

COGNITIVE-DISCURSIVE ANALYSIS BY MEANS OF THE TROPES SOFTWARE

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Abstract:

In this chapter we shall focus on an analytical model called the cognitive-discursive analysis, proposed by Rodolphe Ghiglione, Christiane Kekenbosch and Agnès Landré in 1995, which has the advantage of having been automatized by Pierre Molette and Agnès Landré under the name *Tropes*¹, an automatic discourse analysis software also available in Romanian.

Key words: Cognitive-discursive analysis, informatized discourse analysis, *Tropes* software.

1. Informatized discourse analysis

Rodolphe Ghiglione and his laboratory, *Groupe de recherche sur la parole*, from the University of Paris VIII, had previously worked on what was initially called the *propositional discourse analysis*. This model emerged in 1985, when Rodolphe Ghiglione, Benjamin Matalon and Nicole Bacri published *Les Dires analysées. L'analyse propositionnelle du discours*. Later, Rodolphe Ghiglione and Alain Blanchet would publish *Analyse de contenu et contenus d'analyses*, and thus the model was completed.

As already mentioned in the first paragraph, in 1995, Rodolphe Ghiglione, Christiane Kekenbosch and Agnès Landré launched the cognitive-discursive analysis (CDA), which aims to integrate two analytical models:

- a. *propositional discourse analysis* (PDA), cf. Ghiglione *et al.*, 1985; 1991. and
- b. *propositional predicative analysis* (PPA), cf. Kintsch and Van Dijk, 1978; Le Ny, 1979.

¹ [http://fr.wikipedia.org/wiki/Tropes_\(logiciel\)](http://fr.wikipedia.org/wiki/Tropes_(logiciel)) (accessed on 08.04.2020)

The cognitive-discursive analysis starts from the need to find a cognitive unit for the treatment of information received by the receiver and a syntactic unit likely to make it possible to clip the received discourse. Therefore, there is a cognitive dimension (how do we understand?) and a linguistic dimension (how do we clip the discourse?), which should correspond to each other. The processes of segmentation, reorganization, simplification of complex propositions are triggered by the cognitive system, which “adapts” the received discourse to the subject’s understanding.

These models show that there are different treatments from the sender to the receiver:

“The received information is processed by extracting elements under the constraint of a limited capacity, of memory, whereas the produced information is processed by accumulating elements under the constraint of a system of rules and a set of representations and objectives related to the situation of enunciation, but without an a priori limitation of the generated elements. It may not be too hazardous to state that discourse is understood and memorized predicatively, but it is produced syntactically.” (Caragea; Curaj, 2013, p. 56)

The propositional discourse analysis relies on two principles: the consideration of grammatical propositions as unit of analysis (defining a unit of univocal analysis) and the semantic classification of words in the text into large grammatical categories, grouping them into generating cores (or core references) “summing up” the discourse semantic structure within several argumentative models, which make it possible to extract the “actors” in the discourse (content) and organize them at the macro level.

Cognitive-discursive analysis adds the concept of event matrix, which is an abstract grouping of argumentative models. The method thus aims to point out two axes of constructing textual coherence: the text itself (the elements of the formulation and the connections between text parts) and the expression resulting from what the speaker wanted to communicate to the receiver (i.e. the cognitive operations underlying speech).

In 1998, Rodolphe Ghiglione, Agnès Landré, Marcel and Pierre Molette published *L'analyse automatique des contenus*, which focuses on automating this model by means of the *Tropes* software. We may say that, by then, both the model and the software had been completed.

2. Propositional predicative analysis (PPA)

The propositional predicative analysis, PPA for short, is a model that appeared in the early 1980s – in a field of research dominated by the American and French directions, concerned with discourse analysis or content analysis –, and was proposed by a few cognitive psychologists interested in how subjects store information (this is the age of cybernetic advances!), in order to better understand the process of receiving information, of memorizing, as well as the storage formats of information transmitted in communication.

Kintsch and van Dijk's model of text comprehension (1978) is among the first to approach the meaning of the text in terms of representing memory as a coherent structure, highlighting complex cognitive processes operating in reading, parallel and interactively. The idea is to represent the text meaning through a list of proposals. Text units are described as propositions, defined as the smallest linguistic units, each one consisting of a predicate, which specify the content of the relation, and one or several arguments, which specify the objects involved in the relation. The predicate refers to the properties of "objects" or expresses the relations among them. These are generally verbs, adjectives, adverbs, connectors or quantifiers. Meanwhile, the arguments correspond to individual elements (agent, object, instrument) and are ordered according to their semantic role in relation to the predicate.

Text meaning may be represented through a network of propositions, organized in cycles, each cycle corresponding to a proposition. By implementing these cycles, two types of major processes might occur and run in parallel, each referring to the level of structuring of a text during the comprehension activity: the microprocesses, which refer to the local structure called text microstructure, and the macroprocesses, which refer to the global structure underlying the discourse, called macrostructure.

The basic question was: what exactly, how much and in what way does the subject retain the information transmitted by the discourse? Initially, the *proposition* (the predicate and its arguments) was considered as the minimal segmentation unit. The working hypothesis was that information is stored in a propositional form. Gradually, as the experiment unfolded and the corpus was constructed, it was possible to prove, based on the results obtained, that taking only the propositional form into consideration was not

enough. Thus, new terms such as *schema*, *script*, *mental model* (Johnson-Laird, 1983), *situation model* (Van Dijk and Kintsch, 1983) were introduced in order for one to be able to discuss a number of aspects related to discourse understanding and the role of the subject's previous knowledge in the act of receiving the information.

Thus, according to this theory, the subjects construct the global meaning of what is received through discourse within the discursive referential frame, based on language knowledge and on recognizable references, activating some of the receiver's knowledge of the world and life.

It was noted, from the beginning, that not all propositions have the same importance for the receiver in the process of understanding, re-elaborating and retaining the discourse. This means that receivers filter what they receive according to their receiving strategies. Memory works, therefore, selectively, in accordance with hitherto unknown laws. Any discourse, regardless of its degree of structuring, should have referential coherence, text coherence and argumentative coherence of elaborated statements:

“An individual X (the producer) attempts through his/her discourse to guide the receiver Y communicatively, allowing the latter to anticipate, infer propositions, that is, to understand. In order for the receiver Y to acquire the meaning of the message, he/she should have the sometimes illusory certainty of having understood it, which implies overcoming linguistic (terminological), social or cognitive obstacles. The illusion of understanding does not disarm the theoretician. At any rate, something is transmitted and whatever is transmitted is neither indifferent nor absolutely random. Otherwise, the very social coherence may be called into question.” (Caragea; Curaj, 2013, p. 58)

Thus, when a large number of people were asked to mark the propositions they considered important in a particular discourse, it was noted that there were some propositions one finds in all segmentation solutions, which make up a set of essential statements and which are, according to Rodolphe Ghiglione – who extends the PPA –, the *fundamental structure of signification* (‘structure fondamentale de signification’ *SFS*) of the discourse:

“This is not an exclusively causal structure, as causal coherence combines with the referential one. For operationalization, we are offered a framework for selecting the propositions that are part of the *SFS* as well as those which,

hypothetically, should not be included. We shall further enumerate only the rules that make a certain proposition part of the SFS. These rules are of two kinds:

- *rules regarding linear coherence*, which allow the inclusion of propositions with a functional role in the text (they introduce the theme, main characters and episodes of the story) and of propositions rendering an event essential to the progression of the story, closely related to the theme of the narrative (text);
- *rules regarding global coherence*, which allow the inclusion of propositions expressing causalities, consequences, results, goals, directly concerning the events described in the text.

These hypotheses were validated through a number of group experiments in which analyses were conducted based on newspaper articles, information broadcast on radio and television, which entailed two conclusions:

- the propositions belonging to the SFS are much more likely to be retained than the others;
- the propositions expressing causal relations (global coherence) are much more likely to be retained than the others (linear coherence).” (Caragea; Curaj, 2013, p. 59)

The fundamental structure of signification is the fabric of the text and, of course, the result of a process of selection or filtering. Thus, it has been noted that propositions expressing causal relations are more likely to be retained as opposed to the others. Similarly, in turn, propositions belonging to the fundamental signification structure are much more likely to be retained by the receivers, as compared to the others.

This theory based on cognitive psychology, completed by the fundamental structure of signification, which concerns the processes of understanding, re-elaboration, memorization, recall and reinstatement, would later be integrated into the *cognitive-discursive analysis*, formulated by Ghiglione and his collaborators.

3. Propositional discourse analysis (PDA)

As early as the 1980s, Rodolphe Ghiglione approached discourse analysis from his perspective as a social psychologist. The propositional discourse analysis, PDA for short, is a model published by Ghiglione and his collaborators in *Les Dires analysées. L'analyse propositionnelle du discours*

(1985) and finalized in 1991 (Ghiglione; Blanchet, 1991). Initially applied to the analysis of re-transcribed sociological inquiries, the PDA is carried out in four stages.

The first one refers to establishing a list of core referents ('référents noyaux'). Core referents are semantic paradigms of the text to be analysed. Or, as the authors of the method state, these paradigms are the main subjects involved in the text propositions. A core referent consists of a generic term and a set of equivalent terms (later, core referents were to be renamed core references). Thus, the core referent "prime minister" (generic) may have equivalent terms in the discourse: "premier", "he", "this" etc.

"This technique occurs as if one had previously conducted a thematic analysis, more specifically, an identification of themes presents in the discourse to be analysed." In this way, "the list of core referents is decided based on its ability to meet the expectations the analyst may formulate about the discourse that he/she needs to analyse, although the latter is now presented as a text." (Massu, 1991, p. 8)

The second stage is the stage of rewriting the text. Rewriting implies associating the core referents with the set of propositions in which they occur. Thus, *"... the proposition is presented as a textual segment of the interlocutor's discourse. This segment can be identified, as it will have received the formal markers of the proposition accurately constructed in the considered language, namely compliance with grammatical rules, punctuation marks, in short, with the elementary codes of the language used."* (Massu, 1991, p. 8)

The third stage regards the reduction of propositions. In this stage, the largest possible number of propositions that are not part of the argumentative structure of the analysed text are eliminated:

"In any case, this stage of reduction of proposition is a set of operations which cannot be purely syntactic, as the application of the method principles sensu stricto would have required." (Massu, 1991, p. 16)

The fourth stage deals with the generalization of proposition and the formulation of argumentative models. These models rely on the act, i.e. the verb, classified into one of the three categories:

- stative verbs, those which have *to be* and *to have* as archlexeme; hence, they indicate a state or possession;

- factive verbs, those which have *to do* as archlexeme; hence, they indicate an action;

- declarative verbs, those which have *to say* as archlexeme; hence, they indicate a statement.

Therefore, the basic unit is, as in the previous model, *the proposition*, which is however not clipped according to the logico-semantic principle, as in the propositional predicate analysis (PPA), but according to the rules of syntax.

A proposition is a micro-universe consisting of at least one *actant* and one *act*, in other words, a subject and a predicate. This reduction leads one to the primary mode from which discourse is constructed by the sender. As we have seen, discourse cannot be conceived without a subject, and the subject imposes an act (predicate), as the PPA also states. Thus, if the PPA tries to highlight what is significant to the receiver, what the receiver understands and retains from the discourse, the PDA allows one to analyse how the sender elaborates and organizes his/her own discourse.

The theory of the propositional discourse analysis proposes a number of analytical categories: *references* (nouns or pronouns, particularly personal pronouns, in the position of *actant* or *acted*); *verbs*, divided into three large classes: *factives*, *statives* and *declaratives*; *modalities* (adverbs which may be placed in various positions: ‘now’, ‘then’, ‘perhaps’, ‘certainly’ etc.) and *connectors* (linking elements), which chain units and ensure discourse coherence.

“We would like to mention the introduction of the models of argumentation (MA), which enable one to describe the proposition in a sufficiently abstract form (simplified formal modelling) in order to allow aggregations, fusions, dissociations, comparisons. Thus, if the PPA deals with a subject that has structuring knowledge of the world and a strategy of history unfolding, the PDA aims to highlight the cognitive activities underlying the discourse. It is, therefore, stated, that language elements are both components of the system of representation and cognitive operations or attitudes, as we have previously said.” (Caragea; Curaj, 2013, p. 60-61)

The propositional discourse analysis promotes a central concept: *reference-generating core* (‘noyau générateur de la référence’ NGR). It consists of the proposition(s) describing the main event or events and their consequences. This type of analysis also has filter models: the identification of the main actors (the most frequent *references*); the highlighting of the

models of argumentation to which the actors belong; the establishment of the *event matrix*, in other words, of the main event and its cause or causes.

In later versions, the actors may occupy either the position of actant (subject) or that of acted (object). Among them, the protagonists or main actors stand out as well as those actors occupying the “scene” of discourse the most, that is, those that are most talked about.

“The event matrix or the generating core appears as ‘a macro-episode which can be described by Pavel’s binary model (1976), according to which one moves from a disturbed universe to a restored universe.’² Furthermore, this core may also be described as macro-propositions extracted by inference from the body of propositions belonging to the SFS. It is, whichever way one looks at it, a process of condensation, of aiming to reach the gist of a text. As ‘heart’ of the narrative structure, the generating core allows, through a number of circumstantial questions such as: where?, when?, how?, why?, what for?, for the reinstatement of the SFS.” (Caragea; Curaj, 2013, 62)

If in the PPA the *fundamental structure of signification* is responsible for what the receiver retains, in the PDA the *reference-generating core* is the ‘engine’ that sets the production of discourse by the emitter in motion. The *references* or *actors* occupy the discursive scene according to the *models of argumentation* and the *event matrix* elaborated by the sender in an order that he/she has established.

The two models of analysis, the PPA and the PDA, were to merge into a third integrative model, the *cognitive-discursive analysis*.

4. Cognitive-discursive analysis (CDA)

As we have shown in the preamble, this model was developed by Rodolphe Ghiglione and his collaborators in 1995. In order to merge the two analytical models into an integrating one, it was first necessary to show that the similarity between these two could be considered as consistent:

“Thus, if one considers the propositions belonging to the SFS and those resulting from the NGR, one may note a number of common elements.

² T. H. Pavel, *La syntaxe narrative des tragédies de Corneille*, Klincksieck, Paris, 1976.

At the level of the *enunciation*: ‘Who does/is, has/says what, with whom, why?’ (we have expressed the question using the three verb types and aiming to discover the actant, the adjuvant and the cause).

At the level of the *receiver*: ‘With what effect on understanding, memorization or reinstatement?’.

At the level of the enunciation, ‘who/with whom?’ refer to the core reference play staged by story characters.

‘What/How’ refer to the unfolding of the story, on the one hand, and to its belonging to such reasonings as: causes/effects, means/objectives, goals/results, on the other hand.

‘Why/What for?’ refer to mechanisms which allow for understanding, memorization and reinstatement.” (Caragea; Curaj, 2013, p. 63-64)

This new model postulates linguistically and pragmatically competent subjects, able to elaborate and communicate intelligible statements. Understanding is not only a matter of linguistic text coherence, but also of how textual information interacts with the receiver’s cognitive structures.

Thus, there are three types of coherence: *local or linear coherence*, which depends on the implicit and explicit relations between two neighbouring propositions and which allows the concatenation of statements of a discourse; *global coherence*, which depends on the implicit and explicit relations among text propositions, providing the presentation of facts and events and their inclusion in such reasonings as: causes/effects, means/objectives, goals/results; finally, there is a *fundamental coherence*, present in the SFS, which responds to some principles of logic necessity related to the establishment of the theme and discursive progression.

In terms of the receiver, one may also refer to a *cognitive coherence*, which has to do with the compatibility between mental and situation models employed by the text and those pertaining to his/her experience. It is not only a question of understanding what is transmitted, but also of what the receiver can retrieve from the received text.

“There is an assumption that one should remember for its axiomatic character: the representations elaborated by the receiver rely on representations of common knowledge from the repertoire of the collective mentality. It is, therefore, a common set of information acquired by social contact throughout one’s life, in the absence of which no specific type of

knowledge would be possible. Thus, any object is exposed and inscribed in a history or rationality.

With regard to the text, it is necessary to have propositions that should introduce the main actors, actions, events or their states and opinions on the stage, that should support the causal coherence, so that they may be retained by the receiver.” (Caragea; Curaj, 2013, p. 65)

The principles of the cognitive-discursive analyses were synthesized by the authors as follows:

- “any discourse is part of a communication contract and aims to influence the other (listener, reader);
- any discourse is part of an ‘interdiscourse’, but it is, at the same time, a product of ‘here and now’, which specifically updates the communication contract, regardless of its nature;
- any discourse enacts worlds belonging to a constructed history, following the rules of cohesion, coherence, consistency and the causal relations;
- any discourse includes the traces of cognitive operations performed by a speaker or a writer staging something with a certain purpose, meaning or intention;
- any discourse may be questioned, considering the abovementioned, in terms of the meaning it conveys and the intentionality it manifests.” (Caragea; Curaj, 2013, p. 66)

5. Informatization of analytical models: *Tropes* software

As the basic unit of analysis is the *proposition*, in a syntactic sense, the first task of the software is to divide the text into propositions, which implies the analysis of punctuation and connectors, and reduce inflected forms to their canonical shape, i.e. lemmatization of the text.³

³ The figures were reproduced after Pierre Molette, *De l'APD à Tropes: comment un outil d'analyse de contenu peut évoluer en logiciel de classification sémantique généraliste*, conférence au colloque „Psychologie Sociale et Communication”, Tarbes, 2009.

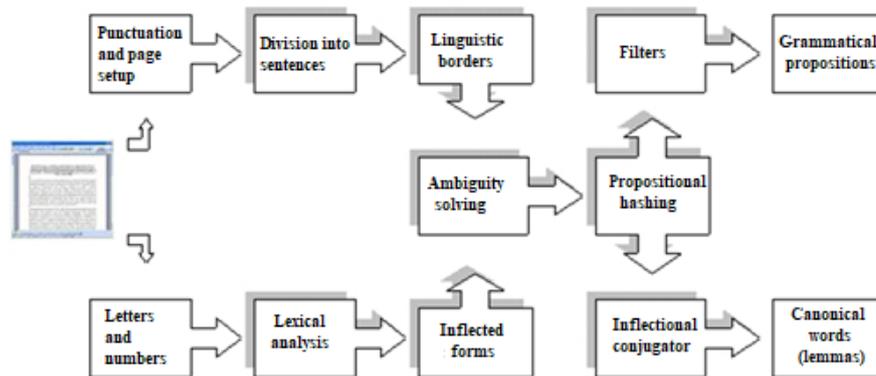


Figure 1. The schema of dividing the text into propositions and reducing the inflected forms to the lemma (Molette, 2009)

It should be noted that the software allows the treatment of morphological homonyms (“sare” – noun and verb) in order to conveniently find the lemma of each of these forms. Naturally, this treatment does not cover all contexts, but the error may be considered as stylistically irrelevant.

#Pisica nu sare gardul la vecini.
 Nu am voie
 să mănânc pâine cu sare.
 Se spune în popor
 că aşchia nu sare niciodată departe de copac.
 Citeşte o pagină şi sare două
 ca să termine cartea.
 Dincolo de oraş este un munte de sare.
 Cine sare cel mai departe, câştigă concursul.
 Nimeni nu sare peste un obstacol atât de mare.
 Dacă faci pilaf,
 trebuie să adaugi mai multă sare şi piper.
 Ea sare cel mai bine coarda.
 Prinţesa i-a mărturisit împăratului
 că îl iubeste ca vârful de sare în bucate t

Figure 2. The analysed morphosyntactic categories and the problem of ambiguity.

As can be seen, *Tropes* deals with ambiguity by morphosyntactically analysing a set of propositions. Verbs are coloured differently from nouns, as are connectors, modalities, pronouns, adjectives. As can be seen, in the propositions

above, “sare” was accurately treated either as a noun or as a verb, which means that the software analyses the syntactic context of each statement.

“**Tropes** was the first software in the world that aimed to solve the problem of morphological ambiguity and, as we shall see, of the semantic one, taking a decisive step in the automatic analysis of the text, which is all the more important, as can be observed, because in language one of four words is ambiguous.” (Caragea; Curaj, 2013, 71)

Thus, the entire lexical material is included in the morphosyntactic categories with which the software operates, namely:

- **nouns**, common and proper. They are considered, according to the PDA, *references*, i.e. carrying pertinent information, and will be included in semantic networks (equivalent reference classes), according to an ontology or semantic classification with which the software operates;
- **verbs**, divided, according to the PDA model, into *factive* (expressing actions), *stative* (expressing state or possession) and *reflexive* (expressing thoughts about the world, objects, feelings);
- **connectors**, i.e. conjunctions, conjunctive phrases, relative pronouns and adverbs, which introduce *condition*, *cause*, *goal*, *coordination*, *disjunction*, *opposition*, *comparison*, *time* and *place*;
- **modalities**, especially *adverbs* and *adverbial phrases*, classified into the following subcategories: *time*, *place*, *manner*, *assertion*, *doubt*, *negation* and *intensity*;
- **adjectives**, divided into *subjective*, expressing subjectively perceived properties, such as “mare” (‘big’), “adevărat” (‘true’) etc., *objective*, expressing objectively perceived properties, such as “românesc” (‘Romanian’), “științific” (‘scientific’) etc., and *numeral*, grouping the numerals;
- **personal pronouns**;
- **determiners**, i.e. articles, prepositions, some pronouns and pronominal adjectives, such as demonstrative, indefinite etc.

Tropes lists all these classifications (except that of *determiners*) and indicates the number of occurrences in the text and the percentage in relation to the main category.

With a view to present this software, we have chosen the novel *Ciuleandra* by Liviu Rebreanu, a text which is available online⁴, free of charge.

In the figure below, we can see, on the left, the list of these categories (verbs, connectors, modalities etc.). On the right, there are the extracted propositions (in a slightly broader context) in which the elements of a certain category are displayed. Thus, we may note all the adverbs and adverbial phrases of time (a total of 817). This category accounts for 21.1% of all modalities which appear in Rebreanu's text.

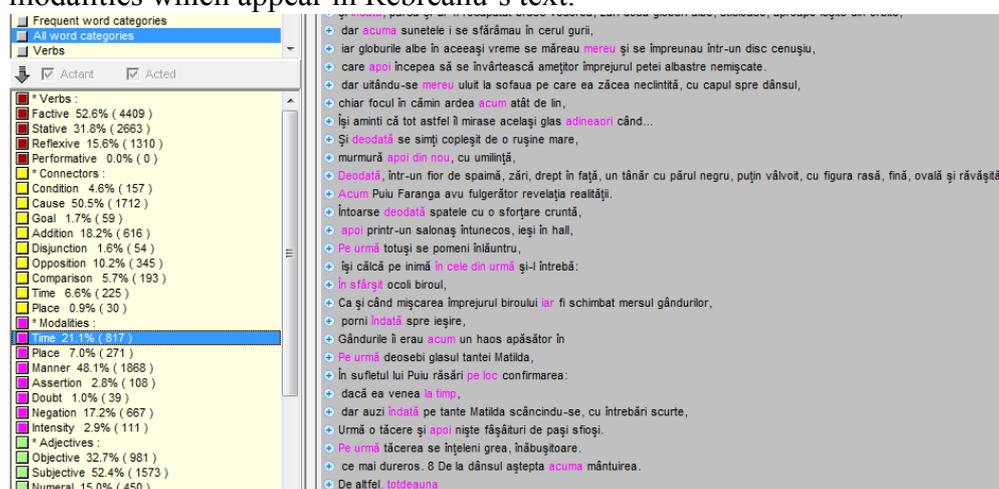


Figure 3. The analysed morphosyntactic categories, number of occurrences and their weight.

As we have mentioned, common nouns and some proper nouns (such as geographical names) are called *references* or *classes of equivalent terms* when the semantic reduction has already been carried out according to an ontology. Thus, “cap” (‘head’) includes a number of meronyms such as “ochi” (‘eyes’), “obraji” (‘cheeks’), “frunte” (‘forehead’) etc.

⁴ <http://cartibunegratis.blogspot.com/2017/02/ciuleandra-liviu-rebreanu.html>, accessed on 13.03.2020

Therefore, by morphological reduction (lemmatization) and semantic reduction, *references* are integrated into two hierarchical *fields* (1 and 2), which allows one to observe the themes occurring in the text. Thus, there are such terms as “ochi”, “obraji”, “frunte” etc; the software deduces that the text is about “cap”, which, in turn, is integrated into “corp” (“body”).

Tropes calculates the number of occurrences, which are displayed in alphabetical or descending order. The most frequent *references* and *reference fields* will occupy the first places, being considered the main actors. Selecting any of these concepts, one can visualize the terms in the context. This semantic reduction is done using the dictionary included in the software or by means of a specific classification called *scenario*, designed by the analyst based on their own needs. The two analyses, morphosyntactic and semantic, are schematically presented below⁵:

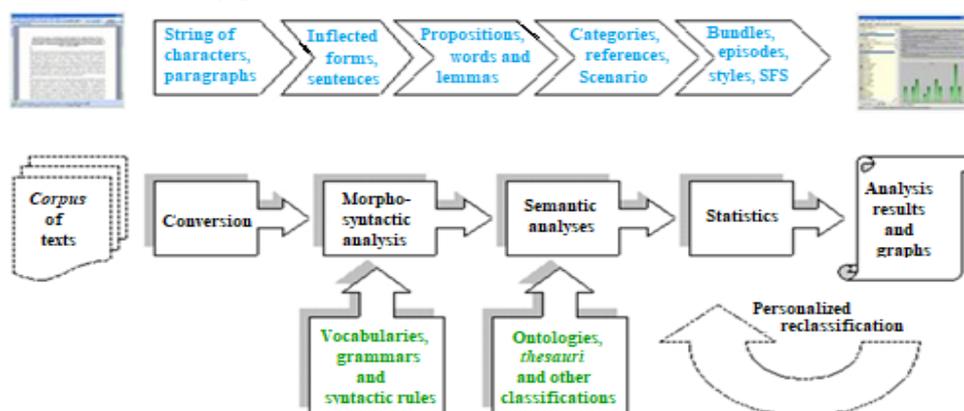


Figure 6. Morphosyntactic and semantic analysis schema (Molette, 2009).

In this schema, at the top of the picture, one can note the five stages of the analysis, starting with the punctuation and page setup analysis and finishing with the discursive styles and the general structure of signification.

At the bottom of the image one can see the functioning, of particular interest when one considers the textual corpus. The results here are statistical and graphical. When analysing the corpus, one may use personalized

⁵ *Apud* Pierre Molette, *op. cit.*

classifications, ontologies etc. Other times, researchers use tree classifications such as *thesaurus*, as in the library science. Classifications may be permanently enhanced, reorganized in such a way as to make sure that one dominates the reality of the corpus.

Verbs, adjectives, modalities and connectors are also classified according to the PDA grammar and can be taken, if one wishes, in one's own *scenario*. Let us suppose that one wishes to recover the statements containing the concept of "frică" ('fear'). In addition to the synonymous nouns: "groază" ('dread'), "spaimă" ('scare'), "panică" ('panic'), one may add to the *scenario* such verbs as "a înfricoșa" ('frighten'), "a înspăimâta" ('terrify') etc. or adjectives: "înfricoșător" ('frightful'), "înspăimântător" ('dreadful') etc.

In addition to calculating the number of occurrences of a reference and instantly locating it in the text, *Tropes* provides three types of referential analyses: of co-occurrence, of distribution and chronological.

The co-occurrence analysis enables one to understand the *relations* between references. The more frequently a co-occurrence appears, the more strongly those particular terms are related.

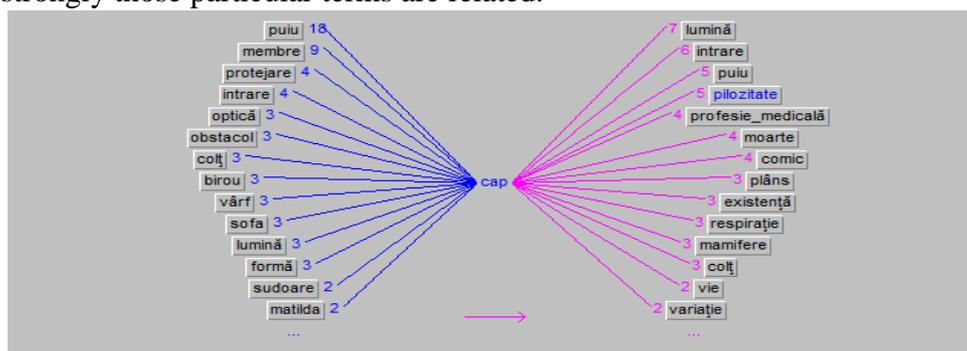


Figure 7. Co-occurrence graph.

In the graph above, we notice that the reference "cap" has 23 relations with "Puiu Faranga". In 18 propositions, "Puiu Faranga" occurs as the *actant*, to the left, and in 5 other propositions "Puiu Faranga" occurs as the *acted*, to the right, in relation to the term "cap". Below we shall reproduce some of the extracted propositions:

Degetele și le înfipse în gâtul ei plin și alb parc-ar fi vrut
 Repeta același cuvânt, cu același glas horcât, forând pe nas rar, prelung. Ochii lui umflați nu vedeau totuși nimic,
 ca și când s-ar fi coborât peste ei un obositor vâl roșu...Intr-un târziu, o atingere molatecă îi cuprinse brațele, numai câteva clipe,
 ochii ei înmărmuriți într-o lucire de spaimă resemnată. Privirea îl ustura ca o muștrare nesuferită:
 dar acum sunetele i se sfărâmau în cerul gurii, hârâitoare și uscate, iar globurile albe în aceeași vreme se măreau mereu și se împreunau într-un disc cenușiu,
 iar capul cu ochii morți, de sticlă, îl privea căscând gura către el, amenințator.
 dar uitându-se mereu uluit la sofa pe care ea zăcea neclintită, cu capul spre dânsul,
 Sudorile îi curgeau pe obraji ca lacrimile. Și totuși mai rău îl supăra tăcerea încât,
 deși avea ochii ațintiți asupra sofalei, sufletul lui nu voia să vadă nimica de frică
 cu ochii rățâciți, îmbrăcat în frac, dar cu manșetele ieșite din mâneci, cu plastronul frământat și o aripă a gulerului ridicată

Figure 8. Propositions extracted following the co-occurrence analysis.

The distribution analysis indicates, in a graph, in what area of the text a certain reference or reference field occurs. It may thus be noted whether a character, for example, appears only in a certain chapter in the novel or if he/she appears throughout the novel.

A certain reference, in this case “ciuleandra”, occurs more frequently in the second part of the novel (9 and 21 occurrences, respectively). The last reference is the following:

“Fără a se opri din joc, Puiu întoarse capul, surâse către tatăl său și-i răspunse:
 — C'est “Ciuleandra”, vous savez?... Vous m'avez permis, n'est-ce pas?
 C'est vous qui m'avez dit: “Vas-y!” Alors vous ne pouvez pas être fâché,
 papa! Et puis c'est très amusant... oui... très...”

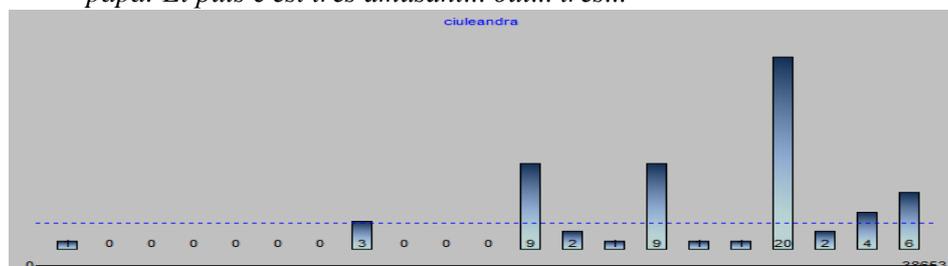


Figure 9. Distribution analysis.

The chronological analysis shows the order of entry of references. This is done by highlighting the *episodes*, i.e. the groups of references occurring together in a certain area of the text, isolated by certain connectors.

“When the narrator changes the set of references, looking away to another scene, the software detects this change. The narrator’s persistence on a certain reference is called *bundle*. This concept, equivalent to *focus*, is decisive in the chronological analysis of a text, because it allows the

separation of episodes and a positioning of a reference in history as well.”
(Caragea; Curaj, 2013, p. 79-80)

The chronological analysis of the first chapter indicates that it consists of 5 episodes, of variable sizes, and that the character “Madeleine” appears in episode 4:

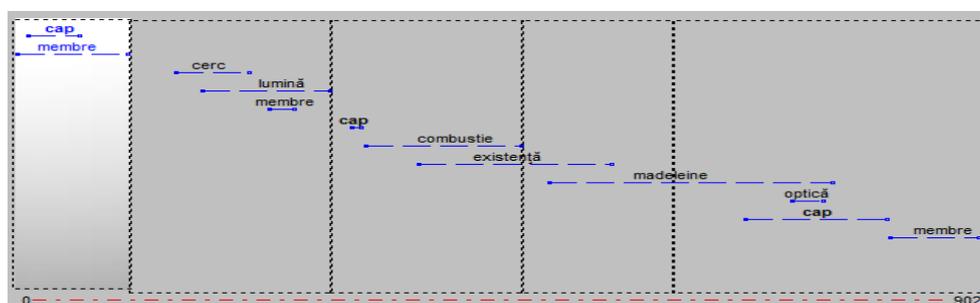


Figure 10. Chronological analysis.

The chapter begins with the core reference “cap” (“Degetele și le înfipsese în **gâtul** [s.n.] ei plin și alb parc-ar fi vrut să înăbușe un răspuns de care se temea.”) and ends with “membre” (“limbs”) (“Degetele și le înfipsese în **gâtul** [s.n.] ei plin și alb parc-ar fi vrut să înăbușe un răspuns de care se temea.”). The author’s insistence on a certain reference is called bundle. In figure 10, one can see that the core reference “membre” occurs in the form of three bundles. Here are the respective contexts:

O prăvălise pe sofa și cu **genunchiul** drept, îi zdrobea sânii. **Degetele** și le înfipsese în gâtul ei plin și alb parc-ar fi vrut să înăbușe un răspuns de care se temea. Îi simțea corpul zvârcolindu-se, întocmai ca sub o îmbrățișare fierbinte, într-un târziu, o atingere molatecă îi cuprinse **brațele**, numai câteva clipe, și apoi se topi, neputincioasă. că trebuie să fie **mâinile** ei, încercând să se apere. Și atunci, deodată și foarte deslușit, Un simțământ greu de leșin îi înmuie **brațele**. I se părea că are să se prăbușească și căuta disperat un sprijin... sări trei pași înapoi. **Degetele** îi rămaseră rășchirate și țepene. Se uită împrejur năucit. Făcea eforturi să se orienteze. Razele becurilor, gălbui și filtrate, îl dureau, **Brațul** Madeleinei, alb și rotund, alunecase jos, oprindu-se pe gâtul ursului parc-ar fi vrut **brațul** ei se lăsase într-o mișcare vie #și tocmai acestea îi spuseră mai limpede ca și când și-ar fi smuls **picioarele** dintr-o țintuire, și porni afară pe ușa deschisă a dormitorului. În șira spinării o **mână** urmăritoare îl trăgea înapoi

Figure 11. A bundle.

As we have seen, the cognitive-discursive analysis (CDA) aims at separating the significant propositions that make up the *fundamental structure*

of signification. Thus, following a comparative assessment of all text propositions, one obtains the so-called *essential propositions* (the most important parts of the text that can be retained by the receiver), i.e. the skeletal structure of the discourse.

Based on more complex calculations, *Tropes* extracts the *essential propositions* from the text. It is the text framework or, as we have previously mentioned, the fundamental structure of meaning. These are the first essential propositions of the text:

- + O prăvălise pe sofa și cu genunchiul drept, îi zdrobea sânii. Degetele și le înfipsese în gâtul ei plin și alb parc-ar fi vrut
- + Repeta același cuvânt, cu același glas horcăit, forăind pe nas rar, prelung. Ochii lui umflați nu vedeau totuși nimic,
- + că trebuie să fie mâinile ei, încercând să se apere. Și atunci, deodată și foarte deslușit,
- + și îndată, parcă și-ar fi recăpătat brusc vederea, zări două globuri albe, sticloase, aproape ieșite din orbite,
- + ochii ei înmărmuriți într-o lucire de spaimă resemnată. Privirea îl ustura ca o muștrare nesuferită:
- + iar capul cu ochii morți, de sticlă, îl privea căscând gura către el, amenințător.

Figure 12. Essential propositions.

In order to better understand this filtering, we shall reproduce the text and highlight the respective propositions:

“— Taci!... Taci!... Taci!...

O prăvălise pe sofa și, cu genunchiul drept, îi zdrobea sânii. Degetele și le înfipsese în gâtul ei plin și alb parc-ar fi vrut să înăbușe un răspuns de care se temea. Îi simțea corpul zvârcolindu-se, întocmai ca subț o îmbrățișare fierbinte, și zvârcolirea îl înfuria mai nătâng.

— Taci!... Taci!...

Repeta același cuvânt, cu același glas horcăit, forăind pe nas rar, prelung. Ochii lui umflați nu vedeau totuși nimic, ca și când s-ar fi coborât peste ei un obositor văl roșu...

Într-un târziu, o atingere molatecă îi cuprinse brațele, numai câteva clipe, și apoi se topi, neputincioasă. El își dădu seama, ca prin vis, **că trebuie să fie mâinile ei, încercând să se apere.** Și atunci, deodată și foarte deslușit, își auzi propria-i voce, aspră, strâmbă, gâfâită, răbufnind ca dintr-o adâncime de pivniță. Îi trecu fulgerător prin gând, “ce glas!” și **îndată, parcă și-ar fi recăpătat brusc vederea, zări două globuri albe, sticloase, aproape ieșite din orbite,** cu o fină rețea de vinișoare roșii încercuind o pată rotundă albastră-viorie: **ochii ei înmărmuriți într-o lucire de spaimă resemnată.**

Privirea îl ustura ca o muștrare nesuferită:

— Ta... a...”

The *general style* of the text is further established by analysing the distribution and weight of verbs (factive, stative and declarative), adjectives (subjective, objective and numeral) etc. as well as the setting strategies. Using the suggestions of P. Charaudeau (1992), *Tropes* distinguishes four styles:

- *enunciative*: it establishes a relation of influence, force or demand between the speaker and the interlocutor; reveals the speaker's standpoint (opinions, appreciations, assessments); reveals the standpoints of other speakers or opiners;
- *descriptive*: it designates or states the discursive objects, locates or places them in space and time, classifies and characterizes them as objective or subjective;
- *narrative*: it shows the sequence of actions that are chained together, influencing each other, changing the actors and the setting;
- *argumentative*: it is addressed to the interlocutor as reasoning, being the expression of the speaker's beliefs, explanations and justifications transmitted in order to persuade the former.” (Caragea; Curaj, 2013, p. 82)

Tropes classifies the general style of the novel *Ciuleandra* as rather *enunciative*.

We shall further reproduce the way of integrating the propositional discourse analysis and the cognitive-discursive analysis into the *Tropes* software as well as their results presented to the right of the graph:⁶

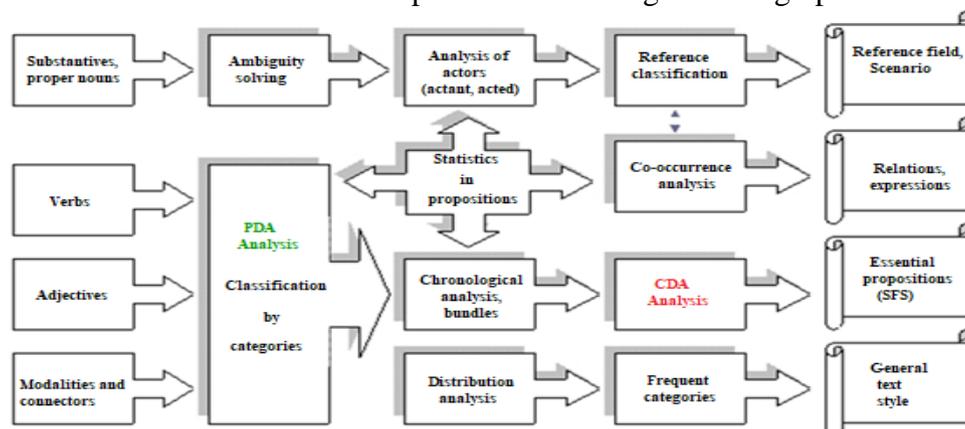


Figure 13. General graph of *Tropes* software analyses.

⁶ Cf. Pierre Molette, *loc. cit.*

Therefore, the *Tropes* software helps one reconstruct, more easily and more precisely, the reference field in the analysed texts, point out the essential and recurrent utterances (called ‘remarkable’ in the respective metalanguage) in the general message structure and establish, with more accuracy, the system of relations between the ideas advanced and the expressions which ‘clothe’ them. Sometimes, this program reveals what the sender conveys involuntarily, because the recurrence of expressions, utterances etc. is recorded by the software. In general, one can get a fairly accurate idea about the real style of communication which reflects, naturally, the speaker’s true personality.

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