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Can Faces Reveal Suicide Attempt Risks?[2]

Key Words

Suicide attempt risk - facial behaviour - conscious/nonconscious communication - doctor/patient interaction

Abstract

A psychiatrist was filmed, interviewing 59 patients who had just made a suicide attempt. Within two years, 11 of these patients made one more suicide attempt. This group was matched with a similar group of 12 patients who did not reattempt within the two years. Film samples of the facial behaviour of the two groups of patients and of the doctor were coded, using Ekman and Friesen's Facial Action Coding System (FACS), with the aim of identifying bodily signs that could be associated with reattempt risk. We found a number of such signs, in both the doctor and the patients, which discriminated more than 80% (18) of the 23 interviews in function of the patient's suicide reattempt risk.

1. Geneva University Hospitals, Department of Psychiatry. The project was also supported by the "Swiss National Funds for Scientific Research", grant no. 32-33548.92.

Introduction

How do suicide attempters behave?

There are basically two ways of approaching suicide. Some suppose that there exists a group of factors that are common to all suicides (Ringel 1976), while others think that there are distinct types of suicides (Moron 1993). The first trend has been supported since twenty years by studies which show a strong association between suicidal behaviour and low levels of a neurotransmitter peptide called serotonin in the cerebrospinal fluids, inside the spine (Mann and al. 1999).

No other type of behaviour has been the subject of as much publication as suicide. During this last century a vast amount of literature has approached the topic from many angles, ranging from sociology to biology. Research has shown that all these levels exert a strong influence on suicidal behaviour, but that none explain it... which implies that although our understanding of suicide has considerably progressed, one has not found a way of putting the pieces of the puzzle together. Until now the actual communicative behaviour of suicides has not been scrutinized systematically. The term behaviour is here used in its narrowest sense: a description of gestures, mimics, and postures used by a person. Studies mostly focused on what subject's do, rather than on how they do it: noticing that suicides often go to see their doctors the year before their attempt, that they sometimes go and visit all the people who are dear to them before making their attempt, or studying the letters they write to explain their attempt. Yet several studies show that future suicides probably have a way of behaving that influence their environment. One has for example noticed that people close to suicide attempters tend to experience negative feelings towards them (Fawcett, Leff & Bunney 1969, Wolk-Wasserman 1986 and 1987). There are two aspects here. The first is that people may not feel very happy when people they like try to kill themselves. Parents, for example, can feel rejected and guilty. The second is that future suicides tend to produce various forms of "obnoxious" behaviours that increase the tendency to be rejected by others, thus confirming their impression that death is the only possible issue.

There is also a persistent rumour that psychotherapists can feel when a patient hides an intention to attempt suicide. For Wolk-Wasserman (1987), the signs are often indirect cues the therapist in charge can perceive but not other members of a psychiatric team (e.g. certain ways of 'suddenly arriving at, or repeatedly ringing, the psychiatric department').

In their "Mary" case study, Ekman (1985)[3] and Friesen looked for signs that could betray a hidden intention to commit suicide. The signs they found were also difficult to access through conscious attention. The authors mention numerous *micro expressions and gestures*. Some of these occurred extremely briefly at a very specific moment. For example: '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 describes several relevant cues produced by all parts of the body, but the most striking ones were facial.

Given the difficulty clinicians face in dealing efficiently with the indirect signals addressed to them by suicidal patients (Vedrinne & Gaud, 1998), we wanted to pursue Ekman's study. Our main question was the following: if one looks at the face of a person who just made a suicide attempt, would it be possible to determine a form of behaviour which could allow us to predict reliably if another attempt will occur?

Analysing nonverbal communication

Psychiatrists have already established that particular bodily patterns of communication can be associated to such variables as depression and schizophrenia clinically since a century at least. Thus the main interest of experimental studies on such issues is to establish exactly what these associations are, and their underlying mechanisms. The relation between suicide risk and bodily behaviour, if it really exists, is necessarily

3. Mary is described as subject C in the Ekman and Friesen 1968, and as subject A in the 1969 article (W. Friesen, personal communication, San Francisco, December 1988).

more subtle, as it seems to occur at levels that are practically inaccessible to consciousness, and therefore to clinical analysis. Our hypothesis is that the association between nonverbal communication and suicide risk could be of a nonconscious nature, which typically follows modular and parallel processing rules (Allen Hobson 1999, Karmiloff-Smith 1999, Moessinger 1999).

Method

Between November 23, 1992 and, March 1, 1994, we recorded a psychiatrist's interview with 59 patients. These patients had arrived in the emergency ward of Geneva University Hospitals[4] just after a suicide attempt. They were adults, aged 20 to retirement age[5], who spoke enough French to understand and be understood easily, and lived in the Geneva area. We informed the patients of the purpose of the study and the use of films, and they gave their written consent. These patients represented 12% of the suicidal patients received at the hospital during this period (Chevey-Buchs, 1996, p. 6). Patients had taken no psychotropic drugs since their arrival at the hospital. An experienced female psychiatrist from the hospital interviewed the patients.

We followed the files of our subjects in the Geneva hospitals and psychiatric institutions for two years[6] after each interview, to know which ones made another suicide attempt. Eleven of the filmed patients made another suicide attempt. These patients form the "Reattempter' group [R]" in this study. The next attempt occurred on an average of 119.18 days after the target attempt (minimum: 33 days, maximum: 417 days, SD = 115.58). We then formed an "Attempter group [A]", with films of patients with no known reattempt. To obtain groups that were as comparable as possible, we looked for subjects that could be paired with the 11 Reattempters in respect of sex, age, and

4. Medical and Surgical Centre, Admissions, Geneva University Hospital.
5. In Switzerland, the legal age for retirement was 65 for men and 62 for women.
6. According to Andreoli, Gognalons and Abensur (1989), based on the Geneva psychiatric population they studied, the critical period for most reattempts in Geneva is 2 years.

number of previous attempts. Twelve patients fit these criteria. Of the 23 patients included in this study, 6 were males and 17 females, aged between 21 and 49 years (M = 35 years, SD = 10).

Each interview lasted about 20 minutes. The interviewing psychiatrist asked a series of open-ended questions. The psychiatrist's questions were written on a sheet of paper handed to her a few weeks before the first interview so that she could familiarize herself with them. She usually kept this sheet on her lap throughout the interview. After the indexed attempt (M = 1.4 days, SD = 1.1, maximum = 4, minimum = 0), two VHS-S cameras (Panasonic NV-S7EC) recorded the faces of patient and doctor. Subjects almost faced each other: protagonists must turn slightly to the right to face the other. All the recordings occurred in the same room at the hospital, with a distance of 1 meter between the chairs. Following current practice, relatively short samples of two 'topics' were coded:

- *Suicide topic*. The target question for this sample was whether a patient still wanted to commit suicide (M = 42.2 seconds, SD = 12.9).
- *Care topic*. The target question for this sample was what the patient liked and disliked in the treatment he or she had just received in the hospital (M = 48.3 seconds, SD = 10.4). It was also the last topic in the interview. We chose this topic for analysis because we supposed that it was the one topic where the patient's aggression could most clearly express itself[7].

For each topic, coding began at the beginning of the silence before the doctor's target question. The sample ended 40 seconds after the beginning of the patient's answer to the doctor's question, or at the end of the discussion if it lasted less time. We collected verbal and nonverbal data.

- *Verbal Data*: After each interview, patient and doctor completed a written questionnaire to enable us to assess the quality of the interaction. Patients and doctor were asked how they felt during the interview. The doctor also answered questions on her intuitive appraisal of the patient's suicide risk, the patient's medication, psychiatric diagnosis, and previous suicide attempts (how and when).
- *Nonverbal data*: Facial muscular activity and head and eye orientation were coded using the Facial Action Coding System (FACS) of Ekman and Friesen (1978).

7. There are two main trends in the literature that hypothesize that suicides tend to turn a strong impulsive aggression against themselves: the psychoanalytic literature, and research on the management of aggression by serotonin.

> We coded 57 muscular units using a 0.2 second time scale. A five-point intensity scale was used for units for which such a scale is recommended. Otherwise a two-point intensity scale was used: "B" for at least minimum requirements, and "D" for strong activation. We coded action units individually, taking into account interactions between muscular units in an expression.

A computer programme written by our laboratory, generated 33 *constructed units* grouping certain aspects of the coded data. In this article, the term motor unit designates the 57 coded action units and the 33 constructed units used to describe facial behaviour, head and eye orientation. Six coders were involved[8]. All were psychologists qualified as certified FACS coders.

Current statistical procedures require more subjects than variables. The configuration of studies on nonverbal behaviour currently work with many more variables than subjects. We can therefore not properly test our results. In the presentation of our results, we shall give nonparametric test computation as an indication, but with no hypothesis on future analysis. At this stage of research, only replication can inform us on the robustness of the observations reported in this article.

For comparison between Reattempter and Attempter dyads, we used Belson's criterion (Hugues 1970) to compute a *threshold efficiency percentag*e. This percentage takes into account inter-group variance and the number of subjects in each group. In other terms, the programme A) looks for the threshold value that generates the strongest difference between the two groups, and B) computes the percentage of subjects that are correctly distinguished by this threshold. This descriptive criterion corresponds to the type of differentiation a clinician can use comfortably.

Results based on questionnaire data

None of the questionnaire items varied systematically in function of the reattempt variable.

8. Véronique Haynal-Reymond, Michael Heller, Christina Leoni-Salem, Christine Lessko, Joëlle Leutwyler, and Nathalie Ruffieux.

For Grebb, Kaplan and Sadock (1994, p. 806) 'a past suicide attempt is perhaps the best indicator that a patient is at increased risk for suicide'. This indication had a threshold efficiency of 74% in our population. The number of previous suicide attempts reported by patients or found in their files was markedly higher among Reattempter patients (M = 2.5, SD = 1.8) than among Attempter patients (M = 1.2, SD = 1.0). [9]

After each interview, the doctor was asked for a spontaneous evaluation of the patient's future suicide risk, using the following scale: 0 (no risk), 1 (slight risk), 2 (moderate risk) and 3 (high risk). The doctor never used the no risk score, used slight risk twice (once wrongly), moderate risk 14 times and high risk 7 times (twice wrongly). When she did have an opinion, she was wrong 3 times and accurate 6 times. No systematic trend is observed for the predictions which profile may thus be considered as close to randomness. The analysis of the doctor's spontaneous prediction of suicide risk, as well as discussions with the doctor, suggests that if there were any systematic behavioural differences between Reattempter and Attempter dyads, they escaped her conscious attention.

Results based on bodily behaviour

The coding procedure we used yielded a vast amount of information. Our team spent several years trying to sort various impressions gathered by looking at film, and using computerized screening procedures (Heller, M. 1998). We shall now give what seems to us the most striking results.

Differences between Reattempter and

9. This difference is not significant with a one-tailed Mann-Whitney test (W = 157). Abbiatti (1999) however found this trend significant in an analysis of 41 of our subjects.

Attempter patients: oral activity

Oral activity occurs (a) every time one of the muscles that move lips without moving the cheeks[10] is activated, and (b) when this activation cannot be explained by speech activity. This behaviour is displayed 9% of time by patients (M = 3.6 seconds, S.D. = 4.1) and doctor (M = 5.3 seconds, S.D. = 5.2). One can therefore not always associate oral activation with suicide reattempt risk.

Oral activity groups a wide variety of lip configurations, some of which seemed characteristic of an individual. Some of us could have the impression that an oral activity had a meaningful (e.g. despair or contempt) and relevant function, but then not all the members of our team would attribute the same meaning and/or function to this motor event; at other times, we could not attribute the slightest meaning to these movements. Most of the time these lip movements seemed to appear randomly, in function of inner impulses, or to modulate the general atmosphere of the interview.

Reattempter patients had a systematic tendency to display more oral activation than Attempters did. Among these oral units, only one varied significantly in function of a patient's reattempt risk: chin raise [AU17] (efficiency = 78%). At least sometimes, this unit is clearly involved in expressions of despair and/or sadness, as observed by Ekman (1985) on Mary. Given the doctor's oral activity, one can think that Attempter patients diminish their current oral activity. We have been particularly careful to check with the medical team that medica-

10. Thus smiles [AU12] are not included in our "oral activity" motor category.

tion could not explain this oral activity (e.g. in this hospital service, for such cases, all psychiatric medication was temporarily stopped).

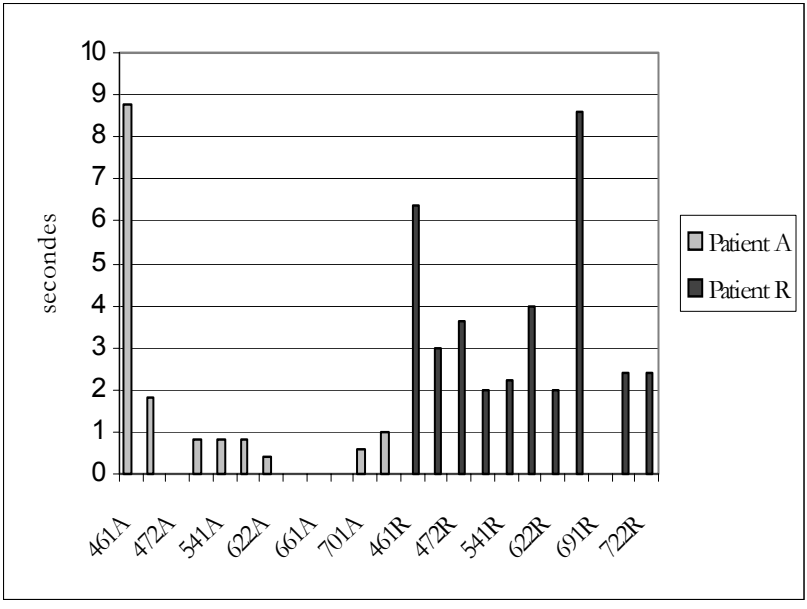

Figure 1: Number of seconds during which patients displayed oral activity, in silences of the Care topic. 11 Attempter patients displayed oral activation for less than two seconds (M = 1.3 seconds, S.D. = 2.3), while 10 Reattempter patients displayed such activity for two seconds or more (M = 3.3 seconds, S.D. = 2.2). Mann-Whitney (two-tailed): W = 178, p <= .01; efficiency for a 2 second threshold: 91%..

The discriminative power of oral activity varied in function of times and circumstances, but was often efficient for more than 80% of the patients. The association between oral activation and reattempt risk was particularly strong during the silences of the Care topic, as shown in figure 1.

The literature on conversation rules is extensive (Feyereisen & De Lannoy, 1991, pp 15-20). Nevertheless, high rates of facial mobility when listening remains uncommon (Ellgring, 1998, pp 390-391) and could have a strong impact on the speaker (Cosnier, 1988). For the moment, the best explanation we may come out with on the function of these

lip movements is that they could be representative of an *ostentatious way of regulating disagreeable feelings*. This implies three steps:

- Patient feels a blend of strong feelings such as sadness (or even despair), anger, or contempt.
- Patient needs to keep these feelings under control so as not interrupt the interview by an outburst.
- Patients explicitly communicate that she or he is making a considerable effort to self-regulate such feelings. Our idea is not that this type of behaviour is specific to Reattempters. Once we became attentive to oral activation as a phenomenon, we observed it in many people. President Clinton, for example, often displays oral activation. The intensity of his oral units can be very strong. Both doctor and patients mostly displayed low intensities of oral activation which often barely reach Ekman and Friesen's minimum requirements. This behaviour could be a universal way of "ostentatious self-regulation".

How the doctor's behaviour changed in function of the patient's suicide reattempt risk

There were several aspects of the doctors' bodily behaviour that could be associated with a patient's reattempt risk (Archinard, Heller, Haynal-Reymond 2000). The most striking phenomena are associations with gaze orientation. To analyse this dimension we constructed the following variables:

- When a subject orients eyes in the direction of the other protagonist's *face*, variable [EyeON] is constructed.
- When a subject clearly orients eyes away from the other protagonist's *body*, variable [EyeOFF] is constructed.
- All other positions are categorized in the ambiguous [EyeAMB] variable.

Generally, the doctor looked more at patients than patients at the doctor [EyeON]. The difference was one of mean and variance.

Table 1: % Time during which subjects oriented their gaze towards the protagonist

	Mean	S.D.	Median
Patient:	46%	24	48.43%
Doctor:	76%	19	79.00%

Table 1: The doctor is always the same person, so one expects to find a smaller standard deviation. However, what the median tells us is that in 50% of the situations she orients her gaze in the direction of a patient's face more than 79% of the time. There are in fact only two patients (a Reattempter and an Attempter) with whom she oriented her gaze less than 50% of the time: both are the youngest (born in 1972). In these two samples she maintained an ambiguous orientation 100% of the time.

With patients a greater diversity may be observed. Both 1972 patients also never look at the doctor's face. But the Median informs us that this is not so exceptional, as in 50% of the samples patients looked at the doctor's face less than 48% of the time. What we end up with is a result that can easily be explained by the function of the protagonists. The doctor tends to look at the patients. Not doing so for at least 50% of the time probably indicates that the doctor is having a particular kind of reaction. On the other hand, patients do as they please. Some constantly need to contact the doctor's face; others avoid this as much as possible, while others use this dimension in more complex ways.

This difference was sometimes observed in all samples. For example when patients spoke, this could be observed in all dyads without exception. However, when the doctor spoke, both patients and doctor had a tendency not to look at each other (74% of the doctor's speaking time for the doctor and 64% of the doctor's speaking time for patients). The [EyeOFF] orientations were sharply reduced while patients were speaking (averages of 3% of the patient's speaking time for the doctor and 26% of the patients speaking time for patients). While she was listening, the doctor oriented her gaze more consistently at patients.

When she spoke, the doctor mostly oriented her eyes towards the patient's face. But, regularly, her eyes briefly looked elsewhere, as if to think.

Table 2: Percentage of patients' speaking time during which the doctor clearly oriented her gaze away from the patient's body

Topics:	Doctor in Reattempter Dyads	Doctor in Attempter Dyads
Suicide:	4.3% (average)	4.1% (average)

Table 2: Percentage of patients' speaking time during which the doctor clearly oriented her gaze away from the patient's body

Topics:	Doctor in Reattempter Dyads	Doctor in Attempter Dyads
Care**:	3.3% (average)	0.1% (average)

Table 2: ***Mann-Whitney = 172, p <= .01 (two tailed), efficiency = 83%.

During the Suicide topic, the doctor seems to need moments of visual escape that averaged with all patients at 4% of the time while she spoke. During the Care topic we find a similar trend, although slightly lower in a non-systematic way with Reattempter patients. However, with Attempter patients during the Care Topic, her tendency whilst speaking to look away from time to time completely disappears with 10 patients. We have no hypothesis on why this occurred. However that something is happening during the Care topic which associates eye orientation and reattempt risk is supported by another observation.

During the first silence of the Care topic, the interviewing psychiatrist looked more at Reattempter than at Attempter patients.

Before asking the initial question in the Care topic, the doctor tended to look downwards, at the sheet containing the questions she had to ask. This was automatic. With Reattempter patients she began to orient head and eyes towards the patient before she started to ask her questions, while with Attempters she began to speak while still looking at the paper, and then oriented her eyes towards the patient's face. The duration of these silences was much the same in both types of dyads (M = 2.4 seconds).

This difference involves 2 to 8 motor units associated with head and eye orientation. The most discriminative (83%) dimension was the number of eye movements on the horizontal plane [Eye Rotational]. The doctor made more horizontal eye movements with Reattempter patients than with Attempter patients. The phenomenon is clearly visible through coded behaviour, but cannot even be perceived when one looks at a tape in slow motion. Probably because this involves too many dimensions (e.g. speech, head and eye orientation...) during too

short a period (less than three seconds) and accompanied by too many other forms of behaviour in other dimensions.

At this moment, both protagonists also showed more general activation [Tot] in Reattempter dyads. For both protagonists this variable has an average efficiency of 81% in association to a patient's reattempt risk.

To summarize:

- The doctor's reaction we are speaking of is specific to the Care topic.
- We are focusing on subtle mechanisms which we understand to be part of her self-regulation mechanism: looking away while speaking.
- Two "looking away" strategies are considered. The first one occurs at the beginning of the topic, just before she starts speaking: she tends to remain in eye contact with the paper on her lap as long as possible, when she is interacting with an Attempter patient. Then as soon as she starts speaking, she inhibits her habitual tendency to look away from time to time.

The doctor displays several topic related behaviours during Care topic. Given our initial hypothesis on this topic, it may have something to do with the management of aggressive feelings. Our general impression of the doctor is that she had had enough of tragic events by that time and that she was aiming at a positive ending of the interview. She therefore wanted (not necessarily consciously) to avoid negative comments on the treatment given by her hospital service as much as possible. This seems to be particularly true with the Attempter patients, as shown on table 3.

Table 3: Percent duration of the Care topic samples during which the doctor smiled

	Doctor in Reattempter Dyads	Doctor in Attempter Dyads
Suicide topic:	5.4% (average)	2.3% (average)

Table 3: ***Wilcoxon Matched-Pairs Signed-Ranks Test = 3, p <= .01 (two tailed). R: with Reattempter patients, A: with Attempter patients

The distribution is somewhat similar to the one observed on table 2. In this case we noticed that the doctor had a tendency to smile less in

the Suicide question, which is reasonable if one considers how grim the topic was. This trend is not systematic with Reattempter patients, but becomes clearly so with Attempter patients. During the Suicide topic, with Attempter patients she smiled particularly seldom, while in 9 of the 12 dyads she smiled more with attempter patients in the Care topic then in the Suicide topic. Again, age seems to have some influence on this trend, as we notice that the difference between the two topics with Attempter patients has a correlation of .58 with the age of these patients. During the Care topic, with the 3 Attempter patients (1 male and 2 women) born after 1968 she smiles for more than 12% of the time; while with the other Attempter patients, she smiles less than 8% of the time. The smiles displayed by the doctor were closer to regulating smiles than expressions of happiness[11].

General configuration of the results

The statistical dilemma

There is here an interesting issue for body psychotherapists and their way of clinically associating body traits with psychological dispositions. Two by two comparisons imply that you take a motor unit (an independent variable) and see if it is systematically more frequent in the Reattempter or the Attempter group (two dependent variables). If statistical tests yield a significance smaller than 0.05, one can surmise that the observed pattern may repeat itself if one replicates this situation. The 0.05 figure informs us that according to statisticians, if we accept the tested hypothesis as true we have 5% chances of being wrong. However, this computation is only valid if one takes one motor variable after having good reasons to test a precise hypothesis. If one does that with all imaginable bodily variables the situation is entirely different. Statisticians predict that you will randomly find correlations between several motor patterns and the tested variable (e.g. suicide risk). Let us say that instead of comparing one independent variable

11. No "true smiles" as defined by Ekman and Friesen.

with two dependent variables we test how a 5 motor unit varies in two different groups. We then need to test 10 comparisons. Mathematical considerations show that in that case, each test that yields a 0.05 probability corresponds in fact to a 0.40 probability (40% chances of accepting a hypothesis for the wrong reasons).[12] Although two by two comparisons then become useless for statistical inference, they are nevertheless computed in most laboratories to guide the researcher's attention towards certain type of configurations, and to get an idea on what sort of mass of information we are dealing with. This strategy is used mostly because it is available on most statistical packages. We hope that statisticians will find relevant forms of understandable screening procedures adapted to this type of data in the future.

The first utility of computing such comparisons is to get an idea of how many such comparisons are needed to detect an apparently relevant signal. In the case of this experiment, programmes computed 113'400 comparisons to see which motor units related to the upper body could be associated with maximum differences between (a) doctor and patients, (b) reattempt and attempter patients, and (c) doctor with reattempt and attempter patients. We found the following number of significant results ($p. < .05$ with a two-tailed test:

Table 4: Number of significant results associated to reattempt risk for doctor and patients

D&P	
P: A & R:	147
D A & R:	197

Table 4: D: doctor, P: patients, R: reattempt dyads, A: Attempter dyads.

The number of comparisons, and therefore of significant results, partially depends on how compulsively we have defined our dependent and independent variables. However the number of comparisons and significant computations is probably greater than what is currently ex-

12. Siegel 1965, p. 159–161.

pected by a psychotherapist, considering the small number of subjects, the shortness of the samples, and a coding restricted to the upper part of the body. We do not know how a nervous system looks for relevant signals, but this computation informs us that we have to take into consideration algorithms that screen millions of possibilities as soon as we consider in a psychotherapy session all of the body for one hour. It also raises the question of how easily a psychotherapist can have the impression that a certain bodily trait is associated to a psychological trait... for the wrong reasons.

The statistician's assumption was easy to check. We divided our subjects in two different virtual groups, randomly attributing a Reattempter or an Attempter label. We then ran the data through the same computer programmes and once again found a large number of significant differences. Several such randomisations however always yielded a smaller quantity of significant results (about half of what we get here).

As predicted by statisticians, some of the results produced by this procedure are clearly not usable by us at the present stage of this research. Here is an example. We are considering how much eyebrows [AUs 1+2] move during silences in both topics, for doctor and patients. Two measures are considered: a) relative mobility (percent of time during which this motor unit moved), and b) absolute mobility (number of movements). If we consider the absolute number of movements observed there is no significant difference in eyebrow mobility; if we look at the number of movements per second, we compute that patients systematically move their eyebrows slightly more (1.93% of the time in average) than the doctor (0.25% of the time): a .01 significance with a two-tailed Wilcoxon test. We used as often as possible several ways of computing a single dimension so that we could erase all systematic computations that led to results we could not process. Following a set of formal procedures[13] we filtered these results and retained 462 (0.4%) results that seemed to have fairly robust configurations. These results are grouped in function of several time samples (e.g. silences

13. Described in Abbiatti 2000, Heller & Haynal-Reymond 1999.

when the doctor speaks, when patients speak, topics, etc.) and in function of 37 motor units that are distributed in the following way:

Table 5: Group comparisons for number of motor dimensions

D & P:	
P: A & R:	5
D A & R:	7

Table 5: D: doctor, P: patients, R: Reattempter dyads, A: Attempter dyads.

We now have a more "manageable" set of data, but nevertheless still far too big to be able to use statistical significance reliably which is why we focused this article on a few phenomena that seemed particularly striking for non-statistical reasons. However, as our results were filtered and methods created to do this, we constantly had the following question in mind: how does our brain filter and organise the multitude of possible correlations that chance provides? You see, if we can find 100'000 possibly relevant bodily phenomena, so can the brain.

The first implication for psychotherapy is that we do not need to imagine or hallucinate when we project or become paranoid: there are enough signs out there to which we could rationally attribute a meaning:

> Let us take, as a speculative example, the case of any patient who meets a psychotherapist for a few sessions. There is a high probability that among the millions of perceptual items received by the patient from the therapist, some can be spontaneously associated with some of the billion items received by that patient from his father. Thus, finding a psychotherapist with whom the patient may experience strong transference relations is fairly easy. This may mean that from the point of view of transference, the best therapist is the one that shares a manageable amount of common signs with a significant amount of members of the patient's family.

This sort of analysis shows that finding a relevant meaning to a sign is more of an adventure than one may have imagined.

Conscious and nonconscious forms of communication

Given the room chance has to provide apparently meaningful associations between bodily dimensions and various meaningful experiences, the data we are left with - after using our filtering method - will only prove strong enough if and when tested by replication studies. However, nothing prevents us from speculating on what we have, so as to imagine plausible avenues of thought that should be tested once replication is on the way.

The data suggests that patients tend to display less activity in Attempter than in Reattempter dyads. This is significant for more than 80% of the patients at certain moments for the following dimensions: blinking [AU45], eye lowering [AU64] and oral activation. This trend is also found in other units, but less clearly. More specifically we wondered if some ongoing current behaviour was not inhibited in the Attempter dyads by patients and doctor.

Even for those who looked at our films for the first time, the hypothesis that doctor does not behave like her patients seems plausible[14], while no difference between Attempter and Reattempter dyads reaches conscious feelings. Table 4 and 5 also show that the doctor/patient status differences yield more significant results than the reattempt variables (for patients or doctor). We have refined our analysis with a concept of motor involvement, assessed through the following 3 dimensions: A) number of motor units involved, B) intensity of the differences, and C) the number of significant differences associated to this dimension.

The intensity of the differences also suggests more motor involvement. For 18 motor units, the doctor/patient comparisons yield differences that involve more than 85% of the dyads. Among our filtered results on suicide reattempt risk, the strongest one is the oral activation of patients already described. Some results involve a greater

14. It is also well documented, as in Frey 1980, Heath 1986, Goffman 1961.

number of dimensions than others. For example in one difference one may have more intensity (1 dimension) but not more mobility, while another difference involves more intensity and more duration and more mobility (3 dimensions) in one group than in the other group. The hypothesis we have here is that more dimensions are recruited in a motor difference, the easier it is to perceive them consciously. With the status difference, we find 11 motor units that are differentiated by 8 to 12 dimensions. The strongest differences related to reattempt risk involve 7 dimensions.

Our hypothesis is that consciously perceived phenomena require a relatively important recruitment in terms of number of motor units involved, number of dimensions involving each motor unit and in terms of how systematically it involves a group of people or a person.

Conclusion

In this article we have summarised results that could lead to a better understanding of suicidal behaviour and methodological considerations that could deepen our understanding of conscious and nonconscious nonverbal communication. One cannot code all that is perceived. Our data also stresses that not all that may be coded can reach awareness. Thus we coded several aspects of the patient's behaviour which seemed to be sensitive to a patient's reattempt risk, but which apparently did not reach the awareness of the doctor or of those who studied the films. The relevance of such signs is demonstrated by the fact that, when produced by a person, they may influence the behaviour and the feelings of others with whom they are interacting.

We can thus distinguish A) visible bodily behaviour directly accessible to consciousness, from B) codable bodily signs only indirectly accessible to consciousness (for example mediated by impressions, judgements, feelings, etc.). Clearly, the communication patterns we are associating to suicide reattempt risk are of the second type. We suggest that psychiatric expertise is often based on similar forms of communication, felt by the most sensitive practitioners, but difficult to put into

words. Understanding such phenomena could thus help us improve and support the clinician's management of human relationships.

The data also suggest that the body can send information configured in ways that are more or less accessible to consciousness. For example, a motor pattern that groups masses of congruent and redundant information may be more easily perceptible. If the doctor reacted nonconsciously to a patient's suicide reattempt risk, then even nonconsciously processed information becomes relevant for clinicians. We are assuming that some nonconscious processes can be accessed when consciousness is guided in the correct direction. These representations can be characteristic feelings or atmospheres that one could learn to associate with certain clinically relevant entities. Ambady and Rosenthal (1993) have proposed a similar analysis to understand results from a study on how nonverbal behaviour allows teachers to predict some of their students' behaviour several months ahead:

> We found that judgmental accuracy based on thin slices of behaviour was not strongly linked to specific nonverbal behaviours of the targets. Judgmental accuracy was, however, strongly linked to gestalt, molar impressions[15] based on nonverbal behaviour. This result supports previous research showing that judgments of molar impressions, although vaguer and fuzzier, generally yield more useful information than the coding of specific behaviour.

When we present our results to colleagues, they invariably expect that Reattempter patients should be less active then Attempters. The argument is invariably the following: the more you move, the more expressive you are, the healthier you are (at least for a population often associated to depression). Thus, Attempter patients must be healthier than Reattempter patients.

When we consider in a global way the behaviours that could be associated to suicide reattempt risk, we notice that there is more activity in Reattempter dyads, mostly with patients. If this information is confirmed, then there must be something wrong in the chain of arguments followed by many colleagues in psychiatry and psychotherapy. We do however wish to stress that we are talking here about small variations of activation displayed by only a few parts of the body. The other parts

15. Molar impressions, in this study, are impression of whether a person is active, dominant, warm, empathic, etc.

of the body we analysed seem to follow other themes that may not necessarily be linked to suicide.

The association we have found between suicide risk and nonconscious mechanisms confirm the observations of Ekman and Wolk-Wasserman. Our results also support the notion that some mechanisms are common to most persons who make a suicide attempt. Continuing research on this issue can therefore be useful for at least three reasons.

- The first is that it could improve our understanding of how suicidal patients behave, and how they influence their environment.
- The second is that by refining these results, we could find ways of monitoring psychotherapists in such a way that they could sort in the multitude of inner and outer stimulations they are continuously experiencing and focus on clinically relevant aspects of behaviour and personal reactions. Suicide is a particularly good topic for this, as there are fewer diagnostic issues than in most other clinical topics.
- Finally, one can use the association between suicide, reattempt risk, and bodily behaviour in a less intrusive way than purely biological indicators such as serotonin.

The behaviours we focused on have, for patients and doctor, a self-regulation function. It would seem that suicide attempt risk modulates already existing self-regulation behaviours. This could explain why these behaviours are seldom associated with suicidal behaviour. On the other hand, as they are familiar, one can also expect people to be nonconsciously sensitive to slight variations. Another nonconscious aspect of the interactive patterns we have observed is that they do not occur in tight spatial frames. Such loose (non contingent) temporal relations associated to self-regulation have also been recently observed on babies (Bigelow 1998, Gergely & Watson 1999, Rochat & Striano, in print). These studies also suggest ways of training psychotherapists to become more aware of how they become involved in such nonconscious processes.

For example Gergely & Watson (1996, 1999) show how 3-month old infants learn to categorize vegetative feelings through the feedbacks they receive from their parents. Similarly, once psychotherapists learn which signs correspond to a psychological issue, they may be able

to learn what inner feelings tend to be aroused when these signs appear.

These results also lead us to an interesting speculation, suggested by Candace B. Pert (1998, pp 130-149) between chemical and neural pathways. Both systems have a chemical basis, but the neurological process implies that information pass from one neuron to another. It is the model on which computer engineering is based. The chemical pathway can simultaneously influence several groups of neurons, as well as other organs in the organism.

Any behaviour is influenced by neurological and chemical pathways, but in varying proportion. Gestures with a clear configuration, directly related to a specific stimulus (e.g. a startle reflex, an emotional reaction), are mostly produced by such nervous processes as reflexes or modular systems. Chemical processes are known to play an important role in more diffuse processes such as moods; they tend to make some type of activities more probable than others. This distinction might be a new way to approach the more redundant aspects of bodily behaviour.

We know that suicidal behaviour can be strongly influenced by chemical processes such as serotonin circuits. Furthermore we are working on a predisposition that sometimes manifests itself a year after the films we have analysed. It is therefore possible that the type of behaviour we have observed on suicidal patients (e.g. oral activation) is a good example of the type of behaviour generated by chemical circuits. Thus, Reattempter patients have a predisposition that makes certain forms of oral activity more probable. This predisposition also makes a certain type of behaviour more probable, but does not control the more specific contours of this motor activity.

If we follow this idea, then the influence of the patient's reattempt risk on the doctor's behaviour is an example of nervous nonconscious behaviour: the contours are clearer in shape and in time span: for example, when the doctor inhibits her eye avoidance behaviour during a specific topic (second topic) with attempter patients. Again this fits the situational frame, as one does expect the doctor to react to a specific stimulation of patients, even if this stimulation is randomly distributed during the interview.

Body psychotherapists have mostly learned to identify specific motor patterns. It may be that studies like this one will teach them to spot more diffuse motor patterns that are nevertheless clinically highly relevant. An already well-established example is having a dry mouth and/or salivation caused by certain antidepressants. There is probably a whole range of chemically induced diffuse behaviours. Body psychotherapists may use their expertise and find ways of dealing with these mechanisms.

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