The validity and reliability of the German version of the Somatoform Dissociation Questionnaire (SDQ-20)

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Originally published at:
Title: The Validity and Reliability of the German Version of the Somatoform Dissociation Questionnaire (SDQ-20)

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Word count: 7467

Acknowledgments: The authors wish to express their gratitude towards the clinical colleagues and their clients who supported us in this work. The authors have no conflicting interests.
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ABSTRACT. The present study investigated the validity of the German version of the Somatoform Dissociation Questionnaire (SDQ-20), a scale designed to measure somatoform dissociative symptoms. Somatoform dissociation involves physical manifestations of a dissociation of the personality and is considered a unique entity in the phenomenological spectrum of dissociation. The validity and reliability of the German version of the SDQ-20 was examined using a sample of 225 patients with (N = 39) and without dissociative disorders who were recruited from several in- and outpatient psychiatric clinics. They were assessed by structured diagnostic interviews, diagnostic checklists, self-rating scales for dissociation, post-traumatic stress, anxiety and depression. Patients with dissociative disorders reported significantly more (p < 0.001) somatoform dissociative symptoms than patients without dissociative disorders (criterion validity). Significant correlations (p < 0.001) were found between scores of somatoform dissociation, psychoform dissociation, posttraumatic stress symptoms and traumatic childhood experiences (construct validity). Reliability was corroborated by a Cronbach’s alpha coefficient of 0.91 and a test-retest correlation of 0.89. A component factor analysis suggested one-dimensionality of the SDQ-20. The psychometric properties and cross-cultural validity of the German version of the SDQ-20 are excellent. Our results form the basis for the further study of somatoform dissociation in German-speaking populations.

KEYWORDS. Psychometrics; Dissociative Disorders; Somatoform Disorders; Self Assessment
Recent data shows that trauma-associated dissociation and dissociative disorders are important, cross-culturally valid factors in psychiatric morbidity (Akyuz, Dogan, Sar, Yargic, & Tutkun, 1999; Draijer & Boon, 1993; Foote, Smolin, Kaplan, Legatt, & Lipschitz, 2006; Gast, Rodewald, Nickel, & Emrich, 2001; Maaranen et al., 2008; Ross, Anderson, Fleisher, & Norton, 1991; Sar, Tutkun, Alyanak, Bakim, & Baral, 2000; Saxe et al., 1993; Schafer et al., 2007; Teicher, Samson, Polcari, & McGreenery, 2006; Tutkun et al., 1998; Xiao et al., 2006). According to DSM-IV (American Psychiatric Association, 1994), the essential feature of dissociative disorders is a disruption of the normally integrated functions of memory, consciousness, identity and perception. These symptoms are commonly referred to as psychoform dissociation. Patients with dissociative disorders, however, often complain of somatic symptoms with no apparent physical cause, e.g. pain, anaesthesia or paralysis (Dell, 2002; Öztürk & Sar, 2008; Espirito-Santo & Pio-Abreu, 2009; Saxe et al., 1994). Nijenhuis and colleagues (Nijenhuis, 2000; Nijenhuis, 2004; Nijenhuis, Spinshoven, Van Dyck, Van der Hart, & Vanderlinden, 1996, 1998a; Nijenhuis et al., 1999; Nijenhuis, 2009) introduced the term somatoform dissociation which emphasizes the equal importance of dissociation’s disintegrating effect on both psychoform and somatic processes. Within their theory of structural dissociation of the personality, Van der Hart, Nijenhuis, & Steele (2006) propose that both psychoform and somatoform dissociative symptoms are manifestations of the existence of a structural dissociation of the personality into two or more insufficiently integrated biopsychosocial subsystems. Psychoform dissociation refers to symptoms that phenomenologically involve the mind, e.g. dissociative amnesia, or Schneiderian symptoms (e.g. hearing voices) whereas somatoform dissociation refers to symptoms that phenomenologically involve the body and cannot
be explained by a medical condition, e.g. anesthesia or analgesia, pain, loss of the ability to move, or pseudoseizures. In this theoretical framework, structural dissociation is due to diminished mental integrative capacity as a result of cumulative adversities during childhood. This view is empirically supported by a strong link between dissociative symptoms in adulthood and self-reported childhood trauma (Briere, 2006; Draijer & Langeland, 1999; Näring & Nijenhuis, 2005; Teicher et al., 2006; Waller et al., 2000; Watson, Chilton, Fairchild, & Whewell, 2006; Zlotnick et al., 1995).

Nijenhuis and co-workers developed the somatoform dissociation questionnaire (SDQ-20) (Nijenhuis et al., 1996; Nijenhuis, Spinhoven, Van Dyck, Van der Hart, & Vanderlinden, 1998a), a 20-item self-rating instrument for measuring somatoform dissociation. The original SDQ-20 items were derived from a pool of 75 items describing somatoform dissociative symptoms that had been reported in clinical settings and clinically observed upon reactivation of particular dissociative parts of the personality in patients with dissociative disorders (Nijenhuis et al., 1996). Each of the 20 items is rated on a five-point Likert scale. Higher total scores indicate greater levels of somatoform dissociation. The original Dutch questionnaire exhibited good psychometric characteristics with good internal consistency, concurrent validity and convergent validity (Nijenhuis et al., 1996; Nijenhuis et al., 1998a). Cross-cultural adaptations of the SDQ-20 are available in English (Waller et al., 2000), Turkish (Sar, Kundakci, Emre, Bahadir, & Oya, 2000), French (El-Hage, Darves-Bornoz, Allilaire, & Gaillard, 2002) and Portuguese (Amaral do Espírito Santo & Pio-Abreu, 2007). The results of these studies have demonstrated that the scalability, reliability, and validity of the instrument are satisfactory.
Based on their SDQ-20 validation data, Nijenhuis and colleagues developed the SDQ-5 as a brief screening measure for dissociative disorders (Nijenhuis, Spinhoven, Van Dyck, Van der Hart, & Vanderlinden, 1997). Using regression analysis methods they identified five SDQ-20 items that provided optimal discrimination between dissociative disorders and other mental disorders: “I have pain while urinating” (#4), “My body, or a part of it, is insensitive to pain” (#8), “I see things around me differently than usual (for example as if looking through a tunnel, or seeing merely a part of an object” (#13), “It is as if my body, or a part of it, has disappeared” (#15), and “I cannot speak (or only with great effort) or I can only whisper” (#18). A sum score of $\geq 8$ (sum scores range from 5 to 25) was recommended as cut-off, yielding a sensitivity of 94%, a specificity of 96-98%, a corrected positive predictive value of 72-84% and a corrected negative predictive level of 99% at an estimated prevalence rate of 10% in the author’s samples (Nijenhuis et al., 1997; Nijenhuis et al., 1998a).

There is a translated scale in German that covers manifestations of psychoform dissociation: the authorized German version of the Dissociative Experience Scale (DES) (Bernstein & Putnam, 1986) – “Fragebogen für Dissoziative Symptome” (FDS) (Spitzer et al., 1998). Although the FDS is expanded by a dimension ‘conversion’, comprising ten items which cover pseudo-neurological conversion symptoms according to ICD-10 (World Health Organization (WHO), 1989) criteria for dissociative and conversion disorders, a comprehensive German scale based on the concept of somatoform dissociation is lacking.

The present study aims to establish the cross-cultural validity of the German version of the SDQ-20, allowing for future investigation of the occurrence of psychoform and somatoform dissociative symptoms in German-speaking parts of
Europe. Three hypotheses were put forward. Firstly, patients with dissociative disorders were expected to present more somatoform dissociative symptoms than patients with other mental disorders. Secondly, patients who reported more traumatic adversity in childhood were expected to score higher on the somatoform dissociation scale than patients with no or with less self-reported childhood trauma. Thirdly, the association between somatoform dissociation measured by the SDQ-20 and conversion symptoms measured by the FDS subscale should be stronger than SDQ-20 scores and scores in other FDS dimensions.

**METHODS**

**Participants**

Patients were recruited from outpatient and inpatient units of seven psychiatric services in the German-speaking part of Switzerland and in the federal state of Baden-Württemberg in Germany. In addition, patients of private practitioners of psychiatry and psychotherapy were included. Patients in therapy or newly admitted patients who had completed assessment procedures were eligible for the study and were invited by their therapists to take part. Patients were eligible for the study regardless of their dissociative condition. Exclusion criteria were: younger than 17 or older than 75 years, current serious cognitive impairment or mental retardation (diagnosis of an organic mental disorder or mental retardation [IQ < 70] according to ICD-10 criteria), current acute psychosis, current severe substance abuse (ICD-10 diagnosis of a dependence syndrome with active or permanent psychoactive substance use; acute intoxication; withdrawal state), current affective disorder with psychotic symptoms, current acute
suicidality, and inadequate knowledge of the German language. Furthermore, only patients who were evaluated by their therapist as able adequately to cope with completing trauma questionnaires were considered for participation. Diagnoses according to the ICD-10 Classification of Mental and Behavioural Disorders (World Health Organization (WHO), 1989) were made by patients’ therapists using the ICD-10 Symptom Checklist for Mental Disorders (Janca, Ustun, van Drimmelen, Dittmann, & Isaac, 1994).

Participating patients were selected for further assessment with the Structured Clinical Interview for DSM-IV Dissociative Disorders (SCID-D) (Gast, Oswald, & Zundorf, 2000) (1) if they were in current psychotherapy because of a known dissociative disorder; or (2) if their clinical presentation suggested the presence of a dissociative disorder as evaluated by three of the authors who are trained and have experience in the treatment of dissociative disorders (C.M-P; G.W; H.A.); or (3) if self-ratings on the FDS exceeded a score of 20; and (4) if they were accessible for locally conducted interviews (e.g. not yet discharged from inpatient treatment) or if they were willing to travel to the office of one of the interviewers; and (5) if they agreed to the interview. The interviews were conducted by experienced clinicians trained in the treatment of dissociative disorders and use of the instrument.

In the first stage of data collection study participants were routinely asked to recomplete the SDQ-20 three to four weeks after the primary measurement in order to evaluate the test-retest reliability of the scale. After achieving a sizeable sub-group, the retest procedure was stopped due to financial considerations.

The study protocol was approved by the Institutional Ethics Committee. All participants provided written informed consent after the study’s procedures had been
explained to them. The possibility of sending their therapists their individual rating scores was offered.

The total sample comprised 225 patients (78.7% women). Thirty-nine patients (97.4% women, 17.3% of the total sample) were allocated to the dissociative group due to their fullfilment of DSM-IV criteria for dissociative disorders as assessed by the SCID-D interview. One hundred nine patients (70.6% women, 48.5% of the total sample) were assigned to the non-dissociative group as they had an FDS score \( \leq 9 \). This cutoff score was set according to a norm sample (mean + 1 SD of healthy subjects) (Freyberger, 1999). Seventy-seven patients (80.5% women, 34.2% of the total sample) did not meet these criteria and were therefore excluded from group comparisons and only incorporated in correlational analyses. One hundred and forty-eight patients (77.7% women, 65.8% of the total sample) were included in both group comparisons and correlational analyses.

**Measures**

The Somatoform Dissociation Questionnaire (SDQ-20) was translated from both English and Dutch into German. This was followed by a back translation from German into both English and Dutch. Both translation processes were carried out by native speakers of the target language who possess excellent knowledge of the source language. The final German version of the questionnaire was the best possible synthesis of the two preliminary English and Dutch versions. The 20 items of the SDQ-20 are rated on 5-point Likert scale ranging from 1 to 5, so that a minimum score of 20 and a maximum score of 100 can be attained by adding the individual item scores. Higher total scores indicate greater levels of somatoform dissociation.
The “Fragebogen für Dissoziative Symptome” (FDS) (Spitzer et al., 1998) is the authorized German version of the Dissociative Experience Scale (DES) (Bernstein & Putnam, 1986), a self-rating scale with excellent psychometric properties (Bernstein & Putnam, 1986; Carlson & Putnam, 1993) which is used world-wide for the assessment of psychoform dissociative symptoms. The 28 items of the DES are rated on an 11-point Likert scale that ranges from 0 (“never”) to 100 (“always”) and correspond to the subscales absorption, depersonalization, derealisation, and amnesia. The FDS contains an additional 16 items that correspond to a conversion subscale. The overall FDS score is obtained by adding up the 44 item scores and dividing by 44. This yields an overall score ranging from 0 to 100. An equivalent range applies to each subscale score. The higher the score is, the greater the experience of dissociative symptoms. The psychometric properties of the FDS are comparable to the original English DES (Freyberger et al., 1998; Spitzer et al., 1998). The FDS and DES are used as screening measures for dissociative disorders. Nevertheless, appropriate cut-off scores are still not well established and for the DES, they vary from 15 to 35 in various prevalence studies.

Little work has been done to determine scores that optimally differentiate between dissociative disorders and other mental disorders using Bayesian statistics and Receiver Operating Characteristic (ROC) analysis. Carlson et al. (1993), using a large North American sample, suggested a DES score of 30 or higher to identify subjects with dissociative identity disorder. Analyzing their Dutch sample, Draijer & Boon (1993) revealed a cut-off score of 25 that best distinguished between subjects with dissociative disorders and those with other mental disorders. Conversely, based on a German sample, Rodewald, Gast, & Emrich (2006) recommended a cut-off score of 15 for the DES, and 13 for the FDS to identify patients with dissociative disorders and dissociative
disorders not otherwise specified, type I (similar to dissociative identity disorder, but without sufficient distinction of different personality states or no amnesia for personal information). This is in line with a cut-off between 15 and 20 for the DES that we suggested in a previous study among a sample of chronic and severely impaired psychiatric outpatients (Mueller, Moergeli, Assaloni, Schneider, & Rufer, 2007).

The Childhood Trauma Questionnaire (CTQ) (Bernstein & Fink, 1998; Bernstein et al., 1993) is a 28-item retrospective measure of child abuse and neglect. Patients rate the frequency with which various events took place whilst they were growing up. Subscales measure emotional and physical abuse, sexual abuse, emotional neglect, and physical neglect. For each of the five subscales, the five appropriate item scores are summed to produce the subtotal. Subtotals range from 5 to 25 and provide a quantitative index of the severity of adverse experiences in each area. Higher scores indicate a more severe extent of traumatic experience. Total CTQ scores range from 25 to 125 and are obtained by adding the five subtotals. Cut off scores representing severity levels for each type of trauma are provided by the authors: e.g., the scores indicating moderate level of abuse are 13 (emotional abuse), 10 (physical abuse), 8 (sexual abuse), 15 (emotional neglect), and 10 (physical neglect). The version of the CTQ used in the present study is a German adaptation of the scale (Gast et al., 2001; Wulff, Schröder, Reinhold, & Driessen, 2006).

PTSD was measured using the German Adaptation (Griesel, Wessa, & Flor, 2006) of the Posttraumatic Stress Diagnostic Scale, developed by Foa et al. (Foa, Cashman, Jaycox, & Perry, 1997). The PDS is a 49-item questionnaire designed to assess symptoms consistent with DSM-IV diagnostic criteria for posttraumatic stress disorder (American Psychiatric Association, 1994). It comprises four sections: 1) a
trauma checklist; 2) questions specifically asking about DSM-IV A1 criteria relating to the most upsetting traumatic event (when it happened, if anyone was injured, perceived life threat, and whether the event resulted in helplessness or terror); 3) inquiry of the frequency of re-experiencing, avoidance, and arousal symptoms on a 4-point Likert scale from 0 (not at all or only once) to 3 (five or more times per week/nearly always); 4) assessment of impairment in important areas of functioning. The total severity score (ranging from 0 to 51) is based on the symptom frequency ratings and is obtained by adding up the 17 individual item scores. The cut-offs for the symptom severity rating categories are as follow: ≤ 10 mild; ≥ 11 and ≤ 20 moderate; ≥ 21 and ≤ 35 moderate to severe; ≥ 36 severe.

The ICD-10 Symptom Checklist for Mental Disorders (Janca et al., 1994) is a semi-structured instrument intended for clinicians’ assessment of psychiatric symptoms and syndromes in the F0-F6 categories of the ICD-10 system: organic, including symptomatic, mental disorders (F00-F09); mental and behavioural disorders due to psychoactive substance use (F10-F19); schizophrenia, schizotypal and delusional disorders (F20-F29); mood disorders (F30-F39); neurotic, stress-related and somatoform disorders (F40-F49); behavioural syndromes associated with physiological disturbances and physical factors (F50-F59); disorders of adult personality and behaviour (F60). It comprises a listing of the symptom items specified by the ICD-10 research criteria that allow for an accurate diagnostic evaluation by clinicians. No special training is necessary if the checklist is used by educated clinicians (psychiatrists or psychotherapists). Preliminary testing revealed good interrater reliability of the instrument (Janca, Ustun, Early, & Sartorius, 1993).
Dissociative disorders according to DSM-IV were diagnosed by applying the German version of the Structured Clinical Interview for DSM-IV Dissociative Disorders (Bronisch, Hiller, Mombour, & Zaudig, 1995; Gast et al., 2000) which is considered the “gold standard” for the assessment of dissociative disorders.

Statistical analysis

We used t-tests to examine group differences in test scores. Pearson correlation coefficients were calculated to measure associations between SDQ-20 and other scores. Criterion validity was determined by the group difference in mean SDQ-20 scores. Construct validity was assessed by the correlations between FDS, PDS and CTQ scores with the SDQ-20 score. Reliability of the SDQ-20 was evaluated by the correlation between test and retest and by internal consistency using Cronbach’s alpha (Cronbach, 1951). To analyze dimensionality of the SDQ-20 a principal component factor analysis (PCA) was performed. Bayesian statistics were used to determine the test performance of the SDQ-5 in detecting dissociative disorders. In order to determine which items of the SDQ-20 best discriminated between patients with dissociative disorders and patients with other mental disorders, we entered the 20 items of the SDQ-20 into a logistic regression analysis using the stepwise selection method with entry testing based on the significance of the score statistic (p < 0.05), and removal testing based on the probability of a likelihood-ratio statistic based on the maximum partial likelihood estimates (p > 0.10). Statistical analyses were performed using SPSS 15.0 (SPSS Inc., Chicago, II, USA). The level of significance was set at 0.05. All tests were two-tailed.
RESULTS

Sociodemographics and clinical characteristics

All patients were recruited from psychiatric services in Switzerland and Germany. The age of the patients ranged from 17 to 73 years (M = 37.7, SD = 14.0). Most patients were Swiss or German (N = 192, 85.4%), the minority were immigrants (N=29, 12.9%). One hundred twenty-four (55.1%) were single, 57 (25.4%) married, 37 (16.4%) divorced, and 4 (1.8%) widowed. Most had completed an apprenticeship or college (N=115, 51.1%), 57 (25.3%) a polytech or business school/university, 50 (22.2%) obligatory school only or they were early school leavers. Four participants (1.8%) did not provide any information about their nationality, 3 (1.3%) did not mention their marital status or level of education. The mean age did not differ significantly (t = 0.972, p = 0.334) between patients with dissociative disorders (M = 36.9, SD = 10.4) and patients with other mental disorders (M = 39.0, SD = 14.1). The two groups were comparable with regard to marital status and education, but there were significantly more immigrants among the patients with dissociative disorders (N = 11, 28.2%) than among patients with other mental disorders (N = 11, 10.1%) (X² = 8.54, df = 2, p = 0.015). Diagnoses according to ICD-10 included mental and behavioural disorders due to psychoactive substance use (N = 6), schizophrenia, schizotypal and delusional disorders (N = 4), affective disorders (N = 77), neurotic, stress-related and somatoform disorders (N = 103, thereof 36 with posttraumatic stress disorder (PTSD) [16% of the total sample] and 20 with other anxiety disorders such as phobia, panic disorder, generalized anxiety disorder and obsessive-compulsive disorder [8.9% of the total sample]), behavioural syndromes associated with physiological disturbances and
physical factors (N = 18), behavioural and emotional disorders with onset usually occurring in childhood and adolescence (N = 5), and personality disorders (N = 75).

**SDQ-20 criteria-related validity**

The SDQ-20 scores ranged from 20 to 79, including 32 subjects (14.2%) with the minimum score of 20 (20 = no symptoms). SDQ-20 scores were independent of age (r = 0.01, p = 0.943). The women in our sample reported significantly higher mean scores than the men (33.8 vs. 27.3, p < 0.001). SDQ-20 scores were significantly higher in patients with dissociative disorders than in patients with other mental disorders (t = -9.55, df = 42, p < 0.001) (Table 1). Moreover, SDQ-20 scores in patients with PTSD (M = 35.0, SD = 14.7) were significantly higher than in patients with anxiety disorders other than PTSD (M = 26.5, SD = 11.6) (t = 2.216, df = 54, p = 0.031).

**SDQ-20 construct validity (convergent and divergent validity)**

The FDS scores ranged from 0.2 to 66.6 with a significant group difference (t = -11.159, df = 39, p < 0.001) between patients with dissociative disorders and patients with other mental disorders (Table 1). On all subscales of the FDS patients with dissociative disorders scored significantly higher than patients with other mental disorders (amnesia: t = -6.28, p < 0.001; absorption: t = -11.34, p < 0.001; derealisation: t = -9.74, p < 0.001; conversion: t = -9.17, p < 0.001).

PDS scores ranged from 0 to 49 with 7 patients (3.1%) attaining a score of 0. Patients in the dissociative group reported a significantly higher number of post traumatic stress symptoms than patients in the non-dissociative group (t = -12.31, p < 0.001).
CTQ scores ranged from 25 to 124 including 7 subjects (3.1%) with the minimum score of 25 (25 = no symptoms). Subjects in the dissociative group scored significantly higher than patients in the non-dissociative group on the CTQ total score ($t = -10.52$, $p < 0.001$) as well as on all CTQ subscales (emotional abuse: $t = -12.63$, $p < 0.001$; physical abuse: $t = -5.29$, $p < 0.001$; sexual abuse: $t = -7.76$, $p < 0.001$; emotional neglect: $t = -6.16$, $p < 0.001$; physical neglect: $t = -5.07$, $p < 0.001$) (Table 1).

The correlation between SDQ-20 and FDS scores was significant and strong ($r = 0.81$, $p < 0.001$). All the correlations between the FDS subscales and the SDQ-20 were significant (amnesia: $r = 0.63$, $p < 0.001$; absorption: $r = 0.71$, $p < 0.001$; derealisation: $r = 0.74$, $p < 0.001$). The highest correlation was found between the conversion subscale of the FDS and the SDQ-20 score ($r = 0.82$, $p < 0.001$). The correlation coefficient between the FDS conversion subscale and the SDQ-20 score differed significantly from the correlation coefficients between the other FDS dimensions and the SDQ-20 scores ($p < 0.05$). The correlation between SDQ-20 and PDS scores was also significant ($r = 0.59$, $p < 0.001$) as was the correlation between SDQ-20 and CTQ total scores ($r = 0.46$, $p < 0.001$). The correlations between SDQ-20 scores and CTQ subscales are given in Table 2.

**SDQ-20 reliability**

Cronbach’s alpha coefficient for the SDQ-20 was 0.914. The Pearson correlation coefficient for test-retest reliability was 0.89 ($p < 0.001$, $N = 67$). The test-retest correlation is shown in Fig. 1.

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Insert Fig. 1
**SDQ-20 dimensionality**

The PCA of the SDQ-20 ratings yielded a 1-factor solution according to Cattell’s scree test (Cattell, 1978) which explained 39.5% of the total variance (Fig. 2).

Insert Fig. 2

**Relationship between psychoform dissociation, posttraumatic stress and self-reported childhood trauma**

The correlations between psychoform dissociation, as measured by the DES (subdimensions amnesia, absorption and derealisation that are part of the FDS scale), PDS scores and CTQ dimensional scores are presented in Table 2. All the correlations reached significance (all p’s < 0.001, N=225). The correlation between DES scores and CTQ total scores was also significant (r = 0.52, p < 0.001).

Insert Table 2

**Screening performance of the SDQ-5**

We calculated the screening performance of the SDQ-5 at various cutoff scores. The results are given in Table 3. According to logistic regression analysis, 4 of the SDQ-20 items independently contributed to the discrimination between patients with dissociative disorders and patients with other mental disorders: “People and things look bigger than usual” (#6); “My body, or a part of it, is insensitive to pain” (#8); “I cannot see for a while (as if I am blind)” (#12); “I cannot speak (or only with great effort) or I can only whisper” (#18).

Insert Table 3
DISCUSSION

The aim of the present study was to determine the psychometric properties and cross-cultural validity of a German version of the SDQ-20 questionnaire.

Criteria-related validity was supported by the finding that patients with dissociative disorders attained significantly higher SDQ-20 scores than comparison patients. This supports our first hypothesis. Convergent validity was corroborated by the significant intercorrelations between SDQ-20 scores and FDS (p < 0.001), CTQ (p < 0.001) and PDS scores (p < 0.001). According to our second hypothesis, we expected patients who reported more traumatic adversities in childhood to score higher on the somatoform dissociation scale than patients with no or less self-reported childhood trauma. This was supported by our finding of a significant correlation between CTQ and SDQ scores, suggesting that the more subjects experienced childhood trauma, the more likely they were to develop dissociative symptoms. Though psychoform and somatoform dissociative symptoms may originate from a common mental process, it is suggested that they represent a phenomenologically distinct aspect of that process (Maaranen et al., 2005; Nijenhuis et al., 1996b; Nijenhuis et al., 1998; Nijenhuis et al., 1999; Nijenhuis, 2000; Waller et al., 2000). This view is supported by the finding that the correlation between the SDQ-20 scores and the FDS dimension conversion (which measures pseudo-neurological symptoms similar to somatoform dissociative symptoms) was significantly higher (p < 0.05) than the SDQ-20 scores and the other FDS dimensions amnesia, absorption and derealisation (divergent validity). These results support our third hypothesis. The two measures of reliability yielded excellent results (Cronbach’s alpha coefficient = 0.92, test-retest correlation = 0.89, p < 0.001) and are
comparable to the original Dutch version (Cronbach’s alpha coefficient = 0.95) (Nijenhuis et al., 1996).

The principal component factor analysis (PCA) yielded a single factor and confirmed the one-dimensional structure that was found in the original Dutch version of the SDQ-20. This finding contradicts the results of El-Hage and colleagues (El-Hage et al., 2002), who identified a three factorial structure comprising sensory neglect, subjective reactions to perceptive distortions and vigilance modulation disturbances in their French version of the scale. This discrepancy might be attributed to the high rate of PTSD (54%) in El-Hage and colleagues’ (El-Hage et al., 2002) sample compared to our sample (16%) and by the fact that they did not include patients with dissociative disorders. No PCA was done in the Dutch, English, Turkish or Portuguese versions, but the results from Nijenhuis et al. (Nijenhuis et al., 1996) showed a unidimensional structure for the SDQ-20.

In keeping with most previous work on somatoform dissociation throughout the lifespan (El-Hage et al., 2002; Maaranen et al., 2005; Nijenhuis et al., 1999; Nijenhuis et al., 2003; Waller et al., 2003), the age of our study participants had no effect on their SDQ-20 scores. Our finding that women had higher scores than men is in accordance with some previous work (El-Hage et al., 2002; Nijenhuis, Van der Hart, & Kruger, 2002).

Cross-cultural validity is supported by the similar amount of somatoform dissociative symptoms reported by patients with dissociative disorders in our sample (M = 48.4, SD = 15.3) and in subjects with dissociative disorders in other cultures, e.g. in the Netherlands (M = 49.4, SD = 15.0) (Nijenhuis et al., 1996; Nijenhuis et al., 1998a), Turkey (M = 52.5, SD = 18.0) (Sar et al., 2000) and Portugal (M = 39.3, SD = 11.9)
(Amaral do Espirito Santo & Pio-Abreu, 2007). More severe somatoform dissociation in patients with dissociative disorders compared to patients with other mental disorders has also been reported in the USA (Dell, 2002). Furthermore, somatoform dissociative symptoms among subjects with PTSD have been reported in France (El-Hage et al., 2002) and Nepal (Van Ommeren et al., 2002). It is worth noting that Dell (2002) and Van Ommeren et al. (2002) measured somatoform dissociation with scales other than the SDQ-20.

Our results show a strong association between psychoform and somatoform dissociation and cumulative childhood trauma which conforms to empirical evidence (Briere, 2006; Draijer & Langeland, 1999; Näring & Nijenhuis, 2005; Teicher et al., 2006; Waller et al., 2000; Watson et al., 2006; Zlotnick et al., 1995). According to the majority of previous studies, the association between somatoform dissociative symptoms and cumulative traumatization appears to be stronger than that seen between psychoform dissociative symptoms and cumulative traumatization (Näring & Nijenhuis, 2005; Nijenhuis et al., 2002; Nijenhuis et al., 2003; Waller et al., 2000; Waller et al., 2003). One possible explanation for this finding is the inclusion of non-dissociative items in instruments such as the DES that are intended to measure psychoform dissociation (Nijenhuis, 2009). However, the association that we found between cumulative traumatization and somatoform dissociation is similar to the association between psychoform dissociation and cumulative traumatization.

Patients with PTSD in our sample reported significantly more somatoform dissociative symptoms than patients with anxiety disorders other than PTSD. Furthermore, we found a strong association between posttraumatic stress symptoms, as measured by the PDS, and somatoform dissociation. These findings are consistent with
the theory of structural dissociation of the personality which conceptualizes PTSD as a dissociative disorder (Van der Hart et al., 2006).

According to the data from their Dutch samples, Nijenhuis and colleagues recommended that patients with a SDQ-5 score ≥ 8 be assessed with a structured diagnostic interview for DSM-IV dissociative disorders such as the SCID-D (Nijenhuis et al., 1997; Nijenhuis et al., 1998a). In our sample, 90% of the patients with a dissociative disorder attained a SDQ-5 score ≥ 8 (sensitivity), and 86% of the patients in the group with other mental disorders had a score < 8 (specificity). The performance of the SDQ-5, in particular as relates to specificity, at this cut-off point is lower in our data than that reported by Nijenhuis et al. (sensitivity of 94%, specificity of 96-98%). Accordingly, the positive predictive value of the SDQ-5, corrected for an estimated dissociative disorders prevalence rate of 10%, is substantially lower compared to Nijenhuis et al.’s results (positive: 42% vs. 72-84%; negative: 99% vs. 99%). The limited diagnostic accuracy of the SDQ-5 among German patients is in line with the findings of Sar and colleagues (2000) who reported 90% sensitivity and 75% specificity in their Turkish sample. Moreover, only two of the five items in the SDQ-5 scale significantly contributed to the discrimination between our group of patients with dissociative disorders and the comparison group: “My body, or a part of it, is insensitive to pain” (#8); and “I cannot speak (or only with great effort) or I can only whisper” (#18). This hints at some weakness regarding the screening performance of the SDQ-5 among German patients.

An important limitation of our study is that the non-dissociative group was determined by using a threshold in a self-rating scale (FDS) acquired using its normative properties. Although we administered a SCID-D interview to patients who
clinically presented dissociative symptoms, even if they had a low FDS score, we cannot definitely preclude false negative cases in the non-dissociative group as not all study participants were regularly seen by the authors or treated by therapists with experience in dissociative disorders. Since epidemiological studies (Foote et al., 2006; Gast et al., 2001; Saxe et al., 1993; Tutkun et al., 1998) have reported a prevalence rate of approximately 10% for dissociative disorders among in- and outpatients, we theoretically had to presume 11 false negative cases in our non-dissociative group. However, empirical evidence suggests that patients with dissociative disorders score high on the FDS scale (Carlson, Cicchetti, Barnett, & Braunwald, 1989; Draijer & Boon, 1993; Mueller, Moergeli, Assaloni, Schneider, & Rufer, 2007; Rodewald et al., 2006). Therefore, it is unlikely that individuals with a dissociative disorder would score lower than 9 on the FDS. Even if the inclusion of false negative cases remains a limitation of our study, the potential rate of false negative cases may be too low to significantly diminish the large differences in the SDQ-20 scores observed between the dissociative and non-dissociative group. A second methodological flaw is the non-randomized selection of subjects for the re-evaluation of the SDQ-20 which resulted in a non-representative sub-group. The comparison of the participants who conducted test-retest measures with the sample as a whole revealed no significant group differences regarding sociodemographics, distribution of diagnoses (dissociative disorders and other mental disorders) and mean SDQ-20 scores, therefore, suggesting that our results for SDQ-20 reliability are valid. A third methodological limitation is the lack of consecutive enrolment of participants, with the exception of one recruitment location (Baden-Wurttemberg, Germany). However, patients in the consecutively recruited sample did not differ from the selectively recruited sample with regard to
sociodemographics, thus decreasing the probability of a systematic recruitment bias. Finally, the high female to male ratio among the dissociative group limits the results relating to gender differences. However, other studies have reported a similarly high gender ratio in clinical populations (Spitzer et al., 2003) which seems to reflect a clinical reality for this type of disorders.

In summary, this study revealed excellent psychometric properties and cross-cultural validity of the German version of the SDQ-20 scale. Future studies should investigate whether somatoform dissociation is an essential psychopathological construct that is unique within the dissociative spectrum.
REFERENCES


<table>
<thead>
<tr>
<th></th>
<th>Non-dissociative group (N=109)</th>
<th>Dissociative group (N=39)</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>SDQ-20 total score</td>
<td>24.4</td>
<td>5.8</td>
<td>48.4</td>
</tr>
<tr>
<td>FDS total score</td>
<td>4.5</td>
<td>2.6</td>
<td>32.9</td>
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<tr>
<td>amnesia</td>
<td>2.0</td>
<td>2.5</td>
<td>22.8</td>
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<tr>
<td>absorption</td>
<td>8.4</td>
<td>5.5</td>
<td>41.3</td>
</tr>
<tr>
<td>derealisation</td>
<td>2.7</td>
<td>3.9</td>
<td>38.7</td>
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<tr>
<td>conversion</td>
<td>3.3</td>
<td>3.8</td>
<td>28.7</td>
</tr>
<tr>
<td>PDS total score</td>
<td>15.2</td>
<td>10.4</td>
<td>35.7</td>
</tr>
<tr>
<td>CTQ total score</td>
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<td>18.0</td>
<td>80.6</td>
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<tr>
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<td>5.3</td>
<td>20.0</td>
</tr>
<tr>
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<td>6.6</td>
<td>3.1</td>
<td>12.2</td>
</tr>
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<td>7.1</td>
<td>4.1</td>
<td>17.4</td>
</tr>
<tr>
<td>emotional neglect</td>
<td>12.1</td>
<td>5.9</td>
<td>18.7</td>
</tr>
<tr>
<td>physical neglect</td>
<td>8.0</td>
<td>3.5</td>
<td>12.3</td>
</tr>
</tbody>
</table>

SDQ-20, Somatoform Dissociation Questionnaire; FDS, “Fragebogen für Dissoziative Symptome”; PDS, Posttraumatic Stress Diagnostic Scale; CTQ, Childhood Trauma Questionnaire
TABLE 2. Somatoform dissociation, psychoform dissociation, and posttraumatic stress symptoms as correlated to type and severity of self-reported childhood adversities (N=225)

<table>
<thead>
<tr>
<th>Type of adversity</th>
<th>Mean</th>
<th>SD</th>
<th>r*</th>
<th>r*</th>
<th>r*</th>
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</thead>
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<tr>
<td>emotional abuse</td>
<td>13.0</td>
<td>6.2</td>
<td>0.45</td>
<td>0.48</td>
<td>0.44</td>
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<tr>
<td>physical abuse</td>
<td>8.0</td>
<td>4.7</td>
<td>0.36</td>
<td>0.39</td>
<td>0.34</td>
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<tr>
<td>sexual abuse</td>
<td>9.7</td>
<td>6.8</td>
<td>0.43</td>
<td>0.53</td>
<td>0.47</td>
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<tr>
<td>emotional neglect</td>
<td>14.2</td>
<td>6.0</td>
<td>0.31</td>
<td>0.32</td>
<td>0.33</td>
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<tr>
<td>physical neglect</td>
<td>9.2</td>
<td>4.1</td>
<td>0.31</td>
<td>0.41</td>
<td>0.34</td>
</tr>
</tbody>
</table>

*all p’s < 0.001

SDQ-20, Somatoform Dissociation Questionnaire; DES, Dissociative Experience Scale (part of the FDS, “Fragebogen für Dissoziative Symptome”); PDS, Posttraumatic Stress Diagnostic Scale; CTQ, Childhood Trauma Questionnaire
TABLE 3. Performance of the SDQ-5 at various cutoff scores in 39 patients with a dissociative disorder and 109 patients with other mental disorders

<table>
<thead>
<tr>
<th>CutOff Score</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Positive predictive value</th>
<th>Negative predictive value</th>
<th>Predictive value estimated at prevalence 10%</th>
<th>Likelihood ratio</th>
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<tbody>
<tr>
<td>10</td>
<td>0.77</td>
<td>0.92</td>
<td>0.77</td>
<td>0.92</td>
<td>0.51</td>
<td>0.97</td>
</tr>
<tr>
<td>9</td>
<td>0.82</td>
<td>0.90</td>
<td>0.74</td>
<td>0.93</td>
<td>0.47</td>
<td>0.98</td>
</tr>
<tr>
<td>8</td>
<td>0.90</td>
<td>0.86</td>
<td>0.70</td>
<td>0.96</td>
<td>0.42</td>
<td>0.99</td>
</tr>
<tr>
<td>7</td>
<td>0.97</td>
<td>0.76</td>
<td>0.59</td>
<td>0.99</td>
<td>0.31</td>
<td>1.0</td>
</tr>
</tbody>
</table>

SDQ-5, Short 5-item screening version of the Somatoform Dissociation Questionnaire
FIGURE 1. Reliability of the SDQ-20 as indicated by the test-retest correlation between mean scores at baseline (T1) and mean scores 3-5 weeks later (T2) for a subgroup of patients (N = 67)
FIGURE 2. Results of a principal component factor analysis (PCA) performed on the SDQ-20 scores in our sample suggesting one-dimensionality of the scale.