

DISSOCIATION AND THE PROCESSING OF THREAT-RELATED INFORMATION

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ABSTRACT

It is well established that dissociation is a clinically important phenomenon. However, relatively little is known about the cognitive processes that underpin that phenomenon. It is suggested that dissociation reflects a characteristic pattern of processing information about present or past threat. Using a novel computer-driven task, this study examines the association between dissociation and the processing of threat-related information in a group of 105 non-clinical women. The results show that women with higher levels of dissociation (particularly absorption) take longer to respond to threatening information, even though the task might be expected to produce faster processing. A model of cognitive processing is suggested, in which dissociation is characterized by secondary schemata that are specifically unrelated to the threatening information. Further research is needed to test and extend this model, especially with clinical subjects.

Dissociation can be conceptualized as a relatively 'primitive' defense mechanism, in which experiences are not integrated in a normal manner. There may be disturbances of memory, identity or consciousness. This failure to integrate experience is central to a number of diagnoses. For example, *DSM-III-R* (American Psychiatric Association, 1987) outlines a number of disorders where the core psychopathology involves dissociation. These diagnostic criteria should not yet be seen as stable. For example, Spiegel and Cardena (1991) suggested changes to the *DSM-III-R* criteria and recommended the introduction of further distinct dissociative diagnoses into *DSM-IV*.

Despite the traditional focus on these syndromes, recent research has shown that it is equally important to under-

stand the role of dissociation in other psychological and psychiatric disorders. Abnormally high levels of dissociation have been reported among individuals with diagnoses of post-traumatic stress disorder (e.g., Branscomb, 1991; Spiegel, Hunt, & Donnershine, 1988), substance abuse (e.g., Dunn, Paolo, Ryan, & Van Fleet, 1993), eating disorders (e.g., Chandarana & Malla, 1989; Torem, 1986), and multiple personality disorder (e.g., Carlson et al., 1993). High levels of dissociation are also found in cases where these (and other) disorders co-exist (e.g., Demitrack, Putnam, Brewerton, Brandt, & Gold, 1990; Levin, Kahan, Lamm, & Spauster, 1993). However, in their review of research using one clinical assessment tool, Carlson and Putnam (1993) demonstrated that dissociation is not a characteristic of all psychological disorders, since individuals with some diagnoses (e.g., anxiety and affective disorders) do not score consistently higher than adults in the general population.

Although such research has stressed the role of dissociation in diagnosable disorders, it has been suggested that dissociation is a continuum of experiences, which are present to some degree throughout the population. A number of measures have been developed in order to assess dissociation (e.g., Bernstein & Putnam, 1986; Sanders, 1986; Steinberg, Cicchetti, Buchanan, Hall, & Rounsville, 1993; Vanderlinden, Van Dyck, Vandereycken, & Vertommen, 1991), and the majority of these tools consider dissociation as a dimensional characteristic rather than as a categorical one. There are many clinical dangers in relying on such measures to establish 'cut-offs' for diagnostic purposes (e.g., Carlson & Putnam, 1993). However, from the use of these measures in the general population, it appears that dissociative disorders may be seriously under-diagnosed (Vanderlinden et al., 1991).

In order to understand the phenomenon of dissociation, as with any clinical syndrome or symptom (Costello, 1992; Owens & Ashcroft, 1982), it is important to understand its functional value for the individuals concerned. It is generally accepted that dissociation is associated with a past or present experience of trauma or stress, and it has frequently been suggested that dissociation helps to relieve the unbearable emotional distress associated with past, present or anticipated trauma or threat (e.g., Chu & Dill, 1990; Coons, Cole, Pellow, & Milstein, 1990; Sandberg & Lynn, 1992; Sanders

& Giolas, 1991; Sanders, McRoberts, & Tollefson, 1989; Saxe et al., 1993; Spiegel, 1986; Spiegel & Cardena, 1991). However, there is relatively little empirical evidence of the cognitive mechanisms involved in the processing of threat-related information, and how they relate to the broad concept of dissociation.

Individuals with a clinical disorder tend to show an attentional bias to information that is relevant to their disorder (e.g., Williams, Watts, MacLeod, & Mathews, 1988), and individuals who report a history of trauma also show cognitive biases to information that is relevant to their experience, especially if that experience has had a clinical impact (Foa, Feske, Murdock, Kozak, & McCarthy, 1991; Waller, Ruddock, & Cureton, 1995). The clinical presentation of individuals with dissociative disorders involves a number of processes (e.g., amnesia, depersonalization) that appear to serve the function of reducing awareness of trauma-related information. Given this clinical presentation, it can be hypothesized that a key aspect of the cognitive characteristics of individuals with higher levels of dissociation will be a slower processing of threat-related information (although other processes will need to be understood). The aim of the present study is to examine whether the characteristic of dissociation is related to the processing of threat-related information among individuals with no psychological or psychiatric disturbance. If it is the case that dissociation is related to the processing of threat-related information, then it can be hypothesized that those individuals who show greater levels of dissociation will take longer to identify threatening material.

METHOD

Subjects

The subjects were 116 female undergraduates, who received course credits for participation. They were drawn from a variety of courses, although the majority were taking psychology or sports/exercise science. All subjects were interviewed about their past and present history of treatment for psychological problems, in order to exclude the possibility of any psychiatric disorder (using the criteria of *DSM-III-R* [American Psychiatric Association, 1987]). Eleven women were excluded from the final sample due to having such diagnosable disorders in the present or past. The mean age of the final sample of 105 women was 21.8 years ($SD = 5.69$). This mean age is slightly older than that of most college samples in comparable research, probably due to the fact that both psychology and sports/exercise science attract a comparatively high number of mature students.

Measures and Procedure

The women completed a computer-driven test of the processing of threat-related information and a questionnaire measure of dissociative characteristics (Carlson & Putnam, 1993). In the computer-driven task, the participants were

required to look at a stimulus word (threatening or neutral) on the screen. They then saw an array of words, and were required to decide whether or not the stimulus word was present in that array. This task was a novel one, and therefore there are no existing validation data relating to its use with different groups or its association with other features of psychopathology. Finally, the women were interviewed to exclude cases of psychiatric/psychological disorders.

In the information-processing task, there were 40 trials. The task was to identify whether a single stimulus word (neutral or threat) that was shown was present in or absent from an array of words that was shown subsequently. In each trial, the subjects first saw a word at the center of the computer screen. This 'stimulus' word appeared for one second and then left the screen. The stimulus word was either a neutral (non-affective) or a threatening one, and it appeared in upper case. Pairs of neutral and threatening words were matched for initial letter, length, and frequency of use (using the criteria of Johansson & Hofland, 1989). The ten neutral words used were: heel, moor, farm, page, lady, king, huge, date, fill, and sped. The matched threatening words were: harm, maim, fear, pain, loss, kill, hurt, dead, fail, and stab.

Following one second of an empty screen, an array of 16 words (in a 4 x 4 matrix) appeared at the center of the screen. The words in the array were all four letters long, and were presented in lower case (to avoid priming by physical characteristics of the stimulus word). On half the trials, the array consisted of 16 neutral words (all of which began with the same letter as the stimulus word). On the other 20 trials, the array consisted of 15 neutral words and the stimulus word. The position of the stimulus word within the array was balanced as far as possible, to avoid priming by position. The array remained on the screen until the subject pressed a button to indicate that the stimulus word was either present in or absent from the array. The computer recorded the time (in milliseconds) taken to answer and whether or not the answer was correct. To summarize, there were: ten trials where the stimulus word was threatening and was present in the array; ten trials where the stimulus word was threatening but was absent from the array; ten trials where the stimulus word was neutral and was present in the array; and ten trials where the stimulus word was neutral and was absent from the array. The women had to identify whether or not the stimulus word was present in the array, and were asked to make their judgment as quickly as possible but avoiding mistakes as far as possible.

Following the information-processing task, the women completed the Dissociative Experiences Scale II (DES II) (Carlson & Putnam, 1993). This 28-item self-report questionnaire measures the extent of dissociative experiences. Factor analysis has shown that the DES II includes subscales that measure the presence and severity of three types of dissociative experience: i) amnesic dissociation, such as memory loss (using items 3, 4, 5, 6, 8, 10, 25 & 26); ii) absorption

TABLE 1
Number of Stimulus Words Correctly Identified (max. = 10) as Present/Absent from the Array of "Target" Words, According to the Nature of the Stimulus Word

Stimulus word	Presence in array	Group		Mann-Whitney Z
		Low DES	High DES	
	<u>N</u>	51	54	
Neutral	Absent	9.88	9.93	0.46
	(<u>SD</u>)	(0.38)	(0.26)	
Threat	Absent	9.82	9.85	0.86
	(<u>SD</u>)	(0.39)	(0.45)	
	<i>Wilcoxon Z</i>	0.71	1.05	
Neutral	Present	7.45	7.28	0.43
	(<u>SD</u>)	(1.65)	(1.71)	
Threat	Present	8.06	8.26	1.08
	(<u>SD</u>)	(0.38)	(0.26)	
	<i>Wilcoxon Z</i>	2.68 ^{***}	3.75 ^{***}	

*** $P < .001$

and imaginative involvement, such as daydreaming (items 2, 14, 15, 16, 17, 18, 20, 22 & 23); and iii) depersonalization and derealization, such as identity confusion (items 7, 11, 12, 13, 27 & 28). However, Carlson & Putnam (1993) have stressed that subscales based on such factor analyses may not represent true components of dissociation, and such subscales should be used and interpreted with caution. Given the nature of the population that was used in this study, it should also be borne in mind that the range of scores available would be restricted, and that the validity of using DES subscales must consequently be further called into question. In contrast to cautions regarding the subscales, the validity and reliability of the overall DES II scale have been shown to be acceptable with both clinical and non-clinical samples (Carlson & Putnam, 1993).

Data Analysis

Non-parametric analyses were used, due to the non-normal distribution of the data. The data were analyzed in two ways. First, in order to determine whether the women with more dissociative tendencies processed threat-related information differently to women with less dissociative tendencies, the subjects were divided into two groups according to their median DES II scores (median = 10.5). The high-DES group consisted of 54 women, while 51 women were in the low-DES group. Mann-Whitney tests were used to make relevant comparisons between the high- and low-DES groups under each condition (nature of stimulus word in combination with presence in array). Wilcoxon tests were used to compare scores within each group under different conditions. The above analyses were carried out twice, using the dependent variables of: a) the number of words that were correctly identified under each condition; and b) the time

TABLE 2
Time (ms) Taken to Identify the Presence/Absence of the Individual Stimulus Words in the Array of "Target" Words, According to the Nature of the Stimulus (Correct Words Only)

Stimulus word	Presence in array	Group		Mann-Whitney <i>Z</i>
		Low DES	High DES	
	<i>N</i>	51	54	
Neutral	Absent	3076.7	3149.1	0.46
	(<i>SD</i>)	(846.6)	(1321.3)	
Threat	Absent	3246.4	3234.1	0.68
	(<i>SD</i>)	(869.8)	(1364.1)	
	<i>Wilcoxon Z</i>	3.37***	2.33*	
Neutral	Present	1987.8	1922.3	1.16
	(<i>SD</i>)	(436.3)	(631.4)	
Threat	Present	1979.4	2066.0	2.11*
	(<i>SD</i>)	(441.8)	(647.3)	
	<i>Wilcoxon Z</i>	0.22	2.61**	

* $p < .05$, ** $p < .01$, *** $p < .001$

taken to correctly identify the presence/absence of the stimulus words in the array (using only the trials where the women answered correctly). In keeping with the hypotheses, it was predicted that processing of threat-related words in the array would be slowed following exposure to a threat-related stimulus word, but only in the women who had greater dissociative tendencies.

Second, in order to determine whether there was a dimensional relationship between dissociative tendencies and the processing of threat-related information, correlations (Spearman's rho) were carried out between DES II scales and two temporal difference scores. The first of these scores was the difference in time taken to identify neutral vs. threat stimulus words as being present in the array. The second score was the difference in time taken to identify neutral vs.

threat stimulus words as being absent from the array. Higher temporal difference scores indicate that processing of the words was slower when the stimulus was a threat word. In keeping with the hypothesis that processing of threat words would be slowed among women with greater dissociative tendencies when the stimulus was a threat word, it was predicted that DES scores would be associated with the first of these temporal difference scores.

RESULTS

Dissociative Experiences Scale Scores

The women had a mean DES II score of 13.1 (*SD* = 8.31; median = 10.5). Their scores on the three DES subscales were: amnesic dissociation = 6.37 (*SD* = 7.02); absorption and

imaginative involvement = 20.1 ($SD = 11.5$); and depersonalization and derealization = 7.17 ($SD = 10.1$). In keeping with the age of these women, these scores are generally between those reported for non-disordered adolescent and adult populations (Carlson & Putnam, 1993), although they are similar to the scores reported by Smyser and Baron (1993).

Accuracy of Perception of the Threatening vs. the Neutral Words

Table 1 shows the number of stimulus words that were correctly identified as being present in or absent from the array (maximum = 10), as a function of the nature of the word (threat vs neutral) and the group (high-DES vs. low-DES). It also shows the results of the Mann-Whitney and Wilcoxon tests that were used to examine the effects of the type of stimulus word and its presence/absence in the array. There were no differences between the groups under any condition. However, it was noticeable that all of the women were more likely to make identification errors when the word was present in the array than when it was absent, suggesting a signal detection and/or response bias. Both groups were significantly more likely to detect the presence of a threat word than a neutral word. To summarize, all of the women were more likely to correctly identify threatening words than neutral ones as being present, but there was no difference in the accuracy of identification when the stimulus words were not in the array.

Speed of Perception of the Threatening vs. the Neutral Words

Table 2 shows the speed (in milliseconds) at which the stimulus words were identified as present in or absent from the array, as a function of the nature of the word (threat vs neutral) and the group (high-DES vs. low-DES). Where words were incorrectly identified as present or absent, that trial was excluded for the purposes of calculating the mean response time. The table also shows the results of the Mann-Whitney and Wilcoxon tests used to examine the effects of the type of stimulus word and its presence/absence in the array. When the stimulus word was absent from the array, there was no difference between the high- and low-DES groups. In both groups, the women were slower to identify threat words than neutral words as being absent. However, when the stimulus word was present in the array, the two groups performed differently. The women with low DES scores were not affected by the nature of the stimulus word, but the women with high DES scores were significantly slower to identify the threat words. To summarize, all of the women were slower to identify threatening words than neutral ones as being absent from the array, but only the high-DES group were influenced by the threatening words when they were present in the array.

To test whether this difference between the processing of neutral and threat-related words was dimensionally related to DES II scores, two sets of correlations (one-tailed Spearman's rho) were carried out. The first set of correlations tested the association between each of the DES II scales

and the difference in time taken to identify neutral vs. threat stimulus words as being present in the array. There was no significant association between this difference in time and the overall DES II score ($\rho = .134$, NS). There was a significant correlation with one of the three DES subscales (absorption and imaginative involvement - $\rho = .181$, $P < .04$) but not with the amnesia scale ($\rho = .029$, NS) or depersonalization/derealization scale ($\rho = .081$, NS). The second set of correlations shows that there was no association between the DES II scales and the difference in time taken to identify neutral vs. threat stimulus words as being absent from the array ($\rho < -.11$, in all cases). To summarize, these results support and extend those in Table 2, showing that women with a higher level of absorption/imaginative involvement are slower to identify a threatening word as being present than a neutral word.

DISCUSSION

The aim of this study was to determine the links between dissociation and the processing of threat-related information, among a group of women with no psychological disorder. There were two important results. First, the level of dissociation was not associated with the women's ability to identify threatening material. In fact, such words were identified more accurately than were neutral words. Second, dissociation was associated with the speed of processing of threatening words that were present in the array. While all of the women were slower to identify the absence of a threatening word than of a neutral word, only the women with higher levels of dissociation were slower to identify the presence of a threat word than the presence of a neutral word. This link between dissociation and slower processing of threatening material was particularly true of one facet of dissociation - absorption and imaginative involvement (i.e., cutting off from present experience, rather than from past experience). However, it has already been stressed that one should consider and interpret the DES subscale scores with caution, and that the range of DES scores in such a population may be too narrow to adequately reflect the associations that would be likely to emerge with a clinical group.

While these results confirm that the processing of threat-related information is slower in individuals with more dissociative tendencies, it is important to consider the potential psychological mechanisms that might explain this pattern. Since there was no association of the level of dissociation and the number of threat words identified, the threat words must have been perceived equally well by each group. Therefore, it cannot be concluded that dissociation involves simply blocking out threatening information. However, the women with greater dissociative tendencies processed threatening information more slowly.

The reason for this slower processing of threat-related information is likely to be complex. It is unlikely that this

pattern can be explained simply through an attentional process. Research using the Stroop paradigm (e.g., Foa et al., 1991) has suggested that the relevance of threat to the individual is reflected in an interference with performance on other tasks (due to an attentional bias), where the hypothesized relevant semantic material activates relatively complex schemata which conflict with the task of color-naming. The cognitive processing involved in those schemata reduces the resource available for the overt task of color-naming, thus slowing performance. However, the Stroop paradigm depends on an interference with cognitive processing, whereas the task in the present study is compatible with the response required, and hence an attentional bias would be more likely to facilitate processing. In such studies (e.g., Patton, 1992), the hypothesized attentional bias leads to a greater likelihood of detection or a faster performance. Therefore, it seems unlikely that the present results (especially the slowing of performance) can be explained simply as the result of an attentional bias.

One important consideration is the role of signal detection theory, which allows for the possibility of multiple cognitive processes in the determination of a response to information. It is possible that the women in this study with greater dissociative tendencies are slower to respond to threatening words because they require greater certainty in detecting such information. In other words, their speed of identification of threat may be faster than that of women with low dissociative tendencies (given the literature outlined above on facilitation of identification). However, their response to that information may be slowed by the greater time taken to achieve confirmation before reaching a decision.

With this multi-factorial model in mind, it can be hypothesized that there is a further cognitive process taking place in dissociation. This process appears to define dissociative phenomena more than any attentional bias to threat-related information (which occurs in a number of disorders). The clinical presentation of individuals who present with dissociative psychopathology frequently involves a number of characteristics that are relevant to threat (e.g., past history of trauma, [Spiegel & Cardena, 1991]), and also consists of a number of behaviours and cognitive processes (e.g., amnesia, depersonalization, use of alternative personalities) that appear to serve the function of reducing awareness of past and present trauma. Given this clinical presentation, it is suggested that threat serves to activate two sets of schemata, where the activation of one schema entails the activation of the second. The primary schema involves an elaborated structure of threat-related information. Foa et al. (1991) have described models for such a schema, including the possibility that cognitive structures for threatening information are more elaborated than many other structures (e.g., because they may include more potential response choices), and therefore they require a high level of processing capacity.

The secondary "dissociative" schema would be activated

by the threat schema itself, but involves information that is specifically not related to threat (e.g., irrelevant memories, focus on irrelevant features of the environment). Such a secondary schema would be likely to be developed and elaborated when the threat was perceived as unavoidable in practice, due to either current circumstances or past developmental experiences, such as trauma. An example might be where an individual has a history of traumatic experiences that were unavoidable at the time (e.g., emotional neglect, sexual or physical abuse), and hence perceives present-day threat as unavoidable. A secondary schema that specifically involves other information may serve the function of allowing the individual to avoid thinking about the past and present threat, given that such cognitions and emotions cannot be resolved when they are activated (i.e., as part of the primary schema). It is suggested that this 'dissociative schema' is the cognitive process that distinguishes individuals with dissociative tendencies and disorders. Higher levels of dissociation would be associated with a more complex, elaborate secondary schema. Such a cognitive system would explain why the women with greater levels of dissociation were slower to identify threat words in this study, since the threat words would activate the secondary schema, which would compete with the task (responding to the word) for processing space.

It should be remembered that dissociation is a dimensional characteristic, and is likely that such secondary schemata will be present in all individuals. Those individuals with more elaborate secondary schemata will be those who present as being more dissociated or as having a diagnosable psychological disorder. However, the proposed secondary "dissociative schema" will only be able to offer a certain degree of avoidance of the perceived threat. When the avoidance breaks down, one might see overt psychological disturbance as the individual is incapacitated by the threat (e.g., in the "flashback" memories of post-traumatic stress disorder) or seeks alternative means of blocking the intolerable threat (such as the "impulsive" behaviors seen in cases of substance abuse, eating disorders and borderline personality disorder, e.g., Lacey, 1986). Dissociative identity disorder (previously known as multiple personality disorder) might occur where a number of dissociative schemata are used because no one schema is sufficient, and these secondary schemata may form the basis of the distinct "personalities."

The proposed "dissociative schemata" might not explain all dissociative behavior. Further research will be needed to examine whether other specific cognitive processes are involved. In particular, it should be remembered that the association between dissociation and response to threat was small and relatively specific. The failure to show any association with memory and depersonalization/derealization difficulties might simply reflect the nature of this specific task (assessing reaction to present threat rather than to past events), but it might also demonstrate that there are further cognitive processes underlying dissociation, which are not yet under-

stood. Before any specific recommendations for clinical practice can be made, it will be important to understand those cognitive processes better, and to understand any differences between clinical groups. ■

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