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Behaviour Research and Therapy 42 (2004) 1215–1225
BEHAVIOUR RESEARCH AND THERAPY
www.elsevier.com/locate/brat

Beliefs in personality disorders: a test with the Personality Disorder Belief Questionnaire

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Received 30 December 2002; received in revised form 29 July 2003; accepted 15 August 2003

Abstract

The hypothesis that each personality disorder (PD) is characterized by a specific set of beliefs was tested in a sample of 643 subjects, including non-patient controls, axis-I and axis-II patients, diagnosed with SCID-I and -II interviews. Beliefs of six PDs (avoidant, dependent, obsessive–compulsive, paranoid, histrionic, borderline) were assessed with the Personality Disorder Belief Questionnaire (PDBQ). Factor analyses supported the existence of six hypothesized sets of beliefs. Structural equation modeling (SEM) supported the hypothesis that each PD is characterized by a specific set of beliefs. Path coefficients were however in the medium range, suggesting that PDs are not solely determined by beliefs. Nevertheless, empirically derived cutoff scores of the six belief subscales were reasonably successful in classifying subjects, percentages ranging form 51% to 83%. It appeared that there was a monotonical increase in scores on each belief subscale from non-patient controls, to patients without any PD, to patients with PDs (other than the pertinent PD), to patients with the pertinent PD. This suggests that PD-related beliefs are at least partly associated with (personality) psychopathology in general. Another explanation is that many patients' position on the underlying dimensions is not high enough to lead to a DSM PD diagnosis, but high enough to lead to an elevated belief score.

Keywords: Personality disorders; Beliefs; Schema; Borderline personality disorder; Cognitive therapy

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doi:10.1016/j.brat.2003.08.004

1. Introduction

In cognitive views of personality disorders, an important role is given to the patient's beliefs or schema's that are assumed to underlie the patient's dysfunctional behavior and emotions (Beck, Freeman et al., 1990; Beck et al., 2001). These views hypothesize that each personality disorder (PD) is characterized by a specific set of beliefs.

Various suggestions have been made about the beliefs that are central in PDs. Young (1990) has suggested that 18 themes like self-sacrifice and entitlement are fundamental dimensions in personality pathology (see Schmidt, Joiner, Young, & Telch, 1995 for a psychometric evaluation of Young's Schema Questionnaire). So far, it is unclear how these themes exactly relate to the PDs as defined by the DSM. Beck et al. (1990) offer an extensive list of beliefs for most DSM-III-R PDs. Arntz, Dietzel, & Dreessen (1999) have suggested that specific beliefs characterize borderline PD (BPD).

Based on Beck et al. (1990), Beck and Beck (1991) have developed the Personality Belief Questionnaire (PBQ). The PBQ has been investigated in several studies. Trull, Goodwin, Schopp, Hillenbrand, and Schuster (1993) tested the PBQ in a sample of 188 students, and found that reliability of subscales was good (Cronbach alpha's 0.77–0.93). The authors concluded that intercorrelations between subscales were too high (up to 0.65, median 0.40), and correlations with other PD measures too low (median correlation with corresponding PDQ-R scale 0.37). Factor analyses did not reproduce the hypothesized subscales. This may have been caused by the non-clinical sample, leading to a limited number of factors (e.g., 'psychopathology') dominating the variance. Fydrich, Schmitz, Hennch, and Bodem (1996) investigated a German version in 282 psychiatric patients, and found good evidence for the subscales in terms of internal consistency (Cronbach alpha 0.78–91). But, no data on factorial validity were reported. The PBQ subscales correlated poorly (0.09, antisocial) to good (0.57, dependent) with corresponding SCID-II trait scores (median correlation 0.32), but tests of specificity were not reported. A study in a clinical sample by Beck et al. (2001) also found promising results. This study largely confirmed that each of five PDs (avoidant, dependent, obsessive–compulsive, narcissistic and paranoid) was specifically characterized by the corresponding beliefs as assessed with the PBQ. But, this study did not investigate the factor analytic structure of the PBQ, thus, in a sense, omitting a first step in investigating a self-report instrument.

Independently from Beck and Beck's PBQ, Dreessen and Arntz (1995) developed the Personality Disorder Belief Questionnaire (PDBQ). For each PD, 20 beliefs were formulated, partly on the basis of the Appendix in Beck et al. (1990; with permission), excluding items describing symptoms, impulses, emotions, and behaviors, and partly on the basis of hypotheses of the constructors. All beliefs hypothesized to be specific to BPD were constructed by the authors, since the Appendix of Beck et al.'s (1990) book does not give a list of BPD beliefs (see Arntz, 1994; Arntz et al., 1999 for hypothesized themes of BPD beliefs). Arntz et al. (1999) investigated some of the properties of a short PDBQ version (assessing avoidant, dependent, obsessive–compulsive, paranoid, histrionic, and BPD beliefs) in a small sample of borderline and cluster-C PD patients, and non-patient controls. It was demonstrated that the six subscales of the PDBQ were highly reliable (internal consistency) and stable (despite a mood induction), and that the BPD subscale was a very good predictor of BPD as assessed with the SCID-II. The borderline PDBQ subscale also mediated the relationship between childhood trauma reports and SCID-II BPD

diagnosis. But, a factor analytic investigation was not done (the sample was too small) and the specificity of the other PDBQ subscales was not tested.

The aim of the present study was to test the hypothesis that six PDs are characterized by specific beliefs, using the PDBQ to assess beliefs[1]. By means of factor analytic techniques, the hypothesis was tested that factors could be derived from the PDBQ that correspond to the hypothesized subscales. Next, we attempted to improve psychometric properties by item selection. Internal consistencies of the new subscales were estimated. Then, the hypothesis was tested that each subscale was specifically related to (i.e., characteristic of) the corresponding PD, as assessed with the SCID-II. Next, it was investigated whether only the pertinent PD shows elevated scores on the belief subscale related to the PD, or that there is a monotonically increasing response in the following groups: (1) non-patient controls, (2) patients without PDs, (3) patients with a PD but not with the pertinent PD, and (4) patients with the pertinent PD. The reason for the last possibility is that patients without PD may score higher than non-patient controls, because dysfunctional personality characteristics, including dysfunctional beliefs, are higher in subjects with than without psychopathology. Similarly, patients meeting any PD may score higher on non-pertinent PDBQ scales than patients without a PD, because they have more general dysfunctional personality characteristics than the latter group. Lastly, cutoff scores were derived for each belief scale and the percentages of correctly classified subjects were calculated.

2. Method

2.1. Subjects

Data were analyzed from 643 subjects. There were 583 patients from the Community Mental Health Center, Maastricht, 6 from the Psychiatric Hospital "Vijverdal" in Maastricht, 3 from the Psychiatric Hospital "Jelgersma" in Oegstgeest, 11 from the Psychotherapeutic Center "Veluweland" in Lunteren, and 25 from the Psychiatric Hospital "Johan Weijer" in Amsterdam who filled out the PDBQ and were screened with SCID-I and -II interviews at intake or during the beginning of their treatment. Non-patient controls ($n = 15$) were recruited by means of advertisements. Exclusion criterion was mental retardation.

Mean age of sample was 33 years, and there were 203 men and 440 women. One hundred and five patients did not participate in SCID-II interviews, for various reasons, including scheduling problems and refusal. Of the sample assessed with the SCID-II, 144 had avoidant, 52 dependent, 71 obsessive–compulsive, 37 paranoid, 7 histrionic, and 47 BPD (including multiple diagnoses). All subjects signed informed consent.

[1] Beliefs of the following six PDs were investigated: avoidant, dependent, obsessive–compulsive, paranoid, histrionic, and BPD. These six PDs were the most prevelant in our clinic when we started the study. Other PDs were diagnosed so infrequently that we decided to construct a short PDBQ encompassing the hypothesized beliefs of these PDs. Another study investigating beliefs of all PDs using other samples is not yet finished.

2.2. Materials

A Dutch version of the SCID-II for DSM-III-R was used to diagnose PDs (Psychiatrisch Centrum Bloemendaal, 1991). This version has proved to have good interrater reliability (joint interview average kappa = 0.80; Arntz et al., 1992; see Dreessen & Arntz, 1998 for test–retest interrater reliability). Factorial validity of the SCID-II has found to be good, almost all criteria specifically loading on the hypothesized dimensions representing the individual PDs, intercorrelations between dimensions being acceptable, and internal consistencies of the dimensions being good (Arntz, 1999). From 1998 on, the Dutch DSM-IV version of the SCID-II was used (Weertman, Arntz, & Kerkhofs, 2000). In a test–retest study, satisfactory interrater reliabilities were found (kappa for avoidant PD = 0.79; median ICC for trait scores of seven PDs = 0.66; Weertman, Arntz, Dreessen, van Velzen, & Vertommen, in press). Interviewers either participated in the originality studies of the SCID-II or had been trained by these interviewers. In the present sample, the internal consistencies (Cronbach alpha) of the trait scores of the six relevant SCID-II PDs ranged from fair (0.52) to excellent (0.85), with the median reliability of the DSM-III-R trait scores being 0.68, and of DSM-IV trait scores 0.73. For each PD, trait scores were derived by dividing the number of traits met by the total number of traits of the relevant PD.

The PDBQ (Dreessen & Arntz, 1995) was used to assess strength of belief in a series of assumptions, hypothesized to be specific to various PDs. Each PD was represented by 20 beliefs, partly formulated on the basis of Beck et al. (1990; with permission), excluding items describing symptoms, impulses, emotions, and behaviors, and partly hypothesized by the constructors. All beliefs hypothesized to be specific to BPD were constructed by the authors, since the Appendix of Beck et al.'s (1990) book does not give a list of BPD beliefs (see Arntz, 1994 and Arntz et al., 1999 for hypothesized themes of BPD beliefs). Beliefs of six PDs reasonably common in our clinic (see Footnote 1) were selected and randomized, yielding a 120-item questionnaire. Subjects were instructed to rate strength of belief in each statement by placing a vertical mark on 100 mm Visual Analogue Scales (VASs), with anchors "I don't believe this at all" and "I believe this completely". Ratings were expressed in millimeter, a higher score meaning stronger belief in the statement. Subscale scores were derived by calculating the average ratings of the relevant items.

2.3. Statistical analyses

PDBQ items were analyzed by means of principal component analysis with oblimin rotation with Kaiser normalization[2]. By visual inspection the breach(es) in the scree plot of eigenvalues was located, so that the number of factors to be extracted could be determined. The best interpretable solution in light of the hypothesized model was finally chosen. Items were selected by means of the following criteria: items should load ≥ 0.40 on one factor, *and* <0.30 on other factors or the difference between the loadings on the main and the other factors should be >0.20. Next, internal consistencies of the scales constructed from the selected items were estimated by

[2] Since items had still to be selected, we did not use a confirmatory approach (e.g., by structural equation modeling (SEM)), but an exploratory approach. In interpreting exploratory solutions, the hypothesized structure was kept in mind.

computing Cronbach's alpha. The validity of these scales was tested by means of SEM, testing the model that each PDBQ scale was specifically related to its PD as assessed with the SCID-II. ANOVA trend analysis was used to test the hypothesis that scores on the subscales of the PDBQ would monotonically increase from non-patient controls, via patients without any PD, to patients with one or more PDs, but without the pertinent PD, to patients with the pertinent PD. Jacobson and Truax (1991) *c* cutoff criterion was used to derive cutoff scores halfway the population with the pertinent PD and the population with any PD.

3. Results

3.1. Factor analysis and item selection

An initial principal component analysis on the 120 PDBQ items yielded 19 factors with eigenvalues larger than 1. There were two breaches in the scree plot, one between the first and the second component, the second in the area of the 5th to the 7th component. Eigenvalues were for component one 39.5, for component five 3.4, for component six 2.2, for component seven 1.9, and for components eight and nine 1.6. Since we were interested in specific sets of beliefs, rather than in a global belief factor related to psychopathology in general, the one factor solution (32.9% variance) was disregarded, and the 5 (47.8% variance), 6 (49.6%) and 7 (51.2%) factor solutions were further investigated. Extractions followed by direct oblimin rotation yielded solutions roughly corresponding to the hypothesized PDBQ dimensions, with the six factor solution the most promising in terms of interpretability in light of the hypothesized structure. After item selection using the criteria mentioned above, a solution clearly corresponding with the hypothesized structure was obtained on the 71 selected items. Ten items loaded on the avoidant beliefs factor (11.8% explained variance), 13 on the dependent (13.2%), 11 on the obsessive–compulsive (7.3%), 20 on the paranoid (17.5%), 11 on the histrionic (6.3%), and 6 on the borderline factor (11.9%). In total, 56.1% of the variance was explained, whereas the sum of the explained variances of the six factors was 68.0%, implying that the overlap of the factors was 68.0% − 56.1% = 11.9% of the total variance. The factors did not correlate highly with each other, as is evident from the raw and the disattenuated correlations between the factors (Table 1). Taken together, the results of the factor analysis supported the hypothesized structure of the

Table 1
Correlations between factors derived from the final factor analysis on 71 PDBQ items (above the diagonal). Internal consistencies (Cronbach alpha) are depicted *in italics* on the diagonal. Disattenuated correlations below the diagonal

PDBQ factor	AV	DEP	OC	PAR	HIS	BOR
AV	*0.93*	0.37	0.25	0.40	0.03	0.40
DEP	0.40	*0.93*	0.30	0.35	0.23	0.30
OC	0.28	0.34	*0.85*	0.23	0.18	0.21
PAR	0.42	0.37	0.25	*0.96*	0.21	0.48
HIS	0.03	0.26	0.21	0.24	*0.83*	0.16
BOR	0.44	0.33	0.24	0.53	0.19	*0.87*

AV, avoidant; DEP, dependent; OC, obsessive–compulsive; PAR, paranoid; HIS, histrionic; BOR, borderline.

PDBQ. The selection of specific PDBQ borderline items appeared the most problematic: only 6 of the original 20 remained.

3.2. Internal consistency

Internal consistencies as estimated by Cronbach alpha's coefficients of the six scales constructed on the basis the final factor analysis (after item selection) are given in Table 1 (diagonal). They are all in the good–excellent range (0.83–0.96).

3.3. Criterion validity

The hypothesis that the six PDBQ scales are specifically related to their corresponding PD was tested with SEM. Two models were tested, the first with PD diagnoses (dichotomous variables) as criteria, the second with PD trait scores (computed as the number of traits met divided by the total number of traits per PD; so that DSM-III-R and DSM-IV trait scores had the same range (0–1)) as criteria. Since comorbidity between PDs is the rule, covariance between PDs was allowed. Fig. 1 depicts the model and the path coefficients (with diagnoses in normal script, with trait scores in brackets and in italics). The model with diagnoses as criteria achieved an excellent fit, root mean square error of approximation (RMSEA) = 0.044, non-normed fit index (NNFI) = 0.96, goodness of fit index (GFI) = 0.98. The model with trait scores achieved higher path coefficients, but slightly lower fit indices, which were still very good: RMSEA = 0.062,

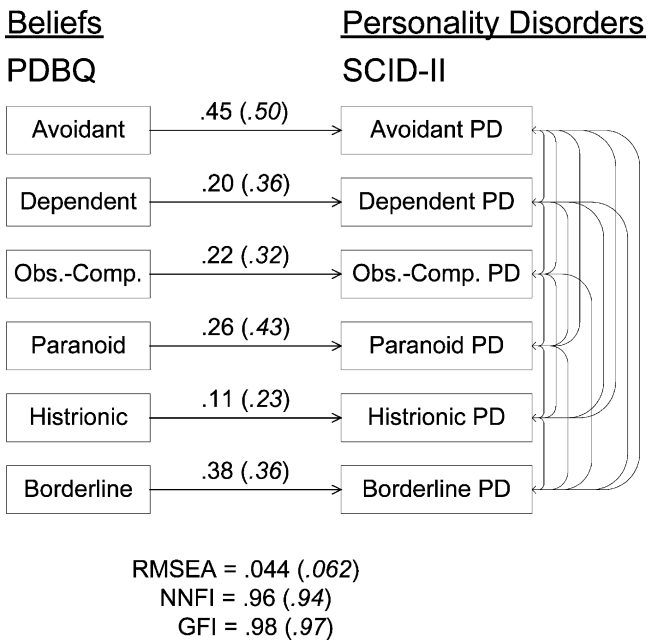

Fig. 1. Hypothesized SEM model and observed path coefficients of belief scores as assessed with the PDBQ specifically predicting PD diagnoses as assessed with the SCID-II. (*Path coefficients relating to PD trait scores in parentheses and in italics.*)

NNFI = 0.94, GFI = 0.97. These results indicate that the data fitted very well with the hypothesized model.

Despite the excellent fits, it was further investigated whether cross-paths (a path from PDBQ subscale x to PD y) should be added. Since allowance of all cross-paths results in a saturated model, which has by definition perfect fit, and the hypothesized model was already tested against the saturated model in the tests above, another approach was chosen. From the saturated model, the cross-paths were selected that met a Bonferroni-corrected significance level of 0.05/30 (given that there were 30 cross-paths that were non-hypothesized). These were added to the model, so that fit indices could be assessed and the extended model could be compared to the hypothesized model.

For the PD diagnoses as criterion variables, only one extra path appeared, from histrionic beliefs to avoidant PD, with a negative path coefficient (−0.18). Adding this to the hypothesized model resulted in a slightly smaller path coefficient (−0.15), and in fit indices that were slightly higher than those of the hypothesized model (RMSEA = 0.034, NNFI = 0.98, GFI = 0.99). With PD traits as dependent variables, none of the cross-paths met the Bonferroni-corrected level of significance.

3.4. Scores in subgroups

Table 2 presents means and standard deviations of four groups: non-patient controls, patients without any PD, patients with one or more PDs, but without the pertinent PD, and patients with the pertinent PD. ANOVA trend analysis confirmed the hypothesis that scores increase monotonically over these four groups: linear trends were all significant ($p < 0.001$), whereas the other trends were NS, with one exception in which the quadratic trend was also significant (HIS beliefs) (Table 2). In case of the histrionic beliefs, the positive quadratic trend was related to the pattern that patients with histrionic PD scored much higher than patients with other PDs (Table 2).

Table 2
Means, standard deviations, and results of trend analyses of the six PDBQ subscales in four subsamples

PDBQ subscale	Non-patient controls		Patients without PD		Patients with any PD[a]		Patients with pertinent PD		Linear trend	
	m	sd	m	sd	m	sd	m	sd	$t(534)$	p
AV	10.1	8.3	27.1	19.9	41.2	20.8	55.5	23.5	8.77	<0.001
DEP	15.8	9.3	30.2	20.1	40.5	22.3	48.0	21.4	5.79	<0.001
OC	27.5	14.0	38.2	19.8	50.7	19.7	56.2	20.8	5.80	<0.001
PAR	9.2	7.2	21.9	17.9	34.2	20.1	48.9	23.1	7.50	<0.001
HIS	18.1	10.4	21.3	14.8	24.9	14.2	40.9	18.7	3.62	<0.001*
BOR	5.2	7.2	13.7	14.3	25.2	21.5	48.0	28.1	8.41	<0.001

AV, avoidant; DEP, dependent; OC, obsessive–compulsive; PAR, paranoid; HIS, histrionic; BOR, borderline.
[a] Except the pertinent PD.
* Quadratic trend also significant, $t(534) = 2.47$, $p = 0.014$.

3.5. Percentages correctly classified subjects

Using Jacobson and Truax's (1991) *c* cutoff point as the point halfway between the pertinent and the non-pertinent PD samples, numbers of successfully classified subjects were calculated (in the whole sample). The PDBQ scales did a reasonable job in correctly classifying the subjects: avoidant beliefs 75% correctly classified (77% of non-avoidant and 69% of avoidant subjects); dependent beliefs 68% (69% of non-dependent and 60% of dependent subjects); obsessive–compulsive beliefs 66% (68% of non-obsessive–compulsive and 51% of obsessive–compulsive subjects); paranoid beliefs 75% (76% of non-paranoid and 57% of paranoid subjects); histrionic beliefs 76% (76% of non-histrionic and 57% of histrionic subjects); borderline beliefs 81% (83% of non-borderline and 64% of borderline subjects).

4. Discussion

The results largely confirmed the hypotheses. Firstly, the hypothesized factor structure in the PDBQ could be demonstrated. After item selection, the six factors accounted for 56.1% of the variance, and correlations between the oblique factors were reasonable (range 0.03–0.48). Subscales derived from these factors were highly reliable, as indicated by internal consistencies. SEM demonstrated that the six PDBQ subscales were specific for the six corresponding PDs as assessed with the SCID-II. Note however, that with PD diagnoses as criterion variables (but not with PD trait scores) a non-hypothesized path from histrionic beliefs to avoidant PD, with a negative path coefficient, was found. Lastly, scores on the subscales monotonically increased with increasing psychopathology to a maximum in the pertinent PD group.

As our approach to factorially validate the PDBQ was necessarily exploratory (since we first had to find the items that were good markers of the hypothesized PDBQ dimensions), there still is the need for a validation of the found factor structure of the PDBQ. Cross-validation in a new sample is necessary here. Other research should also address the beliefs related to the PDs not investigated yet.

An important finding was that we were able to define a set of beliefs specific for BPD. Although most of the original PDBQ borderline items had to be deleted, because of too high loadings on other factors (especially on the PDBQ avoidant, dependent and paranoid factors), six items remained that were, compared to the other PDBQ subscales, quite powerful in discriminating BPD. Inspection of the content of these six beliefs, show that they are characterized by the following themes: (1) loneliness; (2) unlovability; (3) rejection and abandonment by others; (4) viewing the self as bad and to be punished. These themes correspond to two of the so-called schema-modes hypothesized by Young to be characteristic for BPD: the lonely child and the punitive parent modes (McGinn & Young, 1996).

In the SEM analysis dependent, obsessive–compulsive, and histrionic PDs were the most problematic to predict with PDBQ subscales. We may have missed to formulate essential beliefs of these disorders. There may also be problems with these SCID-II diagnoses. The small number ($n = 7$) of histrionic patients as diagnosed by the SCID-II may have reduced the estimation of the specific association between PDBQ histrionic subscale and histrionic PD. The ANOVA results indeed suggest that the small sample size of histrionic patients causes the problem, since

the mean score in the histrionic patients is much higher than in the other three groups (Table 2). More problematic are the obsessive–compulsive and the dependent beliefs. The means of the four groups given in Table 2 suggest that these beliefs are, on the average, not specific enough. Another explanation might be that the SCID-II misses too much true dependent and obsessive–compulsive PD patients. Clinicians in our unit have reported that they find the dependent and the obsessive–compulsive PD criteria too strict, thus missing patients they think to be (emotionally) dependent, respectively obsessive–compulsive.

Unexpectedly, an extra path was suggested from histrionic beliefs to avoidant PD, with a negative path coefficient. The path suggests that high histrionic beliefs are associated with a lower chance to have an avoidant PD. Given the dominant and extraverted social strategic beliefs, and the beliefs that other people are sources of admiration and attention, which are part of the histrionic PDBQ scale, this association is understandable. On the other hand, it was not found when traits, instead of diagnoses were considered. Also note that the hypothesized model already had an excellent fit, indicating that adding extra paths was not necessary. We are therefore reluctant to draw definite conclusions before this finding is replicated.

Despite the modest path coefficients yielded by the SEM analysis, the belief measures appeared to be reasonable successful in distinguishing patients with the associated PD from other subjects. On the average, 73.5% of the subjects was correctly classified, with the empirically derived cutoff scores doing a better job in classifying subjects without the relevant PD (average success 75%) than in correctly identifying the patients with the relevant PD (average success 60%). Calculating a cutoff score using the whole sample (instead of the non-pertinent PD group as reference group) would of course lead to lower successes in identifying non-cases, and higher successes in identifying cases.

The results of the ANOVAs did not support a model in which PDs are characterized by a set of beliefs that are qualitatively different from those in other groups, in the sense that only patients with a certain PD believe in a specific set of assumptions. Rather, it seems that each PD is characterized by a set of *relatively* more strongly held beliefs that are also, but less strongly, held by patients with another PD, and, to a lesser extent, by patients with only axis-I disorders. This suggests that PD-related beliefs are at least partly associated with (personality) psychopathology in general. Another explanation is that many patients' position on the underlying dimensions is not high enough to lead to a DSM PD diagnosis, but high enough to lead to an elevated belief score.

Although specific PDs may be inferred from specific sets of beliefs, and specific belief sets may be inferred from specific PD diagnoses, the findings indicate that in addition to this, there are pathogenic beliefs that are associated with psychopathology in general, and psychopathology in general is also somewhat associated with beliefs that are relatively specific for individual PDs. The clinical implication of this finding is that it is wise to get an impression of the prominent beliefs of each individual patient to base treatment on. Some of the potential beliefs (e.g., ''tension in a relationship means that the relation is irreparable damaged and that I should end the relationship'') are not specific for a PD, others are, but may still play some role in an individual patient without the pertinent PD, still others are highly specific for the pertinent PD. Thus, clinicians should be aware of the possibility that both specific and non-specific beliefs play a pathogenic role with an individual patient. As described by Beck et al. (1990, 2001), knowl-

edge of these beliefs may greatly help to conduct cognitive treatment of patients with personality related problems.

Although SEM supported the hypothesis that each PD is characterized by a specific set of beliefs, the results were, statistically speaking, modest. Specificity was most strongly supported, but the idea that PDs are completely determined by a set of specific beliefs not. Path coefficients were in the lower to medium range (0.11–0.50), and even after correction for attenuation, coefficients remain in medium ranges (0.31–0.60), implying that even with perfect reliability of PDBQ and SCID-II only between 10% and 36% of the variance in PD traits can be explained by the beliefs as measured by the PDBQ. There are at least four explanations for this finding. First, we may have missed to include essential beliefs in the PDBQ. Second, not all beliefs are necessarily explicit, and PDs may be characterized, at least in part, by implicit beliefs that the subject cannot report upon. In line of this interpretation is the observation that all histrionic PDBQ items that related to negative consequences of not getting attention and admiration from others did not load on the hypothesized factor. Third, to completely explain PDs, other variables may be needed than beliefs, whether implicit or explicit, like characteristic behaviors, emotions, and impulses. Fourth, the DSM operationalization of the PDs and/or the SCID-II assessment may not be valid enough to serve as gold standard. It seems obvious that further research is needed to test the hypothesis that a limited set of explicit beliefs completely underlies each PD.

Acknowledgements

Aaron T. Beck gave us permission to use beliefs listed in Beck et al. (1990) for developing the PDBQ.

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