

## Changes of latent meaning structures in psychoanalysis

The basic therapeutic procedure of psychoanalysis aims at structural change of latent meaning. The paper presents a proposal for its empirical assessment. The mainly methodological reflections are determined by the intention to perform the analytical studies by means of computers. They are based on the authors' experience with computer aided content analysis whose underlying principle of categorization is kept. From Cognitive Science however a fundamental approach using conceptual categories is embedded and combined with linguistic categories in the sense of class meaning. The coincidence of a cognitive and a linguistic category in the textual realization as a wordform is now defined as a primitive concept. This results in a different understanding of the nature of categories and finally leads to a text model constituting a structure rather than a set of words as computer aided content analysis does. Latent meaning structures and their changes will be measured in terms of the occurrence of primitive concepts.

The research enterprise dealt within this paper stems from many years of experience with computer-based content analysis and the implementation of a computer assisted text bank system. Besides the presentation of the theoretical points of view, an empirical study will be presented based on the analyses of one fully transcribed psychoanalytic session. The results lead us to believe that the proposed methodology is a sensitive one in terms of changing primitive concept frequencies.

### Introduction

The basic therapeutic procedure in psychoanalysis is the interpretation of feelings and actions expressed by speech. The interpretations of the therapist or even of the patient himself aim at a change in latent structural properties which are best described by Freud's dictum „where Id was, Ego shall be“. Interpretation as a linguistic tool in psychoanalysis can be understood as an answer to a question the patient was not able to pose. By thus answering an unidentified question the patient is able to assimilate an hitherto warded-off element. The function of objectivation of language, as Cassirer points out (1944, 1946) makes language an ideal medium for the study of change during psychoanalysis. Changes in other characteristics of the patient, in actions, and gestures are likewise to be expected, but from its theoretical orientation it is the linguistic system which should be central to psychoanalytic change theories (Luborsky and Schimek 1964). It was as late as 1969 that V. Rosen pointed out in his introduction to a panel on language and psychoanalysis that „the alteration of the structure of the ego through language is one of the goals envisaged by the psychoanalytic process“ (p. 114).

Systematic studies of speech in the psychoanalytic situation as would logically follow have arrived fairly late in the research field. The battle for tape recordings first had to be resolved (Simon et al. 1970). The use of textual data in process research began with Julius Laffal's analysis of the Schreber case in the sixties (cf. 1976). At the same time Harway and Iker (1964) published their first paper on their Words-System. Further reports from their work, which used as textual basis an analytic case, appeared in the following years (e.g. 1966, 1969). Donald Spence considered the issue of processing meaning in psychotherapy and pointed to some links between psycholinguistics and information theory in 1968. His first empirical paper in this field on „computer measurement of process and content in psychoanalysis“ triggered many expectations (1969). Further studies with

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the dictionary approach showed that computer-based content analysis was able to tap interesting phenomena descriptively and could be used as a tool in hypothesis-testing as Dahl (1972) could show. Dahl (1974) went a step further beyond the mere analytic approach of category counting, describing the construction of meaning clusters by statistical methods. His ideas were based on two assumptions: First, words alone, independent of grammar, carry significant information. Second, words and ideas that occur together belong together – the principle of association by contiguity (Dahl 1972, p. 252; Dahl 1974, p. 38).

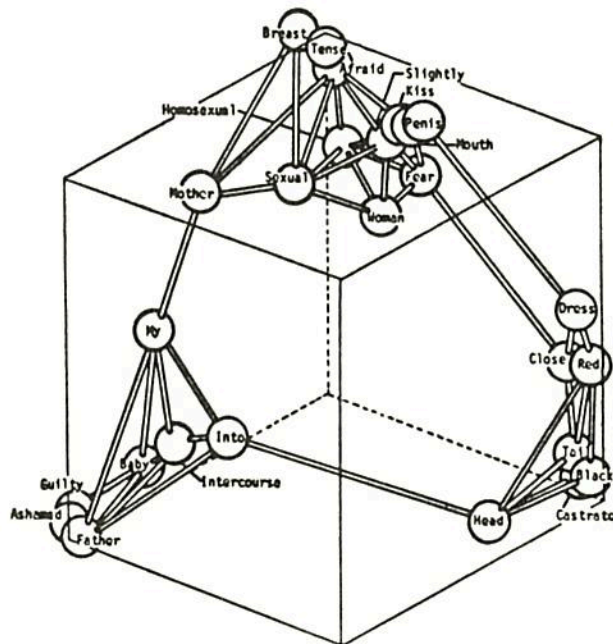


Figure 1 A 3-dimensional representation of words, indicated by balls, representing each of the 3 largest factors. Space defined by the cube with zero point at the intersection of the dotted lines and each axis of unit dimension (values from 0 to +1).

Psychotherapy process research needs methodologies that link up with clinical concepts like ego function. The long-term change that may occur in personality structure and thus in language is a linguistic one as well. It seems obvious to us that any further methodological proposal should narrow the gap between computer aided content analysis (CACA) as a very pragmatic social science tool and mere linguistic approaches. We therefore believe that it is necessary to propose methods that can capture changes of latent meaning structures by means of computer aided content analysis (CACA).

### A Model for CACA

In order to have some idea concerning the matter under discussion, a simple model for content analysis will be reported. It starts from a two partite view of a

real and a formal system. Within the real system a *natural language* and within the formal system a *formal language* is postulated.

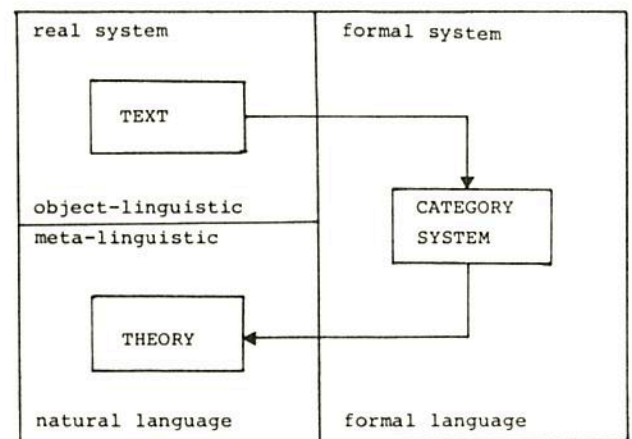


figure 2

Furthermore the real system is divided into an *object-linguistic* and a *meta-linguistic* component. Any text that should be analyzed is now interpreted as an object-linguistic realisation within the real system. The leading theory for the analytic process is handled as a meta-linguistic component. The formal system comprises a *category system* without any further differentiation. The procedural description of the content analysis now can be given in two steps:

- Translation of the text into a formal category system and
- Interpretation of the formal category system within a theory.

This model is appropriate in the description of scaling techniques as for example, the anxiety scales of Gottschalk and Gleser (1969).

By means of CACA the tedious work of translation as a first step is performed by machine. Within the model this results in a further differentiation of the formal system into object-linguistic and meta-linguistic components as well.

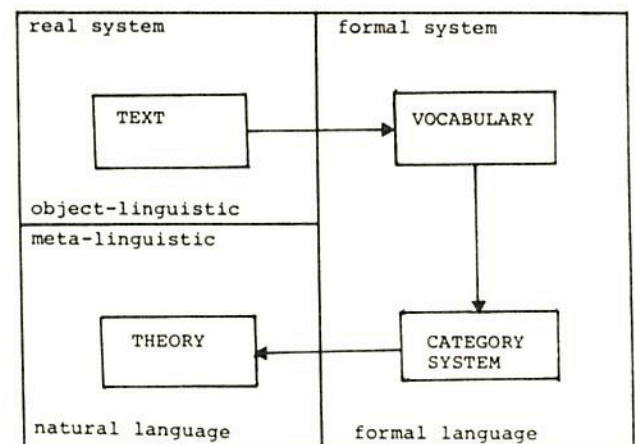


figure 3



Thus there will be a correspondence between *text* and *dictionary*, and *theory* and *category system* respectively. Procedural description now comprises three steps:

- Reduction of a text to a dictionary,
- Translation of a dictionary to a category system and
- Interpretation of a category system within a theory.

With these models in mind CACA can be reviewed as follows.

### CACA up to now

The golden age of CACA is marked by the years from 1965 to 1970. Within numerous contributions – merely all of them within the anglo-american literature – methodological implications have been discussed and basic applications have been shown (e.g. Gerbner et al. 1969; Laffal 1968; Stone et al. 1966). The main areas have been sociology and psychology. The years from 1970 to 1980 are characterized by sporadic published reports on specific applications. At the end of the seventies finally appeared – now even in the German literature – the first overviews on content analysis (e.g. Lisch and Kriz 1978; Krippendorff 1980). The last three years may be characterized by methodological stagnation.

On the other hand, the early eighties have been a phase of great advance in another discipline that calls itself *cognitive science* (e.g. Schank 1980; Kintsch and van Dijk 1978). Cognitive scientists are trying to reproduce or simulate the cognitive capabilities of human beings by means of computer techniques. Within the scope of language the vast range of comprehension should be mentioned. Some concrete applications are e.g. the abstracting or information retrieval via natural language. The youngest sprout of cognitive science called knowledge engineering seems to become the first one with practical applicability. Today it might be worth-while to check the possibilities that knowledge based expert systems will open for psychotherapy research. Of course there will be one tremendous handicap: Even the largest knowledge base that could be handled nowadays is no more than a tiny window to the real world. Thus, for example „poison or divorce experts“ are working sufficiently well in their domain. But psychoanalysts can not restrict their patients or themselves to well elaborated knowledge domains. Psychotherapy has the full scope of the real world. Still the only way for its assessment will be that of reduction. This leads us to content analysis again.

The following proceeding is determined by the underlying principle of CACA with the practical instrument of categories. Fundamental approaches

derived from cognitive science are imbedded in CACA-methodology. In a first stage this yields a different understanding of the nature of categories. The secondary aspects result in the understanding of a text as a structure and not merely as a set of words. In order to explain this in a more sophisticated manner the methodological discussion from the end of the sixties will be brought up again and briefly referred to.

### Category systems – different views

Stone et al. (1966) differentiated *specific* and *general* dictionaries. A *dictionary* is defined as both: wordlist and category system and thus corresponds to the formal component in the above mentioned model. A specific dictionary serves as an instrument for the investigation of a narrow and well defined problem. For example, we refer to the *Anxiety Theme Dictionary* developed at Ulm University. It comprises four categories called *Shame*, *Mutilation*, *Guilt*, and *Separation*. A general dictionary serves as a tool in the investigation of various not necessarily predefined problems. A well known example may be the *Harvard Third Psychosociological Dictionary* with its 53 categories. At a closer look, however, generality in this example reveals as the composition of several specific dictionaries into the general frame of *objects*, *processes*, and *qualifiers*.

A quite different view of generality is proposed by Laffal (1968). He promoted a *Conceptual Dictionary* for use within a „total content analysis“ of language within psychotherapy. The category system should be highly dependent from the cognitive capabilities and experiences of human beings. In a comprehensive rationale Laffal makes use of specific reading like Piaget, Vygotskij or Hallig and Wartburg. With his practical realization, however, he does not succeed in translating his ideas into a formal algorithm that would produce the conceptual dictionary. All 114 categories he used in his empirical studies stem from a heuristic procedure based on his own intuition.

Intuition may also serve as a key word describing the activities of cognitive scientists. However, category corresponding features – called *primitive acts* in Schank's „dependency theory“ (1980) – reached more generality in a cognitive sense.

### New impacts on CACA

Laffal's Total Content Analysis implies the coding of almost every textword except those with extreme high frequencies in normal language. This contrasts with Stone et al., who lists the 5 000 most frequent words to use for dictionary construction. This results in



different types of content analysis. The former picks up a large variety of highly content-dependent nouns, adjectives, and verbs. The latter deals with everyday vocabulary.

On the other hand this results in a text coverage of 10 percent for Stone et al. and of 90 percent according to Laffal. From the above follows that any improvement in CACA should base on *total content* analysis. This claims as a natural consequence for the definition of a general system. Especially the experiences of cognitive science are encouraging for a conceptual dictionary. The main problem that has to be solved is defining a system of categories with the properties of

- exclusiveness and
- completeness.

The coding procedure should be highly reliable and each native speaker should be able to perform such.

#### Conceptual Category System CCS

|               |   |
|---------------|---|
| 1. SENSE      | perception and functioning of sense organs: see, hear, touch  |
| 2. FEELING    | denomination and description of feelings: love, hate          |
| 3. IMAGE      | ideas, dreams, wishes and plans: want, dream                  |
| 4. KNOW       | description of conscious cognitive contents: think, calculate |
| 5. RULE       | normal standards like religion and law: lie, sin              |
| 6. ACT        | all kinds of action: go, stand, drink, work                   |
| 7. SIGN       | all kinds of communication: speak, sing, book                 |
| 8. FORCE      | all kinds of force that influence objects: destroy, press     |
| 9. MOVE       | passive movement: fall, sway                                  |
| 10. PROCESS   | changing and growing: become, end, start                      |
| 11. LET       | all kind of possibilities: can, let, may be                   |
| 12. TIME      | references to time: date, late                                |
| 13. QUANTITY  | references to numbers and sets of elements: some, three       |
| 14. CONSTRUCT | complex terms: culture, social, science                       |
| 15. HUMAN     | references to human beings: mother, Charly                    |
| 16. BODY      | references to the human body: arm, head, finger               |
| 17. NATURE    | references to nature, animals and plants: dog, fog, forest    |
| 18. ENTITY    | things, stuff and abstract entities: stone, sand, building    |
| 19. LOCAL     | regions and areas: place, New York                            |
| 20. PROPERTY  | all kinds of properties relating to objects: thin, good       |
| 21. STATE     | state of things and state of affairs: alive, weak             |
| 22. RELATION  | causal, temporal and spatial relationship: near, under        |
| 23. NEGATION  | denial, disavowal: no, never                                  |
| 24. LEFT OVER | word fragments, grammatical particles: hm, mo-                |

Tabel 1: List of Conceptual Categories (preliminary)

The *conceptual category system* (CCS) represented in table 1 is a preliminary one and is the subject of a doctoral thesis in progress. Its 24 entries are the result of condensing about one dozen different approaches (Schank 1980, Laffal 1968). For practical

use each conceptual category may be named by a mnemonic code like FEELING, ACT, TIME, or LET. In a further step each of these categories may be differentiated into more subtle facets. For example, see de Rivera's decision theory for emotional words (De Rivera 1977, Dahl and Stengel 1978) or Averill's Semantic Atlas of Emotional Concepts (1975).

#### Taking notice of grammatical aspects

Within CACA grammatical aspects should not be disregarded. There are two reasons:

- Grammatical information is important in understanding a text.
- Most of the grammatical information is easy to formalize and therefore may be modelled on a computer.

The linguistic theory in our approach described here stems from Erben (1968), concerning grammatical informations that arise from the role words acquire from their linguistic category in the sense of class-meaning. Thus words are not all seen as equal parts that can be composed to textual structures whatever shape. Words are predefined to resolve certain tasks within the language, to make some roles, to carry some functions.

#### DEFINITION

|                     |        |         |         |
|---------------------|--------|---------|---------|
| Linguistic Category | NOUN   | VERB    | ADJE    |
| has Role of         | OBJECT | PROCESS | QUALITY |

#### EXAMPLE

|                        |           |          |        |
|------------------------|-----------|----------|--------|
| Cognitive Category     | ENTITY    | ENTITY   | ENTITY |
| Linguistic Realisation | the stone | to stone | stony  |

The *noun* impersonates a textual sign as an *object*, the *verb* as a *process*, and the *adjective* as a *quality* without claiming that it has to be an object, process, or quality in reality. This becomes more evident with some examples: 'stone' as an object, 'stone' as a process, and 'stony' as a quality. Even more obvious becomes this fact in German: 'Dank', 'dankbar', 'danken', and 'dank' present the same phenomena as object, quality, process and relation. It is up to each speaker to express his thank to somebody as either of the following statements:

- Thanks.
- I want to thank you.
- I am thankful to you.
- Thanks to your activity I am happy now.

All variants represent the same speech act (cf. Austin, 1962). The variations may be measured with linguistic categories. A special character's choice, however, is to be handled as a psychological phenomena. As a tool in CACA a new source of information is available.



## Primitive concepts

The coincidence of a cognitive and a linguistic category in the textual realization as a word-form is now defined as a *primitive concept* (PC). With the above example four PCs can be stated. The lexical meaning of 'thank' may be coded as the primitive category FEEL. Thus the PCs are:

### EXAMPLE

| Linguistic Realisation | thanks   | thank<br>you | thankful | thanks   |
|------------------------|----------|--------------|----------|----------|
| Conceptual Category    | FEEL = 2 | FEEL = 2     | FEEL = 2 | FEEL = 2 |
| Linguistic Category    | NOUN = 1 | VERB = 2     | ADJE = 3 | ADVE = 4 |
| Primitive Concept No   | 0201     | 0202         | 0203     | 0204     |

Distinguishing the three main linguistic categories Noun, Verb, Adjective, and one left cover class called Relation then 96 PCs are available with the above mentioned 24 cognitive categories.

With regard to psychotherapy research the following *basic hypothesis* can be stated:

- H1 Some PCs are necessary tools in constructing natural language and therefore invariant against thematic change (function carrying PC)
- H2 Some PCs are highly dependent from thematic aspects and are subject to change in terms of frequency (content carrying PC)
- H3 Patients show significant changes in the performance of content carrying PCs during a long term treatment.

Such effects, and this is a pleading for CACA, can not be observed by human raters. On the other hand there are reasonable clinical observations and theoretical outlines (e.g. Schafer 1976) that emphasize this basic hypothesis.

In our pilot study we looked for data that could contribute to the above hypothesis. The conceptual category System has been applied to a sample of six

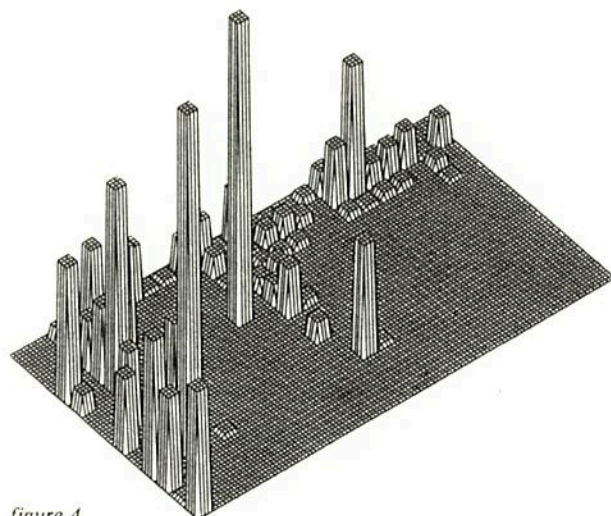


figure 4

sessions spread over a five year lasting psychoanalysis. To test H1 and H2 we restricted the analysis to session 25, that was segmented into 4 equal blocks of 1 000 words each. To share our findings with you we choose a descriptive way of presentation.

First let us have an informal look at the distribution of our PCs in that session: From right to left you will find the conceptual categories, from top to bottom the linguistic categories. It is obvious that there is a wide range of frequencies expressed by the different height of the „towers“, which represent the active PCs. The „flat“ ones, we suppose, will be the content carrying PCs, the „high“ ones should be of the functional type. Let us now have a closer look restricting ourselves to some single PCs belonging to the same cognitive category and order them corresponding to the four blocks (right to left) and the linguistic categories (top to bottom). The first pattern, (fig. 5) shows a very invariant PC (SENSE, VERB).

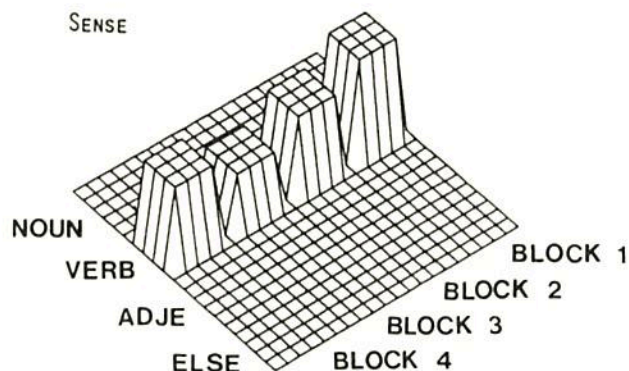


figure 5

A different example is that belonging to RULE (fig. 6). (RULE, NOUN) is increasing and (RULE, VERB) correspondingly decreasing. A KWIC-list (see Appendix) illustrates all references to the category RULE in the speech of the patient ordered by increasing line numbers.

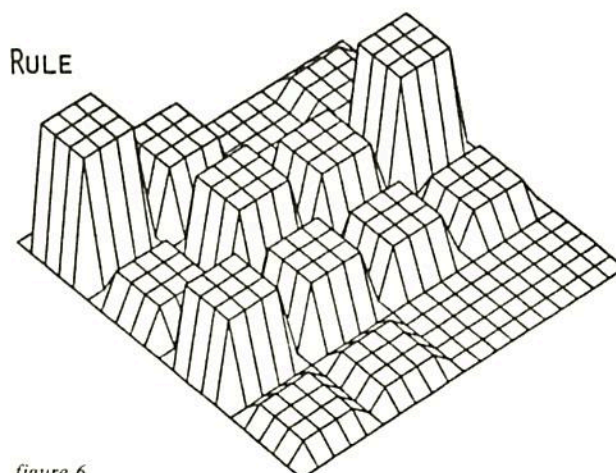


figure 6



## QUANTITY

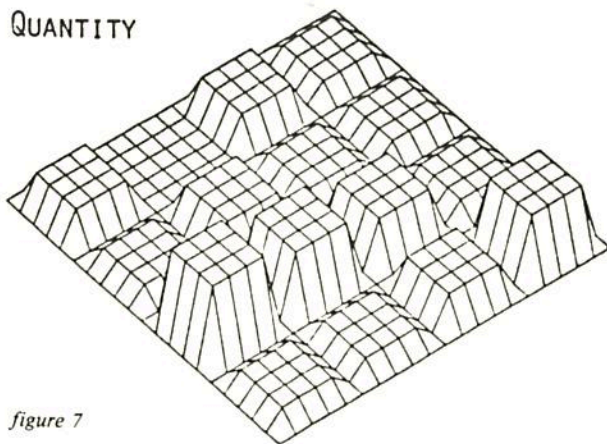


figure 7

A third type will be those PCs represented by QUANTITY (fig. 7) that are widely dispersed.

For more detail let us now look to the thematic structure of this session. The formal segmentation into blocks of 1 000 words can be underpinned by a sensible chain of events:

### Segmentation of the session 25 (treatment 001001)

#### Block 1 RESISTANCE

Patient wants to have reduced the number of sessions from three to two; the reasons are unexpected financial burdens by her new car; the analyst arrives at the interpretation that the unconscious reason for reducing the session frequency is the fear that the analytic relationship might become too intensive.

#### Block 2 SHAME

Patient finds by herself that working in good rhythm is important and the topic of work shifts to shame anxiety, being laughed at and being overwhelmed by interpretations of the analyst.

#### Block 3 SELF-RELATED

Beyond feelings of stupidity, patient describes herself as cause for bad feelings of other important people „neurotic sensitivity“ reaction.

#### Block 4 OBJECT-RELATED

In a next step the patient's scapegoat position is interpreted as an unconscious identification with her brother: if she feels responsible for all the bad things that happen, she is as powerful as he was.

## TIME

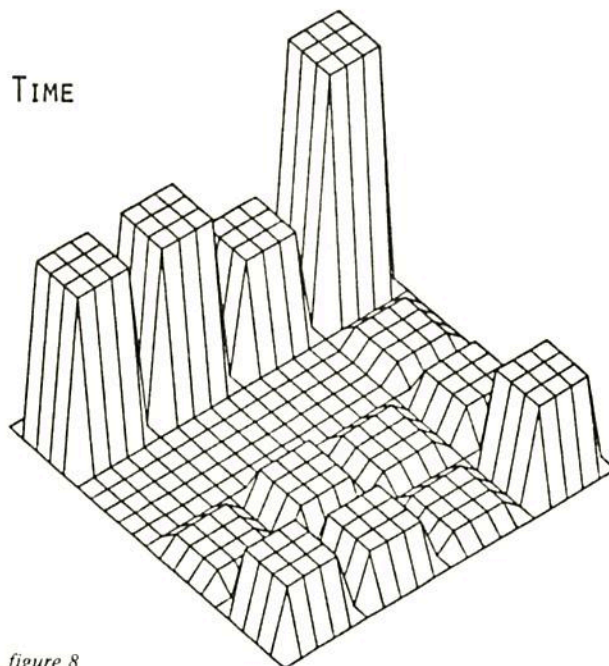


figure 8

## CONSTRUCT

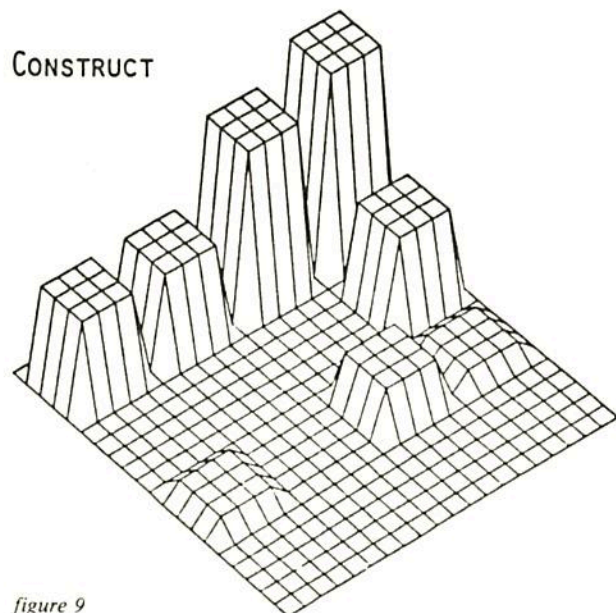


figure 9

The pattern with the TIME PCs reveals the importance of the formal problems interpreted as signifying resistance by the clinician in the first block. The CONSTRUCT PC signifies: The more personal the problems, the less the importance of CONSTRUCT PCs.

We did not perform any statistics with these data. In our opinion, they are useful only in regard to the intended hypothesis generating process, that should yield in a more powerful CACA-methodology than we dispose of today. One of the next empirical steps will be to identify meaning structures on the basis of PCs. We will elaborate on this idea in a brief last section.



Applying the above ideas in a *procedural* way on some text results in a representation as sequence of PCs. In order to find some criteria to combine some or all of the PCs into greater units or structures we refer to the definitions from above called *content carrying PC*, and *function carrying PC*. Structuring now can be achieved by the basic rule, to scan a PC-sequence and to combine all PCs that start with one of the functional type. This procedure results in singular structures consisting at least of one functional PC, that may be followed by some content PCs. Some example:

(ACT, VERB; LET, VERB; LET, ADVE)  
(REL, ADJ; HUM, NOUN; ACT, VERB)

Within one session most of these structures occur once. Some of them are language-immanent and will not vary among subjects with regard to frequency and typical sequences of structures. Other ones – and this is another hypothesis – are in both regards characteristic or idiosyncratic for different speakers and depending from time. They open a tiny window revealing some of the complex processes and structures in the memory of human beings. Calling that what we can see „latent meaning structures“ signifies certainly both: the idea of what we expect and the shape of what is still hidden.

#### Anmerkungen

- \* Special Collaborative Program 129 „Socio-scientific and psychophysiological analysis of psychotherapeutic processes“, Deutsche Forschungsgemeinschaft.

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29 h= das ist das eine und dann= brauch ich= mindestens jede zw  
35 mehr mit denen mache und die muß ich dann immer zu mir hole  
38 u mir holen und und +hm ich muß+ mich vorbereiten. also da  
73 t es, ja. eh drei Stunden eh nötig sind um= wirklich auch d  
75 ich auch die Themen ja damit muß ich // durchzuarbeiten  
83 o mit Ihnen vorher besprechen sollen, früher. ich mein ich h  
99 ll gemacht, (lacht etwas) und muß das alles selber bezahlen=  
143 nd und eh da war meine Mutter schuld aber ich muß das eben d  
143 meine Mutter schuld aber ich muß das eben doch alles zahlen  
145 d eh dann haben sie mir keine richtigen Reifen montiert und  
147 blich, weiter das ist keine richtigen auf eh also ich hab  
148 stellt Gürtelreifen, und mein Gott jetzt reden wir vom Auto.  
214 h früher mit Ihnen besprechen sollen, vor den Ferien, also d  
227 so ich eh eh= das Finanzielle sollte meines Erachtens da nic  
234 ie nicht ganz glaube ich eh= berechtigt ist. eh= ja. ja.  
280 e, aber das mit den Mädchen muß also drin sein weil= das i  
282 jetzt als Zehnte und die muß ich ein bißchen hm nich  
309 nd vor dem Auto hab ich jetzt regelrecht Angst= hm eh in j  
329 h hätte eigentlich eher sagen sollen, ich würd nicht glauben  
388 endlich auch es besser Wissen müßte von berufswegen. ja, in  
389 ist der Beruf nicht so ganz richtig gewesen ja, ja, hm+  
460 das= buchstäbliche schlechte Gewissen von mir= eh bei dem e  
473 tuation wo man ein schlechtes Gewissen haben könnte obwohl w  
475 agt hab, die Cousine, eh sie sollen sich nicht wundern da=  
477 as das war eigentlich nichts= Negatives. aber ich hätte doch  
481 ich getan haben könnte sollte und – meine Mutter sie  
484 fertig, wenn es jemand stört soll er mir's sagen.' – und d  
489 ze jeder ist für sein Gesicht verantwortlich und man kann ni  
493 ist wenn irgendjemand eh was Negatives hat oder oder denkt  
520 ch dann= unsicher und und eh verrückt, wenn irgendwas auf  
527 tte auf.' – und das geht dann recht zügig und fertig. aber i  
538 hen. genau. hm und und= er sollte eigentlich dann zu den  
544 und, ich hatte mich wirklich korrekt verhalten, und dachte  
546 nweisen daß man jetzt nicht verrückt spielen soll' oder so  
547 jetzt nicht verrückt spielen soll' oder so. hm und= – ich  
550 enau wußte ich hatte es nicht falsch gemacht. ja, und dann h  
555 en und, mich würde es einfach verrückt machen. und= er war n  
565 h mal stellvertretend rot und mußte dann abwarten, bis sich  
586 immer= irgendwie sich in die Rolle= von den andern versetzt  
602 ir zugewiesen hat oder seine Rollen vollends durchgeführt o  
606 ht bloß so= stellvertretendes Schuldgefühl sondern wirklich=  
611 ht, – was da alles die letzte Rolle spielte. – ach ja, es  
613 en daß man mal ein schlechtes Gewissen hatte wenn man was sa  
618 wußte daß daß da nichts hm= Inkorrektes dabei war und, und  
620 schlecht behandelt oder nicht korrekt behandelt zu haben, –  
622 irklch ja keine Lust da= der Sündenbock zu sein und= – e  
625 es könnte doch irgend etwas falsch aufgefaßt werden. – auc  
625 faßt werden. – auch was nicht falsch aufzufassen sei weil ic  
654 s mal einen Streit – oder man mußte sich einfach entschuldig  
658 irgend so ein pauschales, eh Schuldgefühl vermitteln und un  
680 Augen nicht mehr, die an sich recht gut sehen. hm denn ic  
695 und ich glaub es war nur so Theologie und Sport und so wei

KWIC-Listing according to category RULE

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