Temperament and Personality Dimensions in Suicidal and Nonsuicidal Psychiatric Inpatients

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Key Words
Suicide • Temperament • Personality traits

Abstract
Background: Suicide is a serious public health problem. In the international literature there is evidence to support the notion that certain temperaments and personality traits are often associated with suicidal behavior. Sampling and Methods: In this study, 150 psychiatric inpatients were investigated using the Temperament Evaluation of Memphis, Pisa, Paris and San Diego autoquestionnaire, the Minnesota Multiphasic Personality Inventory, 2nd edition (MMPI-2) and the Beck Hopelessness Scale and evaluated for suicide risk by means of the critical items of the Mini International Neuropsychiatric Interview. Results: Statistical analysis, including logistic regression analysis and multiple regression analysis, showed that suicide risk contributed to the prediction of hopelessness. Among the temperaments, only the hyperthymic temperament, as a protective factor, and the dysthymic/cyclothymic/anxious temperament contributed significantly to the prediction of hopelessness. Irritable temperament and social introversion were predictive factors for suicidal risk. Hopelessness and depression were associated with higher suicidal behavior and ideation, but, unexpectedly, depression as measured by the MMPI did not contribute significantly to the multiple regressions. Conclusions: The present study indicated that, although suicidal psychiatric patients have MMPI-2 profiles in the pathological range, they exhibit several differences from nonsuicidal patients. Patients at risk of suicide have specific temperaments as well as personality and defense mechanism profiles. They are more socially introverted, depressed and psychasthenic, and use hysterical and schizoid mechanisms more often. Generalizability of the findings was limited by the small sample size and the mix of bipolar disorder I, bipolar disorder II, major depressive disorder and psychotic disorder patients.
Introduction

Suicide is a major public health problem. Between 10 and 18% of adults across diverse regions of the world report lifetime suicidal ideation and 3–5% have made at least 1 suicide attempt at some point in their life [1–3]. The relationship between suicide and psychiatric disorders is an important issue. More than two thirds of completed suicides and suicide attempters have a (mostly untreated) major depressive episode at the time of the suicide act [4, 5].

Several classic studies have connected suicide either to a general history of mental illness or to specific diagnoses of depression, alcoholism, schizophrenia and organic psychoses [6–9]. However, as Hendin [10] has pointed out, ‘the vast majority of depressed, schizophrenic, alcoholic or organically psychotic patients do not commit or even attempt suicide’. Therefore, the critical question is: what makes an individual with any given diagnostic category suicidal?

The search for suicide risk factors independent of diagnosis has been pursued by a number of researchers and clinicians. Weisman et al. [11], for example, suggested that suicidal patients exhibited greater hostility than depressed patients. Fawcett et al. [12] and Minkoff et al. [13] found that hopelessness was a stronger predictor of suicide than the degree of depression. Others have reported evidence that the current (short-time) risk of suicidal behavior is very high in the case of severe depression. Others have reported that the current (short-time) risk of suicidal behavior is very high in the case of severe depression. In support of the clinical view of Kraepelin and Kretschmer, recent research strongly suggests that specific affective temperament types (depressive, cyclothymic, hyperthymic, irritable and anxious) are the subaffective/anlage (trait-related) manifestations and frequently the precursors of the major depressive and bipolar major mood disorders [23, 27, 28], and have a strong relationship with suicidal behavior. Bipolar II patients with cyclothymic temperament and high harm-avoidant traits have been described as individuals with the ‘darkest’ disposition of bipolarity and being prone to dysphoric major mood episodes and impulsive suicide attempts. Moreover, Akiskal et al. [21] reported that, compared to noncyclothymic bipolar II patients, cyclothymic bipolar II subjects reported significantly more lifetime suicide attempts (49 vs. 38%) and had more current hospitalizations for suicidal risk (61 vs. 50%). During a 2- to 4-year prospective follow-up of 80 juvenile inpatients with current major depressive episodes, a cyclothymic-sensitive temperament at baseline significantly predicted not only the bipolar outcome, but also suicidal behavior during the follow-up: among these young patients 81% of those with cyclothymic-sensitive temperament had at least 1 episode of suicidal ideation or attempt versus 36% of subjects without such a temperament [23]. Investigation of the affective temperament profiles of 150 nonviolent suicide attempters (121 of them with a current major depressive episode) and 717 healthy controls indicated that, compared to controls, suicide attempters scored significantly higher on 4 of the 5 affective temperaments containing a more or less depressive component (depressive, cyclothymic, irritable and anxious temperaments). On the other hand, no significant difference between the suicide attempters and controls was found for the hyperthymic temperament [29].

Watson et al. [30] argued against the use of the Minnesota Multiphasic Personality Inventory (MMPI) to predict suicide, and Devries and Shneidman [31] reported that suicidal syndromes were difficult to detect in MMPI profiles unless individuals with homogeneous syndromes are grouped together for purposes of comparison. In that way, changes in MMPI profiles could be better recognized, pointing to presuicidal and suicidal syndromes. However, recent studies support a different view, emphasizing a possible important role for MMPI profiles in the assessment of suicidal risk [32–34].

The aims of the present study were to examine the possible interaction between MMPI-assessed personality dimensions and temperamental traits as predictors of suicidality and hopelessness in psychiatric patients at risk for suicide.
Methods

Participants

The sample consisted of 150 psychiatric inpatients (50 men and 100 women) admitted to the Sant’Andrea Hospital’s psychiatric ward in Rome. Bipolar and major affective disorder patients admitted to our specialized ward are often referred by community mental health services for evaluation, management of acute symptoms and treatment planning. The mean ages of the participants were: males 39.4 years (SD = 13.8) and females 42.7 years (SD = 13.6). At admission, the patients were assessed for psychiatric diagnoses and evaluated for suicide risk. The sample was selected from 186 patients consecutively admitted to the Sant’Andrea Hospital’s psychiatric ward in Rome from May 2005 to December 2006. Exclusion criteria at admission were illiteracy (MMPI-2 traits) and the attending physician. One section of this instrument is dedicated to the assessment of suicidal risk, with questions about patient’s suicide history.

Statistical analyses

<table>
<thead>
<tr>
<th>Variables</th>
<th>Suicide risk yes (n = 62)</th>
<th>Suicide risk no (n = 88)</th>
<th>Statistical analyses</th>
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</thead>
<tbody>
<tr>
<td>Women, %</td>
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<td>Men, %</td>
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<td>Age, years</td>
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<tr>
<td>Beck Hopelessness Scale total score</td>
<td>13.16 ± 5.02 (13.50)</td>
<td>8.56 ± 4.79 (8)</td>
<td>t = 1.48, d.f. = 148, p = 0.14</td>
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<td>TEMPS-A traits</td>
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<td>Dysthymic/cyclothymic/anxious temperament</td>
<td>13.40 ± 3.66 (13.33)</td>
<td>11.60 ± 3.30 (12)</td>
<td>t = 3.13**, d.f. = 148, p = 0.002</td>
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<tr>
<td>Irritable temperament</td>
<td>8.46 ± 3.86 (8)</td>
<td>6.94 ± 3.80 (6)</td>
<td>t = 2.40*, d.f. = 148, p = 0.01</td>
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<td>Hyperthymic temperament</td>
<td>7.53 ± 2.95 (8)</td>
<td>9.52 ± 4.65 (9)</td>
<td>t = 2.74*, d.f. = 148, p = 0.007</td>
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<td>MMPI-2 traits</td>
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<tr>
<td>Hypochondriasis</td>
<td>21.63 ± 8.61 (20)</td>
<td>19.90 ± 5.16 (21)</td>
<td>t = 1.53, d.f. = 148, p = 0.12</td>
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<td>Depression</td>
<td>32.94 ± 9.86 (31.50)</td>
<td>28.80 ± 7.51 (28)</td>
<td>t = 2.86**, d.f. = 148, p = 0.005</td>
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<td>Hysteria</td>
<td>29.76 ± 7.90 (29.50)</td>
<td>27.26 ± 6.86 (28)</td>
<td>t = 2.06, d.f. = 148, p = 0.04</td>
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<td>Psychopathic deviate</td>
<td>31.05 ± 7.26 (30.50)</td>
<td>29.09 ± 6.22 (29)</td>
<td>t = 1.77, d.f. = 148, p = 0.07</td>
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<td>Masculinity-femininity</td>
<td>31.45 ± 5.76 (32)</td>
<td>30.11 ± 6.13 (30)</td>
<td>t = 1.34, d.f. = 148, p = 0.18</td>
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<td>Paranoia</td>
<td>16.71 ± 8.40 (15)</td>
<td>16.05 ± 6.83 (15.50)</td>
<td>t = 0.53, d.f. = 148, p = 0.59</td>
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<td>Psychasthenia</td>
<td>39.61 ± 9.48 (39)</td>
<td>36.49 ± 7.60 (35.50)</td>
<td>t = 2.23*, d.f. = 148, p = 0.02</td>
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<td>Schizophrenia</td>
<td>44.87 ± 12.44 (45)</td>
<td>40.94 ± 11.05 (39)</td>
<td>t = 2.03, d.f. = 148, p = 0.04</td>
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<td>Hypomania</td>
<td>22.79 ± 6.90 (21)</td>
<td>23.80 ± 5.99 (23)</td>
<td>t = 0.95, d.f. = 148, p = 0.34</td>
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<td>Social introversion</td>
<td>38.81 ± 11.86 (38.50)</td>
<td>33.02 ± 9.49 (32)</td>
<td>t = 3.31**, d.f. = 148, p = 0.001</td>
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TEMPS-A = Temperament Evaluation of Memphis, Pisa, Paris and San Diego, autoquestionnaire version. Results shown as means ± SD, with medians in parentheses. * p ≤ 0.05; ** p ≤ 0.01: Benjamini and Hochberg’s correction for multiple testing.
past and current suicidality. Considering the current suicidality section, the MINI classifies subjects into 4 groups: no suicidal risk, low suicidal risk, medium suicidal risk and high suicidal risk. For analysis, we used only 2 major groupings: no suicidal risk (no suicidal risk and low suicidal risk classes as measured by the MINI) and suicidal risk (medium suicidal risk and high suicidal risk classes as measured by the MINI).

The first version of TEMPS-A contained 84 items [40]. Later, clinical and theoretical considerations led to the addition of 26 new items describing the anxious temperament, resulting in the 110-item-long version of the TEMPS-A [41]. The scale is different from most other temperament scales in that it taps subjective trait expressions as they were conceptualized in Greek psychological medicine and, in more modern times, German psychiatry. The TEMPS-A has been validated in Italian populations [42]. In that investigation, a principal-component analysis with a varimax rotation resulted in a 3-factor solution: the first (8.84% of the variance) represented dysthymic, cyclothymic and anxious (Dys/Cyc/Anx) temperaments combined; the second the irritable temperament (5.65% of variance) and the third the hyperthymic temperament (5.16% of variance). Cronbach α reliabilities ranged from 0.89 for the Dys/Cyc/Anx factor to 0.74 for the hyperthymic factor.

There are currently 567 items on the MMPI-2. Scoring generates 6 validity scales and 10 basic clinical or personality scales. The latter are, in order, hypochondriasis, depression, hysteria, psychopathic deviate, masculinity-femininity, paranoia, psychasthenia, schizophrenia, hypomania and social introversion.

The BHS is a 20-item scale for measuring the cognitive component of the syndrome of depression. This scale assesses 3 major aspects of hopelessness: feelings about the future, loss of motivation and expectations. Responding to the 20 true or false items on the BHS, individuals have to either endorse a pessimistic statement or deny an optimistic statement. Research consistently supports a positive relationship between BHS scores and measures of depression, suicidal intent and current suicidal ideation. In addition, Beck et al. [43] carried out a prospective study of 1,958 outpatients and found that BHS scores were related significantly to eventual completed suicide. A cutoff score of 9 or above identified 16 (94%) of the 17 patients who eventually committed suicide. The high-risk group identified by this cutoff score was 11 times more likely to commit suicide than the rest of the outpatients. The BHS may therefore be used as an indicator of suicide potential. There are ongoing validation studies for the Italian population [44].

**Statistical Analyses**

Statistical analyses included bivariate analyses (t tests) and multiple linear and logistic regressions with a stepwise method. The correction for multiple testing by Benjamini and Hochberg [45] was used. Stepwise multiple regressions are an exploratory method of computing regression in stages. In stage 1, the independent variable that best correlates with the dependent variable is included in the equation. In the next stage, the remaining independent predictors are analyzed, controlling for the previous variable entered. The process is repeated until the addition of an independent variable does not increase the predictive power of the model.

Implied in the decision to apply a stepwise regression are 2 major considerations. First, there is no useful theory supporting a methodology based on previous knowledge. Second, we need to balance between sensitivity and usefulness, identifying enough predictors to be sufficiently sensitive to explain the patients’ suicidality but few enough to avoid interaction effects that could result in utility problems [46].

The Statistical Package for the Social Science (SPSS Inc., Chicago, Ill., USA) version 13.0 was used to perform statistical analyses. The 5% level of statistical significance was employed.

**Results**

Although the average scores of both groups were in the pathological range, bivariate analyses (table 1) showed several differences between the groups. Patients with suicidal risk were more likely to have higher raw scores on all the MMPI-2 scales except hypomania, and on the TEMPS-A Dys/Cyc/Anx temperament and irritable temperament scales. The differences reached statistical significance for most dimensions. There was a significant difference on the BHS total score: subjects with suicide risk had higher scores (no risk = 8.56 vs. yes = 13.16; t = 5.68, p = 0.000). Thus, patients at risk of suicide reported higher levels of depression, anxiety and hopelessness, were more socially introverted and irritable but less hyperthymic. They were also more socially introverted, depressed and psychasthenic, and used hysterical and schizoid mechanisms more often, although the last two differences were not significant after correction for multiple testing.

To identify the best predictors of the BHS total scores, suicide risk, TEMPS-A and MMPI-2 subscale scores were entered as predictors in a multiple regression model (table 2). In stage 1, the best predictor was hyperthymic temperament (sr(part correlation) = −0.472; R² = 0.223; 22% explained variance; F = 42.44, p = 0.000), a protective factor. The second step added suicide risk (sr = 0.327; R² = 0.330; 33% explained variance; F = 36.20, p < 0.000). The third step added Dys/Cyc/Anx temperament (sr = 0.190; R² = 0.366; 36% explained variance; F = 28.09, p = 0.000). These variables explained 53% of the variance (22, 11 and 3%, respectively).

To identify the best predictors of suicidal ideation, a logistic regression analysis was carried out with the TEMPS-A dimensions and the MMPI-2 scales as predictor variables (table 3). The analysis resulted in 3 models predictive of suicidality.

The first model (−2log likelihood = 192.84, χ² = 10.56, p < 0.001) contained only 1 predictor, social introversion (odds ratio, OR = 1.05).

The second model (−2log likelihood = 188.72, χ² = 14.69, p < 0.001) contained 2 predictors, the irritable temperament (OR = 1.09) and social introversion (OR = 1.05).
The third model (−2log likelihood = 184.04, \( \chi^2 = 19.36, p = 0.000 \)) contained 3 predictors, irritable temperament (OR = 1.11), hyperthymic temperament (OR = 0.91) as negative predictors, and social introversion (OR = 1.03) as a risk factor.

**Discussion**

The aim of the present research was to study the role played by temperament and personality dimensions in the long-term prediction of suicide among psychiatric inpatients and the analysis of variables that may mediate suicide risk. Past research indicated that suicidal risk may be influenced, in a multifactorial fashion, by the measures included in this study [5, 21, 47, 48].

The present study indicated that, although psychiatric patients have MMPI-2 profiles in the pathological range, they exhibit several differences depending on their risk of suicide. Patients at risk of suicide have specific personality and defense mechanism profiles. For example, they are more characterized by behavior and descriptors of the depressive trait (poor morale, dissatisfied with one’s own life and pessimistic about the future;
feeling blue, unhappy, self-deprecatory and guilty, psychasthenia (ruminative and obsessive, ritualistic and compulsive in one’s own thinking and behavior; marked by vacillation, excessive doubt, worries, turmoil and discomfort) and social introversion (marked by withdrawal from social contacts, being reserved, timid and shy). Besides, they use more hysterical and schizoid mechanisms. Patients at risk of suicide show higher levels of depression, hopelessness, anxiety and irritable temperament, consistent with the results of Nordstrom et al. [49] who found that hopelessness, anhedonia, trait anxiety, hostility, undirected anger expression, psychosis proneness, antisocial traits and interpersonal difficulties were features associated with a vulnerability to suicidal behavior.

Another variable associated with suicide risk was social introversion, meaning that patients at risk of suicide feel alienated from others. When they are in social situations, they feel anxious and behave in an unfriendly manner. This result is consistent with other studies indicating that social introversion is characteristic of adolescents at risk for suicide and studies correlating inhibition and risk of suicide [50, 51]. This suggests that social alienation is a highly stable trait predisposing individuals to suicide, and not just a reaction to environmental difficulties.

Rihmer et al. [29] compared the affective temperament profiles of 150 nonviolent (106 females and 44 males) suicide attempters (121 of them had a current major depressive episode) and 717 normal controls (438 females and 279 males). Compared to controls, both female and male suicide attempters scored significantly higher on 4 of the 5 temperaments, those containing more or less depressive components (depressive, cyclothymic, irritable and anxious). On the other hand however, no significant difference between suicide attempters and controls was found for the hypothyamic temperament scores. A significantly higher rate of suicide attempters (135/150 = 90.0%) than controls (138/717 = 19.2%) had a high (mean score 2 standard deviations or more above the mean) affective temperament (p = 0.0001). The authors concluded that their findings supported the existence of a strong relationship between depression and suicidal behavior at the temperament level, indicating that the hypothyamic temperament has no predisposing role for suicidal behavior at least for nonviolent attempters.

Thus, suicide attempters can be characterized by their temperaments. These variables could be viewed as predisposing traits for emotional instability. In fact, depression seems to be only one of the possible emotional responses. It seems that suicidal people are predisposed to respond to environmental and internal stimuli with emotional lability, ranging from anger to dysthymia and unstable phases of elevated mood. In this situation, the unstable mental state would be problematic for suicide attempters in addition to their environment. They often focus on their unstable and not easily understood internal world causing dysfunction in their socially oriented behavior.

In the present study, hopelessness was predicted by prior suicide ideation and attempts and by the Dys/Cyc/Anx temperament. While irritable temperament and social introversion were the strongest predictors of suicide risk, the hypothyamic temperament may be a protective factor both for hopelessness and suicide risk.

In our study, unexpectedly, depression as measured by the MMPI scale of depression was not a good predictor of suicide risk. However, this result could have been dependent on the other scales used, and we measured depression in terms of personality traits and not in terms of current depressive psychopathology. The MMPI-2 scale of depression does appear to be moderately accurate in predicting depression [52].

Our results are important for clinicians. The most effective predictors of suicide risk reported in the literature are state variables with validity only for short-term prediction. Our study identified specific personality traits predictive of suicide risk, particularly temperament traits, subaffective manifestations and precursors of major affective disorders with high stability for long-term prediction. However, temperament and personality traits are able to explain the variance of suicide risk only partially, suggesting the need for several long-term and short-term variables when predicting suicide.

However, we should bear in mind what Hendin [10] pointed out, suggesting that ‘the interest in classifying populations of suicidal patients by their psychiatric diagnoses is being supplemented by an interest in understanding what makes a minority of patients within any given diagnostic category suicidal while the majority are not suicidal’. Suicidality and depression might be considered to be two separate dimensions often coexisting in the same individuals, sharing part of the symptomatology. For instance, Ahrens and Müller-Oerlinghausen [53] found that the antisuicidal property of lithium was independent of its mood-stabilizing property. In other words, lithium could reduce suicide risk dramatically in depressed patients who were classified as ‘poor responders’ on the basis of clinical evaluation.
It is interesting to note that, of the temperament scales, the absence of hyperthymia contributed significantly to the prediction of hopelessness. This is somewhat consistent with Jamison's [54] suggestion that temperaments modulate the interplay between biology and environment. She suggested that, even in the animal world, between individuals within one species, those who are highly energetic, grasping and aggressive are drawn to new regions, different foods and disparate mates which may in part explain why those individuals who are hyperthymic may be less prone to suicidal gestures. On the other hand, those who have a cyclothymic temperament or other temperaments may be at higher risk for suicide due to difficulties in adapting to changing environments. The hyperthymic temperament might be present in those who engage in more risky behaviors, those who accept challenges and, therefore, who are at risk of injury or death.

In her compassionate book on suicide, Jamison [54] stated that ‘genes, in the main, determine our temperaments, and our temperaments in turn influence our choices about which environments we seek out or avoid. Our temperaments also mold how we respond to our environments and how we are shaped by them. For those who are low-key and stable, a disappointment or rejection, the loss of a job or the end of a marriage, or an extended bout of depression will be painful and distressing but not life-threatening. For those with a short wick, a savage temper, and impulse-laden wiring, life’s setbacks and illness are more dangerous. For them, it is as though the nervous system had been soaked in kerosene: a fight with a lover, a gambling loss or a run-in with the law, or an irritable flash from a mental illness can ignite a suicidal response’ (p. 197). Can this process be prevented? A genetic predisposition implies that, in the presence of cumulative stress, suicide may be an option as might be a lifestyle that involves smoking and behaviors that increase the risk of heart disease, cancer and other diseases.

One of the main targets of the research on temperaments and personality dimensions should be the recognition of those vulnerable individuals that can benefit from prophylactic measures as in the case of healthy lifestyle for organic diseases. Reduction of stigmatization toward psychiatric treatment, including psychotherapy, may offer a chance to counterbalance biological predispositions.

The present study had a number of limitations. First, it had the limitations of all naturalistic designs, that is potentially relevant variables, such as the intensity of antidepressant treatment, the presence of treatment refractoriness, the lethality of previous suicide attempts and the time-varying nature of depressive symptoms and suicidality, were not addressed.

Also, the small sample size, the mix of patients with bipolar disorder I, bipolar disorder II, major depressive disorder and psychotic disorders all limit the generalization of findings. However, the results support previously reported findings such as the importance of paying particular attention to hopelessness and depression as well as the role of temperament.

Another limitation is that use of the BHS may have drawbacks which are shared by all self-administered psychometric instruments. Nevertheless, this simple, self-administered method has been reported to be an important tool for the prediction of suicide [47]. The use of the critical items of the MINI provided assessment of suicide by clinicians. However, possible sources of bias might remain in patients with mood disorders who exhibit volatile and erratic moods associated with dysphoria and agitation or presenting the classic mixed states. In this case, the administration of lithium or other mood stabilizers including novel antipsychotics may lead to dramatic amelioration of impulsivity and aggression and in turn reduction of their anguish and despair otherwise associated with hopelessness and suicide risk. Patients may feel less suicidal or deny suicide ideation due to this first improvement of the clinical condition whereas the suicide risk may emerge again soon thereafter if adherence is poor or if patients do not respond to treatment. Our patients were interviewed 5 days after admission when first-line treatment was already in use. Proper understanding of the temperaments involved in this latter issue and in the dynamics reported in this study may help clinicians to better describe the clinical picture.

In conclusion, we believe that studying temperaments can contribute to a better understanding of suicide, a phenomenon often unfortunately difficult to predict and prevent despite the great amount of information. Clearly, more knowledge on possible key risk factors is crucial to provide effective preventive measures.
References


320 Psychopathology 2008;41:313–321

Pompili et al.


