Shaping Mind
A Dynamic System Model for the Measurement of Psychoanalytic Process.

Abstract

Freud's original intention in writing *Project for a Scientific Psychology* in 1986 was to develop the discipline of psychology as a science of nature founded on quantitative data. He continuously stressed this view (1915,1937), but only in the last decade psychoanalysts (Spruiell, 1993; et al. Lonie 1992) suggested that the patient/therapist interaction would be better understood using dynamic system theories. Recently Kauffman (1999) stressed that psychoanalysis should build up a methodology for the measurement of process and changes, if it aspires to become a science of nature, as in its premises.

Although these articles clearly indicate the way along which researchers can develop new methodologies, this goal has never been realised. The majority of psychoanalysts believe that psychoanalysis is the science of meaning and so they decline any step toward the construction of psychoanalysis as a science of nature. Nevertheless, can psychoanalysis continue to develop if their members reject any kind of proof about its effectiveness? All main psychological theories are working on the single case study design (Blampied, 1999).

This research is an attempt to proceed toward this purpose involving modern science of non-linearity. It is argued that psychoanalytic setting is a recursive pattern and so can be measured and visualized as a set of data by a mathematical model. Based upon the theory of non-linearity a grid was constructed from 21 variables, which intend to represent the therapeutic process, and a pilot study was conducted. Using time series measurement and plotting variables or combinations of variables, information was obtained which aided in identifying the changes taking place in the therapeutic process. If an extended research will make evidence on reliability of the model, it will be possible to show the effectiveness of treatment, the comparison between different approaches and the probabilistic predictions regarding treatment outcomes.

29th October 2002 Lecco, Italy

Measurement and Psychoanalysis

The aim of my paper concerns *a methodology for the measurement of the therapeutic process within the specific field of Psychoanalysis and Psychoanalytic Psychotherapy*.

The methodology of quantitative measurement in psychoanalysis is still a source of considerable debate

1) The Freudian legacy and contemporary literature on measurement in psychoanalysis.

Freud argued for quantitative analysis as early as 1896 with his *Project for a Scientific Psychology*. From this earliest paper to the last one, *The Analysis Terminable or Interminable* in 1937, Freud periodically used concepts that he borrowed from natural sciences, such as: *phase, process, motion, frequency, constant, quantitative factors, mechanisms, periods,* in his effort to build up psychoanalysis as a scientific psychology.

This project has not been realised, above all because contemporary sciences didn't have means, conceptual as technical, to understand and describe the dynamic of 'the whole variegation of the phenomena of life' (1915:14). Freud's *Meta-Psychology* was a slave to reductionist and deterministic views that were based on 19th century's hydrodynamics (Maiocchi, 1995).

The English psychoanalyst Wilfred Bion (1993) first suggested that Poincare's (1997) mathematical devices were possible avenues for the measurement of the psychoanalytic process. Bion himself wrote:

> *We are familiar with Freud's attempt to build up a system… He has not completed his investigation. The problem has to be passed on, delegated to his survivors, the inheritance… Possibly we do attempt to formulate a kind of architectonic, the building-up of a system of thought into a stable form, like Cantor's exploration of matrices (1998:49).*

Bion began to build up a matrix or grid (1998) with psychoanalytic parameters along the x axis and intensity on the y axis, so that change could be represented and measured, but he did not test this grid in practice.

During the last decade, psychoanalysts such as Langs (1991), Moran (1191), and Van Spruiell (1993) in America, Haymal (1993) in Europe and many non-psychoanalysts such as Lonie (1992), have suggested that the patient/therapist interaction would be better understood using different dynamic systems theories. Their tendency to link psychoanalytic theory with non-linearity was dominated by the use of metaphor, but more is clearly required.

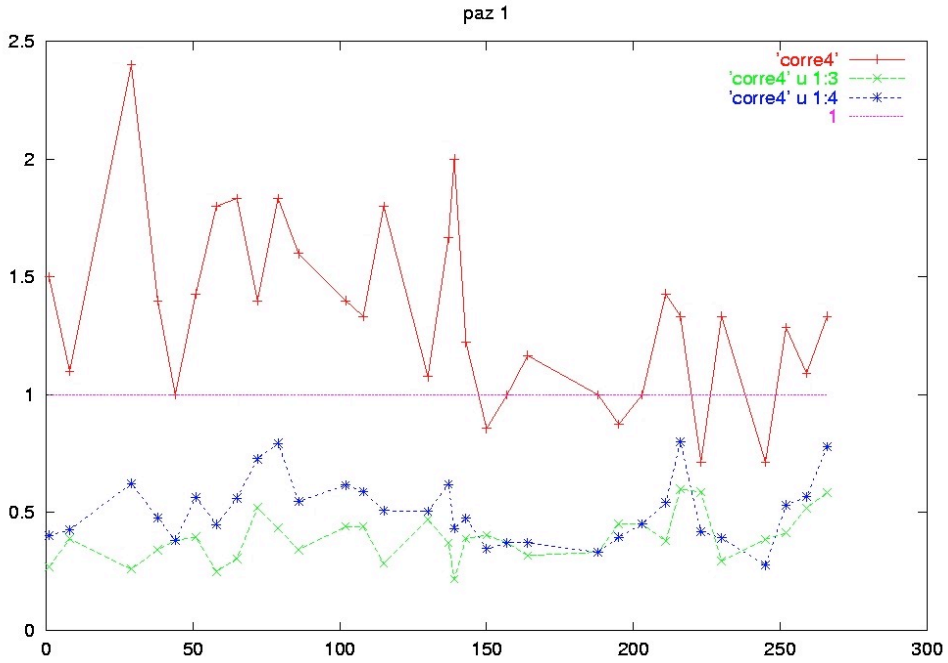
2) Mapping changes, which occur during the therapeutic process.

My experience in long term psychoanalytically psychotherapy led me to understand that patients may put therapists in an apparently locked situation, for as long as two years, during which it seems that nothing is happening in the therapy and the patient's bizarre, erratic behaviour seems not to change.

During this time, they test the therapist in many ways (Pigazzini, 1997,1998) and, as a consequence of their ability to cope with unbearable projections, changes can briefly appear in the course of sessions. How do we map these changes?

Non-linearity theories, like Chaos Theory and Fractal Geometry, offer models to shape the changes of the recursive events and interactions over time both in natural occurrences and in living organisms. Non-linearity means that three or more interacting variables are under investigation at the same time and the responses are *not directly proportional* (Williams, 1997) to the impulse.

The next diagram will clarify these points.



This diagram (paz 1)represents 9 months correlation between the basic relationships in the psychotherapy of a young girl with schizophrenia, during her second year of psychotherapy.

The dot-points series above the line on 1 support the idea that patient, the **“ I “,** is unable to relate, as a person, with:

- outside reality, e.g. people, the **“ IT ”,** represented by the dot-points series under the line on 1 marked by the square;
- therapist, the **“ YOU ”**, the dot-points series marked by the cross.

You can see that “ **I** ” is more object related in the second part of this year’s psychotherapy.

Comparing diagram features at the dot-points around a time of 150 days with my clinical notes, the change is connected with her first conscious experience of testing my emotions, by destroying some leaves of a beautiful ficus plant.

Being able to express her aggressive feelings, without escaping from the room, means that, at this point, she was starting to take under control her destructiveness and the connected anxieties.

3) Fractal geometry.

I am developing a model whereby psychoanalysts or psychotherapists can map out the development of the therapeutic process across time with an individual patient. A *model* is a *tool* by which it is possible to find information about *selected dimensions,* which are expected to represent the real world and its processes that are to be investigated. Psychoanalysis being a series of interactions *over time*, I selected a model that is able give a picture of the most important phenomena of growing and phases of development.

Because Psychoanalysis offers a talking cure and because the three persons,

I – YOU – IT

are fundamental aspects of any verbal interaction in almost all languages, I applied this rule to the fractal model of the *Sierpinski Gasket* (Peitgen *et al.,* 1992).

Later on, I selected the variables, which represent the process that was investigating.

Looking at the **Figure 1** it is possible to gain an insight into the model. I take into consideration 2 interacting, identically structured, sub-systems, with three variables each.

Variables: *3-4-5* are related to **I:** (3) - relationship,
(4) - defences,
(5) - anxieties;

6-7-8 are related to **YOU:** (6) - analytic process,
(7) - drives,
(8) - ego-functions.

Each of them has a developmental axis of 10 states (items), inside 3 phase spaces. This set oscillates between three bipolar dimensions *[variables 9 – 10 – 11]:*

9 Relaxation-**T**ension,

10 Presence-**A**bsence,

11 Emergence-**C**losing off

and swings between the **Ev**ents, variable 12

and the **O**bserver, the analyst, all variables from13 to 21.

This system develops in time, variable 2.

The patient's code is variable 1.

4) Methodology

a. Building up a grid.

To shape the development in time, I built up a grid as an instrument to make a measurement of the dynamics of the system. I stress the concept of a *system* as a *whole composed of interacting dimensions able to change over time.*

In any dynamic system based upon a recursive pattern, in order to simulate the process, we have:

- to set the rules that govern the system,
- to clearly define each item,
- to remain within the deterministic development of the intervals of any variable.

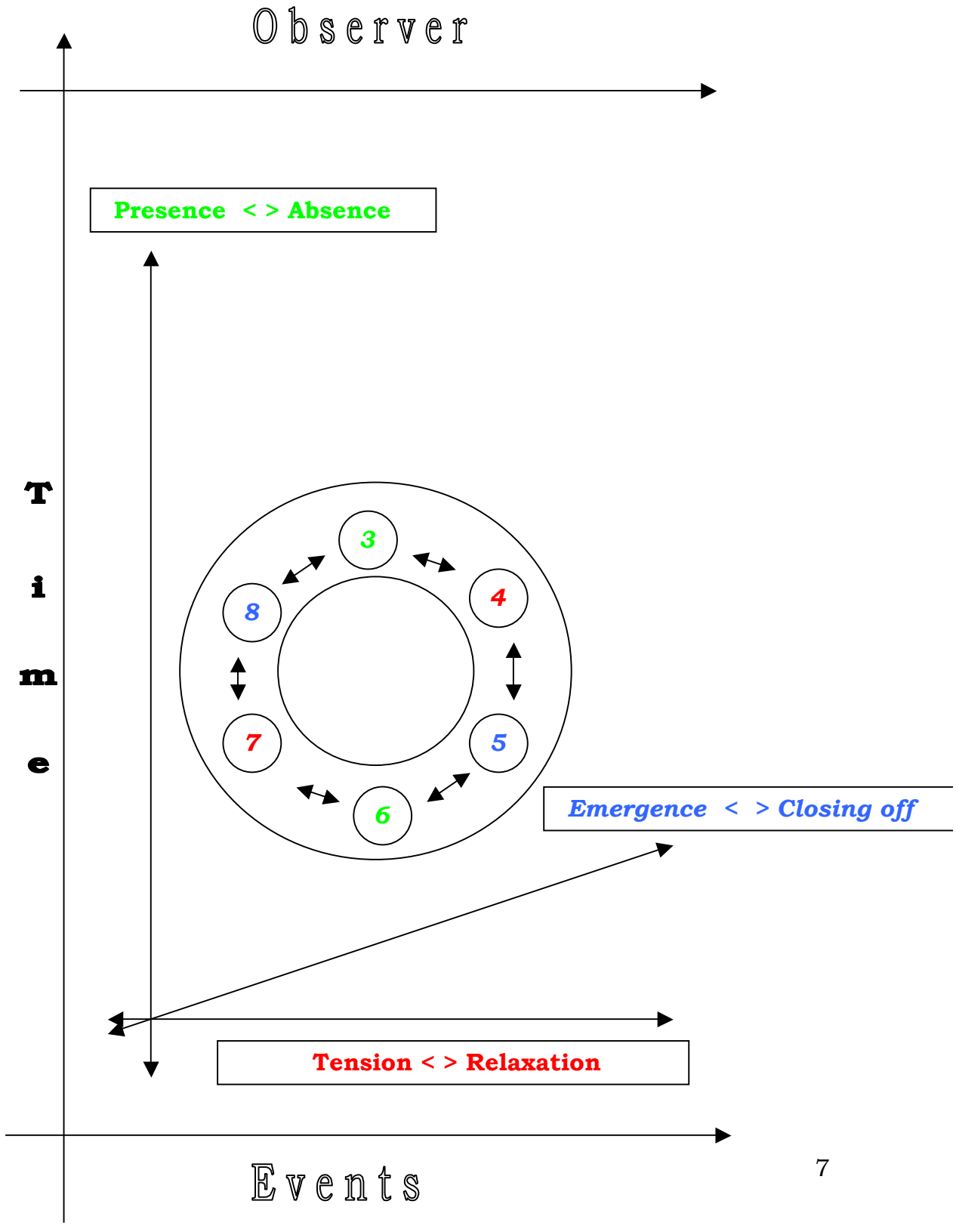
The structure of any variable will include:

1) the rules of the system:

- *Basic Relationship* represents I – You – It.
- *Poles* are branching configurations of the self-similarity of the system.
- The *Dynamics of Interaction* are the patterns of change.
- The *Coupling Interaction* represents the functions of every axis.

DYNAMIC SYSTEM MODEL of the Psychoanalytic & Psychotherapeutic Process **Fig. 1**

Six inter-related subsystems with developmental axes
Oscillating inside three dimensions and swinging within
Three interdependent variables: time, observer, events.



2) Three phase-spaces, which contain *the parameters that* represent the variables needed to specify the phase of a dynamic system at any time. I followed Freud's original organization of three phases:

- psychotic,
- neurotic,
- mature dependence.

3) 30 (or 15) intervals or states, which are the parameters that specify the phase-space.

4) The *vector,* the agent of change.

b. Selecting the contents for this grid

I would like to draw your attention to the fact that:

- this grid has already been tested and has reached an agreement, but all these contents (variables) will always be under investigation and can be redefined.
- the reliability of this grid is the most problematic part of this research.

c. Piloting the grid

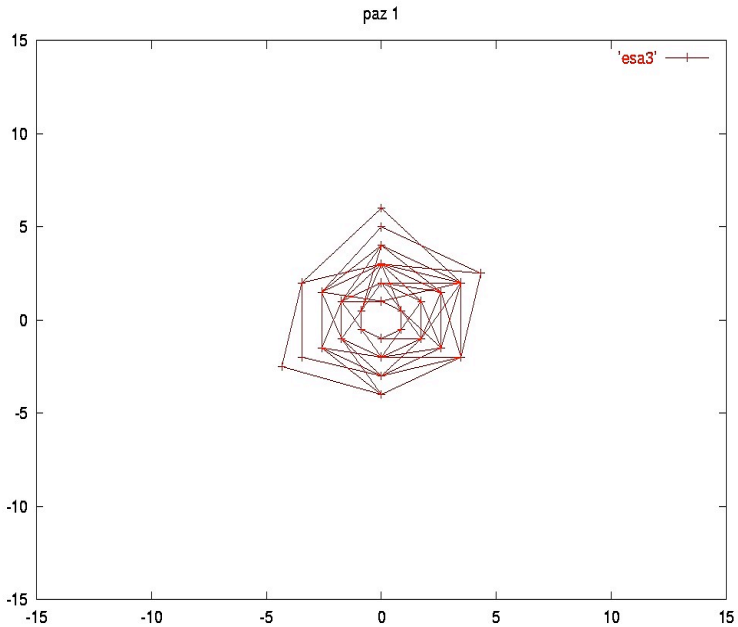
The diagrams that I will show are the result of the pilot study started on 1st September '98 and ended on 31st May '99. Ten patients were under investigation, from both the Psychiatric Unit, where I work as Consultant Psychologist and Psychotherapist, and from my private practice as Psychoanalyst. After each session I filled a grid in manually to analyse the data later.

This model offers the possibility to analyse thousands of diagrams in order to:

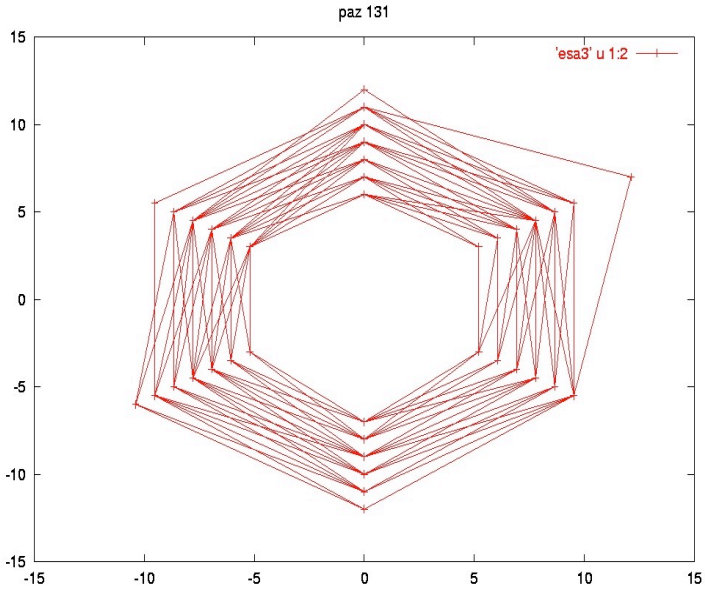
- grasp new information;
- discover new aspects of the therapeutic process;
- understand missing meaning;
- test the initial hypothesis;
- make many combinations and comparisons;
- check the different evolutions between the variables;
- underline the differences between psychoanalysis and psychoanalytic psychotherapy.

d) Plotting diagrams.

To demonstrate the previous points, I will show some diagrams, which have been analysed by mathematicians from both Milan University, using Gnu Plot and other software, and Adelaide University, using MatLab.



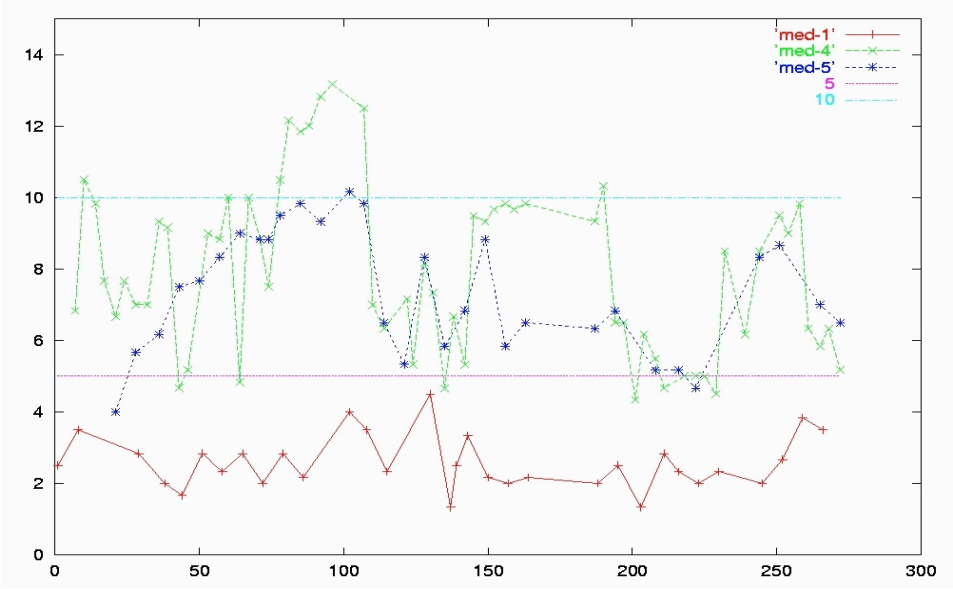
This diagram (paz1-esa3) shows that it is possible to visualize the evolution of the same variable – but also a group of variables – in a wide range of graphs, in order to collect more information. This patient is a young schizophrenic girl whom I meet once a week in the Outpatients Unit.



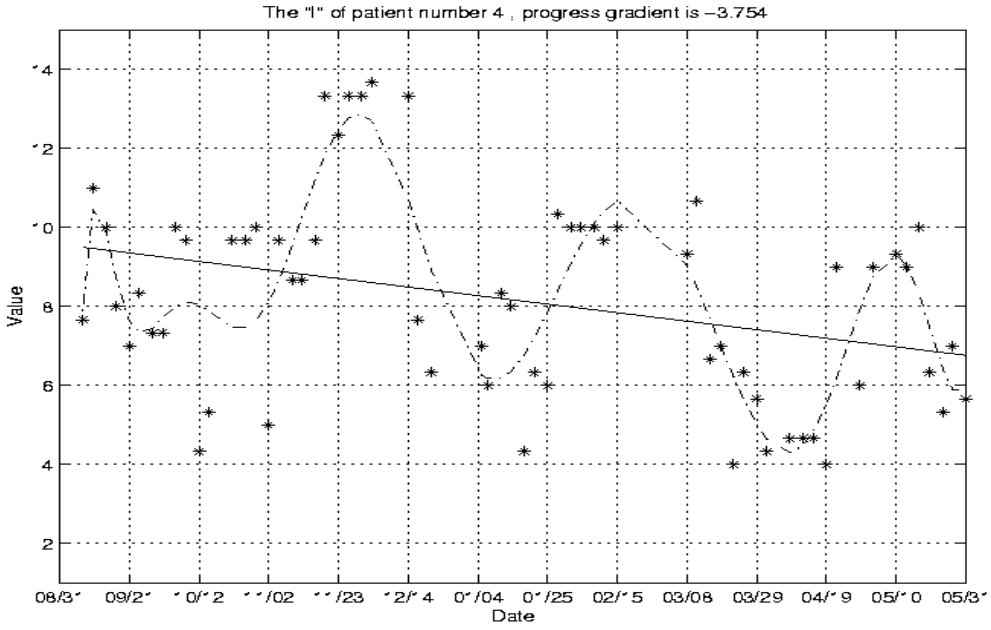
These two graphs (pa1-esa3 and paz131) show the same variables. This graph (paz131) represents a middle-aged man in his fourth year of analysis.

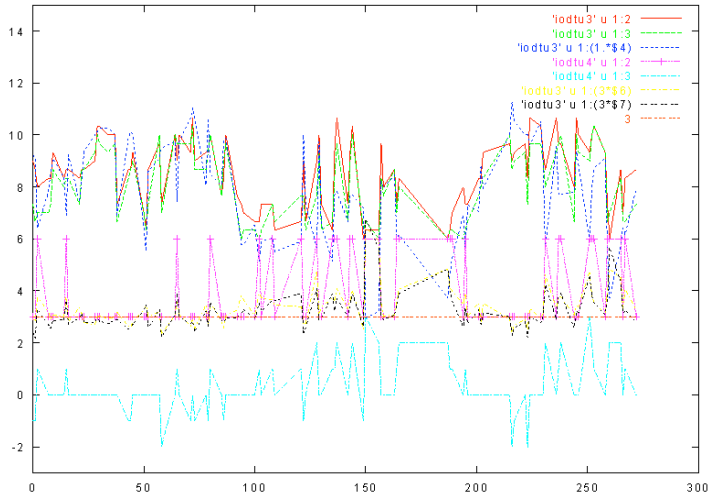
The following diagram (media 1-4-5) shows a high correlation between the 3 Basic Relationships. I chose this example because:

- it shows the phenomenon of continuously crossing boundaries by the borderline pathologies;
- the high variation presents stronger evidence of the high correlation. The diagram also shows an example of potential comparisons between patients with different pathologies.



These two last diagrams shows the real change; the first of the megalomaniac aspects of borderline patient. The progress gradient is negative because shows the decrease of megalomaniac fantasies.





5) Is this research valuable?

I have used, and I intend to use, this model for:

- comparing different clients' evolutions and outcomes;
- visualising the therapeutic process, and this is usually called *longitudinal* or *single case study design*, in order to:
  a) help my understanding of the outcomes;
  b) check the assessment and evolution of therapy at any time;
  c) check errors and their consequences;
  d) help the client to focus on what is changing and what is not;
- analyse different dimensions and their evolutions in both a single patient and a range of pathologies, in order to evaluate the work that I have done;
- build up the shape of the mind's interactions;
- make probabilistic predictions.

All these features will also be useful for discussion with colleagues, who can compare:

- how changes take place during the therapeutic process;
- the configurations of changes;
- the influence of errors;
- the effectiveness of treatment;
- the common ground and differences between various techniques;
- predictions of outcomes.

They can also:

- gain a picture of what is occurring;
- make more accurate validation of professional activity.

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