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Clinical and Quantitative

A Quantitative Study of a Psychoanalysis

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The widespread uneasiness among psychoanalysts about the current status and the future of our profession is largely based, I believe, on our failure to redeem the promise of psychoanalysis as a science. We must start fulfilling that promise in a more basic way than we have generally recognized, by revising our very methods of collecting data. I am convinced that we must begin by audio-recording psychoanalyses, to eliminate the unsystematic and unspecified selection procedures involved in note-taking, as well as the errors resulting from our fallible memories. Moreover, I assume that we need to make our data public, in the sense that analysts other than ourselves can have access to the fine details of what each has heard and responded to in private. I cannot accept Meissner's **(1966)** position that this is a pointless task because the real data are by nature private-that is, subjective experiences of analysands and analysts. If it is really true that the words used by analyst and patient do not significantly inform us about the analytic process, then we might as well forget about our scientific development. Gill et al. **(1968)** have cogently stated the important arguments for recording.

But recording alone is only a beginning. What we need even more is a whole new approach to the study of analyses. We cannot live off the genius of Freud forever, nor off the second generation of truly gifted and creative clinicians upon whose insights we still feed but whom we have begun to lose. All current signs point to a steady decline in creative innovation and fresh clinical insights. In short, it can be said, and I believe most analysts would agree, that there is a powerful need for new life, new blood, new students with fire and creative imagination. By all the signs, this hope is forlorn unless the field of psychoanalysis is reinvigorated by some fundamentally new feature that will attract creative men and women.

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Such an innovation is at hand, for progress in science is made not only by gifted individuals; it is also made by new technologies. One such technology awaits us and offers a whole new order of possibilities for restoring the investigative spirit to analysis, for enabling younger analysts to accumulate relevant experience earlier, and for bringing a whole set of new disciplines to bear on our field. I refer to the possibilities of content-analysis techniques that computers have provided. Few analysts know about the enormous strides in recent years in the ability of computers to process text. New programming languages have made such processing practical, and the latest computers combine the necessary speed, memory capacity, and economy.

One of the basic problems in studying analyses has always been the enormous reduction of data required. Computers are marvelously reliable, tenacious and dutiful, when properly told what to do. Given correct protocols from tape recordings, a properly programmed computer can search for and count words, alone or in context, can assign them to conceptual categories, and can give us the frequency of occurrence of each category.

I wish I could say that the study I am about to report utilized computers to the full extent currently possible. It did not. Moreover, there are various technical issues and certain problems of a detailed nature that I must skip for lack of space. All these matters will be covered in a detailed publication when the studies on this case are complete.

Here I report on three of the ways in which I studied data from 363 tape-recorded psychoanalytic sessions. First, I factor-analyzed a correlation matrix of 53 variables of interest to psychoanalysts, produced estimates of the amount of each factor in each hour, and plotted these factor scores over time. Second, I selected 25 hours having certain types of factor score profiles and, using a computer content-analysis dictionary, compared frequency counts of 83 different categories with the factor scores for each hour. Third, I had analysts rate eight of these hours for the predominance of analytic work or of resistance to such work.

The data are from the case of a young woman whose analysis was begun by a male analyst, Dr. A, a number of years ago. It was specifically a research case and was recorded with the patient's consent. After 102 hours, Dr. A became ill and had to stop the analysis. About five months later a female analyst, Dr. B, was able to take over the case and continue the recording. Dr. A had made a list of some 58 subjects and processes that interested him. This list was subsequently revised by Dr. B. She then regularly read a somewhat abbreviated transcript of each hour and simply counted the presence of any of the 58 categories. At the time I learned of these data and obtained Dr. B's permission to analyze them, 363 hours were available. The analysis continued for some time afterward, was eventually changed to psychotherapy, and then terminated. I shall describe the patient and the story of the analysis later.

After preliminary examination, I eliminated several variables that had too few entries to be useful, and added as variables the day of the week and the hour number, ending up with 53 variables. **Table 1** lists these variables, together

Table 1

Variable No.	*Variable Name, Hour Number, and Examples*
1	*Fear of Insanity*
	113 Just now I was recalling the topic of losing my mind. There seems to be a constellation between homosexuality, going crazy, and these kind of paranoiac fears I am subject to. The specific thought about losing my mind slightly before we began, I had a dream I was losing my mind. It wasn't that I was going crazy, but my intelligence was unable to function.
2	*Fear of Hurting Children*
	162 Before the sessions broke off for you to have the baby, I was experiencing anxiety about feelings that might well up in me, that I couldn't control. Anxiety of pushing a child or anyone off the train platform. When I was here I tried to express what I might be feeling and I experienced anxiety with shortness of breath.
3	*Compulsive Eating*
	191 She couldn't imagine herself losing control or being afraid of her own desires, where I can. Times I gain weight overeating in an attempt to lose it. Some faint idea of the whole cycle of indulgence.
4	*Angry Feelings*
	465 I was angry.
	463 Was feeling very irritated.
	441 If your judgment about things like this is an issue I'm going to resent it … I don't know if I then have to.
5	*Thoughts of Doing Violence*
	249 On the train I thought of pushing or being pushed off.
6	*Depression*
	450 I'm in a depressed mood.
7	*Thoughts of Suicide*
	450 The point about suicide was that they felt she's got so much feelings-frustrations and very low toleration for handling difficulties, that if she tried to control it, maybe she would end up committing suicide.
	450 Was thinking about suicide yesterday.
8	*Anxiety*
	113 I woke up this morning tense and apprehensive, as though everything was vaguely threatening.
9	*Guilt and Punishment*
	450 Tied up in my mind, I was reading The New Statesman, which is a Left paper. I was being punished.
	450 Punished by peers in school and by my parents. Sense that I will suffer if I don't watch my feelings.
	249 Yes, I think that's close to it, because I think, how should I put it, that you feel guilty to the extent that you withdraw here or run away or what have you. (Analyst)
10	*Homosexuality*

113 That's an association both with the expression of hostility and also with some homosexual impulses.

11 *Heterosexuality*

113 There's a young man at R who is a writer. It's his first year out

Table 1 (*continued*)

Variable No.	*Variable Name, Hour Number, and Examples*
	there, and he is very attractive and very responsive. Although he's married and i know that, yet there is a fantasied thing I've got going.
12	*Positive Oedipal Feelings*
	217 The fantasies of a man, which doesn't describe my father well. It's in exaggerated form. Experience doesn't describe my father. I magically admit the attitude I have for him by labeling him in that way or seeking a person like him. Magically transforming him in reference to me so I have an exaggerated reality and a wish fulfillment at the same time.
13	*Penis Envy and Castration*
	249 It came up in relation to thoughts of having a penis. Could it be a wish? I would have been discovered to have the disease and isolated, shamed, humiliated. If I was aware of a fantasy of having a penis and afraid of being discovered and knowing it was wrong for a girl to have one, I would be scorned or rejected very violently.
14	*Other References to Genitals*
	249 Like some forcefulness on-like being a penis entering a vagina.
15	*Having a Baby*
	113 I don't know why this makes me feel like crying, but … that I … er … that I won't, that I won't, I won't marry or have children.
	113 I see that problem at this point that means … I don't know, that I … er … want to have a child too.
16	*Masturbation*
	249 That summer some children talked about the word masturbation, or maybe homosexuality. (CC-10)*
17	*Anality*
	249 I can't believe I would ever understand the composite image of breast and penis and the association to feces or remember anything more about the two memories I mentioned yesterday.
18	*Domination-Submission*
	441 Although it seems that way I think I just feel you are using your power and you are going to defend this situation and then it seems to me a kind of a very circumstantial thing.
	441 I did sense again how it could not be resolved very well because how it turned out it's like a power struggle.
19	*Involvement-Separation*
	463 I was to meet you somewhere or-anyway, something about unexpected informality or contact.
	450 After I left here Wednesday, thought about this reaction I'm having, drawing back, that fear of closeness, only manifests itself in a conscious way to me with women.
	465 L and I are not going to see each other any more.
	441 That doesn't invite me to develop a need for you, and that I will see the end as something painful as if I'd been rejected

and I don't see what the point is in doing this.

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* CC means cross-coded.

Table 1 (*continued*)

Variable No.	*Variable Name, Hour Number, and Examples*
20	*Mother*
	113 I associate that she's from the past and that it's related to my talking about mother in here yesterday.
21	*Father*
	249 To my knowledge I never saw my father naked.
22	*Sister*
	249 I asked out of the same general feeling that she's going to have a difficult life like my sister and myself.
23	*Parents*
	113 I associate, I have a thought that you must be wondering about this, from that to my parent's concern with nail-biting when I was a child.
24	*Mother Role*
	113 Now it occurs to me that last night, I think I was wondering how it could be, if it can be, that somehow understanding my relationship to you, since I see you almost entirely as a mother figure, how that's going to help me establish better relationships with men.
25	*Negroes*
	463 One thing I remember specifically, that in the dream there was something about the children looking part Negro. Very light skin, but clearly part Negro. Then I realized in the dream you were part Negro too.
26	*Political Interests*
	441 Well, I think that I shouldn't have to think about whether you approve of my doing things about Vietnam.
	462 About an incident that happened last week at school, about the military recruitment on campus.
27	*Paranoia*
	450 Something happened on the bus that bothered me. Was sitting down, the buses were still crowded. There was a Negro boy who was standing in front of me. He sat down beside me. I had two papers, a morning and *The New Statesman*. Was reading one and the other was on my lap. He took the paper off my lap. I said, that is my paper. He said, I just want to look at it. I told him, you didn't ask me, I'd rather you didn't. I took it back. It was strange. When he got off, he stepped on my foot. Don't know if it was deliberate or not. Thought he might hit me before he got out. When I took the paper he didn't try to insist on it. He had no reaction. (CC-25)
28	*Color in Dreams*
	113 The other fragment of a dream I remember involves-I don't know exactly the situation but I was talking to another girl, C who I knew in S and now she comes down from time to time and lives in S. There were two cats lying curled like the top of a stoop, like on a pillar or something. One was black and the other pink. (CC-51)

180 I'm not unwilling to talk if you encourage me. Maybe I have to

Table 1 (*continued*)

Variable No.	*Variable Name, Hour Number, and Examples*
	say those things and get them off my mind. Declined to speak at the teach-in. I had nothing to say. To get up before all those people not having anything to say, a vacuum inside me. I don't get to talk to people. I've stopped thinking about things or having ideas.
30	*Moving or Details of Dwelling*
	202 In the dream where the boys attack outside of the apartment. There was a wall and the couch like in this room, like the wall between my living room and bedroom which is a partition with a couch against it. In today's dream I was afraid to go into the living room.
31	*Fair Play and Justice*
	463 And that it's much easier for you to have a rule that you can say is unjust or just or whatever. (Analyst)
32	*Childhood Memories*
	249 The summer I was 11 at the beach, some kids put on a show and I wore a dress like that.
	249 It reminds me of one of my small stock of memories, playing dentist, putting rocks in my mouth.
	113 It was recalling that sometime, I guess it was about age 4 or 5 but maybe later, I recollect trying to urinate like a boy.
33	*Report of Major Affect in Dream or Reality*
	225 Not that I am on exhibition. I'm self-conscious because there's no conversation. I can't stand sitting waiting for the food. I had no reason to say that I felt very bad together with what I said to A. I began to think I was awful. In the middle of the day I was in tears. Felt no one could care for me because I'm a horrible person.
34	*Masochistic Wish*
	462 The fact that you're not pulling away, that what I think you see as a self-destructive piece of behavior, trying to understand, trying to sort it out. (Analyst, CC-19)
35	*Negative Feelings Toward Analyst*
	113 What comes to mind is that somehow I think, I don't know if I can fully explain this, but I'm envious of you.
36	*Genetic Interpretations*
	173 Some of the apprehensions is the fear that I will intervene and the thought that I am controlling your bowel movement, giving you enemas, etc., by requiring you to speak your thoughts, making you lose control of your thoughts, making you do something at a different time, in a different way from what you want. (Analyst)
37	*Other Interpretations*
	463 Don't you think it's likely to do with what went on between us?
	463 Is it that your going away was an effort to make distance and saying OK meant I was willing? And if it wasn't I'd say no?
	463 I hope I can make this clear to you because it's very clear to

me now. I think you're freer when there is a rule that you can defy than when there's an opportunity for negotiation. In other words, I think I made it harder for you to leave by saying OK.

Table 1 (*continued*)

Variable No.	*Variable Name, Hour Number, and Examples*
	249 You can see the reason for some of the hesitation you have had, the thought that you would be crazy, homosexual, if you began to really associate in the analysis. *(All analyst)*
38	*Response to Interventions as Interaction*
	463 (Analyst) Yes. The last escape hatch from it being you and me. You can't say it's the convention of the analysis. I wonder whether that too doesn't serve that purpose.
	(Patient) Don't have any thoughts about that. Not thinking about my reaction to what you said. Didn't tell me. Thinking you haven't confirmed or denied. Assumed you wouldn't.
39	*Transference Phenomena*
	163 It didn't seem I was feeling angry about you having a child. The way it came to mind was about there being another child, so maybe I do feel that (patient's voice fell away for the last few words).
40	*Other References to Analyst*
	249 Some memory recreating earlier anger and I would scream and flail in here. You would be around to control. (CC-4)
	249 Whether I am preoccupied with it because of having such impulses myself, specifically in relationship to you.
	249 Probably doing better today in the analysis. You must be approving. (CC-43)
	249 Maybe you understand about the breast-penis-feces collocation. Would you tell me? Maybe at some time you would. If you did you would leave me question that, leave me to unravel it myself.
41	*Research*
	463 The second thing, probably more important, I said I was someone's research patient and it cost me little money. He mentioned that he had a cousin who had been a research patient, who had a woman doctor and that this woman doctor had told him after two and a half years that she couldn't do anything for him and let him go.
42	*Non-verbal Behavior on Couch Which Is Discussed in the Analysis*
	462 But there have been, even in the last week, plenty of sessions where you were silent for a long time, where you have yourself reported you felt extremely withdrawn and you weren't saying what you were thinking or what you were feeling. (Analyst)
	113 That reference to taillessness in the dream brought to mind that during the hour yesterday, I was conscious of my genitals … my female genitals, that is, and so am I now … and partly why I stopped.
	113 Anyway, just now, I have the need to urinate and that may be related to the question of control.
43	*Reflections on Quality of Associations*
	113 I see that yesterday and in the beginning today, the subject

matter was my feelings about you and about my mother as females few minutes, I'm talking about my male proclivities. I don't know who provide warmth and perhaps nourishment. Now, in the last the nature of the connection between those two subjects.

Table 1 (*continued*)

Variable No.	*Variable Name, Hour Number, and Examples*
44	*Major Affect in Analysis*
	465 If I say he can't hurt me, nobody can hurt me (speech broken, crying). The reason he gave or continues to handle things in the way, even though I told him I didn't like it, was that I should be less unhappy. Indicated there was no unhappiness for him. He could manage. That was very insulting to me (crying).
45	*Major Speech Disturbances*
	465 He didn't have anything to say. Suppose he could see the contradictions. (Disrupted speech.) I have many feelings.
46	*Momentary or Immediate Forgetting*
	459 I meant to say I don't do it out of selfishness. In a way it's-part of those feelings have to do with my feeling superior. Partly it's just easier (silence)-forgot what I was going to say.
47	*Discussion of Arrangements*
	462 May have to go to a meeting in school tomorrow.
48	*Instructions about Associations*
	462 If we could understand, it might be more valuable in getting over it, so to speak, than not feeling it.
	463 There is still something in the relationship we have to work on.
	463 I don't mean you're purposely not doing what you should or even that you could change overnight. I want you to notice it. (All analyst)
49	*Other References to Analysis*
	229 I saw downstairs one of the people that I recognize from the other building. Made me think again, I don't want anyone else in on this analysis.
	229 Just a general feeling, you're not. Everything else except the analysis feels transient.
	463 Yes. And we know you've complained bitterly of the conventions of the analysis. (Analyst)
(50	*Analyst Speaks* [frequency per hour])
51	*Dream Report*
	113 I remember two fragments of a dream.
	463 Dreamed about you last night.
(52	*Day of the Week*)
(53	*Hour Number*)

with one or more examples of text (chosen unsystematically from what happened to be available) which was coded for each.

There are several features to be noted. Many, but not all, of the categories lend themselves to coding with minimal or no inference. For example, categories such as *Mother and Father* are simply manifest references to them. Categories such as *Depression, Anxiety, Angry Feelings, or Guilt and Punishment* were coded when the patient or analyst manifestly spoke of such feelings: the patient would have to say she was tense or anxious or nervous; it was not an inference on the part of the analyst. Other categories, such as

Paranoia and Response to Intervention as Interaction, clearly require a judgment on the part of the analyst, as

does *Reflections on the Quality of Associations*. Others are coded from comments in the transcript as in *Major Affect in Analysis*, which was almost always crying, and *Major Speech Disturbances*.

But 53 variables are a lot to keep in mind all at once, and experience has shown that there is usually a lot of redundancy in psychological variables. Factor analysis is basically a procedure for removing redundancy, for picking out relatively non-redundant variables and systematically grouping those that go together. Normally, it is applied to variables measured on many people, but it can also be applied to variables measured on one person over many time units. The latter is called P-technique Factor Analysis; Lester Luborsky **(1953)** was among the very first to use it, in the early 1950's. The P-technique was then nearly abandoned until very recently. This is its first application to extensive psychoanalytic data. **Table 2** shows the six factors derived from a matrix of intercorrelations of the 53 variables I have just described.

Thirty-one of the 53 variables are grouped into six factors. The variables that are most important in determining each factor are listed along with their factor loadings. Factors do not come out of the computer labeled. It is necessary to look at the variables that define a factor and decide what concept or construct they represent. Factors 2, 3, 4, and 5 are very easily understood. Factor 2, I have labeled a *Family* factor for obvious reasons. Factor 3, a *Sex* factor, is of special interest to analysts because the variables of *heterosexuality, having a baby, thoughts of doing violence, masochistic wishes, penis envy and castration, positive oedipal feelings, and guilt and punishment* are here grouped together. Factor 4 is a *Dream* factor. Factor 5, labeled *Anxiety*, is of interest because it includes not only *anxiety, fear of insanity, and fear of hurting children, but anality* and a measure of obsessive thinking, namely, *reflections on the quality of associations*.

I thought about Factors 1 and 6 for some time before deciding to call them *Resistance* factors. You will notice that the highest-loading variable on Factor 1 is *analyst speaks*. This is simply a count of the number of times the analyst spoke during an hour. It is highly correlated with the hour number, which means that the analyst spoke more and more often as the analysis went on. I then noted the other variables that loaded on this factor: other *interpretations, other references to the analyst, involvement-separation, major speech disturbances, and paranoia*. It occurred to me that what must have been happening was that the analyst was encountering severe resistance and making an increasingly active effort to deal with it. Factor 6 then appeared to be another type of resistance. It includes the analyst's *instructions about associations, other references to the analysis, discussion of arrangements* (such as money and time), and *response to interventions as interaction* (the patient's focus is not upon the content of the intervention, but upon its interpersonal significance).

The results in **Table 2** are based upon the frequency of occurrence of these variables. But it is not necessarily true that because a particular matter is mentioned 10 times it is more important than a matter that is mentioned only once.

I decided to find out whether there would be any difference if the data

Table 2. FACTORS BASED ON FREQUENCY DATA*

Variables	*Factor Loadings*
Factor I (Resistance I)	
Analyst Speaks	.82
Other Interpretations	.75
Involvement-Separation	.66
Other References to the Analyst	.62
Major Speech Disturbances	.48
Paranoia	.35
Factor II (Family-Genetic)	
Mother	.72
Father	.56
Childhood Memories	.46
Sister	.44
Genetic Interpretations	.37
Factor III (Sexuality)	
Heterosexuality	.58
Having a Baby	.46
Thoughts of Doing Violence	.44
Masochistic Wish	.36
Penis Envy and Castration	.35
Positive Oedipal Feelings	.31
Guilt and Punishment	.30
Factor IV (Dreams)	
Dream Report	.55
Color in Dreams	.45
Moving or Details of Dwelling	.37
Report of Major Affect in Dream or Reality	.30
Factor V (Anxiety)	
Anxiety	.45
Reflections on the Quality of Associations	.37
Anality	.35
Fear of Insanity	.33
Fear of Hurting Children	.28
Factor VI (Interaction-Resistance II)	
Instructions about Associations	.37
Response to Interventions as Interaction	.30
Other References to the Analysis	.30
Discussion of Arrangements	.28

* Square root transformation of frequencies (*f*),

$$(x = \sqrt{f} + \sqrt{f+1})$$

. With two exceptions, variables chosen to represent a factor had factor loadings ≥.30. The correlation matrix was factored by principal components method with a Varimax (orthogonal) rotation. Six factors

accounted for 78 per cent of the variance.

were treated as though any number of occurrences is equivalent to one occurrence. For example, if the patient said she was tense several times during an hour and it had been so tabulated, I now counted this as 1, and if the variable was not found at all it was counted zero. I then repeated the whole procedure; the results are shown in **Table 3**. The striking thing is the similarity in results from

Table 3. FACTORS BASED ON ALL-OR-NONE DATA*

Variables	*Factor Loadings*
Factor I (Analyst Speaks-Resistance I)	
Analyst Speaks	.59
Paranoia	.45
Major Speech Disturbances	40
Momentary Forgetting	-.30
Mother Role	-.30
Other Interpretations	.27
Factor II (Family-Genetic)	
Mother	.64
Father	.48
Childhood Memories	.44
Sister	.43
Genetic Interpretations	.31
Factor III (Sexuality)	
Heterosexuality	.48
Having a Baby	.42
Negative Feelings toward Analyst	-.40
Penis Envy and Castration	.35
Masochistic Wish	.27
Positive Oedipal Feelings	.26
Factor IV (Dreams)	
Color in Dreams	.49
Dream Report	.48
Moving or Details of Dwelling	.35
Report of Major Affect in Dream or Reality	.31
Factor V (Anxiety)	
Anxiety	.36
Thoughts of Doing Violence	.36
Anality	.31
Reflections on Quality of Associations	.31
Fear of Hurting Children	.23
Factor VI (Interaction-Resistance II)	
Instructions about Associations	.37
Response to Interventions as Interaction	.36
Involvement-Separation	.30

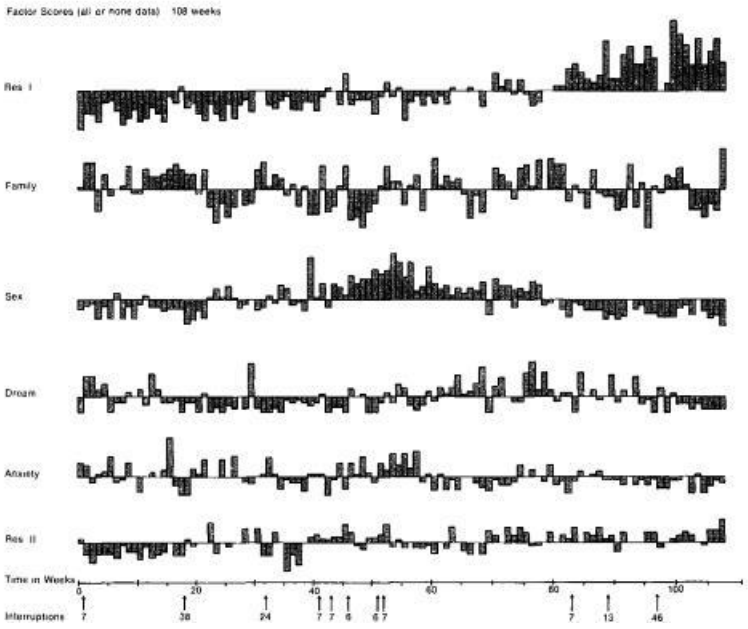
* All-or-none transformation of frequencies (f) (when f>1, x = 1). With two exceptions, variables chosen to represent a factor had factor loadings ≥.27.

Principal components solution with Varimax rotation. Six factors accounted for 73 per cent of the variance.

the two procedures. Although there are a number of relatively minor differences, the main one consists in the shifting of the variable *involvement-separation* from Factor 1 to Factor 6. For reasons that will become clear later on, the *involvement-separation* theme is of major importance in the case. For technical reasons we can see its contribution more effectively when it is grouped with Factor 6 rather than with Factor 1. The rest of this report is based on the all-or-none data.

After we have reduced the variables in number and have grouped them by factor analysis, it then becomes possible to get a measure of the amount of each factor that is present during each of the 363 hours. Estimates of these amounts are called factor scores.[2] Since it is very difficult to look at long columns of numbers-363 in all-I obtained averages for each week and plotted the amounts of each of these factors for each of the 108 weeks. **Figure 1** is a graph of these plots. There are a number of things to be noted about these plots. For each factor the central line is the mean value; up is more, and down is less. The striking characteristic of Factor 1, which I have called *Resistance 1*, is its practically linear

Figure 1. Each vertical bar represents the average factor score for a week, standardized over the entire 108 weeks. The center line is zero; above the line is a positive score and below the line is a negative score. The numbers under the arrows at the bottom represent the numbers of days of an interruption in the analysis.



2 These factor scores were estimated by treating the variables that were chosen to represent the factor as predictors of a dependent variable, the factor, and computing beta weights for a linear combination of the variables.

increase over the 108 weeks. Factor 2, the *Family* factor, has some kind of cycle, but it is very hard to relate it systematically to other factors. For about the first 20 weeks most of the values are above the mean. Factor 3 is the *Sexuality* factor. Most of its values are low until about the 40th week; then it sharply increases to about the 54th week, then gradually drops off to about the 80lh week, and finally returns to low values. Factor 4, the *Dream* factor, shows some dreams in the early weeks, but is generally low until about the 60th week. There is then a rising and descending curve of dreams until the 100th week, with a peak at about 80. Factor 5, the *Anxiety* factor, is intermittently above the mean in the first 40 weeks, but the striking thing is a steady increase after the 40th week until about the 59th week, when it drops sharply and remains less than the mean during the rest of the period. And Factor 6, the second *Resistance* factor, including *involvement-separation*, is consistently negative until the 18th week; then it suddenly shifts upward, where it remains for pretty much the rest of the 108-week period.

By this time I had done what is known as a second-order factor analysis in my head; that is, I had reduced these six factors to two. I combined the two resistance factors into one (*R*). Then I combined the other four factors into one factor which represented both content and conflict (*C*). Let me now briefly explain the main reason for reducing everything to these two measures. What I really wanted was an overall measure of "analytic work." This is a key concept for understanding the psychoanalytic process, but we have had no way to measure its viscissitudes over time. My thinking ran something like this: during periods when the patient is doing what we call analytic work she will, on the average, tend to talk about her conflicts; she will refer to sexual topics, to her family and childhood, to her anxieties and symptoms, and she will tend to report dreams. It is true that we cannot define a typical pattern of the way these topics will alternate over time, and it is also true that talking about these matters may sometimes be in the service of resistance. Nonetheless, if conflicts are to be resolved, they must be dealt with, and it therefore seems reasonable, for the time being, to adopt the simplifying assumption that these topics will be most evident during periods of "work" and least evident during periods of "resistance" and less productive work.

It therefore occurred to me that it would be possible to get a rough overall measure of analytic work by summing the four conflict factors and subtracting the resistance factors from them. If my reasoning is correct, then the probability of "work" will tend to be greatest when *C* is high and *R* is low; conversely, the probability of "work" will tend to be lowest when *C* is low and *R* is high.[3] Thus I began to think of *C* minus *R* as a rough measure of analytic work. I am quite aware that this idea involves a number of difficulties; but its merit is that it turned out to be useful. **Figure 2** shows plots of the sum of the conflict factors (*C*), the sum of the resistance factors (*R*), and the difference between them (*C-R*).

In **Figure 2** the top graph (*C*) represents the sum of the four conflict

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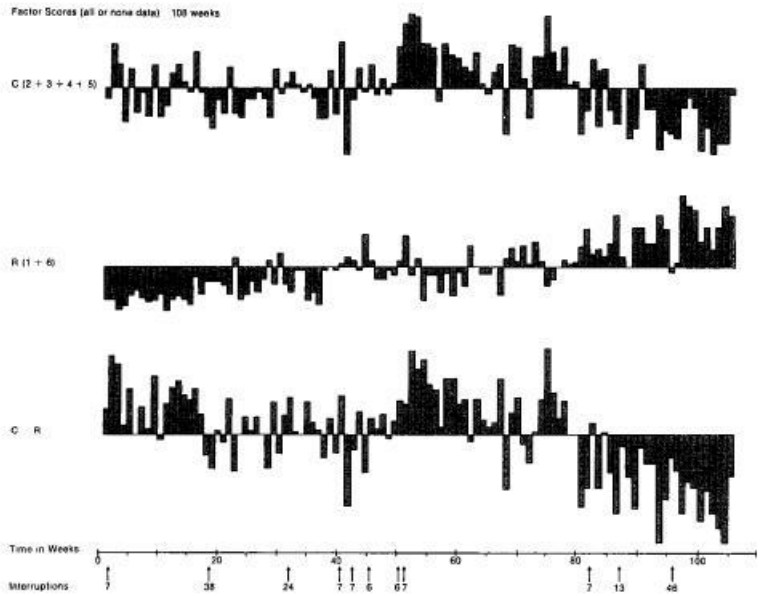
[3] Much later I actually did a second-order factor analysis and the results were consistent with the intuitive grouping.

Figure 2. Each vertical bar represents a sum of the average factor scores for the indicated factors. C is the sum of the factor scores for factors 2, 3, 4, and 5; R is the sum of factors 1 and 6; *C - R* is C minus Ft. The center line is zero; above the line is a positive score and below the line is a negative score.



factors, the middle graph (*R*) represents the sum of the two resistance factors, and the bottom graph (*C - R*) shows the difference between the two. As before, each vertical bar represents one week. The features I want to call attention to here show up most clearly in the *C* minus *R* or, if you will, the "analytic-work" time plot. Notice that in the first 18 weeks the scores are above the mean. Then there is a sudden drop and a good deal of variability up and down, until after the 45th week; next there is a great rise to about the 54th week, and from there to the 108th week there is a very pronounced downward trend, with only one exception.

The Course of the Analysis

In order to demonstrate the striking correlation between these time plots and some of the main events of the analysis it is necessary to describe something about the patient and the course of the analysis. The patient was a young, unmarried, professional woman. At the time she began her analysis with Dr. A, two of her express hopes were that she would be able to change her relationships with men in such a way that she could get married, and that she would be able to have children. During the early months of the analysis with Dr. A, it seemed

quite clear that she was developing a positive transference-perhaps it might even be called a working alliance. Then, suddenly and unexpectedly, Dr. A became ill. The patient was given little or no information about the circumstances, and was finally told that he would not be able to return. Our time plots begin with the first session with Dr. B, who was herself five months pregnant at the time of taking on this patient. The vertical arrows at the bottom of the time plot show all the major interruptions in the analysis and the number of days of interruption. The first major interruption of 38 days came after 18 weeks, when the analyst left to have her baby. This event coincides with the sudden shift in the *C* minus *R* score (**Fig. 2**). This shift is the result of abrupt changes in both the *C* and the *R* scores. The Resistance scores increase and the Content-Conflict scores decrease. Shortly after the 40th week, during the summer when there were several short holidays, the patient met a married man with whom she quickly began an affair. She promptly got pregnant, and then during the 53rd week had an abortion, with the approval of her lover. Following this, with the single exception of some events betwen the 70th and 80th weeks, our measure shows a steady decline.

It seems reasonable to assume that this young lady, who wanted among other things to get married and to have a child of her own, began her analysis with the expectation that she would indeed find these things. I believe that she also expected to find in her male analyst someone who would not threaten her with desertion by getting ill, as her father frequently had with threats of heart attacks. When Dr. A did become ill, her wish was thwarted and her fear confirmed. Five months later, she began analysis with a woman who was pregnant, and the signs, it seems to me, are quite clear that there was a pronounced change in the analysis following the analyst's leaving to have her baby. There seems little doubt that the patient viewed this event with great envy and jealousy. About half a year later, when she met the married man, she decided to have an affair, to get pregnant and to have a baby; but no sooner did she become pregnant “accidentally” than she decided to have an abortion. It is evident from an independent summary of the case that the patient took the fact that the man readily agreed to the abortion and was very supportive during it as a sign that nothing could come of her relationship with him. The abortion occurred just before the peak of *C* (53rd week); the course from there on was downhill with a single exception. Notice the increase in talk about sexual matters during the affair as well as the steady increase in anxiety during the affair, the abortion, and immediately afterwards.

But there is another striking finding. The increase in dreams coincides with the decrease in anxiety and the decrease in sexual topics. The content of these dreams is often violent and destructive; associations went to powerful feelings of jealousy and anger at the birth of a sister when she was two or three years old. It seems reasonable to assume that her wish to have a baby was now being fulfilled only in her dreams; that what had begun as a conscious wish had been abandoned under the combined influence of her own childhood conflicts and the fortuitous events of the analyses; that her jealousy, her ill-fated (predestined

to be so) affair, pregnancy, and subsequent abortion had conspired to destroy all hope of realistic fulfillment. The independent summary of the analysis during this period (80th to 108th week) is replete with comments about the stalemate, the stagnation, the difficult resistance, and the analyst's nearly futile efforts to do something successful about it.

Computer Content Analysis

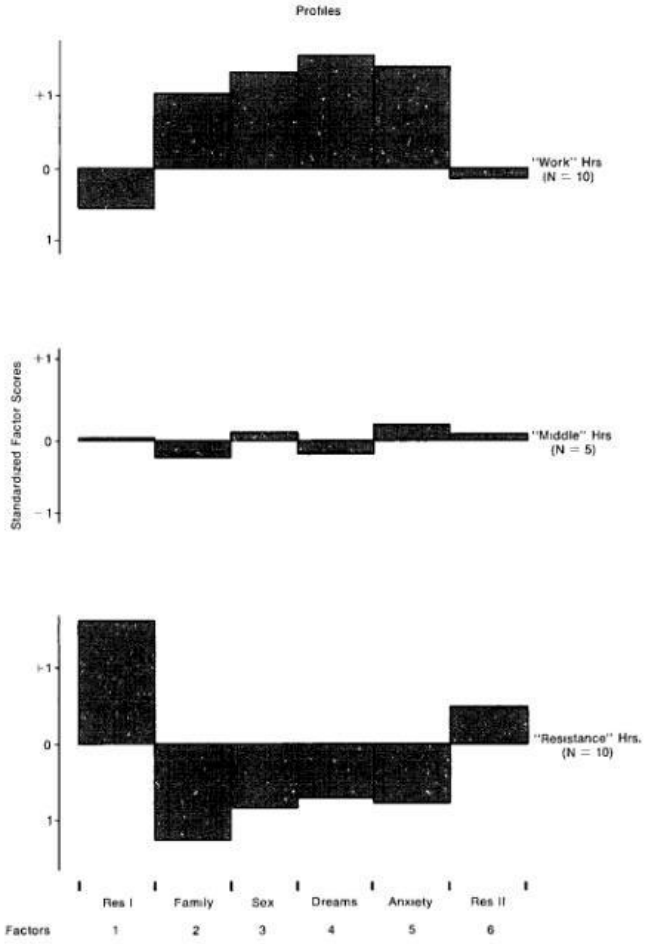
A second way of studying this analysis was through a simple form of computer content-analysis. This approach is based on two simplifying assumptions. The first is that words alone, independent of grammar, carry significant information. The second is that words and ideas that occur together belong together-the principle of association by contiguity. Since it was not practical at the time to keypunch all 363 hours, I had to have a criterion for selecting a much smaller number of hours. In view of the striking relationship between the course of the analysis and the graphic representation of it by factor scores, I decided to use the factor scores as a basis for selecting certain hours in which analytic work (insofar as the factor scores might indeed measure this) was predominant, and other hours in which resistance to analytic work was predominant. Accordingly, I selected hours with low scores on factors 1 and 6 and high scores on factors 2, 3, 4, and 5 as "work" hours, and hours with high scores on 1 and 6 and low scores on 2, 3, 4 and 5 as "resistance" hours. Hours with scores in the middle on all six factors were selected to represent the middle. **Figure 3** shows what these profiles look like.

I then searched the text of the patient's portion of 25 hours (10 "work," 10 "resistance," and five "middle") for words from the Harvard III Psychosociological Dictionary. In this dictionary, each of about 3200 words is defined by assigning it to one of 55 denotative categories and to one or more of 28 connotative categories. Thus a word is defined by the categories to which it is assigned. A category is in turn defined by the words that are assigned to it. Details of this dictionary are described in *The General Inquirer* by Stone et al. **(1966)**. A computer program reads in the text of the hour from IBM cards, looks up each word, counts the number of times each concept is found in each hour, and converts these to percentages.

Figure 4 shows the results in graphic form. With 17 dictionary categories, the highest percentages occurred in the "work" hours, intermediate percentages occurred in the "middle" hours, and the lowest percentages occurred in the "resistance" hours. Three dictionary categories show just the reverse, with their highest values occurring in the "resistance hours" and their lowest values in the "work" hours. **Table 4** summarizes the results as correlations between the percentages of each of the dictionary categories and the overall "analytic work" measure, *C-R*, over the 25 hours. The results are clear: the analysis of the content of the patient's speech reveals sharp differences between the hours with different factor-score profiles.

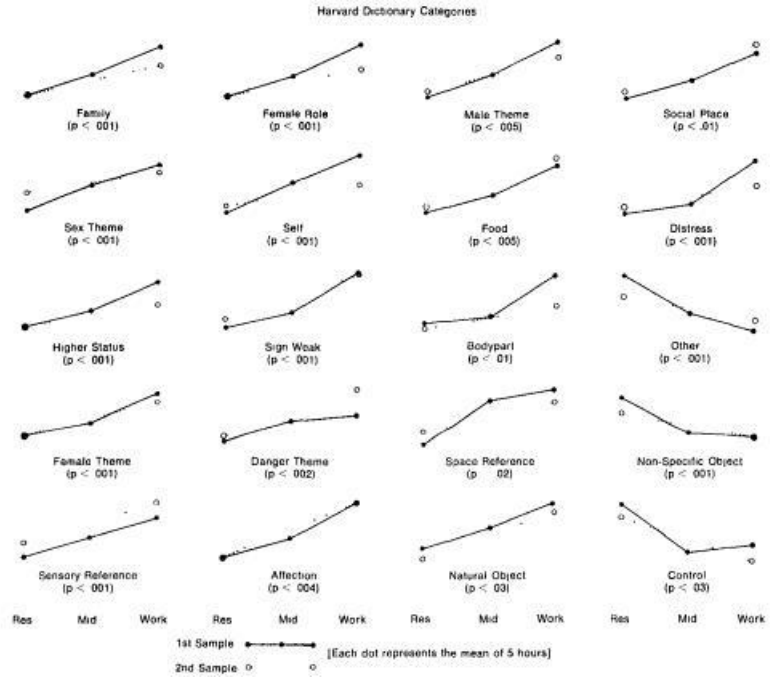
Of the many interesting details of these differences, I shall mention only

Figure 3. In each profile, the bars represent the average factor scores (of N hours) for each of the six factors.



three. There are more Self references (*mine, my, myself, self*) during the "work" hours. There are more references to Others (*you, your, yourself, they, them, their, themselves*) during "resistance" hours. There are many more Non-specific Object references during "resistance" hours. This category includes such words as *anything, characteristic, component, everything, it, that, thing, sort, what*, etc. With the addition of a few verbs, prepositions, and articles it is possible, using this list, to talk endlessly and say nothing. (This category would, I am certain, dominate a great many political speeches.)

Figure 4. For illustrative purposes, all slopes have been made equivalent and numerical axes omitted. The *p* values, based on linear trend analyses, indicate the significance of the linearity of the relationship between the dictionary category score (plotted vertically) and the three different types of hours (plotted horizontally).



But it was still not demonstrated that my use of the concept of work as measured by the factor scores was related to the concept as used by analysts. Accordingly, I asked several analysts to act as judges. First I asked each of them to read an example of each of the two types of hours. Then I asked them to read transcripts of eight other hours and to judge whether analytic work or resistance to analytic work was predominant, and also to give a confidence rating for each judgment. The two ratings were combined into a 6-point scale. The coefficient of reliability for the mean of the three analysts who completed the ratings was .90. Their mean ratings correlated with the factor score criterion (*C* - *R*) .93.

Some of the deficiencies in the measure of analytic work will be intuitively apparent to experienced clinicians. Moreover, since it was a measure derived from the clustering of variables specifically chosen for this particular case, we simply do not know whether the same clusters would occur in the next case, or whether, if they did, they would measure the same thing. Nonetheless it is encouraging to have found systematic relationships among the three different kinds of measures-the 53 analyst-coded variables, the computer-dictionary categories,

Table 4. PRODUCT-MOMENT CORRELATIONS (*r*) BETWEEN THE HARVARD DICTIONARY CATEGORY SCORE (PERCENTAGE OF OCCURRENCE) FOR EACH HOUR AND THE FACTOR SCORE CRITERION (*C* - *R*) FOR EACH HOUR*

Dictionary Category	*r*
Family	.80
Sex Theme	.78
Higher Status	.77
Female Theme	.72
Distress	.69
Self	.68
Other	−.67
Non-Specific Object	−.67
Female Role	.66
Sensory Reference	.66
Sign Weak	.64
Danger Theme	.60
Affection	.59
Food	.55
Male Theme	.53
Body Part	.51
Social Place	.51
Space Reference	..50
Control	−.49
Natural Object	.42

and the clinician's judgments. These relationships show that large amounts of psychoanalytic material can be quantitatively described in a way that does not lose clinical meaning. Indeed, in this case the time plots may have enhanced our understanding of the course of the analysis. More important, however, is the demonstration that a simple computer content-analysis procedure, using simple frequency counts of words and a dictionary not particularly suited to the purpose, can discriminate among qualitatively different kinds of hours.

Future Research Needs

In order to continue this kind of research, we need to take certain steps. First, we need to establish a library of recorded psychoanalyses, characteristic cases, analyzed by the best and most gifted analysts. Thirty completed cases might be a suitable initial goal. What will we do with these? We have already learned that it is possible to transcribe tape recordings directly onto IBM cards, without intermediate typescripts. All the text is then stored on computer tape by an editing program, and can be retrieved in various ways by appropriate and simple requests. For example, we can ask for and get print-outs of the complete text of all hours

* *N = 25 hours. For p = .05, r = 40; for p = .01, r = .51; for p = .001, r = .62.*

that contain a dream report, or we can get a Key Word in Context index output of any word or set of words, so that we can examine the context and then decide whether we have found what we want. In effect, this is an instant indexing system based on the actual words used by analyst and patient. At the same time, if the analyst dictates notes about the hour and includes in these notes his own first classifications of the material, these notes can be stored and retrieved in a similar way. I am now doing this with the notes I dictate after each hour of an analytic case I am recording.

Second, we need to develop computer content-analysis dictionaries specifically for psychoanalytic concepts. Initially, these would be constructed like the Harvard III Psychosociological Dictionary to which I have referred. But we will soon be discontented with something so gross and error-prone. We will want contextual dictionaries, which will allow us to label and count concepts only when a number of several sub-concepts or words have been found in a specified segment of material. In developing the basic conceptual categories and the words that define them, we will need to apply the most sophisticated techniques of current psychometric theory, so that we can know something about the reliabilities of our measuring instruments. At the same time, we need to construct other content-analysis measuring instruments, such as the Gottschalk **(1969)** scales, and we need to try specifying the judgments in these instruments with sufficient precision so that we can write computer programs to do the ratings.

Third, we need vastly increased mathematical and statistical sophistication. We need to learn a great deal about the expected frequencies of the words that are actually used by people on the couch. From the economists we must borrow knowledge of the application of the mathematics for multiple time series. And to do these things means that we must analyze our own resistances to numbers and computers.

The consequences of getting reliable data through recording, of using computer-based content-analysis procedure, and of applying sophisticated statistical and mathematical analyses to our data will be, I believe, a revitalization of our field. It will force us to formulate our clinical theories in ways that will allow us to specify the kind of evidence we need to answer particular questions, and then permit us to return to the data, make our counts, and determine the probabilities that our results support or refute our expectations.

I know this must seem fanciful after so brief an exposure to these quite primitive and tentative demonstrations of a few possibilities. Nonetheless, I believe that what I have suggested is essential to attract to psychoanalysis the kind of imaginative and research-oriented young candidates that our field needs. And even if in the end these approaches fail, we will have had an exciting time along the way.

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