Zeitschrift für
SPRACHVARIATION
& SOZIOLINGUISTIK
JOURNAL OF LANGUAGE
VARIATION AND SOCIOLINGUISTICS

https://doi.org/10.5282/jlvs/12

How to model and capture dialect-standard repertoires? Global-correlative results from Southern Austria

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Received 22.10.2024
Accepted for publication 10.03.2025
Published 23.06.2025

Abstract

The paper discusses various approaches and (mostly quantitative) methods to analyze dialect-standard repertoires. In the empirical part, the paper employs a global-correlative approach to analyze the (collective) linguistic repertoires of a South Bavarian village called Weissbriach (Carinthia) in Southern Austria. The area, due to its geographic location, exhibits a more linguistically conservative character and has been largely underrepresented in previous research. Using a bottom-up methodology, the study first examines the language use of four individuals based on a single phonetic-phonological variable before applying quantitative methods (including variable analysis, cluster analysis, and correspondence analysis) to extend findings across multiple linguistic variables. This methodological framework enables a systematic identification of variation patterns and contributes to broader discussions on diaglossic and diglossic language models.

The results reveal ongoing processes of language change, particularly regarding the transition from local dialectal features to more regionally widespread variants. The study further highlights significant differences in speech adaptation across formal and informal settings, suggesting a dynamic interplay between dialect and standard language use which confirms a dialect-standard continuum. The findings contribute to the broader field of variationist linguistics by offering a methodological approach that ensures comparability with previous research while providing new insights into an understudied linguistic region.

Keywords: dialect-standard repertoires, diaglossia, Austria

1 Introduction

There is broad consensus that individual speakers systematically adjust their speech depending on factors such as the situation, interlocutor, or conversational context. Most commonly, the term *repertoire* refers to the "linguistic range of an individual or a small group" (Bell 2014: 104), from which they can draw depending on the communicative conditions and the influencing social or individual processes. On a broader scale, Gumperz (1964: 137–138) extended the concept to the collective repertoire of a speech community, the *verbal repertoire*, referring to the sum of linguistic patterns available within a social group or community. In further consequence, the concept of a repertoire can theoretically encompass diatopic, diaphasic, diastratic, and diachronic variation, as well as multiple languages. In the present paper, the focus lies on (verbal) repertoires that range between the two 'extremes' dialect and standard language[1].

In Austria, where a wide range of variation between dialect and standard within the German language is commonly assumed, the question arises as to which model of variation along the dialect-standard axis can be applied (cf. Auer 2005 for an overview of dialect-standard scenarios in Europe). Is it a case of diglossia, where dialect and standard function as systematically and functionally separate entities, or is the linguistic reality of Austria better described by the model of diaglossia, where dialect and standard intertwine, forming either a continuum without clear-cut registers and varieties or a distinct 'intermediate' variety? In the typology of dialect-standard scenarios, it has been discussed whether recent studies on vertical structures in different regions of the German speaking area reflect stages of a continuous diachronic process (cf. Schmidt 1998: 174): According to this perspective, diglossia gradually transitions into diaglossia as dialects evolve into regional varieties with increasing variation, giving rise to 'intermediate' forms between dialect and standard language. As dialects converge towards the standard, a continuum emerges but progressively loses variation as the dialectal foundation weakens. Ultimately, this process culminates in monoglossia, where only a few substandard features persist for symbolic or socio-deictic purposes.

To address such questions, many methods have been developed over the past decades to be able to capture and describe the linguistic repertoires of single individuals, social groups or entire speech communities — the latter being also referred to as *vertical variation space* in German variationist linguistics (cf. Kehrein 2020). In these analyses, the methodological choices are often made implicitly as a consequence of broader theoretical frameworks while actual step-by-step guides remain rare. Typically, considerable effort is invested in the selection and design of elicitation methods to capture dialect-standard variation, while the actual data processing and analysis – the process from raw data to interpretation – is often less highlighted. In particular, the (statistical) integration and visualization of multiple linguistic variables, which might reflect parallel or dissimilar processes of language change (e.g., dialect levelling, standardization etc.), has frequently posed a challenge in the past.

Therefore, the present paper aims to first outline and discuss general methodological steps for analyzing linguistic data on both individual and collective repertoires (cf. Section 2 and Section 3), and then apply selected (global-correlative) methods and techniques in a case study conducted in the state of Carinthia in Southern Austria (cf. Section 4 and Section 5).

2 Approaches to modelling dialect-standard repertoires

Generally, two types of approaches towards analyzing and modelling the language repertoires of individuals can be identified: a qualitative local-conversational approach and a quantitative global-correlative approach (cf. Gilles 2003; Scheutz & Haudum 1982). The local-conversational approach, influenced by Gumperz among others (e.g., Gumperz 1964 or Blom & Gumperz 2000 [1972]), examines linguistic variation within a conversation, focusing on how the change of code serves communicative functions such as stance-taking, conversational structuring or attaching sociosymbolic meaning (cf. Glauninger 2007, 2012; Kaiser 2006; Soukup 2013 for the Austrian context). These functions are mainly identified through contrastive analyses on a micro-level, i.e., the co-occurrence of dialect and standard variants within a word or a prosodic unit are of particular relevance (cf. Lanwer 2015: 20–21; cf. also

Section 3). Thereby, the sequentiality of utterances is important as the participants construct meaning in the specific speech event by reacting to each other (cf. Auer 1986: 113–119; Lanwer 2015: 23, 89–104). In German variationist linguistics, the local-conversational approach (mixed with correlative-quantitative analyses) has been used to identify dialect-standard repertoires by e.g., Auer (1986, 1990), Knöbl (2012), Möller (2006), Lanwer (2015) and Vergeiner (2019).

In contrast, the global-correlative approach, rooted in Labov's work (e.g., 2006 [1966], 2018 [1971], 1972), follows the view that speakers adjust their way of speaking depending on the situation. Hence, by recording a speaker in various situations with different pragmatic-situational parameters (e.g., degree of formality and familiarity between the interlocutors), any adaptations within the language of the speakers can be captured. Consequently, if a speaker is recorded in as many different situations as possible, conclusions about their repertoire or "individual range of possibilities" (Macha 1991) on a macro-level can be drawn. Furthermore, speech dynamics theory assumes that situations represent recurring, conventionalized speech events that can be compared across individuals in correlation with social parameters in order to make general statements about the collective repertoire or vertical spectrum of an entire speech community (cf. Schmidt & Herrgen 2011: 38; Steiner 1994: 184).

A key advantage of global-correlative approaches is their generalizing explanatory power (maybe at the expense of individual or speech-specific particularities) that enables comparisons between social groups, regions or languages and allows for a typology of (collective) dialect-standard scenarios (like the one in Auer 2005 for Europe and Kehrein 2020: 89–92 for Germany). In an ideal diglossic situation (cf. Ferguson 1959) – which has often been proclaimed for the German-speaking part of Switzerland –, speakers would have clear-cut domains for each variety, hence, they would use the dialect in one situation (e.g., in informal and private talks) and the standard language in another (e.g., in formal and official conversations). Switching on a micro-level would serve similar functions as switching between different languages[2] (cf. Christen et al. 2010). In an ideal diaglossic repertoire however, speakers would adapt their speech gradually from one situation to another leading to a mixed 'intermediate' variety[3], often labelled *Umgangssprache* in German or regiolect. This can be conceptualized either as a continuum model with a fluid transition between dialect and standard or as a layered model that defines one or more (rather discrete) varieties in the intermediate section of the repertoire (cf. e.g., Berruto 2004 for the discussion on the discreteness of varieties). An intermediate variety is thus characterised either by the quantitative coexistence of dialectal and standard variants (quantitative diaglossia) or by the presence of distinct regiolectal variants that belong to neither the standard nor the base dialect (qualitative diaglossia, cf. Lenz et al. submitted). This was, for example, observed in Eastern Austria for the variable Middle High German *ei*, where, alongside the dialectal variant /ɔɐ̯/ and the standard variant /aɛ̯/, a third variant /aː/ occurs, which functions as a marker of supraregional yet informal speech (cf. Fanta-Jende 2021)

Although the global-correlative approach is predominantly used in variationist linguistics in German-speaking countries (cf. Scheutz 1985; Lenz 2003; Kehrein 2012; Kaiser & Ender 2013; Limper 2024, among others), there is still a lack of comprehensive data on the Austrian language situation (cf. Section 4.1). For this reason, and to contribute to the question of how to model the dialect-standard dynamics in Austria, the present paper adopts a global-correlative approach, as it allows for comparisons with previous studies while addressing the existing gap and providing a methodological guide for future research. Additionally, while there has been extensive discussion on how data collection methods should be designed to best capture a speaker's linguistic spectrum (cf. Section 4.2), comparatively little attention has been given to contrasting the methods of data processing and analysis. Therefore, the following section will primarily focus on these aspects.

3 Approaches to analyzing the data

When confronted with the actual data analysis, again various choices arise with regard to variable selection and variant determination. The first step of data analysis is typically a variable analysis which revolves around "determining as precisely as possible which variants from two competing linguistic systems stand in opposition to each other and together form a linguistic

variable" (Kehrein 2012: 85, own translation).[4] To do so, in most cases, particularly promising variables are being picked in advance and searched for in various utterances throughout a conversation or a linguistic task so that the distribution of variants can be analyzed, e.g., by reporting frequencies or type/token ratios (cf. e.g., Fanta-Jende 2020 on MHG *ei*).[5] Another option is to just select variables based on their natural appearance in a conversation within a sentence or passage, e.g., the first words of an utterance (cf. Vergeiner 2019). This approach is less restricted to a fixed linguistic level (e.g., only phonetic level) or specific types of variables (e.g., only vocalic or consonantal variables) and can capture variation in its "natural" oral occurrence more effectively by also considering lexicalizations (e.g., the pronunciation of loan words), reductions/shortenings (e.g., *das Mädchen* to '*s Madl* 'the girl', comparable to 'she is' to 'she's' or 'because' to 'coz'), allegro forms (e.g., *gemma* instead of *gehen wir 'let's go',* comparable to 'wanna' instead of 'want to') and so on. The disadvantage, however, is the lack of comparability between situations, especially if they are not spontaneous conversations (but rather controlled data, cf. Section 4.2). Additionally, certain variables might not be considered at all, especially less-frequent variables – which could show a different pattern of cross-situational variation than high-frequent variables or could be significant for determining varieties from a qualitative perspective (cf. Lenz et al. submitted) – may remain undetected.

Such a passage- or sentence-based variable selection is also the method applied by phonetic distance measurements (e.g., Leivenshtein distance) or so-called dialectality measurements (cf. Herrgen & Schmidt 1989, Lameli 2004). In these approaches – which are suitable for phonetic analyses only and cannot account for lexical, morphological or syntactic variation –, comparability is achieved by a normalization of phonetic variants and the deviation of each variant from a defined benchmark. In various studies on dialect-standard repertoires in Germany (e.g., Kehrein 2012, 2020; Vorberger 2019; Limper 2019, 2024), the Northern German pronunciation norm (defined by Siebs 1898) has been selected to serve as a point of reference.

> The individual segments of the transcript are compared intersegmentally with the standard language, and the resulting phonetic differences are included in the measurement. Phonetic differences arise both qualitatively, through deviations in terms of the manner or place of articulation, phonation, lip rounding, or nasality, and quantitatively, through differences in sound length (Lameli 2004: 65, own translation).

Following this concept, different sound processes are considered, e.g. small deviations from the standard norm are generally evaluated by 0.5 points (e.g., [ɛ] vs. [æ] or [iː] vs. [ɪː]) while larger deviations are assigned 1 point (e.g., [ɛ] vs. [a]) and can go up to 3 points (e.g., changes from monophthong to diphthong or vice-versa). The resulting deviation values ("d-values") between the prescriptive norm and the actual pronunciation are added together, allowing an assessment of the average "degree of dialectality" for an utterance, situation, or speaker. Not only is "the entire phonetic segment chain taken into account", but reliable statements about the level of 'dialectality' of an utterance are also possible "from a text length of 150 words (equivalent to about one minute of spoken text)" (Kleiner 2013: 434, own translation). While the method is undoubtedly appealing due to its comparability across different speakers and regions, it also entails the risk of evaluating speakers against a normative threshold which might not be part of their individual repertoire and which they might not aspire to reach. In an attempt to adjust the dialectality measurements for the Austrian case (aligned with the Austrian pronunciation dictionary by Muhr 2007), Kaiser & Ender (2013: 284–290) determined averaged d-values for Bavarian speakers from Austria (Salzburg) ranging from 0.33 to 2.15 depending on the speaker and the situation.[6] Yet, since the calculated outcome is always a numerical and averaged value (between 0 and 3 in the case of dialectality measurements), a general drawback is that the composition of this score (whether it results from a few highly salient markers or a larger number of smaller, less prominent features) is obscured. These quantitative differences suggest differences between speakers and regions even though they might not coincide with what speakers (of different regions and countries) perceive as dialectal in a given situation (cf. e.g., Soukup 2011 or Herrgen 2015).

The latter is also an argument against another approach to analyze the data, namely contrastive analyses. Hereby, all variants are classified into a binary

system, namely whether they correspond to the standard variety or to the nonstandard/dialect variety. In conversational analyses, such contrasts might be useful to deconstruct the sociosymbolic meanings accompanying register choices. In a correlative approach, the result is expressed as a percentage value, indicating how "dialectal" or "non-standard" the utterance or conversation of a speaker turns out to be. The simplification allows, again, for comparing various variables, speakers, situations, regions and correlating them among each other and with other parameters (e.g. age, gender, education), and is sometimes necessary for various follow-up statistical analyses which do not allow for categorical/multinomial variables with three or more categories. Furthermore, gradual transitions expressed by higher or lower frequencies of "dialectal" speech from one situation to another can depict diaglossic repertoires quite clearly. However, those frequencies are widely dependent on the apriori decision whether a variant is allocated to the "standard" or "nonstandard" category and thus strongly disputable. This is particularly the case regarding non-dominant varieties when two opposing standard norms compete with each other (e.g., Lanwermeyer et al. 2019 on the pronunciation of <-ig> in Austria).

More complex methodological approaches target the relationships between variants, i.e. which variants (of the same or a different linguistic level) occur together or show a similar pattern of increase and decline. This allows for a preliminary understanding that a variety is "defined by their independent prosodic-phonological and morpho-syntactic structures" (Schmidt & Herrgen 2011: 67–68), meaning that the combination of multiple variants from generally different linguistic system levels forms a variety. Variants, otherwise, can be understood as the "smallest unit" necessary for the constitution of varieties, serving as "coexisting expression variants" (Steiner 1994: 11) of the same variable, i.e., an overarching semantic, pragmatic, or functional reference concept (cf. also Lenz 2003: 33). Imo & Lanwer (2019: 280–281) have coined the term co-variation for all types of side-by-side occurrences of different variants as clusters or bundles in various situations (macro-level). In contrast, co-occurrences refer to the relations of two (or more) variants within a smaller linguistic unit, e.g., within a word, an utterance or an intonational phrase (IP) (micro-level). The relationship of co-occurrences on a micro-level can be assessed by implicational scales: In prototypic diglossic systems, co-occurrence relationships are typically very strict, meaning that dialect variants do not usually co-occur arbitrarily with standard variants within a word or an utterance, e.g., *ich nicht* 'not me (ST)' versus *i net/nit* 'not me (D)', making combinations such as *i nicht* or *ich net* more unlikely (cf. Martin 1996: 145, 150). Accordingly, a hierarchy of implicational restrictions can be identified indicating which variants are more likely to be used together or avoided (cf. Auer 1997; Scheutz 1999). On the other hand, in diaglossic systems, the more both varieties interfere with one another in a community, the more relaxed the co-occurrence relationships between variants of the two systems tend to become, resulting in more frequent mixings of dialect and standard variants (cf. Schönherr 2016: 340).

At this point, multivariate statistical methods can be fruitful to deal with the complexity regarding the analysis of dialect-standard variation on the macro-level (co-variation), especially when various linguistic variables with multiple variants, a diverse set of speakers from different locations, and several communicative situations etc., are considered. A tried and tested method used in previous variationist linguistic studies on dialect-standard repertoires is the cluster analysis (e.g., Breuer 2021: 257–258; Kallenborn 2019: 374–379; Vorberger 2019: 111–112). Similarities and differences (in terms of relative frequencies) between the data points are calculated in different and multi-step mathematical procedures until groups of statistical similarities, so-called clusters emerge. In the context of capturing dialect-standard repertoires, usually a k-means clustering method is used which relies on the Ward method (with squared Euclidean distance) as calculation procedure. That is "a hierarchically agglomerative algorithm", in which the aim is "[...] on the one hand to obtain clusters that are homogeneous in themselves, which on the other hand exhibit the greatest possible heterogeneity compared to others" (Lenz 2003: 219, own translation).

Similarly, also the correspondence analysis intends to structure the data, to find similarities and deviations in the data, and to make them visually accessible. In contrast to cluster analyses, which show similarities

through a tree structure with branching, a so-called dendrogram, data points in the correspondence analysis are displayed as a point cloud in a 2D space. Similar to factor and principal component analyses, the aim is to define as few dimensions/factors that explain as much variation in the data as possible.[7] The amount of dimensions required can be determined in a first step by calculating a screeplot with the eigenvalues of each dimension – the subsequent visual representation in 2D space, however, only allows a comparison of two dimensions, one is plotted on the X-axis and one on the Y-axis.[8] What the respective dimensions or axes represent is not predetermined, but must be determined by interpretation.

Both multivariate statistical methods have the advantage that they can deal with categorical/multinomial data, i.e. the variant classification of the variable analysis does not have to be abandoned in favor of a binary recoding (e.g., 0 as "standard language(s)" vs. 1 as "non-standard language(s)"). In contrast to the "classic" multiple correspondence analysis, which has been used in particular for categorization issues in lexicology and semantics (cf. Levshina 2015: 373–384), the present study draws on a multiple correspondence analysis modified by Plevoets (2008: 70–72) and applied by Ghyselen (2016) for the Flemish variety spectrum in Ghent/Belgium. This version, referred to by De Sutter et al. (2012) as profile-based correspondence analysis, is modified in a way that all possible relationships are taken into account – both between the variables at hand (linguistic and extralinguistic) as well as between the variables and their (multiple) categories/variants. This way, not only the distribution of variants (e.g., aspirated [p^{h}] vs. not-aspirated [p] in *papa*) is considered (as is the case with cluster analysis) but also whether the variable occurs with high or low frequency in the corpus at all (e.g., general distribution of /p/ vs. /t/). In multiple steps, a complex distance matrix (based on the chi-square metric) is calculated in which the ratios of all rows and columns are crossed repeatedly (cf. Ghyselen et al. 2020: 213–214; Ghyselen 2016: 43). Finally, an additional benefit of the modified (profile-based) correspondence analysis by Plevoets (2008: 70–72) is that regression analyses are integrated in the calculation. So-called confidence ellipses in the 2D plot express the level of resemblance between potential data bundles (clusters) with overlapping ellipses indicating a significant correlation. Hence, this approach not only visualizes the clusters in a 2D space based on individual data points but also represents whether the correlation is significant through confidence ellipses.

Ultimately, quantitative-correlative and qualitative-conversational as well as global or local perspectives are all complementary approaches contributing to describing and modelling dialect-standard repertoires. The choice of one or the other approach or a mix of various methods has to be made with regard to the linguistic object of analysis and the research desiderata identified in a specific community. Broad generalizability and comparability with previous studies make global-correlative approaches particularly valuable and are also the main reason why they have been selected for the following empirical study. Additionally, to address the question whether the dialect-standard scenario in Southern Austria corresponds to a diglossia or diaglossia, it seems to be a suitable approach to focus on the macro-structure of the collective language repertoire. In this context, it is important that the (statistical) methods are able to handle categorical or multinomial variables, as neither the (base) dialect nor the standard language are fixed entities but rather exhibit internal variation, often encompassing multiple coexisting variants whose vertical status cannot be defined beforehand.

The following sections present the exemplary case study conducted in Weissbriach, a village in the Austrian state of Carinthia. In particular, the integration of data and identification of linguistic patterns based on multiple variables have posed challenges in the past, especially when capturing both individual and collective linguistic repertoires. To address these challenges, the present study applies three key global-correlative quantitative methods: type/token ratios, cluster analysis with heat-map visualization, as well as (profile-based) correspondence analysis. This way, the approach can be explained bottom-up, starting with the variation patterns of a single linguistic variable (MHG *œ*) among four speakers of Weissbriach. Based on these findings, quantitative methods (cluster and correspondence analysis) are employed to extend the analysis beyond a single variable, allowing for cross-variable insights into

the overall linguistic spectrum at the community level. Ideally, the methodological framework presented here can be applied to other regions and languages. However, it should be noted that the interpretation of the results and their contextualization within the research field also rely on knowledge of the language area and the specifics of the data.

4 Data sample and methods

In order to investigate the dialect-standard repertoire, I draw on data collected within the framework of the Special Research Program "German in Austria" (https://dioe.at/). The choice of a global-correlative approach was also influenced by the project design and the overall goal to compare the dialect-standard constellations of various regions within Austria (cf. Section 4.1). Further information on the structure of the vertical spectrum in other regions of Austria or regarding other methods (e.g., contrastive analyses) can be found in Fanta-Jende (2023) and Lenz et al. (submitted).

4.1 Research area and participants

According to Lenz (2018: 269), the linguistic situation of German in Austria can be seen as an "ideal research laboratory" for variationist linguistic studies, characterized by a central location in Europe, a historically grown multilingualism in succession of the Austro-Hungarian empire, vibrant dialects in the Alpine landscape and particularly complex language dynamics along the dialect-standard axis. It is therefore surprising that, compared to Germany, empirical studies on language repertoires remain rare in Austria. The existing studies have mostly focused on the more densely populated Central Bavarian dialect region where typically a diaglossic spectrum is assumed (e.g., Scheutz 1985; Kaiser 2022; Vergeiner 2019) and recently on Austria's West (Kaiser & Ender 2013; Schönherr 2016; Lenz et al. submitted). However, variation on dialect-standard repertoires in South Bavarian, particularly the states of Carinthia and Styria, continue to be a research desideratum (exceptions are older works from Moser 1982: 84–85 on South and North Tyrol, and recent results focusing on urban youth language cf. Ziegler 2018 and the city of Graz, e.g. Fischer et al. 2022; Edler & Oberdorfer 2022). The South Bavarian dialect area, is generally said to be linguistically more conservative than Central Bavarian (cf. Scheuringer 1997: 334; Wiesinger 1990: 457), hence, the question remains whether and how levelling processes between dialect and standard are transpiring, and if so, which repertoires and overall spectra of dialect-standard variation can be derived. To tackle the desideratum, I draw on language data from Weissbriach, a small town (about 700 inhabitants) in Austria's most southern state Carinthia. The sample consists of four speakers, two men and two women, one person in each group representing an older (age above 60 years) and a younger generation (age between 18–35 years).

4.2 Materials and data processing

Following the global-correlative approach (cf. Section 2), each speaker was analyzed in six situational-pragmatic tasks with the aim of capturing as broad a section of the individuals' repertoires as possible. Hence, all speakers were recorded in the following situations (cf. Koppensteiner & Lenz 2017 or Fanta-Jende 2023: 83–92 for more information):

- a 60-minute formal interview (INT) conducted by a linguist from the University of Vienna, who was instructed to speak (Austrian) Standard German. The interviewer followed a written questionnaire revolving around the person's language biography, attitudes and conceptualization of the linguistic repertoire in Austria.
- a 60-minute informal conversation among two friends (CaF) of the same town/village aiming at the speakers most 'natural' spontaneous speech. Since the participants were left without a linguistic interviewer, playing cards with potential (language-related) topics were used to ensure that the conversation was kept afloat and that the topics were comparable to the ones from the formal interview.
- two translation tasks in which speakers had to translate a fixed set of 49 sentences (40 "Wenker sentences" and nine additional sentences) from Standard German to dialect and vice-versa. The stimuli were recorded beforehand by an Austrian news broadcaster in case of the standard version and a speaker from the village

under investigation in case of the dialect version. They were orally presented one by one and had to be translated ad-hoc into what the speakers believed was their individually 'best standard' (round I) or 'best dialect' (round II) – the corresponding terminology to describe the speakers 'extremes' was established during the interview.

- two reading tasks aiming at the individuals' reading pronunciation, both in a text passage ("the northwind and the sun" which was introduced by the International Phonetic Association (1949) to illustrate the International Phonetic Alphabet) as well as in a list of isolated words considering minimal pairs (e.g., *Seele* 'soul' vs. *Säle* 'halls, rooms (pl.)'). The methodological aim was to not only reveal variation within the standard pronunciation in Austria but also to derive indirect statements about the speakers' normative beliefs and concepts regarding 'correct' and 'proper' pronunciation (cf. Lanwermeyer et al. 2019 for a broader discussion of this issue and results regarding the pronunciation of the syllable <-ig>).

As a result, around four hours of language material was recorded per speaker. The entire material was transcribed orthographically in the project-specific data base (cf. Korecky-Kröll et al. 2023) and annotated with regard to different linguistic levels. For the present paper, twelve phonetic-phonological variables were selected which – in accordance with the older research literature – are expected to show different types of variation horizontally (across locations, cf. Fanta-Jende 2023) and vertically (across situations). Hence, for the selected location of Weissbriach in Carinthia, a total of 4,672 tokens were analyzed (with averaged 1,168 tokens per speaker) based on the variables shown in Table 1.

Criteria for the variable selection were that the variables had to a) be high-frequented enough to appear in all tasks and situations (no extremely restricted variables), b) represent different types of features (e.g., consonants and vowels but also back and

Table 1: Phonetic-phonological variables and variants used for the empirical study.

Variable	Example word	Variants	n (total)	n (avg. per person)
MHG *ei*	*heiß* 'hot'	[aɛ̯] vs. [æɐ̯] vs. [æː] vs. /aː/	722	181
MHG *â*	*fragen* 'to ask'	/a/ vs. /ɔ/	183	46
MHG *a*	*Wasser* 'water'		403	101
MHG *œ*	*böse* 'bad, evil'	/øː/ vs. /eː, ɛː/ vs. /ɛɐ̯/	128	32
MHG *üe*	*müssen* 'must'	/ʏ, ʏ/ vs. /ɪɐ̯, ɪə̯/	110	28
/l/-vocalization <al>	*alt* 'old'	rounded vowel, vocalized /l/? /al/ vs. /ɔl/ vs. /ɔɛ̯/ vs. /aɛ̯/	233	58
/l/-vocalization (all other contexts)	*Spiel* 'game, play'	rounded vowel, vocalized /l/? e.g., /ɪl/ vs. /ʏl/ vs. /ʏː/ vs. /ɪ/	551	138
/s/-palatalization <rs(t)>	*anders(t)* 'different' *Ferse* 'heel'	/s(t)/ vs. /ʃ(t)/	74	19
/s/-palatalization <st>, <sp>	*Fest* 'feast'	/st, sp/ vs. /ʃt, ʃp/	584	146
/t/-lenition	*Tag* 'day'	[tʰ] vs. [t] vs. [t̬] vs. [d]	1,143	286
/p/-lenition	*Polizist* 'police officer'	[pʰ] vs. [p] vs. [b̥] vs. [b]	269	67
<-ig>	*Honig* 'honey'	/ɪg, ɪk/ vs. /ɪç/ vs. /ɪ/	272	68
Total			**4,672**	1,168

front vowels, etc.), c) be distinguishable by auditory phonetics (as the segmentation and measuring of continuous speech in differing settings (and noise backgrounds)[9] are huge methodological challenges for acoustic analyses), and d) could be found via text search based on the project-specific orthographic transcription. For the following phonetic-phonological analyses, in a first step, all words[10] of a variable were transcribed (according to the IPA) and annotated regarding the selected phenomena. During this process, the variant categories were expanded or adjusted as necessary to accurately reflect the reality of variant usage in the given location. In a second step, lexical particularities, loan words, neologisms, etc. which did not show any variation at all but are very likely to appear in spontaneous conversational data were excluded manually.[11]

5 Results

Following the global-correlative approach, I will first present variable-specific results as an example of how speakers of Weissbriach in South Bavarian Austria vary quantitatively and qualitatively between the variants available to them depending on the situation (type/token ratio). In the course of the cross-variable analyses, the different variation patterns of all twelve variables are re-evaluated in relation to the situation by conducting cluster and correspondence analysis and visualizing the calculated frequencies in form of a heat-map table. For this study, only phonetic-phonological variables were used, the quantitative procedures are suitable nonetheless to include also lexical, morphological or syntactical variables and to discuss the relationship of the linguistic variables for constituting a variety.

5.1 Variable-specific results

As one of the key features for distinguishing between South and Central Bavarian (cf. Schatz 1903: 31; Wiesinger 1990: 449; Pohl 2009: 124; Lenz 2019: 328), the variable MHG *œ* is a good example to demonstrate how and to what extent speakers from Weissbriach vary their way of speaking according to the pragmatic situation. Figure 1 shows the relative and absolute frequencies of the variants for each speaker in each of the five analyzed tasks. The situations are listed according to their hypothesized target register. Unfortunately, the task in which the speakers had to read a text (“Northwind and the Sun”) is not included as there are simply no instances of the given phenomenon in the text.

For the analysis of MHG *œ*, four variants are considered: (1) the variant /ø:/, which corresponds to the standard language norm in pronunciation codices, (2) the monophthongs /e(:)/ and /ɛ(:)/, which is the most wide-spread dialectal variant, particularly in the

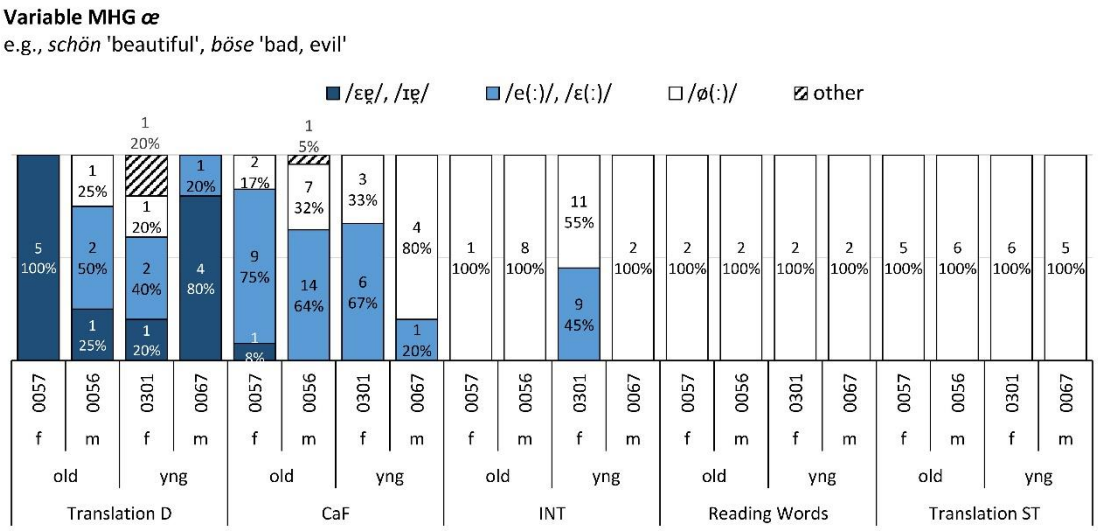


Figure 1: Relative and absolute frequencies of variants for MHG *œ* for four speakers from Weissbriach (Carinthia) in five situations (n=128).

Central Bavarian dialect area, and (3) the "falling diphthong"[12] /ɛɐ̯/, a variant historically connected to South Bavarian (which can also include a more closed [eɐ̯] or [ɪɐ̯] before nasals). Additionally, as with all other variables, there is (4) a residual category "other," which includes substitute realizations with /o/ (e.g., [g̊ʁɔsɐʁɛn] instead of [g̊ʁøːsɐʁɛn] *größeren* 'taller, bigger') or auditorily unclear cases. The latter typically occur when individuals are speaking simultaneously during the free conversations.

Although only a relatively small number of 128 instances are present in the corpus, primarily based on the few items *(wunder)schön* '(very) beautiful', *größer* 'bigger, taller', *höher* 'higher', *böse* 'bad, evil', and *blöd* 'stupid', dialectal restructuring processes within Austria as well as an intriguing cross-situational dynamic can be observed based on this variable. Looking at the translations into dialect as well as the conversation among friends, the diphthongs /ɛɐ̯, ɪɐ̯/ (dark blue in Figure 1) are competing with the Central Bavarian /e(ː)/ and /ɛ(ː)/ monophthongs (light blue). This result not only indicates the diffusion of the monophthong on the areal-horizontal level but also reveals inter-situational differences along the social-vertical axis. Speakers from Weissbriach still produce the diphthong in dialect translation tasks in form of a 'dialect reminiscence' (cf. the analogous trend of /ɔɐ̯/ and /aː/ for MHG *ei* among speakers from Eastern Austria in Fanta-Jende 2021), however, in everyday conversations with friends, /ɛɐ̯/ is replaced by the more widespread /e(ː), ɛ(ː)/ which gradually gives way to the standard language variant /ø/ in the formal interview (ideally observable in speaker 0057).

Conclusively, Figure 1 shows that the use of dialectal features generally declines continuously across the situational tasks until they are almost completely avoided during the interview. Only young speaker 0301 continues using the /e(ː)/ and /ɛ(ː)/ variants (to 45%, 9x) in the formal conversation which might be explained by an interviewer effect.[13] Finally, in the tasks which aim at eliciting the standard language, neither /eː, ɛː/ nor /ɛɐ̯, ɪɐ̯/ variants are used at all.

Strikingly, the intraindividual linguistic patterns do not necessarily coincide with the social groups of the speakers: Against common expectations, the older female as well as the younger male speaker are the ones activating the 'old' diphthong to a much higher degree in the dialect translations than their generational counterparts. At the same time, it is the young man (speaker 0067) who rather employs the standard variant /øː/ in the informal conversations (CaF) than the regiolectal or regional dialectal monophthong /eː, ɛː/.

5.2 Cross-variable results

Similar or entirely different patterns of variation across speakers and settings could be illustrated for each of the selected variables (and can actually be looked up in Fanta-Jende 2023). While MHG *œ* is suitable to describe ongoing processes on the dialectal and intermediate part of the repertoire, other variables (e.g., lenitions of /t/ and /p/ or the pronunciation of <-ig>) might serve better to reflect variation in a standard-near section of the spectrum. Exactly the interplay between different types of variation patterns across speakers and situations is the topic of Section 5.2. All statistical analyses were conducted using the statistical software *R*: The package *WeightedCluster* was employed for the cluster analyses (cf. Studer 2013), and *corregp* was used for the correspondence analyses (cf. Plevoets 2018).

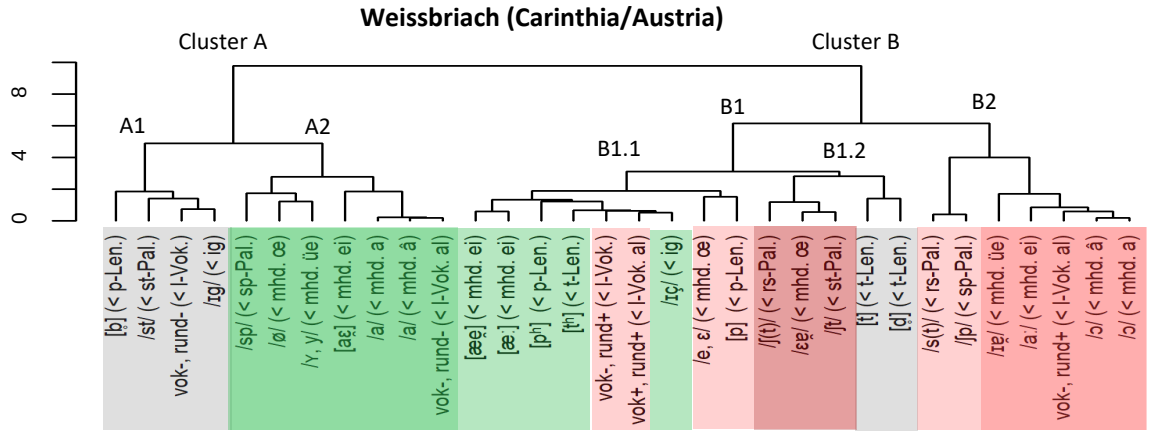
Cluster analysis and heat-map table

As a way to consolidate the data and to cross-analyze multiple variables, speakers and situational contexts, previous studies on dialect-standard repertoires have often relied on cluster analyses (cf. Section 3 for more information). Ideally, similar variation patterns across settings and speakers would cluster together so that based on the emerging clusters of variants, the structure of varieties (e.g., whether they appear as distinct varieties or continua) as well as individual speaker profiles could be revealed (cf. Lenz 2003 as an example). For this matter, also in the present paper, a cluster analysis (following the Ward's method) was conducted (cf. the dendrogram in Figure 2). After several tests, the best model for explainable clusters was based on variant frequencies per setting and individual speaker, the exclusion of variants with less than 5% occurrence (as they would only form their own cluster of residuals), and combined frequencies for the text and word reading tasks (as the differences between them were minimal and some data points were missing).

However, a recurring statistical issue with the cluster analysis is that the clustering tends to reflect the frequency values rather than the cross-situational pattern, i.e. the systematic rise and fall of frequencies. Consequently, low-frequency variants often cluster together simply because of their overall low frequencies (cf. Cluster B1.1 and B1.2 in Figure 2 marked with an asterisk), regardless of whether they actually occur in the same situation or whether they follow a similar variation trend across the situations. An example of this mismatch would be a vocalized and rounded version of <al> as in [ɔɪd̥] *alt* 'old' with the highest frequency of 10% in the conversations among friends (and no occurrence in Translation S or the reading tasks, hence clearly nonstandard) which is clustered together with the fricative pronunciation of <-ig> as in [kønɪç] *König* 'king' (which, at 12%, is almost exclusively limited to the reading of isolated words and thus clearly standard-oriented). Therefore, the cluster analysis functions here only as a preliminary structure for describing the location-specific patterns, the results are further represented and optimized (in terms of the order of the variants) through a heat-map table (cf. Figure 2 and Breuer 2021: 258 for additional information on the visualization technique). This table includes the average frequency values for each variant in each setting per location (excluding the individual speaker). Variants with high frequencies are displayed in darker shades, while cells with lower percentages are shaded from white to light grey. In both graphs, the variants are colored as well with regard to their situational appearance: red shades represent rather dialectal variants (with dark red representing base dialectal features), green shades align with standard features (with light green reflecting variation within the standard language) and gray shades correspond to variants with similar frequencies across all situations.

Following the variable-specific results, it turns out that the 'lower' section[14] of the inter-situational dynamics in Weissbriach are primarily shaped by the contrast between general Bavarian variants and original South Bavarian features. The previously mentioned /ɛɐ̯/ diphthong (<MHG *œ*, cf. Section 5.1) can be considered a prototypical primary variant (according to the variant classification system of Schirmunski 1930; Lenz 2003: 188), with frequencies exceeding 60% in the dialect translations followed by a particularly sharp decline to only 2% in the conversations among friends. Similarly, the palatalization in /rs(t)/ and /st/ contexts, which distinguish Weissbriach as an Upper (Western) Carinthian location, still occasionally appear in conversations among friends, occurring in up to one out of every four instances (24%), but are then entirely avoided in the interview.

A prototypical gradual adaption to the situation can be illustrated by the variant /ɪɐ̯/ for MHG *üe* (e.g., in *müssen* 'must') with averaged values of 95% in the dialect translations, 69% in the conversations among friends and only 35% in the interviews. Opposing these variants are several non-standard features that still show relatively high frequencies even in the formal interviews (most of Cluster B2), including /aː/ (<MHG *ei*, e.g. [haːm] *heim* 'home'), rounded /ɔ/ (<MHG *â* and *a*, e.g. [tɔg̊] *Tag* 'day'), and non-vocalized but rounded variants of <al> (e.g., [ɔɬt] for *alt*). The fact that they do not appear in standard translations or reading tasks suggests that they occupy an intermediate status — perceived as colloquial but not coarse. Additionally, /ʃp/ (<palatalization of /sp/), as in [kʰaʃb̥el] *Kasperl* 'fool, clown' or [fɐhaʃb̥l̩n] *verhaspeln* 'to flounder', could be included in this grouping but is too rare in the present corpus (e.g., no instances of this variation phenomenon in the controlled data). The only 'intermediate' variant of qualitative nature (marked with "!" in Figure 2; cf. Lenz et al. submitted for more information) is /e, ɛ/ (<MHG *œ*), i.e. it serves as idiovarietary feature for a regiolect or regional dialect which can be modelled between the base dialect (represented by /ɛɐ̯/) and the standard language (represented by /ø/). The group of 'intermediate' variants transitions into those that are relatively stable across the situations (most of Cluster A1) and thus might represent 'everyday language', e.g., /ɪg̊/, [b̥], and [d̥], along with a few non-standard variants that consistently show low relative values (e.g., /l/ realizations after rounded vowels, such as in [vʏ] for *(ich) will* '(I) want', or some vocalizations of /l/ in contexts of <al>).



	Weissbriach	Transl. D	CaF	INT	Transl. S	Read Text	Read Words	
B1.1*	[æɐ̯] (< MHG ei)	13,89%	2,26%	0,78%	17,86%	26,67%	20,83%	
	[æː] (< MHG ei)	2,78%	1,13%	3,10%	7,14%	13,33%	12,50%	
	[pʰ] (< p-len.)	0,00%	2,02%	1,49%	25,00%		3,57%	
	[tʰ] (< t-len.)	1,82%	5,33%	3,54%	12,23%	12,50%	7,59%	
	/ɪç/ (< ig)	0,00%	2,70%	2,30%	0,00%	0,00%	11,96%	
A2	[aɛ̯] (< MHG ei)	16,67%	11,58%	9,69%	75,00%	60,00%	66,67%	
	/a/ (< MHG â)	0,00%	5,06%	8,82%	100,00%	100,00%	100,00%	
	/a/ (< MHG a)	2,78%	3,13%	7,78%	97,14%	100,00%	100,00%	
	voc-, round- (< l-voc. al)	0,00%	9,30%	11,36%	100,00%	100,00%	100,00%	
	/sp/ (< sp-pal.)			50,00%			95,00%	
	/ø/ (< MHG œ)	11,11%	34,04%	70,97%	100,00%		100,00%	
	/ʏ, y/ (< MHG üe)	5,00%	26,92%	65,22%	100,00%		100,00%	
A1	/st/ (< st-pal.)	48,98%	85,17%	98,04%	100,00%	100,00%	100,00%	
	voc-, round- (< l-voc.)	83,33%	77,07%	85,53%	100,00%	100,00%	100,00%	
	/ɪg/ (< ig)	100,00%	97,30%	96,55%	100,00%	100,00%	84,78%	
	[b̥] (< p-len.)	75,00%	72,73%	72,39%	75,00%		89,29%	
	[d̥] (< t-len.)	55,45%	54,67%	48,11%	42,45%	50,00%	77,24%	
	[t] (< t-len.)	41,82%	38,33%	47,17%	43,88%	37,50%	14,48%	
	[p] (< p-len.)	25,00%	22,22%	26,12%	0,00%		7,14%	
	voc+, round+ (< l-voc. al)	5,26%	10,47%	6,82%	0,00%	0,00%	0,00%	
	voc-, round+ (< l-voc.)	15,00%	15,92%	11,95%	0,00%	0,00%	0,00%	
	/e, ɛ/ (< MHG œ)	27,78%	63,83%	29,03%	0,00%		0,00%	!
B2	/ʃp/ (< sp-pal.)			50,00%			5,00%	
	/s(t)/ (< rs-pal.)	10,53%	76,47%	100,00%	100,00%			
	/aː/ (< MHG ei)	66,67%	84,18%	86,43%	0,00%	0,00%	0,00%	
	voc-, round+ (< l-voc. al)	94,74%	80,23%	81,82%	0,00%	0,00%	0,00%	
	/ɔ/ (< MHG â)	100,00%	94,94%	91,18%	0,00%	0,00%	0,00%	
	/ɔ/ (< MHG a)	97,22%	96,88%	92,22%	2,86%	0,00%	0,00%	
	/ɪɐ̯/ (< MHG üe)	95,00%	69,23%	34,78%	0,00%		0,00%	
B1.2*	/ʃ(t)/ (< rs-pal.)	89,47%	23,53%	0,00%	0,00%			
	/ʃt/ (< st-pal.)	51,02%	14,83%	1,96%	0,00%	0,00%	0,00%	
	/ɛɐ̯/ (< MHG œ)	61,11%	2,13%	0,00%	0,00%		0,00%	

Figure 2: Cluster analysis based on individual frequencies of variants per situation (Read text and read words combined) and heat-map table with averaged (inter-individual) frequencies of variants per situation (variants with frequencies below 5% were excluded).

Finally, the last category reflects the standard-near section of the spectrum in Weissbriach: Cluster A2 of the cluster analysis encompasses all features that predominate in the standard translations and the reading tasks with at least 60%. Cluster B1.1 incorporates those standard variants which are used less frequently: occurrences of aspirated [tʰ] and [pʰ] (instead of [t] or [d̥] and [p] or [b̥]), slightly monophthongized realizations of /ai/ as [æɛ̯] or [æː] (instead of [aɛ̯] or [aɪ̯]) as well as /ɪç/ instead of /ɪǧ, ɪk/ for <-ig>. Since the numbers are small compared to the counterparts of the same variables, the statement can be derived that speakers from Weissbriach are not overly strongly influenced by (Northern) German pronunciation norms (in cases of /p/, /t/ and <-ig>) nor by a regional standard spreading from Vienna (Viennese Monophthongization in cases of MHG *ei*, cf. Luttenberger & Fanta-Jende 2020).

Multiple correspondence analysis

The multiple correspondence analysis is another statistical method to determine the similarities and distances in the data by correlating each and every data point (cf. Section 3). For this purpose, the raw data (instead of frequency tables with the calculated percentage) is used, i.e. a table in which each instant of an utterance – the actual realization of a linguistic variable – occupies a row (dependent variable) and all additional information (independent variables) such as situation, speaker ID, generation, gender are represented by a column. Again, very rare variants (with less than 5 instances in total) were removed from the corpus as outliers. Figure 3 depicts the calculated results as a point cloud in a 2D plot with varying layers – namely situations as topmost layer and variants as bottom layer – which is structured along the dimensions that explain most of the variance in the dataset (cf. Screeplot in Figure 3).[15] Furthermore, the integrated regression analysis also indicates through overlapping confidence ellipses, whether a significant relationship exists between the situations.

The results for Weissbriach in Figure 3 clearly demonstrate that the situations differ significantly, as each is positioned in a distinct area of the 2D space with no overlapping confidence ellipses. This provides further evidence that the methodological framework, based on various situational contexts, is well-suited to capturing variation along individual dialect-standard repertoires. If these situational contexts were too broad — a concern sometimes raised by proponents of the local-conversational approach — all data points and situation labels (CaF, INT, dialect and standard translations, reading text, and words) would be plotted on top of each other. Consistent with this, the large cluster of ('shared') variants in the center of the graph (cf. zoomed section in Figure 3) indicates that any potential varieties are not distinct but instead share a set of overlapping features.

Accordingly, based on the relative proximities, three core types of registers can be distinguished for the village of Weissbriach in Southern Austria: (1) a 'traditional' dialect which is (re)produced in the dialect translations encompassing (Western) South Bavarian base dialectal features such as the palatalization of /s/ and /ɛɐ̯/ diphthongs for MHG *œ*, (2) an 'everyday' language that is characterized by strong intra-individual variation (cf. Figure 1) and a considerable amount of wide-spread regiolectal or regional dialectal features such as the rounded /ɔ, ɒ/ (>MHG â and a), /ɔl/ (>/l/ vocalization of <al>) and non-aspirated plosive pronunciations ([b̥] or [p] and [d̥] or [t]) which seem to have a high acceptance not only in dialogues among the speakers themselves (in the conversations among friends) but also in formal conversations with a non-local Austrian (interviews), and (3) a standard-near repertoire linked to the translations into standard and reading tasks which is defined by the avoidance of almost all dialectal features. At the same time, the subdivisions within these groups are more pronounced than in the previous results in that also the most 'articulated' pronunciation (Reading Words) significantly differs from the remaining standard-oriented settings. This can likely be explained by the speakers' tendency to occasionally use aspirated [pʰ] and [tʰ] plosives or fricative realizations of the syllable <-ig> (e.g., [kønɪç] *König* 'king'), when reading isolated words.

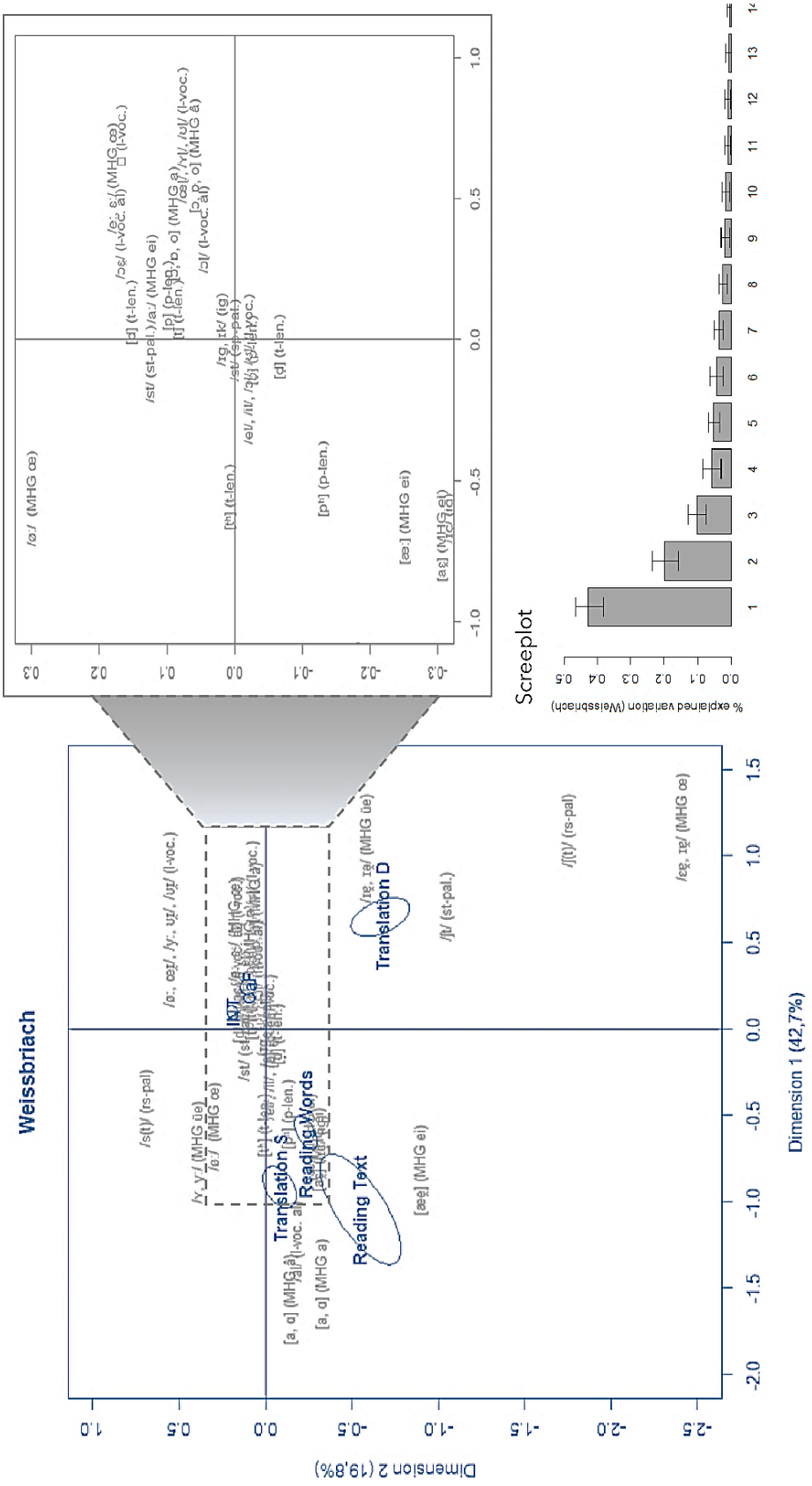


Figure 3: 2D plot for Multiple correspondence analysis with situations as main effect (n=4,632).

Note that the respective dimensions or axes must be determined by interpretation. Accordingly, Dimension 1 (x-axis) which explains 43% of the variance in the data alone is most likely an expression of the quantitative distribution of variants in a given situation. Dimension 2 (y-axis) which adds another 20% (=63% in total) presumably represents either the qualitative choice of a variant in a situation taking the individual speaker into account, or it reflects the methodological effect by considering whether the situation is conversational and free (CaF, INT) or controlled and standardized (dialect and standard translations, reading text and words).

6 Conclusion

The aim of the present paper was to structure and discuss various methods on how to model and analyze dialect-standard repertoires. While local-conversational approaches often focus on the (sociosymbolic) function of dialect-standard variation in a specific micro-level context (a word or an utterance, e.g., within a request or an argument, etc.), correlative-global perspectives primarily investigate language use in relation to extralinguistic factors (such as situations, social groups etc.), operating mostly on the macro-level (e.g., variation between different communicative contexts). In the present paper, methods of data analysis strongly connected to the global-correlative approach (such as type/token ratios, dialectality measurements, contrastive analyses, cluster and correspondence analysis) have been discussed, and selected methods and visualizations (type/token ratios, cluster analyses with heat-maps, correspondence analysis) have been demonstrated based on empirical material.

The empirical study presented deals with the (collective) dialect-standard repertoire in the South Bavarian dialect area of Austria. This raises the research question of how the dialect-standard spectrum manifests in a rural region that, due to its geographical location, exhibits a more linguistically conservative character and for which little data has been available to date. For this purpose, the repertoires of four speakers from Weissbriach (Carinthia) were recorded in six sociopragmatic situations (two conversations, dialect/standard translation assignments and two reading tasks). The analysis of a single phonetic-phonological variable (MHG *œ*) revealed current changes along the individuals' repertoires. Moreover, it could be shown that descriptive statistics, such as cluster and correspondence analyses, are fruitful tools to identify similarities and distances in the data across multiple (linguistic and extralinguistic) variables. While the results are actually comparable between both methods, the correspondence analyses have the advantage of providing a clearer visual representation of how variants with different variation patterns cluster across the vertical space.

For the Austrian location, the interpretation can be derived that the speakers from Weissbriach indeed vary significantly in their way of speaking according to the situation. The data show ongoing processes of language change in that local variants (e.g., South Bavarian /ɛe̯/ for MHG *œ*) are being replaced by more widespread variants (e.g, /e(ː), ɛ(ː)/, cf. variable-specific results on MHG *œ*). These areal-horizontal processes are reflected vertically insofar as local variants are now only used in dialect translations (as a form of dialect reminiscence), while the more widespread variants are used in everyday conversations with acquaintances and friends from the same location. The cross-variable results reveal that the speakers from Weissbriach adjust their register use both quantitatively (by a gradual increase or decrease of dialectal or regiolectal variants) and qualitatively (by using specific variants which occupy an 'intermediate' status) according to the situation. Hence, the speakers position themselves within the vertical space (cf. Kehrein 2020) primarily by using or avoiding the traditional Southern Bavarian base dialect, as well as by shifting to a more standard-oriented register in the standard translations and reading tasks. Although non-standard and dialectal features at the phonetic-phonological level are still frequently used in the formal interview, a significant difference can be observed compared to the informal conversation among friends. Based on the phenomena discussed, this supports the hypothesis that dialect and standard in South Bavarian Weissbriach do not represent separate systems; rather, everyday speech is characterized by a diasystem that incorporates both dialectal and standard features. While the "intermediate" range may still be somewhat more dialectal than in Eastern Austria, where the continuum is particularly gradual and fluid (cf. Fanta-

Jende 2023), the results still support the notion of diaglossia.

Future studies will not only have to include additional variables (from other linguistic levels) but will also have to investigate how the analyzed variants are used within a conversation, how their implicational hierarchy is defined and how they match with the speakers' perceptions of the concepts 'dialectal', 'intermediate' and 'standard'.

Acknowledgements

The research in the present article was conducted within the framework of the Special Research Program (SFB) "German in Austria. Variation – Contact – Perception" (Project Part 03 "Language Repertoires and Variety Spectra"), FWF ID: SFB F 60, Grant DOI: 10.55776/F60). I would like to thank our former student assistant Barbara Binder for her work during data transcriptions, as well as the two anonymous reviewers and the editors for their valuable feedback. Additionally, I would like to express my sincere thanks to Anne-Sophie Ghyselen for providing the *R* code for her correspondence analyses (cf. Ghyselen 2016 and Ghyselen et al. 2020). The code was slightly adapted for my own data.

Author Statement

JFJ carried out the data preparation and analysis, as well as the concept, visualizations, writing and revision of the manuscript.

Data availability

The data supporting the reported results are not published alongside this paper. However, within the framework of the project "German in Austria", a platform with selected data and results will be made available. For further inquiries or early access, please contact the author.

Endnotes

1 The present concept of dialect follows the tradition of German philology where dialect is often viewed as a historically-grown and geographically limited – local or regional – variety (also style or register) of a language that might differ from the standard language in terms of phonology, morphology, syntax, and lexicon (cf. Schmidt & Herrgen 2011: 59, 66).

2 The terms mixing, switching and shifting are used synonymously in this paper, as variation on the micro-level is not the main focus. Note that different concepts might be associated, e.g., in German linguistic literature (cf. Gilles 2003: 209; Kaiser 2006: 278) shifting often describes a gradual transition between codes while switching is used for an abrupt change. However, in multilingual contact situations they can be used to differentiate between internal and external multilingualism, e.g. mixing/switching between languages versus inter-varietal or stylistic shifting (cf. Hernández Campoy 2016: 43–44).

3 The notion of 'mixing' two varieties is particularly present when looking at the terminology used by Austrian laypeople describing their own way of speaking during interviews: *dazwischen* 'inbetween', *Mischmasch* 'mishmash' or as a mixture of dialect and German (cf. Koppensteiner & Lenz 2017: 67; Fanta-Jende 2023: 269).

4 Note that the distinction of variables might be easier in terms of phonetic-phonological or morphological variation. In the case of syntax of German, there are some recent discussions on how to define a syntactic variable (cf. Kallenborn 2019: 50–62; Breuer 2021: 72–82)

5 In terms of vocalic variation in German dialects, the variable selection is usually not based on the sound system of Standard German but on the historic sound system of Middle High German (MHG) as it is better suited for comparing German dialects. For consonants, Standard German serves as reference system in this paper (cf. Section 4.2).

6 The following values can serve as reference points: Lameli (2004) analyzed ARD news presenters (from the years 1960 and 2001), who reached values of 0.025 and 0.029. For the participants from West Central German Wittlich (cf. Lenz 2003) the following average D-values per speech style were calculated: regional accent: 0.30; intermediate regiolect: 0.63; lower regiolect: 0.82; regional dialect: 1.41, and base dialect: 1.87 (cf. Kehrein 2012: 92). Finally, Limper (2019: 161) calculated significantly higher d-values for two older Central Bavarian speakers from Munich and Trostberg (South Germany) as they were also measured by the northern German pronunciation norm: standard translations and reading pronunciation lie between 1 and 1.5, interviews, informal conversations with friends, and dialect translations range between 2 and 3.

7 Unlike principal component analysis, correspondence analysis appears to handle categorical variables effectively, and unlike factor analysis, unexplained variation that does not load onto the main factors remains significant and is not excluded from further analysis as 'random noise'. Cf. Jenset & McGillivray (2012) for a comparison of factor analysis, principal component analysis, and correspondence analysis in studies on corpus linguistics.

8 When interpreting the data, it should be noted that the coordinate system for each axis or dimension is calculated from the extreme and average values of a given variable and can be different on each axis (e.g. number of data points per speaker on x-axis and age between min. 18 and max. 75 years on y-axis). In the case of simple correspondence analyses, the distance is not Euclidean, i.e. distances between two points on the x-axis do not have to correspond to the (theoretical) distances on the y-axis (cf. Levshina 2015: 371). In the interpretation it is therefore not the factual (measured) distances that are relevant, but the dimension-specific relational ones (which points cluster together).

9 The data was collected in the participants' homes with high-end microphones but no precautions in terms of noise reduction, thus, all kinds of background noises are part of the audio data (e.g., traffic noise, lawn mower, dish washer, coffee maker, etc.)

10 In case of the conversational data and high-frequented variables, the word count was capped at 75-150 words per speaker which were taken from the beginning, the middle and the end of the conversation to account for potential accommodation processes. The only exception is the variable /t/- and /p/-lenition which was also investigated by Tavernier (2021) with regard to standard pronunciation, hence all occurrences were transcribed.

11 Lexical particularities can occur for several reasons, e.g., in the case of MHG /ei/, lexemes connected historically to domains such as church and bible translation, etc. – so called 'sacral words' like *heilig* 'sacred', *Fleisch* 'flesh, meat' (cf. Fanta-Jende 2020: 230-232 for a list and discussion) – have undergone individual processes of language change. Thus, in most Bavarian dialects, they are not transferrable into the local dialect (e.g., *Fleisch* remains [flaʂʃ] and is never realized as [flɔɐ̯ʃ] or [flaːʃ] in our corpus). Like with co-occurrence restrictions (cf. Section 3), the intuitive knowledge of lexical particularities is strongly connected to the general proficiency of the dialect variety of a community and/or might differ between communities/regions (e.g., Tyroleans using [ɔɐ̯] in cases of *meistens* 'mostly', Carinthians using [aː] in cases of *beide* 'both', these are dialectalizations which are not used in these words in Lower Austria, even though both phonological variants exist).

12 "Falling" refers to the height of the tongue which drops in the transition from /ɛ/ to /ɐ/ (cf. Wiesinger 1970: 217).

13 The interviews have been conducted by a researcher from the same state (Carinthia) as the interviewees. As the interviewer was also female and in the same age group as participant 0301, the methodologically conceptualized distance and formality between the interviewer and interviewee may not have been maintained throughout the interview leading to more dialectal speech on the part of participant 0301.

14 In many schematic representations of the vertical dialect-standard axis, dialect is positioned "at the bottom" and the standard language "at the top". This is not meant to convey hierarchy or prestige, rather, it serves to provide a simplified and abstract modelling of multidimensionality (especially when repertoires of different regions are compared) within the context of the research literature (cf. also Auer 2005: 33).

15 Unfortunately, it was not possible to plot the dependent variable (variants) directly in the same diagram as the independent variable (situations), so the two plots were calculated separately and then overlaid using an image editing program.

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