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THE FACES OF SUICIDE¹

Abstract. This article groups material from research reports on a pilot study of the facial behavior of patients who had made a suicide attempt. The aim of this pilot study was to explore the possibility of perceiving elements of facial behavior that could be correlated with future suicide attempts. This first part summarizes elements of the literature that had inspired us at the beginning of the 1990s, and the second part describes the first phenomena that seemed relevant then.

1. Suicidal behavior

In psychiatry, the main cause of death is suicide. Suicide rates increase fairly regularly in industrial societies. A considerable amount of research has shown that certain factors are related to the process that leads to suicide; nevertheless, the process itself remains elusive and unpredictable. Ultimately, suicide is an act, a specific type of behavior that aims at the destruction of oneself.

Research on suicide reached a crossroads when Don Jackson published an article on suicide for the November 1954 issue of the *Scientific American*. Although "...310,000 members of the human race take their lives each year...", "...hardly any systematic research is done on the causes of suicide...", and "...the views on the prevailing views on the subject are still unbelievably naïve." Jackson can only find two approaches of suicidal behavior worth mentioning, which he summarizes in the following way:

- Durkheim's sociological approach, which "...arrived at some conclusions which still hold good: he dismissed climate and certain other 'extrasocial' influences as causes of suicide and suggested that a major factor was a lack of sympathetic acceptance of an individual by his group."
- According to Freud's psychoanalytical approach, "a depressed person, prevented by his conscience from expressing hateful or murderous wishes towards a loved object (originally the mother), turns them against himself. He has tremendous guilt feelings and feels responsible for all sorts of sins, crimes, and wrongs which realistically do not exist. If he goes so far as to commit suicide, his self destruction is in reality a strike against the hated loved object as well as against himself. Most suicides occur during an emo-

¹ Based on a research reports for the Laboratory of Affect and Communication of the Geneva Psychiatric University Institutions (I.U.P.G.), 1992 & 1993, written by *Christine Lesko, Véronique Haynal-Reymond and Michael Heller*. Although the final result is under my responsibility, I am grateful to Judy Ramsay-Jensen for the many corrections she has introduced to improve my English and clarify my thoughts. *Copyright: Michael Coster Heller*. Last revision: November 2004.

tional depression. It may be said that suicide is an impulsive urge which comprises all the elements of a depression within the single brief act."

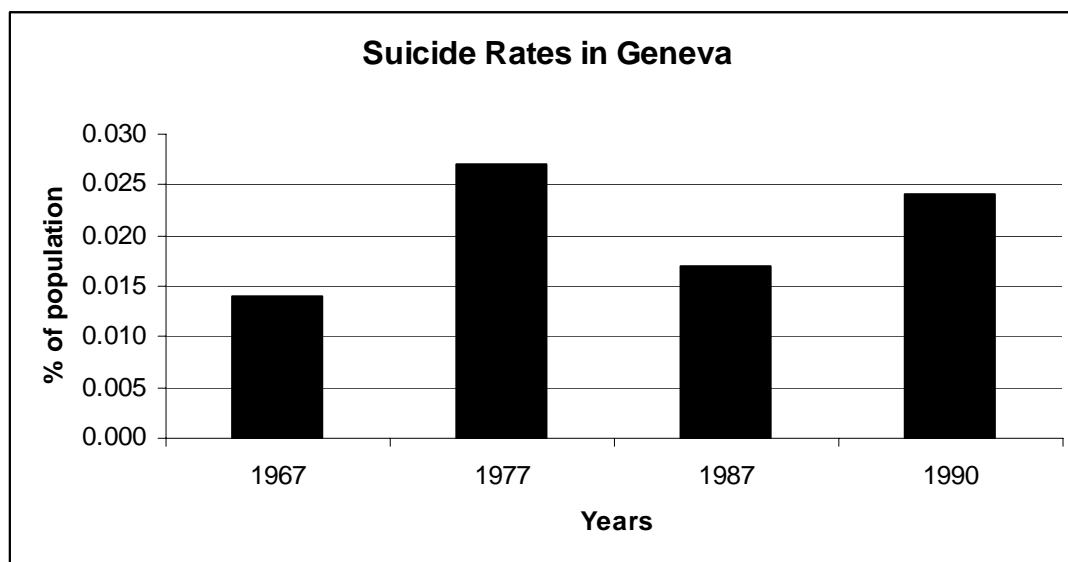
Through this article, Jackson probably had the intention of showing that at least some human behaviors must be approached with a pluridisciplinary frame of mind, as 1954 is also the year when Don Jackson reduced his psychoanalytical practice to join Gregory Bateson, Jay Haley, John Weakland, and William Fry who created what is known as the Palo Alto school of family therapy. Suicide is simultaneously caused by a coordination of social, psychological, and physiological (mostly chemical) causes. No single dimension yields a convincing model. Suicide, as well as schizophrenia, seems to have been for Jackson a good case to justify the development of new therapeutic approaches, focused on the interface of psychological and sociological levels of reality: interpersonal and communicative regulation.

Today, a considerable amount of systematic research on suicide has been carried out, confirming Jackson's views on the need of a multidisciplinary approach to understand suicide.

1.1. Sociological approach

Since Durkheim (1897), sociologists have tried to show that suicide could be defined as a sociological phenomenon, caused by sociological factors rather than psychological ones. It is in industrialized, Protestant countries of northern Europe and northern America that we tend to find the highest rates of suicide. In other types of societies, only Sri Lanka and Surinam have rates as high as those observed in our northwestern world. Switzerland does not escape this trend, and, in 1987, it ranked 9th in the world according to the World Health Association in terms of suicide rate.

Chart 1



Variation of suicide rates in Geneva (Switzerland) during the years 1967 – 1990, in percent of the population.

As shown Chart 1, suicide rates have dramatically risen since 1967 (Service Cantonal de Statistique de Genève 1971 and 1991). During the 19th century (Durkheim, 1897), suicide rate increased with age, which is to say that the older people had the highest probability of suicide. This has changed since

1967, as now the number of young people who suicide has risen during the 1980s and 1990s. During the year 1979, the Geneva statistical service observed a dramatic increase of suicide rates among males in the 15 to 35 age group, with a peak in the 20 to 29 age group. Observations carried out in 1988 show that suicide is the main cause of death for men aged 25 to 34 years, with a rate higher than car accidents by 40%.

Suicide *attempts* yield much higher numbers and do not cover exactly the same population (for example, there are *more men* in the suicide population and *more women* in the attempt population). In 1976, 427 persons in 100,000 (431,174 cases) made a suicide attempt in the EEC (Diekstra, 1989). In Switzerland, 1500 persons suicide each year, and 5 to 10 times more people than that make suicide attempts. These official figures are probably lower than in reality, as an unknown number of accidents could be masked suicides, or suicide attempts.

In cultures such as Switzerland, it is usually a medical institution that is asked to assess the state of persons who attempt suicide. It has often been observed that most suicidal people asked for medical help a few months before their death (Yessler et al, 1961; Brown & Sheran, 1972; Nielsen, B., Wang, A.G. & Bille-Brahe, U., 1990). In the more recent studies it is observed that from 30 to 64 percent of persons who made a suicide attempt had a recent contact with psychiatric institutions (Wolk-Wasserman, D., 1987). Nielsen, Wang & Bille-Brahe and (1990) report that in Denmark in 1987, psychiatric institutions had seen 10,000 suicidal patients.

Trying to understand what such figures meant, Durkheim suggested that the variation of suicidal rates correlated negatively with how well integrated a person is in his social environment. Epidemiologists have confirmed this finding (Dantzer, 1989, p. 47), as well as other studies we shall discuss here. More influenced by psychodynamic hypotheses than sociological ones, epidemiological studies have mostly stressed the relation existing between depressing social factors and rate of suicide. They have thus associated suicide with age, illness (cancer, AIDS), unemployment, desperate situations (in prison, etc.), professional or school failure, broken home, people hoping to avoid unnecessary treatments, to avoid talking under torture.

These findings show that the sociological and psychological factors combine in a more complex way than what was suggested by Durkheim, who was probably too rigidly "sociological".

These important data are of course fascinating, but of little help for the clinician. If a northern Protestant bachelor living in town is more likely to attempt suicide than a Mediterranean Catholic married in a village, the percentage of Protestant bachelors who suicide remains nevertheless small. Clearly, the clinician would need data which could help him to make decisions related to the individual he is dealing with at a given moment. Some clinicians even still cling to the hope that there might be a form of suicidal predisposition that could be detected in individuals.

1.2. Psychological approach

By 1917, Freud (1917, p. 252) had already noticed that intense murderous impulses against others could be turned back on oneself. But he also found that aggression directed to oneself was not a sufficient cause 'to explain what interplay of forces can carry such a purpose thought to execution'. As in epidemiological studies, the risk population thus defined is much too large: there

are many more people with intense auto-aggressive and suicidal impulses than the number of people who carry out a suicidal intention.

To explain which people among those with suicidal fantasies might finally carry them out, psychoanalytical 'characteriology' also distinguishes between weak and strong ego. One of the ego's functions is the regulation of our instinctual and emotional life from at least 3 points of view:

- a) A *delay* system: expressing an emotion or satisfying an instinctual charge must often be delayed until we find ourselves in a suitable situation. This delay system must at least allow for regulations within a day.
- b) A *cooling* system: the delay system can only function if our emotional forces can be somewhat cooled for a moment so that, for example, we can concentrate on our work until lunch time even if an attack of hunger intrudes in our mind at eleven o'clock.
- c) A *sublimation* process: when an emotion cannot be adequately expressed within a matter of days, the organism has the possibility of expressing an urge through less appropriate channels.

For example, sometimes it may be more appropriate to use excess anger by overworking than by shouting at one's boss and losing one's job. Two types of psychopathology can be derived from this model:

- a) People who only have some of these means available, and therefore over-use them (neurotic pole)
- b) People for whom all these means are insufficiently developed (psychotic pole)

When the ego is too weak for one or more of these functions, people tend to rely on a more voluntary form of control — will power — generating what one often calls 'super-ego' pathologies. The term 'will power' itself shows the limits of such a mode of self-regulation: it is strongly dependent on the amount of 'inner power' available at each moment in us. Thus during moments of inner weakness, the 'willful person' finds himself incapable of regulating his behavior in a coherent way, and may act upon impulses. At such moments, as a person finds himself incapable of delaying, cooling or sublimating his drives, he will find himself with only two options: either having his drives move his body, or blocking completely his mobility (Reich, 1945, p.150). It is this state which is qualified by the word 'impulsive'. In 1925, Alexander and Reich had already observed that the impulses of persons behaving this way chronically have a 'compulsive' quality, as they become incapable of preventing themselves from acting in a certain way repetitively (Reich, 1925). The impulsive character is thus only apparently spontaneous in his impulsive acts, as in fact these characters always end up by acting in the same way (e.g. a man who "spontaneously" expresses his anger... by beating his wife every week).

Acting on impulses may mean doing things parts of oneself wish to do, but which other parts of oneself might not want to do. Thus, reacting to a beautiful but depressing film I might kill myself, while more deeply I might wish to live. Spiegel (1969) studied notes written by people to explain a suicide attempt. He noticed that the text written by people who subsequently committed suicide was far less explicit about suicidal intentions than a text written by a person writing a fake suicide note. It appeared that the truly suicidal individual might be avoiding direct psychological confrontation of the self-destructive course of action in which he was about to engage.

Ringel (1976), influenced by psychoanalysis, attempts to describe a *suicidal syndrome*. The core feature of this model is what Ringel calls *dynamic con-*

striction. This notion covers factors close to those described by Reich on the *impulsive character*, and on "chronical constrictions of the energetic field" (Reich, 1945, p.392 - 394). Constriction is an impression that one's life field is narrowing. According to Ringel, dynamic constriction also implies "a compulsive urge into one direction, that is, in the direction of ultimate suicide. ...In the outward appearance of the individual, dynamic constriction is frequently manifested by a loss of spontaneity, by inhibition and passive behaviour. ...The patient feels that the situation or the condition will never change and thus he falls prey to his own mood." There is a general depreciation of self and others. Ringel also observes a strong superego pathology, full of aggression against the self. He also stresses that suicide is independent from specific pathologies.

Following such a line of thought, Rainer Krause, who has helped us with our experiments since 1987, suggested that a likely area to find behavioral traits related to suicide would be in the direction of impulsive acts.

1.3. Suicidal patients and significant others

In 1954, Don Jackson showed how difficult it was to write on suicide as a psychoanalyst who respects such findings as those of Durkheim. Jackson creatively tackled this problem by participating in the creation of what is today known as 'family therapy' or more conveniently as 'systemic therapy'. Observations carried out with this point of view have shown how sociological and psychological mechanisms are coordinated at the level of *communication structures*: it would seem that suicidal patients receive an important number of intense negative feedbacks from the 'significant others' they rely on.

Fawcett, Leff & Bunney (1969) quote clinical observations showing that "suicidal behaviour occurs in a symbiotic relationship of mutual dependence and masochism". Wolk-Wasserman (1986) observed that family members manifested extremely strong hostility and expressed death wishes against the patient. He suggests that suicide occurs in people who have to deal with strong displays of aggression around them. Wolk-Wasserman (1987) also summarizes observations by Richman who "stated that the suicidal family is characterised by its closed nature and broken links with social institutions, as with friends and acquaintances. Family members were therefore reduced to seeking help within the closed family circle. If this support failed, there was a risk of suicidal action".

A suicidal person would then be (a) over-dependent of a 'tribe' which provides an aggressive and dismal feedback, and (b) a person who is aggressive against herself and has a dismal view of what can be lived in this world. Among those we should find most suicides.

Such an approach of suicidal behavior requires concrete descriptions of behavioral patterns to be substantiated. Although such a project has not yet been carried out for suicidal patients, certain such clinical observations support our idea that a better understanding of the non-verbal communication patterns of such persons could be highly relevant. In a clinic or a hospital, suicidal patients seem to behave in such a way that the staff does not understand their non-verbal communication anymore, and patients find themselves in a dead end. Wolk-Wasserman (1987) has made an observation of the relationships between 5 suicidal patients and psychiatric wards; this observation goes in the same direction:

On the day preceding the suicide attempt, all five patients conveyed their suicidal intentions by indirect, non-verbal communication. This suicidal communication could be expressed by the patient - although in regular contact

with the therapist suddenly arriving at, or repeatedly ringing, the psychiatric department, driven by a need to see the therapist and make sure the contact would continue. This uncertainty regarding the continued contact, and the suicidal thoughts arising in this connection, were often caused by a misapprehension, or misinterpretation of the therapist's remarks about concluding the contact. The staff would try to put the patient back into current time structures. But when the therapist was warned he would immediately think in terms of suicide.

The suicidal problems of (pre)psychotic patients should be deliberately tackled in the therapeutic contacts, in order to promote verbal forms of suicidal communication and prevent the patients resorting, in an acute situation to indirect, non-verbal situation, to indirect, non-verbal suicidal communication, which is seldom understood by temporary emergency-duty staff as suicidal and which consequently means that the risks of suicide are not discovered.

Motto (1991), observed that suicidal people have difficulty managing psychic pain. Suicide occurs when a person's limit of psychic pain tolerance is exceeded by the level of pain that is either experienced or anticipated with a degree of subjective certainty. Thus the process of estimating the risk of suicide at a given moment is essentially determining how close the actual or anticipated pain is to the person's tolerance threshold at that time.

1.4. Biological approach

Neuropsychiatric studies have found a relation between quantity of available serotonin, structures considered as having a weak ego by psychoanalysts, and impulsive (auto) aggressive acts. This trend of research tends to favor a relation between suicide attempts and low serotonin rather than a relation between suicide attempts and depression. Edman, Asberg, Levander & Schalling (1986) observed a clear correlation between the level of serotonin level and suicide, which is not the same as the one observed between serotonin and melancholia. Suicide attempters who do not satisfy research criteria for depression have lower CSF5-HIAAA levels² than control subjects. Furthermore, subjects with personality disorders and borderline conditions who have attempted suicide had lower CSF5-HIAAA levels than those who had not. Moss, Yao, & Panzak (1990) stress that 'alterations in serotonergic neurotransmission have been implicated in disorders characterised by impulsivity, aggression, low mood, and substance abuse.' They found low serotonin concentration among antisocial personality disorders (ASP) as well.

The relationship between CSF5-HIAA and suicidal behavior appears to be most clear-cut for suicidal acts, in particular when violent methods have been used. Thus, 'when suicidal ideation was rated or a rating scale was used that combines ideation and acts, the association was weaker or non-existent' (Edman, Asberg, Levander & Schalling 1986). Brown and Goodwin (1986, pp. 144-145) stress that low serotonin levels are associated first of all with violent acts, and then with suicide: with impulsiveness and an inability to 'delay gratification'. It would therefore seem that an impulsive violent act requires (a) a tendency for violence, and (b) low serotonin. In other words serotonin might influence the "cooling" function of the psychoanalyst's ego.

A low level of serotonin is thus associated to a series of attitudes. This substance is probably only one of the regulators of a more general process of *suicidal impulsivity*.

² 5-hydroxyindoleacetic acid (a substance close to serotonin) concentration in the cerebrospinal fluid.

1.5. Discussion

Looking at all the data accumulated on suicide, something like a coherent picture of at least those suicidal persons psychiatric services have to deal with seems to be taking shape. It would seem that any attempt to describe a 'risk' population using data extracted from only one level of organization of matter (sociology, communication, psychology, physiology) leaves us with too wide a definition, and that only a certain coordination between these levels is really relevant. The tendency to approach emotional behavior from such a varied perspective seems to become inevitable. Durkheim's notion of poorly socially integrated people, systemic descriptions of people receiving negative feedbacks from those they depend on, psychoanalytical descriptions of auto-aggressive impulsive people with a poor opinion of themselves, and physiological measures of a weak capacity to contain aggressivity, all point in the same direction.

The solidity of recent physiological findings encourages us to look for common modes of behavior and communicative patterns. We hope that adding concrete descriptions of how suicidal patients behave, communicate and influence those they interact with at an intimate level could be a way to complete the representation we have of suicidal persons, and allow us to provide a model which could become manageable for clinicians.

The necessity of associating several dimensions is well illustrated by experiments on serotonin Michael McGuire was involved in. He showed the following:

- a) 'Dominant male adult vervet monkeys have whole-blood serotonin concentrations approximately twice those of subordinate adult males.' (Raleigh et al, 1984)
- b) That when one of these dominant males was put in a cage the serotonin level diminished.
- c) Analyzing who became the next dominant male they observed that the serotonin level correlated positively with the 'frequency with which an adult male receives submissive displays from other adult males in his social group. (McGuire et al, 1998)'

These are examples where the concentration of a chemical in the blood (serotonin), a psychological impression (a feeling of power) and a form of social efficiency (dominance) influence each other to produce a single status state. I am suggesting that the suicide syndrome is a similar system, which combines most of the information I have just summarized. A restriction of inner and social possibilities leaves the person with only one way of 'letting the steam out' during stressing situations: suicide. The well-known influence of alcoholism on suicide shows how social and biological factors influence each other.

Although these studies have considerably narrowed the categories of people who might suicide, the classes thus generated still include many people who will never commit suicide, as shown in Beck's studies. One relevant approach that has not yet been explored is the analysis of how suicidal persons actually behave when they interact and communicate. The only published observation of suicidal behavior we have found is an inspiring case study of a suicidal patient by Paul Ekman³. Ekman was filming interviews of psychiatric patients "to isolate expressions and gestures that might help in diagnosing the severity and type of mental disorders." During one of these interviews, a patient called

³. Telling Lies, 1985, p. 16-18. Ekman has recently informed us that the same patient is mentioned as subject C in Ekman & Friesen, 1968, and as patient A in Ekman & Friesen, 1969.

Mary "told the doctor how much better she felt and asked for a weekend pass. Before receiving the pass, she confessed that she had been lying to get it. She still desperately wanted to kill herself.... The filmed interview with Mary fooled most of the young and even many of the experienced psychiatrists and psychologists to whom I showed it. We studied it for hundreds of hours, going over it again and again, inspecting each gesture and expression in slow motion to uncover any possible clues to deceit. In a moment's pause before replying to her doctor's question about her plan for the future, we saw in slow-motion a fleeting facial expression of despair, so quick that we had missed seeing it the first few times we examined the film. Once we had the idea that concealed feelings might be evident in these very brief *micro expressions*, we searched and found many more, typically covered in an instant by a smile. We also found a *micro gesture*. When telling the doctor how well she was handling her problems Mary sometimes showed a fragment of a shrug - not the whole thing, just part of it. (...)"

Ekman observed several cues produced by all parts of the body, but apparently the most striking one was a facial one. So we decided to start our study of suicidal behavior by trying to replicate Ekman's observation, concentrating on facial behavior.

2. Experimental setting

In this article I would like to report results from a pilot study carried out in the 'Laboratory of Affect and Communication' (L.A.C.), on the facial behavior of suicidal patients⁴.

A psychiatrist interviewed 17 suicidal patients, less than 2 weeks after their attempt, in a semi-structured interview. These patients were in "a major depressive mood" as defined by the DSM-III. The patients' facial behavior was recorded with a portable VHS video camera. Protagonists sat facing each other. A year later we checked if any of these patients had attempted suicide again. This allowed us to distinguish 12 non-reattempters from 5 reattempters. One of the reattempters actually died.

So as to create an experimental situation with an atmosphere as close as possible to a clinical interview, we chose five questions from the Present State Examination, which the psychiatrist adapted to the patient's reactions. Our analysis focused on two of those questions:

Question 1: Will you try to attempt suicide again?

Question 2: How self-confident do you feel?

The time windows started at the beginning of the silence that precedes the target question, and stopped 10 seconds after the beginning of the patient's answer. Average duration of these samples is 18 seconds. For the first sample we coded facial actions, eye movements, and head movements. As we found nothing with the head and eye movements, we focused, for the second sample, on facial actions. In both cases we used Ekman and Friesen's (1978) Facial Action Coding System: FACS.

⁴. The L.A.C. was created in the Geneva University Institutions of Psychiatry by Professor André Haynal and Doctor Marc Archinard for the study of affective, non-verbal interaction during psychiatric interviews and psychotherapy. The data of this research has been collected by Doctor Yvonne Gitnacht, and analyzed by members of our laboratory: Christine Lessko, Véronique Haynal, Pat Claus and the author. This project benefited from the support and advice of Paul Ekman, Rainer Krause, Wally Friesen and their teams, who helped us to construct it's methodological and theoretical frame.

Our first strategy was to analyze our data with a *screening* procedure, where computer programs analyze strict coding. We are now in the process of analyzing the same films in a more *clinical* way, exploring all observable FACS phenomena, without sampling, using our clinical and personal experience as analyzers. In this article we shall focus on the results yielded by the screening procedure.

We had too few subjects to have statistically significant trends; nevertheless, it is already remarkable that by just screening what was coded we observed different behavior trends when we compared non-reattempters with reattempters. I shall start discussing some of these results.

3. Facial behavior

3.1. Suicidality and expressive activity

3.1.1. Facial repertory by units

The phenomena detected by our screening procedure which has predominately drawn our attention is a clear and palpable reduction of repertoire, both in terms of facial action units (AUs), and in terms of emotional repertoire.

Table 1: Width of repertoires

	N-R	R
Average individual repertoire:	2.3	3.4
Average group specific repertoire	1.1	0.6

N-R: non-reattempters, R: reattempters

FACS allows one to distinguish 39 facial units. Eight of these were never observed in our samples; 28 were observed on non-reattempters; 17 on attempters. Three units were used by reattempters only, and 13 by non-reattempters only. These results can be grouped by individual and group repertoires:

- Individual repertoire: all units used at least once by an individual
- Group repertoire: all units used at least once by at least one member of the group
- Individual specific repertoire: all units used by an individual and no other
- Group specific repertoire: all units used by a group and not the other

Table 2: Number of subjects on whom the most frequent AUs are observed

Most frequent AUs	N-R	R
Dimplers (14):	8	2
Smiles (12):	4	4
Lips tight/press (23/24):	8	5

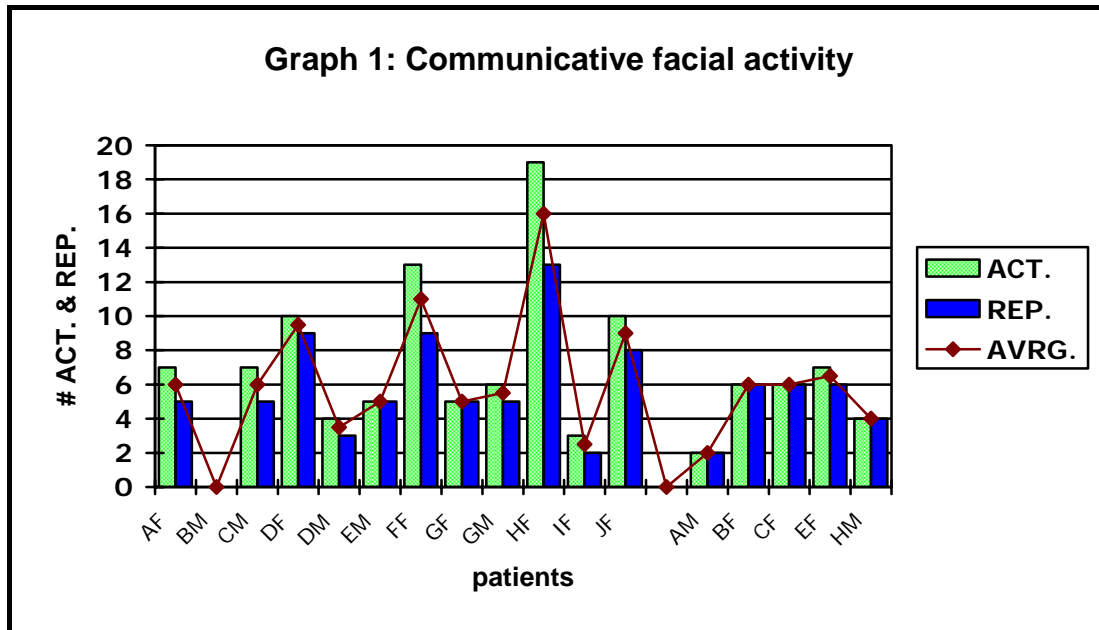
N-R: non-reattempters, R: reattempters

The average number of units used in both groups is roughly similar but the average group specific repertoire of non-reattempters is twice as big as for reattempters.

The AUs most frequently observed in our samples were also characteristic of the more severe cases of depression studied by Ellgring. All subjects but one (a non-reattempter) used at least once a 14, a 23, or a 24.

3.1.2. High / low communicators

The 31 observed AUs combined into a 109 different configurations⁵. Even with people one could consider fairly “inexpressive”, variety seems to be the rule, as for each 18-second sample we coded, we observed, on average, nearly 4 expressions that were not used in other samples. A distinction which seems relevant for our analysis is an active - passive expressivity dichotomy, which for the moment can be operationalized by counting the number of times an AU is activated on the face (facial activity), and repertoire width (number of different AUs which were activated). Graph 1 shows our results on these measures.



Graph 1: The 12 first patients are non-reattempters (from AF to JF), the 5 last patients are reattempters (from AM to HM). ACT: number of times an AU was **activated**. REP: **rep**ertoire width, or number of different facial AUs used by each patient. AVRG.: average of ACT. & REP. values. Not included in this computation are eyelid movements (AUs 41 to 46), and jaw movements (AUs 25 to 27).

Graph 1 shows a continuum of expressive activity ranging from no AUs mobilized in our samples, to 19 AUs. With these subjects, amount of activity and width of repertoire correlates highly (.97) so that averaging these values gives us a fairly accurate measure of facial activation. Relevant to our group is a dispersion categorization. Non-reattempters display behaviors ranging from much activity to no activity at all. Reattempters display fairly low medium values only, avoiding absolutely nothing, or more than 7 in average values.

This type of variance difference rather than average difference is a fairly common configuration when comparing non-verbal behavior of two groups. Basically all commonly used behavior units are available to all. In this case, what needs to be explained is why reattempters only use some of the possibilities available to attempters in general. These possibilities can be described using a “passive - active expressivity” continuum. BM uses no AUs in our samples, but his behavior is expressive. He seems to be astonished to be a victim, his voice complains in a continuous way. The verbal content is also repetitive: Mr. BM complains that he is being aggressed by an irresistible urge to sexually

⁵. For this computation we have not taken into account speech and blinks.

and physically aggress others. He is as much a victim of this impulse as his victims. He attempted to kill himself to destroy the source of this impulse. The expression is conveyed by a chronic expression which does not vary. Eyes and eyelids tend to be chronically opened, jaw drops often. In other words, Mr. BM has an expressive **mask**. Thus passive expressivity is not the same as no expressivity. It just means that chronical tensions of AU muscles maintain a constant mask.

For a first operational definition of active expressivity, I just equate increase of activity and increase of repertoire to an increase of expressive activity. From this perspective, HF is the most active communicator in this group. Thus our reattempters are all fairly low communicators, but never totally passive or more than averagely active.

3.1.3. Emotional repertory

The computerized emotional dictionary of Ekman and Friesen made the hypothesis that 44 of the 109 facial configurations could be associated with a known emotional expression. This dictionary only includes fairly 'safe' possible associations between facial expressions and emotions, so that it may well be that emotional expressions that occurred were not detected by this screening procedure. Furthermore, there is no assumption that a facial configuration has a given meaning each time it appears. Nevertheless the results, shown on the screen, provide a fairly adequate impression of the constant oscillation between smiles and negative feelings we observed, confirming Ekman's similar impressions in his case study of Mary.

Table 3: Number of subjects who displayed basic emotions: repertoire width categories

Basic emotions	N-R	R
Smiles	4	3
Anger	4	4
Contempt	4	1
Disgust	2	0
Other negative	2	0
Sadness	1	0
Surprise	1	0
N-P	3	0

N-R: non-reattempters, R: reattempters; N-P: no prediction.

Non-reattempters and reattempters displayed expressions that could be associated with anger and various forms of smiles. But only non-reattempters displayed disgust, negative feelings, surprise, and sadness in forms that could be detected by the dictionary. Contempt is used once by reattempters and 4 times by non-reattempters. Four reattempters displayed forms of anger; the one reattempter who did not have such an expression of anger is the one who actually killed himself. Finally, here again the lower extreme is also associated with non-reattempters: 3 use none of the expressions associated to an emotion by the dictionary.

Sadness was detected only once, which is rather surprising in such circumstances⁶. Looking more closely at the films, we observed quite a few

⁶. For example Beck, Brown & Steer (1989) observed that feelings of hopelessness are reported by more than 90% of eventual suiciders.

expressions that convey sadness or even despair; but most of the time they are not expressed through facial muscles. As Rainer Krause noticed in one of his visits to us, sadness is conveyed by such phenomena as a change in the eye's glare — veiled eyes, for example. Voice, eye and head orientation, basic tone of muscles and skin, and shrugs, are other variables used to convey sadness. These observations suggest an hypothesis: in this population, in such a situation, on such topics, *suicidal patients tend to avoid using facial muscles to express sadness*.

Here again, reattempters have a less varied group repertoire, focused on smiles and anger. The general impression gathered from these data can be related to several hypotheses found in the literature we mentioned at the beginning of this article:

- Non-reattempters had a limited facial repertoire, and reattempters an even more limited one (in terms of group repertoire).
- If one only considers such emotions as those picked out by Ekman and Friesen's dictionary, we not only observe a similar configuration with emotional expressions, but also that our 4 reattempters who did not die from their reattempt mostly expressed, apart from smiles, anger.

These observations are fairly consistent with the idea that there may exist something like Ringel's "suicidal syndrome". For example, Ringel's clinical observation of a "dynamic constriction" among suicidal patients predicts a poor repertoire, and a poorer one among reattempters. The focus on a single emotion, anger for instance, also fits the model pretty well. The pattern is also similar to what one could expect from serotonin studies on suicide: there is less of *something* with suicidal patients, and even less of this *something* among reattempters. The *something* in this case is both facial repertoire, and diversity of emotions.

3.1.4. AU 25⁷

The doctor asks: Will you make other attempts? In most cases, there is a silence before the patient answers. During this silence, 4 out of 5 reattempters had slightly parted lips (unit 25), while none of the non-reattempters used that unit at that particular moment. The one reattempter who did not use a 25 is the only patient who answered *before* the doctor had finished her question. In this case, one could say that every time there was a silence after the suicide prediction question, if the patient did not display AU 25, we could predict he would make no reattempt.

These AU25s could not really be assimilated to a signal, as some AU 25s were completely different from others. In one case, the subject had loosely parted lips, while another subject had tight lips during the first half of the silence, then parted his lips slightly as if he was about to say something, then opened mouth and jaw to speak. These results, without being able to be more specific for the moment, could indicate that something is indeed happening for reattempters precisely at the moment when Ekman, in his study, had noticed "a fleeting facial expression of despair". Although this sign is physical, it is also strongly related to verbal communication.

I do not know what a 25 means, but it could be indicative of a state of mind that varies when asked such a question in relation to the reattempt/non-reattempt variable. It may well be that with another doctor, the same type of conflict may be experienced/expressed in a different way, because the rela-

⁷ In our later study (Heller et al. 2001) our results did not confirmed this observation.

tional context is different, but that the core message would be the same. In other words, our hypothesis, in relation to AU 25, is not yet that each time this question is asked by a doctor in a formal setting reattempters will display AU 25, but that reattempters might have fairly similar conflicts before answering this question, while non-reattempters would have any type of state of mind except the one felt by reattempters.

3.1.5. Discussion of repertoire results

Table 4: Repertoire variable and hypothesis on recurrence

Patient	O-R	H1	H2	H3	N-Rh
AF	N-R				0
BM	N-R	n-r	n-r		2
CM	N-R			n-r	1
DF	N-R	n-r	n-r	n-r	3
DM	N-R		n-r		1
EM	N-R		n-r	n-r	2
FF	N-R	n-r	n-r	n-r	3
GF	N-R			n-r	1
GM	N-R				0
HF	N-R	n-r	n-r	n-r	3
IF	N-R		n-r	n-r	2
JF	N-R				0
AM	R				0
BF	R				0
CF	R				0
EF	R				0
HM	S				0

O-R: observe reattempt. **H1:** First hypothesis is that if AVRG expression activity (See Graph 1) is less than 2 or more than 7, the patient is a non-reattempter. **H2:** Second hypothesis is that if there is no display of predictable expressions, or a display of disgust, other negative, sadness, or surprise as described by the FACS dictionary, the patient is a non-reattempter. **H3:** Third hypothesis is that if there is a 4, a 5, or a 10 there will be no reattempt. **N-Rh:** Hypothesis on suicidal risk derived from our 4 hypothesis.

We now have two different types of behavior variables that could be related to suicide prediction:

- a) *Repertoire variables* that mostly characterize non-reattempters: patients with absolutely no expressive activity or with quite a lot of expressive activity (in terms of activity and variety of the group repertoire) did not make a reattempt in the following year. These results are summarized as hypothesis 1 - 3 in Table 4.
- b) A more *specific event* (absence or presence of silence and AU 25 after the question on recurrence) seems to correlate strongly with the recurrence/no-recurrence variable.

The repertoire variables, if used as hypothesis for suicide prediction, would have considered 9 out of 12 non-reattempters as being in little danger for the next year from suicide threats, and would have classed all reattempters in the group of patients one can not be sure of. The more specific AU 25 variable would have clearly differentiated both groups.

For the moment, I mostly stress the repertoire result because, although less spectacular, it might be more easily reproduced in future studies. This result displays a pattern I have often observed when analyzing nonverbal data, but on which I have not read any published comments: here variance and not means differentiate both groups. As a group, our reattempters displayed a fairly low level of expressive activity. Nevertheless, this activity varied between 19 actions and 0. Non-reattempters (as a group) used most of the possibilities within this range, while reattempters (as a group) focused on the lower part of this range. I have not yet found a useful concept to manage such phenomena, but their frequency certainly deserves more attention.

4. Repertoire and improvement during the psychotherapy of a suicidal patient

Patient BF⁸ was a patient who had made a suicide attempt, and had been filmed by her therapist while being asked a series of questions from the first version of our standardized interview of patients who had made a suicide attempt.

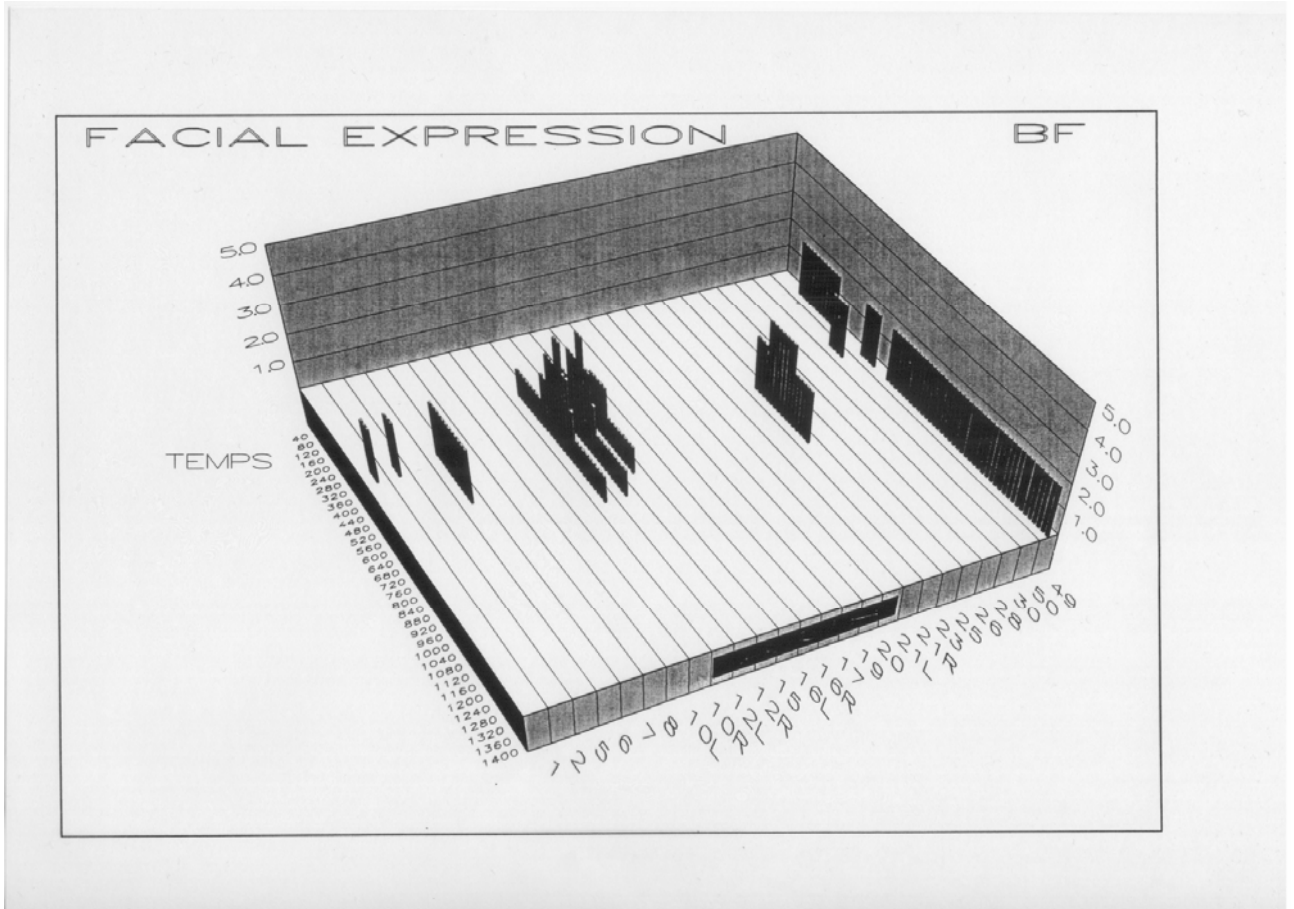
Approximately one year later her therapist felt that BF had manifestly improved, although she had made another suicide attempt (not a very dangerous one) 5 months after the first recording, and needed manifestly more therapy. She filmed BF once again, using the same standardized interview, and brought the film for analysis, to see if we could detect changes that supported her clinical impression. Our general impression was the same as that of the therapist. We coded what happened when the doctor asked what were Miss BF's suicide intentions with the same procedures we had used a year before. The coded behaviors in the two samples are given at the end of this article.

In both films we coded the patient's reaction when her therapist asked her: *Will you try to attempt suicide again?* Graph BF shows the coded behavior of BF in the first film during the suicide topic, which lasted 14 seconds. Graph BF2 shows the coded behavior of BF a year later, as she is being asked the same question, which lasted 19.56 seconds.

These graphs show that a year later there was a clear increase of a) repertoire variety, b) facial activity, c) verbal interaction.

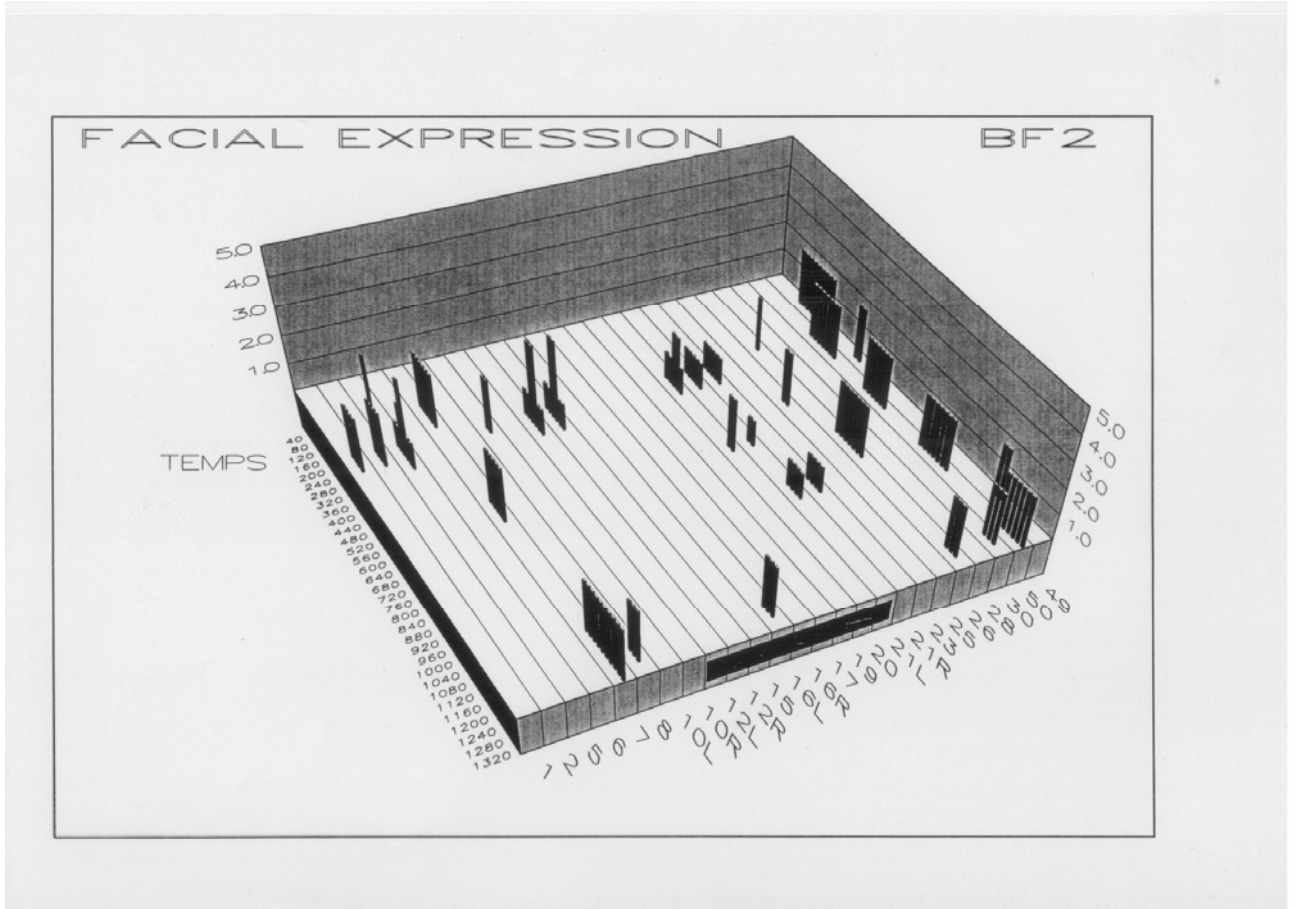
⁸ Her coded behavior is at the end of this article.

GRAPH BF



On the left, time is given in units of 1/100 seconds. On the right, numbers represent facial units (AUs 1 to 39) used by BF in these two samples; AU 50 shows when Miss BF speaks, unit 49 shows when doctor speaks. The vertical axis indicates intensity of events, where 0 stands for no activation of the unit, and 5 for maximum possible intensity for units such as 5, 12, 15, 17 that have an intensity coding. Other units have a 0 or 2 intensity.

GRAPH BF2



On the left, time is given in units of 1/100 seconds. On the right, numbers represent facial units (AUs 1 to 39) used by BF in these two samples; AU 50 shows when Miss BF speaks, unit 49 shows when doctor speaks. The vertical axis indicates intensity of events, where 0 stands for no activation of the unit, and 5 for maximum possible intensity for units such as 5, 12, 15, 17 that have an intensity coding. Other units have a 0 or 2 intensity.

4.1. Facial Repertoire

The coded repertoire was the following:

a) Common repertoire (rep = 9):

- Facial AUs (rep = 3): 1+2 (eye brow raise), 12 (smile), 41 (blinks)
- Head position AUs (rep=4): 51 (face towards therapist), 52 (face not towards therapist), 53 (Head up), 56 (head tilt right)
- Eye position AUs (rep = 2): 61 (eyes towards therapist), 63 (eyes up)

b) First interview repertoire (rep = 4):

- Facial AUs (rep = 4): AU 6 (wrinkles at the corner of the eyes), 15 (corner of the mouth down), 22 (lip funnel), 23 (lip press – often anger)

c) Second interview repertoire (rep = 14):

- Facial AUs (rep = 10): Aus 5 (opening the eyes), 7 (tightening of the eyes), 8 (lip towards), 10 (upper lip raise), 16 (lower lip depress), 19 (tongue show), 21 (neck tightening), 26(jaw drop), 28 (lip suck), 30 (jaw sideways)
- Head position AUs (rep = 3): 54 (head down), 55 (head tilt left)
- Eye position AUs (rep = 1): 62 (eyes away)

One notices that in the second situation BF uses a *wider repertoire* in every dimension.

4.1.1. First Interview

The verbal context is the following: The therapist asks BF if she still wants to suicide. After a short silence (0.64 seconds) she answers that she does not as briefly as possible (0.88 seconds). The doctor tries to stimulate her during the rest of the coded time, but the patient remains with her answer, so after 6 seconds the doctor passes on to the next question of the standardized interview and the coding stops.

The patient's one mimic is a smile that begins while the therapist asks her question, and ends when the doctor already begins to stimulate her for a more detailed answer.

This one smile is incredibly complex. It is at first so tenuous that it is coded as 12A. The "A" intensity implies that the smile cannot be reliably coded, which is to say that one coder would say there is a beginning of smile when another could say the smile has not yet started. While the doctor is ending her question, our coder saw an asymmetric tenuous smile (L12A). The tension can be perceived on the left side only. Had this asymmetric been slightly more intense, Ekman would have associated this moment with an expression of contempt.

During the silence between the doctor's question and the patient's answer, the tenuous smile symmetries but remains tenuous (S12A).

As the patient answers, the symmetric smile intensifies into an intense smile (S12D). As always with this patient there is a conflict at the corner of her smile. In this sample she also activates unit S15B, which pulls lip corners down, conveying something that could be associated with *sadness*. The smile is also accompanied by activity around the eyes: the eyelids are raised (S01B+S02B), and wrinkles appear at the corner of the eyes (S06B). For Ekman and Friesen when a smile is associated with these wrinkles due to cheeks being raised around the external part of the eyes, there is most probably what they call a *true smile*, meaning that it is intended to display something like joy.

This smile has two dimensions:

- Dimension 1: 6+12 is a true smile. This psychiatrist was involved in a research project, and was required to interview several subjects. At the end of this interview the "subject" asked the psychiatrist to become her psychotherapist. It is therefore plausible that this dimension of BF's smile conveyed a sincere pleasure of finding some one with whom she felt she could communicate on the difficult topics that activated her suicidal impulses.
- Dimensions 1+2+15 can be perceived as conflictual muscular movements to the true smile, a *tension* around the smile. However that resistance to the smile does not necessarily have a specific emotional implication.

As soon as the doctor begins to stimulate her for a longer answer, Miss BF deactivates the raised eyebrows, but continues to smile as intensely. However as soon as it becomes clear that the doctor is going to continue to stimulate her, a tightening of the patient's lips (AU23C) superimposes itself on the smile, which is a manifest sign of *anger* for Ekman and Friesen. As the doctor continues to speak the tightening of the lips remains for a while, then all the facial actions gradually disappear. After this complex process ended, which lasts 2.40 seconds, the patient's face becomes motionless. She raises her chin and maintains that position and waits until the doctor understands that it is useless to expect more information from the patient, more information on her suicide intentions. Five months later, while she was in therapy with that psychiatrist, Miss BF made another suicide attempt.

I cannot help stressing that what I have just described lasted only lasted 14 seconds, and that the speed of events makes it impossible for consciousness to pay attention to all these details. This is as true for the patient as it is to the therapist. This becomes all the more true when you consider that I have left out of this summary what happened with the head position and gaze direction. This is why I tend to believe that communication is mostly dealt with by non-conscious processes that edit what parts of that process require conscious awareness.

When she began to answer, the patient not only smiled, but began to face the doctor. This lasted until the therapist replied to the patient's answer. But as soon as it became clear that the therapist wanted a more in-depth answer, the face turned away from the therapist's face just after the lips began to tighten. As the smile faded away, she oriented her face only slightly towards the therapist, which may be a way of conveying that she is waiting for the next question. This is amplified when one considers that it is as soon as she stopped smiling that she raised her chin and retained that position for the rest of the time.

4.1.2. Second Interview

In the first sample the only facial mimic was a smile; in the second sample there were not only several mimics, but a closer coherence between nonverbal and verbal dialogue that only dissolved at the end of the coded sample:

- Mimic 1: While the doctor asks if BF still wants to suicide, Bf displays a first facial response, beginning with AU 7 (tightening of the eyes) for 2.89 seconds, with a complex accompaniment: the first 0.28 second there is only the eye tightening, then the tightening recruits 26 (jaw drop) and 28 (lip suck) for the rest of the time (2.56 seconds). For 0.40 seconds the mimic also recruits a 19 (tongue show). This occurred while the therapist is asking whether she still wants to suicide. The patient listens, tightening her eyes, opening her mouth, sucking her lips and wiping them with her tongue. The head is not oriented towards the doctor, and is tilted towards the interviewer. This mimic gradually stops during the silence after the doctor's questions. The relation to the doctor's activity is thus clearer than in the first topic, as it is a listener's response. In the first topic the smile was following another logic than that of turn-taking in a discussion.

- Mimic 2: BF had just answered briefly to the therapist's question, so the therapist stimulates BF for a more explicit answer. While the doctor speaks BF displays a second similar facial activity. She mobilizes AU 7 (tightening of the eyes) for 1.20 seconds, stopping nearly as soon as the question stops. The head is not oriented towards the doctor, and is tilted away from the interviewer.

- Mimic 3: BF answers as soon as the doctor ends her stimulation. As she speaks she activates a complex 1.24-second smile. While lips form a vague smile she raises her brows and opens her eyes. This first part of this smile (1+2+5+12) conveys *sadness*, fragility and maybe self-pity to those who observed it. The smile conveys a tenser form of sadness when the lips are simultaneously stretched downwards (AU20B + 21B) and the neck tightens. The (1+2+5+20) could be associated with *fear*, which explains the fragility conveyed to the consciousness of some of the coders involved). For a short while there is a left upper lip raise which is often associated to *contempt*. There is no way of knowing if it is contempt for herself, for the therapist, for the interview or something else. This smile stops when she is interrupted by the therapist.

- Mimic 4: The turn-taking logic is quite smooth here, as the next time there is a mimic is when she speaks. However, this time she blends the AU 7 (eye tightening strategy) and a complex smile as she speaks, as if, because of the interruption, she mixes her response mimic with her speaking mimic. She begins by tightening the eyes (AU07) for 1.04 seconds. This action seems to be the spine of what will come, as the smile begins after and stops before AU 07 is deactivated. The smile begins 0.40 seconds later as a barely perceptible left unilateral smile, which again is often associated with *contempt*⁹. Once again the conflictual unit 20 which pulls the mouth sideways and downwards is also activated.

- Mimic 5: There is long silence. The doctor stimulates her briefly. During this stimulation she again narrows the eyes. But this time AU 07 will last 1.68 seconds, while she remains silent and then begins to speak again. As she speaks she activates units 8 (lip towards), 16 (lower lip depress), AU 26 (jaw drop) and 30 (jaw sideways). This is a complex, perplexing expression that cannot be summarized in a sentence or easily associated with an affect.¹⁰

There are several ways of understanding the complexity of Miss BF's smiles. Some will see smiles that mask negative feelings where I tend to see a variety of affects that are expressed simultaneously in a differentiated way. In other words, in this case, smiles may be part of a more complex blend of feelings than a way of masking negativity.

4.2. Clinical impressions

Viewing the films one has an immediate impression that BF's state has improved dramatically, but also that she still needs more help. Her smiles have a hypnotizing quality, but it is difficult to say why. The quality of the facial movements is here as important as the quality of the gaze. Even more striking from the point of view of what is perceived consciously is a certain improvement of the quality of the skin which seems more alive, although still a bit hazy and pale. The quality of the eyes and skin may be what influences the conscious clinical intuition that BF is better; but it cannot be coded, because there is no reliable scale for such items. The modifications that can be coded show a more flexible communicative strategy, which can also explain a form of ease for the therapist. However that ease may also be caused by the familiarity that has developed during a year in the therapeutic dyad. Clinically, the most striking phenomenon is that a therapeutic bond could be established which is seldom easy with suicidal patients. The marks of anger and contempt noticed in these samples are familiar for all those who work with suicidal patients, and not particularly intense with that patient.

In later research (Heller et al, 2001) we have shown that the amount of oral activity that does not involve the cheeks (AUs 8, 14-24) can be predictive of suicide risk. We notice that oral activity is slightly less (1.28 seconds) in the second interview than in the first one (1.59 seconds). This more robust criterion confirms the impression that there is improvement experienced by all those that saw the films, and the therapist.

⁹ This has been coded AUL12A, which implies that the action is so slight that its coding is not reliable.

¹⁰ I have checked if displaying facial activity independently from verbal turn-taking could be a sign of suicidal risk. It is not the case (for example, patient F069CA1 in the Janus study).

5. Conclusion

We later published data (Heller, 1992 a&b) about an analysis of the doctor's and patient's verbal behavior. We observed that the doctor probably modified her behavior in function of the reattempt/non-reattempt variable. In that study, we showed that our patient's facial behavior did display certain modifications that could have monitored the doctor's change of attitude. This would imply that, somehow, at least part of the doctor's psyche was sensitive to expressive activity as defined in this paper, and to the relation between the silence after the suicide prediction question.

Both specific and more structural behavior differences observed in this study provide support to the hypothesis that there might exist something like what Ringel calls a "suicide syndrome" related to a "constriction phenomena" focusing on a restricted area of emotional conflicts. The fact that we needed to consider group repertoire, rather than individual repertoire, to find this relation also supports the idea of authors such as Fawcett, Leff & Bunney (1969) and Wolk-Wasserman (1987) that this phenomenon is probably not only intrapsychic, but also inter-psychic. Clearly, most of our patients displayed a lot of irritating behavior, and many fewer pleasant ones. Nevertheless, in most cases their behavior was not so obnoxious, considering that suicide attempters are known to elicit strong negative reactions.

If the pattern we observed holds, then we will have a possible therapeutic recommendation close to Ringel's for suicidal people: a central aspect in the support of suicidal patients could be to help them to find a wider variety of possibilities in their environment, their behavior, and in how they imagine their future. What we do not know is: a) whether this expressive restriction is characteristic of attempters all of the time in all situations, or b) characteristic of attempters in all situations a few days after their attempt, or c) characteristic of attempters in a psychiatric interview, or d) a combination of points b) and c). The observations of Beck and his colleagues on cognitive patterns suggest that some constricted bodily behavior could be a long-term sign of suicidality.

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7. 7. Miss BF's coded behavior

7.1. The facial behavior of Miss BF in 1988

GBF1: Subject GBF in 1988

'08-03-1988

'09:37:08

'05 0617 56B+ 61A
'05 0645 56B+ 61A+ 67
'05 0721 56B+ 61A+ 67
'05 0741 **49** + 56B+ 61A
'05 0761 **49** + 56B+ 61A
'05 0781 **49** + 56B+ 61A
'05 0801 **49** + 56B+ 61A
'05 0821 **49** + 56B+ 61A
'05 0841 **49** + 56B+ 61A
'05 0861 **49** + 56B+ 61A
'05 0887 R12A+ **49** + 56B+ 61B
'05 0907 R12A+ **49** + 56B+ 61B
'05 0927 R12A+ **49** + 56B+ 61B
'05 0947 R12A+ **49** + 56B+ 61B
'05 0953 12A+ 56B+ 61A
'05 1013 12A+ 51A+ 56B+ 61A
'05 1017 12A+ **50** + 51A+ 54A+ 56B+ 61A
'05 1021 1 + 2 + 6 + 12B+ 15A+ **50** + 51A+ 54A+ 56B+ 61A
'05 1037 1 + 2 + 6 + 12B+ 15A+ **50** + 51A+ 56B+ 61A+ 63A
'05 1045 1 + 2 + 6 + 12B+ 15A+ **50** + 51A+ 56B+ 61A
'05 1069 1 + 2 + 6 + 12C+ 15B+ **50** + 51A+ 56B+ 61A
'05 1103 6 + 12C+ 15B+ **49** + 51A+ 56B+ 61A
'05 1117 6 + 12C+ 15B+ 23B+ **49** + 51A+ 54A+ 56B
'05 1133 6 + 12D+ 15B+ 23B+ **49** + 51A+ 54A+ 56B
'05 1161 6 + 12D+ 15B+ 23B+ **49** + 51A+ 56B
'05 1171 6 + 12D+ 15B+ 23C+ 51A+ 56B
'05 1177 6 + 12C+ 15A+ 23C+ 51A+ 56B

'05 1181 6 + 12C+ 15A+ 23C+ 51A+ 56B+ 61B
'05 1189 6 + 12C+ 15A+ 23C+ 56B+ 61B
'05 1209 6 + 12B+ 15A+ 23C+ 56B+ 61B
'05 1237 6 + 12A+ 15A+ 23C+ **49** + 56B+ 61B
'05 1289 12A+ 15A+ 23C+ 56B+ 61B+ **49**
'05 1297 12A+ 15A+ 23C+ 41 + **49** + 56B+ 61B
'05 1301 12A+ 15A+ 23C+ 43 + **49** + 56B+ 61B
'05 1305 12A+ 15A+ 23C+ 42 + **49** + 56B+ 61B
'05 1309 12A+ 15A+ 23C+ 41 + **49** + 56B+ 61B
'05 1313 12A+ 15A+ 23B+ **49** + 56B+ 61B
'05 1333 12A+ 23B+ **49** + 56B+ 61B
'05 1361 12A+ 23B+ **49** + 51A+ 56A+ 61A
'05 1369 12A+ 23B+ 41 + **49** + 51A+ 56A+ 61A
'05 1373 12A+ 23B+ 43 + **49** + 51A+ 56A+ 61A
'05 1377 12A+ 23B+ 41 + **49** + 51A+ 56A+ 61A
'05 1381 12A+ 23B+ **49** + 51A+ 56A+ 61A
'05 1385 12A+ 23B+ **49** + 53A+ 56A
'05 1397 12A+ 23B+ **49** + 51A+ 56A
'05 1421 **49** + 51A+ 56A+ 61A
'05 1425 **49** + 51A+ 53A+ 56A+ 61A
'05 1429 **49** + 51A+ 53B+ 56A+ 61A
'05 1441 **49** + 51A+ 53B+ 56A+ 61A
'05 1445 **49** + 53B+ 56A+ 61A
'05 1453 **49** + 52A+ 53B+ 56A+ 61B
'05 1477 **49** + 53B+ 56A+ 61B
'05 1481 **49** + 53B+ 56A+ 61A
'05 1501 **49** + 53B+ 56A+ 61A
'05 1513 **49** + 51A+ 53A+ 56A
'05 1621 42 + **49** + 51A+ 53A+ 56A
'05 1625 43 + **49** + 51A+ 53A+ 56A
'05 1629 42 + **49** + 51A+ 53A+ 56B
'05 1633 41 + **49** + 51A+ 53A+ 56B
'05 1637 **49** + 51A+ 53A+ 56B
'05 1888 **49** + 51A+ 53A+ 56B+ 61A+ 63A
'05 1896 **49** + 51A+ 53A+ 56B+ 61B+ 63A
'05 1908 **49** + 51A+ 53A+ 56B+ 63A
'05 1932 **49** + 51A+ 53A+ 56B
'05 1940 **49** + 51A+ 53A+ 56B+ 61A
'05 2017 **49** + 53A+ 56B+ 61A

'fin

' 67: swallowing

' 49: doctor speaks

' 70: beard

' 71: glasses

7.2. The facial behavior of Miss BF in 1989

GBF2: Subject GBF in 1989

'08-03-1989

'09:37:31

'01 2023 52A
'01 2043 42 + 52A
'01 2047 43 + 52A
'01 2051 42 + 52A
'01 2055 41 + 52A
'01 2063 52A
'01 2067 52A+ **49**
'01 2115 7 + 52A+ **49**
'01 2143 7 + 26 + 28 + **49** + 52A

'01 2171 7 + 26 + 28 + 41 + **49** + 52A
 '01 2175 7 + 26 + 28 + 43 + **49** + 52A
 '01 2179 7 + 26 + 19 + 28 + 42 + **49** + 52A
 '01 2180 7 + 26 + 19 + 28 + 42 + **50** + 52A+ 49
 '01 2183 7 + 26 + 19 + 28 + 41 + **50** + 52A+ 49
 '01 2195 7 + 26 + 19 + 28 + **50** + 52A+ 49
 '01 2201 7 + 26 + 19 + 28 + **49** + 52A+ 55A
 '01 2215 7 + 26 + 28 + **49** + 52A+ 55A
 '01 2219 7 + 17 + 26 + 28 + **49** + 52A+ 55A
 '01 2230 7 + 26 + 17 + 28 + **49** + 52A+ 55A
 '01 2243 7 + 17 + 28 + **49** + 52A+ 55A
 '01 2327 7 + 17 + 28 + 52A+ 55A
 '01 2379 7 + 28 + 52A+ 55A+ 62A+ 63A
 '01 2395 28 + 52A+ 55A+ 62A+ 63A
 '01 2403 52A+ 55A+ 62A+ 63A
 '01 2431 52A+ 55A+ 62A+ 63A
 '01 2407 52A
 '01 2491 + 52A+ 62A+ 63A+ 63
 '01 2519 **50** + 63 + 52A+ 62A+ 63A
 '01 2527 43 + **50** + 52A+ 62A
 '01 2535 42 + **50** + 53A+ 56A+ 62A
 '01 2539 41 + **50** + 53A+ 56A+ 62A
 '01 2543 41 + **50** + 51A+ 53A+ 56A+ 62A
 '01 2551 41 + **50** + 51A+ 53B+ 56A+ 62A
 '01 2555 41 + **50** + 51A+ 53A+ 56A+ 62A
 '01 2559 **50** + 51A+ 53A+ 56A+ 62A
 '01 2563 51A+ 53A+ 56A+ 62A
 '01 2575 51A+ 53B+ 56A+ 62A
 '01 2579 51A+ 53B+ 56B+ 62A
 '01 2591 51A+ 53A+ 56B+ 62A
 '01 2595 **50** + 51A+ 53A+ 56B+ 62A
 '01 2599 **50** + 51A+ 56B+ 62A
 '01 2643 **50** + 51A+ 56B+ 62A+ 49
 '01 2647 **50** + 51A+ 56A+ 62A+ 49
 '01 2651 41 + **50** + 51A+ 56A
 '01 2655 43 + **50** + 51A+ 56A+ 54A
 '01 2659 42 + **50** + 54A+ 56A
 '01 2663 41 + **50** + 54A+ 56A
 '01 2667 **50** + 54A+ 56A
 '01 2675 56A
 '01 2695 43 + 56A
 '01 2703 42 + 56A
 '01 2707 41 + 56A
 '01 2711 41 + 52A+ 56A
 '01 2715 52A+ 56A
 '01 2759 52A+ 56A
 '01 2803 5A+ **49** + 52A+ 56A
 '01 2819 5B+ **49** + 52A+ 56A
 '01 2835 41 + **49** + 52A+ 56A
 '01 2839 43 + **49** + 52A+ 56A
 '01 2847 42 + **49** + 52A+ 56A
 '01 2851 7 + 41 + **49** + 52A+ 56A
 '01 2859 7 + **49** + 52A+ 56A
 '01 2867 7 + **49** + 52A+ 56A
 '01 2879 7 + **49** + 52A+ 56A
 '01 2935 7 + **49** + 52A+ 56A
 '01 2959 7 + **49** + 52A+ 56A+ 61A
 '01 2969 7 + 26 + **49** + **50** + 52A+ 56A+ 61A
 '01 2971 26 + **49** + **50** + 52A+ 56A+ 61A
 '01 2983 26 + **49** + **50** + 52A+ 53A+ 56A
 '01 2987 1 + 2 + 5A+ **50** + 52A+ 53A+ 56A+ 62A

Michael C. Heller: The faces of suicide (11/18/04)

'01 2995 1 + 2 + 5A+ 12A+ 20A+ 21A+ 50 + 53B+ 56A+ 62A
 '01 3003 1 + 2 + 5A+ 5A+ 12A+ 20A+ 21A+ 50 + 53B+ 56A+ 62A
 '01 3007 1 + 2 + 5A+L10B+ 12A+ 20A+ 21A+ 50 + 51A+ 53A+ 56A+ 62A
 '01 3015 1 + 2 + 5A+L10B+ 12A+ 20A+ 21A+ 50 + 53A+ 56A+ 62A
 '01 3019 1 + 2 + 5B+L10B+ 12B+ 20B+ 21A+ 50 + 53A+ 56B+ 62A
 '01 3025 1 + 2 + 5B+L10B+ 5B+ 12B+ 20B+ 21A+ 50 + 53A+ 56B+ 62A
 '01 3031 1 + 2 + 5B+L10B+ 12B+ 20B+ 21A+ 50 + 53A+ 56B+ 62A
 '01 3035 1 + 2 + 5B+L10B+ 12C+ 20B+ 21A+ 50 + 53A+ 62A
 '01 3039 1 + 2 + 5C+ 12C+ 20B+ 21A+ 50 + 53A+ 62A
 '01 3055 1 + 2 + 5C+ 12C+ 20B+ 21A+ 50 + 62A
 '01 3059 1 + 2 + 5C+ 12C+ 20B+ 21A+ 50 + 62A
 '01 3060 5C+ 12C+ 20B+ 21A+ 50 + 62A
 '01 3060 5B+ 12B+ 20B+ 21A+ 50 + 62A
 '01 3067 5A+ 12A+ 20A+ 21A+ 50 + 62A
 '01 3083 12A+ 5A+ 50 + 62A
 '01 3085 12A+ 5A+ 50 + 62A
 '01 3099 12A+ 5A+ 50 + 52A+ 62A
 '01 3107 42 + 49 + 52A+ 62A
 '01 3115 43 + 49 + 52A
 '01 3119 42 + 49 + 52A
 '01 3123 41 + 49 + 52A
 '01 3127 49 + 52A
 '01 3150 52A
 '01 3159 43 + 52A
 '01 3167 42 + 52A
 '01 3171 41 + 52A
 '01 3179 52A
 '01 3195 52A
 '01 3207 25 + 52A
 '01 3251 50 + 52A
 '01 3259 50 + 52A+ 61A
 '01 3267 50 + 52A+ 61B
 '01 3275 50 + 61B
 '01 3279 42 + 50 + 61B
 '01 3283 7 + 43 + 50
 '01 3291 7 + 42 + 50 + 56A
 '01 3295 7 + 41 + 50 + 56A
 '01 3307 7 + 43 + 50 + 56A
 '01 3315 7 + 42 + 50 + 56A+ 61B
 '01 3319 7 + 41 + 50 + 56A+ 61B
 '01 3323 7 + 20B +L21A+ 41 + 50 + 56A+ 61B
 '01 3331 7 + 20B +L21A+ 43 + 50 + 56A
 '01 3339 7 + 20B +L21A+ 42 + 50 + 56A
 '01 3343 7 + 20B +L21A+ 41 + 50 + 56A
 '01 3351 7 + 20B +L21A+ 50 + 56A
 '01 3355 7 + 20B +L21A+ 50 + 52A+ 53A+ 56A
 '01 3365 7 + 50 + 52A+ 53A+ 56A
 '01 3379 7 + 52A+ 53A+ 56A
 '01 3383 52A+ 53A
 '01 3389 26B+ 52A+ 53A
 '01 3407 26B+ 42 + 52A
 '01 3411 26B+ 43 + 52A
 '01 3415 26B+ 42
 '01 3419 26B+ 41
 '01 3423 26B+
 '01 3519 26B+
 '01 3541 21A+ 50
 '01 3619 50
 '01 3679
 '01 3800 49
 '01 3816 7B+ 49

Michael C. Heller: The faces of suicide (11/18/04)

'01 3822 7B
'01 3890 7B+ 50
'01 3920 7B+ 8B+L16B+ 26B+ 30B+ 50
'01 3974 7B+ 50
'01 3977 7B+ 50

'end

' 67 : swallowing

' 69 : doctor speaks

' 70 : beard

' 71 : glasses

At the end only the face is analyzed (<40)