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Salience of Greater Poland Polish Phonetic Variables

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ABSTRACT

This paper investigates the salience of five phonological variables: pre-sonorant voicing, nasal stopping, nasal assimilation, the *czy-trzy* merger, and denasalization in Greater Poland Polish. We elicited both production (audio recordings) and perception (psycholinguistic study) data from 65 participants. On this basis, we categorize the five variables with regard to the stereotype - marker - indicator scale suggested by Labov (1972). Nasal stopping and the *czy-trzy* merger are the most salient and the most negatively judged, suggesting they are stereotypes; pre-sonorant voicing and nasal assimilation attract little attention, suggesting they are indicators; denasalization is associated with little agreement among the participants as to its acceptability and is avoided in formal speech, suggesting it is a marker, with the caveat that denasalization is not restricted to Greater Poland Polish.

KEYWORDS Salience; Quantitative Sociolinguistics; Phonetic Variation; Polish; Psycholinguistics

0. Introduction

Considering linguistic variation, some variants may be perceived as more salient than others. Social salience, as defined by Preston (2011, 10) is the “[attribution of] non-specialist belief about and reaction to language use, structure, diversification, history, and status.” In this paper, we investigate the salience of a selection of features of Greater Poland Polish by looking at production data and at elicited judgments. Our aim is to harness both production and perception data to shed light on the salience of the selected features, as well as to find out whether overt judgments match participants’ productions. The variables we consider are (1) pre-sonorant voicing (e.g. the realization of *brat rodzony* ‘natural brother’ as [brad rɔdʑɔɲɨ]) (2) nasal stopping (e.g. the realization of *siedzą* ‘they are sitting’ as [ɕɛdʑɔɲ]) (3) nasal assimilation (e.g. the realization of *panienka* ‘miss’ as [pɔɲɛŋka]), (4) the CZY-TRZY merger

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(e.g. the realization of both *trzy* ‘three’ and *czy* ‘whether’ as [tʂi]), and (5) denasalization (e.g. the realization of *idę* ‘I’m going’ as [idɛ]).

Since the bulk of the pioneering theory and empirical research in sociolinguistics has been conducted on English, our introduction relies heavily on sources on English.

In his model of social salience, Labov (1972) suggested a taxonomy of variables based on the level of awareness in a community: variables that speakers are the least aware of and that involve no stylistic stratification, the so-called “indicators,” variables that are on the level of awareness of social meaning and that are subject to style shifting – “markers,” and variables that demonstrate overt social awareness – “stereotypes.” For example, in his sociolinguistic interviews, Trudgill (1986, 7–11) found that in Norwich English, T-glottaling (the use of glottal stop for syllable-final /t/) is a marker since over the course of the interview he accommodated the use of this feature to his interlocutor. On the other hand, he did not modify the degree of fronting or backing of /a:/, which suggests that the variable /a:/ was an indicator. There are also researchers who consider social salience to be a dynamic process depending on different properties of speakers, situational cognitive load, or a situation in which a given variant is encountered (Preston 2010; 2011). For example, in their experiment on sociolinguistic salience of different variables in a Scottish/English boundary zone, Llamas et al. (2016) found that perception was indicative of production; the tendency in Scottish English to avoid the realization of /r/ in coda positions was mirrored in perception since /r/ in coda positions was not frequently matched to the category “Scotland.” As Llamas et al. (2016, 15) conclude, “the strength of their socio-indexical value as seen through the lens of shared social meaning dictates how salient the forms will be. As production patterns change, so may the agreed social meaning of the form”. Salience of a given variant may be determined on the basis of a set of criteria. For example, a given variant may be categorized as a marker if it is a high prestige variant, a stigmatized variant, if the variable is undergoing linguistic change, if there is a phonetic distance between variants, or if there is phonological contrast between variants (Trudgill 1986, 11). Of particular interest may be the impact of highly salient forms, defined as the ones which “index social information more unequivocally than do forms with lower salience” (Llamas, Watt, and MacFarlane 2016, 2), on language variation and change. Trudgill (1986) argues that in dialect contact situations high salience inhibits the acquisition of new features.

Salience is considered to be a dynamic, multidimensional property that evolves over time. Preston (2010; 2011), for example, differentiates four stages of assigning social salience to linguistic forms: noticing, classifying, imbuing (e.g. associating a variant with positive or negative features), and reaction, which is given most attention in language attitude studies since it reveals secretly coded information about the speaker as well as the recipient.

To take one example, “an American may think a stranger ‘cultured’ and ‘refined’ simply because his or her accent is deemed British” (Cargile and Giles 1998, 338). Speakers who use standard forms are usually perceived as being more intelligent and having higher socioeconomic status, while those using non-standard forms are perceived as kinder and more attractive, a case in point being speakers of RP in America who are generally considered to have a higher status, but believed to be conservative and less attractive (Cargile and Giles 1998, 340–342). It may also happen that the same variant is perceived differently by different listeners. For example, in her study on the English variable ING, Campbell-Kibler (2008) found that the speaker who used the standard velar variant was perceived by some as intelligent, while others believed the speaker to be deliberately making an impression on listeners. Thus, to some listeners, this pronunciation had also some negative connotations.

1. Factors Influencing Speech Perception

How listeners perceive speech is dependent on numerous sociolinguistic factors, a good case in point being location. There is a plethora of studies dealing with the identification of the regional dialects of speakers. Clopper and Pisoni (2004), for example, asked people from Indiana to determine which region of the United States the speakers they heard came from. They observed that identifications were based on the recognition of dialectal variants such as r-lessness or vowel qualities. Jansen (2014) explored salience effects in the Carlise dialect. Among her variants of interest was TH-fronting, which is the realization of /θ/ as /f/, and /ð/ as /v/. She found that despite being attested in the Carlise dialect, TH-fronting was associated with London/Cockney speech, not the Carlise dialect, which means that this dialectal variant operates under the level of consciousness. Levon and Fox (2014) examined social salience of two variables: ING and TH-fronting. When it comes to ING, British listeners did not perceive the alveolar variant as less professional, even though the variable has reached the level of awareness. In the case of TH-fronting, while Northern listeners perceived increased fronting as less professional, Southern listeners displayed no such sensitivity. Llamas et al. (2016) wanted to find out how people from a Scottish/English border region differed in categorization of some variables as being Scottish or English. They found that Scottish listeners proved to be more accurate in terms of association between “high consensus forms” (forms that yielded a high level of consensus among community members) and region (England/not England/Scotland/not Scotland) than English listeners.

Of particular interest may also be the impact of the speakers’ location, gender, education, or age on their use of regional and standard variants. For example, in a survey on the use of regional dialects, Hansen (2014)

found that in Poland, speakers from smaller towns and villages declared using their regional accents more frequently than speakers from larger urban centers. The willingness to preserve the regional accent was also reported more frequently by less educated speakers and men. Paltridge and Giles (1984) focused on the perception of four different accents of French by male and female judges. It turned out that Brittany-accented speakers were rated as less positive in terms of “professional appeal” by men, while in terms of “social appeal” it is women who more positively judged Parisian-accented speakers. Bergstorm (2017) investigated the impact of age, dialect, and gender on the perception of the personality of speakers – New Zealanders and Utahns. It turned out that older speakers were perceived as more credible than young and middle-aged groups of speakers. In terms of dialect, New Zealanders were rated as more pleasant and more prestigious, and in terms of gender, women tended to rate male speakers as more prestigious. Bergstorm observed that not only the speaker’s but also the listener’s gender influenced the perception. As she says, “[i]rrespective of the age, dialect, and gender of the speaker, women tended to be more favorable in their perceptions of 26 speakers when compared to men” (Bergstrom 2017, 25–26).

2. Variables in Greater Poland Polish

Participants of the current study come from Poznań (a major Polish city in the West of the country) and surrounding areas. As such, they can be thought of as speakers of Greater Poland Polish, a variety long recognized to have features distinct from standard Polish (the latter having its major source in Warsaw speech). Among the characteristic features of Greater Poland Polish, Witaszek-Samborska (1985, 31) lists the realization of word-final obstruents as voiced when the following word begins with a sonorant (henceforth pre-sonorant voicing), the realization as [ɔm] (henceforth nasal stopping) of the word-final structure represented by the letter <ą> in the spelling (corresponding to the historical nasal vowel */ǫ̃/), the realization of the post-dental nasal /ɲ/ as a velar nasal [ŋ] (henceforth nasal assimilation) when followed by /k/ across a morpheme boundary, and the realization of the plosive-fricative cluster /tʂ/ as an affricate [tʂ] (henceforth *czy-trzy* merger), as widespread features of this Polish variety. The realization of the word-final structure represented by the letter <ę> in the spelling (corresponding to the historical nasal vowel */ɛ̃/) as an oral /ɛ/ (henceforth denasalization), though not restricted to Greater Poland Polish, is certainly present in it (Baranowska and Kaźmierski 2020), and as such it completes the list of variables investigated in this paper. For a phonologically-oriented treatment of these variables, see e.g. Gussmann (2007).

2.1 Pre-sonorant Voicing

Pre-sonorant voicing is a process of voicing word-final obstruents in the context where the following word begins with a vowel or a sonorant consonant (Dejna 1973), e.g. *brat rodzony* ‘natural brother’ is realized as [brad rɔdʑɔni] (Strycharczuk 2012, 71–72) (cf. standard Polish [brat rɔdʑɔni]). Early accounts (e.g. Bethin 1984) treat the process as a case of regressive assimilation. Andersen (1986) provides a diachronic account which sees the origins of pre-sonorant voicing in the way in which an earlier “protensity” contrast was reinterpreted as a voicing contrast. Cyran (2012) rejects the notion that sonorants spread voicing and trigger pre-sonorant voicing since sonorants cannot be specified for voicing. Instead, he suggests that word-final obstruents are subject to ‘spontaneous voicing,’ meaning that word-final obstruents in Greater Poland Polish are not specified for voicing. Settling the issue of the diachronic origins, or of the best synchronic characterization of pre-sonorant voicing, is beyond the scope of this paper. We are solely investigating the salience of this feature.

There is much experimental evidence of the existence of pre-sonorant voicing in Greater Poland Polish. Witaszek-Szymborska (1985) found it to be widespread, used by speakers from all three age groups she investigated. Similarly, Strycharczuk (2012) found pre-sonorant voicing to be frequent in the speech of 6 female speakers from Poznań, but not in that of 6 female speakers from Warsaw. Wojtkowiak and Schwartz (2018) attest it in the speech of ten speakers from Oborniki Wielkopolskie, a small town north of Poznań. Kaźmierski et al. (2019), investigating the speech of 14 speakers from Poznań, found that they voiced 42% of word-final pre-sonorant obstruents (301/723 tokens). The difference between Strycharczuk’s (2012) result, with pre-sonorant voicing being less frequent than pre-obstruent voicing, and Wojtkowiak and Schwartz’s (2018) results, with equal frequencies, might suggest that the more highly educated speakers of Strycharczuk’s (2012) study are avoiding pre-sonorant voicing. Based on that, as well as on our knowledge of forms with pre-sonorant voicing being overtly stigmatized¹, we tentatively categorize

Table 1. Examples of two-word sequences with and without pre-sonorant voicing.

Orthography	Without pre-sonorant voicing	With pre-sonorant voicing
<i>brat ojca</i> ‘father’s brother’	brat ɔjtsa	brad ɔjtsa
<i>pociąg osobowy</i> ‘passenger train’	pɔfɛɔŋk ɔsɔbɔvi	pɔfɛɔŋg ɔsɔbɔvi
<i>kot Jarka</i> ‘Jarek’s cat’	kɔt jarka	kɔd jarka
<i>wód leczniczych</i> ‘medicinal.PL.GEN waters.GEN’	vut lɛʦɲifʦix	vud lɛʦɲifʦix

¹For example, our friend’s mother (both Greater Poland natives) would respond to *Jak nie?* [jag ɲɛ] ‘What do you mean, “no?”’ with *Jagnię* [jagɲɛ] *to taka mała owca* ‘A lamb is a little sheep,’ mocking our friend’s Greater Poland Polish form [.gɲ.] with pre-sonorant voicing, which contrasts with the Warsaw-oriented standard [.kɲ.].

pre-sonorant voicing as a non-standard process, even though normative descriptions tend to see it as a feature of one of the two standard norms of Polish.

2.2 Nasal Stopping

In standard Polish, the reflex of the historical nasal vowel */ $\tilde{ɔ}$ / (represented by the letter <ą> in the spelling) is typically realized as a nasalized diphthong [ɔ \tilde{w}] (Zaleska and Nevins 2015), that is a sequence of the oral vowel [ɔ] and a nasalized labio-velar consonant [w̃] when it occurs before fricatives word-internally e.g. *wąsy* [vɔw̃si] ‘moustache,’ as well as in word final position *idą* [idɔw̃] ‘they are going,’ or a nasalized palatal glide [j̃] when it occurs before alveolo-palatal fricatives e.g. *ukąsi* [ukɔj̃ci] ‘will bite.’ However, word-internally before stops, orthographic <ą> corresponds to a sequence of an oral vowel [ɔ] and a nasal consonant homorganic with the following stop, e.g. *kąp* [kɔmp] ‘bathe.IMP,’ *kąt* [kɔnt] ‘corner,’ *pać* [pɔŋk] ‘bud’ (Lorenc et al. 2018). Interestingly for this paper, in Greater Poland (and in southwest and central Poland more broadly), the phonological material represented by orthographic <ą> may be realized as an oral vowel followed by a nasal stop [ɔm] in word-final position, e.g. *siedzą* (‘they are sitting’) [ɕɛd̥zɔm] contrasting with the standard realization [ɕɛd̥zɔw̃] (Dubisz, Karaś, and Kolis 1995, 114). Further examples include: *robią* ‘they are doing’ [rɔbjɔm] ~ [rɔbjɔw̃], *małą* ‘small.FEM.INS’ [mawɔm] ~ [mawɔw̃], *drogą* ‘road.INS’ [drɔgɔm] ~ [drɔgɔw̃]. Let us refer to the [ɔm] realization of word-final orthographic <ą> as nasal stopping. Witaszek-Samborska (1985) classified nasal stopping as widespread, while a later study (Kaźmierski, Kul, and Zydorowicz 2019) found nasal stopping in only 25% of tokens. Previous research reveals how nasal stopping may be dependent on sociolinguistic factors. For example, Baranowska and Kaźmierski (2020) investigated the impact of age, gender, education, location, and style. They found that the rate of nasal stopping increased with the age of speakers. Moreover, a statistically significant association was found between nasal stopping and education, since speakers with higher education had the tendency to realize / $\tilde{ɔ}$ / as [ɔm] less frequently than speakers with elementary education. This education-driven and age-driven stratification might suggest that nasal stopping is salient and avoided.

2.3 Nasal Assimilation

Across Polish dialects, in morpheme-internal /nk/ sequences dental /n/ undergoes assimilation to velar [ŋ], e.g. *punkt* ‘point’ [puŋkt]. A dental /n/ occurring before /k/ across a morpheme boundary, however, remains

dental in Warsaw speech: *panienka* ‘miss’ [pɔɲɛɲ + ka] (Ostaszewska and Tambor 2000, 86; Kaźmierski, Kul, and Zydorowicz 2019). Since recovering morpheme boundaries in Polish may be non-trivial, Klemensiewicz (1965, 37) reformulates the environment for the blocking of this assimilation without reference to morpheme boundaries and states that in Warsaw speech, /ɲ/ remains dental whenever /ɲ/ and /k/ are separated in inflected forms of the same word, or any other related words, e.g. *panienka* ‘miss-NOM.SG.’ – ‘*panienek*’ ‘miss-GEN.PL.’; *rynku* ‘market-GEN.SG.’ ~ *rynek* ‘market-NOM.SG.’ This limit on nasal assimilation is notably absent from Greater Poland Polish. In Greater Poland Polish, /ɲ/ in this position does assimilate to the following velar, i.e. *panienka* [pɔɲɛɲ + ka] ‘miss’ (Ostaszewska and Tambor 2000, 86; Kaźmierski, Kul, and Zydorowicz 2019). Further examples include *Irenka* ‘Irene.DIM’ [irɛɲ + ka] ~ [irɛɲ + ka], *sarenka* ‘doe.DIM’ [sarɛɲ + ka] ~ [sarɛɲ + ka], and *wisienka* ‘cherry.DIM’ [viçɛɲ + ka] ~ [viçɛɲ + ka]. While variants with nasal assimilation are also accepted as the standard in some normative descriptions which treat Polish as having two standard norms (e.g. Madejowa 1992; Dunaj 2006), given the reasons presented for pre-sonorant voicing above for suspecting that local Greater Poland Polish features are not treated as standard, we again tentatively categorize nasal assimilation for the purposes of this paper as non-standard.

This velar realization of nasals before velar consonants across morpheme boundaries has been found to be characteristic of Greater Poland Polish in various experimental studies (Witaszek-Samborska 1985; Kaźmierski, Kul, and Zydorowicz 2019) since the variant was frequently produced by speakers from the dialect area. For example, in Kaźmierski et al’s study (2019), nasal assimilation was found in 71% of tokens (37/52). We are not aware of any experimental evidence pertaining to the salience of this feature.

2.4 The czy-trzy Merger

Standard Polish maintains a contrast between the /tʃ/ plosive-fricative sequence e.g. *trzy* /tʃi/ ‘three’ and the affricate /tʃ/ e.g. *czy* [tʃi] ‘whether.’ Phonetically, the contrast is often maintained in the form of an opposition between an affricate-fricative sequence, e.g. *trzy* [tʃʃi] ‘three’ and a sole affricate, e.g. *czy* [tʃi] ‘whether.’ Zagórska-Brooks (1964) found acoustic evidence for the difference in the realization of the two structures. In her study, two native speakers of Polish recorded a list of minimal pairs contrasting the plosive-fricative sequence and the affricate in word initial, medial, and final position, e.g. *Czech* [tʃɛx] ‘Czech man’ vs. *trzech* [tʃʃɛx] ‘three’ (our transcription). The acoustic analysis revealed, inter alia, that what differentiated the ‘unit affricate’ [tʃ] from the ‘sequential affricate’ [tʃʃ] the most was the length of the fricative constituent [ʃ], which was relatively longer in the

‘sequential affricate’ $[\text{tʂ}]$ as in *trzech* ‘three’ (as reflected in our adapted transcription). This is illustrated in Figure 1, which visualizes the first author of the present paper pronouncing *do Czech* ‘to Czechia’ $[\text{d}\text{ɔ}\text{tʂ}\text{ɛ}\text{x}]$ with a unit affricate (top panel) and *do trzech* ‘to three’ $[\text{d}\text{ɔ}\text{tʂ}\text{ɛ}\text{x}]$ with a sequential affricate (bottom panel). As in Zagórska-Brooks’ data, the first constituent of the affricate has a similar duration in either case, while the second constituent is considerably longer in the sequential affricate (*do trzech*, bottom panel) than in the unit affricate (*do Czech*, top panel).

Greater Poland Polish is known to neutralize this brittle contrast: e.g. both *trzy* ‘three’ and *czy* ‘whether’ may be realized with the unit affricate $[\text{tʂi}]$. Further examples of words which may have the unit affricate $[\text{tʂ}]$ in Greater

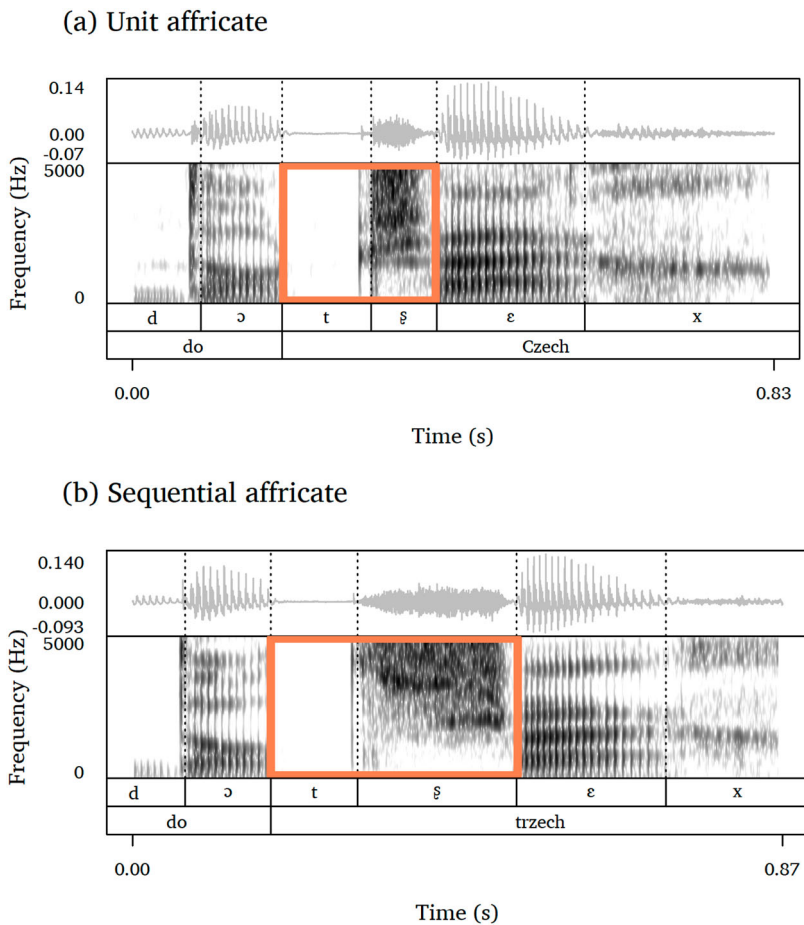


Figure 1. Waveforms and spectrograms of the first author pronouncing *do Czech* (a), top panel, and *do trzech* (b), bottom panel. Re-creation of one example from Zagórska-Brooks (1964).

Poland Polish (but not in other varieties) include *trzymać* ‘hold’ [tʃimac̥], *potrzebować* ‘need’ [pɔtʃɛbɔvat̥], and *patrz* ‘look.IMP’ [patʃ]. Witaszek-Samborska (1985) characterized this *czy-trzy* merger as widespread in Greater Poland Polish, as it was used by speakers of all age groups. Kaźmierski et al. (2019) attest it in a mere 23% of tokens (21/92). The direction of the merger, i.e. towards the unit affricate rather than the sequential affricate, could potentially be driven by ease of articulation: the longer fricative of a sequential affricate arguably involves more articulatory effort than the shorter one of a unit affricate.

2.5 Denasalization

The word-final reflex of the historical vowel */ɛ̃/ represented by <ę> in the spelling, for example in words like *idę* ‘I’m going,’ has two common realizations: it can be realized with a nasalized glide [ɛ̃w̃], here: [idɛ̃w̃], or denasalized to an oral vowel [ɛ], here: [idɛ]. Other examples include: *kartę* ‘card.ACC’ [kartɛ̃w̃] ~ [kartɛ], *mogę* ‘I can’ [mɔgɛ̃w̃] ~ [mɔgɛ], *nogę* ‘leg.ACC’ [nɔgɛ̃w̃] ~ [nɔgɛ]. There is no consensus as to which variant is more standard and more prestigious. Some (e.g. Zajda 1977) regard [ɛ] as less prestigious than [ɛ̃w̃]. At the same time, because of its prevalence, denasalization could be considered as standard (Dunaj 2006, 163), while the realization of /ɛ̃/ as [ɛ̃w̃] as “unnatural” (Karaś 1977)².

Denasalization may be subject to sociolinguistic variation. Johnson (1984) found that speakers from a higher social class opted for the [ɛ̃w̃] variant. On the other hand, a recent study (Baranowska and Kaźmierski 2020) found that speakers with higher education had higher rates of denasalization than speakers with elementary education, which lends support to the recognition of denasalization as a standard variant. However, denasalization was more prevalent in the more informal of the two speech styles elicited in the study, which implies that speakers still perceive denasalization as less prestigious, since they avoid it in controlled speech (Baranowska and Kaźmierski 2020); spelling apparently affects the language users’ perceptions of correctness, as <ę> and <e> are distinct orthographic entities, linked to two distinct realizations.

3. Research Questions

With our empirical studies, we aim to address the following research questions:

²As one of the Reviewers notes, for sequences with multiple word-final <ę>’s, such as *widzę tę dziewczynę* ‘I see this girl,’ the proponents of [ɛ̃w̃] over [ɛ] advise to use [ɛ̃w̃] only in the final instance of <ę> rather than in all of them. It is highly unlikely, as the Reviewer points out, that this is a natural phonological rule.

- 1) Which of the five variables of Greater Poland Polish can be regarded as indicators, markers, and stereotypes?
- 2) Is there any relationship between speakers' overt judgments and their productions?

We hypothesize that regional variants will be judged as less correct than their standard counterparts. Nasal stopping and the *czy-trzy* merger result in hypercorrection. Words spelled with <cz>, that is words containing the unit affricate [tʃ] are occasionally pronounced with the sequence [tʃ], as if they were spelled with <trz>³. Similarly words ending in orthographic <om>, i.e. words ending in the [ɔm] sequence, are occasionally pronounced with [ɔw̃], as if they were spelled with <a>⁴. Hypercorrection suggests overt social awareness of these variables, and so we predict these two variables to serve as stereotypes, while the others may be considered as indicators. Finally, since perception exerts an influence on production, we believe that speakers who judge a given variant as incorrect may not produce it because of being aware of little prestige that the non-standard variant carries, and because the production task is a word-list reading task which elicits very careful speech, allowing speakers to exert greater control over the variants they use.

4. Method

4.1 Participants

The participants were 65 students at Wyższa Szkoła Bezpieczeństwa (Private University of Security) in Poznań. There were 42 women and 23 men, aged between 19 and 46 (*mean* = 24.8, *sd* = 5.5). All participants were native speakers of Polish living in Greater Poland. They were all extramural students of psychology, national security, or health security.

4.2 Materials

A questionnaire consisting of 12 questions was prepared. The first part of the questionnaire elicited sociolinguistic data, such as age, gender, education, place of residence, mobility, and hand dominance. The second part of the questionnaire asked about participants' opinions concerning the use of regional accents. The original questionnaire is available as [Appendix 1](#), its English translation as [Appendix 2](#).

³For a certain elementary school principal from Poznań, *poczet sztandarowy* 'honor guard' is [pɔtʃɛt] instead of the expected [pɔtʃɛt], and school children at the said school end up pronouncing *czytać* 'read' as [tʃitaʃɛ] instead of the historically and orthographically justified form [tʃitaʃɛ].

⁴For example, *dzieciom* /dʒɛtʃɔm/ 'children' occasionally becomes [dʒɛtʃɔw̃].

We selected five variables to investigate their salience in Greater Poland Polish. Four of them are well-known features of Greater Poland Polish (Witaszek-Samborska 1985; Kaźmierski, Kul, and Zydorowicz 2019): pre-sonorant voicing, nasal stopping, nasal assimilation, and the *czy-trzy* merger. Additionally, we included a fifth variable: denasalization. Baranowska and Kaźmierski (2020) found that denasalization may not be considered standard in Greater Poland Polish since speakers avoid it in formal style; however, in informal style, denasalization is frequent, particularly in the speech of highly-educated speakers. Thus, we believe that the salience of denasalization in the Poznań dialect is worth investigating.

The token frequency of words and phrases that served as stimuli was controlled for by means of frequency lists based on the SUBTLEX-PL corpus (Mandera et al. 2015). Each of the five variables was represented by four words or phrases (giving a total of 20 test items). To distract participants from focusing on the test variables, we added two filler variables: the palatalization of /g/, in e.g. *inteligenty* [inteligɛntɲi] ‘intelligent’ to [intɛliɟɛntɲi], and the retention of voiced /v/ after voiceless consonants, e.g. *twój* [tfuj] ‘yours’ realized as [tvuj]. The final list of stimuli consisted of 28 items (20 test items + 8 fillers): *rzut oka, świat oszalał, zbyt ostry, nawet oni; będą, mają, twoją, mogą; sukienka, panienka, panienko, łazienka; trzecie, trzymać, strzały, patrz; muszę, idę, robię, piszę; inteligentny, generał, geniusz, agenci; stworzenia, twój, oszustwo, łatwo*.

For the second part of the study, the perception experiment, each word or phrase was included in two versions: standard and Greater Poland Polish. The stimuli were recorded using a USB microphone connected to a laptop computer. They were spoken by 18 native speakers of Polish, who were asked to read each word/phrase naturally. Afterward, we chose one token of the standard variant, and one token of the Greater Poland Polish variant for each of the five variables. No more than three tokens produced by the same speaker were used. No two variants of the same word/phrase produced by the same speaker were used, not to inflate type I error rate and to ensure the ecological validity of the results (cf. Winter 2015). Desilenced recordings were high-pass filtered at 300 Hz with smoothing at 100 Hz using *PraatR* (Albin 2014). Consequently, the length of the recordings was normalized to 600 ms with a *Praat* (Boersma 2018) script. In total, 56 stimuli were presented to the participants in the perception experiment: seven variables (five test variables) * four items * two variants.

4.3 Procedure

Participants began by filling out consent forms and questionnaires. Not to bias participants with the perception experiment, the production part

came first. Each participant read aloud all test words/phrases and fillers into the microphone plugged into a laptop computer. The stimuli were presented visually in a pseudo-randomized order with the Speech Recorder software (Draxler and Jänsch 2004).

The subsequent perception test was divided into a training block and a test block. All instructions were presented on a computer screen. Each stimulus was played back over headphones, after which a response was provided with the keyboard: either *poprawny* ‘correct’ or *niepoprawny* ‘incorrect.’ The stimuli were played back in isolation; they were not embedded in any carrier sentences or phrases. The responses, as well as the reaction times of the responses, were recorded. The order of stimuli within each block was randomized. To control for hand dominance effects, halfway through each block the value assigned to the two response keys was switched, with an instruction screen informing of the change. The test was implemented in *PsychoPy* v3.2.4 (Peirce et al. 2019).

4.4 Data Screening

For the perception test results, all data points with reaction times above 5 seconds (7 cases) and below 0.5s (3 cases) were removed. This has brought the original *N* of 2730 down to 2720.

4.5 Statistical Analysis

Data transformation, visualization, and modeling were conducted primarily by means of the *dplyr* (Wickham et al. 2017), *ggplot2* (Wickham 2016) and *lme4* (Bates et al. 2015) packages respectively, all being extensions of the R statistical environment (R Core Team 2022).

For the linear mixed-effects model of reaction times from the perception test, the response variable was transformed from reaction time (RT) to its inverse, $1/RT$, which can be construed as processing speed. This transformation has been shown to reduce the skewness of residuals before (cf. Kliegl, Masson, and Richter 2010; Baumann and Kaźmierski 2018), and it has done so with the present data set as well.

5. Results

We begin by presenting the results of the perception study, including the categorization of variants into ‘correct’ and ‘incorrect’, as well as the processing speed of the responses. We then present results of the production study, after which we juxtapose participants’ productions with their categorizations.

5.1 Perception

5.1.1 Categorization

Table 2 lays out the categorization of responses by variable by variant. For the *czy-trzy* merger, denasalization, and nasal stopping, the non-standard variant was mostly judged as incorrect (in 80%, 70%, and 65% of cases, respectively), while the standard variant was mostly judged as correct (in 73%, 83%, and 87% of cases, respectively). However, for the remaining two variables, pre-sonorant voicing and nasal assimilation, the non-standard variant was mostly judged as correct (78% and 65% respectively), and the standard variant was mostly judged as correct as well (in 88% and 74% of cases, respectively).

The above suggests that the participants are aware of the different variants of the *czy-trzy* merger, denasalization, and nasal stopping, and that they see the standard variants as considerably more correct. This suggests high salience of these three variables, and the perception of their non-standard variants as incorrect. While standard variants are rated as correct slightly more often than non-standard variants are for nasal assimilation and pre-sonorant voicing, in the case of these two variables, most of the time the non-standard variant is seen as correct as well. These two variables, then, seem to be less salient.

Figure 2 shows agreement among the participants in categorizing the 10 variants. If the variant was predominantly (> 50%) seen as correct, then % agreement is the percentage of "correct" categorizations. Otherwise, it is the percentage of "incorrect" categorizations. Therefore, in each case the base line is 50%, which would mean that the number of participants who

Table 2. Categorization of perception responses by variable by variant.

Variable	Variant	Response	%
Pre-sonorant voicing	Non-standard (d#ɔ)	"Incorrect"	22
	Standard (t#ɔ)	"Correct"	78
Nasal stopping	Non-standard (ɔm)	"Incorrect"	12
	Standard (ɔw̃)	"Correct"	88
Nasal assimilation	Non-standard (ŋ+k)	"Incorrect"	70
	Standard (n + k)	"Correct"	30
czy-trzy merger	Non-standard (t̃ʂ)	"Incorrect"	17
	Standard (t̃ʂʂ tʂ)	"Correct"	83
Denasalization	Non-standard (ɛ)	"Incorrect"	35
	Standard (ɛw̃)	"Correct"	65
	Non-standard (ɛ)	"Incorrect"	26
	Standard (ɛw̃)	"Correct"	74
	Non-standard (t̃ʂ)	"Incorrect"	80
	Standard (t̃ʂʂ tʂ)	"Correct"	20
	Non-standard (ɛ)	"Incorrect"	27
	Standard (ɛw̃)	"Correct"	73
	Non-standard (ɛ)	"Incorrect"	65
	Standard (ɛw̃)	"Correct"	35
	Non-standard (ɛ)	"Incorrect"	13
	Standard (ɛw̃)	"Correct"	87

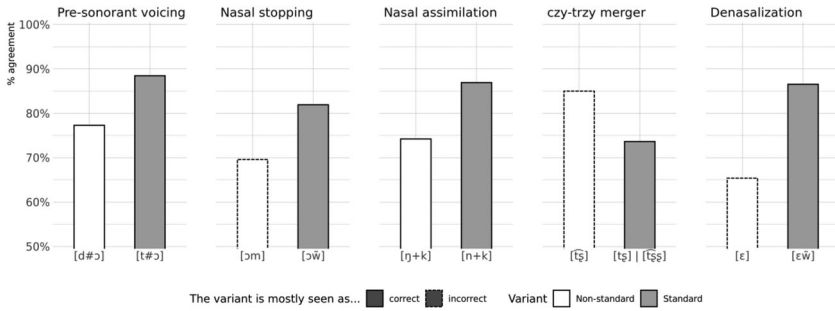


Figure 2. Agreement among participants as to correctness of variants. Dashed outline indicates variants which the majority of participants judged as “incorrect”.

rated this variant as correct was the same as the number of participants who rated it as incorrect.

For both nasal stopping and denasalization, the participants showed a relatively high agreement that the standard variant is correct, while they showed much less agreement that the non-standard variant is incorrect.

For the *czy-trzy* merger, the reverse is the case. The participants showed a relatively high agreement that the non-standard [tʂ] is incorrect (85% agreement), while they showed less agreement that the standard [tʂʂ | tʂ] is correct (~74% agreement).

For pre-sonorant voicing and nasal assimilation, for which as already seen in Table 1 both the standard and the non-standard variants are mostly seen as correct, there is somewhat higher agreement as to the correctness of the standard variant.

To verify the statistical significance of differences between the chances of non-standard and standard variants to be seen as “correct,” we used mixed-effects binomial logistic regression modeling. We fit a model of *response* (binary response variable, reference: “incorrect,” remaining level: “correct”) as a function of several predictors: *variable* (multi-level categorical predictor: “*czy-trzy* merger,” “nasal stopping,” “nasalization,” “pre-sonorant voicing,” “nasal assimilation,” reference: “*czy-trzy* merger”), *standard_language_dominance* (binary predictor variable encoding answers to the question “Should all Poles [...] speak Polish in the same, standard way?”, reference: “no,” the other level: “yes”), *mobility* (binary predictor variable encoding answers to the question “How many times have you moved in the last 10 years?”, reference: “low,” the other level: “non-low”), and *age* (a continuous variable). Each of the four predictors interacted with a fifth predictor *variant* (binary predictor, reference: “standard,” the other level: “non-standard”). Additionally, the model contained by-word and by-participant random intercepts to quantify individual-level and item-level differences, as well as a by-participant random slope for *trial*, to account for potential learning effects or fatigue effects.

A likelihood ratio test ($\chi^2(8) = 24.62, p < 0.01$) showed that the *variable * variant* interaction term was statistically significant. Post-hoc pairwise comparisons with Bonferroni correction were performed with the *emmeans* function from the eponymous package (Lenth 2021). They showed that the standard variant was significantly more likely to be rated as correct for denasalization ($b = 2.82, p = 0.002$), nasal stopping ($b = 2.71, p = 0.003$), and the *czy-trzy* merger ($b = 2.7, p = 0.003$). No statistically significant difference between the standard and the non-standard variant was detected for pre-sonorant voicing ($p = 1$) and nasal assimilation ($p = 1$). This effect is illustrated in Figure 3.

Additionally, as visualized in Figure 4, listeners believing all Poles should speak Polish in the same standard way were more likely to judge the local variant as incorrect than those who did not express this view ($b = -0.45, p = 0.04$).

Finally, the likelihood to see the standard variant as correct increases with age, as attested by the significance of the positive estimate of the *age* predictor ($b = 0.05, p = 0.01$) (notice the top line going up from left to right in Figure 5). The influence of age on the judgments was not attested, as shown by the ‘neutralization’ of the former estimate by the estimate of the *age:variant* predictor ($b = -0.05, p = 0.02$) (notice the bottom line staying almost flat in Figure 5).

5.1.2 Processing Speed

Categorization results suggest a division grouping pre-sonorant voicing and nasal assimilation as variables with relatively little salience on the one hand, and the remaining three variables, that is denasalization, nasal stopping, and

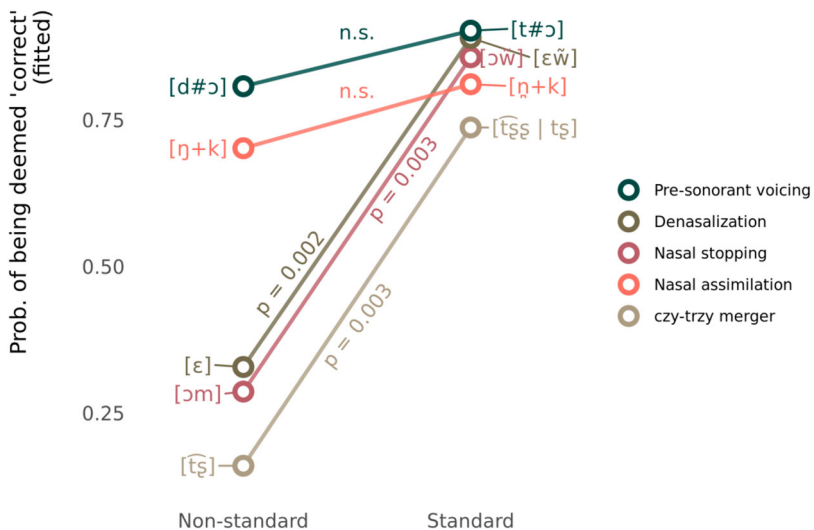


Figure 3. Partial effect of the interaction of ‘variant’ and ‘variable’.

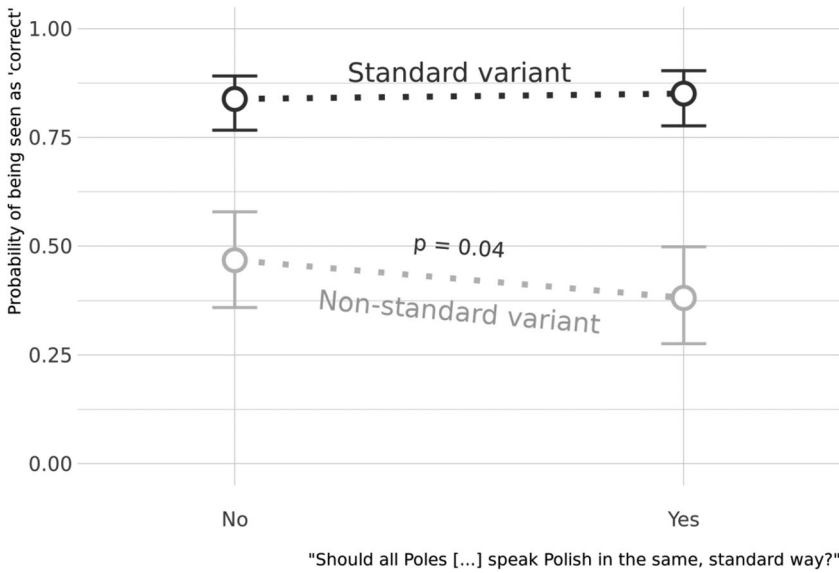


Figure 4. Partial effect of the interaction between variant and views on the dominance of the standard variety of Polish.

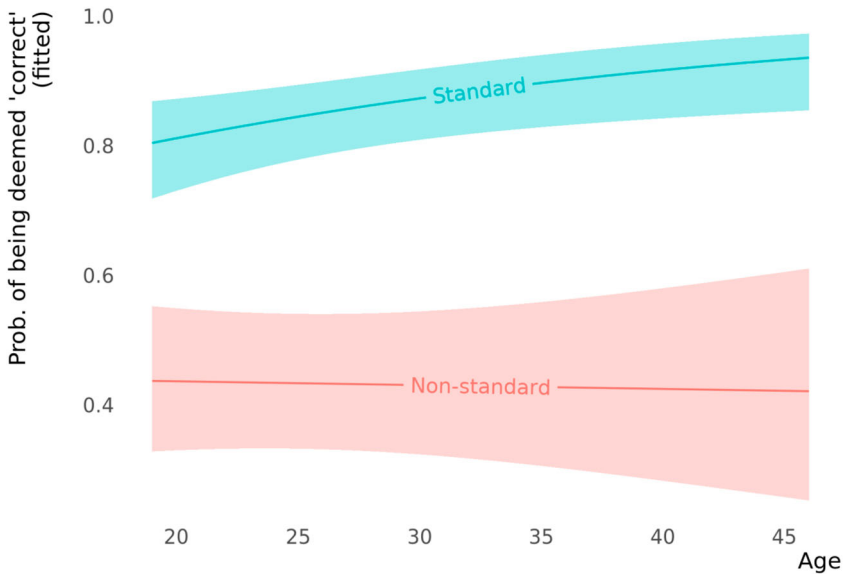


Figure 5. Partial effect of the interaction between variant and age.

the *czy-trzy* merger as variables with relatively higher salience on the other hand. Looking at descriptive statistics of processing speed, however, a different grouping seems to emerge (see Table 3). Pre-sonorant voicing and the

Table 3. Mean processing speeds of the variables and variants.

Variable	Speed (Variable)	Variant	Speed (Variant)
Pre-sonorant voicing	0.721	Non-standard [d#ɔ]	0.687
		Standard [t#ɔ]	0.754
Nasal stopping	0.738	Non-standard [ɔm]	0.723
		Standard [ɔw̃]	0.752
Nasal assimilation	0.758	Non-standard [ŋ + k]	0.770
		Standard [ŋ + k]	0.746
czy-trzy merger	0.722	Non-standard [tʂ]	0.744
		Standard [tʂʂ tʂ]	0.700
Denasalization	0.737	Non-standard [ɛ]	0.704
		Standard [ɛw̃]	0.770

czy-trzy merger are responded to the fastest (721 ms and 722 ms, respectively), then come nasal stopping (738 ms) and denasalization (737 ms), while nasal assimilation elicited the slowest responses (758 ms). There is an asymmetry within the two variables that elicited the fastest mean responses: for pre-sonorant voicing, it is the non-standard variant the was responded to faster, while for the *czy-trzy* merger it was the standard variant.

To test the statistical significance of these differences, we fit a linear regression model with processing speed (1/rt) as the response variable, with the same architecture as the binomial logistic regression model described above. A likelihood ratio test ($\chi^2(8) = 24.62, p < 0.01$) has not shown the *variable * variant* interaction to be statistically significant. In view of this, we have not conducted any post-hoc pairwise comparisons.

5.2 Production

Looking at production data (see Table 4), we can see that the participants produced predominantly standard variants for the *czy-trzy* merger (98%), nasal stopping (95%), denasalization (90%), and nasal assimilation (85%). The non-standard pre-sonorant voicing, on the other hand, was applied nearly as often (46%) as not (54%).

Table 4. Production rates of the variables and variants.

Variable	Variant	N	%
Pre-sonorant voicing	Non-standard [d#ɔ]	120	46
	Standard [t#ɔ]	140	54
Nasal stopping	Non-standard [ɔm]	13	5
	Standard [ɔw̃]	247	95
Nasal assimilation	Non-standard [ŋ + k]	40	15
	Standard [ŋ + k]	220	85
<i>czy-trzy</i> merger	Non-standard [tʂ]	4	2
	Standard [tʂʂ tʂ]	256	98
Denasalization	Non-standard [ɛ]	27	10
	Standard [ɛw̃]	233	90

Pre-sonorant voicing, which showed the largest proportion of non-standard realizations, displays stark by-item variation (see [Figure 6](#)). *świat oszalał* ‘the world has gone mad’ and *nawet oni* ‘even them’ showed very little pre-sonorant voicing (5% and 12%, respectively), while ‘rzut oka’ a glance was realized predominantly (72%), and *zbyt ostry* ‘too spicy’ almost exclusively (95%) with pre-sonorant voicing. At any rate, these differences warrant further research: perhaps transitional probabilities or prosodic boundary strengths influence pre-sonorant voicing (cf. Wojtkowiak Ewelina & Schwartz 2018).

5.3 Perception vs. Production

Pre-sonorant voicing and nasal assimilation are the two variables for which there were the smallest differences in correctness judgments of the standard vs. non-standard variants. Pre-sonorant voicing is the variable most often produced with its non-standard variant (46%). Nasal assimilation is the second most often produced with its non-standard variant, though with a much lower rate (15%). There is some correspondence, then, between participants’ productions and their judgments.

In [Figure 7](#), each circle is a group of participants, with the size of each circle corresponding to the number of participants it represents. Groups that align on the diagonal line are made up of participants whose judgments perfectly match their productions. For example, for pre-sonorant voicing, there is a circle right in the middle of the plot: these participants produced pre-sonorant voicing in 50% of their productions and judged 50% of the stimuli that contained pre-sonorant voicing as correct. Most participants are not like that, however. The circles that are in the bottom right-hand half of each plot group participants who judged the non-standard variant as correct more often than they produced it themselves. The majority of participants

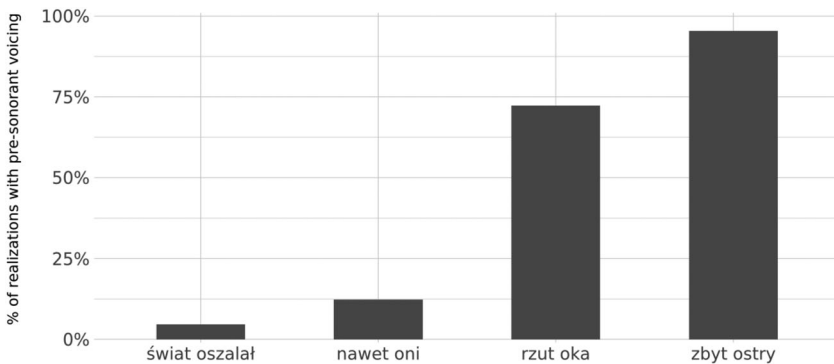


Figure 6. By-item variation in the rate of pre-sonorant voicing in the production data.

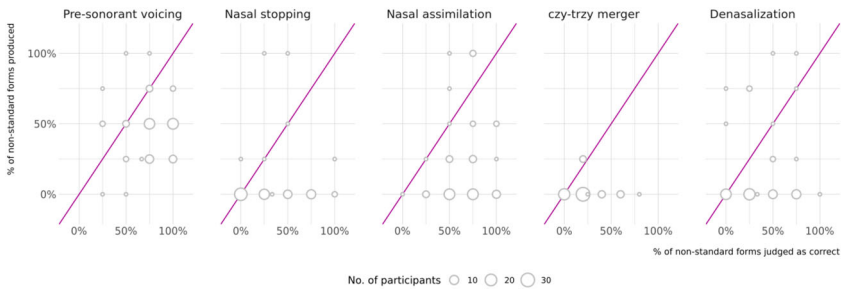


Figure 7. Participants' productions vs. their judgments.

are in this group. Finally, there were participants who produced non-standard forms more often than they judged them as correct: they form the circles in the top left-hand half of each plot. Interestingly, there is a participant who produced nasal stopping at a rate of 100%, but they judged only one out of four stimuli with this variant as correct.

6. Discussion

6.1 The *czy-trzy* Merger and Nasal Stopping

Following Labov's distinction into stereotypes, markers, and indicators (Labov 1972), we believe that nasal stopping and the *czy-trzy* merger serve as stereotypes in Greater Poland Polish. First of all, the participants demonstrated a high level of awareness of the non-standard variants of the two variables since [ɔ̃m] and [t͡ɕ] were significantly more often judged as "incorrect." The elicited careful speech samples allowed us to see which variants are stigmatized, and thus consciously avoided. As evidenced by production rates, participants avoided the use of the non-standard variants [ɔ̃m] and [t͡ɕ]: nasal stopping was used only in 5%, and the *czy-trzy* merger in 2% of tokens. Further, the participants demonstrated a high degree of agreement (85%) when rating the variant [t͡ɕ] as incorrect, while the percentage of agreement was lower (74%) when rating the variant [t͡ɕ] as correct. One possible explanation of the relatively low agreement that the standard variant is correct may be that the [t͡ɕ] sequence often results from hypercorrection. Speakers who have the merger but are aware of the stigmatization of the affricate [t͡ɕ] have the tendency to avoid the affricate altogether. Words which contain the affricate [t͡ɕ], e.g. *oczy* 'eyes,' are then realized with a stop-fricative sequence here: [ɔt͡ɕi]. Listeners noticing the discrepancy between such productions and the standard variants might develop a distrust of the plosive-fricative sequence as well. Taken together, the fact that the *czy-trzy* merger is consciously avoided in careful speech and that it shows hypercorrection lends support to our claim that the *czy-trzy* merger is a stereotype in

Greater Poland Polish. In addition, looking at the relationship between perception and production, even though some speakers judged the non-standard variants as correct, few produced them in their formal style. Rating non-standard forms as correct may be linked to general beliefs about the dominance of the standard dialect. The respondents who do not believe that standard Polish should be used by everyone, regardless of place of origin, perceived non-standard variants as correct more often. Still, the majority of participants judged the two non-standard variants as incorrect, so overall [tʂ] and [ɔm] are seen as carrying little prestige.

Our findings concerning the *czy-trzy* merger and nasal stopping agree with extant research. When it comes to the *czy-trzy* merger, the current study corroborates Kaźmierski et al.'s (2019) findings in that the *czy-trzy* merger was avoided in production. While in Kaźmierski et al.'s study (2019) it was present in 23% of tokens, in the current study it was produced only in 2% of tokens. This difference can be accounted for in terms of the type of production task – Kaźmierski et al. (2019) used the Greater Poland Speech Corpus containing recordings of interviews (casual speech), while we used a word-list reading task, which elicits very controlled speech (cf. Trudgill 1974). Even though both studies show that the *czy-trzy* merger is not dominant in contemporary Greater Poland Polish, the current study additionally sheds some light on the cause of low production rates of the merger: speakers avoid it, in particular in formal speech, since they have internalized the view that the merger is incorrect. Similarly, in the case of nasal stopping, the results of the current study dovetail with previous research which demonstrated that the variant [ɔm] is retreating from Greater Poland Polish (e.g. Kaźmierski and Szlandrowicz 2020; Kaźmierski, Kul, and Zydorowicz 2019; Baranowska and Kaźmierski 2020). Again, this tendency may be accounted for in terms of social salience: since nasal stopping is subject to overt social comment and as such judged as incorrect, it is avoided in production in careful speech.

6.2 Pre-sonorant Voicing and Nasal Assimilation

As the standard variants of these two variables were not judged to be correct significantly more often than the local variants, both pre-sonorant voicing and nasal assimilation can be classified as indicators. While these variables, pre-sonorant voicing in particular, may be very well-known to linguists as features of Greater Poland Polish, they seem not to attract the attention of speakers. In terms of production, pre-sonorant voicing was the most frequently produced variant (46% of tokens) out of all five non-standard variants in this study. Additionally, in the case of pre-sonorant voicing, there was the greatest overlap between production and perception scores. This could mean that participants neither heard nor produced the

difference between the local and the standard variant in some phrases, which further lends support to our claim that pre-sonorant voicing is an indicator. Stark by-item variation in pre-sonorant voicing is a strong incentive for further research into factors influencing its realization. In the case of nasal assimilation, perception did not strongly affect production since nasal assimilation was observed in only 15% of the tokens. However, given that in Kaźmierski et al.'s (2019) study it was the most frequently produced non-standard variant of Poznań speech, and given that in the current study the participants did not judge it as incorrect, nasal assimilation can also be tentatively classified as an indicator.

6.3 Denasalization

Although denasalization, just like the *czy-trzy* merger and nasal stopping, was significantly often judged as incorrect, the difference between the standard variant [ɛ̃] and the non-standard [ɛ] in terms of salience and stigmatization is not that clear-cut. Baranowska and Kaźmierski (2020) found that denasalization was subject to style-shifting: in a reading task it was significantly less frequent than in the picture description task, which elicited more casual speech. On the other hand, though, speakers with higher education showed more denasalization. It seems that denasalization, though still not a part of the standard dialect, does carry prestige (cf. Baranowska & Kaźmierski 2020, 156). We can further substantiate this claim with the results of the present study since there was a high agreement that [ɛ̃] is correct, but much less agreement that [ɛ] is incorrect. Moreover, the juxtaposition of perception and production reveals that even if some speakers produced [ɛ] word-finally, the majority did not perceive this variant as correct. Potentially, in our experiment, the participants' judgements were at least to some extent influenced by the fact that in the production part of the experiment the stimuli were presented to the participants in written form: the nasalized pronunciation of word-final <ę> seems to be much more frequent when speakers read a text rather than when they speak. As already indicated, the status of denasalization is not well established: some publications (e.g. Karaś 1977; Dunaj 2006) see it as standard, while others point to it carrying less prestige than [ɛ̃] (e.g. Zajda 1977). The present study suggests that denasalization is still not fully a part of standard Polish (it was produced in only 10% of the tokens); however, it is not overtly stigmatized the way nasal stopping and the *czy-trzy* merger are. We can conclude then that denasalization could be considered to be a marker in Labov's salience hierarchy. It is not a marker of Greater Poland Polish, though, given that it is widespread throughout Poland, and that different prevalence for different Polish accents has yet to be shown.

6.4 Loss of Lexical Contrasts vs. Salience

Arguably, the salience of the variables might be related to the number of lexical contrasts lost when one of the variants is used⁵. We have the degree of this homophony by taking a list of spell-checked word forms appearing in SUBTLEX-PL (Mandera et al. 2015) at least three times, and replacing standard orthographic representation of one of the variants (<trz> for the *czy-trzy* merger, <-ą> for nasal stopping, and <-ę> for denasalization) with spellings of their non-standard counterparts (<cz>, <-om>, and <-e> respectively). By this estimate, nasal assimilation, nasal stopping, and the *czy-trzy* merger yield relatively few word-form homonyms (4, 32, and 45 respectively), while denasalization yields the vastly higher count of 2,815 homonyms (see Table 5). The *czy-trzy* merger results in homophony on an accidental basis. For nasal stopping, there is homophony between third person plural verbs and related plural dative nouns. For denasalization, there ensues a systematic and widespread homophony between first and third person singular verb forms, as well as homophony between singular accusative and plural accusative/nominative noun forms. If the extent of homophony were a decisive factor in the salience of the variables, one would expect very different results for the *czy-trzy* merger and nasal stopping on the one hand, with a couple dozen resulting homophonous word forms for each of them, and for denasalization on the other hand, with nearly three thousand resulting homophonous word forms. In the perception experiment, however, these three variables pattern virtually alike (cf. Figure 3).

Pre-sonorant voicing takes place across word-boundaries, so it cannot be directly compared with the other four variables in which single words are concerned. When the second word in a sequence begins with a sonorant, the voicing contrast is lost both with pre-sonorant voicing (all word-final obstruents surface as voiced, e.g. *but ojca* [.dɔ.] ‘father’s shoe’ = *bud ojca* [.dɔ.] ‘father’s shacks.GEN’) and without pre-sonorant voicing (all word-final obstruents surface as voiceless, e.g. *but ojca* [.tɔ.] ‘father’s shoe’ = *bud ojca* [.tɔ.] ‘father’s shacks.GEN’⁶). What can be compared, however, is the number of two-word sequences that become identical to single words if pre-sonorant voicing applies versus if it does not apply. For example, *krat nie* ‘bars no’ is not homophonous with any existing Polish word if pre-sonorant voicing does not apply: [kratɲɛ] **kratnie*, but is homophonous with the word *kradnie* [kradɲɛ] ‘steals’ if pre-sonorant voicing does apply. Conversely, *chomik i* ‘hamster and’ is homophonous with an existing Polish word *chomiki* [xɔmici] ‘hamsters’ when pre-sonorant voicing does not apply, but is not homophonous with any existing Polish word if pre-sonorant voicing does apply [xɔmiɟi]

⁵We wish to thank one of the Reviewers for raising this important point.

⁶Though compare Schwartz et al. (2021), who found small differences in closure durations before underlyingly voiced and voiceless word-final obstruents in Polish.

Table 5. Estimated number of homophonic forms that ensue when the non-standard variant of each variable is used.

Variable	Estimated no. of homophones	Examples
czy-trzy merger	45	<i>wietrzny</i> 'windy' = <i>wieczny</i> 'eternal' [vjɛtʂɲi] <i>otrzyma</i> 'will receive' = <i>oczyma</i> 'with eyes' [ɔtʂima] <i>wypatrzili</i> 'they have noticed' = <i>wypaczyli</i> 'they have perverted' [vipatʂili]
nasal stopping	32	<i>myślą</i> 'they think' = <i>mysłom</i> 'thought-PL.DAT' [mɨɕlɔm] <i>widzą</i> 'they see' = <i>widzom</i> 'spectator-PL.DAT' [vidzɔm] <i>tą</i> 'this one' = <i>tom</i> 'volume' [tɔm] <i>złą</i> 'bad-FEM.INSTR' = <i>złom</i> 'scrap metal' [zɫɔm] <i>chcę</i> 'I want' = <i>chce</i> 'she/he/it wants' [xʦɛ]
denasalization	2,815	<i>aleję</i> 'alley-sg.acc' = <i>aleje</i> 'alley-pl.nom; alley-pl.acc' [alɛjɛ] <i>tę</i> 'this' ~ <i>te</i> 'these' [tɛ] <i>Lenka</i> 'little Lena' = <i>lęka</i> 'fears' [lɛŋka] <i>nasionka</i> 'little seeds' = <i>nasiąka</i> 'absorbs' [naɕɔŋka] <i>stronki</i> 'little pages' = <i>strąki</i> 'pods' [strɔŋki] <i>blonka</i> 'little membrane' = <i>bliąka</i> 'meanders' [bwɔŋka]

**chomigi*. To estimate how widespread such homophony is depending on whether pre-sonorant voicing applies or does not apply, we worked with a list of bigrams generated from SUBTLEX-PL and counted how many of the two-word orthographic sequences in which the first word ends in a voiceless obstruent and the second word starts with a sonorant are identical to existing single words⁷: the resulting number is 1,270 (see Table 6). Then, simulating the application of pre-sonorant voicing, we replaced all word-final letter sequences that correspond to voiceless obstruents with their voiced counterparts, and counted how many of these orthographic sequences are identical to single words: the resulting number is much lower: 134. It seems, then, that

Table 6. Estimated number of two-word sequences identical orthographically to existing single words, with as opposed to without pre-sonorant voicing.

	Form without pre-sonorant voicing	Form with pre-sonorant voicing
Contrast loss with pre-sonorant voicing	Contrast preserved: <i>jezdnie</i> ≠ <i>jest nie</i> 'roads' ~ 'is not' [jɛzdɲɛ] ≠ [jɛstɲɛ]	Contrast lost (N = 134): <i>jezdnie</i> = <i>jest nie</i> 'roads' ~ 'is not' [jɛzdɲɛ] = [jɛstɲɛ]
Contrast loss without pre-sonorant voicing	Contrast lost (N = 1,270): <i>brat a</i> = <i>brata</i> 'brother while' ~ 'brother's' [brata] = [brata]	Contrast preserved: <i>brat a</i> ≠ <i>brata</i> 'brother while' ~ 'brother's' [brada] ≠ [brata]

⁷First, we excluded bigrams that occur less than three times; bigrams for which either of the two words does not occur in the spell-checked list of single words, and bigrams in which the first word consists of a single letter (a rough method of excluding prepositions, which do undergo voicing throughout Polish). We extracted bigrams in which the first word ends in a sequence of letters corresponding to a voiceless obstruent, and in which the second word begins with a sonorant. Note that this method disregards lexical stress.

pre-sonorant voicing, through signaling a word boundary, helps avoid ambiguity instead of introducing it. Perhaps it is one factor contributing to this variable's low salience.

7. Conclusion

Our study scrutinized the salience of five variables in Greater Poland Polish: pre-sonorant voicing, nasal stopping, nasal assimilation, the *czy-trzy* merger, and denasalization. Through an analysis of how native speakers of Polish living in Greater Poland perceive, react to, and produce the variables of interest, we found evidence which suggests that, in line with Labov's model of social salience (1972), nasal stopping and the *czy-trzy* merger may be classified as stereotypes, pre-sonorant voicing and nasal assimilation as indicators, and denasalization as a marker.

The linguistic evidence adduced in this study provides a valuable insight into linguistic variation in Greater Poland Polish. While previous studies sought to determine most characteristic variables in this dialect area and investigate their production rates (e.g. Witaszek-Samborska 1985; Kaźmierski et al. 2019), our study juxtaposed the production rates of these variables with their perception through the lens of Labov's model of social salience (1972). This can allow us to make tentative predictions as to the direction of linguistic change in Greater Poland Polish. Since stereotypes, in this case nasal stopping and the *czy-trzy* merger, are overtly stigmatized, they are likely to decline in the future, while, on the other hand, indicators, i.e. pre-sonorant voicing and nasal assimilation, may well remain stable in Greater Poland Polish. While social factors are not the only ones influencing the trajectory of language change, with other factors, such as articulatory difficulty, perception, or contrast preservation likely playing a role as well, the social dimension is certainly one to be considered.

Denasalization necessitates further research. On the basis of previous research (e.g. Baranowska and Kaźmierski 2020), and the current study, we postulate an intermediate status of denasalization: speakers tend to avoid it even if they do not consider it incorrect. The standard form, [ɛw̃], on the other hand, is often seen as hypercorrect. Future research could therefore seek to probe deeper into this apparent case of linguistic insecurity.

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Appendixes

Appendix 1: Questionnaire (original)

ANKIETA

- Nr uczestnika
2. Wiek
3. Płeć:
- KOBIEȚA
- MĘŻCZYŻNA
- ŹADNA Z WYMIENIONYCH
4. Miejsce zamieszkania
5. Wykształcenie
6. Ile razy zmienił Pan/i miejsce zamieszkania w ciągu ostatnich 10 lat?.
7. Czy chciałby się Pan/i wyprowadzić do innej miejscowości? TAK/ NIE
8. Jestem:
- Praworęczny/a
- Leworęczny/a
9. Czy mówi Pan/Pani z akcentem regionalnym? TAK/ NIE
10. Czy Polacy powinni pielęgnować swoje regionalne dialekty, gwary i lokalne sposoby mówienia? TAK/NIE
11. Czy wszyscy Polacy, niezależnie od pochodzenia i miejsca zamieszkania, powinni mówić po polsku w taki sam, standardowy sposób? TAK/NIE

12. Czy Polacy powinni mówić z akcentem regionalnym nie tylko w domu, ale również w miejscach publicznych, pracy, szkole? TAK/ NIE

Appendix 2: Questionnaire (translated)

QUESTIONNAIRE

1. Participant's number
2. Age
3. Gender:
 - WOMAN
 - MAN
 - OTHER
4. Place of residence
5. Education
6. How many times have you changed your place of residence in the last 10 years? . . .
7. Would you like to change your place of residence? YES/NO
8. I am:
 - right-handed
 - left-handed
9. Do you speak with a regional accent? YES/NO
10. Should Poles cherish regional accents and dialects? YES/NO
11. Should all Poles use only standard Polish regardless of their place of residence? YES/NO
12. Should Poles be allowed to use their regional accent not only at home, but also in public places (at work, school, etc.)? YES/NO