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Towards a cognitive model and measure of dissociation

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Abstract

Dissociation comprises a range of psychological processes, which have largely been the subject of psychodynamic discussion. Dissociative phenomena are for the most part unaddressed by cognitive theorists. Current measures are atheoretical and our understanding of dissociation has been hampered by the absence of clear psychological models. This paper describes a new cognitive model of dissociation and the development and validation of a theoretically based measure—the Wessex Dissociation Scale (WDS). The WDS has adequate internal consistency, shows convergent validity with the Dissociative Experiences Scale (DES-II), and is equivalent to the DES-II in its associations with severe psychopathology. However, the WDS has some advantages over the DES-II, in that it is sensitive to milder manifestations of dissociation, demonstrating links to less severe pathologies. The findings described here provide preliminary support for the usefulness of the cognitive model, and the varied consequences of dissociative processes. The clinical and research utility of the model and the scale are discussed.
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1. Introduction

Dissociation can be defined broadly as a failure to integrate experiences (memories, perceptions, etc.) that are normally associated (e.g., Janet, 1889). It involves a variety of psychological processes (such as amnesia, depersonalisation, derealisation and identity confusion) that serve the function of reducing awareness of intolerable information (both internally and externally derived). Dissociation is a characteristic of a number of complex psychological disorders, many of which are associated with relatively poor therapeutic outcomes (Carlson & Putnam, 1993). It has well-established links with traumatic events (Van der Kolk, McFarlane, & Weisaeth, 1996), and there is now preliminary evidence that dissociation mediates the relationship between trauma and psychopathology (Becker-Lausen, Sanders, & Chinsky, 1995; Griffin, Resick, & Mechanic, 1997; Zatzick, Marmar, Weiss, & Metzler, 1994). This finding is particularly important since it suggests that the effective treatment of trauma victims with psychological disturbances might require the reduction of levels of dissociation.

The development of our understanding and treatment of dissociation is hampered by three related factors. First, disturbances associated with dissociation are disparate and have often been studied in isolation. Second, there is a dearth of testable psychologically based models of dissociation that would allow such symptoms to be understood and classified in terms of psychological processes. Finally, existing measures of dissociation are more phenomenologically than theoretically based. The central aims of the present study are to propose a cognitive model of dissociation, and to develop a measure of dissociation based on that model.

1.1. Existing models of dissociation

Dissociation has been seen as a dimensional phenomenon, present to some degree in all individuals (Putnam, 1991; Ross, Joshi, & Currie, 1990). It has been seen as enabling us to conduct complex but routine activities, whilst engaging in other less predictable activities. Dimensional models propose that dissociation becomes a problem at the extreme end of the dimension, as found in clinical groups (Kihlstrom, Glisky, & Angiulo, 1994). There have been a number of attempts to develop formulations of dissociative syndromes or symptoms, but little attention has been paid to the psychological processes underlying dissociation. The principal approaches are reviewed briefly below.

Several authors have used a developmental perspective to describe the traumatic origins of dissociative syndromes, such as dissociative identity disorder (DID) and borderline personality disorder (BPD). Putnam (1988, 1997) suggests that abrupt state-switches, reminiscent of those observed in infants, can be understood as a failure to achieve the major developmental task of integrating discrete states of consciousness, as a direct result of traumatic experience. McIntee and Crompton (1997) have broadened the notion of trauma to include childhood neglect. They suggest that dissociation results from the child's attempt to develop a 'false self' or selves adapted to the needs of the caregiver. Recent psychodynamic formulations

(e.g., Fonagy, 1991; Mollon, 1996) argue that dissociative processes reflect intra-psychic defences. Repeated 'pretending' that trauma is not occurring (denial) and acting 'as if' there is more than one part of oneself (e.g. splitting between a traumatised- and coping-self) lessens the impact of the trauma. Although the developmental and psychodynamic models have contributed to our understanding of dissociation, they are descriptive rather than explanatory. Moreover, they focus on relatively extreme syndromes, such as DID and BPD, and fail to account for the diverse range of dissociative symptomatology.

Van der Hart, van der Kolk and Boon (1996) propose a hierarchical model of dissociation that does address a wider range of dissociative phenomena than the models cited above. They suggest that pathological dissociation can be divided into three levels. Primary dissociation involves fragmented (rather than integrated) processing of traumatic events. Secondary dissociation involves the individual perceiving an event without experiencing the full emotional impact. Finally, tertiary dissociation involves the development of separate identities. Although this model addresses a comprehensive range of dissociative phenomena, it still fails to provide an account of the psychological processes underlying the levels.

There is no coherent and fully developed cognitive-behavioural model of dissociation, but the construct of schema avoidance (Young, 1999) has clear parallels with dissociation. This is the idea that unbearable affect may be associated with a pathological schema, or way of viewing the self or others. The individual makes strenuous conscious and non-conscious behavioural and cognitive efforts to avoid experiencing the unbearable affect, for example, avoiding taking on new challenges if s/he has a 'failure to achieve' schema, orienting attention away from 'threatening' written material describing failure. Cognitive and behavioural avoidance may slow information processing (Foa & Kozak, 1986) or prevent full inspection of stimulus features (Williams, Watts, MacLeod, & Mathews, 1997). These processes have been shown to occur without conscious awareness (Dixon, 1981; Patton, 1992), and are believed to involve both classical (Nijenhuis & Vanderlinden, 1995) and operant conditioning (Kennerley, 1996). Braun (1988) proposed the 'BASK' (behaviour, affect, sensation and knowledge) model. By describing these separate aspects of a given experience he proposed that these aspects could be separated off or dissociated, so that at any time the dissociating individual might be aware of one or more but not all of these aspects (e.g., numbing of affect) extending this to the eventual development of separate personalities or alters. These cognitive accounts differ from the descriptive models previously outlined, in that they are explanatory and open to refutation. By addressing dissociative symptoms rather than syndromes, they are also more broadly applicable to clinical practice. Nevertheless, these processes have not been articulated as a coherent model to date, and are not embedded within a broader cognitive perspective.

Other cognitive models of psychopathology such as Ehlers and Clark's (2000) model of posttraumatic stress disorder include dissociation as a factor but fail to elaborate what processes might be involved and how these might interact with the rest of the model.

1.2. Existing measures of dissociation

The lack of a clear theoretical model of dissociation is reflected in the existing measures of dissociation. These measures include diagnostic instruments such as the Structured Clinical Interview for Dissociative Disorders (SCID-D: Steinberg, 1994) and the Dissociative Disorders Interview Schedule (DDIS: Ross, Heber, Norton, Anderson, Anderson, & Barchet, 1989), which are both based on DSM criteria (American Psychiatric Association, 1994). These instruments reflect a categorical rather than a continuum approach to dissociation. Dimensional measures of dissociation have been developed in accord with the continuum approach. These include the Dissociative Experiences Scale (DES: Bernstein & Putnam, 1986; Carlson & Putnam, 1993); the Dissociation Questionnaire (DIS-Q: Vanderlinden, van Dyck, Vandereycken, Vertommen, & Verkes, 1993); the Perceptual Alteration Scale (PAS: Sanders, 1986); and the Questionnaire on Experiences of Dissociation (QED: Riley, 1988). The most recent version of the DES, the DES-II (Carlson & Putnam, 1993) contains a subscale or "taxon" designed to capture pathological rather than "normal" dissociation, so that the DES-II may be seen as reflecting both the dimensional and the categorical view points.

1.3. A new cognitive-behavioural model of dissociation

The present model of dissociation is developed from Beck's (1996) cognitive theory of personality and psychopathology. A central proposition of this model is that dissociation is a product of 'decoupling' of mental processes, which may occur at various stages of information processing. Beck (1996) proposes that personality is constructed of a collection of 'modes'. A mode is defined as a set of schemas responsible for encoding cognitive, affective, behavioural and physiological information and for generating responses. Orienting schemas encode internal and external events and activate these modes, as appropriate to the context. This early process is thought to occur automatically, without conscious effort or volition (Beck & Clark, 1997). Normally, there is an exchange of information between schemas throughout the system (both within and across modes), and switching between personality modes is smooth and appropriate. According to the proposed model, dissociation is the product of inhibitory decoupling of mental processes at three stages: at the early, automatic processing stage; within modes; and between modes. Fig. 1 illustrates the relationship between the three stages.

Stage I: *Automatic dissociation*. This form of dissociation involves a decoupling of the links at the level of the orienting schemas. Very early associative processing of information (perceptions, emotions or cognitions) allows the material to be identified as threatening. This activates a mechanism that inhibits the processes that would normally associate information. Given that early, preconscious processing can have such an inhibitory effect upon later, conscious processing (Dixon, 1981), it seems likely that the decoupling that occurs at stage I is a preconscious process.

During traumatic events, dissociation at this early stage will prevent further associative processing and may result in the abnormal storage of memory traces in a

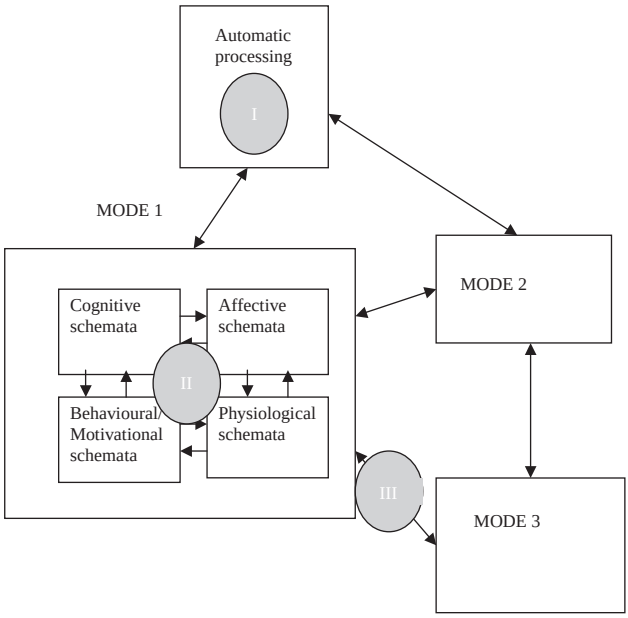

Fig. 1. Personality structure and stages of dissociation.

fragmented rather than integrated fashion (cf., the data-driven memories rather than autobiographical memories discussed by Brewin, Dalgleish, and Joseph (1996). The dissociation of what would normally be associated prevents the integration of the traumatic material and its further elaboration into meaningful memories.

Such inhibition means that material may be activated at the conscious level, but without any understanding of the origins of that material (i.e., associative links that would put the information into context). Within this model, dissociation at the level of automatic processing might produce 'isolated' symptoms, such as the experience of hallucinatory visual, auditory and olfactory fragments. This process appears similar to the mechanism described by Brewin (1996), which produces situationally accessible memories (SAMs). In the SAM system, memories are retrieved on the grounds of crude similarity between stimulus features, and have a vivid, intense and realistic quality that distinguishes them from non-traumatic memories (e.g., re-experiencing aspects of a road traffic accident on hearing a loud noise). It also has much in common with Van der Hart et al.'s (1996) primary dissociation.

Stage II: *Within-mode dissociation*. This form of dissociation involves a decoupling of the normally associative links between schemas (affective, behavioural, cognitive and physiological) within a mode. Within-mode dissociation is characterised by a failure to integrate the relevant information from those schemas. This has implications for storage and retrieval, and results in information being accessed when it is not wanted (e.g., intrusive thoughts) or an inability to access information volitionally (e.g., an inability to think or "blanking"). Processing at this level tends to be strategic rather than automatic (Beck & Clark, 1997). Flattened affect

following trauma may be explained by the decoupling of an affective schema from the rest of the schemas in a mode. Behavioural re-enactment, ritualistic behaviours and superstitious behaviours might reflect behavioural schemas being decoupled from other schemas. Somatic and conversion symptoms (e.g., pain, loss of function, analgesia) can be understood as a decoupling of the physiological schemas. The cognitive element of this formulation has similarities with Brewin's (1996) verbally accessed memories (VAMS) where memories are retrieved through allocated meaning, verbal description etc. The affective element has similarities with Van Der Kolk's 'secondary dissociation'. This model adds the possibility of behavioural and physiological symptomatology as well as cognitive and affective.

Stage III: *Between-mode dissociation*. This form of dissociation involves a partial or total decoupling of different modes (Beck, 1996). This decoupling can occur to varying degrees. For example, DID would involve extreme between-modes decoupling, while the state-switches characteristic of BPD may represent less extreme between-mode decoupling. Such dissociation is associated with more severe psychopathology. For example, amnesias such as failure to recognise friends may be understood as the result of between-mode dissociation. Information (such as the friend's identity) stored in the cognitive schema of one mode may not be accessible to the person when another mode is activated. Impulsive behaviours may involve a 'state switch' (cf. Putnam, 1988, 1997) from a mode where cognition, behaviour and affect are well regulated into one where they are not. Depersonalisation and derealisation may be related to the subjective experiences of such state switches. Finally, multiple or alter personalities could be understood as resulting from more complete decoupling of personality modes. Although people with DID rarely have alter personalities which are completely unknown to each other, there is often some vagueness or lack of awareness regarding the existence or nature of other personalities. This might be described as amnesia when a switch occurs and the person cannot remember the previous time-span when another 'alter' has been active.

1.4. Aims of the study

The present study aimed to test this cognitive model of dissociation by developing a measure of dissociation. The study tested four hypotheses—first, the measure would be internally consistent, second, it would show good convergent validity with an established measure; third, the measure would demonstrate concurrent validity with indices of psychological symptomatology; fourth, the measure would identify three distinct sets of symptoms representing three stages of dissociation.

2. Method

2.1. Participants

There were two groups of participants—clinical and non-clinical. The clinical group consisted of 80 individuals (65 women and 15 men), who were referred to one

of nine local Clinical Psychology services. All patients who were referred were asked if they would be willing to complete the necessary questionnaires during the assessment period. Participants gave written consent. The non-clinical group was made up of 80 undergraduate students (65 women and 15 men). The mean age of the clinical group was 34.6 years (SD = 10.2, range = 18–56). The mean age of the non-clinical group was 22.8 years (SD = 6.4, range = 18–52 years). Among the clinical group, 53 people reported previous treatment. Their range of reported problems included anorexia, anxiety, panic attacks, depression, PTSD, hearing voices, self-harm, overdose, bereavement, abuse, nervous breakdown, paranoia, phobia, and alcoholism. Nine of the non-clinical group reported previous problems including eating disorders and depression.

2.2. Ethical approval

As this project took place over a number of centres in England, it was submitted for ethical approval at two levels. First, it received approval from a regional multi-site research ethics committee. Thereafter, it was submitted for ratification from each of the local research ethics committees that covered the areas where the research took place. The research only took place once both levels of approval had been granted. These ethics committees approved the research using criteria (e.g., confidentiality and consent) that were compatible with those of both the British Psychological Society and the American Psychological Association.

2.3. Measures and procedure

Each participant completed three questionnaires: the measure to be validated here (Wessex Dissociation Scale); an existing measure of dissociation (the Dissociative Experiences Scale: Carlson & Putnam, 1993); and a measure of psychopathology. The last of these varied across the groups. The clinical group completed the Millon Clinical Multiaxial Inventory (MCMI-III: Millon, Millon, & Davis, 1997), which is standardised for clinical groups. However, this measure is not appropriate for use with non-clinical groups. Therefore, the Symptom Checklist (SCL-90-R: Derogatis, 1983) was used with the non-clinical group. The measures were completed in the order given below.

Wessex Dissociation Scale. This is a 40-item questionnaire measure, developed for the present study. The items are given in Appendix A. Items were generated by the authors on the basis of their clinical experience according to the cognitive model of dissociation that is outlined in the Introduction. As well as an overall score, an attempt was made to construct three subscales, consistent with the three stages of information processing. Seven items were hypothesised to arise from dissociation at the automatic stage of information processing; 12 items related to 'within-mode' dissociation; the final subscale included 21 items where dissociation was hypothesised to occur between modes, or sets of schemata. The score for each subscale was the item mean for that scale, the overall score was the item mean for the

whole scale. In each case, higher scores indicate greater levels of that form of dissociation.

Dissociative Experiences Scale—revised version (*DES-II: Carlson & Putnam, 1993*). This 28-item self-report scale reflects severity of dissociation, addressing amnesia (gaps in memory), absorption (excessive focus on internal or external cues), and depersonalisation/derealisation (impairments in sensing that the self or the world is real). Each item is rated on a 0–100% scale, and the individual's score (range = 0–100) is calculated by taking the mean score of the 28 items. Higher scores indicate greater levels of dissociation. Carlson and Putnam (1993) have concluded that the DES has good overall psychometric properties. However, it does not have a consistent subscale structure. Therefore, dissociation as defined by this scale is probably best understood as a relatively global construct. In a more recent analysis, Waller, Putnam, and Carlson (1996) have identified a subset of eight DES-II items ('DES-Taxon') that receive high ratings only from individuals with relatively extreme levels of dissociation. Therefore, the DES-Taxon can be used as a categorical measure in assessment or evaluation, and is relatively sensitive and specific to high levels of dissociation. Both scoring systems will be reported here.

Millon Clinical Multiaxial Inventory (*MCMI-III: Millon, Millon, & Davis, 1997*). The MCMI-III is based on a theory of personality that conceptualises clinical syndromes as disruptions in basic personality styles. These disruptions emerge under conditions of stress. It is a 175-item scale, where each statement is rated as true or false. Scores produce 24 sub-scales aligned with DSM IV Axis I and II disorders. Millon categorises the subscales according to the nature and severity of pathology. They are clustered into Axis II disorders of mild severity (clinical personality patterns); Axis II disorders of moderate and marked severity (severe personality pathology); Axis I disorders of moderate severity (clinical syndromes); and Axis I disorders of marked severity (severe syndromes). Scores are modified for disclosure, anxiety/depression, and denial/compliance. The final score ranges from 0 to 115. A cut off point of 75 is suggested for the presence of a disorder and 85 is considered to indicate the prominence of the disorder. A profile in which all scores are below 60 is a 'flat' profile and considered uninterpretable.

Symptom Checklist (*SCL-90-R: Derogatis, 1977*). The SCL-90-R is a 90-item symptom inventory, which measures the current psychological symptom status of adults and adolescents. It is designed to be used with both patients and non-patients. It is not a direct measure of personality traits or pathology. Each item is self-rated on a five-point scale of distress, yielding nine primary symptom dimensions (somatisation, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism) and three global indices of distress (Global Severity Index, Positive Symptom Distress Index and Positive Symptom Total).

2.4. Data analysis

The first and second hypotheses involved the whole scale properties including its convergent and concurrent validity. Initially, *t*-tests were used to compare the

groups' scores on the dissociation measures. Given the difference in standard deviations across the groups, equal variances were not assumed in these analyses. When the groups were considered separately, the data were sufficiently well distributed to allow the use of parametric methods in the remaining analyses.

The internal consistency of the Wessex Dissociation Scale (WDS) and DES-II scales were tested using Cronbach's alpha. The convergent validity of the WDS relative to the DES-II was tested using Pearson's correlations. Finally, the links between the measures of dissociation and the indices of psychopathology were tested using Pearson's correlations. In all cases, the analyses were two-tailed. Given the number of comparisons and correlations used, a significance level of $p<001$ was adopted in order to reduce the risk of type 1 errors.

The fourth hypothesis involved the structure of the scale, namely that three internally consistent levels of dissociation would be identified. This was tested using both confirmatory and exploratory factor analysis. The former used the structural equation modelling software EQS. The model consisted of three correlated latent variables representing levels 1–3 of the WDS model. Maximum likelihood estimation was used to assess model fit. The latter extracted principal factors using oblimin rotation because the factors were expected to intercorrelate.

3. Results

3.1. Psychometric properties of the Wessex Dissociation Scale

Table 1 shows the mean scores and the construct validity (Cronbach's alpha) of the WDS and DES-II scales for the clinical and non-clinical groups. It also shows the results of two-tailed *t*-tests (equal variances not assumed), comparing the groups on the measures of dissociation. The two measures (WDS and DES-II) had adequate internal consistency. The groups differed significantly on all of the WDS and the DES-II scales, with the patients reporting higher levels of dissociation than the non-clinical group.

3.2. Convergent validity of the WDS

The WDS scores of each group were significantly correlated (two-tailed Pearson's *r*) with their DES-II scores (Table 2). The level of the associations suggests that the WDS has good convergent validity with the DES-II, but not total overlap.

Due to the use of different indices of psychopathology between the two groups (see Measures), the correlations between dissociation and psychopathology for the clinical and non-clinical participants will be presented separately below.

Non-clinical group. Table 3 shows the correlations (two-tailed Pearson's *r*) between measures of dissociation (DES-II and WDS) and the indices of psychopathology (SCL-90-R scales). Both the DES-II scores (Total and Taxon) and the overall WDS score were significantly associated with all scales of the SCL-90-R except for the Phobic Anxiety scale. In addition, the association of the DES-II Total and

Table 1
Descriptive statistics and internal consistency (Cronbach's alpha) for WDS and DES-II

		Group		*t*-test	
		Non-clinical	Clinical	*t*	*p*
DES-II scales					
Total	Mean	9.77	20.7	5.46	0.001
	(SD)	(7.68)	(16.2)		
	[alpha]	[0.901]	[0.949]		
Taxon	Mean	4.05	15.5	6.07	0.001
	(SD)	(5.54)	(16.0)		
	[alpha]	[0.698]	[0.839]		
WDS scale					
Total	Mean	0.88	1.90	10.3	0.001
	(SD)	(0.38)	(0.80)		
	[alpha]	[0.899]	[0.947]		

Table 2
Association of WDS scores with DES-II scores

	Group			
	Non-clinical		Clinical	
DES-II scale	Total	Taxon	Total	Taxon
WDS scale	65*	0.64*	0.80*	0.73*

* $p < 0.001$.

SCL-90-R Somatisation scales narrowly failed to achieve the necessary level of significance. Therefore, the WDS and the DES-II appear to have entirely comparable levels of concurrent validity relative to psychopathology among non-clinical participants.

Clinical group. Table 4 shows the correlations (two-tailed Pearson's *r*) between MCMI-III Axis I psychopathology and the different measures of dissociation. The MCMI-III scales are divided into 'less severe syndromes' and 'severe syndromes'. In almost every case, both measures of dissociation were significantly correlated with the 'severe syndromes' scales. In contrast, the overall WDS scale was more consistently associated than the DES-II scales with the 'less severe syndromes' scales. Axis 1 PTSD, dysthymia, anxiety and somatisation were picked up by the WDS but not by the DES-II. Alcohol dependence, drug dependence and bipolar/manic scales were the only ones that were associated with the DES-II scales. The DES-II Taxon is said to be a measure of more 'pathological' dissociation, yet in the majority of cases the association with less severe Axis 1 pathologies was weaker than for the overall

Table 3
Association of psychopathology (SCL-90-R scores) with DES-II and WDS scores, among non-clinical participants

	DES-II scales		WDS scales
	Total	Taxon	Total
SCL-90-R scales			
Global Severity Index	0.57*	0.51*	0.61*
Positive Symptom Total	0.54*	0.47*	0.59*
Positive Symptom	0.55*	0.43*	0.54*
Distress Index			
Anxiety	0.50*	0.47*	0.46*
Depression	0.54*	0.46*	0.58*
Hostility	0.43*	0.41*	0.44*
Interpersonal sensitivity	0.47*	0.42*	0.51*
Obsessive-compulsive	0.54*	0.43*	0.65*
Paranoid ideation	0.37*	0.37*	0.52*
Phobic anxiety	0.23	0.17	0.24
Psychoticism	0.47*	0.43*	0.47*
Somatisation	0.33	0.36*	0.41*

*$p<0.001$.

Table 4
Association of Axis I psychopathology (MCMI-III scores) with DES-II and WDS scores, among clinical patients

	DES-II scales		WDS scales
	Total	Taxon	Total
MCMI-III Axis I scales			
Less severe clinical syndromes			
Anxiety	0.31	0.20	0.39*
Somatoform	0.32	0.21	0.42*
Bipolar; manic	0.38*	0.26	0.38*
Dysthymia	0.34	0.26	0.43*
Alcohol dependence	0.42*	0.40*	0.49*
Drug dependence	0.36*	0.40*	0.36*
PTSD	0.34	0.22	0.46*
Severe clinical syndromes			
Thought Disorder	0.50*	0.45*	0.57*
Major depression	0.35	0.54*	0.47*
Delusional disorder	0.41*	0.43*	0.52*

*$p<0.001$.

DES-II scores, suggesting a loss of sensitivity when the Taxon is used. Neither the Taxon nor overall DES-II scores were associated with PTSD.

Table 5 shows the correlations (two-tailed Pearson's r) between MCMI-III Axis II personality pathology and the different measures of dissociation. As with the Axis I

Table 5
Association of Axis II personality pathology (MCMI-III scores) with DES-II and WDS scores, among clinical patients

	DES-II scales		WDS scales
	Total	Taxon	Total
MCMI-III Axis II scales			
Less severe clinical personality patterns			
Schizoid	0.22	0.15	0.39*
Avoidant	0.17	0.17	0.31
Depressive	0.08	−0.01	0.15
Dependant	0.27	0.21	0.22
Histrionic	−0.28	−0.25	−0.44*
Narcissistic	−0.17	−0.11	−0.21
Antisocial	0.37*	0.37*	0.40*
Aggressive	0.30	0.27	0.36*
Compulsive	−0.58*	−0.53*	−0.56*
Passive-aggressive	0.37*	0.29	0.36*
Self-defeating	0.28	0.27	0.34
Severe personality pathology			
Schizotypal	0.53*	0.52*	0.62*
Borderline	0.49*	0.42*	0.56*
Paranoid	0.43*	0.41*	0.49*

* $p<0.001$.

syndromes, these MCMI-III scales are divided into 'less severe clinical personality patterns' and 'severe personality pathology'. All of the dissociation scales were significantly correlated with the 'severe personality pathology' measures. However, the pattern was less consistent in the case of the 'less severe personality pathology' scales. While both the WDS and DES-II scales were associated with the antisocial, compulsive and passive-aggressive personality pathologies, the WDS was also correlated with the scales reflecting schizoid, histrionic and aggressive personality pathologies. Use of the Taxon did not improve the DES-II sensitivity to these pathologies.

3.3. Factor analysis

A confirmatory factor analysis estimated the model separately for the clinical and non-clinical groups. In each group the model did not provide a good fit to the data (clinical group: $X^2_{737} = 1781$, $p<0.001$; Comparative Fit Index 0.57; LISREL Goodness of Fit Index 0.55; non-clinical group: $X^2_{737} = 1349$, $p<0.001$; Comparative Fit Index 0.45; LISREL Goodness of Fit Index 0.55). The addition of a fourth factor that represented general symptomatology (with all items loading onto it), significantly increased model fit (clinical group $X^2_{40} = 254$, $p<0.001$; non-clinical group: $X^2_{40} = 175$, $p<0.001$). Nevertheless, in both cases the overall level of fit remained poor (Clinical group: $X^2_{697} = 1527$, $p<0.001$; Comparative Fit Index 0.66;

Table 6
Exploratory factor analysis

Factor 1	Factor 2	Factor 3
Unwanted images from my past come into my head	I hear things that that are not actually there	I do not seem to feel physical pain as much as other people
I have vivid and realistic nightmares	I hear voices when no-one has actually said anything	I feel physical pain, but it does not seem to bother me as much as other people
Unwanted thoughts come into my head	I see something that is not actually there	I do not seem to be as upset by things as I should be
Unwanted memories come into my head	I smell things that are not actually there	I do not really seem to get angry
I find myself unable to think about things, however hard I try	I taste something that I have not eaten	
My mind just goes blank	I feel touched by something or someone that is not there	
I just feel numb and empty inside	I talk to myself as if I was another person	
Sometimes I feel relaxed and sometimes I feel very tense, even though the situation is the same	Things around me do not seem real	
My mood can change very rapidly	It feels as if there is more than one of me	
My personality is very different in different situation		
I feel detached from reality		

LISREL Goodness of Fit Index 0.61; Non-clinical group: $X^2_{697} = 1174$, $p<0.001$; Comparative Fit Index 0.57; LISREL Goodness of Fit Index 0.59).

Three factors were extracted during the exploratory factor analysis, based on the scree plot and eigenvalues greater than 1. Items with loadings $>/=0.5$ were included. The three factors accounted for 50% of the total variance. The three factors (Table 6) provided some support for 'stage 1' type symptoms of an hallucinating or pseudo-hallucinating nature, and some support for 'stage 2' type symptoms including cognitive 'blanking' and intrusions and numbing of affect. Hypothesised 'stage 3' symptoms did not factor together but depersonalisation and de-realisation loaded onto the first two factors. The third factor suggested a somatic form of dissociation similar to Nijenhuis' (2000) work.

4. Discussion

In terms of hypothesis 1, the WDS had good internal consistency. The WDS also had good convergent validity (hypothesis two) with the DES-II for both clinical and non-clinical groups but the overlap was not complete. The WDS showed concurrent validity relative to other indices of psychopathology (hypothesis three). For the

non-clinical group, the concurrent validity of the WDS was comparable to that of the DES-II. In the clinical group, both the DES-II and the WDS are associated with more severe forms of psychopathology. However, the WDS was associated with a wider range of the less severe syndromes. Unlike the DES-II, the WDS seems to measure both less severe and more severe forms of dissociation.

In summary, the WDS had satisfactory internal consistency, convergent and concurrent validity. Further research is needed to examine test-retest reliability. The WDS is sensitive to less severe forms of dissociation and shows links to less severe types of psychopathology, including PTSD. Hence the WDS may provide a better reflection of the full spectrum of dissociation than the DES-II. The fourth hypothesis, that the measure would identify three distinct sets of symptoms representing three stages of dissociation, was not supported and is discussed further below.

4.1. Dissociation and 'less severe' pathology

Consistent with the predictions of the cognitive model presented, anxiety and somatisation were linked specifically with dissociation as measured by the WDS. This link was not present with the DES-II. In the cognitive model dissociation is seen as occurring at the preconscious, threat-perception stage of information processing. It may be that the experience of anxiety and panic without apparent triggers (affect without recollection) results from incomplete dissociation. That is, associative processing identifies threat and triggers an affective reaction but dissociative processing prevents conscious identification of the threat. It is noteworthy that phobic anxiety—where the person is aware of a specific focus—was not correlated with DES-II or WDS scores among non-clinical participants (it was not measured in the clinical group).

PTSD and dysthymia were both associated with the WDS but not with the DES-II. The total DES scores approached significance but the DES Taxon scores did not. The DES Taxon may sacrifice sensitivity to important psychopathological links. Therefore, the WDS may be of particular use in understanding and treating dissociation when a person receives a diagnosis of PTSD.

Obsessive-compulsive pathology and dissociation were positively linked in the non-clinical group, compulsive (and histrionic) personality patterns were *negatively* linked with dissociation in the clinical group. One reason for this could be that compulsive and histrionic behaviours might serve similar functions to dissociation in clinical populations, namely, to reduce awareness of distress. Thus, where more extreme levels of compulsive and histrionic behaviours are seen, dissociation may become less necessary.

There may be several reasons for the failure of factor analytic techniques to show distinct clusters of symptoms. Firstly, factor analysis is a specific statistical procedure designed to produce maximum separation between sets of data. This may be an inappropriate tactic to use in the case of dissociative phenomena. Dissociation is hypothesised to be produced by a single information processing phenomenon, that of inhibition of association. If this process is present at one stage in information

processing, the likelihood of its presence at other stages maybe increased. Secondly, it is not clear how the levels or stages of processing proposed by Beck, on which the present model is based, relate to each other. It be may be that an embedded pattern best describes the relationship, that is, if dissociation is present at level 3, it implies dissociation at levels 2 and 1, if dissociation is present at level 2, it implies dissociation at level 1. Thirdly, the information-processing model proposed by Beck is relatively simple compared with, for example, Barnard and Teasdale's (1991) Interacting Cognitive Subsystems model. Even within Beck's model there exist feedback loops of great complexity (see for example Beck & Clark, 1997). Some potential interactions between dissociative and other information-processing phenomena are discussed below in relation to PTSD. It may have been naive of the authors to presume that three discrete clusters of symptoms would so simply reflect three stages at which dissociation can take place. Many symptoms probably involve dissociation at several stages and complex interactions with other processes. On the available evidence, the hypothesis concerning the existence of three clusters of symptoms reflecting three stages of dissociation should be rejected. Despite this, the model and measure remain useful for reasons outlined below.

4.2. Relationship of the model to selected pathologies

The WDS is the first scale known to the authors to be based explicitly on a theoretically driven model of dissociation. This should allow an interaction between theoretical developments and research findings that is unique in the field to date. The usefulness of a cognitive model of dissociation lies in the fact that dissociation is implicated in so many pathologies, as demonstrated in the results above and in many other studies quoted in the introduction. Furthermore, neglecting to treat dissociation can greatly reduce the effectiveness of many interventions. These points can be illustrated using the examples of PTSD, BPD, dissociative identity disorder and psychogenic amnesia.

4.3. PTSD

The WDS, but not the DES, reflects the relationship between PTSD and dissociation. Ehlers and Clark (2000) propose a cognitive model of persistent PTSD in which two key processes are hypothesised to lead to a sense of current threat, which maintains the PTSD symptoms. The first process is individual appraisals of the trauma and/or its sequelae. The second is the nature of the memory for the event and its link to other autobiographical memories. The second process is of great interest here because Ehlers and Clark propose that data-driven processing (or situationally accessed memory (SAMS) according to Brewin et al., 1996) is linked to the persistence of PTSD. A considerable body of evidence (e.g. Foa & Rothbaum, 1998) shows that elaboration of trauma memory and its integration with other autobiographical memories produces relief of PTSD symptoms. Strong S–S and S–R associations in traumatic material are proposed to make triggering of memories of the event and/or emotional responses to associated stimuli even more likely in PTSD.

For example, Ehlers and Clark quote Reemstma (1997) who reported hearing a knocking sound and feeling great distress following his kidnapping and being held captive in a cellar. He later realised this was triggered by hearing footsteps, although at first the knocking seemed to come from nowhere. His kidnappers' footsteps were heard by Reemstma prior to their knocking at his cell.

Ehlers and Clark's model proposes several information-processing phenomena and strategies which maintain PTSD symptoms. But it does leave several questions unanswered. In particular, why are data-driven (stimulus-accessed) traumatic memories fragmented? What prevents them being elaborated into autobiographical (verbally accessed) memories? The answer may lie in the process of dissociation. The original definition of dissociation is 'failure to associate that which is normally associated'. That is, an inhibition of normal association processes, because of the overwhelmingly threatening nature of the material.

During trauma dissociation prevents further processing of raw stimulus material so that memories are stored in a fragmented fashion. The nature of the storage prevents the elaboration of data-driven memories into autobiographical memory. Even when fragments of material become available, further dissociative processing can be triggered by this material and prevention of elaboration can occur through this route also.

According to the Ehlers and Clark model, Reemstma might have experienced full reliving of data-driven memories each time he heard footsteps. But all he experienced was a knocking sound. The cognitive model of dissociation suggests this is because the rest was rendered inaccessible by dissociation during trauma which left fragmented memory traces. Clinically, therapists often find patients experience one sensory modality hallucination or pseudo-hallucination (such as hearing brakes screech or seeing a crash), then multi-sensory experiences close to 'reliving' as dissociation breaks down (hearing, seeing and feeling the crash). In Reemstma's case, the trigger, of which he was at first unaware, was footsteps. The intrusion or flashback was the knocking sound, accompanied by extreme distress. In the case quoted earlier of Karen, the trigger, of which she was first unaware, was getting up in the morning. The intrusion or olfactory hallucination, was the small of bacon. She experienced no affect with this hallucination except puzzlement. When she later *associated* getting up with being sexually abused by her father she experienced extreme distress around this hallucination. In this way, the trigger can be dissociated from the sensory experience, which can be dissociated from the emotional response. Similarly, Ehlers and Clark quote the case of a girl in a restaurant experiencing emotional distress which she only later realises is connected with the physical resemblance between the man next to her and her rapist (affect without recall). Some process is needed to account for the fact that this (obvious) information is not immediately available to the rape survivor. Dissociation is a good candidate for this process.

Other strategies such as thought suppression and cognitive avoidance are quoted by Ehlers and Clark. The first appears a more or less conscious, effortful strategy, unlike dissociation. The second is more difficult to distinguish from dissociation and may well be the same thing at this early stage of information-processing. Certainly

dissociation and other processes must interact to produce the complex pictures we see. For example, as dissociation breaks down in therapy patients may increasingly use thought suppression or compulsive behaviour such as binge-eating or self-harming to achieve the same effect of reduction of awareness of distress.

The treatment of dissociation as a PTSD symptom and as a phenomenon occurring during exposure therapy may be essential for the success of therapy. Ehlers and Clark report a patient recording her replacement thoughts for use during reliving as a way around dissociating during treatment. Kennerley (1996) quotes several techniques for treating dissociation which are useful during exposure treatments.

The WDS scale should be useful in measuring dissociation before, during and after therapy, alongside PTSD measures. Research measuring reductions in dissociation and its relationship with therapeutic success would be useful.

4.4. BPD

The diagnostic criteria for BPD include dissociation as a key feature. Both the DES and WDS were correlated with the Millon BPD sub-scale. Three widely used theoretical approaches to the formulation of BPD are: Linehans' (1993) cognitive behavioural theory, Ryle's (1995) cognitive analytic theory, and Young's (1990) cognitive theory.

Linehan's account of BPD is described as the 'bio-social theory'. A combination of genetic predisposition and invalidating environments lead to problems for the individual in regulating emotions. Relatively brief reference is made to dissociative states in Linehan's account of BPD and how to treat it. Ryle's theory draws on analytic concepts such as splitting and denial to account for the development of 'dissociated self-states'. These dis-jointed self-states appear identical to the present authors' concept of dissociated modes in cognitive parlance. Young's theory discusses modes in a very similar way to the model proposed by the present authors and includes schema theory as a key explanatory feature. It is proposed that all theories could be further enriched by the addition of the cognitive model of dissociation. In BPD, dissociation is hypothesised to operate throughout the information-processing system including at the personality structure level. The 'failure to associate that which is normally associated' includes lack of normal associations between modes of functioning. The dissociative process may create and maintain personality structures which are functional in childhood but become dysfunctional in adulthood. The treatment of BPD must include integration of modes in order to correct symptoms such as state-switching triggered by perceived threat. Clinically, the authors have found integration can be achieved by first describing the different modes including cognitive, behavioural, affective and physiological schemas within each mode, and then using techniques to encourage the patient to access several modes at once and gain control over the switch process.

In both cases, the cognitive model of dissociation can form a bridge between 'Type 1 PTSD' (single instance, discrete symptoms) 'Type 2' or 'complex' PTSD (repeated trauma, often occurring in childhood as well as adulthood), BPD and even DID.

It is possible that certain symptoms result from trauma in childhood, particularly trauma perpetrated by caregivers with sequelae such as attachment disturbances. The cognitive model presented here includes the idea that modes of responding are learned relatively separately in early childhood and later joined together to form an integrated sense of self, a developmental task in itself. This is not a new concept (see for example Putnam, 1997) and it is this concept which may form the PTSD–BPD–DID bridge. PTSD symptoms encountered during childhood abuse may be isolated in a few modes only within the whole personality structure, by means of dissociation. In this case, a failure to integrate *modes* which would normally become associated during development limits personality damage and allows pseudo-normal attachment to dangerous caregivers.

However, the cost of such between-mode dissociative processes may involve lack of sense of self, state-switching and mood lability in BPD, along with extreme emotional reactions to apparently minor interpersonal problems. The triggering of a mode of responding learned in childhood by stimulus-similarities appears unmodulated by other modes which have been previously observed in the person. For example a BPD patient ran screaming down the corridor after seeing a psychiatrist whose facial appearance and hand gestures were reminiscent of her father. She described 'watching' herself doing this, yet being unable to stop. In other contexts, she is able to observe, analyse and advise on other patients' and her own behaviour, yet this 'wise' mode is unavailable when her 'abused' mode is triggered by such data-driven perception of threat.

A further bridge to DID is provided by the cognitive model, where the dissociative process is so extreme as to prevent any development of a sense of a unitary self so that the individual literally perceives themselves as several or many people, with or without amnesia between self-states. Both BPD and DID involve disturbance of sense of self. DID with dissociative amnesia between modes or self-states can result in fugue experiences, loss of time, de-realisation and depersonalisation. Clinically the authors have also observed these conditions to lesser extent in BPD. Research has already established connections between childhood abuse, dissociation and adult pathology in both BPD and DID. Further research investigating the extent to which childhood PTSD leads to adult BPD and DID would be most useful.

Psychogenic amnesia is a symptom considered definitive of DID (Steinberg, 1994; DSM-IV 1994) yet which requires further definition. Within the cognitive model dissociative amnesia can be involved in post traumatic reactions; PTSD; BPD and DID. The forms such amnesia can take are many and further description should aid treatment. For example, fragmented memory of trauma means certain aspects are not available to conscious *recall* (e.g. one remembers *only* a sound, a sight, a smell) but seem available to either conscious or non-conscious *recognition* (as 'trigger stimuli'). Within more elaborated memories, the behavioural, physiological affective or cognitive elements may be unavailable to consciousness. However, they are not 'forgotten' in the normal sense since they are frequently recovered later. At the personality level, between-mode dissociation can produce amnesia for periods of time (when one mode has been activated which is dissociated from the current mode)

for people, events and appointments (when these things have been encountered by another dissociated mode). This can be to the extent that whole life-periods may appear 'forgotten'. Classification of these different types of psychogenic amnesia would allow further exploration of how they may be related to dissociative processes during and after trauma. Clinical intervention would then be much better targeted at reducing different kinds of dissociative amnesia.

4.5. Future research

Some shortcomings of the present study include the fact that no participants were diagnosed with DID or other dissociation disorders. It could be argued that we need more evidence that the WDS does in fact measure dissociation. However, it is noteworthy that the WDS correlates more highly with the DES (which measures dissociation) than with the SCL-90 or MCMI-III, which do not. Correlations with the SCL-90 and MCMI-III would none the less be expected to be significant because of the role played by dissociation in so many disorders, as discussed earlier.

A study comparing the WDS with the DES to see which discriminates best between a DID group and a control group would be most useful in assessing the relative validities of each scale and in establishing the relationship of the WDS with the more extreme end of the dissociation continuum.

5. Conclusions

The cognitive model of dissociation has several features that should prove useful in further work conceptualising the role played by dissociative processes in many disorders. This theorising will have implications for treatment of dissociation in clinical contexts, which should improve the effectiveness of intervention protocols, for example in PTSD.

The measure has comparable psychometric properties to the DES-II, but in contrast to the DES-II is theory-driven. It is equally specific but more sensitive to psychopathology such as PTSD. It should be useful for both research and clinical evaluation purposes.

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Appendix A. The Wessex Dissociation Scale (WDS)

A.1. Wessex Dissociation Scale (WDS)

This questionnaire asks about experiences that you may have in your daily life. Please indicate, by ticking one of the boxes, how often you have experiences like these. It is important that your answers state how often you have these experiences when you are *not* under the influence of alcohol or drugs.

		Never	Rarely	Some-times	Often	Very Often	All the time
1	Unwanted images from my past come into my head						
2	I hear voices when no-one has actually said anything						
3	Other people describe meetings that we have had but that I cannot remember						
4	Unwanted memories come into my head						
5	My personality is very different in different situations						
6	My mood can change very rapidly						
7	I have vivid and realistic nightmares						
8	I don't always remember what people have said to me						
9	I feel physical pain, but it does not seem to bother me as much as other people						
10	I smell things that are not actually there						
11	I remember bits of past experiences, but cannot them together						
12	I have arguments with myself						

13	I do not seem to be as upset by things as I should be					
14	I act without thinking					
15	I do not really seem to get angry					
16	I just feel numb and empty inside					
17	I notice myself doing things that do not make sense					
18	Sometimes I feel relaxed and sometimes I feel very tense, even though the situation is the same					
19	Even though it makes no sense, I believe that doing certain things can prevent disaster					
20	I have unexplained aches and pains					
21	It feels as if there is more than one of me					
22	Unwanted thoughts come into my head					
23	My mind just goes blank					
24	I feel touched by something that is not actually there					
25	I have big gaps in my memory					
26	I see something that is not actually there					
27	My body does not feel like my own					
28	I cannot control my urges					
29	I feel detached from reality					
30	Chunks of time seem to disappear without my being able to account for them					

31	I sometime s look at myself as though I were another person					
32	Things around me do not seem real					
33	I do not seem to feel anything at all					
34	I taste something that I have not eaten					
35	I find myself unable to think about things however hard I try					
36	I talk to myself as if I was another person					
37	I do not feel physical pain as much as other people					
38	I hear things that are not actually there					
39	I find myself in situations or places with no memory of how I got there					
40	It is absolutely essential that I do some things in a certain way					

Scoring: never = 0; rarely = 1; sometimes = 2; often = 3; very often = 4; all the time = 5; final score = total score/ 40.

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