Psychometric characteristics of Cloninger's criteria for personality disorder in a population of French prisoners

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Abstract

Cloninger has proposed a new procedure to assess personality disorders on the basis of his model of temperament and character. We explored the psychometric characteristics of this instrument in 560 male prisoners, using factor analyses. Results showed that the 20 items relating to the general personality criteria have acceptable internal consistency and that the three-factor structure of the temperament items used to subtype personality disorder are correctly identified by a maximum likelihood factor analysis model with varimax rotation. Overall, 32% of prisoners had a personality disorder according to this model, and it was possible to subtype 68% of these. This new diagnostic procedure for personality disorder seemed to have satisfactory basic psychometric characteristics but further study is required to explore the concurrent validity and the reliability of this instrument. Copyright © 2008 John Wiley & Sons, Ltd.

Key words: Factor analysis, personality disorder, prisoners, temperament, validation

Introduction

The currently used categorical system for personality disorders emerged with the DSM-III in 1980 (American Psychiatric Association, 1980), and it has enabled remarkable developments in personality disorder research since that time. However, several serious problems soon became apparent, mostly related to the hypothesis of discreteness of personality disorder categories. Two main problems have been raised by clinical investigations using DSM-IV criteria, from the non-categorical point of view: first, an extensive overlap among patients meeting criteria for different disorders and, second, the great heterogeneity within personality disorder categories (First, 2003; Widiger and Samuel, 2005).

There is now general agreement that personality disorders are best conceptualized dimensionally (Bornstein, 1998; Nestadt et al., 2006; Trull and Durrett,

2005; Widiger and Samuel, 2005). Thus, several dimensional or mixed dimensional/categorical models have been submitted to discussion for the construction of DSM-V (Bornstein, 1998; Costa et al., 2005; Livesley, 2005; Westen et al., 2006). Cloninger developed a practical means to diagnosis personality disorder based on his long experience with an earlier multidimensional personality model using the Temperament and Character Inventory (TCI) (Cloninger et al., 1993; Svrakic et al., 1993).

The diagnostic procedure developed by Cloninger rests on two successive steps: first, the dimensional evaluation of general criteria for personality disorder and, second, the qualitative appraisal of personality disorder subtypes (Cloninger, 2000). Cloninger suggests four specific dimensions (core factors) that make personality disorder criteria clinically ratable: Self-

directedness, Co-operativeness, Affective Stability, and Self-transcendence. In the new model, two or more of these dimensions must be assessed as significantly low-rating to consider that the general criteria for personality disorder are fulfilled. To reach a significantly low rating, three of five items in each dimension need to be assessed as abnormal.

To enable subtyping of personality disorders, Cloninger proposed to rate three dimensions of temperament, each with five items: Novelty Seeking (NS), Harm Avoidance (HA), and Reward Dependence (RD) (Cloninger, 2000). From the profiles of responses to these three traits, it is possible to define eight mutually exclusive categories of temperament subtypes or personality disorders.

The personality model developed by Cloninger since 1993 has been extensively studied and validated in numerous languages worldwide. However, this new procedure intended for diagnosis of personality disorders in clinical practice has never been actually applied and validated. This is the reason why we decided to explore the psychometric characteristics of this model in a large sample of French prisoners, in the context of a national epidemiological survey on mental disorders in prison (Falissard et al., 2006).

Methods

Sample

Eight hundred men were randomly selected from French metropolitan prisons. Their diagnoses were assessed by a group of two clinicians according to a validated semi-structured procedure (Loze et al., 2002). The interview then continued with criteria for the diagnosis of personality disorders as suggested by C.R. Cloninger (2000), in a French version (not published, translation by A. Pelissolo, available on request).

Statistical analysis

Ascertainment of the existence or absence of a personality disorder is based on the rating of 20 items, grouped together into four core features. There is no personality disorder if only one or none of these four core features have at least three items checked. All four core features have a comparable role and, for a given core feature, all five items that define it also play a comparable role. From a statistical point of view, this presupposed good homogeneity among the 20 character items, or even that they tend to verify a property of uni-

dimensionality. A scree plot of the eigen values of the correlation matrix of the 20 items will be therefore presented. A parallel analysis will be applied to this scree plot as suggested by Horn (1965), since this method appears to be the most accurate in the determination of the number of dimensions of a set of items (Lance et al., 2006; Velicer et al., 2000).

When a personality disorder is present, its sub-typing can be derived from the profiles of three additional dimensions (Cloninger, 2000). Here, the 15 temperament items do not constitute a homogeneous set. Indeed the three temperament dimensions are each assumed to provide a specific amount of independent information. This property was assessed using a three-factor maximum likelihood factor analysis model with varimax rotation. At best, the spontaneous breakdown of the 15 items obtained from this model should meet the original breakdown into five items for a novelty seeking dimension, five items for reward dependence, and five items for harm avoidance. We have voluntarily not used a confirmatory factor analysis here, because the objective is not to test a hard scientific hypothesis but rather to assess if the a priori structure suggested by Cloninger is supported by the data.

Since the items are categorical and sometimes binary variables, the use of a factor analysis model may be criticized. To avoid this problem the use of tetrachoric or polychoric correlations as input data is sometimes suggested (Christofferson, 1973). These computations will be proposed as robustness analyses.

All statistical analyses were conducted with the R 2.1.1 software (R Development Core Team, 2004), with the 'mva', 'polychor' and 'psy' packages. All confidence intervals are 95% bootstrapped confidence intervals.

Results

Sample

Due to prison life constraints the interview of prisoners could be stopped by the guards after one hour and, thus, personality assessment was available for only 560 prisoners (mean age 39 years, standard deviation 13, and average length of imprisonment 15 months, standard deviation 21 months).

Structure of criteria for diagnosis of any personality disorder

Figure 1 presents the scree plot of the eigenvalues of the correlation matrix of the 20 items used to

Figure 1. Scree plot of the eigenvalues of the correlation matrix for the 20 items used to rate general personality disorder criteria on 560 prisoners. A parallel analysis is proposed: a data set of size $n = 560$ ($p = 20$) of independent random normal values is generated; a scree plot of these data is generated; this procedure is then replicated 20 times. These 20 scree plots appear on the drawing as 20 lines close together. Points above these lines are likely to correspond to eigenvalues higher than what could be expected 'by chance'.

determine the four core features that determine the existence of a personality disorder. If the parallel analysis suggests that three eigenvalues are greater than what could be expected 'by chance' (Horn, 1965), it is noticeable that the first eigenvalue is substantially higher than all the others (corrected by chance of explained percentage of variance equal to 19%). This property is compatible with the fact that all 20 items are related in a first approximation to a single latent construct (Falissard, 1999), which could be labelled here as 'personality disorder'.

The 20 items showed an acceptable level of internal consistency since the Cronbach alpha coefficient was equal to 0.77 (0.74; 0.79).

Structure of temperament criteria for subtyping a personality trait or disorder

Figure 2 presents the scree plot of the eigenvalues of the correlation matrix for the 15 items used to determine the three temperament dimensions that define a

Figure 2. Scree plot of the eigenvalues of the correlation matrix for the 15 items used to rate temperament traits for the purpose of subtyping personality disorder. A parallel analysis is proposed.

subtype of personality trait or disorder. The parallel analysis reveals that three eigenvalues are higher than what could be expected 'by chance'. Moreover, the first eigenvalue was only moderately greater than the following ones. These results are consistent with the hypothesis of a three-dimensional set of items.

A three factor maximum likelihood factor analysis model with varimax rotation (Table 1) indicates qualitatively a good fit between the hypothesized structure and the factor loadings. These results are comparable if a factor analysis is conducted on the polychoric correlation matrix of the items (data not shown).

The three dimensions show moderate internal consistency with a Cronbach alpha coefficient for Novelty Seeking equal to 0.59 (0.55; 0.65), for Harm Avoidance equal to 0.69 (0.64; 0.72), and for Reward Dependence equal to 0.55 (0.49; 0.60).

Distribution of personality traits and disorders

Among the 560 prisoners, 181 (32%) had a personality disorder according to Cloninger criteria. The disorders most often present in the prisoners were, in decreasing order of prevalence, passive aggressive (20.4% among the total sample), avoidant (10.5%), antisocial (8.8%), histrionic (8.3%) or borderline (7.7%) personality

Table 1. Maximum likelihood factor analysis with varimax rotation for temperament items

	Factor 1	Factor 2	Factor 3
Novelty Seeking 1 «Easily bored»	0.065	0.259	0.023
Novelty Seeking 2 «Impulsive»	0.062	0.601	−0.025
Novelty Seeking 3 «Quick-tempered»	0.129	0.639	−0.038
Novelty Seeking 4 «Extravagant»	−0.040	0.386	0.065
Novelty Seeking 5 «Disorderly»	−0.027	0.468	−0.084
Harm Avoidance 1 «Pessimistic»	0.602	0.063	0.035
Harm Avoidance 2 «Fearful»	0.644	−0.045	0.140
Harm Avoidance 3 «Shy»	0.570	0.004	−0.052
Harm Avoidance 4 «Anxious»	0.452	0.127	−0.054
Harm Avoidance 5 «Easily fatigued»	0.526	0.037	0.030
Reward Dependence 1 «Sociable»	−0.151	−0.033	0.634
Reward Dependence 2 «Dependent»	0.303	0.112	0.348
Reward Dependence 3 «Sympathetic»	−0.057	−0.017	0.649
Reward Dependence 4 «Sensitive»	0.281	0.275	0.201
Reward Dependence 5 «Sentimental»	0.165	−0.012	0.364

Note: loadings above 0.3 are shown in italic typeface.

disorder. Only a minority of prisoners (32%) could not be subtyped.

For the 379 prisoners who had no personality disorder, a personality trait can be defined if a particular pattern of temperament scores is observed. The most frequent profiles were defined as: methodical (11%), explosive (9.4%), independent (6.6%), sensitive (6.6%), adventurous (6.3%). About half of these prisoners (51%) could not be typed with any such personality profile.

Discussion

Overall, the psychometric characteristics of this instrument appeared satisfactory in this first study carried out

in a substantial but particular sample. The items used in the general criteria process showed a good level of homogeneity, in accordance with the objective to quantify the severity of a potential personality disorder: the scree plot analysis exhibited a predominant first eigenvalue, and the Cronbach alpha coefficient was equal to 0.77. Moreover, the factorial structure of the items used in the subtyping of personality disorder was acceptable, with three factors corresponding to the theoretical model. Only two items did not load particularly on their original factor: 'Easily bored' (NS1) and 'Sensitive' (RD4).

The contribution of the diagnostic system seemed acceptable: when a personality disorder was suggested by the general criteria (32% of the sample), a specific temperament diagnosis could be made in a majority of cases (68%).

The most prevalent subtype of personality disorder in this population was the passive-aggressive subtype, and the antisocial subtype was only second in prevalence rates. In other surveys, antisocial personality disorder was the most frequent diagnosis, present in 47% of prisoners (Fazel and Danesh 2002). In Cloninger's model, the differences between passive-aggressive and antisocial personalities are based on the harm avoidance and reward dependence dimensions, both being high-scoring in passive-aggressive subtypes while they are low-scoring in the antisocial subtype. High Harm Avoidance scores in prisoners could be partially explained by the fact that this dimension is known to be transiently enhanced by the affective state of the subject (Pelissolo et al., 2002). The current prevalence rate of depressive disorders is high in our population, 17.9% to 26.1% according to the diagnostic method used (Falissard et al., 2006), and this observation can explain the high Harm Avoidance ratings in some subjects.

Overall, this new model for personality disorder assessment seemed valid and clinically helpful. The hetero-assessment process is probably an important change compared to the TCI, particularly interesting for difficult populations such as prisoners. However, some traits such as paranoid or schizotypic traits are probably insufficiently described in this approach.

Further validation studies required for this model are concurrent validity studies, in comparison with structured clinical interview for axis II disorder, and reliability studies.

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