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Psychometric validation of the State Scale of Dissociation (SSD)

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Although dissociative phenomena are often transient features of mental states, existing measures of dissociation are designed to measure enduring traits. A new present-state self-report measure, sensitive to changes in dissociative states, was therefore developed and psychometrically validated. Fifty-six items were formulated to measure state features, and sorted according to seven subscales: derealization, depersonalization, identity confusion, identity alteration, conversion, amnesia and hypermnesia. The State Scale of Dissociation (SSD) was administered with other psychiatric scales (DES, BDI, BAI, SCI-PANSS) to 130 participants with DSM-IV major depressive disorder schizophrenia, alcohol withdrawal, dissociative disorders and controls. In these sample populations, the SSD was demonstrated as a valid and reliable measure of changes in and the severity of dissociative states. Discriminant validity, content, concurrent, predictive, internal criterion-related, internal construct and convergent validities, and internal consistency and split-half reliability were confirmed statistically. Clinical observations of dissociative *states*, and their comorbidity with symptoms of depression and psychotic illness, were confirmed empirically. The SSD, an acceptable, valid and reliable scale measuring state features of dissociation at the time of completion, was obtained. This is a prerequisite for further investigation of correlations between changes in dissociative *states* and *concurrent* physiological parameters.

The methodological value of examining both state and trait aspects of psychiatric disorders (Kraemer, Gullion, Rush, Frank, & Kupfer, 1994) has been demonstrated for various psychiatric disorders (Dettling *et al.*, 1995; Schrader, 1994) and psychiatric symptoms (Loranger *et al.*, 1991; Peselow, Sanfilipo, Fieve, & Gulbenkian, 1994). Historically, however, studies relating to *trait* aspects of dissociation have dominated the research scene (Bernstein & Putnam, 1986; Ross, Joshi, & Currie, 1991), despite evidence in the literature and clinical presentations of *state* symptoms of dissociation (Butler, Duran, Jasiukaitis, Koopman, & Spiegel, 1996; Cardeña & Spiegel, 1993).

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Most of the dissociative disorders usually present as transient mental *states*. They include the DSM-IV (American Psychiatric Association, 1994) and ICD-10 (WHO, 1992) disorders of dissociative amnesia, dissociative fugue, depersonalization disorder, conversion disorder (or dissociative disorders of movement and sensation), organic dissociative disorder, and dissociative trance disorder. Less often, these disorders present in an enduring way, although with a varying degree of severity. For these instances, a case could be made for them to be trait-like, as for dissociative identity disorder (DID), which is usually enduring notwithstanding its state-like symptoms such as identity alteration that occur over and above the DID 'trait' (Brenner, 1996).

An assessment of 18 existing measures of dissociation for state and trait characteristics, and for their suitability to measure dissociative states at the time they occur, revealed that these measures address predominantly *trait* characteristics of dissociation (e.g. the most widely used scales by Bernstein and Putnam (1986), Ross *et al.* (1989), Steinberg, Cicchetti, Buchanan, Rakfeldt, and Rounsaville (1994) and Vanderlinden, Van Dyck, Vandereycken, Vertommen, and Verkes (1993)). The dissociation scale for the Symptom Checklist and Hopkins Symptom Checklist (Briere & Runtz, 1990) is an exception in so far as it measures the severity of dissociative symptoms over the previous seven days. However, none of the existing scales measures dissociative states at the time they occur. Furthermore, in most of these scales, the grading of responses is inadequate in that responses are often merely recorded as present/absent.

A valid and reliable measure that is sensitive to *state* characteristics, and to short-term variations in the intensity of dissociation, will provide a scientifically accountable way to study dissociative states and will make it possible to study *concurrent* neurophysiological states that potentially correlate with dissociative states. For this reason, the State Scale of Dissociation (SSD; see Appendix) was developed and tested psychometrically. It is a 56-item self-report measure of the severity of dissociative states at the time they occur. A self-report format was used as it can be difficult to gain objective access to some dissociative experiences during an interview, and self-ratings are more likely to be valid than questionnaire scales in measuring dissociative experiences (Burisch, 1984).

The items describe dissociative symptoms, each of which had previously been recorded in diverse places in the psychiatric literature and had been included in several of the 18 existing measures of (trait) dissociation mentioned above. They were sorted according to seven subscales: derealization (items 1–8), depersonalization (items 9–16), identity confusion (items 17–24), identity alteration (items 25–32), conversion (items 33–40), amnesia (items 41–46) and hypermnesia (items 47–56). Five of the subscales represent the core dissociative symptoms that informed the DSM-IV (American Psychiatric Association, 1994) and that approximate closely the ICD-10 (WHO, 1992) description of dissociative psychopathology, viz. amnesia, depersonalization, derealization, identity confusion and identity alteration. A conversion subscale was added to account for the ICD-10 inclusion of conversion among the dissociative disorders. A hypermnesia subscale was included in the SSD following reports of a high frequency of flashbacks and intrusive memories after traumatic events, in the light of the claimed role of psychological trauma in the aetiology of the dissociative disorders, and the suggested role of overconsolidated memories in dissociative hypermnesias (Butler *et al.*, 1996). The original items were transformed by altering the tense and time specifiers to make them sensitive to the intensity of dissociative states at the time of completing the scale. A modified visual analogue scale allows for freedom of expression and grading of the severity of dissociative symptoms, without sacrificing ease of scoring.

The psychometric testing was designed to meet the following objectives:

(1) To ascertain that the SSD is indeed a *state* scale, the sensitivity of the SSD to changes in dissociative states was tested by comparing SSD scores before and after a grounding activity that aimed at reducing the intensity of dissociation.
(2) To ascertain that the SSD measures the severity of dissociative symptoms among participants with mild and severe dissociative symptoms, the SSD scores were compared among different clinical and non-clinical populations. These comparisons also assessed the SSD's ability to predict a diagnosis of a dissociative disorder, despite its not being designed for this purpose.
(3) To ascertain that the SSD and the Dissociative Experiences Scale (DES, a *trait* measure of dissociation; Bernstein & Putnam, 1986) measure related phenomena, the statistical association between SSD and DES scores was examined.
(4) To ascertain whether the seven SSD symptom groups represent a single construct of dissociation or multiple constructs, the clustering of correlations was compared between various dissociative symptoms. These correlations also tested whether the SSD measures consistently (i.e. whether SSD and subscale scores are free from errors of measurement).
(5) To ascertain that dissociative states as measured by the SSD represent a different construct from other psychiatric symptoms, the clustering of correlations was compared between SSD item scores and item scores of measures of non-dissociative symptoms.

The primary objective was to ascertain that the SSD is indeed a state scale and the subsequent objectives addressed other salient aspects of validity and reliability testing — hence the above order of the objectives. However, in the methodology of the analyses described below, the more logical, traditional sequence of psychometric validation is followed where the various forms of validity testing are separated from the various forms of reliability testing.

Methods

Pilot study

A 58-item pilot-SSD was administered twice to 22 nurses, near the beginning and the end of a night shift; and to 10 psychiatric in-patients with prominent dissociative symptoms. Spearman's rho item–total correlation coefficients were statistically significant at the .01 level — preliminary evidence for internal criterion-related validity. Cronbach's alpha (.99) and Guttman split-half reliability (.98) coefficients, and high item–item correlation coefficients, supported the internal consistency. The external validity of the pilot-SSD was supported by its ability to determine whether a person belonged to the control or patient groups (Mann–Whitney $U = 2.0$; $p = .001$). Questions to individuals suggested that the pilot-SSD was user-friendly; it required only 3–8 min to complete. As anticipated (owing to exhaustion and sleep deprivation), nurses' mean scores increased from 1.28 (SD = 2.38) to 3.12 (SD = 6.84) during the night shift. The low, non-significant correlation (Kendall's tau = .30; $p = .07$) between evening and morning scores (i.e. low test–retest reliability) provided preliminary evidence for the sensitivity of the pilot-SSD to changes in the intensity of dissociation. The pilot study highlighted some items that were reworded subsequently to be more sensitive. The limitations of the pilot study are considered in the discussion below.

Participants

The study population ($N = 130$) consisted of two groups of participants: 67 adult patients and

63 controls. Among the patient group, a subgroup of patients with a diagnosis of a dissociative disorder was included as a criterion group (N= 10; M age 35.8 ± SD 4.1 yrs), for they were anticipated to show the highest prevalence and severity of dissociative symptoms. Their DSM-IV diagnoses were dissociative amnesia (N= 1), dissociative identity disorder (N= 1) and dissociative disorder NOS (N= 8). Patients suffering from a major depressive episode (N= 19; M age 44.2 ± SD 7.6 yrs), schizophrenia (N= 18; M age 34.2 ± SD 5.4 yrs) and alcohol withdrawal (N= 20; M age 39.8 ± SD 5.4 yrs) served as contrasting samples to the patients with dissociative disorders. None of the patients of the contrasting samples had significant comorbid psychopathology or significant personality problems. These contrasting samples were included owing to the frequent comorbidity and symptom overlap between dissociative symptoms and depressive disorders (Ross *et al.*, 1990; Saxe *et al.*, 1993), between dissociative symptoms and schizophrenia and other psychotic illnesses (Ellason & Ross, 1995; Steinberg *et al.*, 1994) and between dissociative symptoms and alcohol and other substance abuse-related problems (Dunn, Paolo, Ryan, & Van Fleet, 1993; Wenzel *et al.*, 1996). Patients fulfilling DSM-IV criteria for the above disorders were identified among all consecutive admissions to the general adult in-patient treatment facilities of the South Warwickshire Mental Health Services NHS Trust, England, during a five-month period. Patients who suffered from a first or recurrent major depressive episode at that time were included. Patients with schizophrenia were included if they had been experiencing active phase symptoms. Patients suffering from alcohol withdrawal, without significant other psychoactive substance use, were included if they were at Day 2 or Day 3 of an alcohol withdrawal treatment regimen. Patients with an enduring dissociative disorder were identified from regular attendees at community-based facilities of the same Trust. The control group consisted of undergraduate university students without any history of psychiatric treatment (N= 63; M age 29.3 ± SD 4.8 yrs). The group included several mature undergraduate students — hence the mean age, which is higher than would be expected in a group of undergraduate students. Research ethics approval for the study was obtained from the local research ethics committees. Written informed consent was obtained from all participants prior to participation. In-patients were included only if their participation was not independently considered to be clinically contra-indicated.

Instruments and procedure

The SSD (see Appendix), Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988), Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986) and Structured Clinical Interview for the Positive and Negative Syndrome Scale (SCI-PANSS; Kay, 1991; Kay, Fiszbein, & Opler, 1987) were administered in this order. The SSD was subsequently administered again, since two sets of SSD scores were necessary for testing of the sensitivity of the SSD to changes in the intensity of dissociation. Participants' attention was drawn to the different time frames addressed by the various scales (e.g. to the 'right now' of the SSD, referring to the time of completing the scale). The administration of the four other scales served as a grounding activity that had been anticipated to increase participants' awareness of their own experiences, thereby inhibiting dissociative processes, and thus resulting in lower SSD scores at the second administration.

The DES, a 28-item self-report measure of the percentage of time that participants experience dissociative symptoms, was administered as the most widely used and thoroughly validated scale of dissociation. The BDI, BAI and SCI-PANSS were administered to account for the frequent co-occurrence of dissociative symptoms with symptoms of depression (Saxe *et al.*, 1993), anxiety (Van der Kolk *et al.*, 1996) and psychotic illness (Ellason & Ross, 1995).

Analysis

The SSD data were scored according to the ticks in the squares, ranging from '0' for a tick in the first square, to '9' for a tick in the 10th square. The total SSD score was calculated as

the mean of all item scores, and subscale scores as the mean of the item scores under each subscale.

The following analysis addresses validity testing first, and then reliability testing. Sensitivity of the SSD to change is reported along with reliability testing (Aiken, 1996).

For the purpose of external criterion-related validity testing (Aiken, 1996), the presence of a dissociative disorder (diagnosed without the aid of the SSD) was taken as an external criterion of dissociative symptomatology. The testing of concurrent validity (Aiken, 1996) in the contrasting samples would examine the SSD's ability to measure the severity of dissociative symptoms at the time of completing the scale (Objective 2). The Kruskal–Wallis analysis of variance by ranks tested for differences in SSD and subscale scores among the five diagnostic groups. Participants were subsequently divided into those with and those without a dissociative disorder, and the difference in SSD score assessed by the independent samples *t*-test. The testing of predictive validity (Altman, 1991) would examine the ability of the total SSD score to predict whether a participant suffered from a dissociative disorder (Objective 2). The SSD was not designed to be a diagnostic instrument, unlike other (trait) measures that are widely used to predict the diagnosis of a dissociative disorder (Bernstein & Putnam 1986; Ross *et al.*, 1989; Steinberg *et al.*, 1994). Hence, it would not have been anticipated that the SSD would demonstrate predictive validity. Nonetheless, the predictive validity of the SSD was tested to contribute to thorough psychometric validation.

Owing to the lack of consensus in the literature on a well-demarcated domain of dissociation (external criterion), an internal criterion was also used whereby item–total Pearson correlations gave some indication of 'internal criterion-related validity' (Aiken, 1996), even though this method does not represent an ideal way of testing criterion-related validity. Similarly, item–subscale correlations informed the internal validity of each subscale, and subscale–total correlations informed the internal validity of the seven-subscale structure of the SSD. For construct validity testing, principal-components analyses with varimax rotation were performed on all SSD item scores (Objective 4). Discriminant validity was tested by principal-components analyses with varimax rotation on all pooled items from the SSD, DES, BDI, BAI and PANSS (Objective 5). Convergent validity was assessed by Spearman's rho correlations between SSD and DES scores for each diagnostic group (Objective 3).

Reliability testing included the identification of redundant items (item–item correlations $\geq .8$), and the testing of internal consistency (Cronbach's alpha for the entire SSD and for each subscale) and the related split-half reliability (Spearman–Brown and Guttman methods). Test–retest reliability was not determined here, since the SSD was not designed to measure a stable phenomenon consistently over time. Instead, the testing of the SSD's sensitivity to changes in the intensity of dissociation relied on the statistical difference (paired-samples *t*-test) between SSD scores obtained before and after a grounding activity that aimed at reducing dissociation (Objective 1).

Results

Subgroups and measures of psychopathology

The 95% confidence intervals of the SSD and subscale scores in the various clinical and non-clinical subgroups were examined in order to assess the SSD's ability to measure the severity of dissociative symptoms among participants with mild and severe dissociative symptoms (see Fig. 1). The mean *total SSD* score and 95% confidence intervals for each diagnostic group were as follows: control subjects = .51 (.35–.67); alcohol withdrawal = 2.22 (1.51–2.93); schizophrenia = 2.10 (1.26–2.94); major depressive episode = 2.11 (1.44–2.78); dissociative disorder = 4.33 (3.23–5.43). As anticipated, the patients with a diagnosis of a dissociative disorder had the most severe dissociative state symptoms at the first time of completing the SSD (see Fig. 1).

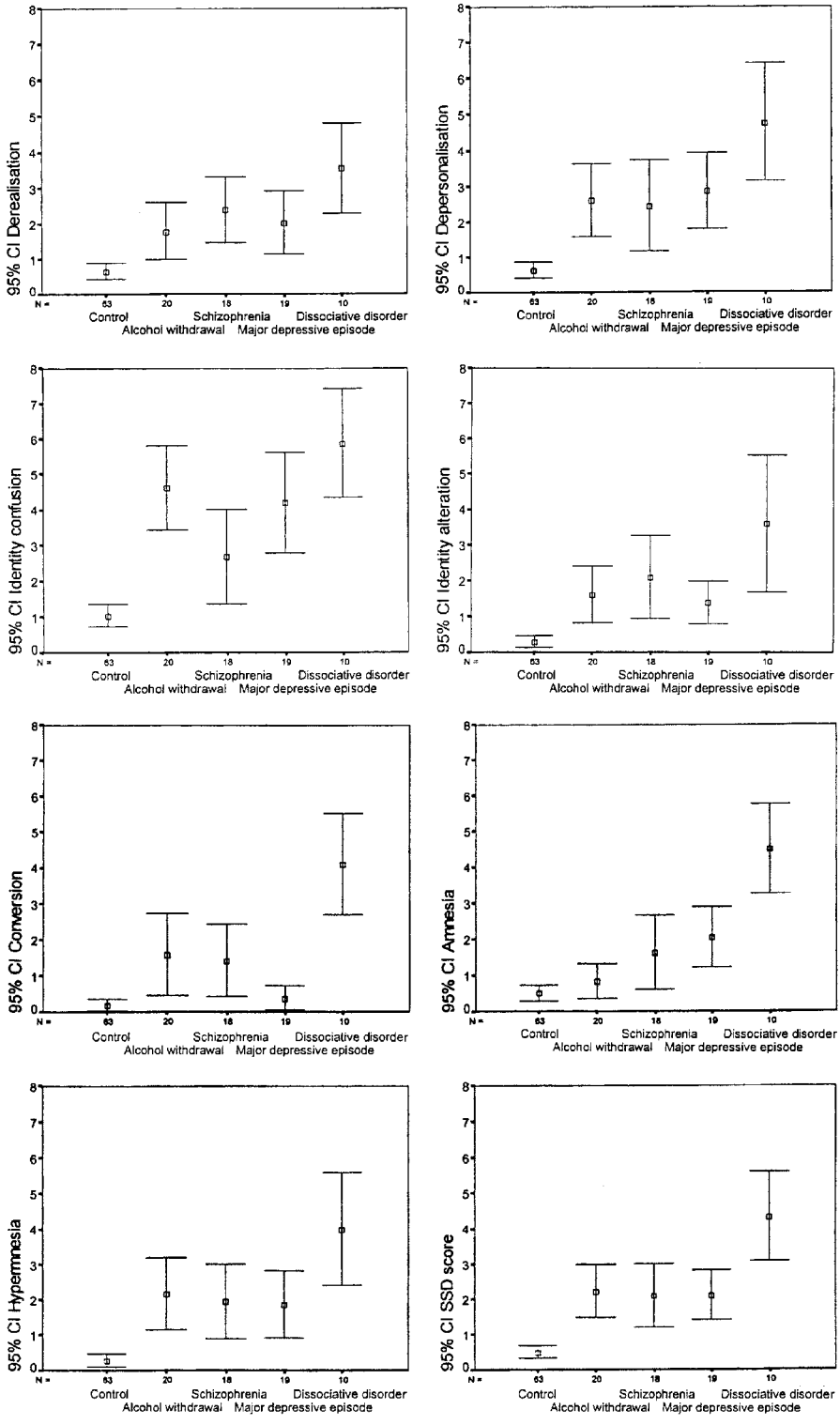

Figure 1. Confidence intervals: SSD and subscale scores across groups.

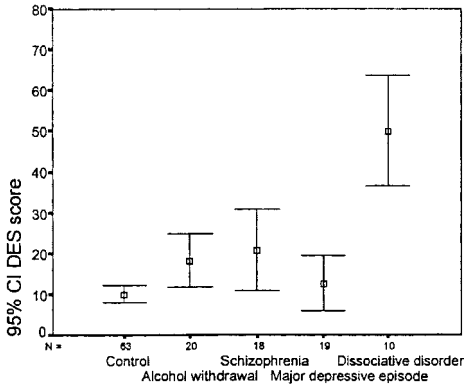

Figure 2. Confidence intervals: DES scores across groups.

However, they were not the only ones, for the other clinical subgroups also demonstrated prominent dissociative state symptoms (as anticipated), for example derealization, depersonalization and identity confusion. The variation in SSD and subscale scores was further assessed by the Kruskal–Wallis test (see results of concurrent validity testing below).

Figure 2 illustrates the 95% confidence intervals of the DES score across diagnostic groups and demonstrates the high scores, as anticipated, in the patients with a diagnosis of a dissociative disorder. Figure 3 illustrates the shared range between patients with a major depressive episode and a dissociative disorder of the BDI score confidence intervals. Figure 4 demonstrates the high scores in patients with dissociative disorders on PANSS general psychopathology and on the positive syndrome. The prominence of some 'positive' symptoms in the patients with dissociative disorders is further demonstrated by the high PANSS composite index in those patients. The composite indices of patients with alcohol withdrawal, schizophrenia and major depressive episodes have negative values, while those of the controls and patients with dissociative disorders have positive values. Figure 4 also shows the high value for the PANSS depression cluster score in the patients with

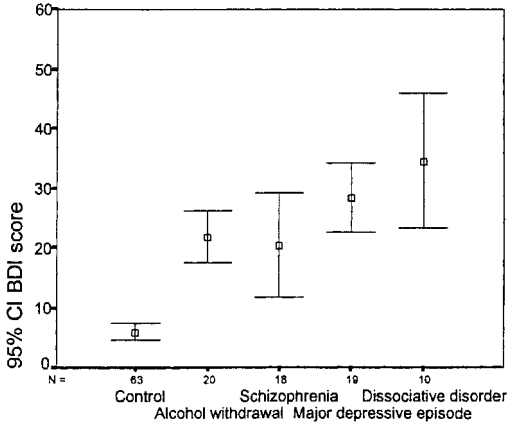

Figure 3. Confidence intervals: BDI scores across groups.

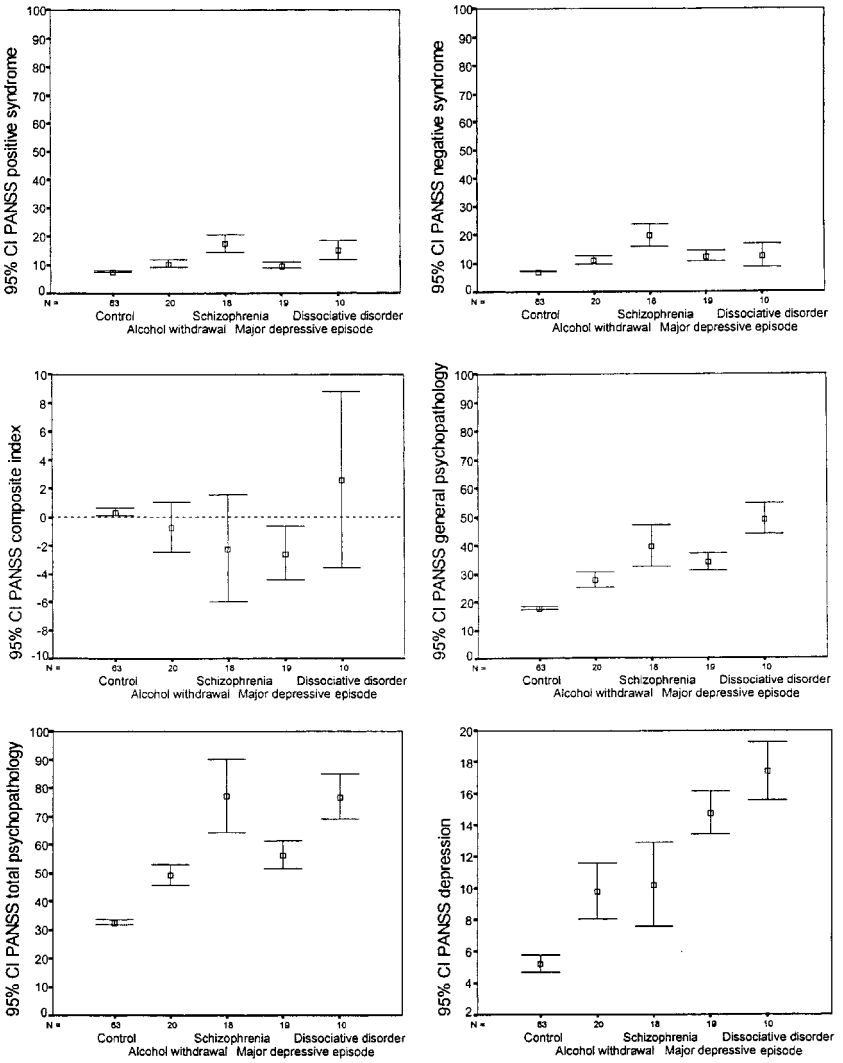

Figure 4. Confidence intervals: PANSS scores across groups. (PANSS composite index = PANSS positive syndrome scale score—PANSS negative syndrome scale score.)

dissociative disorders, even higher than in the patients with a major depressive episode. This is consistent with the high BDI scores in patients with dissociative disorders (see Fig. 3).

Validity of the SSD

The development of the SSD was based on existing scales, DSM-IV, ICD-10, and judgments of independent experts on the items and subscales of the SSD. This basis contributes towards its content validity, since it suggests that the SSD measures what it was supposed to measure. Concurrent validity was confirmed by the Kruskal–Wallis test, which demonstrated a statistically highly significant variation in SSD and subscale scores across diagnostic groups ($\chi^2(4) = 57.83$, $p = <.01$ for the total SSD score).

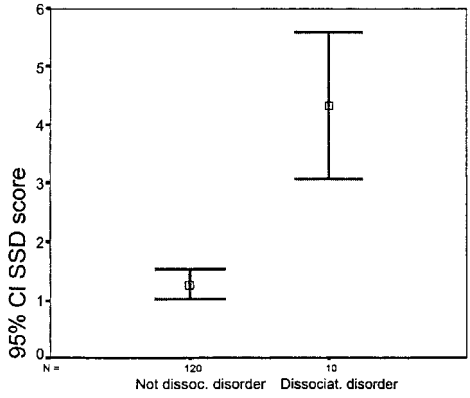

Figure 5. Comparison of SSD scores between those with and those without a dissociative disorder.

Concurrent validity was also demonstrated in the comparison between those with and those without a dissociative disorder, for which the independent samples *t*-test was statistically highly significant ($t(10.04) = -5.30$; $p < .001$: see Fig. 5).

In the testing of the predictive validity, the best cut-off score for the SSD was identified as 3.9. At this score, the sum of the sensitivity and specificity was maximal. The positive predictive value of this cut-off score was calculated as .35 and the negative predictive value as .98. The posterior probabilities, based on a prevalence taken as 5% (Ross, 1991; Ross *et al.*, 1991), showed that an SSD score of ≥ 3.9 made for a seven times higher risk of having a dissociative disorder, whereas an SSD score of < 3.9 reduced the risk of having a dissociative disorder by 60% (as compared with the general population). The likelihood ratio of 10 and the post-test odds of 1.9:1 further indicate that an SSD score of ≥ 3.9 nearly doubles the certainty of a diagnosis of a dissociative disorder. Note, though, that important limitations pertain to the SSD's predictive validity (see Discussion).

In the testing of the internal criterion-related validity, among the item–subscale correlations, none of the Pearson coefficients was $\leq .4$ ($N = 130$). Among the item–total correlations, two items yielded Pearson coefficients of $\leq .4$ ($N = 130$): one measured the state of having a blank mind; the other measured the state of being unaware of what was happening around one (both were amnesia subscale items). These two items were subsequently discarded from the SSD and excluded from further analyses. For the subscale–total correlations among the different subgroups, Pearson coefficients were all statistically highly significant or significant.

Principal-components analyses with varimax rotation ($N = 130$) yielded a five-factor model, accounting for 61% of the variance (summarized in Table 1). Despite high factor loadings onto more than one factor by several items (especially derealization and depersonalization items, which appear to measure aspects of more than one factor), the factor loadings supported the subscale structure of the SSD. Repetition of the factor analyses with oblique rotation yielded no additional meaningful results.

Convergent validity between the SSD and DES is demonstrated by statistically significant and highly significant Spearman's rho correlation coefficients between SSD and DES scores, as anticipated: controls ($\rho = .57$, $p < .001$); alcohol withdrawal ($\rho = .43$, $p = .06$); schizophrenia ($\rho = .74$, $p < .001$); major depressive episode ($\rho = .51$, $p = .03$); and dissociative disorder ($\rho = .81$, $p < .01$).

Discriminant validity testing by principal-components analysis with varimax rotation

Table 1. Correspondence between internal factor structure of SSD items and SSD subscale structure

Factor	Eigenvalue	% variance	Items corresponding mostly to these subscales
1	23.762	42.4	Identity confusion, derealization, depersonalization
2	4.050	7.2	Conversion
3	2.282	4.1	Amnesia
4	2.051	3.7	Identity alteration
5	2.003	3.6	Hypermnesia
Total:		61.0	

(N= 130) of the pooled items of all the scales yielded a five-factor model, accounting for 52.9% of the variance (summarized in Table 2). The factors corresponded to the different scales, despite occasional high factor loadings onto more than one factor by some items from the BAI and from the SSD subscale of identity confusion.

Table 2. Factor structure of pooled items from the SSD, DES, BDI, BAI and PANSS

Factor	Eigenvalue	% variance	Items corresponding mostly to these scales
1	55.311	35.5	Depression (BDI), Anxiety (BAI), Identity confusion (SSD subscale)
2	8.922	5.7	DES
3	8.276	5.3	SSD (all subscales, and identity confusion less so)
4	5.765	3.7	PANSS (general, positive and negative syndromes)
5	4.276	2.7	Anxiety (BAI)
Total:		52.9	

Reliability of the SSD

Item–item (Pearson) correlation coefficients of $\geq .8$ were taken to identify redundant items. No highly correlated item pairs consistently suggested redundancy across diagnostic groups. The internal consistency of the SSD and its subscales was high: Cronbach's alpha for the entire SSD was .97; for the derealization subscale, .84; for depersonalization, .91; for identity confusion, .93; for identity alteration, .87; for conversion, .92; for amnesia, .82; and hypermnesia, .90. The split-half reliability was also high: Guttman and equal length Spearman–Brown coefficients were .92.

Sensitivity of the SSD to change

Figure 6 shows the decrease after the grounding activity in the 95% confidence intervals of the SSD scores across diagnostic groups. The mean length of the period between the first and second administrations of the SSD (i.e. the duration of the grounding activity) was 53 min. The paired-samples t-test to compare the two sets of SSD scores among all participants was statistically highly significant ($t(129) = 7.26$, $p < .001$). For individual diagnostic groups, similar highly significant test results were found.

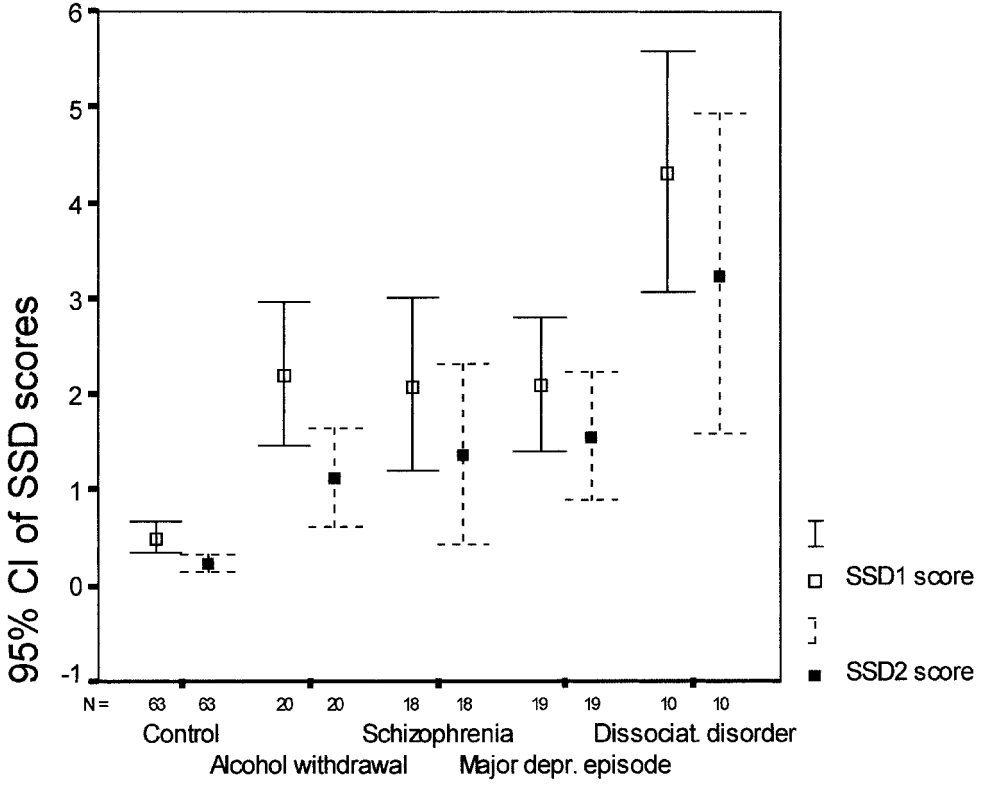

Figure 6. Change in SSD scores during data collection.

Discussion

The SSD is sensitive to changes in dissociative states

Figure 6 demonstrated the sensitivity of the SSD to a decrease in the intensity of dissociative symptoms after a grounding activity. The statistically highly significant paired-samples *t*-test of the difference between scores obtained on the first SSD and the second SSD might have suggested that the two sets of SSD scores do not statistically belong to the same population. However, since the scores do come from the same population, and since the implication of a difference in scores is taken to show that SSD scores can change significantly within a short period of time, it suggests that the SSD is sensitive to short-term changes in the intensity of the participants' dissociative symptoms.

Although the main study was designed in a way that *decreased* dissociative symptoms, the sensitivity of the SSD to changes in dissociative states was also demonstrated in the pilot study where dissociative experiences *increased* among the 22 nurses during the night shift, to the extent that the evening and morning SSD scores correlated poorly. However, substantive interpretations should not be made from the pilot study, since additional measurements had neither been made of tiredness, nor of other self-report scales such as the DES, nor of other vulnerabilities such as being early in the night shift run, nor had measurements been repeated on other nights.

One might ask whether the filling out of questionnaires and being subjected to a

semi-structured interview can be considered a grounding activity. It could be that this had various effects among the respondents. However, the highly significant *t*-test of the difference between the first and second sets of scores and the fact that it was a *paired-samples* test suggest that the SSD is sensitive to a reduction in the true score. Notwithstanding the demonstrated true SSD score reduction, if questionnaire completion and the semi-structured interview encourage self-reflection, the same effect would be expected for the SSD, which means that one would expect to see lower item scores towards the end of the SSD. This, however, was not observed (see Fig. 1), the most likely reason being that the short time required to complete the SSD does not allow for as much self-reflection as does the lengthy administration of several instruments.

The SSD measures the severity of dissociative states

Testing of the concurrent validity of the SSD among different clinical and non-clinical populations demonstrated the SSD's ability to measure the severity of dissociative symptoms among participants with mild and severe dissociative symptoms (see Figs 1 and 5; supported statistically by the significance of the Kruskal–Wallis test). As reported earlier, none of the psychiatric patients had a personality disorder. Had patients with borderline personality disorder, who are reported to dissociate (American Psychiatric Association, 1994), been included, the SSD might have measured the severity of their dissociative states as well.

The SSD has limited predictive value

The result of the predictive validity testing (i.e. that an SSD score of ≥ 3.9 nearly doubles the certainty of a diagnosis of a dissociative disorder) has to be interpreted in the light of the following limitations. The sample of patients with a dissociative disorder was small, and they were not all experiencing severe dissociative states at the time of completing the SSD. Furthermore, since the prevalence of the dissociative disorders is relatively low (i.e. 5%), and the post-test odds were greater than the positive predictive value, an SSD score of ≥ 3.9 would still mean the person is more likely *not* to suffer from a dissociative disorder than to suffer from a dissociative disorder.

The greatest value of the SSD may be its assessment of immediate dissociative symptomatology (i.e. the identification of people who are 'actively' or acutely dissociating, irrespective of the presence or absence of a psychiatric or other diagnosis). An SSD cut-off score of 3.9 might have very limited value in clinical diagnostic screening for a dissociative disorder, bearing the above limitations in mind. Moreover, note that the SSD does not assess longer-term trends (including enduring symptoms of dissociation or their longitudinal course), as do those measures that are widely used to diagnose dissociative disorders (Bernstein & Putnam 1986; Ross *et al.*, 1989; Steinberg *et al.*, 1994). The reason is that the SSD was not designed as a diagnostic instrument. Nonetheless, the testing of the predictive validity contributes towards the overall psychometric validity. Also, the limited predictive value demonstrated here is congruent with the SSD's specific niche as a *state* scale among other measures of dissociation.

Although the SSD has limited predictive value, psychiatric and psychotherapeutic assessment of patients could be aided by the SSD if the presence and severity of dissociative symptoms at that time are to be measured.

The SSD and the DES measure related phenomena

The significant SSD–DES correlations confirmed that the SSD and the DES measure related phenomena. Testing the convergent validity of the SSD in comparison with the DES was not ideal, because the DES measures the usual frequency of dissociative experiences (a dissociative *trait*), whereas the SSD measures the severity of dissociative *states*. However, this was inevitable owing to the lack of another state measure of dissociation. Further, the use of the DES was unsatisfactory in so far as it only covers depersonalization/derealization, amnestic dissociation, and absorption/imaginative involvement, but not identity confusion, identity alteration, conversion or hypermnesia, as in the SSD. Following the DSM-IV and ICD-10, absorption/imaginative involvement was not included in the SSD.

The SSD measures dissociative states only

The results of the internal principal-components analyses supported the construct validity of the SSD, and suggested that *all* the subscales of the SSD measure *core* dissociation. This is evidenced in very high loadings by many items on the first factor, and this large factor's accounting for 42.4% of the variance (see Table 1). The high loadings by some items, especially derealization and depersonalization items, onto other factors as well, further suggest that one general factor runs throughout the SSD. Also, the satisfactory coefficients for internal consistency and split-half reliability suggest a high common variance across the items of the SSD.

Potential confounding factors may be the influence of the context of questionnaire administration, problems of suggestibility, social desirability issues and factors that the respondents impute to the researcher (e.g. 'odd' experiences). These factors were not addressed empirically here, but could be resolved by the future co-administration of a personality measure in which subscales detect misrepresentation, defensiveness, true response inconsistency or variable response inconsistency.

SSD dissociation does not overlap with other constructs

The four other psychiatric scales that were administered are accepted measures of the constructs of depression (BDI) anxiety (BAI) and psychosis (PANSS), respectively. Testing of the discriminant validity of the SSD as compared with these scales (see Table 2) permits the conclusion that dissociation as measured by the SSD does not overlap significantly with the constructs of depression, anxiety or psychosis.

The 'external' factor analysis, the method by which the discriminant validity of the SSD was tested, has the shortcoming of negating potential comorbidity of the various symptoms in some clinical populations. In other words, if patients were to suffer from more than one group of symptoms, the external factor analysis might show high correlations between the items of two different scales, thus compromising the discriminant validity. The relatively small number of participants in this study ($N = 130$), given the number of items studied, is a further constraint to the 'external' factor analysis. Replication in larger studies can overcome this problem.

Contributions of this study to research on dissociation, and potential application of the SSD

In addition to evidence for the validity and reliability of the SSD, the psychometric

validation of the SSD contributes to research on dissociation in so far as, first, state and trait aspects of dissociation were empirically distinguished and, second, the comorbidity was confirmed between dissociative symptoms and other symptoms of psychopathology. Comorbidity was confirmed between dissociative symptoms and symptoms of depression in patients with dissociative disorders (see Figs 3 and 4). Similarly, patients with dissociative disorders showed high positive syndrome scores on the PANSS (see Fig. 4), and in turn, patients with schizophrenia experienced dissociative symptoms (see Fig. 1). However, notwithstanding the fact that these two groups of patients share some symptoms, the constructs of dissociation and 'psychosis' are distinct from one another, as seen in the external factor analysis (see Table 2) where SSD and PANSS items clustered into separate, uncorrelated factors.

The sensitivity of the SSD to short-term changes in the intensity of dissociation makes it well suited for serial measurements, which will allow research into the neurophysiological concomitants of changes in dissociative states, including experimentally induced changes in dissociative states. The following illustrates a few examples. Concurrent electro-encephalographic (EEG) correlates of dissociative states can be studied to elucidate previous work that suggested a possible relationship of dissociation with background activity and epileptiform phenomena on EEG (Coons, Bowman, & Milstein, 1988; Schenk & Bear, 1981; Spiegel, 1991). Polysomnographic recordings might be used to study the relationship between electro-encephalographic sleep parameters, and hypnogogic or hypnopompic dissociative experiences. Functional magnetic resonance imaging, positron emission tomography, single photon emission computerized tomography, regional cerebral blood flow, and event-related potentials can be correlated with dissociative states as measured by the SSD.

The SSD might be applied to examine the relationships between dissociative states and other present-state psychiatric symptoms such as somatoform symptoms (other than conversion symptoms) (Ross *et al.*, 1990; Saxe *et al.*, 1994). An additional format for the SSD might extend its utility: it could be used for the development of a new measure of trait dissociation, improving on the DES in so far as seven groups of dissociative symptoms would be included. This would facilitate further comparison between state and trait aspects of dissociation.

Conclusions

The SSD was demonstrated in these sample populations as a valid and reliable measure of changes in and the severity of dissociative states at the time of completing the scale. First, this study demonstrates that the SSD is what it was designed to be — a *state* scale of dissociation — as reflected in its sensitivity to changes in the intensity of dissociative states. Second, it is valid: it measures what it is supposed to measure as reflected in its derivation from existing measures of dissociation (content validity); its ability to measure the severity of dissociative symptoms among participants with mild and severe dissociative symptoms (concurrent validity); its satisfactory correlation with the DES (convergent validity); its high item–total and subscale–total correlations (internal criterion-related validity); its construct validity on factor analysis by which all the subscales were demonstrated to measure core dissociation; and its lack of overlap with other constructs (discriminant validity when compared to the BDI, BAI and PANSS). Third, it is reliable: it is relatively free from measurement errors as reflected in its high internal consistency and split-half reliability.

Furthermore, the psychometric testing of the SSD confirmed the comorbidity between dissociative and depressive symptoms in patients with a dissociative disorder. The psychometric testing also demonstrated an overlap of symptoms between patients with a dissociative disorder and patients with schizophrenia, notwithstanding other symptomatological evidence in this study, which distinguishes between the diagnostic groups. A state measure of dissociation was a prerequisite for the concurrent measurement of dissociative states and other psychiatric symptoms in the various diagnostic groups.

Clinical observations that dissociative status fluctuates were confirmed empirically in this research. Moreover, an acceptable, valid and reliable scale capable of measuring such changes has been obtained. This is a prerequisite for further investigation of *concurrent* correlations between dissociative *states* and physiological parameters, since, without a state scale, only a non-temporal association could be inferred between a dissociative tendency and neurophysiological deviations.

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Appendix
State Scale of Dissociation (SSD)

This questionnaire contains phrases about experiences that you may or may not have **right now**. For each statement, please tick the box corresponding to the intensity of your experience, as shown in this example:

Not at all □□□□□✔□□□□ Very much so

	Read the statement in this column	Then answer in this column
1	Right now things around me seem unreal or dreamlike.	Not at all □□□□□□□□□□ Very much so
2	Things around me look different right now from the way they usually do.	Not at all □□□□□□□□□□ Very much so
3	At this moment it is as if I am looking at things around me through a fog.	Not at all □□□□□□□□□□ Very much so
4	At this moment I feel far away from what is happening around me.	Not at all □□□□□□□□□□ Very much so
5	Right now things around me are looking smaller than they usually do.	Not at all □□□□□□□□□□ Very much so
6	Right now things around me are looking much larger than they usually do.	Not at all □□□□□□□□□□ Very much so
7	I am in a world of my own at this moment.	Not at all □□□□□□□□□□ Very much so
8	I am in a trance now.	Not at all □□□□□□□□□□ Very much so
9	At this moment my body feels vague, indefinite, strange.	Not at all □□□□□□□□□□ Very much so
10	Right now my body seems disconnected from my thoughts, my feelings, my self.	Not at all □□□□□□□□□□ Very much so
11	It feels as if I am going through the motions of living, but the real me is far away from what is happening to me now.	Not at all □□□□□□□□□□ Very much so

12 It feels as if I am watching my body from a distance now. Not at all □□□□□□□□□□ Very much so

13 If feels now as if parts of my body or my whole being is unreal. Not at all □□□□□□□□□□ Very much so

14 My hands or feet or other parts of my body are feeling as if they have just changed in size. Not at all □□□□□□□□□□ Very much so

15 Right now I am feeling like a stranger to myself. Not at all □□□□□□□□□□ Very much so

16 It seems that my emotions or thoughts are not all my own at this moment. Not at all □□□□□□□□□□ Very much so

17 Right now I do not feel like my real self. Not at all □□□□□□□□□□ Very much so

18 This is not me. Not at all □□□□□□□□□□ Very much so

19 Right now I do not know who I really am. Not at all □□□□□□□□□□ Very much so

20 I do not feel like a whole person now. Not at all □□□□□□□□□□ Very much so

21 There is a struggle going on inside of me. Not at all □□□□□□□□□□ Very much so

22 I am feeling torn between one thing and another. Not at all □□□□□□□□□□ Very much so

23 There is a dialogue in my head now. Not at all □□□□□□□□□□ Very much so

24 My inner voices are talking. Not at all □□□□□□□□□□ Very much so

25 Right now we are more than one person looking at this statement. Not at all □□□□□□□□□□ Very much so

26 Someone else is about to enter now (for example the child). Not at all □□□□□□□□□□ Very much so

27 Right now there is another person waiting to come out and take control of my actions and speech. Not at all □□□□□□□□□□ Very much so

28 Another person wants to take over now. Not at all □□□□□□□□□□ Very much so

29 Someone else is in control now. Not at all □□□□□□□□□□ Very much so

30 It feels as if I am being possessed by something or someone. Not at all □□□□□□□□□□ Very much so

31 I am not in control of my emotions right now. Not at all □□□□□□□□□□ Very much so

32 My mood is changing right now (for example into anger, anxiety, happiness, or a feeling of mystical awareness). Not at all □□□□□□□□□□ Very much so

33 I am unusually weak or paralysed in one or more of my muscles now. Not at all □□□□□□□□□□ Very much so

34 I am feeling immobile like a statue, while being aware of what is going on around me. Not at all □□□□□□□□□□ Very much so

35 If I try to speak now, my voice will be gone or different from usually. Not at all □□□□□□□□□□ Very much so

36 I cannot control my speech now. Not at all □□□□□□□□□□ Very much so

37 My skin sensation is abnormal at this moment. Not at all □□□□□□□□□□ Very much so

38 I have numbness in one or more places on my skin now. Not at all □□□□□□□□□□ Very much so

39 I feel as if I am going to faint now. Not at all □□□□□□□□□□ Very much so

40 It feels as if I am about to have a fit or a seizure of some kind now. Not at all □□□□□□□□□□ Very much so

41 I am having difficulty taking in new information. Not at all □□□□□□□□□□ Very much so

42 I am forgetting what I want to do or say. Not at all □□□□□□□□□□ Very much so

43 I do not remember much of what has happened so far today. Not at all □□□□□□□□□□ Very much so

44 I think I may have forgotten to tick one or more of the preceding statements. Not at all □□□□□□□□□□ Very much so

45 I am feeling quite uncertain of where we are in time. Not at all □□□□□□□□□□ Very much so

46 I am feeling uncertain of how I arrived at this place today. Not at all □□□□□□□□□□ Very much so

47 This situation feels as if it has happened before in exactly the same way. Not at all □□□□□□□□□□ Very much so

48 I am having a strange feeling as if I know what will happen next. Not at all □□□□□□□□□□ Very much so

49 I am remembering things that I have not thought about for some time. Not at all □□□□□□□□□□ Very much so

50 Unwanted memories are entering my mind. Not at all □□□□□□□□□□ Very much so

51 I am seeing a past event in my mind's eye right now. Not at all □□□□□□□□□□ Very much so

52 I am experiencing a flashback now. Not at all □□□□□□□□□□ Very much so

53 It feels as if some past event is occurring again now. Not at all □□□□□□□□□□ Very much so

54 I am hearing one of my memories now. Not at all □□□□□□□□□□ Very much so

55 I am experiencing a smell now that reminds me of something in my past. Not at all □□□□□□□□□□ Very much so

56 Right now there is a taste in my mouth that reminds me of something in my past. Not at all □□□□□□□□□□ Very much so