

The Young Schema Questionnaire 3 Short Form (YSQ-S3)

Psychometric Properties and Association With Personality Disorders in a Danish Mixed Sample

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Abstract. Early Maladaptive Schemas, as measured with the Young Schema Questionnaire (YSQ), are proposed to underlie a variety of mental health problems, in particular Personality Disorders. The latest short version of the instrument measuring all 18 schemas, the YSQ-S3, has only been examined to a limited extent, and its associations with Personality Disorders have not yet been tested in a psychiatric setting. We investigated psychometric properties of the Danish YSQ-S3 including its associations with Personality Disorders. A mixed Danish sample of clinical and nonclinical participants ($N = 567$) completed the YSQ-S3, whereas a clinical subsample ($n = 142$) was also assessed with a diagnostic interview for Personality Disorders. We performed reliability analysis, confirmatory factor analysis, regression analysis, and tested for group differences using analysis of variance. The Danish YSQ-S3 proved to be a reliable and valid measure. Its theoretical factorial structure was weakly but sufficiently supported. Its scales were meaningfully associated with specific Personality Disorders and discriminated between relevant groups. We conclude that the YSQ-S3 is a psychometrically valuable instrument for the assessment of Early Maladaptive Schemas in both clinical and research settings. Findings are discussed in relation to Personality Disorders and the Schema Therapy model.

Keywords: Early Maladaptive Schema, Young Schema Questionnaire, Personality Disorder, Borderline, psychometric properties

The Young Schema Questionnaire (YSQ) is a measure of Early Maladaptive Schemas (we refer to this as “schemas”) developed for the understanding and treatment of enduring mental health problems, in particular Personality Disorders (PDs). Thus, YSQ serves as a clinical measure in psychotherapy, as well as a research measure in studies of PDs and developmental psychopathology. Originally, the YSQ was developed by Young (1990) for Schema Therapy, an adaptation of Cognitive Behavioral Therapy with insights from Attachment Theory, experiential approaches, and concepts of emotional core needs. The model proposes that schemas are core beliefs developed in childhood through interaction between innate temperament, culture, and insufficient fulfillment of emotional needs. Due to a human drive for consistency, the schemas persist throughout adolescence and adulthood as an organizing structure for emotions, thoughts, and bodily sensations causing enduring behavioral, emotional, and interpersonal problems (Young, Klosko, & Weishaar, 2003). The current taxonomy consists of 18 schemas (Table 1). The psychometric properties of various translations and versions of YSQ have been investigated in several studies qualifying the instrument for research and clinical purposes (Oei & Baranoff, 2007). Importantly, it has been verified, that the psychometric

properties of the short YSQ are fairly similar to those of the long version supporting use of the more convenient short form in both clinical and research settings (Waller, Meyer, & Ohanian, 2001). In its latest form, the YSQ-S3 comprises 90 items measuring 18 schemas with five items each (Young, 2005). To our knowledge, the psychometric properties of the YSQ-S3 have so far been tested in seven studies, in seven different languages. The 18 scales of YSQ-S3 have overall been supported by internal consistency and confirmatory factor analyses (CFA) in Finnish (Saariaho, Saariaho, Karila, & Joukamaa, 2009), French-Canadian (Hawke & Provencher, 2012), German (Kriston, Schäfer, Jacob, Härter, & Hölzel, 2013), Portuguese (Rijo & Gouveia, 2008), and Spanish (Calvete, Orue, & González-Diez, 2013) populations, involving both clinical and nonclinical participants. Additionally, one Romanian study revealed good internal consistencies of the YSQ-S3 scales (Trip, 2006). Yet, in one Turkish study only 14 of the proposed 18 factors were identified based on a principal components analysis (Soygüt, Karaosmanoglu, & Cakir, 2009). In the evaluations by Saariaho et al. (2009), Calvete, Orue, and González-Diez (2013), and Kriston et al. (2013), approximately all CFA fit indices indicated acceptable fit of the 18 factor model (normed χ^2 below 3.00, CFI above .90,

Table 1. The 18 schemas as measured with the YSQ-S3, and assumed associations with various personality disorders

Schema	Description of content	Personality disorder
Emotional Deprivation	Other people are not going to meet one's emotional needs.	BDL
Abandonment	Significant others will be lost or leave one emotionally or physically.	BDL , DPT
Mistrust/Abused	Other people will harm, abuse, or take advantage of one.	PAR , BDL
Social Isolation	Feeling different from other people; not being a part of a group.	STY , SCD, BDL, AVD
Defectiveness	Shameful/worthless due to feelings of being bad, inferior, or invalid.	AVD , BDL
Failure to Achieve	Sense of failure in school/career; one will eventually fail in life.	AVD
Dependence	Being unable to handle daily tasks without help from others.	DPT
Vulnerability to Harm	Bad things will happen and one cannot prevent it or cope with it.	BDL
Enmeshment	Over-involvement and constant search for support from close others.	DPT , BDL
Subjugation	Compliance with others in order to avoid feared consequences.	DPT , AVD, BDL
Self-Sacrifice	A preference of taking care of others instead of self.	OBS
Emotional Inhibition	Inhibition in expression of emotions and spontaneity.	AVD , SCD, OBS
Unrelenting Standards	High personal standards of productivity, performance, and behavior.	OBS
Entitlement	Entitled to special rights; sense of superiority	NAR
Insufficient Self-Control	Difficulties with perseverance and delayed gratification.	ANT , BDL
Approval-Seeking	One's worth/significance depends on positive attention from others.	HIS , NAR
Pessimism	Expectation that everything will turn out badly.	BDL , AVD
Self-Punitiveness	One deserves and expects negative consequences for own imperfection.	BDL , OBS

Notes. Borderline (BDL), Avoidant (AVD), Dependent (DPT), Obsessive-Compulsive (OBS), Paranoid (PAR), Narcissistic (NAR), Histrionic (HIS), Schizoid (SCD), Schizotypal (STY), and Antisocial (ANT) Personality Disorder.

The hypotheses were raised from previous research findings (Gilbert & Daffern, 2013; Nordahl et al., 2005), propositions in Schema Therapy (Young et al., 2003), and thematically coherent associations. PDs in bold are considered primarily connected with the corresponding schema.

RMSEA below .050, and SRMR below .080). However, in the study by Kriston et al. (2013), the CFI index (.847) missed the required threshold for an acceptable fit. All seven studies found good discriminant validity regarding group differences (participants with higher degree of clinical symptoms always scored significantly higher on YSQ-S3 than participants with lower degree of clinical symptoms) as well as conceptually relevant convergence between the 18 schemas and measures of psychopathology. Moreover, test-retest stability of the 18 schemas (e.g., Calvete, Orue, & González-Diez, 2013) and schema specificity of particular psychiatric disorders (e.g., Voderholzer et al., 2014) have been verified. Summing up the findings from these studies suggests that the YSQ-S3 is a psychometrically sound instrument, particularly in Western countries.

Schemas as measured with the YSQ have been employed in several studies of PDs (Chakhssi, Bernstein, & de Ruiter, 2012; Gilbert & Daffern, 2013; Jovev & Jackson, 2004; Petrocelli, Glaser, Calhoun, & Campbell, 2001; Thimm, 2011) as well as developmental psychopathology (Calvete, Orue, & Hankin, 2013; Parker, Gladstone, Mitchell, Wilhelm, & Roy, 2000). Accordingly, schemas appear to translate childhood adversities into adult psychopathology (Wright, 2007). Moreover, the schema taxonomy as measured with the YSQ has been proposed as an alternative dimensionally based approach to PDs offering hope for overcoming many of the limitations of the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) Axis II categories (American Psychiatric Association, 2000; Young & Gluhoski, 1996, pp. 304–305).

In other words, schemas are theoretically and empirically linked with PD features.

In recent years, Schema Therapy has been considered as a recommended approach to the treatment of Borderline PD (Zanarini, 2009). Outcome studies of Schema Therapy have revealed promising therapeutic features compared with other approaches, primarily with PDs (Bamelis, Evers, Spinhoven, & Arntz, 2014; Sempértegui, Karreman, Arntz, & Bekker, 2013). Currently, Schema Therapy is being implemented in the Danish mental health care system. Accordingly, we have found it important to evaluate the Danish translation of YSQ-S3 before comprehensively implementing it into both clinical and research settings. This also applies for future Danish studies of PDs and developmental psychopathology involving schemas. Also, the YSQ-S3 stands out from previous versions by comprising randomized items instead of thematically clustered items, which is assumed to prevent response biases (McFarland, Ryan, & Ellis, 2002). Also, the 90 items seem feasible for most patients. Consequently, in Denmark the YSQ-S3 has already become the instrument of choice when assessing schemas.

In the present study we examined the 18 schema scales as measured with the YSQ-S3 regarding their (1) reliability, (2) structural validity, and (3) ability to discriminate between relevant groups. Subsequently, we inspected (4) associations between YSQ-S3 scales and clinician-rated DSM-IV Axis II PDs (retained in DSM-5 Section II). We tested structural validity by investigating whether the 18 first-order factor structure, proposed by the test

developers and supported in previous studies, could be replicated in a Danish mixed sample by means of confirmatory factor analysis. As findings on the second-order structure of the instrument are inconclusive (Kriston, Schäfer, von Wolff, Härter, & Hölzel, 2012), we solely aimed to investigate the 18 first-order factors but also performed posteriori secondary analyses. Based on the Schema Therapy literature (Young et al., 2003, p. 306) and previous research findings (Lawrence, Allen, & Chanen, 2011; Nilsson, Jorgensen, Straarup, & Licht, 2010) we selected Borderline PD as an anticipated indicator of high schema severity, as this disorder is particular characterized by elevated scores on most schemas in comparison with other disorders. Accordingly, we expected non-Borderline PD patients to have lower schema severity, and nonclinical participants the lowest. A priori hypotheses regarding the schema-PD associations are presented in Table 1 along with definitions. To our knowledge, this was the first study to investigate associations between all the current 18 schemas and PD diagnoses in a psychiatric setting.

Method

Sampling

The analyses presented in this study were based on a mixed sample of clinical and nonclinical adult participants from Denmark. All data were collected from March 2012 to January 2014 with a secure online system, which prevented missing data. By means of a naturalistic design, all clinical participants were consecutively included from a psychiatric outpatient clinic and a prison mental health department. Each met the diagnostic criteria for at least one psychiatric disorder, based on evaluation by a clinical psychologist or psychiatrist. Participants suspected of having a current psychotic disorder, severe depression, current manic episode, autism, organic disorder, or substance induced condition were not included. A total number of 176 clinical participants completed the assessment program, and 142 of them were also systematically characterized with standardized diagnostic interviews for Psychiatric Syndromes and PDs, respectively. With assistance from the Danish Civil Registration System, 221 community-dwelling participants were recruited via personal letter in order to attain a randomly selected sample matched with age and gender of the clinical participants. In order to increase the number of young non-clinical participants, 170 college students were recruited from emails and intranet ads. A total number of 391 non-clinical participants completed the online assessment program. All participants were informed about the study and gave their consent to participate. Besides, all clinical participants received individual feedback on their schema profile as a part of their clinical program. As incentive for participation, all nonclinical participants were offered feedback on their responses. The study protocol was approved by the Regional Ethics Committee of Zealand and notified to the Danish Data Protection Agency (SJ-PSY-01).

Measures

The Danish version of the *Young Schema Questionnaire – Short Form 3* (YSQ-S3; Young, 2005) was administered as a measure of all 18 schemas. Participants were asked to describe themselves by rating descriptive statements through 6-step Likert-type items ranging from “completely untrue of me” to “describes me perfectly.” Higher values indicate a stronger presence of the respective schema. The 18 schema scales (Table 1) include five items per scale, resulting in a total of 90 items. The mean score format was used to calculate the scale scores for each schema. The YSQ-S3 was initially translated into Danish by an advanced-level certified schema therapist with assistance from an authorized translator. Subsequently, a final blinded back-translation was carried out by a bilingual authorized translator.

The Mini International Neuropsychiatric Interview 6.0 (MINI 6.0; Sheehan et al., 1998) was administered to 142 clinical participants as a structured diagnostic measure of mental disorders. This served to characterize and include the most common nonpsychotic syndromes (Table 2). Accordingly, we used it to exclude current Manic Episodes and Psychotic Disorders as well as severe/psychotic Major Depressive Episodes.

The Structured Clinical Interview for DSM-IV Axis II (SCID-II) was administered to 142 clinical participants as a diagnostic measure of PDs (First, Gibbon, Spitzer, Williams, & Benjamin, 1994). In this study we excluded the DSM-IV appendix diagnoses of Passive-Aggressive and Depressive PDs. The PDs were expressed dimensionally by adding the number of fulfilled criteria for each category. The overall psychometric properties of the SCID-II have been shown to be satisfactory (Lobbstaël, Leurgans, & Arntz, 2011). All SCID-II interviews were performed and recorded by the first author independently of the computerized administration and scoring of the YSQ-S3. Furthermore, the interviewer was trained and supervised by the second and the third author. The official SCID-II guideline was systematically followed in the scoring procedure. The 9 PD types utilized in this study correspond with the retained categories in the Section II of the DSM-5 (American Psychiatric Association, 2013a).

Statistical Analysis

The reliability of YSQ-S3 was estimated by calculating item discrimination statistics (corrected item-total correlations) and Cronbach's α for each scale. This was performed for the total sample as well as the clinical and nonclinical samples, separately. We tested factorial validity of the Danish YSQ-S3 in a confirmatory factor analysis (CFA). In order to achieve a sufficiently large sample size we had to include all participants in one single analysis (Wolf, Harrington, Clark, & Miller, 2013). We tested the first-order factorial structure with 18 oblique (correlated) factors (without cross-loadings) corresponding to Young's

Table 2. Characteristics of DSM-IV Axis II Personality Disorders and Psychiatric Syndromes in clinical subsample ($n = 142$)

	Personality disorder	n (%)	Psychiatric syndromes	n (%)
A	Paranoid	69 (48.6%)	Major depressive disorder	40 (28.2%)
	Schizotypal	11 (7.7%)	Dysthymia	41 (29.9%)
	Schizoid	8 (5.6%)	Social phobia	64 (45.1%)
B	Borderline	101 (71.1%)	Post-traumatic stress disorder	47 (33.1%)
	Narcissistic	9 (6.3%)	Panic disorder	54 (38.0%)
	Histrionic	1 (0.7%)	Agoraphobia	71 (50.0%)
	Antisocial	37 (26.1%)	Obsessive-compulsive disorder	45 (31.7%)
C	Avoidant	70 (49.3%)	Anorexia nervosa	5 (3.5%)
	Dependent	18 (12.7%)	Bulimia nervosa	26 (18.3%)
	Obsessive-compulsive	45 (31.7%)	Generalized anxiety disorder	25 (17.6%)
			Substance use disorder	25 (17.6%)
			Alcohol use disorder	4 (2.8%)
	Not otherwise specified	7 (4.9%)	No criteria met	1 (0.7%)
	No criteria met	7 (4.9%)		

theoretical model that served as the basis for the development of the instrument. We analyzed the covariance matrix of the items with robust maximum likelihood estimation. Although the 6-step Likert-type responses should strictly be considered ordered categorical rather than continuous, the limited sample size indicated using maximum likelihood estimation. This estimator has been shown to be largely unbiased with a sufficient number of scale points (Green, Akey, Fleming, Hershberger, & Marquis, 1997). We investigated local fit of the model components by examining factor loadings (standardized and unstandardized regression weights), factor reliabilities, average extracted variance in items, and congruence (correlation) between factor scores and corresponding scale scores. We assessed global fit applying the discrepancy χ^2 statistic, the normed χ^2 statistic, the Bentler comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). We evaluated the similarity of estimated factor loadings from this study with those of a recent large German study using congruency coefficients (Kriston et al., 2013). In order to gain further insights into the factor structure, we performed posteriori secondary analyses including model estimation with robust weighted least squares and categorical indicators, investigation of a bifactor structure (where all items load on a first-order generic factor and the items associated with specific schemas load on the corresponding first-order schema factors), and exploration of modification indices. The ability of YSQ-S3 to discriminate between relevant groups was investigated by comparing mean schema scores across three selected subsamples (Borderline PD patients, non-Borderline PD patients, and nonclinical community) employing analysis of variance (ANOVA). Finally, we investigated associations between each schema and all PD dimensions by means of multiple regression analysis. The 10 SCID-II dimensions (independent variables) were simultaneously regressed on each schema (dependent variable). All analyses in the present study were performed using SPSS version 22 (IBM

Corp., Armonk, NY) and Mplus 7.1 (Muthén & Muthén, 2012).

Results

Participant Characteristics

The total mixed sample ($N = 567$) included in the reliability- and factor analysis was composed of nonpsychotic psychiatric outpatients ($n = 158$), prison inmates in mental health care ($n = 18$), a randomly selected community sample ($n = 221$), and college students ($n = 170$). In order to achieve a better overview, we divided this into one clinical sample ($n = 176$; 71.6% females; mean age 29.3, range 18–56) and one nonclinical sample ($n = 391$; 81.3% females; mean age 29.4, range 18–56). The clinical subsample of inmates and psychiatric patients ($n = 142$; 68.3% females; mean age 29.0, range 18–56) included in the analyses of convergent and discriminant validity was systematically characterized with MINI and SCID-II diagnostic interviews. Thirteen of the SCID-II interviews were inter-rated during the assessment by a blinded psychologist, and we identified optimal inter-rater reliability with an intraclass correlation coefficient (ICC) of .98 ($p < .001$). The majority of participants in this subsample met the criteria of two or more PDs. Diagnostic characteristics of this clinical subsample are given in Table 2.

Reliability

Results of the reliability analysis are shown in Table 3, whereas detailed scale statistics are reported in Electronic Supplemental Material 1–3 (Tables 1S, 2S, and 3S) as online special features. Based on the total sample, the internal consistency was sufficient for all 18 scales (Cronbach's $\alpha > .70$). Also, the analyses of item-total correlations in the total sample revealed acceptable item discriminations

Table 3. Results of the factorial validity analysis and reliability analysis in the total sample ($N = 567$)

Scale (schema)	α	1st item	2nd item	3rd item	4th item	5th item	Factor reliability	Variance extracted	Factor-scale congruency	Congruency w. Kriston et al. (2013)
Emotional Deprivation	.81	.637	.666	.844	.766	.530	.827	.520	.965	.995
Abandonment	.89	.771	.739	.860	.758	.797	.891	.660	.982	.999
Mistrust/Abused	.92	.825	.794	.852	.871	.818	.920	.730	.990	.995
Social Isolation	.90	.872	.726	.698	.898	.876	.909	.716	.985	.994
Defectiveness	.93	.851	.861	.851	.890	.794	.928	.760	.989	.999
Failure to Achieve	.90	.814	.713	.861	.856	.798	.905	.697	.990	.997
Dependence	.87	.789	.668	.703	.778	.889	.877	.634	.978	.996
Vulnerability to Harm	.82	.823	.771	.566	.662	.613	.824	.552	.951	.996
Enmeshment	.76	.595	.490	.631	.564	.760	.746	.419	.914	.990
Subjugation	.84	.712	.765	.683	.677	.773	.848	.575	.954	.997
Self-Sacrifice	.82	.610	.577	.847	.605	.783	.822	.529	.969	.999
Emotional Inhibition	.76	.607	.679	.654	.483	.674	.758	.426	.938	.992
Unrelenting Standards	.74	.651	.589	.524	.701	.518	.740	.424	.942	.995
Entitlement	.70	.554	.550	.558	.641	.535	.701	.365	.945	.976
Insufficient Self-Control	.75	.552	.759	.516	.576	.659	.753	.425	.906	.992
Approval-Seeking	.78	.504	.781	.747	.616	.540	.781	.451	.950	.996
Pessimism	.88	.813	.829	.802	.652	.785	.888	.667	.969	.999
Self-Punitiveness	.87	.791	.698	.761	.846	.779	.879	.648	.986	.957

Notes. Factor loadings (standardized regression weights). All reported parameters are statistically significantly different from zero at $p < .001$ α refers to Cronbach's alpha reliability.

Detailed characteristics of scale reliabilities and interitem correlations are presented in Table 1S, 2S, and 3S for the total sample and the two subsamples.

Unstandardized factor loadings (regression weights) are presented in Electronic Supplementary Material ESM 4, Table 4S.

(> .40) in all but two cases (item 85 of the Unrelenting Standards scale, and item 14 of the Entitlement scale). However, internal consistency and item discrimination were marginally lower if analyzed in the nonclinical and clinical samples separately. This applied for the schemas of Enmeshment ($\alpha = .69$), Entitlement ($\alpha = .69$), and Insufficient Self-control ($\alpha = .69$) in the nonclinical sample as well as for Emotional Inhibition ($\alpha = .65$) and Insufficient Self-control ($\alpha = .67$) in the clinical sample.

Factor Structure

Results for factorial validity are shown in Table 3. All factor loadings (standardized regression weights) and factor reliability coefficients were satisfactory (exceeding the desired thresholds of .40 and .70, respectively). Unstandardized loadings are reported in the Electronic Supplementary Material ESM 4 (Table 4S) as online special features. The average extracted variance from items did not reach the threshold of .50 but was still above .40 for the scales Enmeshment/Undeveloped Self, Emotional Inhibition, Unrelenting Standards, Insufficient Self-Control, and Approval-Seeking. The average extracted variance was substantially lower than required for the scale Entitlement (.365). As reported in Table 3, factor-scale congruency (correlation between factor scores and corresponding sum scores) was very high (above .90) for all scales. Additionally, the similarity (congruency coefficients) between factor loadings in the present study and factor loadings in the

German study (Kriston et al., 2013) ranged from .957 to .999 indicating a high degree of similarity (Lorenzo-Seva & ten Berge, 2006).

All factors were positively associated with each other in terms of correlation coefficients ranging from .021 (Entitlement) to .929 (Pessimism). See Electronic Supplementary Material 5 (Table 5S) for more details on this. The factor of Pessimism was strongly correlated with three other factors (Mistrust/Abused, Vulnerability to Harm, and Subjugation) suggesting that this factor either is redundant or represents a general negative attribution style related to other schemas.

The discrepancy chi-square test indicated a statistically significant misfit ($\chi^2 = 7,914.785$; $df = 3,762$; $p < .001$), while the normed chi-square statistic (2.104) showed an acceptable fit of the model (below 3.00). The CFI (.842) and the TLI (.832) missed the required threshold (above .90). Both the RMSEA (.044; 90% CI .043 to .045) and the SRMR (.068) reached recommended thresholds (below .050 and .080, respectively) signifying a moderate to good model fit.

Using a robust weighted least square estimator in a secondary analysis confirmed the primary findings ($\chi^2 = 7,602.436$; $df = 3,825$; $p < .001$; normed $\chi^2 = 1.988$; RMSEA = .044; 90% CI .042–.045) with a considerably improved CFI (.941) and TLI (.938) but the weighted root mean square residual (WRMR = 1.615) failed the recommended threshold (below 1.000). Exploratory testing showed that the bifactor model fit the data as well as the original correlated factors model ($\chi^2 = 8,029.156$; $df = 3,825$; $p < .001$; normed $\chi^2 = 2.099$; CFI = .840;

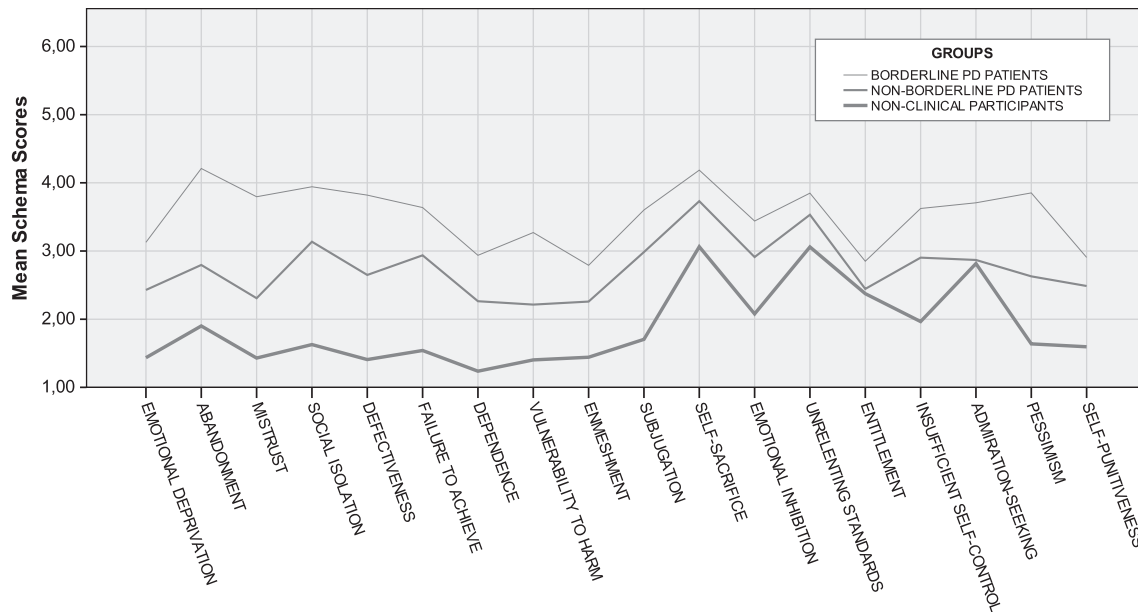


Figure 1. Mean schema profiles (YSQ-S3) of patients with Borderline PD ($n = 101$), Patients without Borderline PD ($n = 41$), and Nonclinical Participants ($n = 127$). The overall difference between group mean scores in one-factorial analysis of variance is statistically significant for each scale at $p \leq .001$. The nonclinical group was defined by self-reported absence of lifetime incidence of any mental health care or suicidal ideations, whereas the two clinical groups were defined by criterion-based outcome of diagnostic interviews. PD = Personality Disorder; YSQ-S3 = Young Schema Questionnaire – Short Form 3.

TLI = 0.833; RMSEA = .044; 90% CI .043–.045; SRMR = 0.057). An analysis of the modification indices in the correlated factors model revealed that some items are likely to load on most of the primary factors. Considerable cross-loadings affected particularly item 36, 67, 77, and 85 in the robust maximum likelihood estimation and item 31, 32, 85, and 88 in the robust weighted least square estimation. We also identified some substantial residual correlations (item 5 with 23, 13 with 31, and 62 with 71).

Discriminant Validity

The distributions of age and gender for Borderline PD patients (mean age = 28.33; $SD = 7.36$; 70.3% women), non-Borderline PD patients (mean age = 30.73; $SD = 10.4$; 63.4% women), and nonclinical participants (mean age = 29.84; $SD = 8.2$; 80.3% women) were found largely comparable. Statistically significant ($p \leq .001$) group differences were found for all schemas between the three groups with effect sizes (variance explained as η^2) ranging from .05 (Entitlement) to .55 (Mistrust/Abused). See Electronic Supplementary Material 6 (Table 6S) for more details. As shown in Figure 1, schema scores were generally most pronounced in the group of Borderline PD patients (mean total score = 63.5; $SD = 13.3$; $n = 101$), followed by patients without Borderline PD (mean total score = 49.5; $SD = 13.0$; $n = 41$), and least in the nonclinical group (mean total score = 33.7; $SD = 8.6$; $n = 127$).

Overall, differences were most pronounced for the first five schemas, referred to as *the domain of disconnection* (Emotional Deprivation, Abandonment, Mistrust, Social Isolation, and Defectiveness), whereas the smallest differences occurred in the schemas of Entitlement, Unrelenting Standards, Self-Sacrifice, and Approval-Seeking.

Associations With Personality Disorders

We explored associations between schema scales and SCID-II rated PD dimensions by estimating standardized regression coefficients (see zero-order correlations in Electronic Supplementary Material 7, Table 7S). This also served as an evaluation of the construct validity of the trait-like schema features by using SCID-II dimensional scores as a criterion measure. As presented in Table 4, the sum of all PD dimensions explained 53% of the variance in the total YSQ-S3 score suggesting a significant association between schemas and personality pathology. Most of the hypothesized associations in Table 1 were supported. However, Emotional Inhibition, Enmeshment, Self-Sacrifice, and Insufficient Self-control were not particularly associated with the expected PDs. The Borderline PD dimension had the highest number of significant associations with schemas followed by Avoidant PD, Antisocial PD, Dependent PD, Obsessive-Compulsive PD, Schizotypal PD, Narcissistic PD, Histrionic PD, and Paranoid PD, in that order. Schizoid PD had no significant association with any schema.

Table 4. Regression of each YSQ-S3 scale on 10 personality disorder dimensions ($n = 142$)

Schemas	SCID-II personality disorder dimensions										R^2
	BDL	AVD	DPT	OBS	PAR	NAR	HIS	SCD	STY	ANT	
Emotional Deprivation	.26	.20	-.01	-.04	.07	.08	.01	.04	.17	-.13	.23
Abandonment	.54	.03	.25	-.04	.13	.15	-.07	-.05	-.09	-.30	.49
Mistrust/Abused	.29	<.01	-.02	.04	.52	.07	-.06	.08	.13	-.18	.60
Social Isolation	.31	.23	.13	.08	-.07	-.06	.07	.11	.25	-.11	.37
Defectiveness	.41	.23	.14	-.08	.05	-.09	.04	.08	.10	-.19	.42
Failure to Achieve	.20	.27	.22	-.10	.02	-.28	.20	.06	.04	-.02	.39
Dependence	.18	.18	.41	<.01	.05	-.02	-.04	-.08	.03	.04	.38
Vulnerable to Harm	.26	.02	.12	.05	.13	.16	.13	.02	.02	-.19	.26
Enmeshment	.19	-.07	.23	.29	.10	.10	-.04	-.07	.08	-.22	.29
Subjugation	.25	.21	.28	.14	-.05	.10	.01	-.06	.17	-.23	.42
Self-Sacrifice	.26	-.26	.05	.21	.13	-.01	-.12	-.04	-.01	-.22	.18
Emotional Inhibition	.11	.25	-.12	.08	.14	-.01	-.06	.11	.09	.02	.19
Unrelenting Standards	.05	.09	-.05	.42	.08	.13	.03	.17	-.12	-.33	.33
Entitlement	-.02	-.10	-.09	.11	.07	.60	.04	.12	.19	-.18	.52
Insufficient Self-Control	.34	.20	.18	-.03	-.09	.12	.07	.02	.21	-.07	.35
Approval-Seeking	.19	.05	.10	.08	.11	.16	.24	-.07	-.13	-.15	.28
Pessimism	.29	.18	.08	.11	.16	.08	.11	.10	<.01	-.25	.38
Self-Punitiveness	.20	.13	.01	.23	-.03	.02	.01	.06	.11	-.14	.19
YSQ-S3 total	.39	.16	.17	.12	.13	.10	.05	.05	.10	-.25	.53

Notes. Standardized beta-coefficients are reported. Coefficients in bold are significant at $p < .0$ and the largest coefficient for each schema is underlined. R^2 indicates the degree to which all personality disorder dimensions account for each schema score (all $p < .001$). Structured Clinical Interview for DSM-IV Axis II (SCID-II) dimensional scores: Borderline (BDL), Avoidant (AVD), Dependent (DPT), Obsessive-Compulsive (OBS), Paranoid (PAR), Narcissistic (NAR), Histrionic (HIS), Schizoid (SCD), Schizotypal (STY), and Antisocial (ANT) Personality Disorder.

Discussion

In this study we investigated the psychometric features of the Danish YSQ-S3 with emphasis on its ability to capture and discriminate PDs as measured with SCID-II in accordance with hypothesized and conceptually coherent associations. To our knowledge, this served as the first evaluation of convergence between all 18 schemas and PD diagnoses in a psychiatric setting. Our findings revealed empirical support for the psychometric qualities of the Danish version of the instrument including (1) reliability and (2) acceptable factorial structure. Although the scale of Entitlement exposed some minor problems regarding reliability and factorial validity, we still consider it appropriate to be used without the need for a substantial revision. As expected, the YSQ-S3 discriminated between relevant subgroups, supporting its (3) discriminant validity and applicability in the assessment of different clinical problems. Subsequently, we found that (4) schema scales were associated with conceptually relevant PD dimensions indicating convergent validity of the instrument.

Although in the CFA the discrepancy χ^2 test and the CFI indicated an insufficient model fit, it has been shown that they are oversensitive in sample sizes over 300 and complex models (Hair, Black, Babin, & Anderson, 2009). Thus, here we give a stronger emphasis to local and more robust global fit indexes (normed χ^2 , RMSEA, SRMR) and conclude that the factorial validity of the Danish YSQ-S3 can be considered satisfactory. This is also supported by

our secondary analysis showing good model fit using a robust weighted least square estimator and categorical indicators. Our results are overall in concordance with factorial findings from Germany (Kriston et al., 2013), Finland (Saariaho et al., 2009), Spain (Calvete, Orue, & González-Diez, 2013), Canada (Hawke & Provencher, 2012), and Portugal (Rijo & Gouveia, 2008) suggesting that our conclusions may be generalizable to most Western societies. This is in particular underscored by the strong similarity between factor loadings in the German study and factor loadings in the present study by means of congruency coefficients. Still, high intercorrelations between factors suggest that some of them may be redundant. This was also reinforced by our secondary findings showing that a bifactor model fit the data approximately as well as the original model and that some items are likely to exhibit considerable cross-loadings or residual correlations. A detailed exploration of the factorial structure of the instrument and the comparison of different models were beyond the scope of the present study, but the findings indicate that the true factor structure may be comparably or even better represented by alternative models. Particularly, the application of exploratory structural equation modeling (ESEM) may provide valuable insights into future research (Marsh, Morin, Parker, & Kaur, 2014).

Our hypothesis that schemas discriminate patients from nonclinical participants, and Borderline PD patients from non-Borderline PD patients, was supported in the present study. This is consistent with the Schema Therapy literature

(Young et al., 2003, p. 306) and previous findings (Lawrence et al., 2011; Nilsson et al., 2010; Specht, Chapman, & Cellucci, 2009) suggesting that schemas are particularly pronounced in Borderline PD. Yet, schemas are not entirely equivalent with severity of psychopathology, but are rather severity indicators of core problems associated with attachment issues, Borderline PD, and related problems (Young et al., 2003). The discriminating ability of schemas particularly applied for the basic schema domain of Disconnection (Emotional Deprivation, Abandonment, Mistrust, Social Isolation, and Defectiveness) suggesting that this cluster of schemas may be a sensitive measure of core themes associated with Borderline PD.

The overall correspondence between schema scales and SCID-II dimensions of personality pathology (Table 4) strengthens the assertion that schemas represent pervasive and trait-like features of dysfunction, also supported in studies with previous versions of YSQ (Ball & Cecero, 2001; Nordahl, Holthe, & Haugum, 2005; Pauwels et al., 2012). This is consistent with test-retest studies of schema stability suggesting that schemas are fairly robust to change over time (Riso et al., 2006; Wang, Halvorsen, Eisemann, & Waterloo, 2010), even after evidence-based treatment for depression (Renner, Lobbstaël, Peeters, Arntz, & Huibers, 2012). Although some schemas are sensitive to depressive states (Failure, Emotional Deprivation, Abandonment/Instability), schemas generally behave like traits similar to PDs (Riso et al., 2006).

The particular pattern of associations between YSQ-S3 scales and SCID-II dimensions was overall in accordance with the hypotheses in Table 1 as well as similar studies among psychiatric patients (Nordahl et al., 2005) and offenders (Gilbert & Daffern, 2013): *Borderline PD* was associated with Abandonment, Defectiveness, Insufficient Self-control, Social Isolation, Mistrust/Abused, Vulnerability to Harm, Emotional Deprivation, and Self-Sacrifice, which largely correspond with the Schema Therapy model of Borderline PD (Young et al., 2003, p. 306). *Avoidant PD* was associated with Failure to Achieve, Emotional Inhibition, Defectiveness, and Self-Sacrifice (negatively). *Dependent PD* was associated with Dependence, Subjugation, Abandonment, and Enmeshment. *Obsessive-Compulsive PD* was associated with Unrelenting Standards, Enmeshment, Self-Punitiveness, and Self-Sacrifice. *Paranoid PD* was strongly associated with Mistrust/Abused. *Narcissistic PD* was strongly associated with Entitlement while negatively associated with Failure to Achieve. *Histrionic PD* was associated with Approval-Seeking. Consistent with findings by Nordahl et al. (2005), no schema was significantly associated with *Schizoid PD*; however, Gilbert and Daffern (2013) identified significant associations of Schizoid PD with Emotional Inhibition and Social Isolation. *Schizotypal PD* was associated with Social Isolation. *Antisocial PD* was negatively associated with Unrelenting Standards, Abandonment, and Pessimism, but had no positive associations. The finding that Antisocial PD was not associated with Insufficient Self-control is consistent with the findings of Nordahl et al. (2005), Thimm (2011), and Ball and Cecero (2001). However, in a sample of 87 offenders, Gilbert and Daffern (2013) found that Insufficient

Self-control was associated with Antisocial PD, but even more with Borderline PD. In the present study, this schema had the strongest association with Borderline PD plausibly referring to impulsivity in Borderline PD. Conclusively, the majority of PDs were associated with conceptually related schemas as measured with the YSQ-S3.

In the present study Antisocial, Schizoid, Histrionic, and Schizotypal PD lacked substantial positive associations with schemas. However, the schema model is broader than PDs in several respects by representing a framework of personality pathology rather than merely a taxonomy of descriptors (Young & Gluhoski, 1996). Moreover, the schema model is more specific than PD categories in delineating particular cognitions, affects, and behaviors associated with specific personality pathology. Some of the PD types described in the DSM-IV are hypothesized to represent schemas, while others are based on schema processes involving coping and schema modes (Bamelis, Renner, Heidkamp, & Arntz, 2010). For example, one individual may get enraged and violent when the Mistrust/Abused schema is activated, whereas another individual may become distressed and self-harm. Thus, Avoidant PD is typically characterized by avoidant coping when schemas are triggered, whereas Antisocial PD is characterized by over-compensating coping. This infers, that the hypotheses in Table 1 in fact are artificial and to some extent arbitrary, as schemas are often related to internal processes rather than to manifesting problems (Young et al., 2003). The clinical implication of this is that idiographic schema assessment and formulation along with assessment of schema modes (coping and behavior) and learning history (recalled traumas and parental behavior) are highly recommended prior to treatment.

The results of the present study should be interpreted in light of certain limitations. The online questionnaire format allowed us to collect complete data from a large random community sample, but we were not fully able to control the selection of participants. However, variance regarding YSQ scores and demographic characteristics ranged broadly, leading to one heterogeneous mixed sample, one representative clinical subsample, and one matching non-clinical subsample. Like similar studies we used a modest sample size which is likely to have reduced the power of detecting weak associations. Yet, to our knowledge, the number of clinical participants in the present study assessed with a diagnostic interview for PDs ($n = 142$) is so far the largest number included in an examination of convergence with any version of the YSQ. A particular weakness, though, is the fact that this DSM-IV PD model lacks structural validity, even though it has been retained in the Section II of the DSM-5 (Krueger & Hopwood, 2014). Consequently, future evaluations of convergence should include associations with the empirically based DSM-5 Section III PD Model (PID-5; American Psychiatric Association, 2013b).

When dealing with assessment, conceptualization, and treatment of PDs we need theory to guide us in our clinical work and give our data meaning (Simonsen, 2011). The YSQ-S3 performs as a suitable tool for this purpose and may accompany the retained DSM-IV Axis II categories

as well as the DSM-5 Section III PD model with direct links to psychotherapy. Thus, we consider the YSQ-S3 as an appropriate instrument for studies and clinical assessment of PDs, developmental psychopathology, adult attachment, and other kinds of mental health problems. Largely in agreement with previous findings in other countries and with former versions of the instrument, we conclude that the YSQ-S3 provides a valid and reliable measure of Early Maladaptive Schemas. We suggest that future studies of associations with PDs include the DSM-5 Section III model of Pathological Personality Traits if not another scientifically valid taxonomy of the forthcoming DSM-5.1 and ICD-11 (American Psychiatric Association, 2013b; Tyrer et al., 2014).

Electronic Supplementary Material

The electronic supplementary material is available with the online version of the article at <http://dx.doi.org/10.1027/1015-5759/a000272>

ESM 1. Table 1S.

Item-Total correlations and Cronbach's alpha in the total sample ($N = 567$).

ESM 2. Table 2S.

Item-Total correlations and Cronbach's alpha in clinical subsample ($n = 176$).

ESM 3. Table 3S.

Item-Total correlations and Cronbach's alpha in nonclinical subsample ($n = 391$).

ESM 4. Table 4S.

Unstandardized factor loadings (with standard errors) in the total sample ($N = 567$).

ESM 5. Table 5S.

Intercorrelations of YSQ-S3 factor scores.

ESM 6. Table 6S.

Comparison of mean scores of the YSQ-S3 scales between Borderline PD patients, Non-Borderline PD patients, and nonclinical participants with analysis of variance (ANOVA).

ESM 7. Table 7S.

Zero-order correlations of schemas with personality disorder dimensions ($n = 142$).

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