Natural Language Processing (NLP) resources applied to the David Liberman Algorithm (DLA) research methodology for the analysis of patient and therapist wishes

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Background: The aim of the present study is to upgrade the David Liberman algorithm (DLA) discourse analysis methodology computerized dictionary so that it may acquire more sophisticated functionality and allow more refined in-session patient and therapist discourse analysis.

The DLA discourse analysis computerized dictionary
Created by DLA methodology developer David Maldavsky

DLA discourse analysis method takes place on 3 levels: words, speech acts, narrations. The level of words is analyzed by means of the computerized dictionary whilst the level of speech acts and narrations is analyzed manually.

DLA wish categories
The dictionary consists of more than 700.000 words derived from 7.500 roots assigned to one or more of the 7 wish categories based on Freudian theory.

DLA wish categories

IL	O1	O2	A1	A2	UPH	GPH

DLA inference of normal and pathological defenses
Defenses are expressions of transactions between conflicting wishes of the different Ego structures. The DLA algorithm allows manual detection of main and secondary defenses.

DLA main defenses

EGO	WISH	PATHOLOGICAL DEFENSES
Primitive reality	IL	- For wishes - Against affect *Foreclosure of the affect*
Auto-eroticism	O1	- For wishes - Against reality and Superego *Disavowal, foreclosure of reality and ideal*
Purified pleasure	O2, A1	
Definitive reality	A2, UPH, GPH	- For reality and Superego - Against wishes *Repression*
ALL EGO STRUCTURES - FUNCTIONAL DEFENSES		
According to the goal, creativity, sublimation		

The state of the defense (successful, failed, both) can be inferred in speech acts and narration manually.

The function of the defense (main, complementary) can be inferred in speech acts and in narration manually.

Research conducted with the DLA computerized dictionary
The dictionary has proved useful to analyze in-session as well as psychosocial discourse.
Some DLA discourse analysis contributions to clinical research concern: patient expressions in the Desiderative Questionnaire, chronic organic patients, a patient presenting self-inflicted skin cuts, two cancer patients, a 70 year-old-man, a patient suffering form congenital sensory and motor handicap, comparative analysis of two patients and of two moments in the therapy of the same patient, contrast between the analysis on the narration and the word level, clinical change in children, predictive and postdictive studies, therapist in-session wishes and defenses.

DLA computerized dictionary functionality and limitations
➢ The DLA computerized dictionary is a content analytic lexical resource. Input of verbs, adjectives, adverbs and noun forms of the different categories decode to colored texts, percentage charts and lists of words linked with their respective wish categories.
➢ Upgrading requirements based on limitations: a) term disambiguation so that words will fall into just one of the 7 categories, b) easy insertion of new words which now add 20.000 derived from 200 roots, c) extension of text analyzed which so far includes a limit of 6000 words, d) sophistication of charts which show number of words per wish category without taking into account calibration strategies, e) automatic analysis of the speech acts level and the narration level of discourse which is done manually.

The GATE Natural Language Processing (NLP) software tool
NLP software platform developed at the University of Sheffield.
The DLA computerized dictionary has been incorporated to the platform as well as additional resources, by means of plug-ins, so that a new and more powerful tool has resulted from the assemblage.

The following implementation has been carried out to resolve previous DLA dictionary limitations

- A preliminary implementation of word lists of the DLA computerized dictionary that allow to increment the present dictionary vocabulary by means of vector systems of support that automatically propose words to add to the 7 DLA categories.

- A program of automatic segmentation that allows text mining and combination of large texts, i.e.:
➢ fragments of patient´s and therapist´s discourse
➢ fragments, such as narrated scenes of one of many topics, i.e. narrated scenes of violence, narrated scenes preceding or succeeding violent ones, etc.

- A program which allows the user to count the number of words pertaining to each of the 7 DLA categories in the different fragments is being developed for calibration
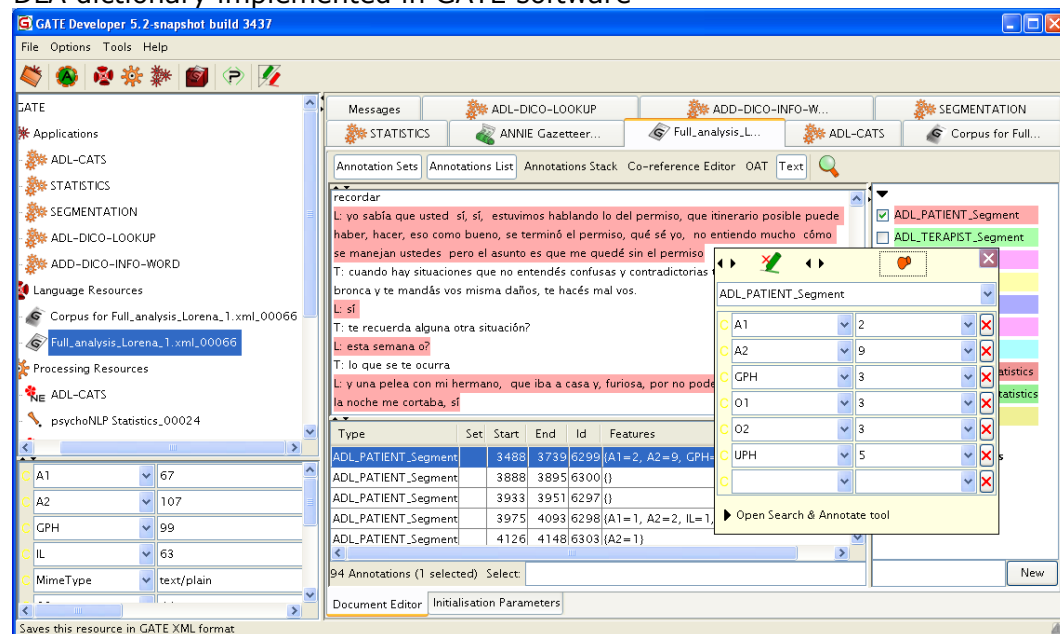
The following implementation has been carried out to include functionality regarding defenses, speech acts and narrations

- An interface with an annotation scheme to classify the DLA dictionary words according to their wish category which allows to present the researcher with options to infer the type of defense, among normal or pathological ones, as well as their state: successful, failed or both.

- Lists of discursive markers to identify termination of discourse corresponding to narrations or speech acts in text fragments.

- An interface with an annotation scheme to label certain speech acts, such *as to complain, to abuse, to congratulate, to flatter*, as belonging to up to 3 of the 7 DLA wish categories.

DLA dictionary implemented in GATE software

The following implementation to resolve previous dictionary limitations is planned for the near future:

- Disambiguation of terms which presently could pertain to up to 3 of the 7 DLA categories

- Organization of the DLA dictionary in terms of roots of words instead of in terms of completed word forms.

Discussion: The implementation of the DLA dictionary in the GATE Natural Language Processing (NLP) tool is proving useful in the patient and therapist discourse analysis to refine the search of lexicon related to the DLA wish categories and defenses as well as to segment speech in order to analyze in-session discourse from a macro and micro-analytical perspective that allows to include speech acts and narration analysis.