



THE ESSENCE OF MULTIDIMENSIONAL ANALYSIS

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Article history:	Abstract:
Received: 11 th October 2023	This article presents a study focused on the study of Multidimensional (MD) Analysis developed by Douglas Biber in 1988 to study the variability of linguistic features in English language registers (Biber, 1988). Multidimensional (MD) analysis affects an in-depths linguistic description of second language (L2) writing texts. However, linguistic studies based on MD analysis are still insufficient and it is crucial to enlarge them. To be more specific, the lack of comparable corpora does not allow current MD-based L2 writing studies to make reliable comparisons of linguistic differences between native-speaking authors and L2 learners.
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Multidimensional analysis was first used by Douglas Biber (Biber, 1986), and then described in details [2]. This approach was developed in order to identify the most statistically significant combinations of linguistic features in spoken and written genres (registers) of texts in English Corpora. The analysis includes eight main methodological stages, a detailed description of which is presented in the works [2], [5; 263].

Collocates have been thought to be a crucial component in determining the senses of expression, and corpus methods that use cognitive semantic concepts, like Gries, can be useful in determining the precise meanings of comparable phrases.

It has been shown that collocates aid in determining the meanings of related words; for this reason, studying linguistic units known as constructions or collostructions is beneficial. Within the context of Construction Grammar (CG), collocates will be regarded as constructs in this study. First things first, let's clarify and describe what construction is.

The structure that is the focus of attention while studying syntax and semantics is the basic unit of the language, according to CG. In this context, a construction is defined as a linguistic statement that possesses both expression (form) and meaning (meaning), which cannot be inferred from the constituent parts' meanings or forms. Language units are seen of as constructs having form and meaning, meaning that their constituent parts might be morphemes, words, and sentences. Works explaining dative, causative, mood, prepositional, prefix, and other constructions are included in the CG framework. The concept of construction is defined as "a pairing of form with meaning/use such that some aspect of the form or some aspect of the meaning/use is not strictly predictable from the component parts or from other constructions already established to exist in the language" by another linguist, Lakoff, who also developed the theory of CG. Put otherwise, a construction is any phrase in language that has a specific meaning and whose form and meaning cannot be determined compositionally. They consist of words, idioms, morphemes, and abstract phrasal patterns.[9]

1. Preparation of the corpus. In the case of an analysis of spoken discourse, the texts are transcribed. Biber emphasizes [5;263] that a corpus created specifically for the task should reflect the entire genre diversity of the area of discourse under study.

2. Identifying a set of language features to extract from texts. According to Biber [5;263], the set should be as comprehensive as possible and include all the features (lexical classes, grammatical categories, and syntactic constructions) that can be given a functional interpretation.

3. Creation of a special computer program (tagger) for automatic marking of all signs in the corpus.

4. Direct marking of the corpus according to all linguistic characteristics.

5. A separate computer program calculates the frequencies of marked features in each text of the corpus.

6. Identification of statistically significant combinations of linguistic features using factor analysis.

As a result of the application of factor analysis, a large number of initials, observable variables (language features) are reduced to a diminished set of hidden variables called factors. Justifying this statistical method, Biber emphasizes [5;264] that factor analysis makes it possible to study the joint occurrence of linguistic features in texts. If some signs are frequently found in some texts and rarely in others, then they are of great importance to the general variance,

since it measures the variation of a sign under the influence of all the factors that cause this variation. Factor analysis is aimed at extracting those factors that explain the largest volume of the total variance of features and which are ordered in descending order of their proportions of variance.

7. Functional interpretation of the results of factor analysis. Each factor (or measurement of variation of linguistic features) is interpreted on the basis of the communicative functions of its defining features.

8. Calculation of the factor score (estimates of the measurement of variability) of each text in the corpus, as well as the average values of the factor scores of each genre under study in order to study their linguistic specificity.

The calculation of factor estimates of all texts is necessary to compare genres with each other, as well as to analyze their distribution in the space of variations of linguistic features.

Main principles of Multidimensional analysis:

- The differences between functional styles are characterized by the systematic use of certain sets of lexical and grammatical constructions

- If certain constructions are used together over and over again, there must be a functional basis that determines their use [2; 13]

Factor analysis.

The task of factor analysis is to investigate the unobservable data structure and explain correlations within a set of observable variables using a set of fundamental unobservable variables underlying these data. Such unobservable variables are called factors, the observed variables are language features.

Factor analysis is the main statistical tool when using a multifunctional/multidimensional approach to textual variability. A large number of initial variables are reduced to a small set of derived variables, "factors". (Biber, 1988: 79)

CONCLUSION

Multi-dimensional analysis in English refers to the process of examining and understanding complex phenomena from multiple perspectives or dimensions. This approach allows for a more comprehensive and nuanced understanding of the subject matter, as it takes into account various factors, variables, and influences that may impact the phenomenon.

In the context of language and literature, multi-dimensional analysis involves considering different aspects such as historical, cultural, social, and psychological factors that shape the meaning and significance of a text. It also involves examining the language itself, including its structure, style, and rhetoric, as well as the context in which it was produced and received.

This approach is particularly useful in understanding complex and ambiguous texts, as it allows for a more thorough exploration of the multiple layers of meaning and interpretation. By considering different dimensions, analysts can uncover hidden connections, contradictions, and complexities that may not be apparent through a single lens.

Multi-dimensional analysis is also valuable in other fields such as psychology, sociology, economics, and science, where it can help researchers to better understand the intricate relationships between different variables and factors. By taking into account multiple dimensions, researchers can gain a more holistic understanding of the phenomena they are studying, which can lead to more accurate and insightful conclusions.

Overall, multi-dimensional analysis in English is a powerful tool for exploring and understanding complex phenomena from a variety of perspectives, ultimately leading to a more comprehensive and nuanced understanding of the subject matter.

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