

## TOWARDS A SYSTEMIC FUNCTIONAL DESCRIPTION OF CO-EXTENSIVENESS IN LEXIS ORGANIZATION IN BRAZILIAN PORTUGUESE

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- **ABSTRACT:** This paper aims at identifying principles of lexis organization under a Functional Approach (HALLIDAY; MCINTOSH; STREVENSON, 1964; MARTIN, 1992; HALLIDAY, 2002; FIGUEREDO, 2011) based on corpus evidence. Problems with the modular and delicacy approaches to lexis – i.e., lexis as filling for grammatical structures or most delicate grammar – motivate the paper as they need further elaboration to describe the internal processes of lexis as a dimension of language, as well as lexis relations to discourse and context. The paper goes on to explain transformation processes integrating lexis and language systems, as lexis is co-extensive to the system in the grammar and register strata. Transformation processes of grammar and register are investigated and lead to the development of protocols of processes internal to lexis. Results show how the protocols can reliably account for the generation of lexical items to a given register. This, in turn, sheds light on lexis internal organization.
- **KEYWORDS:** functional linguistics; lexis; co-extensiveness; grammar transformation; register transformation.

### Introduction

The paper investigates the complementarity between lexis and the systemic organization of language. It departs from the functional framework to conceptualize lexis through the processes of Lexicalization/Grammaticalization, (BASÍLIO, 1991; NEVES, 1997; BORBA, 2003; CASTILHO, 2010), continuity (HASAN, 1987; HALLIDAY, 2008), and contextualization (HASAN, 1985; ROSE, 2006; HAO, 2015). In addition, the

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paper derives its methodology from *Corpus Linguistics* (PEARSON, 1998; SINCLAIR, 2004; BIBER; CONRAD; CORTES, 2004; MOON, 2010).

More specifically, the paper explores the complementarity between the dimensions of the systemic organization of language (MATTHIESSEN, 1995; HALLIDAY, 2002; MARTIN, 2013) and lexis. This exploration is carried out for two relevant phenomena of complementarity, namely, (i) lexis internal organization and (ii) the co-extensiveness between lexis and stratification. The paper goes on to show a set of processes by which lexis interacts with the systemic organization, which in turn allows the identification of characteristics that are exclusive for lexis in the overall organization of language.

Complex phenomena such as Lexicalization (BASÍLIO, 1991), Grammaticalization (NEVES, 1997), delicacy (HASAN, 1987), and realization (MARTIN; WHITE, 2005; MATTHIESSEN; TERUYA; LAM, 2010) can be understood through the interaction between lexis and the other systemic dimensions of language. However, such understanding is mostly restricted to the relationship between lexis and grammar and, more specifically, to the rank of words. Some important problems of this misleading understanding give rise to the univocal relationship between a 'lexical item' and a 'word' (cf. SINCLAIR, 2004; CASTILHO, 2010).

Differently, the complementarity between lexis and systemic organization can be motivated by meaning-making when social contexts are taken into account. A functional approach to meaning-making impacting the understanding of lexis takes into account not only the social context but also the creation, organization, and distribution of meanings according to experiential domains of human activities and social relations (cf. HAO, 2015; ROSE, 2019).

As a result, a lexical item is related to the grammar, but it is related to discourse semantics in the same measure. A lexical item is then interpreted always as an inter-stratal item (HALLIDAY, 2008). The inter-stratal character of lexis can be seen in the role lexis performs along with discourse systems such as IDENTIFICATION – realized by NOMINAL DEIXIS – when both systems are co-extensive to lexical items (cf. ROSE, 2019).

A similar example can be found between the systems of LEXICAL COHESION and some options of SUBSTITUTION and COHESION, which can be realized lexically when there is a co-variant pattern between a choice of features and lexical items (MARTIN, 1992; HAO, 2015). The internal organization of lexis and its co-extensiveness with stratification are the main phenomena explored in this paper.

Beyond the complementarity of lexis to grammar and discourse semantics, there is a correlation between a lexical item and context relative to the creation, organization, and distribution of meanings. This type of correlation has been extensively studied by Corpus Linguistics. The literature shows how lexical units mean differently when put together with other lexical units in the same text (i.e., co-text) and in the distribution across different texts (i.e., context) (PEARSON, 1998; SINCLAIR, 2004; MOON, 2010). Systemic Functional Linguistics construes context as a stratum of language that responds for matching social situation variation to language variation. Thus, a probabilistic

character is built into functionality. We approach this character quantitatively and this is our motivation for adopting Corpus Linguistics methodologies in a functional research.

The correlation between lexis and context opens up the possibility of taking register variables and distribution into the exploration of lexis. This correlation can be approached through register when lexical chains are formed for particular fields, causing activity sequences to be conditioned in a specific configuration for a given genre (cf. HASAN, 1985; PEARSON, 1998; HAO, 2020).

Our objects are accordingly the lexis and its interaction with the systemic dimension of stratification, including (i) the grammar stratum and the lexis-grammar continuum, the forming of lexical items together with grammatical units such as morpheme, word, and group – including the processes of grammatical transformation – and (ii) the register stratum, showing how lexical items come about through demands on the field and its relation to the construal of experience in the register transformation.

The paper aims at contributing to the internal organization of lexis additionally by showing the distribution of different lexical sets across text types, relating lexis to register both in terms of configuration and use (which in itself is also a meaning-making resource).

In order to pursue our present goals, our first step is to treat lexis as an extra dimension of language alongside stratification, instantiation, metafunction, axis, and individuation. Due to the scope of the paper, however, we will limit the investigation to the relations between lexis and stratification (specifically to the strata of grammar and register). The lexis-stratification relation can be seen from two vantage points: as module or as continuity (cf. HASAN, 1985; HALLIDAY, 2008).

Lexis can be treated as a module apart from stratification – grammar in particular (cf. SINCLAIR, 2004) – in such a way that grammar is responsible for the structural organization of language while lexis fills in the structures with meaning from lexical items (cf. MARTIN, 1992).

As continuity, lexis and stratification – again, grammar in particular – are modeled as the same stratum, that of lexicogrammar, thus encompassing the same phenomenon. The difference between a lexical item and a grammatical item depends on where we begin in the continuum – in the lexical end or the grammatical end – and the level of delicacy of systems (HASAN, 1987; HALLIDAY, 2008).

When examined under the framework of functional linguistics and meaning-making, the module faces some problems, following Hasan (1987), we can list: (i) the lack of an explanation detailed enough so it can explain when exactly grammatical structures are filled in with lexical items; the lexical rules (not grammatical rules) determining this ‘filling in’; the general principles of Grammaticalization/Lexicalization in the module perspective. (ii) The correlation between a lexical item and its grammatical properties – taking into account that lexical items somehow have grammatical properties. (iii) The meaning of a lexical item standing on its own “away from” a grammatical structure, a piece of discourse, and a context.

The continuity, in turn, also has some problems, including: (i) restricting the relation of lexis to the grammar, leaving out to a large extent the strata of discourse semantics and register; (ii) a description of the internal organization of lexis relative to that of systems (including composition, axis, realization and metafunction diversification).

The paper explores to what extent the phenomena concerning the internal organization of lexis and its co-extensiveness to stratification can be understood according to the module and continuity perspectives. Our goals are: (a) first present an alternative to the dichotomy module/continuity by showing resources through which lexis is coextensive to grammar systems and (b) secondly show how lexical items are distributed in the language through its co-extensiveness to register (context), helping to understand how lexis contributes to language's overall meaning-making.

### **Lexis and grammar: module perspective**

Lexis definition, its formation process, and its relationship with grammar were discussed in literature at various points in linguistic studies development (HALLIDAY; HASAN, 1976; NEVES, 1997; SINCLAIR, 2004, among others). One of the most frequent ways of approaching the lexical item is to conceive it as a modular unit, being associated with a set of morphemes (BASÍLIO, 1991; BORBA, 2003; CASTILHO, 2010). However, this conception implies a direct relationship between lexis and a specific stratum – grammar – and, within this stratum, a particular grammatical unit – word. In this way, despite sharing resources for meaning production, lexical item and word operate different roles in language organization.

One significant way of conceiving this module perspective is through the functional-cognitive strand that describes lexis, first, through the psychological/individual bias. It is understood as “an inventory (i) of cognitive categories and subcategories; and (ii) inherent semantic traits” (CASTILHO, 2010, p.110, our translation). This inventory integrates properties that we use to create words, so a word is formed from the lexis of a language (CASTILHO, 2010).

Lexical item is distinct from morphological word (+ nucleus; + affixes), phonological (+ stressed syllable; + unstressed syllables) or graphic (blanks around a graphic element, cf. token). It can consist of more than one word in its entirety, as well as it can be formed by a single word (CASTILHO, 2010). This can be verified through the analysis of collocates that have a direct relationship with the lexical item meaning (SINCLAIR, 2004; VIANA; TAGNIN, 2010).

Another relevant way of understanding module perspective is through the collective/social perspective of Corpus Linguistics. From this approach, meaning constructed by lexis is addressed in its functional determination, since lexical items “realize an element of meaning which is the function of the item in its cotext and context” (SINCLAIR, 2004, p.121).

More specifically, the autonomous language plane, according to language conception in use dynamically, is the model responsible for textual organization. This plan accounts for the linguistic organization of human experience that is recorded in the form of texts. In this plan, a complex relationship is established between lexical items and the way it gains meaning. The relationship is complex because; a lexical item of some text depends on other elements (i.e., co-text) of that repository to make sense (PEARSON, 1998). In the same way, it depends on these same items being registered in other texts in the repository (i.e., context) to be accepted, understood, and shared by the community of speakers (SINCLAIR, 2004).

Therefore, Sinclair (2004) describes the relationship between Corpus Linguistics and Functional Linguistics, since the latter deals with structural investigation together with linguistic functions that operate in a given context. This is the approach used in this study, in particular, the junction between the methodology used by Corpus Linguistics in confluence with the theoretical and descriptive categories of Systemic-Functional Linguistics.

### **Lexical expansion processes: Lexicalization and Grammaticalization**

From that point, the lexical item (i) is related to other units of grammar, being conceived psychologically and individually, and (ii) it also depends on discourse semantics, on co-text and context to gain meaning, being understood collectively and socially. Thus, two perspectives for the lexical expansion process can be identified: Lexicalization and Grammaticalization.

From the Lexicalization perspective, the lexical expansion process is initiated by mental impulses transformed into sound waves. It can start from an individual motivation of speakers in a first moment that, in sequence, becomes a negotiated process in the course of human interactions in order to supply a communicative need (CASTILHO, 2010). This process is subclassified as composition and derivation (cf. BASÍLIO, 1991).

In contrast, Grammaticalization, in its classic approach, is conceived as a process of change that leads lexical items to assume grammatical functions, or if those lexical items are already grammatical, they assume even more grammatical functions, due to modifications in their morphological and semantic structures (cf. KURYŁOWICZ, 1975; HOPPER; TRAUOGOTT, 1993). Therefore, the creation of new linguistic items through this process is subcategorized according to the creation process, which takes place from the perspective of lexical morphology or flexional morphology. At first, lexical morphology structures and enriches the lexis of a language; the second, flexional morphology is responsible for imputing grammatical values to the items (cf. BORBA, 2003). The distinction between these two types of morphology becomes one of the most important formal criteria for dividing meanings into two groups: lexical and grammatical (BORBA, 2003).

Thus, the process of creating lexical items is described from two perspectives: (i) from the point of view of the impact on lexis itself (i.e., Lexicalization); and (ii) from the point of view of the impact on grammar (i.e., Grammaticalization). Lexical morphology, classified as a subcategory of Grammaticalization, enables the formation of new linguistic items that are organized by the mechanism of derivation and composition. However, these mechanisms make up the Lexicalization process, thus occurring a parallel between the Lexicalization and Grammaticalization processes.

Consequently, lexical items formation runs through lexical scope, as well as the grammatical one. This process can occur starting from both a lexical and a grammatical item; consequently, the Lexicalization-grammaticalization process is presented through the contiguity bias (KURYŁOWICZ, 1975; HOPPER; TRAUGOTT, 1993).

### **Lexis and grammar: contiguity perspective**

In this perspective, lexis and grammar are understood as open lexical sets and closed grammatical systems (HALLIDAY; MCINTOSH; STREVENSON, 1964; HALLIDAY, 2002). The relationship established between these two poles would be continuous, since linguistic constructions are not polarized choices – lexical or grammatical, but they can belong to any point in the continuum where lexis is at one end and grammar is at the other.

In this way, lexis and grammar are interpreted as part of the same linguistic strata – lexicogrammar – which has delicacy as its systemic principle of organization (HALLIDAY; MCINTOSH; STREVENSON, 1964; HALLIDAY; MATTHIESSEN, 2014). By this principle, lexicogrammar units are described through the system network that is organized by paradigmatic and syntagmatic axes. The system can be detailed by means of subsystems, and the more subsystems are used in description, the greater is its level of delicacy. Thus, the system is developed by levels of delicacy. In the most delicate point of the system, lexis is located and, in the least delicate point, grammar is located, composing the lexicogrammatical continuum.

### **Co-extensiveness of lexical item in linguistic stratification**

One of the main dimensions of language organization is stratification (HALLIDAY, 2002; HALLIDAY; MATTHIESSEN, 2014). This dimension is formed by the strata of expression: phonology and graphology, and by the strata of content: lexicogrammar and discourse semantics. In addition, context (register and genre) is also part of the model because it is modeled as a semiotic system that produces meaning. The principle that organizes the linguistic strata is realization, responsible for the relationship between an abstract linguistic pattern and a more complex one.

Lexis and grammar make up a linguistic stratum that is located at a level more abstract than expression and a level less abstract than discourse semantics. The lexicogrammar stratum is constituted by four ranks that are related through compositional hierarchy: morpheme, word, group/phrase, and clause (HALLIDAY; MATTHIESSEN, 1999, 2014).

Word constitutes a rank of rank scale that is found between morpheme and group/phrase ranks. It constitutes a rank composed of one or more morphemes and has a single function in the higher rank (HALLIDAY; MATTHIESSEN, 2014). In this way, an element of word rank is characterized by a single function that it plays in the group/phrase rank.

An element of word rank is not always co-extensive with a lexical item. Two or more elements can function as a single lexical item, as, for example, in ‘chronic diseases’ and ‘metabolic control’. Each example presents two elements of word rank performing a function of noun and adjective, however, they make up one lexical item, therefore, the lexical item can be formed by one or more elements of word rank (EGGINS, 2004; MARTIN, 1992). Therefore, an element of word rank and a lexical item are not synonymous terms, a lexical item corresponds to words of content or also called lexis (MARTIN; ROSE, 2007).

Lexical item integrates directly with the stratum of semantics and, likewise, that of grammar (HALLIDAY, 2008). In the grammar stratum, for example, it is related not only to word rank, according to different parameters that define it, but to other ranks – extending to the elements of morpheme, word and group, and to some fixed expressions of language, even to clause (Table 1). The relationship established between the lexical item and grammar ranks is called a co-extensive property (HALLIDAY, 2002).

**Table 1** – Co-extensiveness between lexical items and rank scale

grammatical rank	lexical item	meaning
morpheme	self-care	‘self-’ = personal
word	sugar	= food
group/phrase	diabetic foot	= symptom
clause/complex	God willing	= probably

**Source:** Authors’ elaboration.

The co-extensiveness of a lexical item can also expand to other linguistic strata. In co-extensiveness with the discourse semantics stratum, for example, lexical cohesion and collocation present a relationship between lexical items conceived in the text. Lexical cohesion is presented by the discourse semantic system of TAXONOMIC RELATIONS and collocation is dependent on the nuclear relations system. Both TAXONOMIC RELATIONS and NUCLEAR RELATIONS belong to the first level of delicacy of the IDEATION semantic system (MARTIN; ROSE, 2007).



In relation to co-extensiveness and the register stratum, the set of lexical items determines the register type, guiding the development of its field, tenor, and mode. Field shows how register conceives human experience, being subdivided into the experiential domain and the socio-semiotic processes, tenor deals with how human relationships are enacted and mode presents how field and tenor are configured in order to symbolically configure the register (HALLIDAY; MATTHIESSEN, 2014). To the field, a frequency of lexical items helps to determine an experiential domain, thus, the set of lexical items combined with systemic structure organizes and expands registers (NEUMANN, 2013).

The same relation occurs, still concerning the field, with socio-semiotic processes types, the lexical items derived from the socio-semiotic process “explore” are different if compared with the socio-semiotic process “report”. Lexical items of the first have a higher lexical density in relation with the second (cf. URE, 1971). This is also evidenced in the work of Figueredo *et al.* (2019), through the Lexical Investigation Protocol: Generalization Process, whose focus falls on the co-extensiveness between types of lexical items and socio-semiotic processes.

In co-extensiveness with tenor, lexical items help in the development of the proximity/distance relationship between participants. The more lexically dense meaning construction is established, the greater is the distance between participants, determining the type of tenor selection (LIMA, 2013). In this way, field and tenor presented through the lexical density of registers, studied in Figueredo *et al.* (2019), reveals a joint change, that is, a covariation between socio-semiotic process type and tenor type.

In co-extensiveness with mode, lexical items chosen for writing texts collaborate in determining the mode type to which they belong. Nominalized or metaphorized lexical items make up texts more typically in the written mode in greater number when compared to texts configured in spoken mode (HALLIDAY, 2002), since the latter have a lower lexical density, however, they present a more intricate textual structure (HALLIDAY, 2002).

In the same way, co-extensiveness between lexical items and genre lies in genre formation itself through the selection of lexical items sets. The choice of certain lexical items indicates genre type developed – it can be historical, descriptive, among others (ROSE; MARTIN, 2012; ROSE, 2019), as well as determines the way that genre stages are elaborated along with their communicative purposes (MARTIN; ROSE, 2007). The choice of a single lexical item can indicate a genre. For example, the lexical item ‘grammar class’ shows the type of class, as well as a specific activity sequence setting, which would be different from the activity sequence for the genre in a ‘physics class’.

## **Questioning the contiguity perspective**

The contiguity perspective conceives lexis and grammar as part of the same continuum. However, systems of lexicogrammar favor grammatical description, not maintaining a balanced relationship between both poles (HASAN, 1987; MARTIN,



1992). Lexis, seen by the most delicate point of the system, is always interpreted by grammar, and there is no model that describes lexis in its scope of meaning.

Furthermore, grammar is performed by structure, organized by rank scales, and by abstraction principle, whereas lexis organization is related to the probability of lexical item occurrence in certain registers. While grammar is deterministic, lexis is probabilistic (HALLIDAY, 2002), therefore, lexis and grammar have different organization and nature, which also goes against the principle of contiguity, in the form of lexicogrammatical continuum.

The relationship between lexis and grammar can be defined as complementarity since grammatical structures are built by lexical items, as well as, lexical items present collocations in grammatical structures (MATTHIESSEN, 1995; HALLIDAY, 2008). Structure and probability complement each other in the construction and understanding of any linguistic production. In other words, a lexical meaning is always formed by a lexical portion and a grammatical portion.

Lexis, besides being associated with grammar, is also co-extensive (HALLIDAY, 2002) to other strata of language: discourse semantics, context, register, and genre. Lexis coextensive to grammar shows that a lexical item is not only associated with word rank, but establishes relations of meaning with other ranks. The co-extensiveness to discourse semantics, register, and genre points out how certain lexical items sets can (i) create chains of meaning and co-occurrence; (ii) organize and expand experiential domains; (iii) differentiate socio-semiotic processes; (iv) collaborate in the construction of the relationship of proximity/distance between participants; (v) assist in the elaboration of register mode and (vi) indicate genre type and its stages development.

It is worth mentioning that an item is lexical when it can be generalized (cf. FIGUEREDO *et al.*, 2019). Generalization is one of the protocols that are carried out through application of taxonomic relations of identification, classification, and generalization. Thus, generalization points to a difference in functioning between lexical item and grammatical item, while the first is liable to be generalized, the second is liable to be an exponent of more abstract categories.

Consequently, the co-extensiveness to linguistic strata and the generalization phenomena show that lexical item has its own organization, since it generates meanings distinct from grammar, as well as from other strata. The investigation of this organization allows lexical items to be described and mapped in a broad way, in order to understand, more precisely, its nature.

## **Methodology**

According to the assumptions advocated by Systemic Functional Linguistics (HALLIDAY; MCINTOSH; STREVENSON, 1964; HALLIDAY, 2002), the development of so-called lexical probe protocols can be considered a way of furthering studies on the lexis as a theoretical concept within the scope of Brazilian Portuguese (FIGUEREDO

*et al.* 2019). In this sense, it is necessary to define the set of texts to be used for the applications of lexical probe protocols, as well as the experiential domain of these texts.

The first part of this methodology concerns the corpus compiled for the applications of lexical probe protocols. The second part explains the development of two lexical probe protocols. The first probe addresses the co-extensiveness between the lexical item and the stratum of grammar, and the second one deals with the co-extensiveness between the lexical item and the stratum of register.

## **The Corpus**

The texts selected for the applications of lexical probe protocols comprise academic articles that describe researches developed in the context of type II Diabetes Mellitus. The experiential domain (HALLIDAY; MATTHIESSEN, 1999; HAO, 2015) of these texts is, therefore, this chronic condition, specifically, self-care in Diabetes Mellitus<sup>1</sup>.

These academic articles were extracted from publications in the area of Health Sciences from the search of “self-care in diabetes mellitus” as a keyword in Google Scholar<sup>2</sup>. Forty articles originally written in Brazilian Portuguese were collected. This amount of articles corresponds to the minimum number that is sufficient to obtain significant results according to the lexical probe protocols herein proposed. The articles were published between 2010 and 2019, 133.232 tokens were compiled, and the selection of articles from that period is justified by the need for current texts, capable of portraying patterns produced in the last decade.

The choice for this type of text to compose the corpus was due to the need to deal with a language used between peers, that is, authors and readers of this type of text are in the academic environment and belong to a certain area of knowledge, where their expertise is located. In addition, we believe that the language used by peers in the field of Health Sciences would be able to provide a wide variety of lexical items, which could be used in the applications of lexical probe protocols. These lexical probe protocols are detailed below.

Each article was saved separately in a notepad file and named as “*Título da Revista\_ano de publicação*”<sup>3</sup>. If there are two or more articles from a given journal published in the same year, the nomination was made as “*Título da Revista\_ano publicaçãoob*”<sup>4</sup>.

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<sup>1</sup> It is important to mention that this article is part of an ongoing PHD research. This research is in the scope of Language Studies at Graduate Program in Linguistic Studies (PosLin)/Laboratory for Experimentation in Translation – LETRA at Faculty of Languages (FALE)/UFMG/Brazil. This research is also in the scope of Empoder@ Project – methodological innovation in educational practices directed toward autonomy in healthcare – a partnership among Laboratory for Experimentation in Translation (LETRA)/FALE/UFMG, School of Nursing/UFMG, and Laboratory of Biostatistics/UFMG.

<sup>2</sup> Available in: <https://scholar.google.com.br/?hl=pt>

<sup>3</sup> In English: “Journal’s name\_year of publication”.

<sup>4</sup> In English: “Journal’s name\_year of publication”.

We would like to highlight that the abstracts, tables, graphs, attachments, figures, tables, and references of all selected articles were excluded from each notepad file, because they are not useful for the current research since these sections do not present enough lexical items for the applications of lexical probe protocols.

## **The development of a lexical probe protocol**

The creation of a lexical probe protocol takes place through the lexical item's process of producing particular meaning in Brazilian Portuguese, in contrast to the so-called grammatical item. In this sense, the existing literature about lexis, such as the types of lexical cohesion, especially the concept of collocation (cf. HALLIDAY; HASAN, 1976; HALLIDAY; MATTHIESSEN, 2014), as well as the technical terms lexical set and lexical series presented in Halliday, McIntosh and Strevens (1964) and Halliday (2002) are considered. Below, two of the developed lexical probe protocols are detailed.

### **Lexical Probe Protocol: Grammar Transformation Process – LexisProbe: GTP**

The methodological process that encompasses LexisProbe: GTP is formed by two phases, development and application of the protocol. In the development phase, the distinctions between items considered grammatical and those considered lexical are observed, that is, the features that contribute to certain items in Brazilian Portuguese to be grouped in the set of grammatical items; and other items inserted in the set of lexical items. Concerning the application, the items considered lexical are extracted from the corpus, and this lexical probe protocol is tested, in order to verify the relevance of this protocol for the characterization of the lexical item in Brazilian Portuguese.

For the development of LexisProbe: GTP, the corpus' texts, previously saved in a .txt format, were imported to AntConc software (ANTHONY, 2019). Using CALIBRA's monological written portion (cf. FIGUEREDO, 2011) as a reference corpus, AntConc generates a keywords list. It is important to mention that since only AntConc's keyword tool was used, it was not necessary to exclude items called as functional<sup>5</sup> from the corpus.

After generating the keywords list, the morphology of the items considered lexical, understood, until that moment, as those of content, which are in opposition to the functional items, was analyzed. This analysis revealed that the items considered lexical have two portions (i.e., a set of morphemes). The first portion does not change even when the lexical item generates other lexical items; this portion was called the lexical portion because it comprises the part that gives meaning to the item. The other

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<sup>5</sup> In this research, functional items are comprehended as those that belong to the closed systems, such as, prepositions, conjunctions, articles, and adverbs (cf. HALLIDAY; MCINTOSH; STREVEN, 1964).

portion that changes according to the transformations this item considered lexical goes through is called the grammatical portion and refers to the morphological part of the lexical item. Thus, unlike items understood as grammatical (functional), items considered lexical have the ability to break up into portions – the lexical portion and the grammatical portion.

For the application of LexisProbe: GTP, the keywords list generated in the development phase was used. Twelve items that were related to the scope of type II Diabetes Mellitus as an experiential domain and had occurrences capable of identifying the existence of the Grammar Transformation Process (GTP) were selected for the application of LexisProbe: GTP.

In order to be selected, the items must: (i) appear as a lexical item and as a transformed lexical item (understood as the lexical item that has undergone a process of transformation<sup>6</sup> in its grammatical portion). The distinction between lexical items and transformed lexical items is characterized by the number of morphemes; the lexical item must have fewer morphemes than the transformed lexical item.

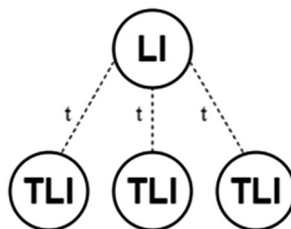
However, if there is only one transformed lexical item for a given lexical item, the transformation between that lexical item and the respective transformed lexical item cannot be related only to the morphemes of gender, number, and/or person. From the co-extensiveness between lexical item and word rank, the addition of these morphemes to lexical items does not involve a change in word class. A lexical item that is in co-extension with a noun, for example, when any of these morphemes are added – gender, number, and/or person – it will continue to be a lexical item in co-extension with a noun.

In this case, the lexical item must not be selected for the application of LexisProbe: GTP. (i) It's a possible transformation, but it is not enough to characterize an item as a lexical one, indeed. (ii) The lexical item must have at least one transformed lexical item to ensure the effectiveness of LexisProbe: GTP in the characterization of lexical items in Brazilian Portuguese. (iii) The lexical item and the transformed lexical item must be exhibited in the corpus and at least one of them must appear in the keywords list (see Fig.1).

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<sup>6</sup> It is relevant to explain that the notion of transformation mentioned in this article is not related with the notion of transformation introduced by Chomsky (1957) in transformational-generative grammar. The approach of transformation process adopted in this research is an attempt of showing how the lexical item in Brazilian Portuguese can be a combination of a lexical portion plus a grammatical portion, indicating that lexis and grammar operate together in order to instantiate lexical items in Brazilian Portuguese.

**Figure 1** – Representation of LexisProbe: GTP



Source: Authors' elaboration.

Figure 1 is formed by a circle located at the top, where the lexical item (LI) with the lowest number of morphemes is found. Then, at the bottom, there are other circles, where the transformed lexical items (TLI) are detected, they come from the lexical item and must have a greater number of morphemes than the respective lexical item. The circle at the top is connected by each circle at the bottom by dotted lines; and on the right side of each line, there is a letter t (written in lowercase), indicating that among the items shown in the top and bottom circles, the transformation of the LexisProbe: GTP occurred (see Fig.3).

It is relevant to explain that the selection of dotted lines to portray the GTP is motivated to represent the non-linearity of this process. This means that this process can vary according to the needs of a given language's context, in this case, Brazilian Portuguese. The lexical items and the transformed lexical items were inserted inside circles to represent the cyclicity of these items. Even though they are items that can be changed according to texts' registers, they would still be considered lexical items, hence the choice of the same form (circle) to represent the lexical items and the transformed lexical items.

### **Lexical Probe Protocol: Register Transformation Process – LexisProbe: RTP**

The LexisProbe: RTP comprises the second protocol presented in this article. It is an expansion of the previous protocol, since the LexisProbe: GTP is an inherent part of the Register Transformation Process (RTP).

The development of LexisProbe: RTP is based on the analysis of LexisProbe: GTP's results. Through this analysis, the concept of register (cf. HALLIDAY, 1978; MATTHIESSEN, TERUYA and LAM, 2010; HALLIDAY and MATTHIESSEN, 2014) is included in the LexisProbe: GTP previously described. In addition, the distinctions mentioned by Taverniers (2008) about the connotative and denotative meanings advocated by Barthes (1957) and Hjelmslev (1963), especially Barthes' specification about the connotative meaning of a sign to be linked to a particular situation, contributed to the creation of LexisProbe: RTP.

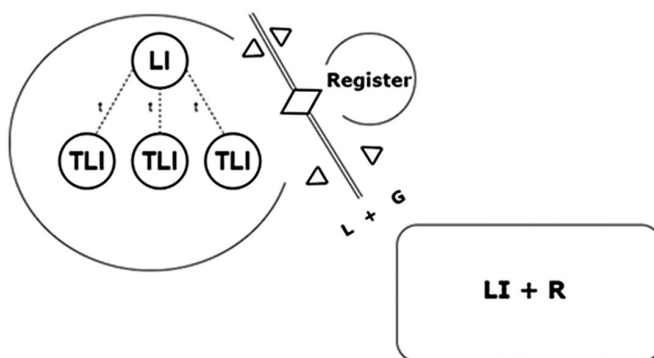
The application of LexisProbe: RTP comprehends three phases. The first one concerns the analysis of the results found through the application of LexisProbe: GTP. As the LexisProbe: GTP is seen as an inseparable part of the LexisProbe: RTP, since, it is not possible to understand the register, without considering the structural functions of the grammar which must be realized linguistically, only those items that were distinguished as lexical, indeed, by the application LexisProbe: GTP can be used in the LexisProbe: RTP.

In the second phase, after selecting the lexical items that may be useful for the application of LexisProbe: RTP, the concordance lines of each selected item were explored in order to find co-occurrence patterns. These patterns must have a frequency regularity that was able to attest to the reliability of such patterns, so the lexical item  $x$  must have at least three co-occurrences with the item  $y$  or  $y + z$ , depending on the number of components of the lexical item in question.

In the third and last phase of the application of LexisProbe: RTP, the co-occurrence patterns are isolated and analyzed. It is verified: (i) the number of components that form the patterns, the assumption is that two or three components are co-occurring with the lexical item selected in the first phase; (ii) how are these components that co-occur with the lexical item selected earlier, for example, which word class it belongs to, which role it plays in that lexical item formed by more than one component, it is influenced by the register of the texts that set the corpus; and (iii) if these lexical items formed by more than one component are co-extensive with grammar, that is, if they are lexical items that contribute to the construction of meaning also in the co-extensiveness related to the group rank.

From this co-extensiveness process, these lexical items become lexical items that emerged in the texts of the corpus, due to changes in the register variables – field, tenor, and mode – that concern the type of text (see Fig.2).

**Figure 2** – Representation of LexisProbe: RTP



**Source:** Authors' elaboration.

Figure 2 shows the representation of the proposed scheme for LexisProbe: RTP. The larger semicircle in the central section corresponds to the phase inherent to the LexisProbe: RTP, which is the LexisProbe: GTP; explained previously. The smaller semicircle located at the top right refers to the register, which, due to changes in the register variables, can influence the occurrence of certain lexical items that have emerged from these changes. In the representation, these emerging items, whose representation is given by the formula LI (lexical item) + R (register), are inside the rectangle with rounded corners that is below the inscription L + G. This inscription, in turn, symbolizes the co-extensiveness between lexis (L) and grammar (G), since lexical items emerging from the influence of the register variables must be formed by two or more components. It highlights the co-extensiveness of these lexical items with the group rank.

The influence of the register variables in the appearance of certain lexical items takes place under indefinite time conditions. This fact indicates that some lexical items may emerge more quickly, meaning that changes in the register variables have occurred more intensely, but other lexical items may take longer to emerge, suggesting that changes in the register variables have occurred more moderately.

For this reason, there is no symmetry in the position of the triangles in the representation above, that is, there may be influences of the register variables on a component of the lexical item coextensive to the nominal group, so some triangles are closer or more distant to the first bar. Likewise, some triangles are also closer or more distant to the second bar, showing, in this case, that the other component of that lexical item spends greater force. When the influence of the register variables in LexisProbe: GTP ends, the co-extensiveness process between lexis and grammar ends as well, with a lexical item emerging by the register variables, in Fig. 2, this co-extensiveness is represented by the shape of a rhombus.

Finally, it is important to note that the choice for semicircle shapes, which appear in parallel in the representation above, can be justified by the need to indicate that in the LexisProbe: RTP the two sets – GTP and register variables – are interconnected, that is, when there are changes in a register variable, LexisProbe: GTP changes too. On the other hand, as these changes take place under indefinite time conditions, the semicircles are not united.

There is, however, a space between these semicircles that is responsible for representing the lexis (L) and grammar (G) link. The shape that symbolizes the components of that lexical item that emerged from the influence of the register variables in the texts of the corpus texts is a triangle. We selected this shape because when two triangles are united, that is, when the co-extensiveness process<sup>7</sup> occurs between the lexical item to be emerged and the group rank, a new shape is generated, the rhombus,

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<sup>7</sup> It is important to mention that the LexisProbe: RTP deals with the concept of co-extensiveness in relation to the lexical item and the structure (syntagmatic order) – rank scale: clause, group, word, and morpheme, especially the co-extensiveness between lexical item and (nominal) group. Besides, there are evidences supporting that this co-extensiveness would be able to occur between lexical items and stratification – context, semantics, grammar, phonology, and phonetics.



which demonstrates the co-extensiveness between the emergent lexical item and the (nominal) group.

## Results

### From the application of LexisProbe: GTP – the corpus of academic articles

As mentioned in the Methodology, twelve items from the corpus of academic articles that are within the scope of the experiential domain of type 2 Diabetes Mellitus were selected for the application of LexisProbe: GTP (see Table 2).

**Table 2** – List of items selected for the application of LexisProbe: GTP – the corpus of academic articles

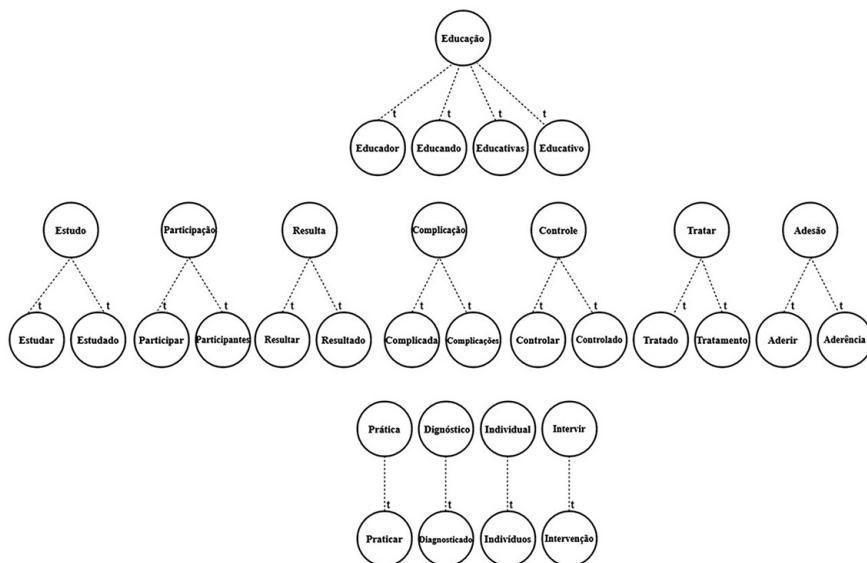
Number of occurrences	Keyness	Items selected from the keywords list: the corpus of academic articles <sup>8</sup>
645	233,91	Estudo
397	149,26	Controle
288	128,81	Educação
276	121,53	Participantes
346	116,14	Tratamento
286	115,86	Resultados
256	112,71	Complicações
225	99,05	Indivíduos
194	85,4	Prática
184	80,99	Diagnóstico
183	80,55	Adesão
175	77,03	Intervenção

**Source:** Authors' elaboration.

Table 2 highlights some items selected from the keywords list generated by AntConc software from the insertion of the corpus of academic articles and the use of CALIBRA's monological written portion as a reference corpus. The selection of these items is explained by the fact that they have a high number of occurrences in the corpus, which is explained by the keyness detailed in the second column of Table 2, also they depict occurrences that contribute to reinforcing their transformation capacity (see Fig. 3).

<sup>8</sup> Items translated into English: Study, Control, Education, Participants, Treatment, Results, Complications, Individuals, Practice, Diagnosis, Adherence, and Intervention.

**Figure 3** – Representation of LexisProbe: GTP – the corpus of academic articles



**Source:** Authors' elaboration.

Figure 3 shows the representation of the Lexical Probe Protocol – LexisProbe: GTP with the twelve occurrences selected from the keywords list of the corpus of academic articles. From the representation, all selected items – Estudo, Controle, Educação, Participantes, Tratamento, Resultados, Complicações, Indivíduos, Prática, Diagnóstico, Adesão, and Intervenção<sup>9</sup> – present at least one other item related to the one that was selected. This indicates that all items, whether the lexical item or the transformed lexical item, can be characterized as lexical items by the application of LexisProbe: GTP.

The number of transformed lexical items may be different for a given lexical item. There is a lexical item – Educação<sup>10</sup> – at the top of Fig. 3 – which obtained four transformed lexical items. Lexical items with two transformed lexical items – Controle, Tratar, Adesão, Estudo, Participação, Resulta, and Complicação<sup>11</sup> – are found in the central section of the representation. Lexical items with only one transformed lexical item – Prática, Diagnóstico, Individual and Intervir<sup>12</sup> – are at the bottom of Fig. 3.

This number of transformed lexical items can be changeable according to the size of the corpus, as described in the Methodology, at least one of the items, the lexical or

<sup>9</sup> Items translated into English: Study, Control, Education, Participants, Treatment, Results, Complications, Individuals, Practice, Diagnosis, Adherence, and Intervention.

<sup>10</sup> Education in English.

<sup>11</sup> Items translated into English: Control, Treat, Adherence, Study, Participation, Result, and Complication.

<sup>12</sup> Items translated into English: Practice, Diagnosis, Individual, and Intervene.

the transformed lexical, must appear in the keywords list. Conditionally, the one that is not on the keywords list must be present in the corpus. Therefore, depending on the size of the corpus, the number of transformed lexical items from a given lexical item may be higher or lower.

The representation of Fig. 3 also reveals that half of the items selected through the keywords list – Participantes, Resultado, Complicações, Tratamento, Indivíduos, and Intervenção<sup>13</sup> (see Table 2) – are not the lexical items (LI) with the least number of morphemes. It indicates that they do not occupy the position of the circle in the top, they are considered transformed lexical items (TLI) and are located in the bottom circles.

It is important to notice that this result is restricted to the corpus used in this research. Thus, in another corpus, the items that are TLIs can be LIs, since these items can also be understood as lexical items depending on the transformation process from which the text builds lexical meanings. Ahead, Table 3 shows the segmentation of lexical portions and grammatical portions of each lexical item represented in Fig. 3.

**Table 3** – Identification of the lexical portion and grammatical portion of each item used in the application of LexisProbe: GTP – the corpus of academic articles

Lexical Item	Transformed Lexical Item				Lexical portion	Grammatical portion
Prática	Praticar				Pratic	a/ar
Diagnóstico	Diagnosticado				Diagnostic	o/ado
Individual	Indivíduos				Individ	ual/uos
Intervir	Intervenção				Interv	ir/enção
Estudo	Estudar	Estudado		Estud	o/ar/ado	
Participação	Participar	Participantes		Particip	ação/ar/ntes	
Resulta	Resultar	Resultado		Result	a/ar/ado	
Complicação	Complicada	Complicações		Complic	ação/ada/ações	
Controle	Controlar	Controlado		Control	e/ar/ado	
Tratar	Tratado		Tratamento		Trat	ar/ado/amento
Educação	Educador	Educando	Educativas	Educativo	Educ	ação/ador/ando/ativas/ativo

**Source:** Authors' elaboration.

The data in Table 3 indicate that all items selected for the application of LexisProbe: GTP in the corpus of academic articles have a lexical portion, carried out by the roots:

<sup>13</sup> Items translated into English: Participants, Result, Complications, Treatment, Individuals, and Intervention.

Pratic-, Diagnostic-, Individ-, Interv-, Estud-, Particip-, Result-, Complic-, Control-, Trat-, and Educ-, and a grammatical portion, performed by the morphemes: -a / ar, -o / ado, -ual / uos, -ir / enção, -o / ar / ado, -ação / ada / ações, -e / ar / ado, -ar / ado / ament, and -ação/ ador / ando / ativas / ativo.

The data in Table 3 also demonstrate that the root (lexical portion) of each lexical item, highlighted in the third column of this table, does not change with the implementation of LexisProbe: GTP, for example, the root Educ- remains the same for every transformed lexical item – Educator, Educando, Educativas e Educativo – from the lexical item Education. The portions, that are modified through LexisProbe: GTP, are the morphemes (grammatical portion) of the transformed lexical items.

This perception suggests that for the corpus of academic articles written in Brazilian Portuguese, which we are using in this research, the lexical portion of each lexical item applied in LexisProbe: GTP is responsible for instantiating the meaning of the lexical items, since it is a permanent part even after the transformation process occurred, generating those transformed lexical items. On the other hand, the morphemes (grammatical portion) of each lexical item vary according to the transformed lexical item; it is not a permanent portion.

The application of LexisProbe: GTP reveals that for an item to be considered a lexical item in Brazilian Portuguese, it must have a lexical portion and a grammatical portion as well. There are no lexical items with only a lexical portion or only a grammatical one. This assumption indicates that lexis and grammar can be conceived as two portions that work together to build lexical items in Brazilian Portuguese, being complementary portions. The grammatical portion, in turn, can be understood as the responsible for the process of transforming a lexical item into other lexical items, because it is the portion that admits changes throughout the transformation process.

In this sense, the analysis of the data obtained from the application of this protocol also indicates that, when the LexisProbe: GTP generates a transformed lexical item, the grammar inserts its grammatical portions, the morphemes, into lexical portions, developing a lexical item (or lexical items) to suppress a need of the register. From this point, the amount of transformed lexical items in a text increases, generating meanings that did not exist before. Thus, over time and according to emerging needs, the number of transformed lexical items in the language itself, in this case, Brazilian Portuguese, may also increase.

### **From the application of LexisProbe: RTP – the corpus of academic articles**

When we explore the concordance lines of the corpus of academic articles for each of the lexical items applied to LexisProbe: RTP, we perceive that there are co-occurrence patterns that are repeated with the same lexical item (see Table 4).

**Table 4** – List of items selected for the application of LexisProbe: RTP – the corpus of academic articles

<b>Items selected from the keywords list</b>	<b>Items that co-occurred with those from the keywords list</b>
Estudo	descritivo – transversal – multicêntrico – qualitativo – prospectivo – experimental
Educação	em diabetes – em DM – em grupo – em saúde – alimentar – individual – física – nutricional – terapêutica
Participantes	do estudo – do grupo – da pesquisa – da intervenção – diabéticos
Tratamento	do diabetes – do DM – da doença – medicamentoso – farmacológico – hemodialítico – dialítico – dietético – ambulatorial – conservador
Resultados	do estudo – da hemoglobina glicada – dos exames laboratoriais satisfatórios – semelhantes – favoráveis – positivos – clínicos – efetivos
Complicações	agudas e crônicas – autorreferidas do diabetes – crônicas do diabetes/DM – da doença – em membros inferiores – microvasculares
Indivíduos	com diabetes – com diagnóstico de DM2 – com DM – diabéticos
Prática	de atividade física – de/do autocuidado – clínica – assistencial – educativa – regular de atividade física
Diagnóstico	do diabetes – de diabetes – do DM – de DM – da doença – médico
Adesão	ao autocuidado – ao tratamento – dos pacientes – terapêutica
Intervenção	educativa – educacional – em grupo – individual – telefônica – nutricional

**Source:** Authors' elaboration.

The data in Table 4 show that the items in the first column, which can be characterized as lexical items by the application of LexisProbe: GTP, admit patterns of co-occurrence<sup>14</sup> with the items in the second column. The lexical item Estudo<sup>15</sup>, for example, co-occurs in the corpus of academic articles with the items: descritivo – transversal – multicêntrico – qualitativo – prospectivo – experimental<sup>16</sup>, producing the following lexical items: Estudo descritivo – Estudo transversal – Estudo multicêntrico – Estudo qualitativo – Estudo

<sup>14</sup> We established that patterns in this research are understood as the nominal groups that were found through the analysis of the co-occurrences of these lexical items – Estudo, Educação, Participantes, Tratamento, Resultados, Complicações, Indivíduos, Prática, Diagnóstico, Adesão, and Intervenção. In order to be considered a pattern, three or more occurrences of the lexical item in co-extensiveness with the same (nominal) group must be found. In other words, the lexical items in the first column of Table 4 must have at least three occurrences with each lexical item in the second column of the same table.

<sup>15</sup> Study in English.

<sup>16</sup> Items translated into English: descriptive – cross-sectional – multicentric – qualitative – prospective – experimental.

prospectivo – Estudo experimental<sup>17</sup>. Below, Table 5 demonstrates how the functions of the lexical item Estudo can be split into lexical functions and grammatical functions, considering the co-occurrences mentioned before, which are in co-extension with the group rank (nominal group).

**Table 5** – The split of lexical functions and grammatical functions considering the co-extension of the item Estudo with the group rank (nominal group).

Lexical functions		Grammatical functions		
Item selected from the keywords list	Items that co-occurred with that from the keywords list	Co-extension with the group rank	The split of the lexical item in co-extension with group rank (nominal group)	
			Thing	Classifier
Estudo	descritivo	Estudo descritivo	Estudo	descritivo
	transversal	Estudo transversal		transversal
	multicêntrico	Estudo multicêntrico		multicêntrico
	qualitativo	Estudo qualitativo		qualitativo
	prospectivo	Estudo prospectivo		prospectivo
	experimental	Estudo experimental		experimental

**Source:** Authors' elaboration.

The first section of Table 5, the two columns on the left, displays the lexical functions that are performed by the lexical item Estudo and by the other lexical items that co-occur with it in the corpus. The second section of Table 5, the two columns on the right, depicts the nominal groups' functions that are co-extensive with the lexical items of the first section.

Every lexical item co-extensive with a nominal group depicted in the third column of Table 4 have two functions: a Thing performed by a nominal word class, a noun: Estudo, and a Classifier performed also by a nominal word class, the adjectives: *descritivo – cross-sectional – multicentric – qualitative – prospective – experimental*.

The segmentation shown in Table 5 is also suitable for the other lexical items that are co-extensive with the group rank (nominal one) detailed in Table 4 because each of them has a Thing, which is co-extensive with the items in the first column of Table 4 – *Estudo, Educação, Participantes, Tratamento, Resultados, Complicações, Indivíduos, Prática, Diagnóstico, Adesão, and Intervenção*<sup>18</sup>. Besides, in most cases, these lexical items also have a Classifier, which is co-extensive with the items in the

<sup>17</sup> Items translated into English: descriptive study – cross-sectional study – multicentric study – qualitative study – prospective study – experimental study.

<sup>18</sup> Items translated into English: Study, Control, Education, Participants, Treatment, Results, Complications, Individuals, Practice, Diagnosis, Adherence, and Intervention.

second column of Table 4, and this Classifier can be performed by an element of the word rank (cf. Table 5) or by a prepositional phrase.

It is important to mention that these results corroborate the data found in Halliday (2002) about the fact that, in English, the lexical item can be co-extensive with one of the three classes of rank scale – group, word and morpheme. This proposal pointed out in Halliday (2002) can also be a possible feature for the lexical items selected for the application of LexisProbe: RTP. However, to Brazilian Portuguese, the lexical items, that are co-extensive with (nominal) groups, are also related to the register variables – field, tenor, and mode (cf. MARTIN; ROSE, 2008).

When the lexical items – Estudo, Educação, Participantes, Tratamento, Resultados, Complicações, Indivíduos, Prática, Diagnóstico, Adesão, and Intervenção<sup>19</sup> – selected for the application of LexisProbe: RTP co-occur with other lexical items, such as those presented at the second column of Table 4, they start to operate together in the text and a new meaning is designed. From this moment, this lexical item is understood as a single lexical item, which is co-extensive with the group rank, mainly, nominal group. Therefore, the lexical items selected for the application of LexisProbe: RTP are able to compound other lexical items that are co-extensive with the group rank through modifications in the register.

These results also suggest that co-extensiveness in Brazilian Portuguese enables lexical items to emerge in the language, instantiating new meanings according to the changes in the register variables of a set of texts. This assumption indicates that the co-extensiveness, understood in this research as the lexical item that is able to be co-extensive with more than one rank scale and more than one stratum, is the result of the influence of the register variables and may be responsible for increasing the language's potential of meaning-making production (see Fig. 4).

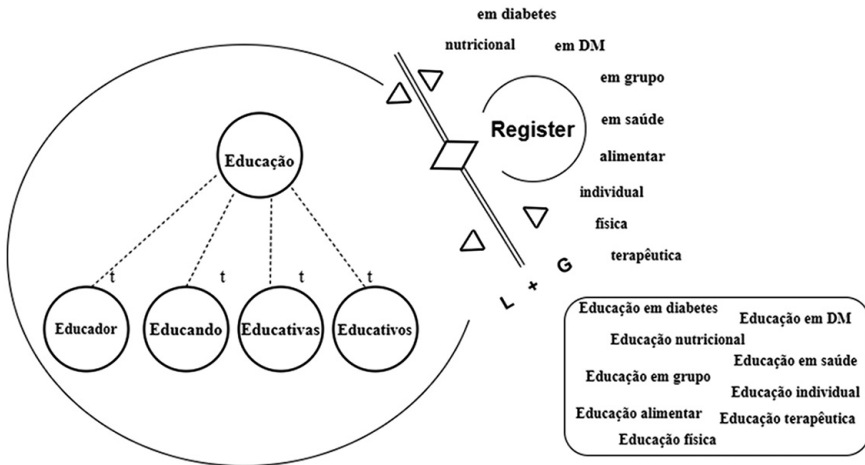
In addition, the results reveal how the relationship between the process of meaning-making production in the language is immediately related to the register settings. This indicates an aspect of the language's functionality in its context. This supposition reinforces the importance to deal with the corpus' quantitative component because it can be useful to improve a functionalist view in relation to the co-extensiveness between lexis and register.

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<sup>19</sup> Items translated into English: Study, Control, Education, Participants, Treatment, Results, Complications, Individuals, Practice, Diagnosis, Adherence, and Intervention.



**Figure 4** – Representation of LexisProbe: RTP – the corpus of academic articles



Source: Authors' elaboration.

In Figure 4, the semicircle located on the left represents the LexisProbe: GTP, which is an inherent part of LexisProbe: RTP. In the case of Figure 4, the lexical item used for the representation is *Educação*<sup>20</sup>, which appears inside the upper circle highlighted in bold and italics. This lexical item was selected for the representation of this protocol, because it was characterized as lexical, after the application of LexisProbe: GTP.

Following the methodological stage's steps established for LexisProbe: GTP, the item with the lowest number of morphemes is considered the lexical item, and appears in the upper circle, while the items with the highest number of morphemes are understood as transformed lexical items, and appear in the lower circles. For this reason, the lexical item *Educação* is located in the upper circle.

It is relevant to clarify that the lexical item that is going to be used for the application LexisProbe: RTP does not need to be in the upper circle of LexisProbe: GTP. Such lexical item can be classified as a transformed lexical item and be used for the application of the protocol as well, because, according to the parameters settled to LexisProbe: GTP, the lexical item and the transformed lexical item can be characterized as lexical items in Brazilian Portuguese.

Regarding the representation depicted in Figure 4, the items that appear around the register's semicircle comprise those that co-occur with the lexical item *Educação* in the corpus of academic articles. These items vary according to the register variables. This indicates that the lexical items formed by the co-occurrence of *Educação* with: em diabetes – em DM – em grupo – em saúde – alimentar – individual – física –

<sup>20</sup> Education in English.

nutricional – terapêutica<sup>21</sup> – may be different if the lexical item Educação, for example, appears in another register.

The co-occurrences, in turn, refer to lexical items formed by more than one component. In other words, the co-occurrences that appear inside the rectangle with rounded corners in the representation of Figure 4 concern the co-extensiveness between lexis (L) and grammar (G), since the lexical items that are formed by two or more components are in co-extension with the group rank.

Finally, it is important to notice that the nominal groups are not analyzed in this research, because they are a class of group rank, while this article addresses lexis as a theoretical concept. Besides, the nominal groups are used in this paper only to demonstrate that there are lexical items in Brazilian Portuguese composed by more than one component, which can be co-extensive to more than one rank and, therefore, can be co-extensive to more than one stratum (illustrated here by the register).

## Final Remarks

The paper departed from a functional view of language organization – thus assuming a natural interdependency between grammar and discourse semantics, and between language and register (context). Our aim was to complement the understanding of Lexicalization/Grammaticalization with the functionality of text in context through the description of transformation processes in Brazilian Portuguese.

Having as our motivation the problems faced by the points of view of module and continuity, the paper attempted to show how the meaning of a lexical item is not isolated from the remaining linguistic system, nor it is constrained to the stratum of grammar and the rank of word.

We departed from the need to understand lexis in more detail, especially when it is integrated to the overall architecture of language as a dimension. Then, we proceeded to model lexis in its co-extensive relation to other dimensions – stratification in particular. This leads to a more detailed view of lexis internal organization and how it is co-extensive to strata such as grammar and register.

Our investigation was carried out through the compilation of a corpus in Brazilian Portuguese and the development of two protocols of lexical investigation – one protocol for the grammar PTG and one protocol for the register PTR. Since the meaning of a lexical item is made in a given text and in the relation between texts (i.e., in co-text and context), the corpus was selected having as guideline ‘texts must belong to the same experiential domain of field’. For this paper, the texts are all research articles from Health Care in the topic of Diabetes Mellitus.

The protocols allowed a description of two processes of transformation, indicating how lexis is co-extensive to grammar and register.

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<sup>21</sup> Items translated into English: in diabetes, in DM, in group, in health, in food, individual, physical, nutritional, therapeutic.

The PTG showed how lexis operates together with grammar to form lexical items. In Brazilian Portuguese, specifically, all items are formed by a lexical portion and a grammar portion, and this is the reason why they can be transformed. This process is what allows the creation of new lexical items, which in turn may explain the meaning of the term ‘linguistic creativity’, that is frequent in the literature about Lexicalization.

The PTR showed how lexical items work together to form new lexical items for a specific register (particularly, the field). This is an analogous process to that of Lexicalization/Grammaticalization for the register – one that we shall call lexicalization/contextualization. In Brazilian Portuguese, the register transformation is typically realized in the grammar at group rank. Accordingly, the co-extensiveness of transformation between lexis and register is realized by the co-extensiveness of transformation between lexis and nominal group.

Our results suggest that the register in Brazilian Portuguese plays a fundamental role as important as the grammar’s role in the emergence of lexical items. This is due to the fact that new lexical items are specific for each context. The paper may contribute to the studies on the complementarity between lexis and grammar in two ways. First, it shows how grammar can be modeled co-extensively to lexis, thus avoiding problems of module and continuity views. Secondly, it shows how co-extensiveness expands beyond the grammar stratum, going up to the register. This opens the possibility for future explorations on the co-extensiveness between discourse semantics and lexis and expanding the present results to new register configurations as well.

## Acknowledgments

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RODRIGUES, J.; FIGUEREDO, G.; OLIVEIRA, F. A co-extensividade e organização lexical no português brasileiro: uma introdução descritiva a partir de uma abordagem sistêmico-funcional. *Alfa*, São Paulo, v.66, 2022.

- *RESUMO: Tendo por finalidade identificar princípios de organização do léxico segundo a Abordagem sistêmico-funcional (HALLIDAY; MCINTOSH; STREVEENS, 1964; MARTIN, 1992; HALLIDAY, 2002; FIGUEREDO, 2011), subsidiada por metodologia da Linguística de Corpus, o presente artigo explica dois processos de transformação pelos quais o léxico se integra aos sistemas da língua, quando relacionado ao eixo paradigmático nos estratos gramatical e do registro por meio da co-extensividade. Tem-se aqui como motivação o fato de que as concepções acerca do léxico modular – modelado como preenchimento de estruturas gramaticais – ou léxico contíguo – modelado como a gramática delicada – necessitam de maior elaboração quanto aos processos internos relativos à dimensão do léxico, bem como*

*às relações do léxico, para além da gramática, com o discurso e o contexto. Neste artigo, especificamente, investigam-se os processos de transformação da gramática e do registo, incluindo principalmente o desenvolvimento de protocolos para análise de processos internos do léxico, assim como a caracterização de como itens lexicais são demandados por um determinado registo.*

- *PALAVRAS-CHAVE: funcionalismo; léxico; co-extensividade; transformação da gramática; transformação do registo.*

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