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Dialect vowel maintenance in a diglossic context: a study of linguistic heterogeneity in Gavaṛ, Armenia

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Abstract: This study uses variationist methods to assess whether three demographic factors (self-reported gender, birth year, education level) correlate with maintenance of previously described dialect vowels in Gavaṛ, Armenia. Some maintenance was found, contradicting previous claims about dialect leveling in Armenian cities. Specifically, in picture-naming and word-list data, men maintained some dialect vowels more than women, while the other two demographic predictors were not significant (though preliminary analysis of spontaneous speech suggests that age may also be relevant for dialect vowel maintenance in less monitored speech contexts). Participants' positive attitudes toward both Standard Eastern Armenian and the local dialect, along with the lack of significant results for education level, are consistent with Armenia's diglossic environment, suggesting that even some highly educated speakers use dialect features outside of formal domains. This result demonstrates the key role of local language ideologies, as social class has been found to predict use of standard variants in more well-studied Western contexts. Because the analysis included one allophonic phenomenon whose results showed idiosyncratic tendencies, the study also has implications for evaluating social meaning of phenomena with different phonological statuses.

Keywords: dialects; Armenian; vowels; variation; diglossia

1 Introduction and background

1.1 Overview

Despite the rich history of Armenian dialectology (e.g., Acharyan [1911]; Jahukyan [1972]), the contemporary state of Armenian dialects remains understudied.[1]

1 Except for names that appear frequently in English (e.g., "Yerevan") and names that appear in Latin letters in the original source, Armenian names, along with the titles of works, are transliterated

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Post-Soviet societies like the Republic of Armenia are likewise underrepresented in the sociolinguistic literature, which skews toward Western contexts (see Smakman [2015]). This imbalance hinders a fuller understanding of how local language ideologies influence linguistic variation. In Armenia specifically, post-Soviet manifestations of linguistic prescriptivism and purism coexist with diglossia, creating an environment where new insights can be gained about how linguistic variation relates to concepts like social prestige.

Using quantitative variationist methods to build upon dialectology, this study analyzes acoustic vowel data from 31 interviews conducted in Gavaṛ, Armenia and addresses two questions. First, which demographic factors – among gender, age, or education level – relate to maintenance of the previously described dialect vowel system? Second, how does participants' metalinguistic commentary inform our understanding of observed correspondences between demographic factors and dialect maintenance? As similar studies have not previously been conducted in regional Armenian cities, the exploratory demographic factors were selected based on foundational sociolinguistic studies.

1.2 Sociolinguistics in the "Second World"

Western contexts are generally overrepresented in sociolinguistics (Coulmas 2005: 19–24; Heller and Duchêne 2012: 15; Laihonen et al. 2016; Meyerhoff and Nagy 2008; Meyerhoff and Stanford 2015; Smakman 2015), and among post-colonial or post-imperial settings, those of the "Second World" are generally overlooked (Greenberg 2015). In the post-Soviet sphere specifically, most studies focus on language policy, ideologies, and contact phenomena (see Portugal and Nonnenmacher [2024] for a review of some relevant literature), and quantitative variationist methods have seldom been implemented (although some experimental studies have considered participants' varying language backgrounds, e.g. Grenoble et al. [2019]; Kantarovich [2020, 2022]). A notable exception in the Armenian context is Zak^{h}aryan's (1981) variationist study of speech in Yerevan. This study examines numerous linguistic variables in relation to age, education level, gender, language of education, profession/social class, previous places of residence, and family's home language variety,

using a modified version of the Library of Congress system. Voiceless aspirated consonants have been indicated with a superscript *h* rather than an apostrophe to avoid confusion with ejective consonants. In contrast, examples of words elicited from or produced by participants in the study are transliterated using IPA to convey dialectal sounds that cannot be transcribed using available romanization systems.

finding variation in relation to these variables and complex interactions with task type.

Studying the post-Soviet region is crucial for formulating comprehensive theories of sociolinguistic variation. In general, the region's sociolinguistic backdrop is characterized by tendencies toward ethnic and linguistic homogeneity, monolingualism, and linguistic purism that have taken hold since the 1990s (see Blommaert and Verschueren [1998]; Brubaker [2011]; Forker and Grenoble [2021]; Pavlenko [2013] for discussion of such tendencies). These trends likely have roots in Soviet nationalities policy, which emphasized and/or created ethnolinguistic and territorial boundaries between peoples (see Bassin and Kelly [2012]; Rouvinski [2007]; Schlegel [2017]; Slezkine [1994]), and in prescriptivist and purist tendencies of Soviet language policy (see Slezkine [1994]; Vaicekauskienė and Šepetys [2018]; Yelenevskaya [2008]).

Although prescriptivism and purism are not exclusive to the post-Soviet region, their manifestations have particular characteristics relevant for linguistic variation. For example, Strelēvica-Ošiņa (2016) has described prescriptivism in Latvia to be "language-oriented," i.e., aimed at protecting the language itself, as opposed to "human-oriented." According to Strelēvica-Ošiņa (2016: 254), the latter type, common in English-speaking countries and "actively criticized in twentieth-century anglophone academic discourse," involves strong links between "incorrect" speech and low social status. In general, prescriptivism in the Republic of Armenia can also be described as "language-oriented" (see Portugal and Nonnenmacher [2024] for further discussion of Armenian linguistic purism/prescriptivism). It is likewise notable that Armenia's standard language was codified recently, in the late 19th century (see Section 1.3). As Subačius (2002: 144) suggests, late codification usually corresponds with less association between the standard language and upper classes. Thus, post-Soviet Armenian prescriptivism and purism could differ in crucial ways from analogous ideologies observed in relation to languages with longer histories of social dominance, in that the social motivation for adhering to prescribed language norms might be relatively weak.

1.3 Variation and diglossia

The Republic of Armenia is characterized by diglossia, in which Standard Eastern Armenian (SEA), used in formal contexts such as writing, educational institutions, and official speeches, coexists with the colloquial language of Yerevan and regional dialects (Karapetian 2014: 31–33; see also Katvalyan [2009: 3] for discussion of Armenian language varieties and their usage contexts). SEA was codified in the late 19th century (Cowe 1992; Dum-Tragut 2009; Karapetian 2014; Oshagan 1997), and the

gap between SEA and modern colloquial varieties has been described as considerable (Dum-Tragut 2009). Though current maintenance of and possible changes to Armenian diglossia and dialects are under-documented (see Section 1.4), the previously described diglossic situation in Armenia can be likened to those documented in recent decades in Switzerland and Norway (Auer 2005: 15), where no social group uses the standard language for everyday spoken communication. Like many standard languages of Europe codified around the same time (see Auer [2005: 13–14]), SEA was influenced by an archaic and prestigious language variety – for example, in the form of borrowings from Classical Armenian as replacements for loanwords (Cowe 1992; Meillet 1928; Oshagan 1997).

Despite the previously described gap between SEA and colloquial speech, Karapetian (2014: 32–33) has observed that colloquial language is increasingly being used in media and official speeches. This tendency may be part of a more general linguistic pattern connected with the collapse of the Soviet Union; Auer (2005: 31–32) identifies processes of "destandardisation towards the urban sociolects" occurring in post-Soviet states such as Russia, Belarus, and Ukraine. Linguistic purism/prescriptivism has been a prominent element of language policy in post-Soviet Armenia (Abrahamian 1998, 2006; Dum-Tragut 2009, 2013; Zakarian 1996). However, its impact on colloquial speech is unclear, and some studies suggest that targeted elements like foreign words are still abundant (e.g., Ghazaryan [2020]).

Broadly speaking, diglossic situations involve "high" and "low" language varieties used in clearly separated contexts (Ferguson 1959). This arrangement shows similarities with "language-oriented" prescriptivism because of the separation of linguistic variation from social status. For example, Hudson (2002: 3) and Coulmas (2005: 128) stress that linguistic variation in diglossic contexts does not depend on or index speakers' social identities to the same degree as in non-diglossic contexts. Nevertheless, other studies complicate these notions. Linguistic variation and diglossia have been relatively well researched in the Arabic context (e.g. Abdel-Jawad [1981]; Albirini [2011, 2014, 2016]; Bassiouney [2020]; Gibson [2002]; Haeri [1991]). According to Bassiouney (2020: 19) an overarching finding is the existence of socially prestigious "low" varieties that coexist both with the "high" variety and with lower-prestige "low" varieties. Without making explicit reference to the idea of diglossia, some studies on UK Englishes (e.g. Johnston [1984]; Milroy [1992]) likewise emphasize the need to examine local varieties as not necessarily existing on a simple usage continuum with supralocal prestige varieties like Received Pronunciation, or the need to consider the interactions of multiple local varieties in addition to the supralocal variety (Newbrook 1986). In general, the necessity of decoupling "standard" language and "prestige" has been emphasized by many previous authors (Abd-El-Jawad 1987; Al-Wer 1997; Haas 1982: 9; Ibrahim 1986; Milroy 2001: 532–533;

Smakman and Barasa 2017), and is also crucial for understanding the relationship between prescribed language norms and linguistic variation in Armenia.

With both its "language-oriented" prescriptivism and its history of diglossia, post-Soviet Armenia is a society where the relationship between prestige, the standard language, and other language varieties could be especially different from the straightforward relationship assumed in much sociolinguistic research in Western contexts, making it an ideal context for exploring understudied ways in which language ideologies influence language variation.

1.4 Documentation of regional varieties of Armenian

Though there were once as many as 120 Armenian dialects (Jahukyan 1972: 32), most western dialects were lost after the Armenian Genocide (Manoukian 2023). The degree of maintenance of eastern dialects in the Republic of Armenia is uncertain. Hodgson (2019: 95–96) writes that a "quasi-standard colloquial language" based on Yerevan's dialect is used in most urban areas, while regional dialects remain in rural areas. However, systematic investigation of dialect maintenance is lacking.

The present study addresses this issue by analyzing speech in Gavaṛ, the regional center of Geghark^{h}unik^{h} province, which had a permanent population of 20,765 in 2011 (Statistical committee 2011). Many recent dialectological works have been written about Gavaṛ's dialect (Katvalyan 2009, 2012, 2016, 2018, 2021; Mkrtch^{h}yan 2015, 2016), which is often called the "Bayazet dialect," as residents of Gavaṛ and the surrounding villages are said to descend from residents of Bayazet (located in present-day Turkey) who migrated in the 19th century (Katvalyan 2016: 31). Recent studies such as Katvalyan (2016) and Mkrtch^{h}yan (2015) maintain that dialect speakers in Gavaṛ have preserved regional features, but it is not explicitly stated which residents of a given area are considered dialect speakers, and these findings conflict with an earlier study (Baghramyan 1972) that reported ongoing dialect leveling. In light of these contradictions, this study investigates the maintenance of dialect elements and seeks to identify correlations between dialect features and demographic factors, building on the legacy of Armenian dialectology in a novel way by using dialectological descriptions as the basis for variationist analysis.

1.5 Research questions and expectations

Quantitative analysis of vowels in relation to gender, age, and education level will shed light on the first research question about which demographic factors correlate with maintenance of the dialect vowel system described by Katvalyan (2016).

Participants' metalinguistic commentary will inform the second research question, elucidating observed demographic patterns. Commentary connecting linguistic variants with dialect speakers generally or with specific types of people could either support or contradict demographic patterns. Such commentary will also shed light on the salience of different dialect vowels. Furthermore, commentary that attributes or denies prestige to language varieties can help explain why demographic groups may be converging toward or away from certain varieties.

Though this study is exploratory, previous research provides some basis for expectations about potential outcomes. Based on Hodgson's (2019) remark about urban dialect leveling, we might expect that younger people will maintain dialect vowels less than older people. On the other hand, ongoing renegotiation of the diglossic norm might mean that younger people could perceive the sociolinguistic interview as an informal context where dialectal speech is acceptable, meaning we could find younger people adhering more to dialect norms.

In relation to gender, women have been found in many studies to use more standard and/or prestigious variants (see Eckert [2012]; Smith [1979]). Indeed, Zak^{h}aryan (1981) notes that women in Yerevan "are slightly more inclined to monitor their own speech, aspiring toward more regular forms" (256).[2] However, in diglossic contexts it cannot be assumed that the high/standard variety carries social prestige, and it is thus not clear which language variety might hold the type of prestige relevant for gender variation in Armenia.

Regarding education level, since the "high" variety in diglossic contexts is acquired through education (Ferguson 1959), it might be expected that more educated speakers would use vowels closer to SEA. On the other hand, because of the separation of speech contexts, we could also find that education level would not affect use of dialect features in informal contexts.

2 Methods

2.1 Participants

Participants spent their childhood and youth in Gavaṛ and were current residents of Gavaṛ. One exception (Speaker 24), despite having parents from Gavaṛ, spent approximately 10 years in Kazakhstan and returned to Gavaṛ around age 12. The decision to not exclude this participant was based on examination of his data, which suggested some use of dialect vowels, with the additional goal of avoiding a larger

2 "…փոքր-ինչ ավելի են հակված հսկելու սեփական խոսքը, ձգտելու դեպի կանոնական ձևերը:"

gender imbalance.[3] The participants included 17 women and 14 men. The number of participants in each gender and education category is presented in Table 1, while Figure 1 shows the distribution of participants by birth year.

Table 1: Summary of participant information with respect to gender and education level.

	Higher	Vocational[a]	Secondary	Total
Men	7	3	4	14
Women	11	4	2	17
Total	18	7	6	

[a]This category includes participants who had completed various vocational courses in addition to their secondary education.

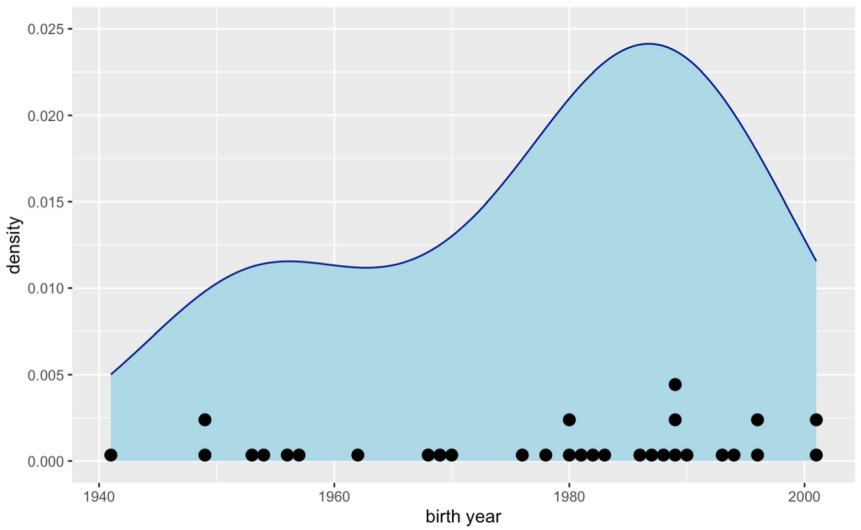

Figure 1: Density of participants by birth year. Each dot represents one participant.

3 The gender imbalance reflects the present (as opposed to permanent) population of Gavaṛ according to the 2011 census, which reported 8,896 men and 10,157 women among the present population and 10,238 men and 10,527 women among the permanent population (Statistical committee 2011).

The research assistant who conducted the interviews was a member of the local community.[4] In an additional attempt to overcome the "observer's paradox" (see Labov [1972]), all participants were from the interviewer's existing social networks. Most participants had immediate or extended family members in the sample.

2.2 Materials

The interview format was adapted from the classic sociolinguistic interview (see Becker [2017]) and consisted of four parts:

(1) Casual conversation
(2) Picture naming task (60 pictures)
(3) Word list (91 words)
(4) Metalinguistic questions

Materials are available on the project's OSF page (https://osf.io/w8mk6/?view_only=90fb00d8216a4042954c70887d275e86). The word list elicited phonetic features, while the picture task elicited phonetic features and lexical variation.

Phonetic features elicited in the picture task included those that could not be elicited in the word list because it is possible to use standard Armenian letters to represent both their SEA and dialect pronunciations. For example, the picture task elicited the word meaning 'bread,' as the dialectal *χatsʰ* and SEA *hatsʰ* can be represented with the Armenian letters indicating *χ* and *h*, such that writing the word would prompt one or the other pronunciation.

In contrast, the word list elicited dialectal features that cannot be represented with standard orthography, under the assumption that standard orthography would not necessarily elicit a standard pronunciation. In general, an attempt was made to select words that are present both in the Gavaṛ/Bayazet dialect and in SEA, such that speakers would neither intentionally perform dialect features nor shift to a standard style.

Words in both lists were attested by Katvalyan (2016, 2009) or proposed/verified by local research assistants.[5] The following phonetic features were elicited: vowels, breathy-voiced versus plain voiced consonants, and the use of [χ], [j], or [ɦ] in

4 Having learned Armenian as an adult and speaking a mixture of SEA and the colloquial variety of Yerevan, the author would not have been a suitable interviewer given this goal of avoiding interlocutor accommodation.

5 Katvalyan's (2021) new dictionary of the Bayazet dialect was not available at the time of the fieldwork, despite the publication date being listed as 2021. The dictionary was retroactively used to determine the predicted pronunciation of one dialect variant (*dœrgœχ*, 'gate'), which was used by many participants despite not having been expected based on Katvalyan (2016, 2009).

contexts where SEA uses [h]. Minimal and near minimal pairs targeting vowels were elicited, as well as additional words containing each vowel. Besides schwa (which is never stressed), target vowels were under primary or secondary stress in predicted pronunciations.

2.3 Data collection

31 interviews lasting approximately 30 minutes each were conducted in July 2022 by a local research assistant. 28 interviews were conducted in quiet rooms of the participants' or their relatives' homes. The remaining interviews were recorded at the author's accommodation.

Interviews were recorded using a Tascam DR-05X recorder set to a range of 48,000 Hz and a 24 bit sampling rate, along with two "Giant Squid" lavalier microphones. The microphones were connected using a splitter, such that the participant and interviewer each contributed one stereo track. Participants signed an informed consent form prior to the interview. After the interview, participants completed a questionnaire including demographic and language background information and an additional form to give consent for various uses of their data. Participants were compensated with 15 USD.

Because of relatively high awareness about the existence of different varieties of Armenian, participants were explicitly instructed to speak as they usually speak with the interviewer and/or at home with their family. Similarly, the picture task was introduced with an example picture of a skirt, while the interviewer explained that participants should use words that they usually use (e.g., the Russian borrowing *jupka*) rather than standard words that they may not use (such as *kisaʃrd͡ʒazgɛst* for 'skirt'). Pictures and words were shown on a laptop computer.

2.4 Empirical domain – vowels

Vowels have been selected for analysis because of numerous differences between the dialect's vowel system (described by Katvalyan [2016]) and SEA, and because of the possible salience of some dialect vowels. Specifically, the local research assistants suggested that [ɒ] (in place of SEA [a]) and [æ] are recognizable dialect features.

The dialect and SEA vowel systems are shown in Figure 2. IPA transcriptions of dialect vowels are the author's interpretations of Katvalyan's (2016) descriptions. In the Bayazet dialect, [ɒ] is in complementary distribution with [a], appearing word-initially and in the first syllables of words after nasals and voiceless unaspirated consonants except [χ] (Katvalyan 2016: 81–82). At the same time, [ɒ] is in a

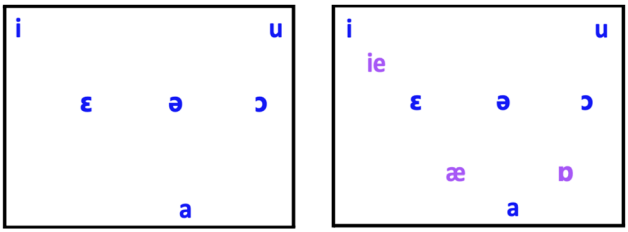

Figure 2: Vowel systems of SEA (left) (see Dum-Tragut [2009]; Khach^{h}atryan [1988]) and the Bayazet dialect (right) (Katvalyan 2016). Non-SEA vowels are shown in purple.

semi-allophonic relationship with [ɔ]. According to Katvalyan, the two sounds represent separate phonemes, although only [ɔ] can appear before [v] (2016: 90–91). Additionally, in older vocabulary, only [ɒ] appears under stress (Katvalyan 2016: 89), although this is not always consistent when stress changes with suffixation (Katvalyan [2016: 89, 178]). Similarly, [ie] and [ɛ] are in a relationship sometimes conditioned by stress or phonetic environment (Katvalyan 2016: 92–95, 178), although minimal pairs exist (Katvalyan 2016: 95). The vowel [æ] represents an independent phoneme (Katvalyan 2016: 83–85).

Although Katvalyan (2016: 67) characterizes [ɒ] as diphthongal, transitioning from rounded to unrounded, he also writes (2016: 68) that its rounding is relatively weak in Gavaṛ, possibly in connection with it being the regional center. As pronunciations that were perceptibly (to the author) different from [a] but not audibly diphthongized were widespread among participants, the transcription [ɒ] has been used. The transcription [ie] has been used despite diphthongized pronunciations also being rare for this word class, as the few instances that were audibly different from [ɛ] were strongly diphthongized.

2.5 Data processing

The analysis includes only tokens from the picture and word lists. Interviews were transcribed by the interviewer using ELAN. Segmentation was performed manually in Praat (Boersma and Weenink 2021). The analysis generally included only planned vowel tokens. In some cases, this meant including a dialectal or Russian word, but not an equivalent SEA word. For example, when the Russian-derived word *nœsilka* ('stretcher') was produced, the first vowel was measured, while no vowels were measured for the SEA equivalent *patgarak*. These SEA lexical variants were excluded for two reasons:

(1) Lack of previous documentation regarding which vowels should be expected if participants were to pronounce certain SEA words with dialect pronunciation (particularly in cases where the dialect pronunciation of vowels is not predictable by phonetic context), which prevented classification of these tokens.
(2) In order to minimize the noise introduced into the vowel data by the elicited lexical variation. For example, many of the excluded SEA variants were alternatives to dialect variants with the vowel [æ]. If a participant consistently used these dialect variants, they would have many tokens representing the [æ] category, while a participant who consistently used the SEA variants would have many tokens representing other vowel categories that the former participant did not have the opportunity to produce. Excluding these SEA variants thus allowed the measured tokens to be overall more consistent across participants, while the information about who used dialectal variants of the [æ] category and who did not was retained.

Some post-hoc schwa tokens were included, as the planned tokens were often excluded due to indistinct formants. Unexpected dialectal and Russian-derived variants were included when the predicted pronunciation of the target vowel could be clearly identified. For example, when the unanticipated Russian variant *pɒlatka* ('tent') was produced in the picture task by many participants, the first vowel was measured, as it is a predictable allophone of [a].

Instances where speakers incorrectly named a picture or misread a word, but produced a different target word, were included. Plurals, suffixed forms, and compound words in which the target vowel was still predictable by phonetic context were also included. Participants sometimes produced forms with explicit metalinguistic commentary indicating that they themselves do not use that form. Such tokens were excluded.

Target vowels were not necessarily under lexical stress. In both the Gavaṛ/Bayazet dialect and in SEA, the last full vowel (i.e., not schwa) of a word is stressed, while the first syllable has secondary stress (Abeghyan 1971: 19–20; Allen 1950: 182–183; Dum-Tragut 2009: 47; Katvalyan 2016: 104; Khach^{h}atryan 1988: 80, Vaux 1998: 134). Except schwa, the target vowels of the present analysis came mostly from these two positions.[6] Armenian is said to be syllable-timed (Mirakyan 2016: 91). Although the validity of such rhythmic classifications is questionable (Arvaniti 2012), some authors have asserted that unstressed syllables in Armenian are not as reduced as those in languages like German and Russian (Abeghyan 1971: 34; Khach^{h}atryan 1988: 83) or even

6 Only one token contained a non-schwa target vowel that was not under primary or secondary stress. This token was *dɔʃækin*, pronounced by Speaker 26, in which the target vowel [æ] becomes unstressed due to the addition of the dative case ending *-in*.

that Armenian stressed and unstressed syllables have no significant length difference (Haghverdi 2016). The present analysis pools stressed and unstressed vowels under the assumption that vowel quality is also minimally affected by stress.

Interview recordings were split into mono tracks using Audacity® (version 3.0.5) (Audacity Team 2021). The first and second formants were measured using Fast Track (Barreda 2021). When measurements could not be obtained due to oversaturation, they were obtained from the recording made with the interviewer's microphone. Measurements were taken every 2 ms from the 40–60 % duration interval of each vowel. For each token, the median formant value among these measurements was recorded for use in further analyses. Formant measurements were visually checked, and those for which tracking appeared inaccurate were corrected either by selecting other measurements generated by Fast Track, or by replicating Fast Track's procedure in Praat. Some tokens with indistinct formants were excluded prior to measurement. Each participant's vowel space was visualized with a scatter plot of raw measurements in R (v4.2.2; R Core Team 2021) using ggplot2 (Wickham 2016). Individual vowel plots are available on the project's OSF page. Tokens which appeared to be outliers were rechecked for accuracy of formant tracking, and those for which tracking was deemed inaccurate were excluded.

As some of the planned analyses required normalized formant data, the data was normalized using the Nearey1 method from the vowels package (Kendall and Thomas 2018). This method was chosen because it does not require F3 and has been found to perform well at preserving social variation (Thomas 2011: 167–168). Among Nearey's two normalization methods, the formant-intrinsic Nearey1 method has been found to perform better at preserving social variation while reducing physiological variation (Adank et al. 2004). A few tokens (n = 4) which were outliers for their predicted vowel categories, but for which the formant tracking was deemed accurate, were included in the normalization of the data but excluded from further analyses. Nearey normalization does not depend on the category identity of tokens, such that being an outlier for the predicted vowel category (which does not equate to being an outlier for the speaker's vowel space in general) did not justify the exclusion of these measurements from normalization. Nevertheless, they were excluded from further analyses dependent on categorization of tokens, due to their potential to skew the results for their categories.

A summary of sample sizes is provided in Table 2, which shows the sample sizes of the speakers who had the maximum, minimum, and median amount of tokens for each vowel category and in total. The table reflects sample sizes after the exclusion of the aforementioned outliers. A detailed table containing sample sizes for each participant for each vowel category, along with the number of tokens excluded in each category, is available on the project's OSF page.

Table 2: Median, maximum, and minimum sample sizes among speakers by vowel category and in total. Categories analyzed in the present study are italicized.

Vowel	Median	Maximum	Minimum
[ɑ]	*19*	*24*	*14*
[æ]	29	34	19
[ə]	8	15	6
[ɒ]$_A$	*19*	*24*	*13*
[ɒ]$_O$	*12*	*13*	*10*
[ɛ]	*8*	*11*	*7*
[ie]	*14*	*15*	*12*
[i]	6	8	6
[ɔ]	*13*	*15*	*10*
[u]	6	7	4
Total	136	147	122

2.6 Motivations for quantitative analysis

Before quantitative variationist analysis was carried out, each token was coded according to the expectations attested by Katvalyan (2016, 2009) or by the local research assistants. For example, if [ɒ] was expected in a given word based on the phonetic environment of that word, it was coded as such, even if the speaker produced [a]. Categorizing tokens in this way allowed for the mapping of each speaker's actual vowel space onto the predicted dialect vowel space, while also incorporating the potential influence of the various linguistic factors that define the dialect's vowel classes (e.g., phonological conditioning based on phonetic environment or stress) into the analysis.

The differences between the dialect and SEA systems could then be conceptualized as differences in the presence of various phonemic and allophonic distinctions. Specifically, four pairs of vowel categories (depicted in Figure 3) were

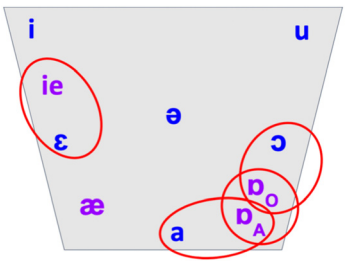

Figure 3: Pairs of vowels included in the analysis of vowel distinctions. Non-SEA vowels are shown in purple.

conceptualized this way. For three of these four pairs ([ie] versus [ɛ], [a] versus [ɒ]$_A$, and [ɔ] versus [ɒ]$_O$) the maintenance of a distinction equates to adherence to the dialect system, while for the comparison of [ɒ]$_A$ versus [ɒ]$_O$, a lack of distinction is expected in the dialect system (see Section 2.4 above regarding the phonological status of each vowel variant). The [ɒ] tokens are divided into two groups because this vowel sometimes corresponds to [a] in SEA and sometimes corresponds to [ɔ]. These groups are indicated as [ɒ]$_A$ and [ɒ]$_O$.[7] Evaluating the presence or absence of these distinctions in each speaker's vowel space allowed for assessment of dialect vowel adherence.

The group of tokens where [æ] was expected could not be included in this analysis due to clear bimodality of this group for about two-thirds of participants, who exhibited sub-groups of pronunciations corresponding to [æ] and [a] within this group.

This analysis accounts for possible convergence toward both SEA and the colloquial variety of Yerevan, as the contemporary variety of Yerevan and many varieties of the Ararat dialect group (which is spoken around Yerevan, and on which SEA is based) have the same six-vowel system as SEA (see Seyfarth et al. [2023] for discussion of Yerevan Armenian and Markosyan [1989: 53] for discussion of the Ararat dialect).

Regarding the demographic variables selected for the quantitative analysis, age, gender, and education level represent key macrosocial factors that have often been implemented in sociophonetic research (see Kendall et al. [2023]). Gender and education level are operationalized as categorical variables (men versus women and secondary versus vocational versus higher education), while age is continuous. Education level has been used in place of socioeconomic class because many people in Armenia do not work in the fields of their education as a result of post-Soviet economic collapse. Accordingly, previous work in post-Soviet states has suggested that social prestige and socioeconomic status may not be closely connected. Garibova (2020: 65) notes such a distinction in Azerbaijan, identifying its roots in "the Soviet separation of economic status from socio-cultural identification based on parameters such as education, erudition, language skills, and ability to understand and value art." Though the method of correlating linguistic and macrosocial variables aligns with the earlier "first wave" of sociolinguistics (Eckert 2012), more modern methods cannot be implemented until sufficient documentation of variation within a speech community has been achieved (Meyerhoff and Stanford 2015: 11).

7 Though Katvalyan (2016) writes that these two groups are pronounced identically, Khachaturian (1992: 118) writes that the two vowels are "almost identical… though some subtle difference can be detected between them, which however is not always present."

2.7 Analysis of vowel distinctions

The four vowel pairs discussed in Section 2.6 have been examined using Pillai scores, which measure overlap, and Euclidean distance, which measures distances between cluster centers. Measuring both overlap and distance is advisable because the two metrics can vary independently (Nycz and Hall-Lew 2014). These static measures were implemented despite Katvalyan's (2016) description of several of the relevant vowel classes ([ie] and [ɒ]) as diphthongized due to the relative infrequency of obviously diphthongized pronunciations in the data. As noted above, [ie] was sometimes strongly diphthongized, but all of these instances were in portions of the interview not included in the present analysis.

Pillai scores were first used to measure vowel overlap by Hay et al. (2006) and have become a "standard metric" (Stanley and Sneller 2023: 54), having been found by Kelley and Tucker (2020: 143) to be preferred especially with small sample sizes. Pillai scores range between 0 and 1, with 0 indicating full overlap and 1 indicating no overlap.

Euclidean distance has also commonly been used to study vowel mergers and distinctions (Nycz and Hall-Lew 2014). Following Nycz and Hall-Lew (2014), Euclidean distances have been calculated using median formant values, which are less skewed than means by extreme values and non-normal distributions. The calculations of Euclidean distance are thus referred to as ED-median throughout the remainder of this paper.

Both Pillai scores (Baranowski 2022; Berry and Ernestus 2018; D'Onofrio et al. 2019; Helms 2023; Labov et al. 2016; Lee 2016; Wong and Hall-Lew 2014; Xu 2019) and Euclidean distances (Baranowski 2022; Lee 2016; Xu 2019) have been used as dependent variables in linear models in previous sociophonetic studies. This method was also employed in the present study. The models have three predictors – gender (categorical with two levels), birth year (continuous), and education level (categorical with three levels). No interactions were included, both because of the lack of specific hypotheses and because of the very small number of participants possessing some combinations of characteristics. Two models were created for each vowel comparison – one with Pillai scores as the dependent variable and one with ED-median.

Pillai scores were calculated in R using raw data for each speaker for each of the four comparisons. Visualizations of Pillai scores below also include individual distinction thresholds calculated using the method proposed by Stanley and Sneller (2023), which accounts for sample size. According to Stanley and Sneller, this method addresses the decreased likelihood of finding low Pillai scores when sample sizes are small. Although it is also intended to address the lack of any accepted non-arbitrary

Pillai score merger/distinction threshold, it is not clear if vowels deemed distinct by this method, which establishes the threshold below which truly merged populations will produce a Pillai score in 95 % of samples of a given size, would always be perceived as distinct. These thresholds thus lack crucial information for interpreting sociolinguistic data, and they are included as a tool to visualize the effects of sample size rather than as a definitive means of determining mergers/distinction. Pillai scores for each comparison were entered into fixed effects linear regression models in R with gender, birth year, and education level as predictors. In the comparison of education groups, higher education served as the reference level against which the vocational and secondary groups were compared. The "contrast" function from the contrast package (O'Callaghan et al. 2022) was applied to the model outputs in order to test the difference between the two non-reference groups. Multicollinearity of predictors was tested using the "VIF" (variance inflation factor) command from the car package (Fox and Weisberg 2019).

ED-median measurements were calculated individually using the normalized data for each speaker for each comparison. Visualizations of ED-median measurements are presented in Section 3 and on the project's OSF page. The ED-median measurements were entered into fixed effects linear regression models in R with gender, birth year, and education level as predictors.

3 Results

3.1 Gender

Gender was a significant predictor of both Pillai scores and ED-median for several of the four vowel comparisons. Results are presented in Table 3. Full model outputs are available on the project's OSF page. Figure 4 presents individual participants' median normalized formant measurements for each vowel category, grouped by gender.[8] This figure and all other data visualizations were created in R with ggplot2.

In the Pillai score models, gender was a significant predictor in three comparisons: [a] versus $[ɒ]_A$ ($p = 0.047$; adjusted R-squared = 0.036), [ɔ] versus $[ɒ]_O$ ($p < 0.015$; adjusted R-squared = 0.103), and $[ɒ]_A$ versus $[ɒ]_O$ ($p < 0.001$; adjusted R-squared = 0.328). The low adjusted R-squared values indicate that the models account for relatively little variability in the data. For the comparison of [a] versus

8 This plot excludes the outliers removed after normalization, as described in Section 2.5, as well as two words intended to elicit the [æ] category for which this categorization was later deemed dubious (see OSF appendices for further discussion). Though omitted from this plot, these data were included in the normalization, as Nearey normalization does not depend on the category identity of the tokens.

Table 3: Results of linear models in relation to gender. *p*-Values of less than 0.05 are italicized. All values are rounded to three decimal places.

Comparison	Pillai scores	ED-median
[a] vs. [ɒ]$_A$	*p = 0.047*	*p = 0.041*
	Adjusted R-squared = 0.036	Adjusted R-squared = 0.091
[ɔ] vs. [ɒ]$_O$	*p < 0.015*	*p < 0.013*
	Adjusted R-squared = 0.103	Adjusted R-squared = 0.102
[ɒ]$_A$ vs. [ɒ]$_O$	*p < 0.001*	*p < 0.001*
	Adjusted R-squared = 0.328	Adjusted R-squared = 0.518
[ie] vs. [ɛ]	*p* = 0.207	*p* = 0.400
	Adjusted R-squared = −0.021	Adjusted R-squared = −0.111

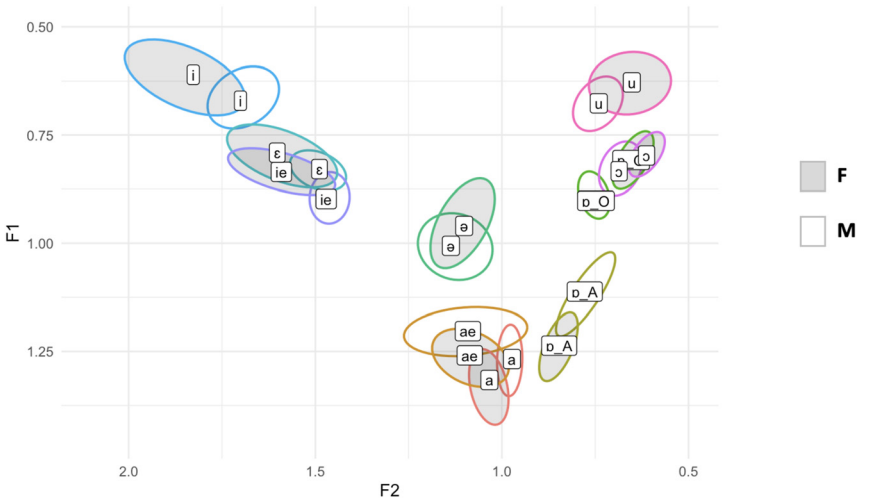

Figure 4: Individual median formant values grouped by gender in normalized units. Confidence ellipses created in ggplot2 with the stat_ellipse function represent approximately one standard deviation.

[ɒ]$_A$, the model estimated a difference of 0.108 between the two groups, with men having higher scores than women. For the comparison of [ɔ] versus [ɒ]$_O$, the model estimated a difference of 0.164, with men having higher scores than women. For the comparison of [ɒ]$_A$ versus [ɒ]$_O$, the model estimated a difference of −0.284, with women having higher scores than men. The directionalities of the differences indicate that men used vowels more consistent with Katvalyan's (2016) descriptions.

Individual Pillai scores for [ɔ] versus [ɒ]$_O$, color-coded by gender and superimposed with distinction thresholds, are presented in Figure 5. Analogous graphs for the other comparisons are available below and on the project's OSF page. As noted above, the method for calculating distinction thresholds is intended to account for differing sample sizes across individuals and their potential effect on Pillai scores. Accordingly, it is notable that in all four comparisons, the thresholds appear relatively similar across participants (see Figures 5, 14, 15–16 [OSF page]). In contrast, the variability in Pillai scores appears much larger. This suggests that the differences in sample size are likely not large enough to inhibit comparison of participants' Pillai scores.

In the ED-median models, gender was a significant predictor in three comparisons: [a] versus [ɒ]$_A$ ($p = 0.041$; adjusted R-squared = 0.091), [ɔ] versus [ɒ]$_O$ ($p < 0.013$; adjusted R-squared = 0.102) and [ɒ]$_A$ versus [ɒ]$_O$ ($p < 0.001$; adjusted R-squared = 0.518). The low R-squared values for [a] versus [ɒ]$_A$ and [ɔ] versus [ɒ]$_O$ indicate that much of the variation in this data has not been accounted for. On the other hand, the higher R-squared value for [ɒ]$_A$ versus [ɒ]$_O$ suggests that gender explains more of the variation in this data. For the comparison of [a] versus [ɒ]$_A$, the model estimated a difference of 0.070 between the two groups, with men having

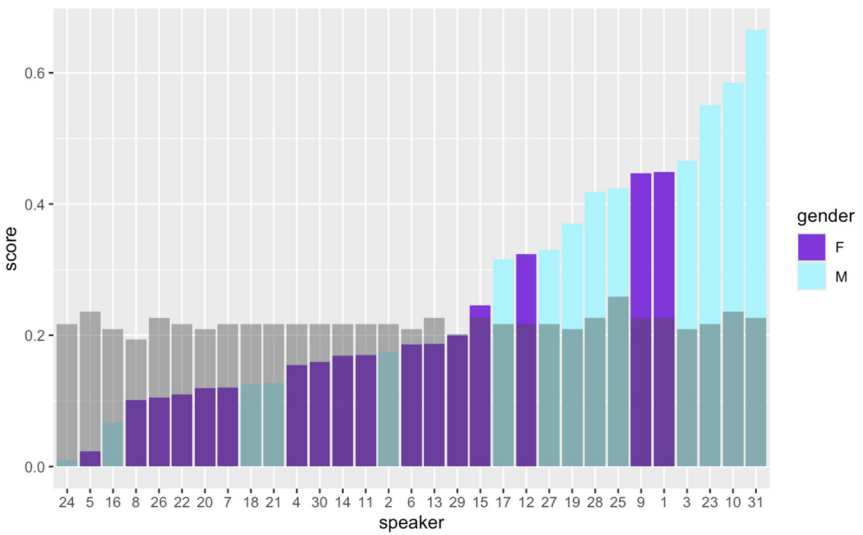

Figure 5: Individual Pillai scores by gender for [ɔ] versus [ɒ]$_O$ with superimposed distinction thresholds. Each bar represents one speaker's Pillai score. A score above the threshold indicates that the two vowel groups would come from an underlyingly unmerged population in 95 % of samples.

higher scores than women. For the comparison of [ɔ] versus [ɒ]$_{O}$, the model estimated a difference of 0.056 normalized units between men and women, with men having larger ED-median values, while for the comparison of [ɒ]$_{A}$ versus [ɒ]$_{O}$, the model estimated a difference of –0.246 normalized units, with men having smaller values. The directionalities of these differences indicate that men used vowels more consistent with Katvalyan's (2016) descriptions. Individual ED-median measurements for [ɒ]$_{A}$ versus [ɒ]$_{O}$, color-coded by gender, are presented in Figure 6. Analogous graphs for the other comparisons are available on the project's OSF page.

Prior to and during data collection, the local research assistants noted their impression that men generally use more dialect features than women. However, this impression was not explicitly echoed in any participants' commentary. Nevertheless, a few participants subtly touched on gender. For example, Speaker 11 mentioned back rounded vowels (specifically, saying *ɒrɑʁ* instead of *ɑrɑʁ* ['vodka']) in connection with male family members (her grandfathers and father-in-law), and Speaker 24, when discussing how he speaks with people from other parts of Armenia, mentioned that he avoids speaking the Gavaṛ dialect with girls.

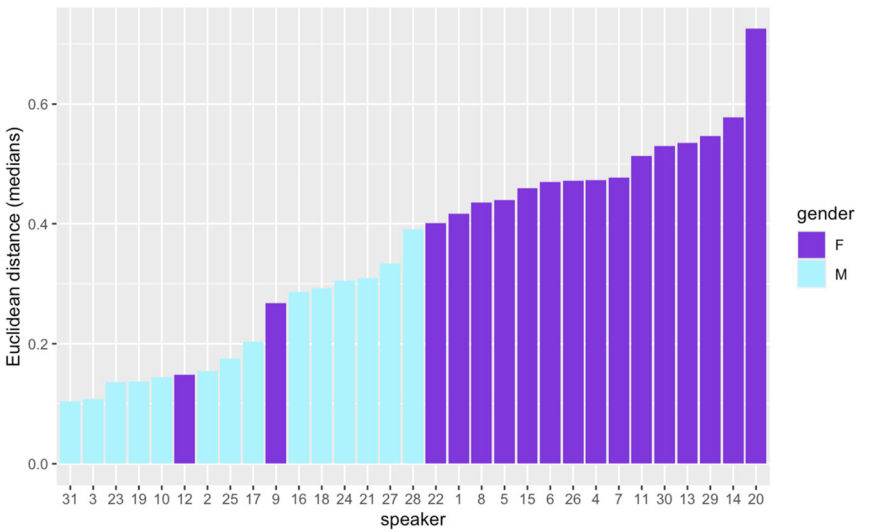

Figure 6: Individual ED-median measurements in normalized units by gender for [ɒ]$_{A}$ versus [ɒ]$_{O}$. Each bar represents one speaker's ED-median measurement.

3.2 Education level

Education level was not a significant predictor of either Pillai scores or ED-median for any of the four vowel comparisons. Results are presented in Table 4. Model outputs are available on the project's OSF page.

Visualizations were consistent with the insignificant results. Figure 7 shows individual Pillai scores for [ɔ] versus $[ɒ]_O$, color-coded by education level and superimposed with distinction thresholds. Figure 8 shows individual ED-median values for the comparison of $[ɒ]_A$ versus $[ɒ]_O$, color-coded by education level. Figure 8 shows a possible exception to the lack of trends, as many participants with higher education have higher ED-median values. However, the entire graph from Speaker 1 rightward is made up of women, suggesting that any education effect might be confined to this gender group. Graphs coded by education level for the remaining comparisons are available on the project's OSF page.

Commentary referencing education level was relatively sparse. Several speakers linked generational changes in speech to the attainment of higher education, though these comments never mentioned vowels. For example, Speaker 6 noted that one of her children (Speaker 7) speaks in a more standard way than the other due to having studied at university. Speaker 7 herself also stated that she believed her speech to have become less dialectal over time in connection with university and work environments, and Speaker 12 also stated that she believes herself to speak dialect less after studying at university. Speaker 8 made a more general statement, noting that

Table 4: Results of linear models in relation to education level. All values are rounded to three decimal places. The *p*-values for the "vocational versus secondary" comparison were obtained using the "contrast" function from the contrast package (O'Callaghan et al. 2022).

Comparison	Pillai scores			ED-median		
	Higher vs. vocational	Higher vs. secondary	Vocational vs. secondary	Higher vs. vocational	Higher vs. secondary	Vocational vs. secondary
[a] vs. $[ɒ]_A$	p = 0.829	p = 0.810	p = 0.684	p = 0.627	p = 0.353	p = 0.718
	Adjusted R-squared = 0.036			Adjusted R-squared = 0.091		
[ɔ] vs. $[ɒ]_O$	p = 0.294	p = 0.339	p = 0.887	p = 0.561	p = 0.642	p = 0.894
	Adjusted R-squared = 0.103			Adjusted R-squared = 0.102		
$[ɒ]_A$ vs. $[ɒ]_O$	p = 0.679	p = 0.582	p = 0.924	p = 0.580	p = 0.685	p = 0.873
	Adjusted R-squared = 0.328			Adjusted R-squared = 0.518		
[ie] vs. [ɛ]	p = 0.736	p = 0.950	p = 0.798	p = 0.939	p = 0.967	p = 0.915
	Adjusted R-squared = −0.021			Adjusted R-squared = −0.111		

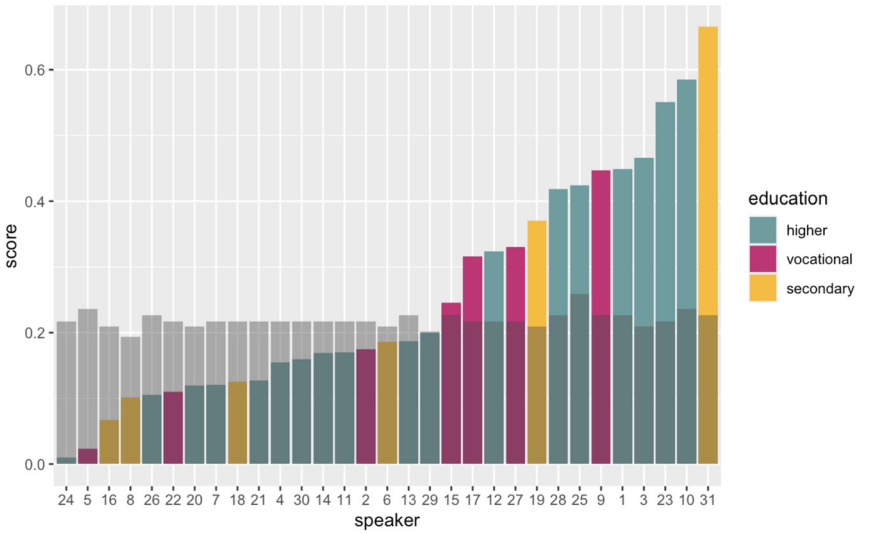

Figure 7: Individual Pillai scores by education level for [ɔ] versus [ɒ]$_O$ with superimposed distinction thresholds. Each bar represents one speaker's Pillai score. A score above the threshold indicates that the two vowel groups would come from an underlyingly unmerged population in 95 % of samples.

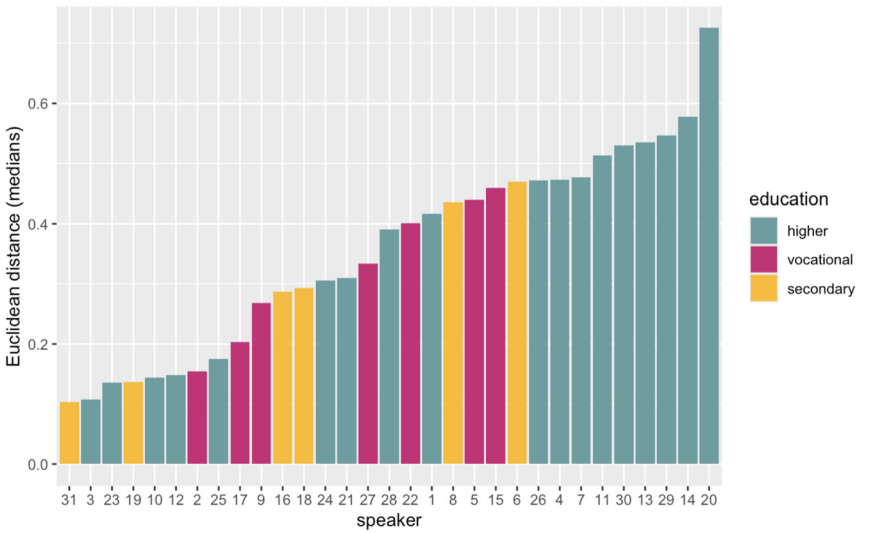

Figure 8: Individual ED-median measurements in normalized units by education level for [ɒ]$_A$ versus [ɒ]$_O$. Each bar represents one speaker's ED-median measurement.

Table 5: Results of linear models in relation to birth year. All values are rounded to three decimal places.

Comparison	Pillai scores	ED-median
[a] vs. $[ɒ]_A$	p = 0.605	p = 0.080
	Adjusted R-squared = 0.036	Adjusted R-squared = 0.091
[ɔ] vs. $[ɒ]_O$	p = 0.230	p = 0.337
	Adjusted R-squared = 0.103	Adjusted R-squared = 0.102
$[ɒ]_A$ vs. $[ɒ]_O$	p = 0.148	p = 0.544
	Adjusted R-squared = 0.328	Adjusted R-squared = 0.518
[ie] vs. [ɛ]	p = 0.182	p = 0.760
	Adjusted R-squared = −0.021	Adjusted R-squared = −0.111

younger people speak in a more standard way because "they are [university] students, they have studied."[9]

3.3 Birth year

Birth year was not a significant predictor of either Pillai scores or ED-median for any of the four vowel comparisons. Results are presented in Table 5. Full model outputs are available on the project's OSF page.

The lack of significant results is consistent with the data visualizations in relation to age. Figure 9 presents a scatter plot of Pillai scores for [ɔ] versus $[ɒ]_O$ in relation to birth year, while Figure 10 shows a scatter plot of ED-median values for $[ɒ]_A$ versus $[ɒ]_O$. The analogous graphs for other vowel comparisons are available on the project's OSF page.

Many participants asserted that older people speak differently from younger people and/or use more dialect features. However, these comments were mostly very general or focused on vocabulary differences.[10] Nevertheless, it is perhaps notable that Speaker 11's comments about back rounded vowels mention family members who are not only male, but also older.

9 "Ուսանող եմ, սովորեր եմ։"

10 Katvalyan (2018: 12) also asserts that diachronic changes to the dialects of Geghark^{h}unik^h province pertain especially to vocabulary.

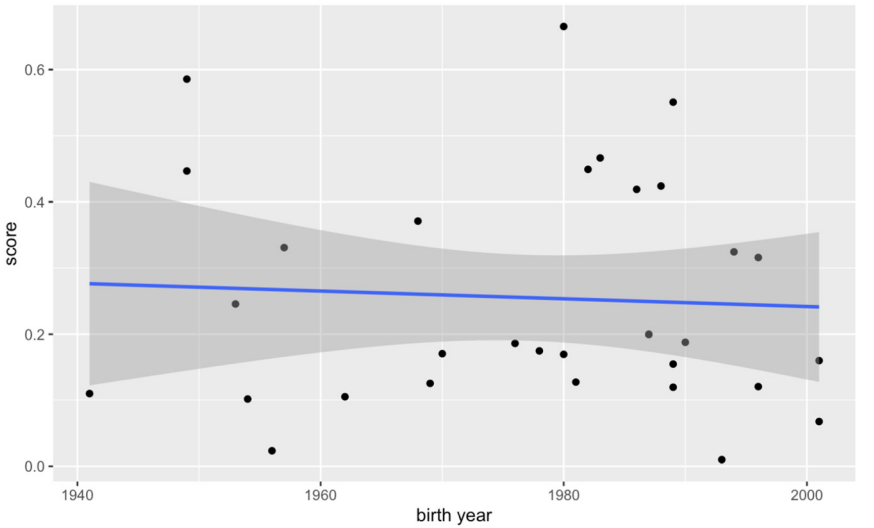

Figure 9: Individual Pillai scores in relation to birth year for [ɔ] versus [ɒ]$_O$ with superimposed regression line.

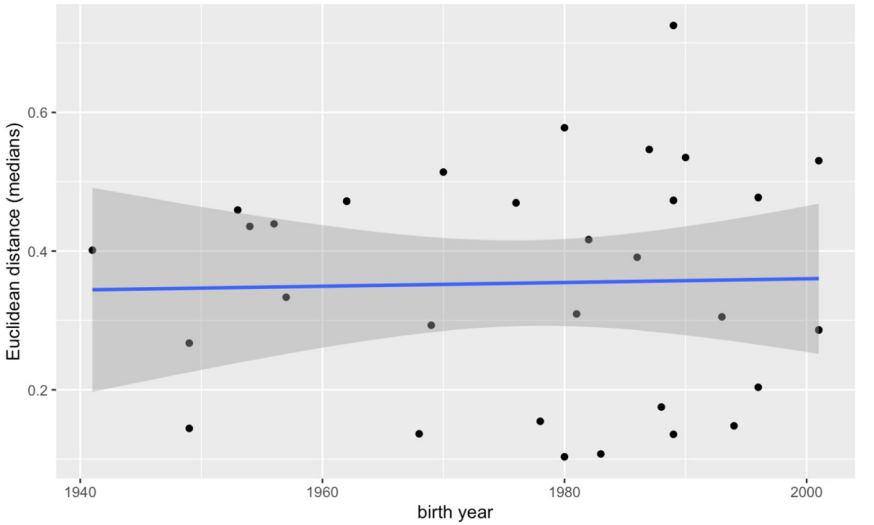

Figure 10: Individual ED-median measurements in normalized units in relation to birth year for [ɒ]$_A$ versus [ɒ]$_O$ with superimposed regression line.

3.4 Metalinguistic commentary related to prestige

The second research question about implications of participant commentary for the quantitative results is illuminated not only by the aforementioned commentary invoking demographic factors, but also by commentary related to prestige. Metalinguistic questions elicited stances on three main varieties: SEA, the Gavaṛ/Bayazet dialect, and the colloquial language of Yerevan. The full question list is available on the project's OSF page, though due to the semi-structured nature of the interviews, not all participants were asked every question. Participants' commentary revealed that different types of prestige coexist and compete.

Both SEA and the dialect were generally met with positive commentary. More than three-quarters of participants noted attempting to speak closer to SEA in some situations (mainly with people from other regions and in educational, professional, or state institutions) and/or noted that SEA is somehow necessary or important. This commentary often touched on the necessity of a means of interdialectal communication, which is unsurprising given previous characterizations of Armenian dialects as mutually unintelligible (Vaux 1998: 7). Nevertheless, no participants asserted that one must speak SEA in all contexts, and most expressed positive attitudes toward Gavaṛ's dialect and dialects in general, despite frequently using words like *kopit* ('crude') to describe Gavaṛ's dialect. For example, Speaker 4 stressed the importance of SEA for presenting Armenia and its literary tradition to the world, while also asserting that dialects are "one of the riches of the Armenian language,"[11] while Speaker 12 declared, "our dialects are beautiful, let's not forget the dialects, but let's speak literary."[12] Similarly, Speaker 28 noted that speaking dialects "is not shameful, every person speaks his fathers', his grandfathers' language," but that "the literary language comes in handy from time to time."[13]

Around two-thirds of participants were asked if they often hear that SEA is "correct" and that dialects and colloquial language are "incorrect." Around half of these replied that they do not often (or ever) hear this. Notably, Speaker 26 noted having heard this mainly in educational institutions. Those who reported hearing such assertions generally disagreed or were ambivalent, sometimes emphasizing that different language varieties are appropriate in different situations. For example, Speaker 28, who had previously mentioned using SEA in educational institutions, stated, "in everyday life you should speak dialect."[14]

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11 "Հայոց լեզվի… հարստություններից մեկը համարվում ա բառբառը:"

12 "Մեր բարբառները սիրուն են, չմոռանանք բարբառները, բայց խոսենք գրական:"

13 "…ամոթ բան չի, ամեն մարդ խոսում ա իր հայրենի, իր պապերի լեզվով… գրականը շատ ա պետք գալիս ժամանակ առ ժամանակ:"

14 "Առօրյայում պտի խոսաս բառբառով:"

Overall, participants' commentary aligned with Milroy and Milroy's (2012: 16) characterization that speakers will generally "pay lip-service to correctness and prestige variants," while continuing to use local variants and feeling that different variants are appropriate for different contexts. Some participants seemed unwilling even to pay lip-service to SEA. Speaker 31, while asserting that SEA should be used in news broadcasts, government meetings, and meetings with "high-ranking" people, also stated that "K^{h}jævær's[15] language is the real Armenian language."[16] Another participant (Speaker 19), when asked if he often hears that SEA is correct and dialects are incorrect, replied that he believes the opposite to be true and does not like when people speak SEA.

Nevertheless, some commentary implicitly granted prestige to SEA. When discussing situations in which they try to speak SEA, some participants framed this as speaking in a way that is *t͡ʃiʃt* ('correct'), *lav* ('good'), *kulturakan* ('cultured'), or *aveli hajɛrɛn* ('more Armenian'). Several participants also mentioned avoiding dialect features with their own children, despite expressing positive attitudes toward the dialect. Thus, while the dialect clearly holds some prestige, it is (often implicitly) subordinated to SEA in some situations.

4 Discussion

4.1 Dialect vowel adherence in relation to demographic factors and metalinguistic commentary

In relation to the first research question about which demographic factors relate to dialect vowel maintenance, the men in the sample were found to adhere more closely to the dialect vowel system than the women. Specifically, the analyses of Pillai scores and ED-median found that gender was a significant predictor of [a] versus [ɒ]$_{\text{A}}$, [ɔ] versus [ɒ]$_{\text{O}}$, and [ɒ]$_{\text{A}}$ versus [ɒ]$_{\text{O}}$. No significant results were found in relation to birth year or education level.

In relation to the second research question, participants' metalinguistic commentary about the Gavaṛ/Bayazet dialect often pertained to rounded back vowels, demonstrating their salience. Some participants associated their use specifically with the village of Sarukhan, which Katvalyan (2016: 68) also notes in connection with [ɒ]$_{\text{A}}$. Katvalyan's (2016: 80) characterization of [ɒ]$_{\text{A}}$ as the dialect vowel system's most salient aspect also aligns with participant commentary. In contrast, only one participant's commentary could be interpreted as related to the high- and mid-front vowels. In listing "letters" that he associated with the dialect, this participant

15 Local name for Gavaṛ

16 "Քըեվըեռա լիզուն իսկական հայերենն ա:"

pronounced a sequence of sounds ([je]) that could be interpreted either as a reference to the dialect vowel [ie] or simply as a reference to one of the letters of the Armenian alphabet. The vowels for which socially conditioned variation was found thus correspond to those most frequently mentioned by participants, suggesting a connection between maintenance and salience.

The findings related to gender are consistent with many early sociolinguistic studies, in which women were found to use more standard and/or prestigious variants (see Eckert [2012] and Smith [1979]). Nevertheless, as later studies have shown, the relationships between gender, prestige, and other social factors often manifest in language in more complicated ways (see Eckert [2012]), and standard and prestige cannot be conflated in a diglossic society. Thus, further investigation is needed to understand why the men in the present study adhered more to dialect norms. Aside from the participant who mentioned back rounded vowels in connection with male family members, commentary that connected language to gender was nearly nonexistent, making it difficult to gain any insights. Although Zak^{h}aryan (1981: 256) notes Yerevan women's tendency to adhere to canonical language forms, he also downplays the role of gender in comparison with other demographic variables (Zak^{h}aryan 1981: 142), offering results that sharply differ from those of the present study.[17] Nevertheless, connections between language and masculinity observed in other Armenian contexts (e.g. Karapetian [2024]) suggest that this will be a fruitful direction for future investigation.

The lack of age trends contradicts both Hodgson's (2019) statement and participant commentary about different generations speaking differently. Nevertheless, generational trends could be different for different linguistic features, as commentary related to age often mentioned vocabulary but never vowels. Another potential explanation could be the differing ideological environments of the Soviet and post-Soviet eras. As noted above, in recent years colloquial language has been entering spheres previously reserved for SEA. This relaxation of norms may lead to younger speakers feeling less pressured to speak formally in certain contexts, such as recorded interviews.

The absence of patterns related to education level conflicts with commentary alluding to the use of fewer dialect features among highly educated people. Even so, this commentary never mentioned vowels specifically, and it is possible that participants who made such comments did not have all speech contexts in mind.

17 It is possible that Zak^{h}aryan's dismissal of gender differences is related to Soviet-era ideological pressure to proclaim the success of socialism in creating gender equality. For example, Zak^{h}aryan writes, "… in a developed socialist social system, the societal position and role of men and women do not have such differences so as to be reflected in language in the form of strictly expressed variation" ["…զարգացած սոցիալիստական հասարակարգում տղամարդկանց և կանանց հասարակական դիրքն ու դերը չունեն այնքան տարբերություններ, որ լեզվում արտացոլվեն խիստ արտահայտված տարբերակման ձևով"] (Zak^{h}aryan 1981: 142).

Moreover, the lack of education trends aligns with an outcome that might be expected in a diglossic society. The fact that highly educated speakers do not generally use more SEA-like vowels suggests that SEA may still be generally reserved for certain formal domains. This interpretation is consistent with commentary that expressed positive attitudes toward both SEA and the Gavaṛ/Bayazet dialect and suggested that their appropriateness varies by context.

4.2 Comparison with previous dialect descriptions

The results suggest that some speakers are maintaining some of the dialect vowels described by Katvalyan (2016). However, many speakers also used a vowel system similar to SEA/the colloquial variety of Yerevan. Thus, while the data do not completely align with Hodgson's (2019) remark about urban dialect leveling, they suggest that such a tendency is present among some speakers. As no speaker adhered fully to SEA norms while conversing with the author, speakers who are shifting away from dialect norms could indeed be converging toward the type of colloquial variety mentioned by Hodgson.

In contrast with the back vowels, no demographic variation and very limited metalinguistic commentary was found in relation to [ie] versus [ɛ]. Pillai scores and ED-median values for this comparison were lower overall than for the others, suggesting that speakers may not be maintaining any consistent distinction between them. Examining formant trajectories may be more informative, given that [ie] is supposedly diphthongal. However, as noted above, none of the analyzed tokens seemed obviously diphthongal based on auditory impressions. Some words containing a diphthongized [ie]-like vowel were observed during non-analyzed portions of some interviews. Specifically, diphthongized instances of this vowel were sporadically used by four male participants in the conversational portions of the interview, and one of these participants also diphthongized the vowel in one word elicited in the picture task (which was not included in the analysis because it was intended to elicit consonant and lexical variation, rather than vowel variation). However, it is notable that some of the given words were those in which [ɛ], rather than [ie], is expected (e.g., *kɛs* ['half']; *χɛr* ['father'], elicited in the picture task – compare with SEA *hajr*). The overall sporadic use of the diphthongized vowel and its appearance in words where it is explicitly not expected according to Katvalyan (2016) suggest that the distinction and former distribution of [ie]/[ɛ] is disappearing in Gavaṛ, though the [ie] variant may perhaps still index association with the local dialect.

Speakers' partial adherence to the dialect vowel system conflicts with Katvalyan's statement that there are not phonetic and grammatical differences between

the Bayazet dialect of the late 19th and early 20th centuries and the dialect of today (2016: 19). However, this discrepancy can likely be explained by the differing methods of dialectological and variationist studies. In particular, it is possible that Katvalyan's work seeks out the most conservative speakers – generally "nonmobile, older, rural males" (Chambers and Trudgill 1998: 29). Accordingly, perhaps even those participants of the present study who maintain some dialect vowels would not be considered dialect speakers within Katvalyan's framework.

4.3 Limitations and future directions

4.3.1 Participant recruitment and sample size

Because participants were all recruited from the interviewer's social network, and because almost all participants were recruited together with several family members, we cannot infer that the uncovered gender patterns generalize to the broader population of Gavaṛ. Nevertheless, this method's contribution to obtaining more natural speech may have outweighed this limitation. Given that commentary about changing one's speech when conversing with outsiders was widespread among participants, it is possible that interacting with an unfamiliar interviewer (whom participants may have initially assumed to be non-local, like the author) would have led to increased style-shifting. An additional sampling limitation comes from the fact that many men go to Russia for work in the summer, such that the male participants (who remained in Gavaṛ) may be an even less representative sample of men from Gavaṛ.

Though the sample size of 31 is not particularly small given Gavaṛ's small population, it also poses interpretational challenges. Given Armenia's linguistic heterogeneity, a much larger sample might be needed to make correlational methods maximally informative (see Romaine [1982: 2] regarding difficulties of using Labovian methods in very linguistically diverse settings). The limited sample is particularly relevant for the interpretation of education level, where the division of participants into three groups resulted in small per-group sample sizes.

Despite these challenges, planned future analyses will seek to uncover the influence of social networks and locally defined identity categories, as well as to explore how speakers actively create social meaning through language (see Eckert [2012] regarding these "second wave" and "third wave" methods).

4.3.2 Data collection and scope of analysis

Interviews that explicitly elicit language forms and attitudes may not be optimal for investigating individuals' actual views and language use. Milroy and Milroy (2012: 15)

note that participants in such interviews "tend to report the form they consider to be socially accepted rather than the form they use themselves." The present study suffers from this issue to some degree. For instance, one speaker produced the SEA form *at͡ʃʰkʰ* ('eye') in the picture task, while producing the dialect form *hæʃk* when commenting on her poor vision. Nevertheless, many speakers produced many dialect variants and maintained some dialect vowels. The fact that these results were obtained from the word and picture tasks, which are the most likely to suffer from the "observer's paradox" and thus may be more likely to cause speakers to shift toward SEA, underscores that the unconventional method of explicitly instructing speakers to use their everyday language was likely justified in the local context and may have reduced style-shifting between different parts of the interview. On the other hand, given the finding that the local dialect holds some prestige, it is also possible that some speakers intentionally exaggerated dialect features. Thus, the elicitation method may have skewed the results in either direction. The picture and word tasks resemble those parts of the classic sociolinguistic interview that are assumed to elicit the most formal/standard speech; however, it is important to note that these tasks (especially when carried out with a familiar interviewer in participants' own homes) do not resemble the real-life contexts where SEA is typically used (e.g., educational institutions, news broadcasts). It thus cannot be assumed that participants' increased attention to their speech during these tasks would universally lead to more SEA-like forms.

The reliance of the present analysis solely on data from the picture and word tasks nevertheless limits the interpretation of the results and raises questions about potential style-shifting that may not have been captured. However, preliminary results from analysis of conversational speech suggest that the uncovered gender pattern and lack of clear education patterns are stable across speech contexts, despite possible evidence for varying style-shifting across age groups. An analysis was conducted of two very frequent lexical items – *ʃat* ('many, very'), which is predicted to contain the [ɒ]$_{A}$ vowel in Gavaṛ's dialect and [a] in SEA, and *lav* ('good'), which is predicted to contain [a] in both varieties. 736 tokens of *ʃat* were collected from the conversational portions of the interviews, with a median per-speaker sample size of 20 tokens (minimum = 6; maximum = 54), and 378 tokens of *lav* were collected (median sample size = 10; minimum = 3; maximum = 29).[18] Though the vowel is surrounded by differing places of articulation in these two words, the effects of these differences (e.g. raising of F2 as a result of coarticulation from [ʃ] and lowering of F2 as a result of coarticulation from [v]) are more likely to obscure differences between the two vowel classes than they are to exaggerate them. F1 and F2 were

18 Suffixed and derived forms of both words were included, though they made up only 23/736 tokens for *ʃat* and 28/378 tokens for *lav*.

measured using the same procedure described in Section 2.5, and the data was Nearey1 normalized together with the picture and word data (as this type of normalization requires data covering the entire vowel space). ED-median between the two words was calculated for each speaker before being entered as the dependent variable into a linear regression model of the same type used for the picture/word data (Pillai scores were not calculated due to some speakers' small sample sizes, which would make any measure of cluster overlap highly unreliable). *p*-Values are summarized in Table 6, while the full model output can be found on the project's OSF page.

Gender was found to be a significant predictor of ED-median in this model ($p < 0.008$), as was age ($p < 0.007$). The results correspond with the patterns observed in data visualizations (Figures 11 and 13), and the directionality of the results was such that men and older participants had larger ED-median values, which equates to using more dialect-like variants. Education level was also found to be a significant predictor in the higher versus vocational comparison ($p = 0.031$), though the directionality of the result was opposite of what would generally be expected, with the vocational group using less dialect-like variants. The visualization of this data (Figure 12) does not show a clear pattern and suggests that this effect may be driven by the particularly low ED-median value of Speaker 17. It is also notable that this speaker had a substantially higher ED-median value in the analysis of the picture/word data, which would indicate style-shifting toward more dialect-like variants in those tasks. Given the lack of a clear explanation underlying why members of this particular education group would shift in this way, it is necessary to consider the possibility that this effect – which is unexpected in its directionality, smaller than those found for the other predictors, and does not correspond to a clear visual pattern – may be a result of the limited data set used in this analysis of spontaneous speech, in combination with the small per-group sample sizes of the education level predictor. As noted above, coarticulation from the consonant contexts of the two words used in this analysis is likely to obscure differences between the two vowel

Table 6: Results of linear regression model predicting ED-median for the words *fat* and *lav* in conversational speech. *p*-Values of less than 0.05 are italicized. All values are rounded to three decimal places.

Predictor		***p*-Value**	**Adjusted R-squared**
Gender		*p < 0.008*	0.267
Birth year		*p < 0.007*	
Education level	**Higher vs. vocational**	**Higher vs. secondary**	
	p = 0.031	*p* = 0.353	

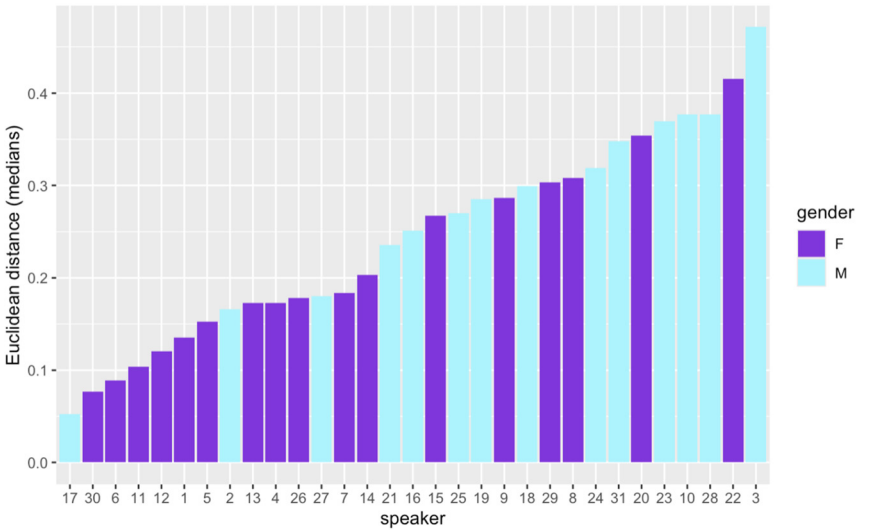

Figure 11: Individual ED-median measurements in normalized units by gender for the words *ʃat* and *lav*. Each bar represents one speaker's ED-median measurement.

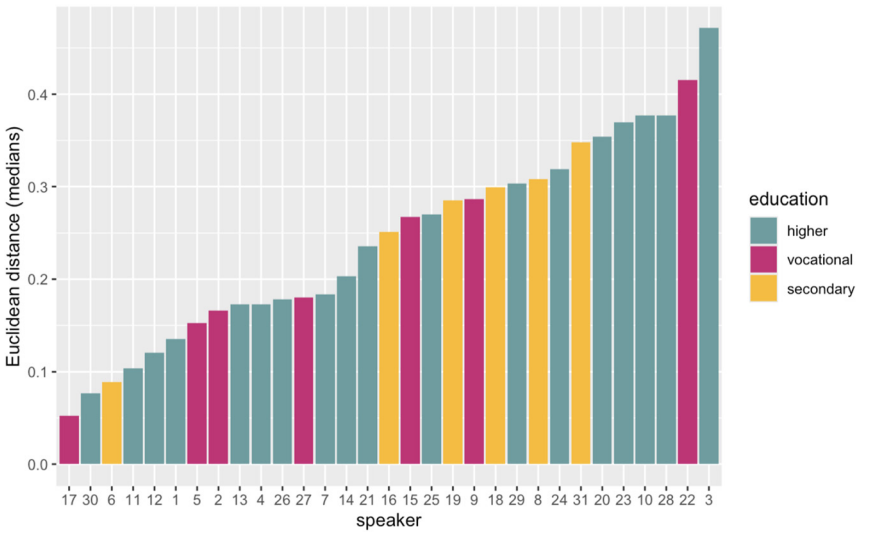

Figure 12: Individual ED-median measurements in normalized units by education level for the words *ʃat* and *lav*. Each bar represents one speaker's ED-median measurement.

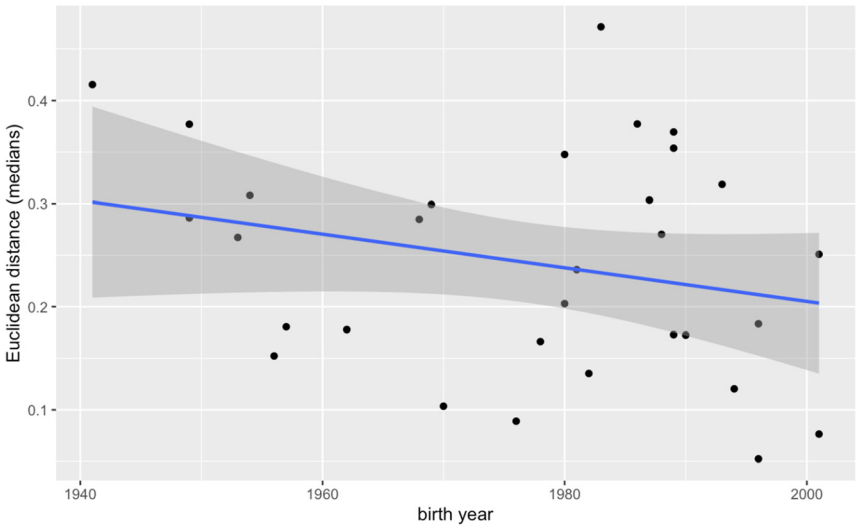

Figure 13: Individual ED-median measurements in normalized units by birth year for the words *fat* and *lav*. Each dot represents one speaker's ED-median measurement.

classes, so some speakers' smaller ED-median values in this analysis could be a byproduct of the use of these particular words. The smallest ED-median values were indeed smaller than in the picture/word analysis, with several speakers having a value below 0.1 units in the spontaneous speech analysis, but no speakers having such values in the picture/word analysis.

This preliminary analysis of conversational speech suggests that at least some of the findings from the analysis of picture and word data are generalizable and stable across multiple speech contexts. The findings support the interpretation that use of dialect vowels in Gavaṛ is currently stratified by gender, while the existence of stratification by education level is dubious. The age effect found in the spontaneous speech – in which older participants used more dialect-like variants – could be interpreted as indicating that older participants were more likely to shift toward SEA variants in the picture and word tasks. This would indeed align with one of the aforementioned possible interpretations of the lack of age patterns in the main analysis, namely that younger speakers might feel less pressured to style-shift in contexts that could be perceived as formal due to ongoing erosion of the diglossic norm. In any case, it seems that the gender effect and lack of clear education effects are robust enough to be detectable despite possible style-shifting, though a fuller analysis of conversational speech should be undertaken in the future to better understand the nature and extent of the style-shifting, including possible

interactions between age and gender. Though it is not possible to know if the same social patterns would be found in non-recorded/non-observed speech, their resistance to (age-related) style-shifting across different interview contexts suggests that these patterns might also be resistant to style-shifting across recorded/observed versus non-recorded/non-observed speech.

4.3.3 Analysis of vowel distinctions

Regarding the problem of determining meaningful merger/distinction thresholds, the thresholds calculated with Stanley and Sneller's (2023) method do not seem closely related to socially meaningful vowel differences. Significant gender variation was observed in cases where most or all speakers had Pillai scores dramatically larger than their thresholds (i.e. in cases where most or all are ostensibly unmerged; see, for example, Figure 14 below and Figure 15 on the project's OSF page.

For the salient [a] versus $[ɒ]_A$ comparison in particular, this result has important implications. Unlike the other vowel pairs, this pair is completely allophonic. As Figure 14 shows, all participants had a Pillai score greatly exceeding their threshold, and examination of individual vowel plots revealed that the differences were in the same direction regardless of size (with $[ɒ]_A$ being more back than [a]). However, based on the author's impressions it seems unlikely that the smallest of these differences are perceptible enough to carry social meaning. This type of pattern was not observed for other vowel pairs.

Notably, Seyfarth and Garellek's (2018) study of Yerevan Armenian found that [a] is more front after voiceless aspirated and breathy-voiced stops than after plain voiceless stops, while Garrett (1998: 17-18) proposed a possible coarticulatory explanation for this. Since the environments found by Seyfarth and Garellek show similarities with those conditioning [a] versus $[ɒ]_A$ in Gavaṛ, it is possible that Gavaṛ's allophony represents an enhanced version of the same phenomenon. Thus, speakers with large differences between [a] and $[ɒ]_A$ could be maintaining the dialect's characteristic allophony, while those with small differences may be exhibiting the type of coarticulation found in Yerevan. It is notable that the gender patterns found for this vowel pair were weaker than those found for the other pairs where gender was a significant predictor, which seems consistent with the idea that the given coarticulatory phenomenon may be preventing a fuller loss of the dialectal allophonic distinction among those speakers who have moved away from the dialect system.

The fact that all participants exhibited significant differences with consistent directionality for [a] versus $[ɒ]_A$ suggests that studying allophonic processes (such as the loss of allophonic distinctions) demands different methods and assumptions in comparison with studying phonemic differences and mergers. This phenomenon's

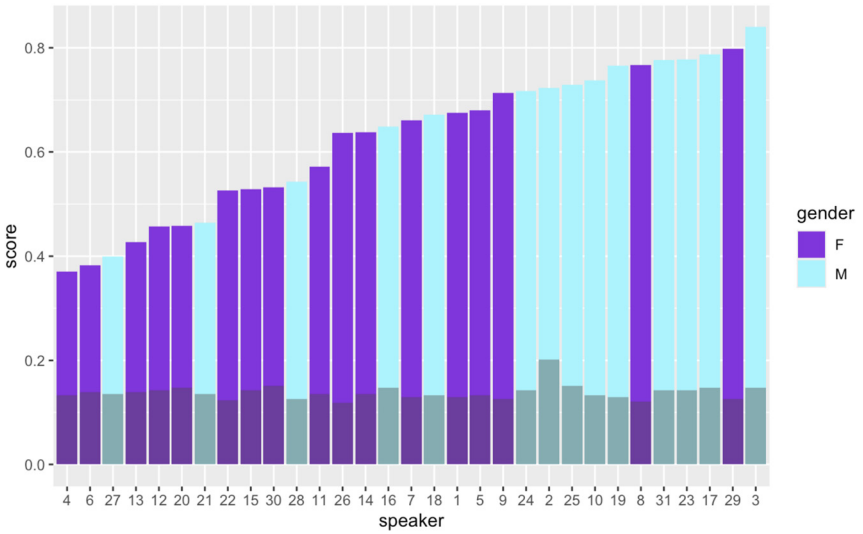

Figure 14: Individual Pillai scores by gender for [a] versus [ɒ]$_A$ with superimposed distinction thresholds. Each bar represents one speaker's Pillai score. A score above the threshold indicates that the two vowel groups would come from an underlyingly unmerged population in 95 % of samples.

potential roots in coarticulation could mean that a small difference that might be perceptible and socially meaningful for a phonemic distinction might be perceived differently or not at all because of perceptual compensation for coarticulation (see Mann [1980]). In other words, the magnitude of differences needed to carry social meaning could be different in phonemic and allophonic cases. This question will be further investigated in a future perception study in Gavaṛ.

4.4 Broader implications

The results suggest that Armenia's environment of diglossia and "language-oriented" prescriptivism facilitates a large degree of heterogeneity of both language varieties and language ideologies. While some of the uncovered linguistic variation correlated with gender, a great deal of heterogeneity was not explainable via any of the examined factors. Participants' metalinguistic commentary, which was generally positive both toward the dialect and toward SEA but also contained implicit or explicit negative attitudes toward these varieties, revealed a similar degree of heterogeneity.

Amidst these conflicting results, one trend nevertheless became clear: participants did not unanimously or unambiguously understand SEA as being the most

prestigious or "correct" variety. Although it has been claimed that language standardization leads to "a firm belief in correctness" of some forms (Milroy 2001: 535), and even that beliefs about incorrectness of colloquial language are more widespread in diglossic societies (De Silva 1982: 103–104), commentary in the present study did not support this. This suggests that post-Soviet prescriptivism and purism have had limited effects on everyday speakers. In particular, the "language-oriented" nature of this prescriptivism and the legacy of Armenian diglossia seem to attenuate pressure to use SEA in everyday speech or to express allegiance to SEA's "correctness." Although speakers do not seem to be converging toward SEA, some may be converging toward an intermediate colloquial variety, as noted above. In contrast, some remain closer to dialect norms. This suggests that when ideological attention at the societal level is directed toward a diglossic "high" variety, heterogeneity of "low" varieties and language attitudes is allowed to flourish.

Regarding the demographic factors explored in this study, education level (as a proxy for social class) has the most interesting implications. Based on the weak links between social status/identity and the diglossic "high" variety alluded to by Coulmas (2005) and Hudson (2002), one could hypothesize that class would be weakly related to language variation in diglossic societies. Similarly, as Strelēvica-Ošiņa (2016: 254) notes that "incorrect" speech is linked to low social status in societies with "human-oriented" but not "language-oriented" prescriptivism, societies with "language-oriented" prescriptivism might exhibit less linguistic variation along this axis. The lack of education-related variation in the present study is consistent with these predictions. This conflicts with studies from other linguistic-ideological environments, such as Labov's studies in New York City, where social class was found to correlate with linguistic variation (see Labov [1972]).

5 Conclusions

This study found that some speakers in Gavaṛ maintain some aspects of the local dialect vowel system as described by Katvalyan (2016). Of the three demographic factors considered in the main analysis, only gender was found to correlate with dialect vowel maintenance, with men adhering more closely to dialect norms. Nevertheless, preliminary examination of spontaneous speech data suggests that age might also correlate with dialect vowel maintenance in contexts less prone to style-shifting, which highlights the need for further analysis of different speech contexts.

The results shed light on Hodgson's (2019) statement about potential dialect leveling in regional Armenian cities, indicating that speakers may have shifted away from local dialects to varying degrees. In the broader context of sociolinguistics, the results have implications for the study of ideologies and linguistic variation.

The Armenian context is characterized by diglossia and by "language-oriented" prescriptivism (a term coined by Strelēvica-Ošiņa [2016]), and dialect vowel maintenance was not found to correlate with education level (a proxy for social class). This result differs from many "first wave" sociolinguistic studies, which found correlations between social class and linguistic variation (see Eckert [2012]).

This discrepancy underscores the importance of considering contexts with different language ideologies in sociolinguistic research, which has largely been skewed toward Western contexts (see Smakman [2015]). Like participants' vowel systems, their metalinguistic commentary was extremely heterogeneous, including largely positive attitudes toward both SEA and the Gavaṛ/Bayazet dialect. In combination with this commentary, the quantitative results suggest that linguistic-ideological environments like Armenia's facilitate preservation of heterogeneity in language use and attitudes. These findings demonstrate that theories about sociolinguistic variation must take into account a broader spectrum of linguistic-ideological landscapes that exist across the globe.

The results have additional implications for the study of social meaning in relation to phenomena with different phonological statuses. In particular, the results pertaining to the [a] versus $[ɒ]_A$ comparison, which is allophonic and potentially rooted in coarticulation, suggest that phonological status may affect the magnitude of difference needed to convey social meaning.

6 Additional materials

Elicitation materials, individual vowel plots, data visualizations, model outputs, and detailed sample size information can be found on the following OSF page: https://osf.io/w8mk6/?view_only=90fb00d8216a4042954c70887d275e86.

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