Presentation¹

Reflections on Tradition and Technology: Perspectives from Linguistic Variation Studies in the 21st Century

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The studies of linguistic variation have, each year, incorporated new technologies to process and map the collected data. This is not a recent practice; many areas within language studies develop or utilize technological tools, now essential for the processing or presentation of data.

Dialectology, the central focus of this edition, now utilizes technologies that enhance the appearance of cartography and/or the fidelity of data. From the seminal milestone of the Linguistic Atlas of France, with its initial linguistic mapping methods, to the development of dialectometric maps such as DiaTech (Aurrekoetxea *et al.*, 2013) and Visual DialectoMetry (Goebl, 2022), many technologies have contributed to the gradual innovation in the analysis and presentation of variation data collected by researchers.

It is within the perspective of historiography and innovation in atlas-making techniques that Aguilera, a researcher at the State University of Londrina, and Mota, from the Federal University of Bahia, present their article entitled *A walk through the history of Geolinguistics in Brazil: from the artisanal to the technological.* The authors trace the history of Brazilian Geolinguistics, inaugurated by the Preliminary Atlas of Bahian Speech – APFB (Rossi, 1963), considered "the first concrete step in the field of Geolinguistics" (Cardoso; Mota, 2013, p. 122). This method of presenting linguistic data continued its path in national lands and reached its peak with the establishment of the Linguistic Atlas of Brazil Project – ALiB, in 1996 (Cardoso, 2006).

The leap in quality of atlases, regarding data collection methodology and its presentation on maps, occurred within the first 50 years of the field in Brazil, and works within this diatopic perspective marked the third phase of dialectal studies (Mota; Cardoso, 2006), inaugurating the beginning of systematic studies in this field. In this phase, the monodimensional atlases that encompassed the territories of Bahia, Minas Gerais, and Paraíba respectively, were included: the Preliminary Atlas of Bahian Speech, Sketch of an Atlas of Minas Gerais - EALMG (Ribeiro *et al.*, 1977), and Linguistic Atlas of Paraíba - ALPB (Aragão; Menezes, 1984).

Although in this third phase, the volumes of the atlases of Sergipe and Paraná (and their second volumes)², being bidimensional in nature as they include, in addition to the diatopic dimension, the diasexual dimension, represent the first step towards the adoption of the vertical layer advocated by Thun (1997).

The Linguistic and Ethnographic Atlas of the Southern Region of Brazil - ALERS (Koch *et al.*, 2002; Altenhofen and Klassmann, 2011), which records the speech of Paraná, Santa Catarina, and Rio Grande do Sul, launched after the milestone

We highlight that this number is from December 2023, but was completed in June 2024.

The Linguistic Atlas of Sergipe - ALS II (Cardoso, 2002, 2005) and the Linguistic Atlas of Paraná II - ALPR II (Altino, 2007) continued the mapping of data collected during the first volume.

of ALiB, opted to explore the nature of areality. Its authors state that this decision is centered on the emphasis given to the diatopic dimension, "thus privileging the delimitation of linguistic areas that indicate trends of variation in Portuguese spoken in the area under study. From this purpose stems the entire research methodology, of a monodimensional nature [...]³" (Altenhofen; Klassmann, 2011, p. 26).

With the advent of the ALiB Project in 1996, the fourth phase of Brazilian Dialectology was established. According to Mota and Cardoso,

From a methodological point of view, this new phase coincides with the incorporation of principles implemented by Sociolinguistics from the 1960s onwards, abandoning the monodimensional view - monostratic, monogenerational, monogeneric, monophasic, etc. - which predominated in geolinguistics now labeled as "traditional" (Mota; Cardoso, 2006, p. 21)⁴.

Atlas publications after the implementation of the ALiB project, mapping not only the diatopic scope but also variables that may facilitate the visualization of variation, are part of this group. In the multidimensional era of linguistic variation studies, as Oliveira (2006) states,

The extensive nature of Dialectology, in the sense that it predominantly encompasses a spatial, diatopic scope, to which systematic incursions of sociolinguistic nature - stratal, age-based, situational - can and should be added, guarantees its relevance and ensures the importance of expanding studies in this field, at least until the entire Brazilian territory is described (Oliveira, 2006, p. 175)⁵.

In this phase, we have the Linguistic Atlas of Mato Grosso do Sul - ALMS (Oliveira, 2007), which investigates the speech of individuals from southern Mato Grosso in 32 localities, stratified by gender, age, and education level, and the Linguistic Atlas of Ceará - ALECE (Bessa, 2011), which visited 70 localities and interviewed four informants in each one, also stratified by gender, age, and education level. These atlases, discussed in the article that initiates this issue of the journal, serve as examples of the expansion of Geolinguistics in the country, in which Aguilera and Mota demonstrate the feasibilities, difficulties, and possibilities of geolinguistic work in Brazil, thus fulfilling defined objectives.

There are other geolinguistic studies already completed, others in different stages of implementation, or those yet to be organized, which carry the mark of multidimensionality that can further integrate technology, as is the case with the Sound

In the original: Do ponto de vista metodológico, essa nova fase coincide com a incorporação dos princípios implementados pela Sociolinguística a partir da década de 60 do século passado, abandonando-se a visão monodimensional – monoestrática, monogeracional, monogenérica, monofásica, etc. – que predominou na geolinguística hoje rotulada de "tradicional" (Mota; Cardoso 2006, p. 21).

In the original: privilegiando desta forma a delimitação de áreas linguísticas que apontassem tendências de variação do português falado na área em estudo. Desse propósito advém toda a metodologia da pesquisa, de ordem monodimensional [...]

In the original: O caráter extensivo da Dialetologia, no sentido de que tem predominantemente uma abrangência espacial, diatópica, à qual se podem e devem agregar incursões sistemáticas de natureza sociolingüístico - estráticas, etárias, diafásicas - garante a sua atualidade e assegura a importância da expansão dos estudos nesse campo, pelo menos até que se tenha descrito todo o território brasileiro (Oliveira, 2006, p. 175).

Linguistic Atlas of Pará - ALISPA (Razky, 2004), providing the consultant with the reality of language, the recording of interaction now of the interview.

The second article, authored by Romano, a researcher at the Federal University of Santa Catarina, and Robbin, a doctoral student in the Graduate Program in Literature at the Federal University of Rio Grande do Sul, entitled *Recartography of Linguistic Atlases of the Southern Region of Brazil: ALERS and ALPR*, seeks to highlight the contributions that linguistic data processing software can offer to Geolinguistics.

The tool used by the authors for recartography was developed specifically for this purpose. In other words, the software was designed to meet the demand for mapping linguistic records obtained by researchers.

SGVCLin is a Software for Generating and Visualizing Linguistic Charts - version 1.1 (Romano; Seabra; Oliveira, 2014), which enables the creation of linguistic charts and the generation of various reports, facilitating the work of dialectologists in presenting collected data and has been used in numerous studies, from state atlases to those of small domains. The adoption of this technology has redefined the creation of charts, replacing the sometimes-manual task or one aided by drawing tools with computerized issuance of charts and frequency and record reports.

According to Romano (2014), a co-author of the software and the article being discussed here, the tool allows the generation of: a) purely diatopic charts (monodimensional) that allow, for example, checking the presence/absence of a particular variant in a demarcated territorial area; b) charts in which two variables can be displayed (bidimensional), with the selection of variables left to the author's discretion (for example, diatopic and diasexual or diatopic and diagenerational, etc.); c) charts that include more than two variables (multidimensional), also selected by the author; d) finally, synthetic charts, which, in general, allow the visualization of isogloss lines in the studied territory. The representation of variation in the charts of this software depends on the modality - mono, bi, multidimensional, or synthetic - offering a range of possibilities for the linguistic photograph intended.

The article by Romano and Robbin empirically presents the software and seeks to recartograph some charts from the two volumes of ALERS (Koch *et al.*, 2002; Altenhofen and Klassmann, 2011) and revisits the charts of Altino (2022), who reissued phonetic charts from ALPR (Aguilera, 1994), ALPR II (Altino, 2007), and mapped unpublished data from the ALiB database. The authors present the contributions of the tool and the considerable advancements it allows in the presentation of variant mapping, in this case, based on data from the Southern Region.

An example of the use of the technological resource created by Romano, Seabra, and Oliveira (2014) is the third article in the collection, authored by Isquerdo and Fernandes, researchers at the Federal University of Mato Grosso do Sul. In this work, titled *Appellations for 'daily worker': marks of rurality in the lexicon of speakers in the Southeast Region of Brazil*, the authors investigate traces of rurality in the vocabulary recorded by informants from the interior of Minas Gerais, Espírito Santo, Rio de Janeiro, and São Paulo.

The article presents data discussed in other academic works for the responses obtained to question 61 of the Semantic-Lexical Questionnaire of ALiB, semantic area of Agricultural Activities (National Committee, 2001, p. 26), for the denomination of the worker paid per day, and discusses them in light of Geolinguistics, Rural Sociology (Sorokin; Zimmerman; Galpin, 1981), and Brazilian cultural division (Diégues Júnior, 1960), arriving at Bortoni-Ricardo's Educational Sociolinguistics (2005). These seemingly distant theories align to consolidate analyses of the vocabulary recorded in the interviews.

According to the authors, this approach to vocabulary treatment was adopted because in a society that experienced rural exodus so strongly, from the second half of the last century onwards, understanding the meaning of rurality because of territorial occupation seems insufficient. It is likely that this migratory movement has dissolved the rural/urban polarization to compose a framework of continuum so well defined and discussed by Bortoni-Ricardo (2005) and its consequences for schooling.

In this scenario, the theories evoked by Isquerdo and Fernandes prove to be efficient as they combine knowledge from related areas - dialectology, sociology, culture, and educational sociolinguistics - to compose the mosaic of language and its representativeness in society. Reconciling the theoretical-methodological instruments of Geolinguistics and Rural Sociology made it possible to unveil the presence of possible traits of rurality and conservatism in the vocabulary repertoire of speakers, presented in linguistic letters elaborated in the SGVCLin software, reaffirming technological advancement in the field.

The fourth article of this edition, entitled *Mapping the variation of /R/ in internal syllable coda in the Southeast Region: contributions of QGIS*, was elaborated by Silva, a researcher at the Federal University of Pampa. A product derived from the author's doctoral thesis, which adopts the Geography tool for presenting geolinguistic data.

QGIS is a multi-platform, meaning a hardware, software, georeferenced information system, among other attributes, enabling visualization, editing, and analysis of geographic information data. The GIS application (Geographic Information System) is an Open Source platform developed for creating maps from raster⁶ and/or vector layers. It allows data storage in different formats, such as points, lines, or polygons, facilitating the construction of detailed and customized maps.

The article focuses on Geolinguistics, presenting the diatopic distribution of the retroflex vibrants through cartography performed with the mentioned software. The data allow verification of the phonetic phenomenon's vitality and, thus, refute the prediction made by Amaral ([1920] 1976) of its decrease and possible disappearance. It is worth returning to the introduction of his work, when he announced that the caipira dialect was doomed to disappear. Without a doubt, this was not the case with retroflex /R/, an unmistakable mark of the spoken dialect, previously, in part of São Paulo and Paraná, today, according to ALiB data, for the capitals, recorded in letters F04 C3, F04 C4 and F04 C6 (Cardoso *et al.*, 2014, p. 103, 105. 109), spread across the South, Central-West Regions and part of São Paulo. This irradiation may be greater as we move forward with the publication of data from informants from the interior.

Aguilera (2020), in addition to the studies referenced by Silva, revisits this "prediction" by Amaral and discusses it considering data from ALPR (Aguilera, 1994), ALERS (Altenhofen; Klassmann, 2011), ALMS (Oliveira, 2007), and ALiB. The conclusions of the work demonstrate the maintenance and expansion of the retroflex space, affirming that "among the three phenomena addressed, the retroflex /R/, or 'caipira,' offers the greatest resistance in the area that historically was traversed and occupied by Paulista bandeirantes and drovers during Colonial Brazil" (Aguilera, 2020, p. 188).

In the maps presented by Silva, it is possible to expand this horizon of the retroflex /R/'s reach, verify its persistence, and attest to the effectiveness of the QGIS

As described in Gazaba (2024, p.18) "la explicación más simple que podemos oferecer para el formato ráster es similar a la de una imagen como lo es una fotografía digital común y corriente. Una imagen digitial es una matriz rectangular de píxeles, donde cada uno de ellos tiene un valor, que posteriormente pude representarse mediante um color."

tool, viable for Geolinguistics' purposes, which increasingly requires a detailed, understandable, and computerized representation of data.

Dialetometric Study of the Semantic and lexical of the Great ABC Region (ASL-ABC), by Cristianini, a researcher at the Federal University of Uberlândia, is the fifth article in this edition and presents itself as a model of Dialetometry studies.

Contemporary with the first Brazilian linguistic atlas, this area of study consists of applying quantitative methods to the study of dialects, allowing the maximum use of information contained in a linguistic atlas and thereby making evident patterns and grouping structures hidden from direct observation. Brissos e Saramago (2019, p. 353) provide an operational definition of the discipline, which involves

[...] a quantitative approach to the study of dialects with a focus on metrics, i.e., on the measurement of dialectal variation phenomena through exact and fully comparable procedures, which import numerical or taxonomic classification. mathematical-statistical calculations elaborated on the data matrix obtained from the mentioned procedures and cartographically (spatializes) the results of these calculations, leaving to the linguist, with the freedom that statistics confer, the final task of interpreting the geolinguistic framework before them⁷.

The technological and applied nature of Dialetometry has led to a growing methodological diversification, especially leveraged by the increasing use of computer programs specially created for this purpose, such as the aforementioned VDM and DiaTech or the increasingly used Gabmap (Nerbonne, 2011). As Aurrekoetxea (2019, p. 20) notes, all this technology allows for the inclusion of greater "possibilities of analysis and using various units of distance, with different classification algorithms, etc. There has been a change from a dialectology based on some resources to a dialectology that deals with a large amount of data⁸."

An expanding area, Dialetometry has been gaining followers in Brazilian lands as well, and the article signed by Cristianini adopts this theoretical-methodological framework, with the assistance of the DiaTech software, for the analysis of data recorded in the ASL-ABC.

The information technology involving verbal language is becoming increasingly necessary in our lives. Search engines for website searches, automatic translators, database queries are constants in academia and even in everyday life. It is within this perspective that the sixth article, titled *The use of computational techniques in the Dialetology and Lexicography field: XML and X-Query*, by Jorge Júnior, a researcher at the Federal University of Mato Grosso do Sul, is inserted.

A result of research in Natural Language Processing (NLP) dedicated to solving computational linguistic problems, such as optimizing the relationships between users and machines (Manfio, 2014), this article aims to demonstrate and reflect on the

In the original: uma abordagem quantitativa ao estudo dos dialetos com um enfoque na métrica, i.e. na mensuração dos fenómenos de variação dialetal por meio de procedimentos exatos e totalmente comparáveis, os quais importa da classificação numérica ou taxonómica. Aplica cálculos matemático-estatísticos elaborados à matriz de dados obtida a partir dos procedimentos referidos e representa cartograficamente (espacializa) os resultados desses cálculos, cabendo ao linguista, com a liberdade que a estatística confere, a tarefa final de interpretação do quadro geolinguístico que tem à frente.

In the original: "incluyendo más posibilidades de análisis y utilizando diversas unidades de distancia, con diferentes algoritmos de clasificación, etc. Se ha pasado de una dialectología basada en unos pocos rasgos a una dialectología que maneja gran cantidad de datos"

use of the Extensible Markup Language (XML) and X-Query expressions as computational techniques for the treatment of dialectal and lexicographic data.

The author develops a prototype of an electronic dialectal vocabulary from the data recorded within the North Region for ALiB. In this way, they seek to combine Geolinguistics, Lexicography, and Computational Linguistics to retrieve information from the XML database, analyzing issues of interest to Dialetology through the selection of data favored by diatopic, diassexual, and diagerational variables.

Elaborated respecting the methodologies for composing the entry, the dialectal vocabulary provides the lexicon registered in the North Region, besides discussing the importance of knowing and making use of accessible technologies in other areas of knowledge.

The focus of the seventh article is Sociolinguistics. Titled *Introduction to the R package Ordinal for sociolinguistic evaluation analyzes*, Souza Guerreiro, Sales, and Batista da Silveira, researchers at the Federal University of Rio de Janeiro, investigate the evaluation of speakers from Rio de Janeiro regarding the phenomenon of pretonic raising, as in "escola"/"iscola", "senhor"/"sinhor", "serviço"/"sirviço", etc.

Sociolinguistics has long integrated technology into its practices, employing statistical tools in its research. The sociolinguistic approach is crucial for identifying the conditions and contexts, both linguistic and extralinguistic, in which variation occurs. As the authors rightly point out, there are many software tools that assist in this task: Varbrul, GoldVarb X, and Rbrul are the most well-known tools. The Ordinal Package (Christensen, 2022) adds to the, intending to organize information in the form of scores and to be another option for ordinal logistic regression models, with data that present some type of hierarchical ordering. For the authors, this tool could generate subjective evaluation tests, resulting from experimental methods capable of producing data of very diverse natures.

The articles in this volume provide a glimpse of the advancement of the field in handling variation data. Since the inaugural date of the geolinguistic method in Brazilian lands, we have had 30 years in which five atlases were elaborated - from APFB (Rossi, 1963) to ALPR (Aguilera, 1994). The pioneers of this area paved the way and opened fronts for the dialectological mentality of Nascentes (1953) to be established. As a result, in the following 30 years, many atlases were published or are in the elaboration phase. Among those of state, regional scope, and those of small domain, we have reached close to a hundred linguistic atlases, many of which inspired by the methodology of ALiB.

The linguistic atlases of the 21st century have technological supports that extend the reach of analysis, such as programs like SGVCLin, DiaTech, VDM, among others for clipping, editing, analysis of sound materials, and computational data processing systems. From the arrival of the recorder for corpus collection to the elaboration of linguistic letters, using ArcGIS, Thiessen Polygon⁹, among others, or programs created exclusively for mapping and data analysis, studies of linguistic variation gain new contours and new mathematical/statistical models to aid in data analysis.

This edition of Signum: Language Studies, from the Graduate Program in Language Studies, brought together researchers from variation areas who submitted their articles on the contributions of mapping technology and linguistic data analysis, allowing us to achieve the goal of disseminating studies that present and critically

Also called a Voronoi Diagram, it is a graphical representation that divides a space into regions, where each region is composed of the closest points to a given set of points.

analyze the use of cutting-edge technologies in the mapping and interpretation of linguistic data of variational nature. We thank our colleagues and wish you a good read!

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