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The analysis of latent meaning structures in psychoanalysis.

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ABSTRACT

The basic therapeutic procedure of psychoanalysis aims at change of behavioral, emotional and cognitive aspects of human functioning placing distinct value on changingo f latent meaning structures. The paper reviewes some empirical approaches for the assessment of these changes. 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 word-form 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 occurence of primitive concepts.

The research dealt within this paper stems from many years of experience with computer-assisted content analysis and the implementation of a computer-assisted text bank system. Besides the presentation of the theoretical points of view, a first empirical study will be presented based on the analysis of a psychoanalytic session.

Introduction

We shall first outline why we are focussing on psychoanalytic process research since 1970. Psychoanalysis as a clinical theory on human mind has been a field of

controversial discussion since its beginnings; however, there have been many experimental investigations dealing with the pro and cons, with the tenability of its hypotheses, summarized most succinctly by psychologists as Paul Kline (1978). These studies most often have been performed not by clinicians, not by analysts but by many experimentally working psychologists as the hypotheses under discussion could be tested outside the consulting room.

Psychoanalysis as a long-term treatment modality cannot be said to have been tested in a similar, systematic way either with regard to outcome or to process. Except from a few outcome studies notably the 3o year long Menninger study on the " Forty two lives in treatment" - so the title of the final report by R.Wallerstein (1986) and the account of the Columbia Psychoanalytic Treatment Center based on initial evaluations and outcome data on a large population of patients (Bachrach et al.1985), few groups have accepted the challenge to embark on outcome studies of long-term psychoanalytic treatment. Though the distinction between process and outcome has been criticized for its artificiality, there are quantitatively more efforts directed on process phenomena like the work of the Philadelphia study group on long term transference developments (Graff & Luborsky, 1977) or the systematic work of the Mount Zion group over the last decade (Weiss and Sampson 1986). Compared to the bulk of studies that have dealt with psychodynamic short term therapy, for many reasons long term psychoanalysis has been a stepchild of psychoanalytic researchers. H.Schlesinger as chairman of a panel on research into the therapeutic process in 1972 was quite explicit when pointing out: " There has rarely been encouragement, or even tolerance, for research into the heartland of psychoanalysis, the psychoanalytic situation itself" (1974, p.3).

Why did we embark into this field: we started with doubting the clinical notion that the validation of analytic hypotheses could take place by just performing analytic work in the consulting room. We felt like others that the only way to render the psychoanalytic process to scientific study would be by introducing new observational tools and measurement technologies that are capable of adaequately capturing salient features of the process; tape recordings of actual sessions being one of the essential step in promoting research and studying changes in verbal behavior as indicators of underlying internal processes.

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The basic therapeutic procedure in psychoanalysis consists of a verbal exchange with the tendency to reduce at least non-verbal interaction by use of the couch and thus disconnecting face-to-face interaction. Though the non-verbal channels as voice quality and gestural activity can become very decisive in specific situations, it seems fair to say that verbal exchange becomes more prominent in the classical psychoanalytic situation. The basic rules of the transaction - the one for the patient and the one for the analyst - press for the expression of feelings and thoughts on part of the patient, defy everyday complementary action on part of the therapist by invoking a
specific kind of commentary discourse known as clarification, confrontation and interpretation. Having studied many verbatim protocolls from different analysts it seems real to say that there is a vast variability in terms of technical purity; this means the deviation from everyday discourse rules to highly specific psycho-analytic discourse rules varies from case to case, from session to session and from therapist to therapist. The aim of the therapeutic strategy of psychoanalytic therapy interventions is ideally a change in latent structural properties which are only vaguely described by Freud´s dictum "where Id was, Ego shall be". In more simple terms this means that mental contents, call them a wish, or a need or a thought not available in conscious speech shall become explicit in the course of the process. Weiss and Sampson (1986) describe this as bringing forth hitherto repressed "grim beliefs", which are assumptions about negatively perceived interactions with significant others. From a linguistic point of view interpretation as a decisive 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 theory placing insight and self-awareness into the center (Luborsky and Schimek 1964). In his introduction to a panel on language and psychoanalysis V. Rosen (1969) pointed out that "the alteration of the structure of the ego through language is one of the goals envisaged by the psychoanalytic process" (p.114).

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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 (Luborsky & Spence 1971). 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 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 objective 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).

The evaluation of changes in meaning clusters can be achieved by constructing such images at different time references during therapy. It may well be that this approach is useful to differentiate between changes in short-term therapy and long term treatments.

The application of this analytic tool in psychotherapy research has been paved by a period which we like to call the golden age of computer-assisted content analysis marked by the years from 1960 to 1970. Within numerous contributions - merely all of them within the anglo-american literature working mainly on mass communication research and literary text analysis- methodological implications have been discussed and basic applications have been shown (e.g. Gerbner et al. 1969; Laffal 1968; Stone et al. 1966). The years from 1970 to 1980, when the method was discovered by psychotherapy researchers, are characterized by a slowing down of published reports on specific applications in the primary fields of applications. Though at the end of the seventies there appeared some overviews on

content analysis i(e.g. Lisch and Kriz 1978; Krippendorf 1980), the field of computer-aided content analysis may be characterized by methodological stagnation, insofar that no new theoretical and technological steps were envisaged.

To understand the very nature of the method a short introduction into the formal linguistic logic of content analysis could help a step further.

A Model for computer-assisted content analysis

A simple model for content analysis 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 1 about here

Furthermore the real system is divided into an object-linguistic and a meta-linguistic component. Any text that will be analyzed is now interpreted as an object-linguistic realisation within the real system. The guiding 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 for verbal material as for example, the anxiety scales of Gottschalk and Gleser (1969).

By means of Computer-Aided Content-Analysis the crucial work of translation as a first step is performed by algorithmic rules implemented as part of the program, the second step still involves a coding procedure. Within the model this results in a further differentiation of the formal system into object-linguistic and meta-linguistic components as well.

figure 2 about here

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

- Reduction of a text to a vocabulary
- Translation of the vocabulary to a category system and
- Interpretation of a category system within a theory.

Category systems - different views

As it may be obvious the decisive tool in computer aided content analysis resides with the dictionary as it connects voabulary with theory. Stone et al. (1966) differentiated specific and general dictionaries. A dictionary is defined as both: wordlist and category system and thus coresponds 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 (Gruenzig, 1984). It comprises four categories called Shame, Mutilitation, 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, Vygotzkij 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.

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New impacts on computer aided content analysis

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 list the 5000 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 computer aided content analysis should base on total content analysis. As a natural consequence this claims for the definition of a general system.

Before introducing our thoughts on how to arrive at such a general system of category system, we shall make a few references to a new development.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 remain 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.

The following proceeding is determined by the underlying principle of computer aided content analysis with the practical instrument of categories. Fundamental approaches derived form 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.

The definition of a general system

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.

table 1 about here

The conceptual category system (CCS) represented in table 1 is a preliminary one and is the subject of a doctorial thesis by Hege (1986). Its 24 entrys are the result of condensing about one dozen different approaches. We were encourged to look for such a general system by Schank´s "dependency theory" (1980), using categories instead of his more complex features, called primitive acts which reach more generality in a cognitive sense.

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

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Within computer aided content analysis 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 Erbens work on German (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 take 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 Category	NOUN	VERB	ADJE
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 thanks 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. Given these premisses we think a new source of information is available as a tool in computer aided content analysis.

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 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 over class called Relation then 96 PCs are available with the above mentioned 24 cognitive categories. For the application of such a formal approach in 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)

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H3 Patients show significant changes in the use of content carrying PCs during a long term treatment.

Such effects, and this may serve as a special argument for computer aided content analysis, 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 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 1000 words each. To convey our findings we choose a descriptive way of presentation.

figure 3 about here

First let us have an informal look at the distribution of our PCs in that session: From right to left the picture shows 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. 4) shows a very invariant PC (SENSE, VERB).

figure 4 about here

A different example is that belonging to RULE. (RULE, NOUN) is increasing and (RULE, VERB) correspondingly decreasing. A Key-word-in-context-list could illustrate all references to a specific category in the speech of the patient and thus offer a way of qualitative interpretation of textual data.

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For more detail let us now look to the thematic structure of this session. The formal segmentation into blocks of 1000 words can be underpinned by a sensible chain of events:

Segmentation of the session 25 (treatment 001001)

Block 1 RESISTANCE	
from	Patient wants to have reduced the number of sessions 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 over- whelmed 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 powerfull as he was.

figure 5 and 6 about here

The pattern with the TIME PCs reveals the importance of the formal problems interpreted as signifying resistence 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 . 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.

Meaning structures

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.

Conclusions

The development of new methods for investigating the complexity of the psychoanalytic process is based on our conviction that one has to clarify the issue of "what method for which task" (Kächele, 1986).

The psychoanalytic method, a clinical technique for observing a patient by listening to him in a state of evenly suspended attention and unavoidably influencing him by technical interventions such as clarifications, confrontations and interpretations has been able to serve as a very fruitful heuristic tool with regard to theory scaffolding. The experiences gained by each psychoanalyst in the analytic setting are pooled together in a highly unsystematic way, comparable to ethnologists coming home from their field work and trying to systematize their collected data by reporting them to their peers, which again are unavoidable interpreted data shaped by the preconceptions of the analyst when working in the field, e.g. in the analytic situation. This process is heavily influenced by the prevailing conceptions - theoretical and clinical- of the group in which the individual psychoanalyst has been trained and with which he works. But there is no other way to communicate the experiential nature of the data collected of the analyst as a particpating reporter of a dyadic enterprise as these data are of a dialogic nature. This feature accounts for the academic aspects of psychoanalytic groups. However, if science must also be regarded as a social enterprise, this kind of collective, schoolism thinking can be found in all kind of scientific endeavours. If the concept of a clincial science has any meaning at all, it refers to this process of mutual stabilizing of intervention procedures (s.Bowlby, 1979). The dangers of such group thinking are well known and the history of psychoanalysis presents an abundance of good and bad examples. This is where nonclinical research methodology should enter the field. This approach needs true primary data, as Luborsky and Spence (1971) aptly coined it, data that are no more contaminated than by the introduction of observational tools in the clinical setting as illustrated

by tape-recording. This step being established allows the systematic description and the testing of hypotheses derived from clinical experience.

It has been our conviction that method development has to come first before the testing phase can be attained. With regard to the problem of large amounts of textual data to be processed when studying psychoanalytic processes our group has decided to spend ample time (and money) on this particular aspects (Kächele and Mergenthaler 1983). Our first major aim was the establishment of a large data bank with psychoanalytic sessions from various sources combined with software tools for analyzing textual features on formal, grammatical and content level (Mergenthaler 1985). The next steps consist of refinement of available tools by incorporating new developments from the field of cognitive science. The work outlined in this communication describes this work-in-progress.

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