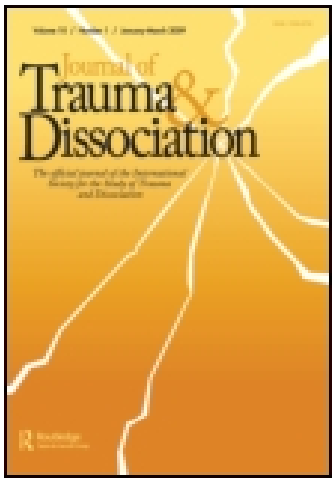

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Investigating Cognitive Inhibition in Dissociative Identity Disorder Compared to Depression, Posttraumatic Stress Disorder and Psychosis

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Investigating Cognitive Inhibition in Dissociative Identity Disorder Compared to Depression, Posttraumatic Stress Disorder and Psychosis

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ABSTRACT. Cognitive inhibition refers to the mental capacity to suppress distracting stimuli that compete with target stimuli for processing resources. Using neutral word stimuli in a flanker task, a recent study suggested that dissociative identity disorder (DID) is characterized by weakened cognitive inhibitory functioning (Dorahy, Irwin, & Middleton, 2002). The current study used single digit stimuli in the flanker task and tested cognitive inhibitory ability in samples with DID, depression, posttraumatic stress disorder and psychosis. The DID, depressed and PTSD groups displayed no evidence of weakened cognitive inhibitory functioning. Consistent with previous research, however, the psychosis sample displayed a reduced capacity to engage in cognitive inhibition. Cognitive inhibitory ability was not related to measures of dissociation,

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childhood traumatic experience or schizotypy. Results are discussed in terms of the positive symptoms of schizophrenia and the nature of stimuli used in the flanker task.

KEYWORDS. Cognitive inhibition, dissociative identity disorder, depression, posttraumatic stress disorder, schizophrenia

INTRODUCTION

Dissociative identity disorder (DID) is a polysymptomatic developmental psychopathology (Putnam, 1997) associated with a range of cognitive and emotional deficits. Experimental cognitive research on the nature of memory dysfunction in DID has tended to focus on information retrieval within and between identity states (Huntjens, Postma, Peters, Woertman, & van der Hart, 2001; Nissen, Ross, Willingham, Mackenzie, & Schacter, 1988; Schacter, Kihlstrom, Kihlstrom, & Berran, 1989). Despite the interest in working memory function in conditions with overlapping symptoms to DID such as schizophrenia and the anxiety disorders (Beech, Powell, McWilliam, & Claridge, 1989; Enright & Beech, 1993; McNally, Kaspi, Riemann, & Zeitlin, 1990; Mogg, Mathews, & Weinman, 1989), very little work has sought to examine working memory in DID. However, studies of non-pathological dissociation indicate the potential fruitfulness of this endeavor for understanding dissociative processes. For example, as measured by the Stroop task, interference effects in working memory are greater in high compared to low non-clinical dissociators (DePrince & Freyd, 1999; Freyd, Martorello, Alvarado, Hayes, & Christman, 1998), and this effect may be accentuated by threat stimuli (Waller, Quinton, & Watson, 1995). In addition, one study has recently found evidence for weakened cognitive inhibition in DID (Dorahy et al., 2002). Cognitive inhibition is viewed as a working memory function that seeks to minimize the impact of distractor stimuli on target stimulus selection (Neill, 1977; Tipper, 1985). Currently, there is little known about working memory processes that are associated with the production of dissociative experience and the maintenance of dissociative pathology. Processes such as cognitive inhibition may be linked to the cognitive underpinnings of dissociative symptoms and therefore, may have implications not only for a greater

understanding of dissociative symptoms but also for diagnosis and treatment.

A reduced capacity to inhibit distractor stimuli was thought to be a feature of DID on the grounds of the specificity of symptoms experienced by those with the condition. First, the positive or first rank symptoms of schizophrenia are commonly reported in DID (Ellason & Ross, 1995; Kluft, 1987; Ross et al., 1990); these symptoms have been related to weakened inhibition in studies of schizophrenia and schizotypy (e.g., Moritz, Mass, & Junk, 1998; Peters et al., 2000; Williams, 1996). Associated with this line of reasoning, self report measures of dissociation (e.g., the Dissociative Experiences Scale) have been positively correlated with the first rank symptoms of schizophrenia (Spitzer, Haug, & Freyberger, 1997; Startup, 1999) and high levels of dissociation are a primary feature of DID (e.g., Bernstein & Putnam, 1986; Carlson et al., 1993). Therefore, the symptoms of schizophrenia thought to be related to weakened inhibition are evident in DID. Second, intrusive thoughts are frequently reported by DID patients (Middleton & Butler, 1998; Putnam, Guroff, Silberman, Barban, & Post, 1986) and these same symptoms, despite potential differences in content, have been argued to be related to the reduction in cognitive inhibition reported by Enright, Beech, and Claridge (1995) in obsessive compulsive disorder (OCD). Finally, proneness towards dissociation was argued by Dorahy et al. (2002) to be related to weakened inhibition because dissociative episodes are characterized by a modification or even replacement of information in conscious awareness. In other words, dissociative episodes are characterized by frank or gross alterations in conscious content (and therefore experience). For example, the content of conscious awareness may be replaced by intrusive traumatic images via flashback or atypical perceptual information via an episode of derealization. Cognitive inhibition is the principal means of regulating the content of working memory and barring irrelevant or unwanted stimuli from conscious awareness (Bjorklund & Harnishfeger, 1995). Consequently, a greater propensity towards dissociation is likely to be related to a general weakening in cognitive inhibitory capacity.

Following these potential indicators for weakened inhibition in DID, Dorahy et al. (2002) found reduced cognitive inhibition in DID samples compared to general population control samples (Study 1 & 2). Moreover, greater levels of dissociation were associated with weakened inhibition (Study 2). Although these findings support the relationship between DID, dissociation and reduced inhibition, the DID samples in both studies displayed a similar pattern of performance when compared

to psychiatric comparison groups. Therefore, the direct nature of the relationship between dissociation and inhibitory functioning in DID remains obscured by the lack of controlling for confounding variables such as other psychiatric symptoms (i.e., non-dissociative psychopathology).

In the laboratory an individual's cognitive inhibitory ability is indexed through tests of negative priming. Negative priming refers to the delayed response time (latency) or accuracy created by selecting a previously ignored stimulus (May, Kane, & Hasher, 1995; Fox, 1995). Dorahy et al. (2002) used a flanker task to assess negative priming. In this task participants are presented with three stimuli simultaneously in which the identity of the two outside (or distractor) stimuli are the same and the middle (or target) stimulus is different (e.g., 1 2 1). Following target response to the middle stimulus, an additional set of three stimuli is presented. In the ignored repetition condition the distractor stimulus of the previous presentation becomes the target stimulus of the current presentation (e.g., 1 2 1 followed by 3 1 3). The degree of response delay created by first ignoring then selecting a stimulus, compared to a control condition where no stimuli are repeated on consecutive trials, is a measure of negative priming. Hence, the greater an individual's propensity for negative priming the greater the response discrepancy between ignored repetition and control conditions.

Dorahy et al. (2002) used everyday neutral words as flanker stimuli (e.g., book note book). This procedure allows the manipulation of emotional content by using words with different emotional valence. However, in comparison to single digit, single syllable number stimuli, word stimuli increase response variance and therefore reduces the likelihood of finding statistically reliable effects. The current study was designed to assess with optimal sensitivity the occurrence of cognitive inhibitory functioning in DID and therefore used single digit, as opposed to word, stimuli. Assessing cognitive inhibitory functioning in DID using neutral, non-threatening stimuli is necessary to provide a 'baseline' for further work to examine threat-related inhibitory functioning.

To further assist in assessing the direct relationship between DID and inhibitory functioning, three psychiatric comparison samples were specifically selected based on their overlapping symptom profiles with DID. Such populations included people diagnosed with depression, posttraumatic stress disorder and psychosis. The primary symptom difference between these three diagnostic groups and DID is the quality and quantity of dissociation in DID (Putnam et al., 1996; Waller, Putnam, & Carlson, 1996). These samples were therefore utilized to as-

sess more sensitively the role of dissociation in cognitive inhibitory functioning in DID. In addition, aside from the shared symptoms in schizophrenia and DID, a psychosis sample was recruited as a validity measure for the flanker task, as previous research has typically demonstrated reduced inhibition in schizophrenic groups (e.g., Beech, Powell et al., 1989; Peters et al., 2000). Following the findings of Dorahy et al. (2002) the DID sample were hypothesized to display reduced negative priming. Measures of dissociation, childhood trauma and positive symptoms of schizophrenia were administered to further assess the psychological constructs and experiences related to cognitive inhibitory functioning.

METHOD

Participants

Four groups of participants were recruited to represent the DID, depressed, PTSD and psychosis populations. Recruitment of participants was through referrals from consultant psychiatrists who received information regarding the study by mail. No participant reported visual acuity problems for computer presented stimuli. No incentive was offered for participation.

Participants in the DID sample were 10 females ranging in age from 19 to 52 years ($M = 37.7$ years, $SD = 12.4$). Each had been clinically diagnosed by a psychiatrist and independently confirmed for DID using the Dissociative Disorders Interview Schedule (DDIS; Ross et al., 1989). All participants reported normal or corrected-to-normal vision. Five participants in this sample were recruited based on referrals to the study and five participants were inpatients at a Trauma and Dissociative Disorders Unit. In terms of psychotropic medication, anticonvulsants were being taken by two participants, five participants were taking antidepressants, three were taking neuroleptics, two were on sedatives, and one was taking an anxiolytic agent. Finally, three participants were taking no psychotropic medication.

Participants in the depressed sample were eight females and two males ($N = 10$) either in a cognitive behavioral therapy program for depression or in inpatient hospitalization for that condition. The depressed sample was administered the "major depressive episodes" section of the DDIS to confirm their diagnosis. The sample ranged in age from 22 to 60 years ($M = 46.3$ years, $SD = 12.39$). All patients were on current

courses of antidepressant medication. In addition, two were taking anxiolytics, four were on neuroleptics, one was taking a sedative, and one was taking an anticonvulsant.

The PTSD sample comprised of 3 females and 7 males ($N = 10$) either referred to the study by their treating psychiatrist or recruited by virtue of being hospital inpatients. Four participants were Vietnam veterans, and the PTSD criterion A event for the remaining participants ranged from occupational traumas to recreational accidents. The sample ranged in age from 27 to 57 years ($M = 45.9$ years, $SD = 9.29$). Eight participants were taking anxiolytics, nine were on antidepressants, three were on either anti-psychotics or anticonvulsants, and two were taking sedatives.

Nine participants were recruited as part of the psychosis sample (three females, six males). Participants were diagnosed with either schizophrenia ($N = 6$) or schizoaffective disorder ($N = 3$) and ranged in age from 18 years to 57 years ($M = 30.0$ years, $SD = 14.34$). Eight participants were hospital inpatients at the time of testing and one participant was referred to the study. All participants in this sample were taking neuroleptic medication. In addition, five were on anti-depressants, three were taking sedatives, and two were taking either anxiolytics or anticonvulsants.

Materials and Procedure

Before completing a computer presented flanker test, each participant was administered a structured clinical interview for dissociative disorders, a set of questions and the type and dosage of psychotropic medications were assessed. The flanker task contained an ignored repetition condition and a control condition. In the ignored repetition condition the distractor and target stimuli presented in the first (prime) trial were reversed in the second (probe) trial (see Table 1). The control condition probe trial contained no repeated stimuli from the prime trial. The stimuli for these conditions were the numbers between 1 and 4. Twelve different flanker trial combinations are possible with four stimuli, therefore the control and ignored repetition conditions contained 12 flanker sets each (i.e., prime plus probe trial). To minimize the effects of cognitive leakage between each flanker set a distractor set was presented between the previous probe trial and the next prime trial. Target stimuli in these trials were the numbers between 5 and 9 (with the exception of the two-syllabled 7) and flanker stimuli were asterisks (see Table 1). Each prime trial was presented for 100 ms and each probe trial was displayed

for 150 ms. The longer display time for the probe trial served as a means of minimizing non-inhibitory forms of negative priming (viz., episodic retrieval), by ensuring that the probe target stimulus was more easily detected and top-down memorial processes were not relied upon for identification (Kane, May, Hasher, Rahhal, & Stoltzfus, 1997). The delay between a prime response and the probe display (Response-Stimulus Interval; RSI) was set at 500 ms.

The battery of questionnaires that were utilized were the following: Dissociative Experiences Scale (DES), the Schizotypal Personality Scale (STA) and the Survey of Traumatic Childhood Experiences (STCE).

The DES (Carlson & Putnam, 1993) is a 28-item self-report inventory of statements believed to tap both pathological and non-pathological types of dissociation (Waller et al., 1996). Items assess dissociative alterations in identity, cognition, and awareness (Carlson & Putnam, 1993). The response format offers an 11-point scale ranging from 0% to 100% in 10% increments and asks respondents to circle the percentage of time they experience each item. Collectively, eight items of the DES (known as the Dissociative Experiences Scale-Taxon; DES-T) have been shown to index pathological dissociative tendencies (Waller et al., 1996). The total DES score is the mean of the 28 items and the DES-T total score is the mean of its eight items; thus, scores range between 0 and 100. The DES is the most widely used and researched self-report measure of dissociation (Carlson, 1997). It has consistently shown excellent psychometric properties in both clinical and non-clinical populations (see Van IJzendoorn & Schuengel, 1996).

The STCE (Council & Edwards, 1987) is a retrospective measure of childhood and adolescent history of overwhelming experiences. It taps a range of traumatic experiences including abuse, neglect, parental separation, vicarious and interpersonal violence, and social isolation. The STCE comprises 30 items with responses being made along a 5 point Likert-type scale ranging from A (never occurred) to E (occurred 10 times or more). The 30 items are averaged to get a total trauma score for each participant. This survey was included in the battery to assess the

TABLE 1. Examples of control, ignored repetition and distractor conditions

Trial	Control	Ignored Repetition	Distractor
Prime	3 1 3	2 3 2	*9*
Probe	2 4 2	3 2 3	*5*

nature of the relationship between childhood trauma and cognitive inhibition. As the STCE was originally designed to index aversive episodes in both childhood and adolescence, two changes were made to the original scale so that it specifically assessed childhood events. The first was an instructional change, which asked participants to consider only events occurring before their 13th birthday. The second amendment was the omission of item 5 which addressed the adolescent experience of abortion.

The Schizotypal Personality Scale (STA; Claridge & Broks, 1984) has 37 items designed on the basis of both personality and clinical accounts of psychotic traits (Mason, Claridge, & Williams, 1997). The STA has been used in various studies with clinical and non-clinical samples to assess positive schizotypal experiences (e.g., Beech, Baylis, Smithson, & Claridge, 1989; Peters, Pickering, & Hemsley, 1994; Williams, 1995). Sound psychometric properties have been reported for the STA (Claridge & Hewitt, 1987; Lipp, Arnold, & Siddle, 1994). Factor analytic work has suggested that the STA has three factors which are relatively orthogonal (i.e., correlations from .21 to .46 between factors) and contain 8 items each (Hewitt & Claridge, 1989). The factors or subscales are described as magical thinking, unusual perceptual experiences, paranoid ideation and suspiciousness.

Selected portions of the Dissociative Disorders Interview Schedule (DDIS; Ross et al., 1989) were administered to the DID sample to confirm their diagnosis and also to the comparison groups to exclude those fulfilling criteria for a dissociative diagnosis. The DDIS is a structured clinical interview designed to assess for dissociative disorders and related symptoms and conditions; for example, subscales assess Schneiderian symptoms, depression, and features consistent with borderline personality disorder. The DDIS is comprised of 132 items and has displayed good sensitivity for detecting true cases of DID (Ross, 1995). Moreover, Kappa coefficients for detecting agreement between clinical judgment and DDIS indications for the presence or absence of DID have been reported at over .9 (e.g., Ross et al., 1989). The current study used the following DDIS subscales: features associated with dissociative identity disorder (16 items); dissociative amnesia (three items); and dissociative identity disorder (four items).

Data points in the flanker task below 200 ms and above 1200 ms were omitted. Moreover, scores within these bounds that were beyond the second standard deviation for each participant in each condition were adjusted to the second standard deviation score. These procedures were thought to control for "nuisance" activation of the voice activated relay

and lapses in concentration or distraction. In addition, they had a normalizing effect on the data.

Research Design

The statistical design for this study was a 2 (condition) × 4 (group) way ANOVA with repeated measures on the condition variable. Important to hypothesis testing was the effect for the group by condition interaction, the simple effects analysis of which examined each group's priming effect.

RESULTS

Participants in the psychosis sample were significantly younger than those in the depressed ($p < .05$) and PTSD ($p < .05$) samples. No other differences were found between groups for age. Given the small number of participants taking antipsychotic medication in the DID ($N = 3$), depressed ($N = 4$) and PTSD ($N = 3$) samples, this variable was not used in the analysis. However, overall dosage of psychotropic medication was examined between groups. Antipsychotics were converted to their chlorpromazine equivalent, antidepressants to their amitriptyline equivalent and anxiolytics/sedatives were converted to their diazepam equivalent. The PTSD sample were taking the greatest average daily dosage of psychotropic medication (451.87 mg), followed by the depressed sample (330.20 mg) then the psychosis sample (312.97 mg) and finally the DID sample (144.95 mg). Despite the variation in quantity of medication, differences between groups were not significant. In addition, average daily dosage of medication was not related to negative priming ($r = -.03$). Psychotropic medication therefore was not used as a co-variate in the analysis.

Analysis of Survey Measures

Table 2 displays the descriptive statistics and internal reliability (Cronbach's alpha) for the survey measures.

Mann-Whitney non-parametric tests with a Bonferonni adjusted p value (criterion $p = .008$) were used to analyze the DES, DES-T and STCE scales across groups as these variables breached the parametric assumption of normality. The DID sample had significantly higher DES and DES-T scores than the depressed ($Z = 3.70$, $p < .001$; $Z = 3.79$, $p <$

TABLE 2. Means and standard deviations across groups for the DES, DES-T, STCE, and STA

	∝		DID	Depression	PTSD	Psychosis
DES	.96	*M*	50.1	11.3	19.3	22.7
		SD	14.7	8.7	7.8	13.8
DES-T	.89	*M*	52.6	7.1	9.6	18.5
		SD	15.3	8.5	6.7	14.1
STCE	.87	*M*	2.5	1.5	2.0	1.7
		SD	.38	.29	.74	.32
STA	.89	*M*	28.4	13.1	21.1	18.0
		SD	5.8	6.6	3.4	8.8
Magical Thinking	.75	*M*	5.8	3.1	4.4	4.0
		SD	1.4	2.4	2.3	2.3
Unusual Perceptual Experiences	.82	*M*	6.5	2.1	3.6	3.4
		SD	1.9	1.7	1.9	2.8
Paranoid Ideations and Experiences	.68	*M*	6.1	2.9	4.2	4.8
		SD	1.9	2.1	1.2	2.6

Note: DES = Dissociative Experiences Scale; DES-T = Dissociative Experiences Scale-Taxon; STCE = Survey of Traumatic Childhood Experiences; STA = Schizotypal Personality Scale

.001, respectively), PTSD ($Z = 3.70$, $p < .001$; $Z = 3.78$, $p < .001$, respectively) and psychosis ($Z = 3.02$, $p < .008$; $Z = 3.20$, $p < .008$, respectively) groups. No significant differences were found between the depressed, PTSD and psychosis samples on DES or DES-T scores. For the STCE the DID sample produced a significantly higher score than the depressed ($Z = 3.63$, $p < .001$) and psychosis ($Z = 3.20$, $p < .008$) samples, but not the PTSD group. The STCE displayed no significant differences between the depressed, PTSD and psychosis groups.

A MANOVA analysis on the STA and its component subscales produced a significant effect [$F(15,80) = 2.37$, $p < .01$]. Univariate analysis show that the DID sample had significantly higher STA scores than the depressed ($p < .001$) and psychosis ($p < .05$) groups. For the unusual perceptual experiences scales the DID sample had higher scores than the depressed ($p < .01$), PTSD ($p < .05$) and psychosis ($p < .05$) samples. The DID sample also produced higher scores on the paranoid ideations and suspiciousness subscale than the depressed ($p < .01$) group.

Analysis of Priming Effects

Table 3 displays the means and standard deviations across experimental conditions as well as group priming effects.

The ANOVA for group by condition showed a main effect for condition [$F(1,35) = 29.68$, $p < .001$] but not group [$F(3,35) = .75$]. The condition main effect revealed that the overall negative priming effect of −17.01 was significant. The non-significant result for the group suggested that no differences were evident in response time for each group. The interaction between condition and group failed to reach significance [$F(3,35) = 1.97$]. The negative priming effects for the DID [$t(9) = 2.93$, $p < .01$], depressed [$t(9) = 3.81$, $p < .01$] and PTSD [$t(9) = 3.69$, $p < .01$] samples were significant. However, no significant priming effect was found for the psychosis cohort.

Spearman's correlation coefficients show no significant relationships between priming and the survey measures. Trends, however, were evident for the relationship between higher STA scores and greater negative priming ($r = .31$, $p = .06$), and higher paranoid ideations suspiciousness scores and greater negative priming ($r = .30$, $p = .08$).

DISCUSSION

The flanker task result for the DID group failed to support the hypothesis that they would display reduced negative priming. Along with the depressed and PTSD samples, the DID group displayed significant negative priming. Despite the failure to produce a significant interaction between group and condition, which may be mediated by the large stan-

TABLE 3. Descriptive statistics for response times (in ms) in the control and ignored repetition conditions, and the priming effect for each group

	Control		Ignored repetition		*Priming effect*
	Mean	SD	Mean	SD	
DID	522.52	103.9	544.57	106.9	*−22.05*
Depression	516.46	46.3	532.01	47.0	*−15.55*
PTSD	534.54	80.7	558.96	96.8	*−24.42*
Psychosis	492.42	52.4	497.23	60.1	*−4.80*
Total	517.10	73.6	534.11	82.0	*−17.01*

dard deviations in the DID and PTSD samples, the psychosis sample produced the predicted reduction in negative priming. This finding is consistent with previous research (e.g., Beech, Powell et al., 1989; Peters et al., 2000).

The DID sample reported significantly more episodes of dissociation than the comparison samples, yet their negative priming result was similar to the depressed and PTSD groups. This suggests that dissociation was not directly related to negative priming in this study. Such an interpretation is further supported by the correlational analysis which evidenced no association between dissociation and negative priming. Yet, the current study used psychiatric diagnosis as the independent variable and not dissociation. Persons (1996) has detailed the advantage of studying psychological phenomena or symptoms, rather than diagnostic categories or groups. Such an approach has generated considerable empirical insights into the psychological understanding of psychosis (e.g., Bentall, 2003) as well as the specific symptom clusters associated with child abuse (e.g., Read, Agar, Argyle, & Aderhold, 2003; Ross, Anderson, & Clark, 1994). A greater understanding of the cognitive underpinnings of DID may come from employing this strategy by using dissociation as the independent variable.

In recent times there has been a focus on the relationship between specific positive symptoms and reduced negative priming. However, since the work of Frith (1979), there has been a general view that the positive symptoms of schizophrenia, as assessed by the STA in people with schizophrenia, are related to weakened inhibition (e.g., Moritz et al., 1998; Peters et al., 1994; Williams, 1995, 1996). Clinical studies have typically used schizophrenic samples only (e.g., Williams, 1996) or have used psychotically symptomatic and psychotically asymptomatic patients with schizophrenia (Peters et al., 2000). The current study sampled two other psychiatric groups (i.e., DID and PTSD) that present a considerable amount and range of so-called positive schizophrenic symptoms (Brady, Killeen, Brewerton, & Lucerini, 2000; David, Kutcher, Jackson, & Mellman, 1999; Kluft, 1987). In particular, these first rank symptoms have a long association in the phenomenological understanding of DID (Bliss, 1980; Gainer, 1994; Peck, 1922; Rosenbaum, 1980; Solomon & Solomon, 1982). The findings here fail to support the general assumption that the positive symptoms of schizophrenia are directly related to reduced inhibition. The DID sample had significantly higher STA and UPE scores than the psychotic group and the samples did not differ on magical thinking and PIS scores (several authors have focused on the clinical significance of Schneiderian symptoms in DID; e.g., Kluft,

1987; Ross et al., 1990). Yet, the DID group showed a significant negative priming effect and the psychotic group did not. Consequently, the results here caution against the simplistic notion that Schneiderian symptoms are directly related to reduced negative priming.

Reduced negative priming in psychosis may be associated with first rank symptoms less evident in DID. There may also be phenomenological differences in the nature of first-rank symptoms experienced in schizophrenia and DID which are more or less associated with inhibitory functioning. Hoffman, Oates, Hafner, Hustig, and McGlashan (1995) argued that hallucinations in DID are phenomenologically different in content and expression from those experienced in schizophrenia. Alternatively, symptoms more characteristic of schizophrenia than DID may be associated with differences in negative priming across groups. For instance, formal thought disorder appears less frequently in DID than delusional- and hallucinatory-type symptoms (Middleton & Butler, 1998); thus, this symptom may be related to cognitive inhibitory functioning.

In addition, the significant negative priming produced by the DID sample but the failure of the psychosis sample to produce negative priming in this study may be related not to differences in the nature of positive symptoms, but to between group differences in variables that they explicitly differed on (i.e., gender or anti-psychotic medication). With reference to gender differences, some investigators (i.e., Claridge, Clark, & Beech, 1992; Steel, Hemsley & Jones, 1996) have found weakened negative priming in non-clinical highly schizotypal males but not in females. However, other researchers have observed no interaction between gender, schizotypy and negative priming (Peters et al., 1994). Thus, previous work provides no consistent indication regarding whether the gender differences in the DID and psychosis samples may have lead to differing negative priming results. With regard to neuroleptic medication, all the participants in the psychosis sample were taking neuroleptics, while only three participants in the DID sample were on a course of this form of medication. However, the actual degree to which this feature may have affected priming results is difficult to decipher. Some studies have shown that antipsychotic medication normalizes negative priming (e.g., Salo, Robertson, Nordahl, & Kraft, 1997), while findings from other studies suggest that antipsychotic medication reduces negative priming (e.g., Moritz, Jacobsen, Mersmann, Kloss, & Andresen, 2000). Due to the small number of participants taking antipsychotic medication it was not used as a covariate in this study. Consequently, the influence of neuroleptic medication on inhibitory func-

tioning, especially in the psychosis sample, is unknown. Future work would be best served by examining whether the differences in priming effect between the psychosis and DID samples is related to differences in the phenomenological experience of first-rank symptoms or is rather a by-product of differences in psychotropic medication.

Dorahy et al. (2002) reported no evidence of negative priming in DID when using word stimuli in the flanker task. Yet, the current study, using single digit number stimuli, found significant negative priming in this group. It is tentatively proposed that the differing results may be related to the differing emotional contexts evoked by word and number stimuli. In Dorahy et al.'s study (Study 1) participants were simply told that all stimuli would be "everyday neutral words." An examination of the debriefing records following test sessions revealed that a number of participants reported finding the task stressful because of fear that each new trial may present a word that was anxiety provoking. Some participants experienced dissociative reactions (e.g., depersonalization, trance episodes and identity alterations) to neutral words that in some cases were later found to be idiosyncratically related to their history of childhood trauma. The single digit numbers used in the current study, on the other hand, represent highly familiar, non-threatening, non-arousing stimuli. Though tentative at this stage, inhibitory ability in individuals with DID may weaken in anxiety-provoking contexts, but may operate effectively when tested in stable, non-emotive environments. Recent work has noted the "state" characteristic of inhibitory functioning (Peters et al., 2000) and emotion has been found to interact with information processing in non-clinical high dissociators (Waller et al., 1995). Consequently, empirical work is now testing the hypothesis of differing cognitive inhibitory functioning in DID across differing emotional environments. Although speculative at this stage, it may be that as stress or the perception of threat increases, inhibitory ability decreases. Such a cognitive consequence of threat would leave an individual with DID vulnerable to cognitive intrusions from dissociated material. Thus, the weakening of cognitive inhibitory ability may be associated with the onset of a dissociative episode in DID.

A psychosis sample was used in this study as a criterion group for reduced cognitive inhibitory performance. The DID group displayed no evidence of this degree of disinhibition, with the negative priming effect for the DID sample reaching significance. Consequently, DID may be characterized by the ability to engage in cognitive inhibition, at least when this executive process is assessed using single digit number stimuli. Despite the need for further research, this finding may generalize to

any experimental context that is deemed non-threatening. There was no support for the view that dissociation was specifically related to inhibitory functioning. The major weaknesses of this work were the small numbers of participants in each group, gender differences between samples and the lack of control for neuroleptic medication. Aside from taking up these issues, future work should expand the cognitive assessment of DID to other markers of working memory functioning.

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