Assessment of Personality in Psychosomatic Medicine: Current Concepts

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Abstract

The notion that personality variables can affect vulnerability to specific diseases has been widely promoted in psychosomatic medicine. Over the time, some personality patterns have been extensively studied. Among them, alexithymia, type A, and type D personality are the most relevant. However, also temperament and character has increasingly been object of studies. Alexithymia is currently recognized as a risk factor for medical, psychiatric, or behavioral problems; type A personality is recognized to increase the risk for coronary artery disease, and type D personality has been related to adverse cardiac events and cardiovascular outcomes. The growing interest and clinical role of the personality constructs in psychosomatic medicine has been favored by the revolutionary understanding that personality factors are not causes of medical disease but their moderators/mediators, and by the decline of the psychometric distinction between state and trait. Indeed, it is nowadays recognized that psychological constructs traditionally conceived as trait dimensions may surprisingly display sensitivity to change in specific clinical situations. Assessing personality, thus, has become worth pursuing since it may give unique information about individuals with medical conditions and contribute to completely understand medical patients and their global health as well as formulating optimal decision-making and treatment planning. In this framework, the present chapter has the aim to provide insight into personality dimensions in psychosomatic medicine and describe the main instruments to assess it.

The notion that personality variables can affect vulnerability to specific diseases was prevalent in the first phase of the development of psychosomatic medicine (1930–1960). Thereafter, this notion declined together with the prospects for psychosomatic medicine itself. In the last decades, changes in medicine provided a basis for an alternate approach to psychosomatic medicine [1]. Contributing to this process was the recognition of limitations of the narrow biomedical model and the emerging role of the biopsychosocial model of illness [2]. In this new psychosomatic perspective, personality received a relevant role.
Over the time, some personality patterns have been thought to be strictly linked to somatic illness and have been extensively studied. Moreover, new personality constellations have been developed attracting the attention of many researchers worldwide. One of the seminal personality constructs in psychosomatic medicine is undoubtedly alexithymia; one of the most influential constructs has certainly been type A personality, and one of the most promising constructs for the next years is type D personality.

The popularity of alexithymia in psychosomatic medicine has been highlighted by many authors. It has been conceived as a deficiency in the cognitive processing of emotions, which is not specific to psychosomatic disorders but it is currently recognized as a risk factor for medical, psychiatric, or behavioral problems that are influenced by difficulties modulating arousal, appropriately expressing or suppressing emotions, employing fantasy, and obtaining and using social support [3].

Type A personality has become a classic construct in psychosomatic medicine and indicates a ‘specific emotion-action complex’ of individuals aggressively committed to struggle to achieve more and more in less and less time [4]. Many data have accumulated, particularly in cardiology, according to which subjects with a type A personality might have an increased risk for coronary artery disease if compared to subjects without such personality characteristics.

Type D personality, a general propensity to distress that is defined by high scores on the ‘negative affectivity’ (NA) and ‘social inhibition’ traits, is increasingly studied, and a growing literature shows that it is related to adverse cardiac events and, being characterized also by a general propensity to psychological distress, to cardiovascular outcomes.

In general, the above-mentioned personality constructs, together with additional emerging ones, have earned a growing interest and an increasing clinical role in psychosomatic medicine. Their assessment has become worth pursuing because it can give unique information about individuals with medical conditions that traditional medical methods cannot reveal [5].

In this framework, the present chapter has the aim to provide insight into the assessment of personality dimensions in psychosomatic medicine as a contribution to the understanding of medical patients and their global health. The main instruments to assess personality in psychosomatic settings will be described to encourage their use in daily clinical practice.

Alexithymia

The term alexithymia literally means ‘lacking words for feelings’ and was coined to describe certain clinical characteristics observed among patients with psychosomatic disorders who had difficulty engaging in insight-oriented psychotherapy [6]. Alexithymic patients demonstrate deficiencies in emotional awareness and
communication and show little insight into their feelings, symptoms, and motivation. When asked about their feelings in emotional situations, they may experience confusion (e.g. ‘I don’t know’), give vague or simple answers (e.g. ‘I feel bad’), report bodily states (e.g. ‘my stomach hurts’), or talk about behavior (e.g. ‘I want to punch the wall’).

The alexithymia construct was originally conceptualized by Nemiah et al. [7] as encompassing a cluster of cognitive traits including difficulty identifying feelings and describing feelings to others, externally oriented thinking, and a limited imaginal capacity. This original view of alexithymia has been the most influential in contemporary theory and research [3]. An alternative conceptualization, that alexithymia is a global impairment in emotional processing resulting in limited emotional expression and recognition, has been less influential thus far [8]. Yet, both definitions agree that alexithymia is a deficit, inability, or deficiency in emotional processing rather than a defensive process, and this deficit view is gaining increasing support from basic laboratory and neuroimaging research [9, 10]. For more details on alexithymia conceptualizations, see Taylor [11].

Alexithymia was first described in people with psychosomatic disorders, and subsequent research has confirmed elevated levels of alexithymia in people with rheumatoid arthritis, essential hypertension, peptic ulcer, and inflammatory bowel disease [3]. Yet, studies have found elevated alexithymia in patients with a range of other conditions (e.g. cardiac disease, noncardiac chest pain, breast cancer, diabetes, chronic pain, eating disorders, substance dependence, kidney failure, stroke, HIV infection, fibromyalgia). The growing recognition that alexithymia is not specific to psychosomatic disorders has led to the view of alexithymia as a risk factor for those medical, psychiatric, or behavioral problems that are influenced by disordered affect regulation [3, 12]. Indeed, alexithymia has been associated with a failure to use adaptive affect regulation processes such as modulating arousal, appropriately expressing or suppressing emotions, employing fantasy, obtaining and using social support, tolerating painful emotions, cognitive assimilation, and accommodation. Evidence shows that the alexithymic deficit in processing feelings is likely to affect mental and somatic health through behavioral actions as ways to regulate affective states (e.g. alcohol abuse, eating behaviors), psychopathology directly related to emotional dysregulation (e.g. somatoform disorder, panic disorder), posttraumatic shutdown of emotions (e.g. posttraumatic stress disorder, acute reactions to severe organic diseases), altered autonomic, endocrine, and immune activity (e.g. vulnerability to inflammatory processes), somatosensory amplification, health care-seeking behavior, and negative treatment outcomes [13, 14]. More recently, treatment studies on alexithymia showed, for instance, that it is not appropriate to assume that alexithymic patients have reservations about entering into a psychotherapeutic treatment [15] and that cancer patients may benefit from a multicomponent psychological intervention in terms of cancer pain and alexithymia [16]. Similarly, prognostic studies showed that lower levels of childhood sexual abuse decreased the risk of being highly alexithymic,
thus reducing the likelihood and severity of depression [17], that the presence of alexithymia at the time of the percutaneous transluminal coronary angioplasty in coronary heart disease (CHD) patients is a unique significant psychological predictor of poorer physical functioning at 6 months [18], and that alexithymia is a strong risk factor for all-cause 5-year mortality in hemodialysis patients [19].

Several methods have been developed to measure alexithymia, including structured interviews, self-report scales, by proxy information, and the Rorschach. Currently, the most commonly used method is the 20-item version of the Toronto Alexithymia Scale (TAS-20), a self-report questionnaire. Extensive validation, replication of the factor structure in several languages and countries, short administration time, and ease of use have been among the reasons why the TAS-20 has become the reference standard for measuring alexithymia in several psychiatric and medical settings [14].

**The Structured Interviews**

The original method of assessing alexithymia was to make judgments after clinical interviews. Three interview-based alexithymia assessment approaches have been described.

First, several decades ago, Sifneos [20] recognized the need to rate alexithymia reliably and created the Beth Israel Hospital Questionnaire (BIQ), which consists of items that are rated dichotomously by a clinician. This measure was subsequently modified to become a 12-item rating scale which assesses both the lack of emotional awareness and the tendency for operational thinking [21]. Several studies have used the original or the modified BIQ as the criterion against which other alexithymia measures have been validated, perhaps because the BIQ captures the original, clinically based manifestations of alexithymia [21, 22]. Yet, the BIQ is not widely used, probably because of the challenges of training, the time needed for an interview, the lack of a standardized interview to elicit the information, and problems in obtaining acceptable inter-rater reliability. Moreover, even the modified BIQ is still rarely used probably because, although the preliminary findings were promising, studies are still needed to evaluate its reliability and construct validity (for details on the BIQ modified version, see online suppl. appendix A). Similarly, further scales have been proposed (e.g. the Alexithymia Provoked Response Questionnaire; the Karolinska Psychodynamic Profile) [23, 24], but they have been rarely used.

Second, alexithymia has been included in the set of psychological clusters described by the Diagnostic Criteria for Psychosomatic Research (DCPR) [25–28] (for details, see chapter 9).

As described in chapter 9, the DCPR have consisted not only of diagnostic criteria but also of a structured interview [29]. The ‘diagnosis’ or classification of alexithymia according to the DCPR can be made with high inter-rater reliability [30] and correlates well with self-reported alexithymia [31, 32]. As expected, a high rate of alexithymia,
according to the DCPR criteria, has been found in several settings, including oncology (26%) [33], functional gastrointestinal disorders (48%) [34], frequent attenders in primary care (38%) [35], consultation liaison psychiatry (25%) [36], and eating disorders (27%) [37].

Third, the Toronto group developed a standard set of items to rate alexithymia in an interview-based format. The 24-item Toronto Structured Interview for Alexithymia [12] has a four-factor structure and correlates modestly with self-reported alexithymia ($r = 0.36$). By far, the Toronto group also developed self-report scales which have been much more used than the structured interview and will be described below in detail.

By Proxy Information

A different approach to assess alexithymia is to obtain reports or ratings of collaterals or significant others. Two promising observer alexithymia measures – the Twelve-Item Modified Beth Israel Hospital Psychosomatic Questionnaire [3] and the California Q-set Alexithymia Prototype (CAQ-AP) [38, 39] (which can be either self- or observer administered) – are time consuming and, for some raters, difficult to complete. Thus, they have been rarely used.

A third observer measure is the 33-item Observer Alexithymia Scale (OAS) [40]. It was developed on the assumption that alexithymia manifests in features (i.e. lack of insight, distance, somatizing, lack of humor, rigidity) that can be reliably reported by those who know the target person well, such as family members, friends, or therapists. Item content was taken from the CAQ-AP definition of alexithymia [39]. In CAQ-AP terms, the prototypic alexithymic person has difficulties experiencing and expressing emotion, lacks imagination, and is literal, socially conforming, and utilitarian. He or she is not insightful, is humorless, has not found personal meaning in life, and anxiety and tension find outlet in bodily symptoms. The OAS taps five alexithymic features: (a) distant (unskilled in interpersonal matters and relationships); (b) unsightful (lacking good stress tolerance and insight or self-understanding); (c) somatizing (having health worries and physical problems); (d) humorless (colorless and uninteresting); (e) rigid (too self-controlled). One of the OAS’s greatest strengths is that it is an observer report with ordinary language items accessible to both clinical judges and a (target) person’s acquaintances or relatives [41].

The reliability and validity of the OAS have been examined for people in clinical and nonclinical settings. Clinical reliability and validity data are similar to the initial data for those in nonclinical settings: total and subscale scores are reliable, and the five-factor structure is stable [40, 41]. This measure has been shown to correlate highly with the modified BIQ ($r = 0.69$) when both measures were completed by the same therapists about the same patients [22]; it also differentiates clinical from nonclinical cases [41], and predicts a lack of interference on the emotional Stroop Test [42]. According to some authors [20], however, this relatively new measure has not
been tested enough, so its validity for predicting criteria of clinical relevance is unknown. Furthermore, it has been argued that the scale assesses some features that are not part of the core of alexithymia, but rather are observed behaviors that are correlated with alexithymia, such as lack of humor, somatizing, and rigidity [14]. Finally, its insufficient inter-rater reliability compromises its use for clinical and research purposes [43] (for details on the OAS, see online suppl. appendix A).

Projective Tests

In addition to interview-based or collateral ratings of alexithymia, indices from projective tests, particularly the Rorschach Inkblot Test, have been explored as a measure of the alexithymic deficits in imagination, creativity, symbolism, and affect regulation.

The Rorschach seems to be an appropriate method for evaluating alexithymia because of its multifaceted nature. It is a broadband personality assessment instrument able to evaluate a number of psychological aspects that are included in the construct of alexithymia such as cognitive style, cognitive processing of perceptual stimuli, affective dimensions, ability to tolerate and control stress, and interpersonal representations [5, 44].

Several studies have investigated the assessment of alexithymia by the Rorschach. There have been two main approaches: group comparisons in which at least one group is expected to exhibit alexithymia (e.g. psychosomatic patients), and comparison with self-report measures of alexithymia. However, findings have been mixed and difficult to interpret given many methodological problems [45, 46]. Notwithstanding this, Acklin [47] argued that some Rorschach scores may represent the core features of alexithymia, indicating deficiency in fantasy life, reasoning, mature object relationships, and availability of emotional resources in coping and adaptation.

The Comprehensive System (CS) [48] is the most commonly used Rorschach scoring system and has shown excellent psychometric properties. Several indices from this system have been proposed, such as low response productivity and low human movement suggesting poor fantasy ability, low numbers of blends suggesting concrete thought, and limited use of color indicating reduced affectivity. A few studies have found that these indices are related to illness [49, 50] and obesity [51]. Moreover, Porcelli and Mihura [44] developed the Rorschach Alexithymia Scale to be used with protocols scored with the CS [48]. The authors clustered the CS variables into 3 variables: the percentage of pure form, the Coping Deficit Index, and the Popular responses. The three CS variables showed large associations with the TAS-20. The Rorschach Alexithymia Scale showed excellent diagnostic accuracy (hit rate of 92%, sensitivity of 88%, specificity of 94%, and area under the curve of 0.96); thus, it was suggested to be used as a reliable integrative tool in a multi-method assessment approach to measure alexithymia (see online suppl. appendix A).
Self-Report Instruments

The self-report measures of alexithymia are the instruments which have been most largely used in the last decades. However, investigations in this field have been hampered by problems [52]. For example, several instruments (e.g. the Schalling-Sifneos Personality Scale, the Revised Schalling-Sifneos Personality Scale, the Minnesota Multiphasic Personality Inventory (MMPI) Alexithymia Scale, and the Thematic Apperception Test) have been shown to lack adequate reliability and validity, to have been developed without concern for construct validation and with virtually no consideration of standards of set construction [52, 53]. Thus, the Toronto Group developed a new self-report measure using a common empirical and rational method of scale construction. Initially, they proposed a 26-item TAS [54], which demonstrated good internal consistency and test-retest reliability, and a 4-factor structure theoretically congruent with the alexithymia constructs: difficulty identifying and distinguishing between feelings and bodily sensations (F1), difficulty describing feelings (F2), reduced daydreaming (F3), and externally oriented thinking (F4). Convergent, discriminant, and criterion validity of the TAS were also demonstrated [55]. Thereafter, Bagby et al. [21] developed the TAS-20 in an attempt to surmount the psychometric shortcomings of the original TAS and to improve upon an earlier revision of the scale (the TAS-R).

The TAS-20 is a self-report scale traditionally seen as consisting of three factors mirroring three of the most prominent clinical characteristics of alexithymia: difficulty identifying feelings (DIF), difficulty describing feelings (DDF), and externally oriented thinking (EOT). Although alexithymia scores are continuous, this measure has an empirically-derived cut score that identifies people who are alexithymic.

The TAS-20 is the best validated and most commonly used measure of alexithymia, and studies using it have contributed substantially in accumulating data supporting its validity to predict basic emotional processes and clinical criteria and its excellent factorial stability across different languages and cultures [56]. However, although all authors concluded that the original three-factor structure could be replicated satisfactorily, in all studies about half or more of the EOT items had very low factor loadings. The factor EOT seems also problematic from another perspective. Its internal consistency tends to be unsatisfactorily low (range: 0.45 < Cronbach’s α < 0.76), and the individual factors (DIF, DDF, and EOT) were found to correlate positively with one another, which has been interpreted as these factors being interrelated aspects of the alexithymia construct. In particular, DIF and DDF were found to correlate strongly (r = 0.43–0.80). The correlations of these two with EOT are smaller and more variable (r = −0.06–0.51 and r = −0.03–0.59, respectively). This is probably partly due to the low internal consistency of the EOT scale. Because of all these shortcomings, Kooiman et al. [57] recommended to use the TAS-20 for the assessment of alexithymia in empirical research in combination with other instruments and not to use it in clinical practice. More recently, Gignac et al. [58] evaluated 335 nonclinical
individuals, and found that the TAS-20 measures a global alexithymia factor and that
the commonly utilized subscales of the TAS-20 suffered from very low levels of internal concept and reliability. Bagby et al. [59] commented on this issue, suggesting
that it was premature to dismiss the wide body of results obtained worldwide on the basis of findings from a single sample. However, as we stated above, this was not the only criticism to the scale.

An increasingly used self-administered instrument is the Levels of Emotional Awareness Scale [60], in which participants write responses to 20 interpersonal scenarios that would typically elicit affect. Responses are coded based on a neo-Piagetian affective developmental scheme in which a lack of emotional answers obtains few points, basic emotions yield more points, and blends of emotions and differentiation of self from other yield the highest points. The LEAS has been tested in a number of experimental studies and predicts emotion-related criteria, such as the ability to identify emotions and physiological and brain activation in response to emotional stimuli [61]. Some studies suggested that it predicts clinical improvement of psychosomatic patients in psychodynamic treatment and differentiates eating disorder patients from healthy people [62, 63]. Although the construct measured by the LEAS may be partially independent from alexithymia, it appears that the LEAS has some clinical validity [14].

A relatively new self-report measure, the Bermond-Vorst Alexithymia Scale (BVAQ) [64] covers many of the same characteristics as the TAS-20, but the authors purported that it also assesses ‘emotionalizing,’ or whether a person is emotionally aroused by emotion-inducing events. Although it correlates moderately with the TAS-20 [65], very little research exists on the BVAQ, and its validity is still unclear [14].

**Type A Personality**

Evidence has been steadily accumulating that there are psychological and behavioral components involved in the predisposition to CHD. The integrated description and analysis of these psychological and behavioral factors is generally attributed to the pioneering work of Rosenman and Friedman, who have come to define the coronary-prone, type A behavior (TAB) pattern as ‘a characteristic action-emotion complex which is exhibited by those individuals who are engaged in a relatively chronic struggle to obtain an unlimited number of poorly defined things from their environment in the shortest period of time and, if necessary, against the opposing efforts of other things or persons in this same environment’ [66]. The behavior of type A individuals (typically male) has been characterized as ‘aggressively involved in a chronic, incessant struggle to achieve more and more in less and less time’ [4, p. 67]. The most relevant features of TAB encompass excessive involvement in work and activities subjected to deadlines, time urgency, rapid speech and movements, hostility, competitiveness, and desire for achievement. Conversely, these features are
reduced or relatively absent in the so-called type B individuals who are described as calm and easygoing [67].

The TAB pattern has been shown to be both retrospectively [67, 68] and prospectively [69, 70] associated with increased risk of CHD. After the National Heart, Lung, and Blood Institute recognized TAB as an independent risk factor for CHD in 1981 [71], many data have been accumulated, particularly in cardiology, and a large number of studies have been conducted on the pathogenetic role of TAB in CHD [72–74]. Various methods of assessment have been used, and the results have been rather controversial; hostility and time urgency appeared to be two key components [74, 75]. A substantial problem lies in the fact that the definition of TAB consists of a mixture of state and trait features, which cannot be ascribed to stable personality aspects [25]. However, the bulk of the literature seems to indicate that there is a pattern of behavior associated with CHD, even though this does not apply to every case and cannot be readily identified [3, 73].

The two type A personality aspects that have been more tightly linked to CHD are hostility and anger-in. Hostility has been conceptualized as a relatively stable predisposition in a variety of circumstances to experience varying degrees and combinations of anger, irritation, disgust, annoyance, contempt, resentment, and the like that may or may not be associated with overt behavior directed against the source of a frustration. Anger-in refers to the tendency to withhold expression of anger or irritation against others, even when such expression would be appropriate or merited [76].

Matthews et al. [77] found that hostility ratings have been the most potent psychosocial predictor of the incidence of CHD in the Western Collaborative Group Study (WCGS). The findings of Dembroski et al. [76, 78] were also in accord with the literature implicating the role of hostility in a variety of manifestations of CHD [79–81]. In addition, measures of anger-in successfully predicted the incidence of CHD for both men and women in the Framingham study [82], and the construct has been theoretically, empirically, and anecdotally linked with various manifestations of CHD [79].

The two major approaches used to assess the TAB are the structured interviews and the self-administered scales.

*The Structured Interviews*

The Structured Behavioral Interview (SI) [68] is the first structured interview ever proposed. It includes items intended to elicit and assess actual TABs within the context of the interview itself [83, 84]. For example, the interviewer at some point deliberately hesitates when asking a question to provide an impatient subject the opportunity to interrupt or complete the question for him. The interview-based type A rating is thus determined by the style as well as the content of the subjects’ responses, and in actual practice, is likely to be more dependent on observed interview behavior than on a subject’s self report. Some researches have documented that overt behavioral
characteristics such as speed and volume of speech are the primary predictors of the global type A classification [83, 84].

The SI was validated in the WCGS, a large prospective investigation in America of the development of CHD in middle-aged men [68, 69]. SI has been shown to be related to CHDs in both retrospective and prospective studies [67, 69]. This interview has also been used as a measure of hostility by evaluating subject’s answers to questions involving a variety of potentially frustrating circumstances in daily life (the so called Potential for hostility). The SI at several points also explores the person’s willingness to express anger or annoyance, thus making possible to score the anger-in dimension in a reliable fashion.

Operationally, anger-in can be assessed by directly questioning the respondents regarding how they showed their anger and how they responded to frustrating circumstances [76].

Although providing important information related to an individual’s coronary susceptibility, the interview must be individually administered by a specially trained interviewer, requires a period of training for its appropriate administration and interpretation, and should preferably be video-recorded to enable an accurate assessment of behavior. Thus, this is an extensive technique in terms of expertise, time, and resources, and is unsuitable for use in large-scale studies. Moreover, its stability is, to great extent, unknown [85]. Indeed, Rosenman [86, p. 56] reported that after a period of 12–20 months, 80% of subjects ‘had a similar categorical assessment’, while Myrtek and Greenlee [85] in their estimates of inter-rater reliability found only modest levels of agreement.

An alternative structured interview assessing the TAB is the DCPR interview [29] (see chapter 9). It showed high levels of agreement with the Jenkins Activity Survey-Short Form in measuring TAB [75], good to excellent inter-rater reliability (with $\kappa$-values ranging from 0.69 to 0.97) [30], good correlations with dimensional instruments for the assessment of psychosocial distress (e.g. the TAS [32], the Psychosocial Index [87], the General Health Questionnaire [88]). Studies on this diagnostic feature disclosed that not all coronary artery disease patients display a TAB, and that the TAB is present in other settings including dermatology, gastroenterology, and cancer patients [25, 29, 89] as well as in healthy people [90].

Self-Report Instruments

The restrictions and difficulties that were associated with the SI had led to the development of self-administered measures of TAB. Only two questionnaires have been demonstrated to be predictive of CHD, these being the Jenkins Activity Survey for Health Prediction (JAS) [91] and the Framingham Type A Scale [82]. The JAS [91] is the first self-reported scale used to assess TAB. It consists of four subscales measuring TAB and its three hypothesized underlying factors: Speed and
impatience; Hard-driving and competitiveness; Job involvement [92]. Each item on
the questionnaire is accompanied by 2–5 alternative responses, one of which the sub-
ject is asked to indicate as being most representative of himself or herself. For each
scale, the relevant items are scored and the total scores are standardized. Positive
scores on the Type A scale indicate TAB, whilst negative scores indicate the type B
behavior.

The JAS was validated in the WCGS and was found to achieve only 20% agree-
ment with the SI classification. These discrepancies were at first attributed to the
failure of type A individuals to recognize or acknowledge type A traits in themselves
[66]. Thereafter, Mathews [93] suggested that these measures tap different compon-
ents of the type A construct. The SI appears to measure a general responsivity to
provocative situations, while the JAS emphasizes a rapid pace of living and competi-
tive achievement strivings. However, Jenkins et al. [94, p. 611] stated that 'the JAS
somehow has captured certain corners of the truth but has missed other large por-
tions of it'.

The JAS can be administered to large groups, is objectively scored, and yields a
continuous Type A scale standardized. However, it suffers from several shortcomings
that make it less desirable for clinical use. It takes approximately 20 min to be com-
pleted, and almost half to be scored using hand-scoring weights and a hand calcula-
tor. Although type A assessed by the JAS has been shown to be prospectively related
to CHD [70] and to individual cases of new CHD [92], it is time consuming to admin-
ister, complete, and score it; thus, it is not well suited to large scale risk screening
effort [95] (for details on the JAS, see online suppl. appendix B).

The second prospectively validated type A questionnaire is the Framingham type
A Scale [82]. It consists of 10 items followed by a dichotomous (yes/no) or a Likert
type (very well, fairly well, somewhat, not at all) response. The respondent is asked to
indicate the extent to which each item describes himself or herself. Responses to the
questions are valued from 1 (complete presence of a type A trait) to 0 (complete
absence of the trait). The Framingham Scale was found to be predictive of the de-
velopment of CHD in middle-aged men and women in Framingham, USA [82], but has
not been used in many further studies. Only one study compared its agreement with
the other type A measures and found to agree with the SI ratings in 60% of cases and
correlate significantly with the scores on the Type A subscale and the Speed and
impatience subscale of the JAS [96] (for details on the Framingham Type A Scale, see
online suppl. appendix B).

In 1982, Young and Barborigiak [97] proposed the so called Milwaukee Coronary-
Prone Behavior Attitude Scale. This is a 10-item self-administered scale whose
responses are consistent with the definition of TAB and highly intercorrelated; thus,
a reasonably homogenous response pattern can be projected. Several items (from 1
to 6) are very similar to items appearing on early versions of the JAS [91]. Young and
coworkers found an agreement of 80% and a test-retest correlations of 0.79 and 0.80
between the 10-item score and the Jenkins score. However, although they suggested
to use this instrument to classify at least males in TAB and type B behavior, the Milwaukee Coronary-Prone Behavior Attitude Scale has been rarely used.

In 1985, the Type A self-Report Inventory (TASRI) was proposed [95] to researchers and clinicians as a brief, easy to administer and score scale that performs in a similar manner to the JAS. It correlates well with the type A-B classifications based on the JAS and the SI, and its ability to identify subjects ‘accurately’ (by the criterion of the SI) appears generally to be comparable to that of the JAS. However, even the TASRI has been rarely used.

From 1980s, several researches sought to determine whether individuals high in Antagonistic hostility were at greater risk for cardiovascular disease. Studies led by Barefoot et al. [80] and Shekelle et al. [81] found that Antagonistic hostility, measured by the Cook-Medley Hostility Scale of the MMPI, predicted all-cause mortality. Later, Almada et al. [98] found that MMPI-defined Cynicism predicted all-cause mortality. In brief, the Cook and Medley hostility scale of the MMPI has been used as a measure of hostility showing that it correlates with the degree of coronary occlusion [99] and the incidence of CHD, suggesting that the attitude measured by this scale may play a role in the pathogenesis and course of CHD [100], and hostility scores predicted subsequent mortality from all causes [80].

The MMPI-based Cook and Medley Hostility is a 50-item scale with a true/false answer (for details, see online suppl. appendix B). It was originally devised to identify teachers who had difficulty getting along with their students [99] since those MMPI items discriminating between high and low scorers on the Minnesota Teacher Attitude Inventory were chosen for the initial item pool. Thereafter, refinements in item selection were performed since their empirical rather than theoretical choice led disagreement about the nature of the scale [101, 102]. For this reasons, Costa et al. [103] identified a two-factor solution consisting of Cynicism and Paranoid alienation. Because these subscales were moderately inter-correlated ($r = 0.54$) and were both related to similar measures, they concluded that the two factors were different variants of the same trait and that the Cook-Medley was an assessment of hostile cognition and not for experience or expression. On the other hand, in 1989 Barefoot and a group of clinical psychologists identified six subsets of items and labeled them as follows: Hostile attributions, Cynicism, Hostile affect, Aggressive responding, and Social avoidance, plus a group of miscellaneous items which we placed in an Other category [104].

Hostile attributions reflects a tendency to interpret the behavior of others as intended to harm the respondent. Cynicism items reflect a generally negative view of humankind, depicting others as unworthy, deceitful, and selfish. Items in the Hostile affect subset refer to the experience of negative emotions associated with social relationships. They are admissions of anger, impatience, and loathing when dealing with others. Aggressive responding items indicate the respondent’s tendency to use anger and aggression as instrumental responses to problems or to endorse these behaviors as reasonable and justified. Items describing indirectly negative behaviors were grouped
in a subset termed Social avoidance. They indicate the respondent’s tendency to avoid others, refrain from social interaction, or withdraw from interpersonal involvement [104].

Using rational item analysis, Barefoot et al. [104] identified 6 subscales in the instrument, with only 3 of them (Cynicism, Hostile affect, and Aggressive responding) showing strong relationships with cardiovascular outcomes. These three subscales (27 items) are frequently used in isolation, as a strategy for enhancing the 'signal' and reducing the 'noise' in this instrument. Barefoot et al. [104, 105] proposed that each subscale may tap different components of hostility. For instance, in a recent study Georgiades et al. [106] used the Cynicism subscale to examine whether the relationship of hostility to fasting glucose indices is moderated by sex and race and finding that the relationship is evident in African-American women.

Over the years, the initial excitement about the Cook and Medley Hostility scale has given way to a more critical analysis of its internal consistency and construct validity. Overall, strengths are the wealth of evidence supporting its construct validity, test-retest reliability and its association with health outcomes, especially in initially healthy samples. Weaknesses are the heterogeneity of item content and the fact that it is not an optimal measure of affective or behavioral components of hostility. In particular, in terms of test-retest reliability, the scale is quite stable over periods of several years among adult samples (1–4 year test-retest correlations >0.8) [80], but it is less so over longer periods [107]. Moreover, although the 50-item version appears quite reliable (with internal consistency of nearly 0.80) [108], this is largely due to the number of items, and the average item intercorrelations are quite low, suggesting that individuals with dissimilar characteristics may obtain the same scale score.

Type D Personality

In 1995, the concept of type D, or ‘distressed’ personality, was delineated according to the existing personality theory and the notion that the interaction of specific traits may have deleterious effects on health [72]. The term distressed referred to a discrete personality configuration designating individuals who are inclined to experience emotional and interpersonal difficulties, which is likely to affect physical health [109]. The distressed personality construct was introduced as a vulnerability characteristic of heart patients and distinguished from other psychological measures that are usually examined as predictors of prognosis in heart disease such as social support and major depressive disorder.

Type D personality is comprised of two dimensions: NA, conceived as the tendency to experience negative emotional states across time and situations, and social inhibition, conceived as the tendency to avoid potential dangers involved in social interaction due to anticipation of negative reactions from others, such as disapproval. This construct was proposed by Denollet [110] after studying subtypes of patients
with CHD. Thereafter, Kupper and Denollet [111] reviewed the wide body of the literature on the construct, and suggested that the refinement of this construct is likely to contribute substantially to enhance the knowledge of cardiovascular disorders.

The type D personality has shown to reliably predict adverse outcome in several groups of patients suffering from cardiovascular disease [112], to increase risk for a wide range of adverse health outcomes including mortality and morbidity [109, 113–116], posttraumatic stress [117] and vital exhaustion [118]. Physiological hyperreactivity [119], immune activation [71], and inadequate response to cardiac treatment [116, 118] are mechanisms that may explain this detrimental effect of type D. Type D may also be associated with early onset of CHD in men [120], and the combination of type D and younger age designates a poor prognosis in CHD [114]. Finally, type D patients are at risk for clustering of psychological risk factors, including depression, anxiety, and irritability, and low levels of self-esteem, well-being, and positive affect [114, 121–124].

**Assessment of Type D Personality**

Over the past years, several methods of assessment have been used to determine type D personality. In the beginning, a combination of scales was used to get the appropriate item set. Then, the Type D Scale-16 (DS16) [113] was developed based on a large database of items originating from the MMPI-2 [125], and self-constructed items [113]. The DS16 was revised to form the DS14, the most recent and parsimonious version of the type D questionnaire [126].

The DS16 is a self-administered scale that was developed with the purpose to meet with a lack in measurement tools that allow for adequate characterization of individual risk when looking at the impact of psychosocial factors on heart disease. It was introduced in 1998 as a 16-item questionnaire to assess the distressed personality. Items were selected from a pool of 66 statements derived from an item-level factor analysis of the MMPI-2 and statements that were specifically written for developing a type D assessment scale [114]. The ability of the items to differentiate between type D and non-type-D patients was tested, and the best differentiating items were entered into a principal components analysis that resulted in two sets of eight items that were clearly related to NA and Social inhibition (Cronbach’s as were 0.89 and 0.82, respectively). In the DS16, all items are answered on a 5-point Likert scale ranging from 0 (false) to 4 (true). It yields four personality types, but only those who score high on both subcomponents can be classified as having a type D personality. A retest after 3 months in 60 of the 400 initial participants allowed testing-retest reliability, which was high (r = 0.78 and 0.87 for NA and Social inhibition items, respectively). Cross-validation took place in a second, smaller sample of 100 CHD patients who were not involved in the scale construction study.

The DS14 (see online suppl. appendix B) differs from the earlier DS16 on several points since it includes new items developed to enhance the assessment of NA and
Assessment of Personality

Social inhibition [127]. The DS 14 initially resulted in a pool of 24 self-administered items (12 for each subcomponent), from which the 14 highest loading items were then included in the final version: 7 items assessing NA and 7 items assessing Social inhibition. Inclusion of items in the DS14 was based on conceptual and psychometric grounds. Conceptually, the NA items had to cover the tendency to experience feelings of dysphoria, anxious apprehension, and irritability, while the Social inhibition items had to cover the tendency to experience social discomfort, reticence, and lack of social poise [127].

All items are answered on a 5-point Likert scale ranging from 0 (false) to 4 (true). The DS14 yields four personality types, but only those who score above a predetermined, standardized, cutoff score (i.e. equal or greater than 10) on both subcomponents are classified as having a type D personality.

The psychometric properties of the DS14 are good. Factor analysis in 3,678 respondents showed the presence of two personality domains, with all items on NA loading highly (between 0.69–0.82) on one factor, and all items on Social inhibition loading highly on the other factor (0.62–0.82). The subcomponents of the scale showed high internal consistency, reflected in a Cronbach’s α of 0.88 and 0.86 for NA and Social inhibition, respectively, and the temporal stability over a 3-month period is high (r = 0.82, 0.72 for NA and Social inhibition, respectively) [126]. The type D construct has been validated in multiple languages.

**Temperament and Character**

About 20 years ago, Cloninger developed his unified psychobiological theory of personality [128, 129]. Within this approach, results, models, and theoretical assumptions from various fields of genetics, psychiatry, psychophysiology, psychology, anthropology, and sociology were combined into a comprehensive model. According to Cloninger’s theory, personality represents the results of a life-long interaction between two major domains: temperament and character.

Temperament should reflect individual differences, percept-based habits and skills. Its four dimensions are defined to be genetically homogeneous and independently inherited tendencies. Novelty seeking is viewed as heritable bias in the activation or initiation of behaviors such as frequent exploratory activity in response to novelty, impulsive decision-making, extravagant in approach to cues of reward, and a quick loss of temper and active avoidance of frustration. A second temperament factor, Harm avoidance (HA), is viewed as a heritable bias in the inhibition or cessation of behaviors, such as pessimistic worry in anticipation of future problems, passive avoidant behaviors such as fear of uncertainty and shyness of strangers, and rapid fatigability. The third temperament, Reward dependence (RD), is viewed as a heritable bias in the maintenance or continuation of ongoing behaviors, and as sentimentality, social attachment, and dependent on the approval of others. Normative studies using the
Trimentional Personality Questionnaire (TPQ) [130], a self-report inventory measuring the three dimensions of temperament described, confirmed the proposed structure of temperament with the exception that Persistence emerged as a distinct fourth dimension [129, 130]. Persistence, originally thought to be a component of RD, was measured in terms of perseverance despite frustration and fatigue, and it was uncorrelated with other aspects of RD such as sentimentality, social attachment, and dependence on approval. Although no differences between patients successfully treated for Cushing’s syndrome and healthy controls in personality variables have been detected, the TPQ has been for instance used in psychosomatic research by Sonino et al. [131].

Character development is defined in terms of insight learning or reorganizing of self-concepts [128]. Three aspects of development of self-concepts are distinguished according to the extent to which a person identifies the self as: (a) autonomous individual; (b) an integral part of humanity or society; (c) an integral part of the unity of all things (i.e. in the universe). Each aspect of self-concept corresponds to one of three character dimensions that Cloninger called: self-directedness, cooperativeness, and self-transcendence. For more details on these three characters, see Cloninger et al. [128].

Assessment of Temperament and Character

The Temperament and Character Inventory (TCI) [129] was constructed based on Cloninger’s theory of personality and of the TPQ [130]. The TCI is a self-administered paper-pencil measure of the four temperament and the three character dimensions described above, as well as their related subscales. The inventory has been translated into several languages, and the psychometric properties of these versions have been estimated separately. The coefficient-α of the TCI ranged from 0.84 to 0.89 for temperament dimensions and from 0.65 to 0.87 for character dimensions in the original US normative samples [128] (for details, see online suppl. appendix B).

The TCI seems to allow a reliable assessment of the seven dimensions and subdimensions of Cloninger’s model of personality, with a stable internal structure and numerous indices of external validity. However, some authors have suggested that the TCI reliability [132] could be increased and the factorial structure strengthened [133, 134]. The most frequent psychometric limitations emerging in validation studies of the TCI are the weak reliability parameters (test-retest reliability, internal structure and consistency) obtained for Persistence and RD, the unequal numbers of sub-scales for all dimensions, and the true/false response mode which is known to be less reliable than Likert modalities. These observations and the psychometric analyses emerging from more than 10 years of TCI utilization led Cloninger to propose a new version of this questionnaire, named TCI-Revised (TCI-R) [129]. The major differences between the two versions are the following:
The response mode has been modified: true/false statements in the TCI, and five-point rating scale in the TCI-R (1 = definitively false; 2 = mostly or probably false; 3 = neither true nor false, or about equally true or false; 4 = mostly or probably true; 5 = definitively true). This modality is meant to improve the reliability of the responses, because moderate answers are possible. In particular, the more informative response set was designed to improve the precision of measuring the subscales without increasing the number of items.

The total number of items is the same in both versions (i.e. 240) but only 189 items are common to TCI and TCI-R; 37 items have been eliminated (mostly related to character dimensions), and 51 new items have been introduced in the TCI-R, including five validity items.

The constitution of the four temperament dimensions and the three character dimensions has been modified and homogenized, with an increase in subscales measuring RD and P for a total of 29 TCI-R subscales.

The last point is perhaps the most important because RD included P in the TPQ. These two dimensions were later distinguished for psychometric reasons, so there was only one short scale measuring P and three scales measuring RD. This may explain why RD and P are the least robust dimensions in most populations [135, 136]. Nevertheless, Persistence appeared to be a very relevant construct with, for example, a prognostic value for relapse in alcohol dependence following treatment [137].

The TCI and its revised version seem to be increasingly used to evaluate the personality characteristics of patients suffering from specific medical conditions. There is evidence on the possible relationship between migraine, tension-type headache (TTH), and the TCI. Nylander et al. [138] studied the personality profile of 26 adult migraine patients and 87 controls. On the subscale level of Novelty seeking, a slightly higher average in the Exploratory excitability subscale and a significantly higher average in the Impulsivity subscale were observed in migraine patients when compared to controls. Moreover, Boz et al. [139] evaluated 81 patients with TTH, 56 patients with migraine, and matched healthy controls, and found that TTH patients had higher HA scores than controls.

There is also evidence that certain temperament and character dimensions are more likely to be represented in patients with specific dermatologic diseases. Kim et al. [140] evaluated 50 male patients with atopic dermatitis (AD) and 83 healthy controls, and found that AD patients scored higher on HA and lower on RD, self-directedness, and cooperativeness than controls. It was suggested that AD patients might have distinctive temperament and character dimensions. In particular, those with high HA and a low RD might be cunning, devious, ineffectual, reserved, underachieving, alienated, and cynical [141]; while the AD patients with low self-directedness and cooperativeness scores might show a higher tendency toward personality problems than the healthy controls [142]. Finally, Kiliç et al. [143] evaluated 105 psoriasis patients and 109 healthy individuals, and found that the psoriasis group had significantly higher scores of HA and lower scores on self-directedness than the control group. This study might provide a contribution in understanding the role of
personality characteristics in psoriasis, one of the psychosomatic disorders, which is still being investigated whether it is a hereditary or an acquired disease.

**The Five-Factor Model**

The five-factor model (FFM) of personality is a version of trait theory which holds that the many ways in which individuals differ in their enduring emotional, interpersonal, experiential, attitudinal, and motivational styles can be summarized in terms of five basic factors called Neuroticism, Extraversion, Openness to experience, Agreeableness, and Conscientiousness [144, 145].

N (for Neuroticism, NA, or nervousness) is the dimension underlying the chronic experience of distressing emotions, such as fear, guilt, and frustration. E (for Extraversion, energy, or enthusiasm) means interpersonally sociability and dominance and temperamentally high activity level and cheerfulness. O (for Openness to experience or originality) refers to individuals who are imaginative, aesthetically sensitive, intellectually curious, and attitudinally liberal. A (for Agreeableness or altruism) is a dimension that implies trust and sympathy but contrasts cooperation with cynicism, callousness, and antagonism. Finally, C (or Conscientiousness, control, or constraint) encompasses sense of competence and duty, need of achievement, organization, planning, and self-discipline.

After its initial development, little more was done with the FFM until 1980 when Goldberg [146] renewed interest in the field and led to the development of the five-factor NEO Personality Inventory (NEO-PI) [147].

**Assessment of the Five-Factor Model**

The NEO-PI was developed to measure the FFM using rational and factor analytic methods on large samples of normal adult volunteers. The questionnaire consisted of 181 items, answered on a 5-point scale ranging from strongly disagree (1) to strongly agree (5). Each of the three original domains (N, E, O) was assessed as the sum of six more specific facet scales. Total N, for example, was the sum of scores for the Anxiety, Hostility, Depression, Self-Consciousness, Impulsiveness, and Vulnerability (to stress) scales. Global 18-item scales were used to assess A and C [147]. The NEO-PI requires only a sixth-grade reading level and has been used by subjects ranging in age from 16 to the 90s. Respondents typically take 20–30 min to complete the questionnaire that can be also administered, scored, and interpreted by a personal computer. The NEO-PI has a good cross-observer validity and longitudinal stability, its scales are balanced to control for the effects of acquiescent responding and are not overly sensitive to social desirability effects. Internal consistency reliabilities for the five domain scales range from 0.76 to 0.93 in volunteer samples [148].
Form S is used for self-reports; a third-person version, Form R, can be used by raters and appears to have comparable reliability and validity when completed by knowledgeable raters, such as spouse or long-time friends. Separate profile sheets are available for male and female adult self-reports, college student self-reports, and adult ratings [148].

The most comprehensive, and perhaps the best validated, version of this instrument is the Revised NEO-PI [147]. It is a 240-item questionnaire developed using a top-down strategy, beginning with the five well-established factors or domains (N, E, O, A, C) and subdividing each into six more specific facet scales. Domains are defined as multifaceted collections of specific cognitive, affective, and behavioral tendencies that might be grouped in many different ways. Facets are designated as the lower level traits corresponding to these grouping. A short version of the instrument, the NEO-Five Factor Inventory, is a 60-item questionnaire which provides estimates of the five factors. Each domain is measured by 12 items. The five domains are: neuroticism which includes anxiety, angry hostility, depression, self-consciousness, impulsivity, and vulnerability; extraversion which includes warmth, gregariousness, assertiveness, activity, excitement-seeking, and positive emotion; openness which includes fantasy, aesthetics, feelings, actions, ideas and values; agreeableness which includes altruism, trust, compliance, tender-mindedness, straightforwardness, and modesty, and conscientiousness which includes self-discipline, competence, order, dutifulness, achievement striving, and deliberation.

The same five dimensions measured via the NEO-PI are represented in whole or in part in other instruments such as the Eysenck Personality Questionnaire [149], the Guilford-Zimmerman Temperament Survey [150], the California Psychological Inventory [151], the Personality Research Form [152], and the Myers-Briggs Type Indicator [153]. However, such instruments, together with the commonly accepted psychopathology inventories such as the MMPI-2 [125] or the Personality Assessment Inventory [154], have been largely replaced by the NEO-PI since it has several potential advantages including the provision of a more detailed and comprehensive picture of personality structure [155, 107].

Given these findings, the NEO-PI and its subsequent versions would appear to be ideal, yet they have been criticized for their failure to include validity scales that would provide measures of response bias and distortion.

In psychosomatic medicine, an increasing number of studies have used the NEO-PI and its derived versions. For instance, Tanum and Malt [156] showed that patients with functional gastrointestinal disorders have significantly higher levels of NEO-PI Neuroticism than healthy controls. More recently, Nater et al. [157] observed that chronic fatigue syndrome patients have significantly higher scores on Neuroticism and lower scores on Extraversion than those with Insufficient fatigue or healthy controls. Finally, several researchers have become increasingly interested in the relationships between personality traits and mortality. For instance, Christensen et al. [158] found that patients suffering from chronic renal insufficiency who had
low Conscientiousness or high Neuroticism scores were more likely to have died during a 4-year follow-up period. Weiss and Costa [159] highlighted that NEO-Five Factor Inventory Neuroticism, Agreeableness, and Conscientiousness were significantly associated with a reduced mortality. Jonassaint et al. [160] showed that the facets Openness to feelings, actions, ideas, and aesthetics were protective against cardiac deaths. Taylor et al. [161] observed that people who died during a 10 year follow-up period had significantly lower Openness and Conscientiousness scores than people who survived. Finally, Sutin et al. [162] found that low Conscientiousness and traits related to Impulsivity were associated with lower HDL cholesterol and higher triglycerides.

**Conclusions**

The present chapter reviewed the personality constructs having a fundamental role in psychosomatic medicine and their instruments of assessment. The aim was to encourage a proper assessment to contribute in completely understanding medical patients and their global health, and in formulating optimal decision-making and treatment planning.

Such a role of personality has developed particularly in the last decade thanks to the philosophical and scientific revolution. Indeed, first, personality factors have been no longer treated as causes of medical disease but as moderators/mediators that variously influence preclinical and clinical levels of illness from risk factors and vulnerability to maintenance of symptoms and recovery. Second, the psychometric distinction between state and trait has declined supporting the evidence that psychological constructs traditionally conceived as trait dimensions may surprisingly display sensitivity to change in a specific clinical situation, whereas constructs viewed as state dimensions may display unexpected stability throughout the longitudinal development of the disorder [163]. Thus, the psychometric distinction between state and trait may be feasible in a healthy population, but seems to run against a large body of evidence in clinical populations [164, 165] including the occurrence of episodic personality dysfunction [166]. As a confirmation, the state/trait dichotomy does not appear to apply anymore to clinical studies concerned with psychological well-being and resilience and their modifications [167, 168]. Moreover, there is already evidence suggesting that cognitive behavioral interventions might teach alexithymic patients to learn emotion terms, label emotional situations, observe their own symptoms, and link emotional labels with their symptoms [169], and that variations of psychodynamic therapy, such as labeling feelings for patients rather than asking them how they feel, might help alexithymic patients [3].

In brief, since personality is a moderator/mediator that can variously influence preclinical and clinical levels of illness and can be changed in specific clinical situations, it seems relevant to assess it in clinical settings in order to formulate a proper
treatment planning, thus influencing the outcome of the medical illness. Of course, such an assessment should be realized according to the emerging guidelines which highlight the need for repeated measures, clinimetric methods, using macro- and microanalysis, individualized treatment, and multidisciplinary team treatment [170].

In this framework, we hope the present chapter will shed some light on the value of personality in medical settings and increase its assessment in clinical practice.

References


