Study of linking words in political speeches of Bill Clinton using Python

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***Abstract*—The research deals with syntactic devices, namely linking words and their features in Bill Clinton's political speeches. Particular focus is placed on variations in the actual application of these features based on the unique aspects of the speaker's language. This subject is important for research because it reveals how a politician's words are utilized in a particular setting to develop power, influence, and control of the populace as well as how they are used to reveal a politician's objectives and ambitions. The analysis, systematization, categorization, and comparison of connecting terms based on Bill Clinton's speeches constitute the innovative aspect of this paper. The study's focus is on the structural-semantic models of Bill Clinton's English political speeches in terms of their dynamics. A Python programming language program was created for this research. This program searches for and analyzes syntactic sentence models with a change in the order of components, namely linking words. Materials have been discovered in William Jefferson Clinton's book Speeches of President Bill Clinton, which includes 37 of the politician's speeches. The primary research techniques are theoretical, which include analyzing and synthesizing scientific literature to provide the theoretical framework for the study; comparative analysis to compare the devices used in speeches; synthetic analysis to examine the collection of components that make up the system; structural-semantic analysis to analyze semantics based on connections and relationships between linguistic elements; and political science research. The theme, aim, and objectives of this work have been defined in the introduction, along with its relevance, object, and subject. Consideration is given to the theoretical and methodological underpinnings of the analysis of contemporary political speeches. Therefore, in the present world, a high degree of speech culture is a need and essential component of every professional sector.**

***Keywords*—Python programming language, applied linguistics, computer-based discourse analysis, statistical text analysis, political speech, linking words.**

I. INTRODUCTION

The aim of the research is to study linking words as syntactic stylistic devices and their peculiarities in Bill Clinton's political speeches. Special attention is given to differences in the practical use of the peculiarities linking words depending on the individual features of the speaker's language.

The object of the research is the linking words trimmed in structural-semantic models of sentence syntax which focuses on the meaning of words in English political speeches by Bill Clinton in their dynamics. The subject of research is the semantic structures of the syntactic organization of English political speeches by Bill Clinton, implemented in different types of sentences. Sources of the search for materials: William Jefferson Clinton's book "Speeches of President Bill Clinton", which includes 37 speeches by the politician [14].

The main task of this research is to study the use of words and connections and the techniques that go with them, which are often found in speeches. In solving this problem, the following research methods have been used: generalization, analysis, and synthesis of scientific literature for the theoretical basis of the research; the method of comparative analysis to compare the devices used in speeches; the method of synthetic analysis to study the set of elements that make up the system; structural-semantic analysis for the analysis of semantics on the basis of connections and relations between linguistic elements; and research of political discourse by methods and techniques of computer linguistics for computer word processing.

This topic is relevant to research because the information obtained through the analysis of political speech helps to trace the impact of the words of a politician used in a given context to establish power, influence, and control of the people, as well as to understand the goals and intentions of a politician. The novelty of this study is the detailed analysis, systematization, classification, and comparison of linking words based on the speeches of Bill Clinton.

The study of political discourse is relevant so far as there is an objective need for a scientific justification for this phenomenon. Representatives of different professions and various scientific disciplines are concerned with investigating this issue [7].

With the development of the socio-political system, the structure of public speaking was changed and improved, depending on the level of education of the listener, the importance of the event, and so on. As a result, an official political speech was considered as a means of communication between politicians and the general public. Public speeches must be formed in accordance with certain rules and norms, including the norms of oratory and lexical and stylistic features, which are currently the task of special units at political headquarters. The pragmatic intention has not changed but has been somewhat modernized in accordance with the requirements of the time, remaining the main element in creating the speech text of politicians [1; 13].

In communication with people, the main goal is to convey information and be properly understood. This will be much easier to achieve with the help of special linking words, which not only embellish the language but also help the interlocutor to understand the subject of your message [2, p. 886].

The research findings enable one to forecast the politician's future actions and intentions, as well as identify the most effective means of influencing the listeners [11]. They contribute to the understanding of the mechanisms of political discourse's influence on society, which can be used in further study of the problem of methods and means of influencing the audience during political speeches.

The basics of research and their methods for political discourse were laid by representatives of the Cambridge and Oxford philosophy schools in the 50s of the twentieth century (Cambridge group of philosophers – Ludwig Wittgenstein, Norman Malcolm, Alice Ambrose, Friedrich Waismann, Oets Kolk Bouwsma, Morris Lazerowitz, and Oxford group of philosophers – Gilbert Ryle, J. L. Austin, Paul Grice, H. L. A. Hart, Geoffrey Warnock, J. O. Urmson, P. F. Strawson). Regarding current and classical works in this field, it is worthy of noting the works of Teun van Dijk, R. Barth, M. Foucault, and J. Habermas [8, p. 102].

Primary research allows us to accumulate information on the basis of which a scientist can make generalizations and form trends that come from the analysis of the subject under study. Linguistic research methods themselves have only recently been used in interaction with political discourse.

The practical significance of the work is that the materials and results of the study can be used in the development of theoretical courses in sociolinguistics for the faculties of foreign languages, journalism, and socio-political sciences at higher education institutions. The results of the research can be used in the practical activities of the translator, as they help to solve problems that are not only related to the transmission of content but also to maintaining the power of influence on the audience when translating political discourse.

II. Related Works

Issues of discourse are described as key problems in the research of such scholars as Teun van Dijk, E. Benveniste, J. Habermas, M. Foucault, G. Cook, M.A.K. Halliday, T. Givon, J. Haiman, Sandra A. Thompson, Lynn M. Berk, Christopher S. Butler, J. R. Martin, D. Rose, J. Bayer, R. Hinterhölzl, A. Trotzke, G. Jacqueline, Sh. Herma, H. Pinkster, and others [15, 16, 17, 18, 19, 20, 21, 22, 23, 24].

Teun van Dijk's article *What is political discourse analysis?* makes an important contribution to our understanding of political discourse. The most common interpretation is that his study focuses on the analysis of "political speeches" although, at that time, we still need to find out which conversations are considered political and which are not. There is also a progressive basic examination of the label as a political approach to discourse and an examination of discourse, and how it is understood in modern critical discourse analysis. This is both political discourse and a critical statement [12, p. 11].

The definition of political discourse is closely related to two interpretations of politics: broad and narrow, and more specific. The broad meaning of politics includes the activities of those organizations that take place in civil society and are not necessarily run by the state. This may also include the activities of the mass media as they present discourse, for example, on politics, social conflicts, and international relations. A narrow interpretation of political discourse means a politically limited genre that has its own thesaurus and specific functions [8]. Meanwhile, there has been growing attention of linguists to political discourse due to the number of speeches made by politicians at various events, both international and domestic. To achieve the pragmatic intention of political speech, certain techniques and tools are used. They enhance emotions and assimilate the information provided [1].

At the same time, Natalia Kondratenko notes that political discourse is "a concrete manifestation of political communication, which involves the actualization of political text in the communicative act of interaction between political entities (politics, political force, power) and political objects (audience, electorate, voter)" [8].

In everyday language and political usage, the term "discourse" often refers to any means of communication. There is the political discourse, public discourse, power discourse, totalitarian discourse, patriotic discourse, Christian discourse, identity discourse, discursive practices, and so on [3, p.31].

In a broader sense, discourse can be seen as a mechanism for matching personal, social, and cultural knowledge. In a narrower sense, it focuses on the analysis of language communication and individual texts, speeches, interviews, etc. In the theory of communication, the study of political discourse is conducted mainly on the basis of the analysis of statements of politicians and political observers, programmes of political parties and associations, publications in the media, and materials of specialized and political science publications [12, p.12].

Political speech is the main tool and way for politicians to address and communicate with the people. This type of communication belongs to the style, which is characterized by the accurate presentation of facts, accuracy of information, clarity, consistency, objectivity, and neutrality of statements [12, p.12].

A detailed and expanded analysis of discourse primarily provides direct knowledge of unsystematic political practices, such as bureau meetings, parliamentary debates, laws, bureaucratic reports, targeted party announcements, media meetings, or dissent from resistance groups and associations. These political demonstrations, events, and procedures need to be described and analyzed separately. We need to know how they are composed, organized, and transmitted, and what imaginary influence or application they can have on the political perception of society [12, p. 14]. Language plays a significant role in this procedure. Any political activity is prepared, controlled, and influenced by language.

As a rule, political speeches become a subject for discussion in society. This forces politicians to be thoughtful about their content, speech forms, stylistic and compositional design, and type of speech, as speech is not so much a transfer of certain information but the ideology of politicians, their views, and beliefs.

III. Methods

Automated information technologies play an important role in the lives of modern society. Over time, their importance continues to grow. Applied linguistics is a full-fledged branch of linguistics, which aims to solve practical

problems in various fields of science and technology, everyday life, and society, based on the theoretical achievements of studies on language and speech [9].

When it comes to the creation of prospective information technologies, the problems of automatic processing of textual information presented in natural languages come to the fore. This is because a person's thinking is closely linked to their language. Moreover, natural language is a tool for thinking. It is also a universal means of communication between people – a means of perception, accumulation, storage, processing, and transmission of information. In the second half of the XX century, applied linguistics became an independent linguistic discipline. However, various tasks of an applied nature have been solved for a long time. For example, the creation of alphabets, writing systems, spelling, various dictionaries, reference books, transliteration, and interpretation of texts [8].

Computational linguistics, as a separate applied linguistic discipline, is characterized by the need to use computer tools to process linguistic data. There is a wide range of computer tools – programs, computer technology organization, and data processing – to model the functioning of language in different conditions, situations, and problem areas, as well as the area of computer model application not only in linguistics but also in related disciplines [10].

Computational linguistics is defined as a broad field in which computer programs, computer technologies of organization, and data processing are used to model the functioning of language in specific situations and problem areas, as well as the use of computer language models in linguistics and related disciplines. One of the main applied areas of computational linguistics is the automatic processing of natural language, which involves the creation, transformation, and analysis of texts using natural or artificial (computer) languages, which may result in the formation of machine funds for national languages, automatic dictionaries, terminological data banks, computer files, databases, computer grammars, and multilevel linguistic processors [8, p. 460].

I. Stern claims that automatic language processing is "the generalization of theoretical and applied linguistics areas related to computer word processing" and involves research and modeling of sentence synthesis mechanisms in this area; the creation of models and systems of automatic translation, automatic abstracting, documentary information search, and understanding of natural language; the creation of linguistic processors, systems of automatic spelling editing, the construction of machine funds of national languages, computer grammars, automatic dictionaries, and linguistic databases [9, p. 461]. Computational linguistics is primarily concerned with the linguistic support of the processes of collecting, accumulating, processing, and retrieving information.

Python is a simple and powerful, high-level object-oriented programming language with excellent linguistic data processing capabilities. The main goal of the founder of Python, Guido van Rossum, was to create a simple and understandable for a wide range of people programming language [10, p.11].

Learning any language requires resilience and discipline. In this sense, the Python language is considered one of the most convenient, especially for beginners. The simple syntax makes it easy to learn, read, and share knowledge. This is what makes it so popular and frequently used.

One of the components of any technological success is the community created around it. This is what determines the future vector of development through joint efforts. The community around Python is one of the strongest in the world of IT. It is a complex and well-organized organism that is constantly evolving. In addition to hundreds of thousands of individual developers and small companies, Python supports such IT giants as Google, Dropbox, Mozilla, Facebook, Yandex, Red Hat, and Microsoft.

Nowadays, no project is complete without text analysis and processing [4, 5, 6]. It happens so that Python has a wide range of libraries and frameworks for a variety of tasks. Tasks can be as trivial: text tone analysis, entity recognition, and more interesting as bots, dialogues in support chats. Moreover, the variety of applications is also pleasing, which indicates a wide range of tasks that Python solves skillfully.

IV. Experiment

A Python programming language program was created for this research. This program searches for and analyzes syntactic sentence models with a change in the order of components, namely linking words.

The program is run in Python version 3.9.9 (see Fig. 1). The purpose of this work is to ensure that the linking words found in Bill Clinton's speeches are divided into certain groups. The quantity of each of these words is also counted.

A function in Python is an object that accepts arguments and returns values. The function is usually defined using the def keyword. In our program, def is used to break the text into words.

First of all, the file we are going to work with is open. It is initialized by the parameter f (file). With the help of a cycle, we loop through all the lines. Lines are broken into words. As a result, we get an array that will expand until all the words in the file are separated.

```
def fillFileWords(file, words_dicts):
    words = []
    with open(file) as f:
     for line in f:
     words.extend(re.split('\\W', line))
```

The lowercase function is used for all words to change all uppercase letters to lowercase because an uppercase word is considered a completely different word than lowercase. If a word is in our created dictionary, it will be referred to by a certain group and be added to the quantity of that same word group.

```
for word in words:
 word = word.lower()       if word in words_dicts:
 words_dicts[word]['count'] = words_dicts[word]['count'] + 1
```

We also use the main function. Argparse is a module for handling command line arguments.

```
def main():
```

parser = argparse.ArgumentParser(description='A parallel gcov wrapper for fast coverage report generation')

parser.add_argument('-f', '--file', dest='file', action="store",

help='Path to file')

args = parser.parse_args()

At this point, our dictionary is created to look up linking words in Bill Clinton's speeches file. The found word is a key, and its meaning is its group and quantity.

words_dicts = {

"second":{"group":"sequence", "count":0},

"finally":{"group":"addition", "count":0},

"however":{"group":"contrast", "count":0},

... }

The function and our compiled dictionary are transferred to a file. This function completes the dictionary and determines the correct number of words.

fillFileWords(args.file, words_dicts)

Then the found word, its group, and quantity are displayed.

print('word\tgroup\tcount')

for k, checked_word in words_dicts.items():

print('{:20} {:15} {:10}'.format(k, checked_word['group'], checked_word['count'])) (see Fig. 1)

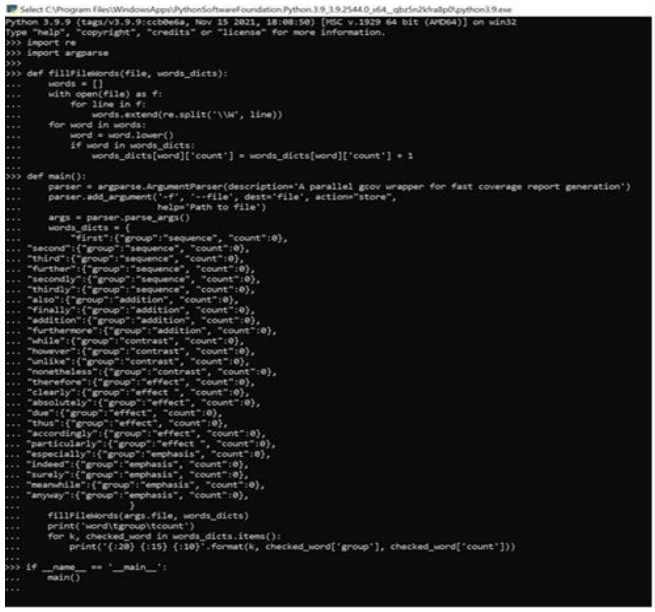

Fig. 1. Program execution in the Python environment.

Here are five arguments commonly used as a reason to use the Python programming language for computational linguistics: simple: Python is built upon principles of coding developed by many other earlier languages, but that these principles have been exploited for a simpler implementation in Python programming; high level: Python is, however, a simplistic programming language. It can be used for the most sophisticated programming of functions; used for maths, science: Python is widely used in mathematics and science; a commonly programmed language in computational linguistics: people in the computational linguistics community frequently use the Python programming language for their research and other related endeavors; free: Pyhton's incredibility is that it is completely free [10].

Python has an obvious syntax. Reading code in this programming language is quite easy as it has few auxiliary elements. A well-designed text with a small number of distractions is easier to read and understand. Python is a full-fledged, versatile programming language.

V. RESULTS

As a result of this program's execution, 26 words that belong to five groups are received, namely: sequence, addition, contrast, effect, and emphasis. The most frequent of them are first – 227 times, also – 204 times, finally – 39 times, especially – 39 times, further – 20 times, indeed – 15 times, clearly – 15 times (see Fig. 2).

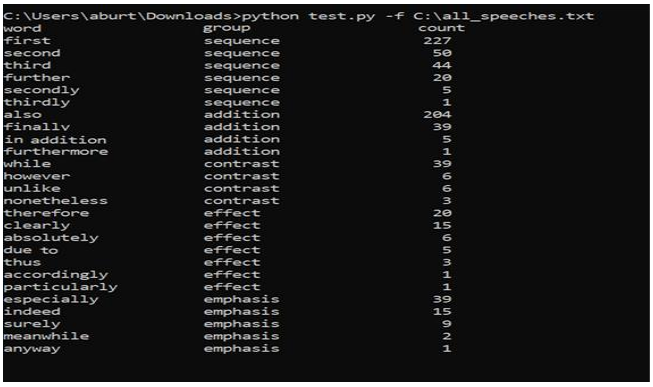

Fig. 2. The results of program execution.

Script:

```
import re
import argparse


def fillFileWords(file, words_dicts):
    words = []
    with open(file) as f:
        for line in f:
            words.extend(re.split('\\W', line))
    for word in words:
        word = word.lower()
        if word in words_dicts:
            words_dicts[word]['count'] = words_dicts[word]['count'] + 1


def main():
    parser = argparse.ArgumentParser(description='A parallel gcov wrapper for fast coverage report generation')
    parser.add_argument('-f', '--file', dest='file', action="store",
                        help='Path to file')
    args = parser.parse_args()
```

```
    words_dicts = {
        "first":{"group":"sequence", "count":0},
    "second":{"group":"sequence", "count":0},
    "third":{"group":"sequence", "count":0},
    "further":{"group":"sequence", "count":0},
    "secondly":{"group":"sequence", "count":0},
    "thirdly":{"group":"sequence", "count":0},
    "also":{"group":"addition", "count":0},
    "finally":{"group":"addition", "count":0},
    "addition":{"group":"addition", "count":0},
    "furthermore":{"group":"addition", "count":0},
    "while":{"group":"contrast", "count":0},
    "however":{"group":"contrast", "count":0},
    "unlike":{"group":"contrast", "count":0},
    "nonetheless":{"group":"contrast", "count":0},
    "therefore":{"group":"effect", "count":0},
    "clearly":{"group":"effect ", "count":0},
    "absolutely":{"group":"effect", "count":0},
    "due":{"group":"effect", "count":0},
    "thus":{"group":"effect", "count":0},
    "accordingly":{"group":"effect", "count":0},
    "particularly":{"group":"effect ", "count":0},
    "especially":{"group":"emphasis", "count":0},
    "indeed":{"group":"emphasis", "count":0},
    "surely":{"group":"emphasis", "count":0},
    "meanwhile":{"group":"emphasis", "count":0},
    "anyway":{"group":"emphasis", "count":0},
                }
    fillFileWords(args.file, words_dicts)
    print('word\tgroup\tcount')
    for k, checked_word in words_dicts.items():
        print('{:20}  {:15}  {:10}'.format(k, checked_word['group'], checked_word['count']))


if __name__ == '__main__':
    main()
```

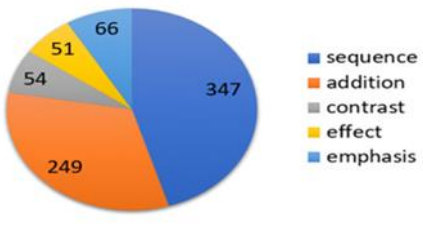

Fig. 3. Correlation of linking words.

Eventually, this program has helped us identify the linking words that Bill Clinton uses in his speeches (see Fig. 3). Analyzing the speeches of former US President Bill Clinton, it has been established that the politician uses a large number of words that belong to the groups of addition, effect, and sequence.

VI. Discussions

Influenced by Teun A. van Dijk's work on the analysis of political discourse, linguistic research on political discourse is mainly focused on the speeches of political elites. This is consistent with van Dijk's definition of political discourse, which is based on three dimensions: actors; the political scale of discourse; and the context of communication.

Using connecting words and phrases can improve the quality of your speech. Here you can see that the ideas flow more smoothly and the logical connections between the ideas are clearer. Most forms of written and oral speeches and presentations are organized in a similar way, with the problem statement, own opinion, and conclusion. Linking words and phrases act as a bridge between parts of what is said. They combine each part together, as well as sentences and paragraphs in each part, or even two ideas in one sentence. Linking words is not just verbal tricks that embellish your language by improving its sound. These are words with special meanings that make the reader or the listener think and react to your ideas in a certain way.

VII. Conclusions

The ambiguity of the notion of "discourse" is due to the history of its formation and a certain uncertainty about the place of discourse in the system of existing categories and modes of language expression. Discourse is called "immersed in life" text, which is studied together with the "forms of life" that shape it: interviews, reports, scientific theories, conferences, and talks. That is why discourse should be studied in its pragmatic, situational, mental, and other aspects.

Political discourse is becoming a popular object of study in different languages. Interest in political discourse is due not only to the strengthening of the role of politics and politicians in the world, and their focus on the media but also to the emergence and development of a number of new disciplines: political science, conflictology, and imageology. Interest in the study of political discourse may lead to the emergence of a new direction in linguistics – political linguistics.

Computational linguistics is primarily concerned with the linguistic implementation of the processes of collection, accumulation, processing, and retrieval of information. With the use of content analysis programs, the possibilities of informal word processing have appeared. Computers provide great assistance in the process of interpretation. This has been notably evident when a large amount of unstructured text data needed to be processed.

Thus, the created program showed that Bill Clinton uses a lot of linking words in his speeches. We have seen that they express the attitude of the speaker towards what is said, attract attention to the content, notify the source of information, indicate the addition of information, and provide consistency of thoughts. This helps to make the speech clearer and focus the listeners' attention on what is being said.

Attracting attention, increasing the emotional tone of speech, and strengthening the pragmatic effect of expression

are the main functions of these devices. They are also used to draw attention to specific issues and convey expected information. In most cases, such devices are not of literary significance. They are used only to convey information or emphasize so that the listener understands the speaker's intention.

The linking words used in the speeches also indicate the addition of information: also, furthermore, moreover, in addition, finally; show contrast, counterbalance: by contrast, however, nevertheless; indicate the cause and effect: therefore, consequently, as a result, hence, thus; express certainty or uncertainty in what is reported: indeed, in fact, undoubtedly, surely; attract, activate the interlocutor's attention: besides, anyway, after all.

Political discourse has undoubtedly been the main area of language use that has attracted the interest of researchers for a long time. This is due to the fact that political discourse is a complex human activity that deserves critical study, in particular, because of its central place in the organization and management of society.

Political language deals with the use of power to organize people's minds and opinions. It is a tool used to control society as a whole. Political speech is considered a means of establishing and maintaining social relations, expressing feelings, and spreading ideas about politics and political projects in any society. Speech activities and utterances that are expressed often depend on the intentions of the speaker and the context in which the opinion is expressed. In political discourse, speakers can emphasize any element of syntactic construction and thus adjust the content of the statement.

Every speech by Bill Clinton calls for something and inspires us. They are always started from afar. Bill Clinton uses tactics to identify with the people. It helps to show people that he is "theirs" and that he can be trusted. Bill Clinton tries to get closer to the people and speaks on behalf of the people. This makes his speeches more emotional and understandable to the average American.

Thus, a high level of speech culture in the modern world is a necessary and integral part of any professional field. For successful public speaking, it is important to have deep knowledge, experience, and competence in public speaking, as the daily activities of politicians are related to communication in which interpersonal contacts take place. The responsibilities of politicians require not only high professional competence but also mastery of various methods of speech communication.

To sum up, political speech is more than just an opportunity to demonstrate the charisma of leaders. It helps especially in a country where most people live without access to digital platforms as speaking is the best way to engage them directly. The findings of this study will aid in identifying the fundamental principles of effective political communication through the use of various linguistic techniques.

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