# THE VALIDATION OF THE DISSOCIATIVE EXPERIENCES SCALE AGAINST THE CRITERION OF THE SCID-D, USING RECEIVER OPERATING CHARACTERISTICS (ROC) ANALYSIS

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## ABSTRACT

*Objective and method: The aim of this study is to analyze the utility of the Dissociative Experience Scale (DES) as a screener for dissociative disorders. The Structured Clinical Interview for* DSM-III-*R DissociativeDisorders (SCID-D) was used as standard of comparison. Forty-three patients with a dissociativedisorderand 36 control patients with a range of psychiatric diagnoses participated in the study.*

*Results: The DES distinguishes dissociative disorder patients from non-dissociative disorder patients very well (p<.0001); diagnostic utility of the DES based on Receiver Operating Characteristic (ROC) analysis is excellent (.4 UC=. 96). The optimal cut-off score of 25 yields good to excellent sensitivity (93 %) and specificity (86% ). The positive predictive value of the DES (>25) in random clinical samples is limited (.26 - .54) due to the relatively low estimated prevalence rate of dissociative disorders (5 - 15% respectively); the negative predictive value is high (.99). The use of a confirmatory interview such as the SLID-D is required to eliminate false positives.*

## INTRODUCTION

The Dissociative Experience Scale developed by Bernstein & Putnam (1986) is the most widely used instrument for the screening for dissociative symptomatology in clinical samples. Good reliability and validity have been reported at different centres (Bernstein & Putnam, 1986; Ross, Norton & Anderson, 1988; Ensink & van Otterloo, 1989; Frischholz et **al.,** 1990).

**For** the screening of dissociative disorders in clinical samples different cut-off scores of the DES are suggested in the literature (Chu & Dill, 1990; Carlson et al., 1990; Ross, Anderson, Fleisner & Morton, 1991; Saxe, etal., 1993). Most are based on median scores for certain diagnostic groups, few are based on validation research. The 'golden standard' for the assessment of the dissociative disorders in those studies was an independent clinical diagnosis according *to DSM-*Illcriteria. No other criterion was available at the time.

To assess the prevalence of severe dissociative symptomatology in a clinical sample (N=98), Chu and Dill (1990) used a cut-off score of 31.3 based on the median for the 10 post traumatic stress disorder (PTSD) patients and a cut-off score of 57.1 based on the 20 multiple personality disorder (MPD) patients who participated in the original study by Bernstein and Putnam (1986). Chu and Dill used the DES without comparison with another clinical diagnostic interview.

Carlson et al. (1993) analyzed the capacity of the DES to distinguish between subjects with and without a clinical diagnosis of MPD in a multicenter sample of 1051 subjects with a range of psychiatric diagnoses. They concluded that the DES performed quite well as a screening instrument to identify subjects with MPD. Using discriminant analysis they found a sensitivity of 76% (proportion of subjects with **MPD** who were correctly classified) and a specificity of 76% (proportion of subjects without MPD who were correctly classified). For clinical use they suggested a cut-off score of 30 to identify patients likely to have MPD; this cut-off score resulted in their study in a sensitivity of 80% and a specificity of 80%: 31% of the subjects misclassified as having **MPD had** another dissociative disorder and 30% had PTSD. Based on an estimated prevalence-rate of MPD of 5% in random clinical samples, they calculate the positive predictive value of the DES: only 17% of the patients with a DES score of 30 or more actually had MPD.

Ross et al. (1991), trying to estimate the prevalence of MPD in a clinical population (N=299), used a cut-off score of 20 with the motivation that DES scores beyond 20 are suggestive of PTSD or a dissociative disorder; for their choice of this cut-off point they refer to the original study of Bernstein & Putnam (1986). Ross et al. found a prevalence rate of patients with a DES score beyond 20 of 31% . Diagnostic interviews with the DDIS confirmed the presence of a dissociative disorder in '77.5% of these patients.

Saxe et al. (1993) chose a cut-off score of 25 for the same

purpose, because it is an intermediate to the scores of 30, used by Chu and Dill (1990) and by Quimby and Putnam (1991), and 20, used by Ross et al. (1991). Fifteen percent of this clinical sample (N=110) scored above 25 on the DES. Using the DDIS as diagnostic instrument they assessed a dissociative disorder in 100% of those patients.

Neither Ross et al. (1991), nor Saxe et at. (1993) take the possibility of false negatives - dissociative disorder patients with a DES-score below the cut-off point - into account.

Steinberg, Rounsaville & Cicchetti (1991) were the first to validate the DES as a screening instrument against a structured clinical interview (SCID-D) as a standard for systematic comparison. They investigated its utility as a screening instrument for the identification of patients at high risk for dissociative disorders and examined several possible cut-off scores. Their results indicate that a DES cut-off score of 15-20 yields good to excellent sensitivity (90-95%) and specificity (93%) as a screening instrument in an outpatient population (N=36). For higher cut-off scores the sensitivity can be much lower. Steinberg et al. conclude that high-risk patients identified with the DES should be further evaluated with a diagnostic instrument, such as the SCID-D or by in-depth clinical follow-up.

Our study is to some extent a replication of this validation study of Steinberg et al. (1991): we use the SCID-D as standard of comparison to determine the best possible cut-off score of the DES. We use ROC-analysis to illustrate the choice of optimal cut-off. The main difference is that we did not use a normal comparison group, as we were interested in the discriminant ability of the DES in clinical populations. Sample sizes (79 versus 36) and characteristics (in- and outpatients versus outpatients only) differ as well. And to enhance understanding of the false positive en negative cases we will give a clinical picture of the patients concerned. Finally we will discuss the predictive value of the DES as a screener for dissociative pathology.

## METHOD

*Instruments*

1. The screening instrument: the Dissociative Experience Scale. The DES is a 28 item self-report questionnaire that is developed to quantify dissociative experiences in both normal and clinical populations. The questions are rated with slashes on 100-mm lines that indicate where the subject falls on a continuum for each item. The DES score ranges from 0 to 100 and represents the mean of all item scores. The DES is not intended as a diagnostic instrument for the assessment of the *DSM*-III-R dissociative disorders, but has been used as a screening instrument for the identification of patients with a dissociative disorder. Although a Dutch translation existed (Ensink & van Otterloo, 1989) we tested a new translation (Boon, Draijer & Van der Hart, 1988) that followed the original more closely.

2. The Structured Clinical Interview *forDSM-III-R* Dissociative Disorders (SCID-D) (Steinberg, Rounsaville & Cicchetti, 1990; Steinberg et al., 1991) is a diagnostic instrument developed for the systematic assessment of five dissociative symptom areas (amnesia, depersonalization, derealization, identity confusion and identity fragmentation) and for the assessment of the diagnoses of the *DSM-III-R* dissociative disorders. Severity ratings of the 5 dissociative symptoms range form 1-4 (absent-severe); the total SCID-D score range from 5-20. Good to excellent reliability and validity have been reported in the US as well as in The Netherlands (Steinberg et al., 1990; Boon & Draijer, 1991; 1992; I993b).

***Administration of the DES***

To prevent bias, the DES-questionnaires were submitted one week prior to the SCID-D interview. Patients with a dissociative disorder were asked to complete the DES by their treating clinician. Patients without a dissociative disorder were given the DES by the independent psychiatrist, who had interviewed them one week prior to the SCID-D interview. All patients completed the DES by themselves and returned the questionnaire at the SCID-D interview.

***The SCID-D interview***

All patients were interviewed with the SCID-D by the authors. Interviews were videotaped or (in a few cases) audiotaped. Informed consent, including consent to video- and audiotaping, was obtained from all patients.

***Subjects***

Two groups of psychiatric patients were compared on their DES-scores: patients with and without *a DSM-III-R* dissociative disorder. Seventy-nine psychiatric patients-inpatients as well as outpatients-participated in the study.

A. The dissociative disorder patients. This group consisted of 43 patients with a dissociative disorder, assessed by an independent clinician and confirmed by the authors with the SCID-D: 20 patients with a diagnosis multiple personality disorder (MPD) and 23 with a diagnosis dissociative disorder not otherwise specified (DDNOS) . Two patients were originally participating in the control group, but a dissociative disorder (in both cases DDNOS) was assigned based on the SCID-D interview.

B. The control group without a dissociative disorder. This group consisted of 36 psychiatric patients (both inpatients and outpatients), drawn from two university psychiatric clinics. Clinical *DSM-111--R* diagnoses were assigned on the basis of consensus within the treatment teams, based on all available data. One week prior to the SCID-D interview all control subjectswere interviewed by an independent psychiatrist with the Present State Examination (PSE) (Wing, Cooper & Sartorius, 1974) and a selection of questions from the Structured Interview for *DSM-III-R* personality disorders (SIDP-R) (Pfohl, Stangle, & Zimmerman, 1992). Dissociative disorders in this group (n-2) were excluded with the SCID-D by the authors.

The control patients had a range of Axis I and II diagnoses. On Axis I patients were diagnosed with: mood disorder; schizophrenia; delusional disorder; psychotic disorder; eating disorder; somatoform disorder; obsessive compulsive disorder; adjustment disorder; organic mental disorder; anxiety disorder. On Axis II patients were diagnosed with: borderline personality disorder; histrionic personality disorder; personality disorder not otherwise specified and dependent personality.

*Demographic characteristics*

The two diagnostic groups did not differ in clinical setting, nor marital status or employment. They slightly differed in age, dissociative disorder patients having a mean age of 32.9 (SD=±8.3) versus controls having a mean age of 36.3 (SD=±10.2) (t=1.67 df=78 p=.10).

*Calculation of AUC and ROC curve.*

**We** used I ABROCI-program for the calculation of the Area Under Curve and the ROC curve. LABROC1 is a modified version by Metz et al. of the program RSCORE II (Dorfman, 1982).

## RESULTS

*Demographic characteristics and DES-scores.*

**In** the whole sample there was no significant relation of DES-score with age, marital status and level of education, nor with treatment setting. Neither was there a difference between patients from different treatment settings (outpatients versus inpatients) in the separate groups.

*Reliability*

Cronbachs alpha coefficient (Cronbach, 1971) was used to estimate the internal consistency of DES scores. The alpha coefficient of the DES based on 74 subjects with answers on all 28 questions was .96. The Dutch version of the DES was found to be highly in to rnally consistent.

For its subscales (based on the factoranalysis described by Carlson et al. 1991) Cronbach's alpha was .90 for amnesic dissociation (8 items) , .91 for absorption and imaginative involvement (9 items) and .88 for depersonalization and derealization (6 items). The subscales are highly internally consistent as well.

*Validity*

The dissociative disorder patients differed significantly from the non-dissociative controls in the severity of the dissociative experiences measured by the DES (t=11.1 df=76 p=<.00001). Dissociative disorder patients had a mean DES score of 47.6 (SD=+16.3) and a median of 46.8 (range 11.6 - 81.3). Patients without a dissociative disorder had a mean DES score of 12.0 (SD=±11.4) and a median of 9.3 (range 0.0 - 38.6) . The mean DES score of the two groups differed more than two standard deviations. That is more than the slight age difference could account for. A graphic representation of the frequency distributions of DES-scores in both groups is presented in Figure 1.

Among the dissociative disorder group we found significant differences on the DES-scores between MPD and DDNOS patients; MPD patients (n=20) had a mean DES score of 56.8 (SD-±13.4) and a median of 57.8; DDNOS patients (n=23) had a mean DES score of39.7 (SD=±I4.5) and a median of 40.7. Those two groups did not differ on the severity of amnesia, depersonalization, derealization and identity alteration as measured by the SCID-D; they differed slightly on identity confusion (t=2.11 df=42 p<.05), the MPD patients reporting more confusion as to who they were. We will discuss the meaning of these results later.

In the whole sample the total DES-score correlated significantly with the severity of the five dissociative symptoms, assessed with the SCID-D: amnesia (r=.68), depersonalization (r=.64), derealization (r=.58),identity confusion (r=.76) and identity fragmentation (r=.78). Both total scores correlated strongly (r=.78). Correlations between the severity of the five symptom areas assessed with the SCID-D and the subscales of the DES (cf. Bernstein et al., 1991) reached from .58 till .73; all three subscales correlated most strongly with the severity of identity alteration, amnesic dissociation and depersonalization/derealization even more so than with their counterparts in the SCID-D. Although the two instruments have different purposes - the DES being a screening instrument and the SCID-D being a clinical diagnostic instrument

FIGURE 1
Dissociative disorders vs controls. Frequency distribution of DES.

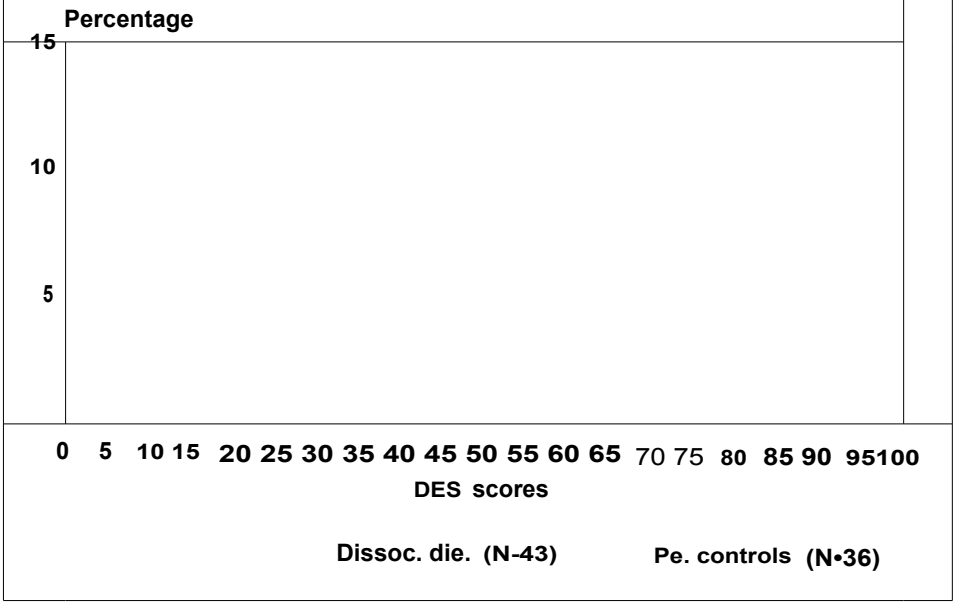
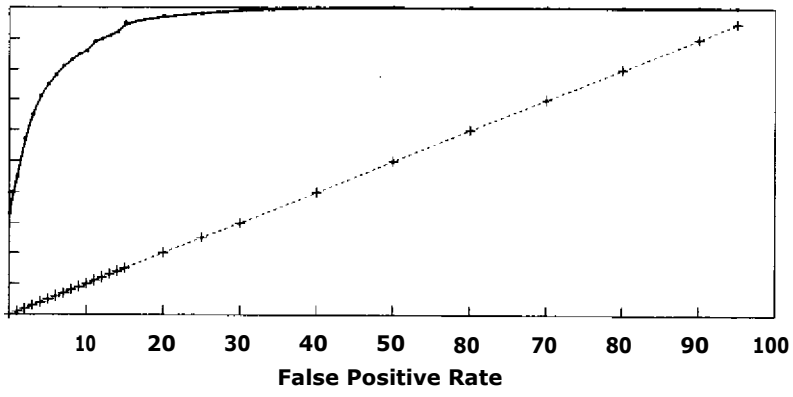


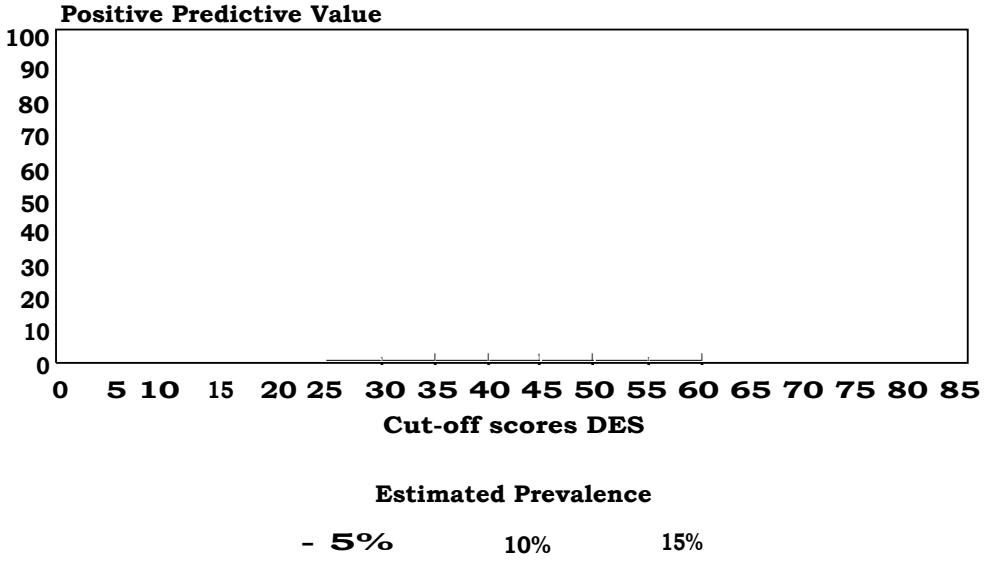
FIGURE 2
Estimated binormal ROC curve. Dissociative Experience Scale.
Comparing 43 DD-pat. with 36 Ps. controls.




– DES ROC +- Random ROC

Standard of comparison: SCID-D
AUC = .96 SE = .02

FIGURE 3
Positive predictive value of DES at different estimated prevalence rates
for dissociative disorders.




Based on DES against SCID-D

- these results support the convergent validity of the DES with the SCID-D as criterion.

Sensitivity *and specificity*

We used the SCID-D as the standard of comparison or `truth standard' to analyze the different DES cut-off scores. Table 1 shows the sensitivity and specificity values, false positive and false negative rates at each cut-off score. Sensitivity at a certain cut-off score indicates how likely a patient *with a dis-*sociative disorder is to have a score above this cut-off point; specificity at a certain cut-off score indicates how likely a patient *without a* dissociative disorder is to have a score below this cut-off point.

**ROC analysis**

Analysis of the receiver operating characteristics (ROC) is-according to Rey, Morris-Yates and Stanislaw (1992)-the only technique currently available that provides an overall index of diagnostic accuracy that is not dependent on prevalence (as is positive predictive value) or on the cut-off score (as are sensitivity and specificity) . ROC analysis originally used in radiological and biomedical research, is judged to be highly promising in the comparison of the qualities of psychiatric screening tests (Mari & Williams, 1985; Bridges & Goldberg, 1986; Murphy et al., 1987; Weinstein, Berwick, Goldman, Murphy & Barsky, 1989; Hsiao, Bartko & Potter, 1989; Rey et al., 1992).

An *index of discriminating ability of a screening instrument* can be obtained from ROC analysis. The most useful index is the area under the ROC curve (Swets 1979; Swets, Pickett, Whitehead & Getty, 1979). This curve

is obtained by plotting sensitivity against false positive rate for all possible cut-off points. The area under curve (AUG) varies from 50% (for a test with no better discriminating ability than chance) till 100% (for a test with perfect discrimination between the patients with and without the disorder: all values fall along the upper and left boundaries). Figure 2 is based on the sensitivity rates plotted against the specificity for all possible cut-off points of the DES; it shows the estimated binormaI ROC curve. This curve indicates that the DES discriminates rather well between dissociative and non-dissociative disorders: 95.6% (Standard Error = 2.3%) of the trapezoid is under the curve (Hanley & McNeil 1982) . This means that the DES has an extremely high discriminating ability. Following ROC-analysis the optimum cut-off point (a compromise between high sensitivity and low false positive rate) was at the point on the ROC curve which is the greatest perpendicular distance from the diagonal (Mari & Williams, 1985) . This results in a DES cut-off score of 25 yielding optimal sensitivity (93%) and specificity (86%).

***Predictive Value of the DES***

The positive predictive value of a positive test result is defined as the proportion of subjects correctly identified by the test as having the disorder (true positives) to all subjects

TABLE 1

Sensitivity, specificity and predictive value of the Dissociative Experience Scale at a range of cut-off scores, discriminating between 43 psychiatric patients with and 36 patients without *DSM-III* dissociative disorders, also positive predictive values at estimated prevalence rates of 15%, 10%, and 5%.

| Cut-off Score | Sensitivity | Specificity | False Pos.Rate (1spec )/ False Neg. Rate (1 seas) | Positive Predictive Value | Negative Predictive Value | Predictive Value | |
|---|---|---|---|---|---|---|---|
| | | | | | | Prevalence: 15%, 10%, 5% Positive 15%/10%5% | Neg. 15% |
| 85 | 0.00 | 1.00 | 0.00 / 1.00 | 1.00 | 0.46 | 1.00/ 1.00/ 1.00 | 0.85 |
| 80 | 0.02 | 1.00 | 0.00 / 0.98 | 0.99 | 0.46 | Imo/ Imo/ Loo | 0.85 |
| 75 | 0.05 | 1.00 | 0.00 / 0.95 | 0.99 | 0.47 | 1.00/ 1.00/ 1.00 | 0.85 |
| 70 | 0.12 | 1.00 | 0.00 / 0.88 | 0.99 | 0.49 | 1.o0/1.00/1.00 | 0.86 |
| 60 | 0.21 | 1.00 | 0.00 / 0.79 | 0.99 | 0.51 | ].oo/ Imo/ Lao | 0.87 |
| 65 | 0.21 | 1.00 | 0.00 / 0.79 | 0.99 | 0.51 | 1.00/ 1.00/ 1.00 | 0.87 |
| 55 | 0.28 | 1.00 | 0.00 / 0.72 | 0.99 | 0.54 | 1.00/ 1.o0/ 1.o0 | 0.89 |
| 50 | 0.47 | 1.00 | 0.00 / 0.53 | 0.99 | 0.61 | 1.00/1.00/1.00 | 0.91 |
| 45 | 0.56 | 1.00 | 0.00 / 0.44 | 0.99 | 0.65 | 1.00/ 1.00/ 1.00 | 0.92 |
| 40 | 0.65 | 1.00 | 0.00 / 0.35 | 0.99 | 0.71 | 1.00/ 1.00/ 1.00 | 0.94 |
| 35 | 0.81 | 0.89 | 0.11 / 0.19 | 0.90 | 0.80 | 0.57/0.45/0/28 | 0.98 |
| 30 | 0.88 | 0.89 | 0.11 / 0.12 | 0.90 | 0.86 | 0.57/0.45/0/28 | 0.98 |
| 25 | 0.93 | 0.86 | 0.14 / 0.07 | 0.89 | 0.91 | 0.54/0.42/0.26 | 0.99 |
| 20 | 0.95 | 0.78 | 0.22 / 0.05 | 0.84 | 0.93 | 0.42/0.32/0.19 | 0.99 |
| 15 | 0.95 | 0.75 | 0.25 / 0.05 | 0.82 | 0.93 | 0.40/0/30/0/17 | 0.99 |
| 10 | 1.00 | 0.50 | 0.50 / 0.00 | 0.70 | 1.00 | 0.26/0.18/0.10 | 1.00 |
| 5 | 1.00 | 0.31 | 0.69 / 0.00 | 0.63 | 1.00 | 0.20/0/14/0/07 | 1.000 |
| 0 | 1.00 | 0.00 | 1.00 / 0.00 | 0.54 | 1.00 | 0.15/0.10/0.05 | 1.00 |

*Positive predictive value (corrected for prevalence) _ [sensitivity x prevalence]/ [(sensitivity x prevalence) + (1-specificity) x (I-prevalence)]*

*Negative predictive value (corrected for prevalence) = [specificity. x (1- prevalence)] / [(specificity x (I-prevalence) + (1-sensitivity) x prevalence]*

identified by the test as having the disorder (true positives + false positives) (see Table 2). In our sample at a cut off score of 25 the positive predictive value of a positive score on the DES is 40 / 40 + 5 = .89 (89%). The negative predictive value of a negative test result is defined as the proportion of subjects correctly identified by the test as not having the disorder (true negatives) to all subjects identified by the test as not having the disorder (true negatives + false negatives) . In our sample at a cut off score of 25 the negative predictive value of a negative score on the DES is 31 / 31 + 3 = .91 (91%).

Predictive value, however, is affected by the prevalence of the disorder in that particular population. Even when sensitivity and specificity are high, the predictive power of a test is low if the prevalence of the condition in that population is low (Rey et al., 1992). We calculated different positive predictive values for different prevalence rates of dissociative disorders among psychiatric patients: a relatively high estimate of 15% (based on Saxe et al., 1993), a more conservative estimate of 5% (Carlson et al., 1993) and a value in between. The positive predictive value of a DES cut-off score of 25 would drop from 89% to 54% at prevalence rate 15%, to 42% at prevalence rate 10% and to 26% at rate 5% (Table 1; Figure 3).

***Implications for screening and the* clinical use *of the DES***

For screening of dissociative pathology in a random psychiatric population one needs to have a high sensitivity and a high negative predictive value: as many cases as possible that have the disorder need to be selected and the chance that a negative test score really excludes the disorder illness needs to be maximal. So in our sample one could prefer a cut-off score of 20 for screening purposes, reaching a sensitivity of 95% and a specificity of 78%; the 22% false positives at that rate need to be excluded by clinical assessment or the use of a structured clinical interview, such as the SCID-D.

In a random clinical sample, though, a cut-off score of 25 has an optimal negative predictive value (99% of the cases with a DES below 25 can be expected not to have the disorder), but a limited positive predictive value. At an estimated prevalence rate of 15% only 54% of the positive scores can be expected to have a dissociative disorder and at an estimated prevalence of 10% only 42% (Table 1).

For clinical use, to identify patients likely to dissociate, a score of 40 predicts a dissociative disorder in all cases: the estimated positive predictive value in a random clinical sample assuming a prevalence of dissociative disorders of 15% is 100%. But at this score one `misses' many dissociative disorder patients: in our sample 37% of all patients with a dissociative disorder had a score below 40. For a detailed summary of results we refer to Table 1.

***Qualitative analysis* *offalse negatives* *and false positives.***

With 25 as optimal cut-off point, we found in our sample a false negative rate of 7% and a false positive rate of 14% (Table 1). To get a clinical understanding of deviant DES-scores, we analyzed the 7% `false negatives' and the 21% `false positives' qualitatively.

***Patients with* a dissociative *disorder and a low DES score (< 25): false negatives***

The two patients with a dissociative disorder and a DES-score below 25 (11.6 and 13.6 respectively), turned out to be both cases with strong resistance against acknowledging the dissociative symptoms. One women was able to report severe dissociative symptoms in the structured clinical interview (SCID-D)--amnesia, depersonalization, derealization, identity-confusion, and fragmentation-and reached a total SCID-D score of 20 (which is the highest possible). The other women had showed difficulty to admit the presence of dissociative symptoms, but was positive on all indirect questions of the SCID-D interview. Both patients met criteria for dissociative disorder not otherwise specified. In both cases the diagnosis of a dissociative disorders was independently confirmed over time. The clinical pictures of the two patients were as follows.

TABLE 2
Two x two contingency table obtained when using a cut-off score of 25 on the Dissociative Experience Scale

| | **Diagnosis** | | | |
|---|---|---|---|---|
| **Score on DES** | **Dissociative Disorder (MPD/DDNOS) (N=43)** | | **No Dissociative Disorder (N=36)** | |
| > 25 (N=45) | 40 | (TP) | 5 | (FP) |
| < 25 (N=34) | 3 | (FN) | 31 | (TN) |

*Of all subjects 89,9% were correctly classified at this cut-off score.*
*Sensitivity = T P/(TP+FN) = .93  False Negative Rate = .07*
*Specificity = TN/(TN+FP) = .86  False Positive Rate = .14*
*Positive predictive value = TP/(TP+FP) = .89*
*Negative predictive value = TN/(TN+FN) = . 91*

One 33-year old patient was clearly ambivalent and very confused about herself. At the research interview she was initially minimizing and denying dissociative symptoms and she showed signs of a continuous internal struggle. Moreover she was recurrently dissociating during the interview. Gradually she was able to give more information. She also told the interviewer that she heard almost continuously voices in her head that told her not to answer the questions. Although at the research interview it became clear that she probably suffered from MPD, this diagnosis was not assigned because it was not yet possible to get information on alter personalities. At follow-up MPD was confirmed.

The second patient was 19 years old and had just finished highschool, left her family of origin and started university in a different part of the country. She had had a history of (pseudo) seizures and had been treated for epilepsy since age 16, although the epilepsy was not clearly corroborated by EEG findings. Since she had left home, there had been a dramatic increase in seizures. Moreover, she had only recently become aware that often after a seizure she would change into a younger person with the same name as she had, who was very confused and unaware of the current date or the place were she was. The patient was totally amnesic for these episodes but had heard in detail about these "younger selves" from friends who were looking after her. They had told her that they had met several younger persons with different ages - 12, 14 and 16. These younger persons seemed to be unaware of the existence of each other and of the fact that they were currently at a university in another part of the country. Some were very anxious, others were preoccupied that they had to go home and see the father. At the research interview the patient was telling this in detail without any emotion. She did report clear amnesic episodes, that would always start with a pseudoseizure. She did not report indirect indications for amnesic episodes such as finding things she couldn't account for etc. She reported occasional depersonalization or derealization and denied identity confusion. She did not report any Schneiderian symptoms and didn't dissociate during the interview. She reported vague, fragmented memories of sexual abuse by her father, starting at age 12.

Although this patient definitely minimized some of her symptoms, the low mean DES score was more in concurrence with the way she presented at the research interview.

***Control patients without a dissociative disorder, but with a high DES score (>25): false positives***

Among the control patients without a dissociative disorder, five patients had a mean DES score above the cut-off point of 25 (28.6, 35.9, 37.5, 38.3 and 38.6). Four of these patients had a DES score that fell in the range of scores of patients with a dissociative disorder not otherwise specified (DDNOS) or a post traumatic stress disorder.

It is of interest to note that these five patients did not have comparable high scores on the SCID-D, in fact two patients had the lowest possible total SCID-D score of 5, which means that, at the SCID-D interview, no dissociative symptoms were reported. Two patients had reported recurrent episodes of depersonalization and derealization at the SCID-D interview (with a total SCID-D score of 9 and one of 11) and one patient (total SCID-D score of 7) reported depersonalization which primarily seemed to be associated with the use of soft drugs (marihuana). A further analysis of the five patients with a high mean DES score showed the following:

The first patient (DES score 28.6; total SCID-D score 11) was 42 years old. She was in out-patient treatment and was assigned a DSM-III-R diagnosis of schizo-affective disorder with histrionic and borderline traits. She had a long psychiatric history (since age 22). There was drug and alcohol addiction in the past. She was currently on depot neuroleptics. At the SCID-D interview she reported recurrent depersonalization in the present and severe derealization associated with psychotic episodes during which she was hospitalized. She reported a history of physical abuse by her mother for which she reported to the police as a teenager.

The second patient (DES score 38.6; total SCID-D score 5) was 47 years old. She was assigned *a DSM-III-R* diagnosis of somatoform pain disorder on axis I and histrionic personality disorder on axis II. The independent psychiatrist who had assessed the PSE and the SIDP-R had commented that the patient seemed to aggravate her symptoms. At the SCID-D interview she did not report dissociative symptoms, at the trauma interview she did report severe emotional neglect.

The third patient (DES score 35.9; total SCID-D score 9) was 23 years old. She had no current axis I diagnosis and a histrionic personality disorder on axis II; she had reported some depersonalization and derealization at the SCID-D interview; her most important complaints were panic attacks and the inability to be alone. She also had had an anorectic episode during adolescence. She did not report a history of physical or sexual abuse.

The fourth patient (DES score 38.3; total SCID-D score 5) was 50 years old and inpatient at the time of the interview. She was assigned the diagnosis schizophrenia, paranoid type and personality disorder not otherwise specified with histrionic and borderline traits. She had had a history of psychotic episodes since age 30 and several psychiatric admissions. The independent psychiatrist, who assessed the PSE and the SIDP-R had commented that the patient was a classical case of hysterical psychosis. She did not report dissociative symptoms at the SCID-D interview and she did not report a history of physical or sexual abuse.

The last patient (DES score 37.5; total SCID-D score 7) was 37 years old. She was assigned the diagnosis schizophrenia and was called "chronic psychotic". She used soft drugs (marihuana) regularly. She reported recurrent feelings of depersonalization at the research interview, but these feelings seemed to be closely associated with the use of soft drugs.

***DES scores of two patients from the original psychiatric control condition who were identified as having a dissociative disorder with the SCID-D.***

A dissociative disorder was detected in two patients, who originally participated in the control group. These two patients had entered the psychiatric control group with a diagnosis of borderline personality disorder. They earned a high mean

DES score of 42 and 57. If the DES had been used as a screening instrument these two cases would have been identified with both instruments.

## DISCUSSION

This study validates the Dissociative Experience Scale (DES) against a structured clinical interview (SCID-D; Steinberg et al. 1990; 1991) as a standard for systematic comparison. The results show that the Dutch version of the DES (translation Boon, Draijer & Van der I-Tart) discriminates at a high level of significance between patients with and without dissociative disorders. We also found a high overall correlation between mean DES scores, total SCID-D scores and SCID-D severity ratings of separate dissociative symptoms.

Our results confirm those found in other studies indicating that the DES is a valid and reliable self-report instrument to measure dissociative pathology (Bernstein & Putnam, 1986; Ross et al. 1988; Ensink & van Otterloo, 1989; Frischholz et al., 1990; Carlson et al., 1993). Our mean and median scores for MPD patients were comparable to those of Bernstein and Putnam's original study and several replication studies both in North America as well as in the Netherlands (Bernstein & Putnam, 1986; Ensink & van Otterloo, 1989; Frischholz et al., 1990).

We investigated the utility of the DES as a screening instrument for the identification of patients at high risk for dissociative disorders and examined several possible cut-off scores using ROC-analysis. The index of discriminating ability of the DES, based on the area under the ROC curve, was .96. This value means that the DES is a test with a very high diagnostic utility. The index of diagnostic accuracy is not dependent on prevalence (as is positive predictive value) or on the cut-off score (as are sensitivity and specificity). Our results indicate that 25 is the optimal cut-off score, yielding good to excellent sensitivity (93%) and specificity (86%) in a selected clinical population (N=79). What do these results mean for the use of the DES as a screener in random clinical samples? We calculated the estimated positive predictive value of the DES based on different estimated prevalence rates for dissociative disorders in a clinical sample. At a base rate of 15% (Saxe et al., 1993), this calculation shows a drop of the positive predictive value at cut-off score 25 from 89% in our sample to 54% in a random clinical sample. At a base rate of 10% it drops even further to 42%, and at 5% it drops to 26%. This means that using the DES as a screener in clinical samples, one certainly needs to use a clinical diagnostic instrument, such as the SCID-D, to select the `true positives'.

Ransohoff and Feinstein (1978) drew attention to the fact that many diagnostic tests have proved to be valueless after optimistic introduction into medical practice, due to the use of a too narrow spectrum for the `diseased' and 'non diseased' patients in the study population. They state that the sensitivity of a test should be examined in a broad range of patients with the disorder and that a test should be challenged for its specificity in a broad range of patients without the disorder.

We may illustrate this by comparing our results to those of Steinberg et al. (1991) and Carlson et al. (1993). In the first study almost identical false negative rates, but much lower false positive rates were found than we did at a cut-off score of 25 (7% versus 14%) or 20 (7% versus 22%). One explanation could be that Steinberg et al. limited their study to outpatients and excluded patients who were very agitated, gravely disabled, or at risk of suicide, whereas we interviewed inpatients as well, some of whom were just recovering from a psychotic episode at the time of the interview. Steinberg saw 21 psychiatric patients which a range of Axis I diagnoses; we saw 36 control patients among whom several also had an Axis II diagnosis. On the other hand, Steinberg studied a range of dissociative disorder patients, whereas in our sample the dissociative disorders were accidentally limited to MPD and DDNOS. Evidently more research on the diagnostic utility of the DES is needed using a wide spectrum in pathology of dissociative as well as non-dissociative patients.

Carlson et al. (1993) assessed the capacity of the DES to blindly predict a psychiatric diagnosis of MPD in a large pool of general psychiatric patients. According to discriminant analysis on a subgroup of 883 subjects (out of 1051) more closely representing patients in a typical psychiatric facility in terms of prevalence rates of MPD, they found a false positive rate of 15% and false negative rate of 24%. The false positive rate is almost identical as in our study. The high false negative rate could be due to the relatively low mean DES score for MPD-patients (42.8, SD=±19.2), which could possibly be explained by a high representation of MPD-patients in early stages of treatment.

The analysis of the false negative cases in our study showed that some patients with a dissociative disorder are unable to give an accurate self report, because they are unaware of their symptoms or deny them. This is, to a certain extent, also confirmed by the interesting findings (1) that a significant difference was found in mean DES scores of patients with MPD and patients with DDNOS, but (2) that these groups did not differ significantly in severity of dissociative symptoms derived with the SCID-D interview. Moreover, at one year follow up we obtained information on 20 of the 24 patients with DDNOS: in 19 of those 20 patients the diagnosis MPD instead of DDNOS was made by the treating clinician and a description of distinct alterpersonalities could be given! These findings confirm the following clinical observations: A majority of MPD patients initially minimizes, denies or is unaware of their dissociative symptoms (Kluft 1987a, 1987b). A self-report questionnaire at that stage may be problematic, because some of these patients deny or may be unaware of their dissociative symptoms and therefore are unable to give an accurate self-report.

When MPD patients have accepted the diagnosis and are more aware of their dissociative symptoms or do not have to deny these symptoms so much, this may influence their scores at a self-report questionnaire. Our hypothesis is that this phenomenon maybe one of the explanations of the fact that DES scores of MPD patients have ranged considerably -from 40.7 to 57-in different studies (Bernstein & Putnam, 1986; Ross, et al., 1988; Ensink & Van Otterloo, 1989; Ross, Miller, Reagor, et al., 1990; Boon & Draijer, 1993a).

A further analysis of the false positive cases in our study showed that here was no convergence between the relatively

high DES score and the scores derived from the SCID-D interview; a dissociative disorder could be easily ruled out with the SCID-D. Moreover, there were distinct qualitative differences in the descriptions of the dissociative experiences of patients with and without a dissociative disorder. Clearly other mechanisms - for instance suggestibility or a tendency to aggravate symptoms - may have influenced the relatively high DES scores of these patients (see also Frankel, 1990). This asks for some caution in the interpretation of high DES scores, if no confirmatory diagnostic interviews are done.

## CONCLUSION

The Dutch version of the Dissociative Experience Scale is a reliable and valid instrument to screen for dissociative pathology. It has a high diagnostic utility according to the results of ROC-analysis (AUC=.96). A cut-off score of 25 is optimal, yielding good to excellent sensitivity and specificity. In spite of those optimistic results, the estimated positive predictive value of the DES for a random clinical sample is rather low (26%, 42% or 54%) due to the relatively low estimated base rate of dissociative disorders (5%, 10%, or 15% respectively). Screening for dissociative disorders in a random clinical sample will result in a certain amount of false positive cases. Clinical assessment or the use of a confirmatory interview such as the SCID-D is required in order to diagnose the presence or absence of a dissociative disorder. Such a clinical diagnostic interview is more able to identify cases of a dissociative disorder with a subtle presentation, who may go undetected with a self-report questionnaire. These patients may be resistant to describe their dissociative symptoms or may be unaware of such symptoms and therefore are unable to complete an accurate self-report. ■

## REFERENCES


Bernstein, E.M. & Putnam, F.W. (1986). Development, reliability, and validity of a dissociation scale. *Journal of Nervous and Mental Disease, 174,* 727-735.

Boon, S. & Draijer, N. (1991). Diagnosing dissociative disorders in the Netherlands: A pilot study with the structured clinical interview for DSM-III-Rdissociative disorders. *American journal ofPsychiaby,* 148, 4, 458-462.

Boon, S. & Draijer, N. (1992). Reliability and validity *of the* Structured Clinical Interview for *DSMIII--R* Dissociative Disorders: report on a study in the Netherlands. *Proceedings of the 9th International Conference on Multiple Personality/Dissociative States.* Chicago, Illinois.

Boon, S. & Draijer, N. (1993a). Multiple Personality Disorder in the Netherlands: A clinical investigation of 71 patients. *American Journal of Psychiatry. 150, 3,* 489-494

Boon, S. & Draijer, N. (1993b). *Multiple Personality Disorder in the Netherlands. A study on reliability and validity of the diagnosis.* Swets & Zeitlinger B.V., Amsterdam/Lisse

Bridges, KW. & Goldberg, D.P. (1986). The validation of the GHQ-28 and the use of the MMSE in neurological inpatients. *British Journal of Psychiatry, 148,* 548.

Carlson, E.B., Putnam, F.W., Ross, C.A., Torem, M., Coons, P,, Dill, D., Loewenstein, R.J., & Braun, B.G. (1993). Validity of the Dissociative Experiences Scale in screening for MPD: A multicenter study. *American Journal of Psychiatry,* 150,1030-1036

Chu, J.A. & Dill, D.L. (1990). Dissociative symptoms in relation to childhood physical and sexual abuse. *American Journal of Psychiatry,* 147, 887-892.

Cronbach, L J. (1971) . Test Validation. In: Thorndyke *R., Educational Measurement.* Second Edition. American Council on Education. Washington DC, 443-507.

Dorfman, D.D. (1982). RSCORE. InJ.E.Swets & R.M.Pickett (Eds.), *Evaluation of* ***Diagnostic*** *Systems:* ***Methods*** *from Signal* ***Detection Theory.*** Academic Press, New York.

Ensink, B J. & Otterloo van, D. (1989). A validation study of the DES in the Netherlands. *DISSOCIATION,* I1(4), 221-223.

Frankel, F.H. (1990). Hypnotizability and dissociation. *American Journal of Psychiatry,* 147, 823-829.

Frischholz, EJ., Braun, B.G., Sachs, G.R., Hopkins, L., Shaeffer, D.M., Lewis, J., Leavitt, F., Pasquotto,J.N. & Schwartz, D.R. (1990) The Dissociative Experiences Scale: Further Replication and Validation. *DISSOCIATION, [11(3),* 151-153.

Hanley, J.A. & McNeil, B J. (1982). The meaning and use of the area under a receiver operating characteristics (ROC) Curve. *Radiology,* 143, 1982, 29-36.

Hsiao, J.K., Bartko, JJ. & Potter, W.Z. (1989). Diagnosing diagnoses: Receiver Operating Characteristic methods and psychiatry. *Archives of General Psychiatry, 46,* 664-667.

Kluft, R.P. (1987a). Making the diagnosis of multiple personality disorder. In: Flach, F. (Ed.), *Diagnostics and* ***psychopathology,*** **207-225. New** York: W.W. Norton.

Kluft, R.P. (1987b). An update on multiple personality disorder. *Hospital and Community Psychiatry,* 38, 4, 363-373.

Mari, J.D J. & Williams, P. (I985) . A Comparison of the Validity of two Psychiatric Screening Questionnaires (GHQ-12 & SRQ-20) in Brazil, using Relative Operating Characteristic (ROC) analysis. *Psychological Medicine,* 15, 651-659.

Metz, C.E., Wang, P., ShenJ. & Kronman, H.B. *LABROCI.* Department of Radiology and the Franklin Mclean Memorial Research Institute. University of Chicago, Chicago Illinois, *60637.*

Murphy, TM, Berwick, D.M., Weinstein, M.C., Borus,J.F., Budman, S.H. & Klerman, G.L. (1987). Performance of screening and diagnostic tests: application of receiver operating characteristic analysis. *Arch. Gen. Psychiatry,* 44, 550.

Pfohl, B., Stangl, D., & Zimmerman, M. (1982) . *The Structured Interview for* DSM-lll *Personality Disorders (SIDP).* University of Iowa Hospitals and Clinics, Iowa City I.A.

Quimby, L.G. & Putnam, F.W. (1991). Dissociative symptoms and aggression in a state mental hospital. *DISSOCIATION,* IV(1), 21-24

Ransohoff, D.F., & Feinstein, A.R. (1978) Problems of Spectrum and Bias in Evaluating the Efficacy of Diagnostic Tests. *The New England journal of Medicine, 26, 926-930.*

Rey, J.M., Morris-Yates, A., & Stanislaw, H. (1992). Measuring the Accuracy of Diagnostic Tests Using Receiver Operating Characteristics (ROC) Analysis. *InternationalJournal ofMethods in PsychiatricResearch,* 2, 39-50.

Ross, C.A., Anderson, G., Fleisner, W.P., & Morton, G.R. (1991). The frequency of Multiple Personality Disorder among Psychiatric Inpatients. *American Journal of Psychiatry,* 148, 12, 1717-1720.

Ross, C.A., Heber, S., Norton, R., & Anderson, G. (1989). Differences between Multiple Personality Disorder and Other Diagnostic Groups on Structured Interview. *Journal of Nervous and Mental Disease,* 177, *8,* 487-491.

Ross, C.A., Joshi, S., & Currie, R. (1991). Dissociative experiences in the general population: A factor analysis. *Hospital and Community Psychiatry, 42, 3,* 297-312.

Ross, C.A., Miller, D.S., Reagor, P., Bjornson, L., Fraser, G.A., & Anderson, G. (1990). Structured interview data on 102 cases of multiple personality disorder from four centers. *American Journal of Psychiatry,* 147, 596-601

Ross, C.A., Norton, G.R., & Anderson, G. (1988) The dissociative experiences scale: A replication study. *DISSOCIATION, I(3),* 21-22.

Saxe, G.N., Kolk van der, B.A., Berkowitz, R., Chinman, G., Hall, K, Lieberg, G., & Schwartz, J. (1993) Dissociative Disorders in Psychiatric Inpatients, *American journal ofPsychi(dry* ,150,1037-1042.

Schwartz, D.R., Frischholz, EJ., Braun, B.G., & Sachs, R.G. (1991) *A confirmatory factor analytic study of the Dissociative Experience Scale (DES).* Proceedings of the 8th International Conference on Multiple Personality/Dissociative States, Chicago.

Steinberg, M., Rounsaville, B., & Cicchetti, D.V. (1990). The structured clinical interview for *DSM-III-R* dissociative disorders: Preliminary report on a new diagnostic instrument. *American journal of Psychiatry, 147,* 76-82.

Steinberg, M., Rounsaville, B., & Cicchetti, D. (1991). Detection of dissociative disorders in psychiatric patients by a screening instrument and a structured diagnostic interview, *American Journal of Psychiatry,* 148, 8, 1050-1054.

Swets,J.A. (1979). ROC analysis applied to the evaluation of imaging techniques. *Investigative Radiology,* 14, 109-121.

Swets, J.A., Pickett, KM., Whitehead, S.F., & Getty, D.J. (1979). Advanced Measurement methods illustrated in a study of computed tomography of the brain. In Swets J.A. & Freeman B.A. (Eds.), *Assessment diagnostic technologies, 205,* 753-759.

Weinstein, M.G., Berwick, D.M., Goldman, P.A., Murphy, J.M., & Barsky, A.J. (1989). A Comparison of Three Psychiatric Screening Tests Using Receiver Operating Characteristic (ROC) Analysis. *Medical Care, 27,* 6, 593-607.

Wing, J.K., Cooper, J.E., & Sartorius, N. (1974) *Measurement and classification of p.sychiatric symptoms; an instruction manual for the PSE and Catego program.* Cambridge University Press, London.