all students at Palacký University (mean age 21.3 years, 80 women, 22 men), out of which 18 came from the Ostrava region. The data was collected in a computer room, and the listeners used circumaural headphones.

### 3. RESULTS

#### 3.1. Production of /a(:)/ duration

Fig. 1 shows the distributions of the relative durations of the target /a(:)/'s for the CCz and SCz speakers, as well as the mobile SCz speakers performing in the Ostrava Mode (SCz.o). The figure suggests shorter durations of long /a:/ for the SCz speakers than for CCz, while the measured /a:/ durations for the SCz.o speakers seem to be intermediate. Listed in Tab. 1, and plotted in Fig. 2, are the coefficients estimated by a linear mixed model with relative V duration as the response variable, Speaker Variety and Vowel Length as the fixed effects, and Item (varying intercepts) and Speaker (varying intercepts and slopes for Vowel Length) as the random effects (analyses in R [23-26]).



**Figure 1:** Violin and boxplots of relative durations of the target long and short /a(:)/ split by the speaker's native variety.

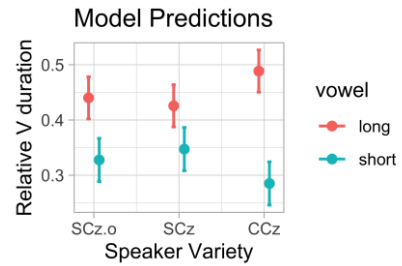
	Estimate	SE	df	t	Pr(> t )
(Intercept)	0.440	0.020	31.40	22.62	<0.0001
varietySCz	-0.015	0.015	17.38	-0.96	0.3500
varietyCCz	0.048	0.015	17.38	3.21	<b>0.0050</b>
vowelShort	-0.113	0.024	26.80	-4.68	<0.0001
varietySCz:vowelShort	0.034	0.015	17.16	2.25	0.0380
varietyCCz:vowelShort	-0.091	0.015	17.26	-5.99	<0.0001

**Table 1:** Coefficients estimated by a linear mixed model fitted to the relative V durations produced by the speakers in their native varieties.

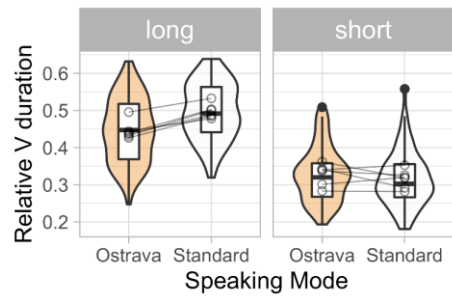
The analysis showed that the CCz speakers' /a:/ durations were reliably longer (est. +0.048,  $SE = 0.015$ ,  $t = 3.21$ ,  $p = 0.005$ ) than those produced by the mobile SCz speakers in the native Ostrava Mode (SCz.o, the Intercept in Tab. 1), which in turn did not differ reliably from those produced by the non-mobile Silesians (SCz).

We plotted (in Fig. 3) and modelled (with Bonferroni alpha correction) the mobile Silesians' productions in the Ostrava Mode and in the Standard Czech Mode separately, as this is a within-speaker comparison. Fig. 3 shows the distributions of the relative durations of the target /a(:)/ for these

speakers. While short /a/ durations did not seem to be affected by Mode, long /a:/ seemed lengthened when produced in the Standard Mode as compared with the Ostrava Mode.



**Figure 2:** Predicted relative durations of /a(:)/'s produced by the speakers in their native varieties.



**Figure 3:** Violin and boxplots of relative durations of the target long and short /a(:)/ for the mobile Silesian speakers split by Mode. Unfilled circles connected by lines show each speaker's means.

Listed in Tab. 2 are the coefficients estimated by a linear mixed model with relative V duration as the response variable and Speaking Mode and Vowel Length as the fixed effects, and Item (varying intercepts) and Speaker (varying intercepts and slopes for Vowel Length) as the random effects. The model confirmed that the bidialectal speakers' lengthening of /a:/ in the Standard Mode was statistically reliable (est. +0.052,  $SE = 0.008$ ,  $t = 6.12$ ,  $p < 0.0001$ ).

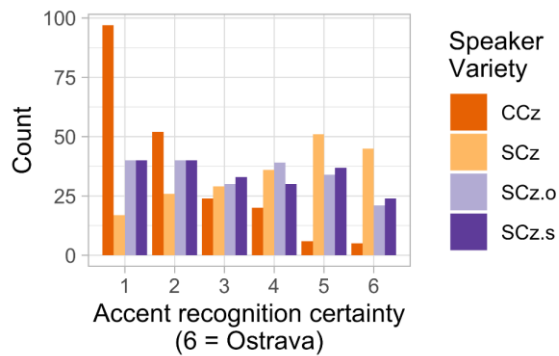
	Estimate	SE	df	t	Pr(> t )
(Intercept)	0.436	0.021	25.68	21.30	<0.0001
modeStandard	0.052	0.008	256.86	6.12	<0.0001
vowelShort	-0.109	0.026	25.15	-4.11	<b>0.0004</b>
modeStandard:vowelShort	-0.065	0.012	256.86	-5.45	<0.0001

**Table 2:** Coefficients estimated by a linear mixed model fitted to the relative V durations produced by the bidialectal speakers in the two Modes.

#### 3.2. Accent recognition

For each step on the accent recognition scale (where 1 = the speaker is definitely not from the Ostrava region, and 6 = definitely yes), Fig. 4 plots the counts

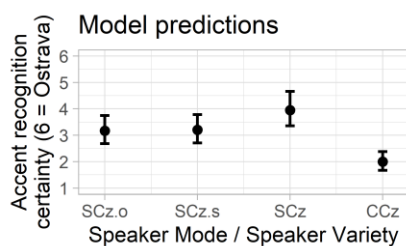
of responses per Speaker Variety, or in the case of the bidialectal Silesians, Speaking Mode. It can be seen that for CCz the frequency of responses decreases rapidly with the growing scale step, while for SCz it increases (though more gradually), both as expected. For the mobile Silesians, the counts are rather evenly spread across the scale and do not differ much between the Ostrava (SCz.o) and Standard (SCz.s) modes.



**Figure 4:** Listeners' accent recognition certainty. Counts of responses per scale step (1 = definitely not from the Ostrava region, 6 = definitely yes) and Speaker Variety / Speaking Mode.

	Estimate	SE	z	Pr(> z )
(Intercept)	1.155	0.085	13.57	<0.0001
var/modeSCz.s	0.010	0.055	0.17	0.8684
var/modeSCz	0.220	0.119	1.86	0.0635
var/modeCCz	-0.463	0.124	-3.75	0.0002

**Table 3:** Coefficients estimated by a generalized linear mixed model (Poisson family) fitted to the listeners accent recognition certainty scores for the stimuli produced by speakers with the different native varieties and in the different speaking modes.



**Figure 5:** Predicted accent recognition certainty ratings of speakers with different native varieties, and for the mobile Silesians, speaking in the different modes.

Given in Tab. 3 and plotted Fig. 5, are the coefficients estimated by a generalized linear mixed model of the Poisson family with Speaker Variety / Mode as the fixed effect, and Listener and Speaker as the random effects (both with varying intercepts). This analysis revealed a reliable difference of the mobile Silesian

speakers' ratings in the native Ostrava Mode (the Intercept in Tab. 3) from the CCz ratings (est. -0.463,  $SE = 0.124$ ,  $z = -3.75$ ,  $p = 0.0002$ ), but not from the mobile Silesians' Standard Mode ratings, or from the non-mobile Silesians' ratings.

#### 4. DISCUSSION

The speech of our (young, educated) Silesian participants shows the hallmark of Silesian Czech, i.e. long vowel shortening. Their "long" /a:/ was shorter than the Common Czech long /a:/. Interestingly, the Silesian "short" /a/'s were longer compared to Common Czech /a/'s. Together, this indicates a reduction of length contrasts in Silesian Czech, vowel duration possibly being more variable due to prosodic factors (word-level stress, intonation phrasing). Yet, the mobile Silesians did differentiate between /a:/ and /a/ (Tab. 1), with the non-mobile Silesians also displaying some, albeit smaller, difference (see Fig. 1). Thus, a systematic investigation of vowel duration in Silesian Czech, accounting for prosody-conditioned variation, needs to follow if the phonological role of vowel length in contemporary Silesian Czech is to be clarified.

Our study did not find evidence of long-term accommodating. The Silesians who regularly spend time away from their home region did not produce reliably longer /a:/ compared to their region-bound counterparts. From Fig. 2 it appears though that the magnitude of the /a:/-/a/ difference, rather than just the duration of /a:/, should be explored next before it is concluded that young mobile Silesian speakers do not experience phonetic drift [27]. However, the mobile Silesians did adjust /a(:)/ durations due to the social setting, producing longer /a:/'s and shorter /a/'s (Tab. 2) in the presence of a Standard Czech speaker. The /a:/ shifts were consistent across speakers, suggesting that V duration is changed dynamically.

In the accent recognition task, the listeners made a global judgement of the phonetic characteristics of the target utterances, reliably distinguishing between the Silesian and Common Czech speakers, which confirms a wide recognisability of the Silesian accent in the Czech Republic. The spread of responses to the Silesian speakers indicates a degree of uncertainty and is possibly due to variation among the Silesians. The counts of endpoint responses on the accent scale were different for the mobile and non-mobile Silesians (Fig. 4), however the model did not predict a reliable difference (Tab. 3). The listeners did not differentiate between the Ostrava and the Standard Mode utterances of the mobile Silesians, suggesting that phonetic adjustments on the part of the Silesian speakers were not sufficient to affect accent perception.

## 5. ACKNOWLEDGMENTS

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