

Do Akiskal & Mallya's affective temperaments belong to the domain of pathology or to that of normality?

L. ROVAI¹, A.G.I. MAREMMANI^{1,2}, F. RUGANI¹, S. BACCIARDI¹, M. PACINI^{1,3},
L. DELL'OSSO¹, H.S. AKISKAL⁴, I. MAREMMANI^{1,2,3}

¹Vincent P. Dole Dual Diagnosis Unit, Department of Neurosciences, Santa Chiara University Hospital, University of Pisa, Italy

²Association for the Application of Neuroscientific Knowledge to Social Aims (AU-CNS), Pietrasanta, Lucca, Italy

³G. De Lisio Institute of Behavioural Sciences, Pisa, Italy

⁴International Mood Centre, University of California, San Diego, CA, USA

Abstract. – BACKGROUND: Kraepelin and Kretschmer hypothesized a continuum between full-blown affective pathology and premorbid temperaments. More recently Akiskal proposed a putative adaptive role for the four fundamental temperaments: the hyperthymic one characterized by emotional intensity, the cyclothymic one by emotional instability, the depressive one by a low energy level, and the irritable one by an excessive response to stimuli. Today it is widely debated whether affective temperaments belong to the domain of pathology or to that of normality.

PURPOSE: To make clear, by applying an integrated model, the position of affective temperaments within the continuum between normality and pathology.

METHODS: We reviewed several papers that explore the distribution of affective temperaments among the general population, and their involvement both in pathological conditions (somatic and psychiatric) and in human activities (professions and other occupations).

RESULTS: Far from being intrinsically pathological conditions, affective temperaments seem to represent adaptive dispositions whose dysregulation can lead to full-blown affective pathology. All the temperamental types display some impact on people's lives by influencing personal skills and professional choices over a wide field of human activities.

CONCLUSIONS: Affective temperaments are not problematic when they appear in a mild form, but when they occur in extreme form we have observed a gap between the hyperthymic temperament, which represents the most functional and desirable, and the cyclothymic, depressive, irritable and phobic anxious ones, which are closer to mood, anxiety, and substance use disorders, and imply a component of somatic diseases and life stressors.

Key Words:

Affective temperaments, TEMPS, Pathology interface, Normality interface, Patho-plastic role, Adaptive role, Somatic diseases, Psychiatric diseases, Substance use disorders, Professional choice, Quality of life.

Introduction

The concept of temperament was postulated by Hippocrates in the fourth century B.C. More recently, Kraepelin and Kretschmer hypothesized a continuum between full-blown affective pathology and premorbid temperaments, referring to them as lifelong, early-onset, attenuated, subclinical forms of manic-depressive psychosis^{1,2}.

According to the conceptualization of Akiskal and Mallya, based on Kraepelin's theory and clinical observations, four fundamental affective temperaments do exist (Table I): the depressive temperament is distinguished by stably depressed mood, introversion, a low energy level and hypersomnia; hyperthymic temperament displays extroversion, a high energy level, emotional intensity and little need for sleep; the cyclothymic temperament shows a central dimension that includes rapid fluctuations in mood and emotional instability; the irritable temperament, which is less consistent than the others, includes a predisposition to being litigious and aggressive and to encountering difficulties in interpersonal relationships. A new development has been the elaboration of a putative phobic-anxious temperament consisting of increased sympathetic activity, fear of illness, hypersensitivity to separation,

Table 1. Affective temperamental characteristics according to Akiskal and Mallya's formulation.

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| <p>Depressive temperament</p> <ul style="list-style-type: none"> • Gloomy, pessimistic, humourless or incapable of fun • Quiet, passive or indecisive • Sceptical, hypercritical or complaining • Brooding and given to worry • Conscientious or self-disciplining • Self-critical, self-reproaching, or self-derogatory • Preoccupied with inadequacy, failure and negative events to the point of morbid enjoyment of one's failures <p>Hyperthymic temperament</p> <ul style="list-style-type: none"> • Cheerful, overoptimistic or exuberant • Naïve, overconfident, self-assured, boastful, bombastic or grandiose • Vigorous, full of plans, improvident, carried away by restless impulses • Over-talkative • Warm, people-seeking or extroverted • Overinvolved and meddlesome • Uninhibited, stimulus-seeking or promiscuous <p>Cyclothymic temperament</p> <ul style="list-style-type: none"> • Biphasic dysregulation characterized by abrupt endo-reactive shifts from one phase to the other, each phase lasting for few days at a time, with infrequent euthymia • Marked unevenness in quantity and quality of productivity-associated unusual working hours • Lethargy alternating with eutonia • Pessimistic brooding alternating with optimism and carefree attitudes • Mental confusion alternating with sharpened and creative thinking • Shaky self-esteem alternating between low self-confidence and overconfidence • Hypersomnia alternating with decreased need for sleep • Introverted self-absorption alternating with uninhibited people-seeking • Decreased verbal output alternating with talkativeness • Unexplained tearfulness alternating with excessive punning and jocularity <p>Irritable temperament</p> <ul style="list-style-type: none"> • Indeterminate early onset • Habitually moody-irritable and choleric with infrequent euthymia • Tendency to brood • Hypercritical or complaining • Ill-humoured joking • Obtrusiveness • Dysphoric restlessness • Impulsiveness |
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difficulty in leaving familiar surroundings, a marked need for reassurance, and oversensitivity to drugs and substances³⁻⁹.

Currently a widely debated issue is whether affective temperaments belong to the domain of pathology or to that of normality,

Within the general framework of evolutionary biology it has been suggested that affective disease, including mania and associated psychotic

states, exists because it serves, in a polygenic model, as the genetic reservoir for adaptive temperaments. If we think of affective disorders as extremes in an oligogenic model of inheritance, adaptive temperaments represent the milder phenotypes of their constituent traits. Depressive traits appear to indicate sensitivity to the suffering of other members of the species, and to overlap with those of the generalized anxious temperament. Cyclothymia may have evolved, thanks to the role played by creativity in sexual seduction, as a mechanism in reproductive success. Hyperthymic traits seem to offer distinct advantages in leadership, exploration, territoriality and mating. On the basis of this comprehensive model, creative and eminent individuals probably occupy a somewhat unstable terrain that is intermediate between temperament and affective disease^{10,11}.

The whole question of the nature of affective temperaments is still an open issue. The concept of temperament derives from the clinical tradition^{6,12,13}, and, in the latest version of the Diagnostic Statistic Manual (DSM-IV-R), affective temperaments are classified among mood disorders, as cyclothymic and dysthymic disorders¹⁴. As a matter of fact, the validation process of Akiskal and Mallya's¹⁵ criteria for the diagnosis of affective temperaments, both in their self-questionnaire and interview version, has confirmed that affective temperaments are a widespread dimension in the general population, with significant sex-, age- and latitude-related differences^{4,5,16-24}.

In this review, we have taken into consideration several papers that explore the distribution of affective temperaments among the general population, and their involvement both in pathological conditions (somatic and psychiatric) and human activities (professions and other occupations), so as to be able to specify, while applying an integrated model, the position of affective temperaments along the continuum between normality and pathology.

Psychometrics of Affective Temperaments

Development of TEMPS-I, TEMPS-A, TEMPS-A[P]

The Temperament Evaluation of Memphis, Pisa, Paris and San Diego (TEMPS), both in its interview and self-questionnaire versions, is based on Akiskal and Mallya's criteria for affective temperaments, validated in an Italian population of 1,010 students aged from 14 to 26 years. Item wording and selection have been performed

through an iterative process that incorporated feedback from clinicians and researchers^{6,12,13}. The interview version of TEMPS (TEMPS-I) is a 20-minute interview usually administered by two psychiatrists. It has been designed to quantify temperament in psychiatric patients and healthy subjects, and includes sections on emotional reactivity, and on cognitive, psychomotor, circadian and social-behavioural traits^{4,5,15}.

The self-questionnaire version of TEMPS (TEMPS-A) is a self-reporting, yes-or-no type of questionnaire formulated on the basis of the same diagnostic criteria as those used for affective temperaments. The first version included 84 items that had been selected to assess dysthymic, cyclothymic, hyperthymic and irritable temperaments. At a later stage, clinical and theoretical considerations led to the addition of 26 new items that were included to account for the anxious temperament, so resulting in the full, 110-item-long version of the TEMPS-A^{25,26}.

Subsequently TEMPS-A has been translated and validated in several languages, both in a short and an extended version. Among the Italian versions of TEMPS-A, there is the special case of TEMPS-A[P], a 61-item auto-questionnaire derived in Pisa directly from the Italian version of TEMPS-I and including the four classical subscales for dysthymic, cyclothymic, hyperthymic and irritable temperaments²⁷⁻³⁰.

To deepen our understanding of the nature of affective temperaments, it would be useful to know how their constitutive traits are distributed among general populations. With respect to biological characteristics, a Gaussian distribution among the general population is usually supportive of their physiological nature. During the validation process of TEMPS-I, this kind of distribution has been confirmed for the depressive, cyclothymic and hyperthymic temperaments, but not for the irritable temperament, which appears to be much less consistent, as demonstrated by the lack of discriminant specificity in exploratory factor analysis, where the irritable traits did not saturate any function. Except for the irritable scale, discriminant analysis has demonstrated the ability of TEMPS-I to classify subjects. With regard to the score obtained by subjects on the hyperthymic scale, it never exceeded the second standard deviation in the Italian population of 1,010 students, and all the traits included in this construct turn out to be highly inter-correlated^{4,5}. It is likely that the hyperthymic temperament is abnormal only in the presence of chronic hypo-

manic symptoms or full-blown mood disorders. The cyclothymic scale appears to be the best defined; the score obtained by subjects on this scale exceeds the second standard deviation in the Italian population mentioned above, and the cyclothymic proves to be completely saturated by its constituent traits. The depressive features exceed the second standard deviation too, and are negatively correlated with the hyperthymic temperament. The exploratory factorial analysis supports Kretschmer's hypothesis of a central underlying cycloid temperament. A four-factor structure emerges, showing on one hand a stable hyperthymic temperament that is negatively correlated with cyclothymia, and, on the other, a central cyclothymic disposition that is closely correlated with the depressive traits. The irritable temperament might be considered to be a variant of the broader temperamental construct of cyclothymia, with coexisting hyperthymic attributes, in line with Kraepelin's conceptualization of a combination of other temperamental traits.

TEMPS-A has been translated into over 25 language versions. American, Argentinian³¹, Italian^{17,18,28,29}, French³², Lebanese^{23,33}, Hungarian²⁰, Japanese³⁴, Portuguese²¹, Brazilian³⁵ and Turkish³⁶ versions have already been validated. A five-factor structure including the four classical temperaments with the recent addition of the anxious subscale has been confirmed in every version. With regard to the Lebanese-Arabic version of TEMPS-A, the strongest correlation was that observed between the anxious and the cyclothymic temperament subscales^{23,33}. With regard to the Turkish Version of TEMPS-A, the anxious temperament has shown some peculiarities. On one hand cognitive anxiety traits have proved to overlap with depressive ones. On the other, a distinct "nervous"-anxious factor has emerged too. Dominant irritable, nervous-anxious and depressive temperaments turned out to be the most common in this population, whereas dominant cyclothymic and hyperthymic temperaments have been shown to be relatively uncommon³⁶. As to the Buenos Aires (Spanish) version of TEMPS-A, the hyperthymic temperament proved to be very uncommon in the general population^{31,37}. Referring now to the Japanese version of TEMPS-A, the factor validity of depressive, hyperthymic, cyclothymic and irritable temperaments has been confirmed, with cyclothymic traits proving to be those best represented in the general population. Moreover Japanese Authors have proposed a new version of the question-

naire, calling it the “Japanese Temperament and Personality (JTP) Scale”; this scale includes the classical subscales, but adds a melancholic and a schizoid type to them. Within this model the traits of the depressive and melancholic types emerge as rather distinct, with the depressive type characterized by interpersonal sensitivity, and the melancholic one characterized by a higher functional efficiency, and the inclusion of others features, such as being perfectionist and work-oriented^{34,38}.

Reliability and Stability (T-retest)

Given that affective temperaments are supposed to be lifelong and early-onset dimensions, the test-retest reliability of TEMPS was evaluated in 206 Italian high school students (aged 14-18). The temperamental traits of students were measured at T0 and T1 (two years later) by means of the interview version of TEMPS (TEMPS-I). Age, sex, psychometric properties, raw scale score, and weighted cut-off (calculated from a specially weighted linear combination of items) were used as predictive variables of stability. Affective temperaments showed a low to moderate level of stability, reaching 60% in the case of subjects with a dominant cyclothymic temperament. The stability of the depressive temperament was primarily related to its weighted cut-off. The stability of the hyperthymic temperament appeared related to male sex, young age, and total scale score. Male gender turned out to be the best predictor of stability for the cyclothymic temperament as well. Unstable depressive and hyperthymic subjects were prevalently reallocated into the dominant cyclothymic group. The irritable construct was the least stable. In summary, TEMPS-I showed considerable fluctuation and instability in depressive and hyperthymic temperaments in mid-adolescence; conversely, the cyclothymic temperament turned out to be the most stable, and for this reason, in referring to cyclothymia, the term “stable instability” is often used¹⁶.

Correlation with Personality Questionnaires (Convergent validity)

Considering the considerable uncertainty found in the current literature about the relationship between personal traits and affective temperaments, the criteria of Akiskal and Mallya have been compared with a few correctly validated instruments for the assessment of personality dimensions, which supposedly overlap with temperaments.

Cloninger's Tri-dimensional Personality Questionnaire (TPQ)

In the Italian population of 1,010 students who participated in the validation of Akiskal and Mallya's criteria for affective temperaments, TEMPS-I has been compared with Cloninger's revised “Tri-dimensional Personality Questionnaire” (TPQ) deriving from the traditions of experimental psychology. As was to be expected, depressive temperament was correlated with a high level of harm avoidance. High scores for novelty-seeking were related both to the hyperthymic and to the cyclothymic temperament. Cyclothymic traits were related both to the harm avoidance and novelty seeking dimensions, in line with Kretschmer's hypothesis of a central cycloid temperament. On a more theoretical plane, hyperthymic novelty seekers should be over-represented among those who have reached a high level of achievement; by contrast, a moody, restless disposition (a cyclothymic-harm avoidant type) should be liable to negative affective arousal. These considerations may shed some light on the origins of socially adaptive behaviour (referred to as belonging to “sunny” or “sanguine” types) on one hand, and borderline conditions typical of anxious-hostile bipolarity (found in “dark” types) on the other³⁹.

Multiphasic Personality Inventory (MMPI)

In a sample of 693 candidates who were applying to become cadets in the Italian Air Force, TEMPS-A[P] has been correlated with the MMPI validity and clinical scales after a stressful challenge represented by the academy entrance trial. MMPI is a self-reporting questionnaire designed to identify personality structure and psychopathology in psychiatric patients and healthy volunteers. As regards MMPI validity scales, TEMPS-A[P] depressive candidates tended to report their symptoms sincerely, hyperthymic candidates tended to give false answers, with the aim of being seen in a good light. Cyclothymic and irritable candidates tended to exaggerate symptoms. As regards the MMPI clinical scales, a low linkage between affective temperaments and abnormal personality traits has been found. From a personological point of view temperaments have proved to belong to the realm of normality rather than to the realm of pathology, in line with their putative adaptive role²⁷.

Occupational Personality Questionnaire (OPO32)

In order to understand the extent to which affective temperaments are adaptive, it would be useful

to know if they influence the work-related abilities of subjects. In a sample of 921 candidates applying to become cadets in the Italian Navy, TEMPS-A[P] has been correlated with Occupational Personality Questionnaire, self-reported version (OPQ32), during a stressful challenge represented by the entrance examination. OPQ32 is a self-reporting personality questionnaire designed to provide information on an individual's preferred behaviour, as assessed in terms of a number of work-related characteristics. Depressive temperament was reported to imply a low level of ability to relate to others; hyperthymic temperament was characterized by high levels of feelings and emotions, and by the capability to relate to people; cyclothymic temperament was distinguished by creativity and a low level of relationships with others; irritable temperament displayed an overlap with cyclothymic temperament, the main difference being the higher level of energy and the lower level of empathy of irritable subjects. The four affective temperaments proved to differ significantly in the work capacity features measured by OPQ32 factors. These observed correlations further support the hypothesis that temperaments belong to the realm of normality rather than that of pathology^{29,40}.

Emotional-Affective State Rating Scale (EAS-RS)

In order to understand the extent to which affective temperaments are adaptive, it would be useful to raise the question of how they influence an individual's emotional and behavioural response to stress. In a sample of 693 candidates applying to become cadets in the Italian Air Force, TEMPS-A[P] scales have been correlated with the emotional-affective state reported by subjects after a stressful situation – the entrance examination to the academy. It is hardly surprising that the hyperthymic temperament on one hand, and the cyclothymic and depressive temperaments on the other, turned out to be distinguished by counter-polar emotional states following the test; these were desirable in the first case and undesirable in the other two²⁷.

Affective Temperaments in Somatic and Psychiatric Pathologies

In the literature, affective temperaments have been reported to correlate with a broad variety of pathological conditions ranging from somatic to

psychiatric disorders, with the latter including not only affective disorders but substance abuse and eating disorders, too.

Somatic Pathology

The idea that affective temperament may have some correlation with somatic pathology is not new. In the literature, in fact, one topic of investigation has been the temperamental profile of patients suffering from several somatic diseases, especially those supposedly related to life style and behavioural patterns. Somatic and psychiatric morbidity might cluster because of reciprocal effects between them, but also as a result of common underlying factors.

Among infective diseases, HIV infection represents, of course, a condition where behavioural risk factors (intravenous drug use and homosexuality) play a crucial role. In an Italian study, HIV patients with index major depressive episode have been compared with seronegative major depressive episode patients by systematically examining rates of DSM-III-R bipolar subtypes and Akiskal's affective temperaments. The most important finding was the significantly higher proportion of HIV patients who had lifetime bipolar II disorder, and associated cyclothymic and hyperthymic temperaments, regardless of HIV risk status. To formulate the question provocatively, premorbid impulsive risk-taking traits associated with cyclothymic and hyperthymic temperaments may have played an important role in needle-sharing drug use and unprotected sexual behaviour, leading ultimately to infection with HIV⁴¹.

Another illness, which has been supposed to be related to affective temperaments, especially in terms of their diagnostic and therapeutic features, is type 2 diabetes mellitus. Among diabetic patients, those with excessive depressive temperament showed a worse psychological adjustment to diabetes, and worse metabolic control⁴², so prompting the idea that depressive temperament may constitute a vulnerability factor to the behavioural and biological outcome of this disease, or even a potential risk factor for its later incidence⁴³. Also, the anxious temperament proved to have an impact on the metabolic parameters of this disease. Among diabetic patients, glycated haemoglobin levels at baseline and at a six-month follow-up were inversely associated with the presence of an anxious temperament. This metabolic outcome was most probably due to the impact of temperament on the glycated haemoglobin at baseline, rather than to the up-

take of self-management behaviours after diagnosis. Markedly anxious temperamental traits have also been associated with an increased likelihood of being diagnosed with a prediabetic condition, and with a poorer quality of life. It is surprising that the same temperamental profile facilitates the early detection of the illness, but not the subsequent behavioural and emotional adjustment to it⁴⁴.

Psychiatric Pathology

Some Authors have stated that temperamental dysregulation may represent the phenotypic expression of the underlying bipolar genotype^{15,45-48}; on the basis of this connection they have explored the role of affective temperaments in pathological conditions such as mood disorders, substance use disorders, and eating disorders.

With reference to mood disorders, it has been shown that affective temperaments influence the clinical features of Bipolar Disorders in terms of both clinical and course characteristics. For example, depressions arising from a cyclothymic temperament, and likely to be misdiagnosed as personality disorders, presented, in 194 patients taking part in a French national multisite study, high familial load for mood disorders, so validating its putative bipolar nature. These patients, characterized as the “darker” expression of the more prototypical “sunny” type-II bipolar phenotype, seem to represent a more “unstable” variant of bipolar disorder⁴⁹. Among 106 bipolar type-I patients of a multicentric Italian study, dominant cyclothymic and hyperthymic subjects reported important differences in terms of gender distribution, family history, number and polarity of previous episodes, hospitalizations, suicidality, rates of comorbid anxiety and personality disorders. These observations are consistent with the hypothesis that affective temperaments, in particular cyclothymia, could be utilized as quantitative, intermediate phenotypes in order to identify genes linked with susceptibility to bipolar disorders⁵⁰. Further evidence has supported the familial, possibly genetic, role of the hyperthymic temperament in the genesis of bipolar I disorder and pure mania, while suggesting a higher specificity of the cyclothymic temperament to the bipolar II subtype and to mixed states⁴⁹⁻⁵³. Affective temperaments have also been shown to influence the pathogenesis of mixed states like mixed mania, as reported in a sample of 104 manic patients during the acute hospital phase.

The reversal from one temperament to an episode belonging to the ‘opposite’ polarity seems to represent a fundamental aspect of the dysregulation that characterizes bipolar disorder. Both men and women possessing a hyperthymic temperament appeared to be protected against depressive symptom formation during a manic episode, which, accordingly, was considered to be relatively ‘pure’. Pure mania appears to be over-represented in men because they show higher scores for the hyperthymic temperament, whereas pictures of mixed mania seem to be more typical of women, consistently with their well-known tendency to experience depression. All this evidence supports the general idea that “mixity” should be conceptualized as an intrusion of mania into its “opposite” temperament, especially in females^{52,53}. More recently, affective temperaments have been explored in a sample of 153 manic inpatients, divided into five groups according to the symptomatological subtype of mania (Depressive, Irritable-Agitated, Euphoric-Grandiose, Accelerated-Sleepless, Paranoid-Anxious). The patients who belonged to the “Euphoric-Grandiose”, “Paranoid-Anxious” and “Accelerated-Sleepless” subtypes were those most likely to present a hyperthymic temperament, while the ‘Depressive’ dominant group had the highest frequency among those with a depressive temperament. The ‘Irritable-Agitated’ group was a frequent finding for both these temperaments. A hyperthymic temperament seemed to underlie the most extreme manic excitement with euphoric-accelerated-paranoid phenomenology. By contrast, the depressive temperament seemed to modify the expression of mania into a depressive-manic phenomenology⁵⁴. Lastly, affective temperaments have been also reported to modulate gender-related differences among bipolar patients. In a sample of 538 subjects with primary mood disorders, females, with respect to males, presented a lower number of hypomanic, and a higher number of depressive, episodes, with a higher rate of comorbid anxiety disorders and somatization. Moreover, they were more likely to exaggerate symptoms and to undergo hospitalization. These gender differences could partly be explained by the higher prevalence of the depressive temperament in women, and of the hyperthymic temperament in men⁵⁵.

With the aim of expanding the boundaries of the bipolar spectrum disorder, the role of temperamental features has also been studied in psy-

chiatric conditions, such as eating disorders, that are not traditionally classified among mood disorders. Recent data have, in fact, indicated a significant clinical, biological and treatment response overlap between eating and bipolar disorders, especially when the soft symptoms of either spectrum disorders are considered. When 107 consecutive patients suffering from a major depressive episode with atypical features were investigated, the patients who did meet the DSM-IV criteria for bulimia nervosa, compared with those who did not, were indistinguishable in terms of all their demographic and most of their psychopathological and clinical features (including bipolar I and II), but showed significantly higher frequencies in lifetime comorbidity for Narcissistic, Histrionic, Borderline and Dependent personality disorders as well as in that for Cyclothymic temperament. They also scored higher on reactivity of mood and interpersonal sensitivity. Cyclothymic temperament and related mood reactivity and interpersonal sensitivity accounted for much of the relationship between Atypical Depression and Bulimia Nervosa. Narcissistic, histrionic and borderline traits, too, seemed to be related to the presence of a cyclothymic disposition. Taken as a whole, these data support the hypothesis that places Bulimia Nervosa in the “ultra-soft” bipolar realm⁵⁶.

Substance Abuse Disorders

Given the generally accepted link between substance use disorders and bipolarity⁵⁷⁻⁶⁵, affective temperaments have been studied in heroin addicts, alcoholics, and cocaine abusers.

With regard to heroin addiction, which provides a paradigm for addictive disorders, the temperamental traits of 59 consecutive stabilized methadone-treated heroin addicts were compared with those of 58 healthy volunteers sharing similar social and regional demographics. Cyclothymic temperament, and, to a lesser extent, irritable traits (the “dark side”), were reported to provide the most representative temperamental profile for heroin addicts⁶⁶. As to alcohol abuse, ninety-four consecutive alcoholics then responding to treatment were compared, with reference to their affective temperaments, with 50 healthy volunteers who displayed the same social characteristics and belonged to the same environment. Alcoholics were distinguished from controls in terms of cyclothymic traits, including a depressive component. These characteristics tend to cohere with previous conceptualizations hypothe-

sizing “sensation-seeking” and “novelty-seeking” dimensions as the main personality characteristics of addiction⁶⁷. In order to understand whether the prevalence of cyclothymic traits among heroin addicts and alcoholics was due to the co-occurrence of a full-blown bipolar disorder, in the two papers just mentioned the Authors compared the temperamental traits of dual diagnosis patients with those of patients without a dual diagnosis. The cyclothymic disposition was unable to differentiate these two groups of patients, prompting the idea that the importance of cyclothymia in addictive disorders is unrelated to the presence of dual diagnosis^{66,67}.

Temperaments have been evaluated too in the field of stimulant abuse, with the aim of outlining the nature of a hypothesized stimulant bipolar spectrum. Among abusers of stimulants, cyclothymic and hyperthymic traits have proved to precede by years the use of stimulants, which seemed to serve the purpose of maintaining the subthreshold that brings the reward of mood elation. This seems to corroborate a bipolar-stimulant spectrum where subthreshold bipolar traits are complicated by the abuse of stimulants, eventually leading to new pathological features in both disorders⁶⁸.

Affective Temperaments and Emotional-Behavioural Problems in Childhood

Since affective temperaments are considered stable, subclinical forms of the manic-depressive illness, we can hypothesize that their early manifestations can be observed in childhood or adolescence. Starting from this hypothesis, the correlation between affective temperament and emotional-behavioural problems has been assessed in a juvenile population of 1,010 students without major psychiatric disorders. The depressive temperament turned out to be a construct that partly overlapped with behavioural inhibition, while extremes of emotionality and behaviours occurred preponderantly in children who showed cyclothymic traits. In particular, cyclothymic subjects have reported the highest rates of anxiety-sleep disorders and sensitivity to separation, in addition to eating disorders in females and anti-social-aggressive behaviour in males. These data support the idea that the cyclothymic disposition is the most ‘morbid’ temperament, as it is associated both with internalizing and externalizing disorders⁶⁹.

Affective Temperaments and "Goodness of Fit"

The concept of matching temperament with learning styles to create a "goodness of fit" as proposed by Thomas and Chess (1977)⁷⁰ is summarized by the Authors as follows: "*Stated briefly, there is a goodness of fit when the person's temperament and other characteristics such as motivation and levels of intellectual and other abilities, are adequate to master the successive demands, expectations, and opportunities of the environment*".

In order to understand the extent to which affective temperaments are adaptive, the first issue that arises is how they influence the quality of life. A multicentric Argentinian study has assessed, among clinically unaffected relatives of bipolar patients, the prevalence of affective temperaments and their impact on the quality of life. Compared with controls, the relatives of bipolar patients showed higher scores on all TEMPS-A subscales, except for the hyperthymic subscale. Only in the case of hyperthymic subjects was the quality of life equal to that of controls, a finding that further qualifies hyperthymia as the most adaptive temperamental subtype⁷¹.

Affective Temperaments and Professional Choice

Affective temperaments have also been explored in a broad range of human activities, with the purpose of identifying the temperamental profile of specific professional fields.

Professional Choice in Outpatients

Temperamental traits have been assessed in a sample of 263 psychiatric outpatients involved in several professional fields. Dysthymic and obsessional attributes were notable in lawyers and physicians. Cyclothymia seemed to be the dominant affective temperament of artists and architects, while hyperthymic temperament appeared to play a central role among managers, self-made businessmen and journalists. The role of cyclothymic and hyperthymic temperaments turned out to be distinguished by obsessional traits. In particular, artists' creativity was 'liberated' by low levels of obsessive traits, whereas among architects, relatively high levels of obsessive traits contributed to the execution of their work. Journalists, as a group, showed that they possess the broadest representation of affective temperaments⁷².

Professional Choice in Student Populations

In order to assess the role of affective temperaments in determining personal choices and aspirations, the temperamental profile of 1,386 students aspiring to enter different professional fields has been described. Future physicians failed to show any predominant temperament, whereas future lawyers and artists predominantly revealed a cyclothymic or irritable temperament, future engineers showed a hyperthymic temperament and, future psychologists and nurses displayed predominantly depressive and anxious temperaments⁷³.

Professional Choice in Applicants

We have recently studied the temperamental traits of 1,548 candidates applying to become a cadet officer in the Italian Air Force. Extremely high scores on the hyperthymic scale combined with extremely low ones on the cyclothymic scale seemed to correspond to the specific temperamental profile of young applicants, and to the highest likelihood of success. Those who took the entrance examination proved to be more hyperthymic than their peers, and the specificity of this correlation was confirmed by the fact that applicants who made a second attempt to pass the entrance examination after an initial failure were more hyperthymic than first-time applicants. In addition, success in specific psychological admission tests was related to the same temperamental profiles, since those who proved to be psychologically fit were more hyperthymic²⁷. In another study carried out on the Italian Air Force we inquired into the question whether gender differences in temperament have continued unchanged in a field – specifically, that of a military career – that has been historically characterized by a male identity. In the general population, males and females have shown different temperamental profiles. As a matter of fact, over the past fifty years in the Western world the professions and activities that were once practised only by males, are now available to females, too. Among our aspiring cadets, both males and females showed high scores on the hyperthymic scale (in general, a typically male temperament) and very low ones on the cyclothymic scale (generally, a typically female temperament). Low scores were also observed on the depressive and the irritable scales. These observations support the idea that the differences observed in gender-related temperaments are functional to the differentiation between the roles played by males and females during the bio-

logical and social evolutionary process⁷⁴. In another study we extended our investigation to another military service – the Italian Navy. We compared temperaments between those who had applied to become a cadet officer in the Italian Air Force or in the Italian Navy, with special reference to gender differences and the ability of the two types of applicants to pass the psychiatric examination for admission. Hyperthymic traits were well represented in both these armed services. Navy applicants differed from Air Force applicants in obtaining higher depressive, cyclothymic and irritable scores. Navy applicants who passed the psychiatric entrance examination showed the same prevalence of hyperthymic temperament as their Air Force counterparts, but higher depressive, cyclothymic and irritable scores³⁰. Hyperthymic temperament turns out to represent the temperamental profile of those who aim to become a cadet officer in two of the Italian armed forces (the Air Force and the Navy).

To enter a particular professional field, personal aspirations and attitudes are not the only features that are required, and other professional skills might be necessary. To date, there is an unjustified lack of data on the correlation between temperamental profiles and the ability to pass examination tests. In order to fill this gap we tested correlations between affective temperaments and step-by-step results during the entrance examination of 921 applicants to become a cadet in the Italian Navy. Hyperthymic temperamental traits proved to be important not only in choosing a profession, but also in passing entrance examinations. Nevertheless, affective temperaments (high scores for hyperthymic and low ones for cyclothymic, depressive, irritable traits) successfully predicted only the results of psychiatric examinations and, to a lesser extent, the results of medical exams and aptitude tests. Passing the high school-leaving exam and passing mathematical exams proved to be skills independent of temperamental traits, and seemed to be influenced by personal skills that were not strictly related to temperaments (unpublished data). These data corroborate the hypothesis that hyperthymic traits bring distinct advantages in a professional field such as a military career, which is closely related to leadership.

Discussion

Affective temperaments have been reported to display an important pathoplastic action on a

wide range of diseases, extending far beyond the field of affective illness. In particular, temperamental traits have been shown to influence not only psychiatric but also somatic diseases, and this tendency is further confirmed when temperaments are measured with instruments other than TEMPS.

In connection with somatic diseases, an interesting study carried out on a very large cohort of psychiatric patients suffering from a wide range of somatic diseases, concluded that neuroticism, which is suggestive of a cyclothymic temperament, has proved not only to raise the risk of psychiatric disorders but also, regardless of whether manifest psychiatric disorders have developed, of a broad spectrum of chronic somatic diseases⁷⁵. Taking into account surgical pathologies, temperamental traits were reported to influence children's behavioural recovery after surgery, and adults' capability to cope with traumatic injuries. Among children undergoing tonsillectomy and adenoidectomy, an inhibited temperament was found to predict postoperative sleep disorder, which seems to affect recovery following surgery⁷⁶. Among adults admitted to a hospital less than 8 h after a car accident, lower scores than controls reported on a harm avoidance scale, together with high scores for self-directedness and cooperativeness – a temperamental profile suggestive of a hyperthymic temperament – corresponded to a high capability to cope with somatic problems⁷⁷. Neuroticism and negative emotionality have also been shown to represent a risk factor for the development of the metabolic syndrome. Essential parameters of the metabolic syndrome have been examined in healthy children. As a result, mental vitality and positive emotionality, which seem to be supportive of a hyperthymic temperament, were related to a low somatic risk level, whereas hyperactivity, negative emotionality, responsiveness to others, and cooperativeness, which seem to reflect a cyclothymic or depressive disposition, were related to a high level of somatic risk⁷⁸. The relationship between affective temperaments and psoriasis has been investigated too, with similar results. Patients suffering from psoriasis have shown a distinctive temperamental profile, represented by significantly higher scores for harm avoidance and lower scores for self-directedness, compared with controls⁷⁹.

These observations, consistently with those carried out on infective and metabolic diseases by means of TEMPS criteria, support the idea

that a hyperthymic temperament might increase subjects' ability to cope with somatic diseases, while a cyclothymic disposition, which is situated closer to neuroticism, might impair emotional and behavioural adaptation to the same diseases. Affective temperaments seem to be involved with the course of somatic illness at different levels, as they influence diagnostic and therapeutic features and have an impact on emotional and behavioural adjustment after diagnosis, ultimately leading to differences in incidence and outcome.

With regard to psychiatric diseases, the boundaries of bipolarity have been expanding over the past decade, with affective temperaments playing a central role in defining the new, softer expressions of bipolarity. On the basis of the demonstrated clinical validity of these expressions, a broader concept of soft bipolarity has been proposed, of which an increasing portion consists of the softest expressions of bipolarity, which are intermediate between bipolar disorder and normality⁸⁰. When temperamental traits have been measured among euthymic bipolar patients by applying Cloninger's criteria, persistence, self-directedness, and cooperativeness had significantly lower scores, and harm avoidance and reward dependence had significantly higher ones than those recorded for controls^{81,82}. We previously mentioned that, according to Akiskal and Mallya's criteria, two different subtypes of bipolar disorder can be considered separately, one arising from the cyclothymic temperament, and the other from the hyperthymic one. This temperamental dichotomy is only partly confirmed by Cloninger's criteria, which, with regard to the novelty-seeking dimension, did not reveal any significant differences between patients and controls, in line with the adaptive nature of the hyperthymic temperament. Conversely, when TPQ dimensions are used to differentiate depressed unipolar patients from bipolar patients, the latter proved to be significantly more novelty-seeking and less harm-avoidant than the former – a temperamental pattern that appears to be closer to that reported by applying Akiskal and Mallya criteria⁸³. In addition, in the field of eating disorders, temperaments have been investigated with instruments other than TEMPS, and, especially for bulimia nervosa, the current evidence indicates a personological profile that shows a good fit with the fundamental traits of the cyclothymic temperament, including impulsiveness, anxiety and a tendency towards dyscontrol⁸⁴.

If we consider the wide range of psychiatric disorders, it can be stated that, while both hyperthymic and cyclothymic temperamental dysregulation are involved in the pathogenesis of mood disorders, in eating disorders, especially the bulimic subtype, a central role is played by the cyclothymic temperament.

With regard to substance abuse disorders, we previously mentioned the crucial role of Akiskal and Mallya's cyclothymic temperament, because of its feature of proneness to addictive disorders. Among urban, northern Italian high school students, higher sensation-seeking, the impairment of the ability to cope socially, direct aggressiveness and poor school achievements – usually typical of a cyclothymic disposition – have been found to be associated with illicit drug use and alcohol abuse⁸⁵, in line with what has been observed by applying TEMPS criteria. The influence of temperament on substance abuse has also been investigated among schizophrenics, who revealed a significant correlation between Cloninger's novelty-seeking dimension and the use of alcohol, cannabis, and nicotine, so suggesting that novelty-seeking type behaviours contribute to substance use in psychotic patients, too⁸⁶. One result has been that the association between substance use disorders and temperamental characteristics has been investigated among hospitalized patients with mood disorders or non-affective psychotic disorders. A lifetime history of alcohol and cannabis misuse was independently associated with having higher scores for sensation-seeking traits. These findings suggest that sensation-seeking and impulsivity are temperamental characteristics that probably favour substance use, independently of categorical diagnoses⁸⁷. After adopting the hypothesis of a continuum between use, abuse and addiction, we wondered if the link bipolarity-substance abuse could be extended from illegal substances of abuse to recreational ones, with special reference to social drugs (caffeine, nicotine and chocolate). We evaluated the social drug habits of patients suffering from mood disorders, according to DSM-IV-R criteria (major depressive episode, recurrent depression, bipolar type 1 and type 2 disorders, and depression not otherwise specified). The same patients were also divided into bipolar or not bipolar subgroups according to inter-episodic clinical features assessed by means of Angst criteria, a correctly validated instrument which proposes a broader concept of soft bipolarity, comprising both the spectrum of bipolar dis-

orders proper, and other soft expressions of bipolarity intermediate between bipolar disorder and normality^{80,88,89}. Only Angst criteria were able to predict a greater use of social drugs, so confirming that the attenuated phenotypes of bipolarity are not of secondary importance among the entire range of bipolar expressions⁹⁰.

If we take into account the wide field of substance abuse disorders, the cyclothymic disposition seems to represent a crucial dimension in determining proneness to addictive diseases, thus favouring exposure to substances of abuse (the novelty-seeking and sensation-seeking dimensions), and facilitating addictive processes (impulsiveness, motivation and reward alteration, anxiety, lack of control, lack of resiliency to stress). Moving now from drug addiction to drug abuse, a minor but still considerable role of the hyperthymic temperament emerges in the field of stimulant drugs. In the case of social drug habits, too, a greater use of coffee, chocolate and tobacco seems to be favoured by sub-threshold affective traits, independently of the temperamental type involved. We propose that, beyond the relationship between cyclothymia and addiction, with regard to use and abuse behaviours, both cyclothymic and hyperthymic temperaments, especially when extreme, seem to display a favouring effect.

We mentioned earlier that, within a juvenile population, affective temperaments, in particular the cyclothymic temperament, have been associated with emotional-behavioural problems in both genders. This association has been widely confirmed by the current literature, which, according to models other than TEMPS, has defined temperamental characteristics as predictors of behaviour disorders in children. In particular, a longitudinal relationship has emerged between temperament traits in the third year of life and behavioural adjustment at school entry⁹¹⁻⁹⁸.

Affective temperaments have been reported to influence the quality of life of bipolar patients' relatives, with a positive impact displayed only by hyperthymic temperament. When the association of temperaments with psychopathology and wellness was investigated in children of the North-Eastern United States, by applying Cloninger's criteria, subjects with a low level of novelty-seeking but a high level of persistence ("steady subjects") showed better functioning and lower levels of psychopathology, whereas subjects with higher scores for novelty-seeking and harm avoidance, but lower ones for reward

dependence and persistence ("disengaged subjects") – personality traits supportive of a cyclothymic temperament – showed the opposite associations⁹⁹. Temperament and character traits and health-related quality of life, have also been evaluated in patients with cancer, by three Italian oncology departments. Lower levels of harm avoidance and higher levels of self-directedness – features suggestive of a hyperthymic temperament – were significantly correlated with a better quality of life, in line with the adaptive nature of this temperamental type¹⁰⁰.

If we take into consideration the global impact of affective temperaments on the quality of life of subjects, a dichotomy can be confirmed between the hyperthymic temperament, which has been shown to improve the quality of life, and the cyclothymic temperament, which has been shown to decrease it. These effects have been observed both in healthy subjects and in patients suffering from a wide range of somatic diseases, and could, to some extent, be mediated by the vulnerability to stress that is related to the hypothalamic-pituitary-adrenal axis reactivity, which has been reported to be lower in subjects with low scores on harm avoidance, and higher in subjects who have high scores on self-directedness and harm avoidance¹⁰¹.

In summary, it can be stated that affective temperaments have been shown to influence people's lives, both in the field of pathology and in that of normality.

In the field of pathology there is growing evidence to suggest that affective temperaments not only display a crucial effect on the pathogenesis of mood disorders, but also have an impact on proneness to non-affective diseases, even in patients who are not strictly bipolar. Among full-blown affective disorders the central role of cyclothymia should be recognized; it has, in fact, been proposed that quantitative, intermediate phenotypes of cyclothymia allow the identification of genes that indicate susceptibility to bipolar disorders. It is also worth mentioning the involvement of the hyperthymic temperament in the pathogenesis of pure mania. However, outside the boundaries of mood disorders as such, the hyperthymic temperament seems to be an adaptive and desirable condition, which allows for hyperadaptation to somatic diseases, whereas the cyclothymic temperament seems to increase the risk of substance abuse and eating disorders, and to imply difficulty in adapting emotionally and behaviourally to somatic diseases.

In the field of normality, all the temperamental types display some impact on the life of subjects, by influencing personal skills and professional choices. In this case too, however, the hyperthymic temperament has proved to be the most adaptive; it is distinguished by a better quality of life, a reduced reactivity to life stressors, and a greater ability to relate to others.

Conclusions

Far from being intrinsically pathological conditions, affective temperaments seem to be adaptive dispositions whose dysregulation can lead to full-blown affective pathology. All the temperamental types display some impact on the life of subjects, by influencing personal skills and professional choices in the broad range of human activities. Affective temperaments are not problematic when they appear in a mild form, but when they take an extreme form, we have observed a gap between the hyperthymic temperament, which must be considered the most functional and desirable, and the cyclothymic, depressive, irritable and phobic anxious ones, which are closer to mood, anxiety and substance use disorders, and imply difficulty in adapting emotionally and behaviourally to somatic diseases and life stressors.

Conflict of Interest

None.

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