Feeling Unreal: Cognitive Processes in Depersonalization

Orna Guralnik, Psy.D., James Schmeidler, Ph.D., and Daphne Simeon, M.D.

Objective: Depersonalization disorder is characterized by a detachment from one's sense of self and one's surroundings that leads to considerable distress and impairment yet an intact testing of reality. Depersonalized individuals often report difficulties in perception, concentration, and memory; however, data on their cognitive profiles are lacking. **Method:** Fifteen patients with depersonalization disorder were compared to 15 matched normal comparison subjects on a comprehensive neuropsychological test battery that assessed cognitive function. **Results:** The subjects with depersonalization disorder showed a distinct cognitive profile. They performed significantly worse than the comparison subjects on certain measures of attention, short-term visual and verbal memory, and spatial reasoning within the context of comparable intellectual abilities. **Conclusions:** The authors propose that depersonalization involves alterations in the attentional and perceptual systems, specifically in the ability to effortfully control the focus of attention. These early encoding deficits are hypothesized to have a deleterious effect on the short-term memory system; they manifest as deficits in the ability to take in new information but not in the ability to conceptualize and manipulate previously encoded information.

(Am J Psychiatry 2000; 157:103–109)

Depersonalization is characterized by a detachment from one's sense of self and one's surroundings and a feeling of being an automaton or as if in a dream while maintaining an adequate testing of reality. Individuals meet the criteria for depersonalization disorder if they suffer from persistent or recurrent depersonalization symptoms that lead to significant distress or dysfunction and do not occur exclusively as part of another axis I disorder. Despite an increased interest in dissociation in recent years, not much is known about the etiology, course, prevalence, and incidence of depersonalization. Some reports suggest it may be the third most common psychiatric symptom after depression and anxiety; however, it is highly resistant to both psychotherapeutic and pharmacological treatment (1). Depersonalization is classified in DSM-IV as a dissociative disorder. Although there exists an impressive theoretical literature on dissociation, there have been few empirical attempts to substantiate theoretical models. The clinical literature is mostly concerned with establishing the premise that dissociation functions to protect the self from overwhelming emotional experiences and views dissociative disorders primarily as a response to trauma (2). In the nineteenth century, Janet (2) described dissociation as a narrowing of attention and a disorganization in the ordinary integrative functions of consciousness that occur when a person experiences vehement emotions. Since then, long-lasting alterations in cognitive processes in response to trauma have been documented (3). However, it is unclear at what stage of information processing dissociation takes effect and whether it involves alterations in the initial stages of encoding information, while it is being overwhelmed by trauma, or is reflective of later amnesic barriers to the retrieval of information.

Neodissociation theories (4, 5) view dissociation as reflective of mechanisms that all people use to varying degrees. Their central premise is that dissociation involves a weakening of the highest-order executive control functions that leave infrastructures more freedom to operate independently. Strong activation of the executive system has the experiential equivalent of concentration, consciousness, and "self-hood," whereas its weakening results in the emergence of the mind's underlying inherently dissociated nature. Hilgard's fa-

Received Nov. 20, 1998; revision received April 5, 1999; accepted June 10, 1999. From the Department of Psychiatry, Mount Sinai School of Medicine. Address reprint requests to Dr. Guralnik, Mount Sinai School of Medicine, Box 1228, One Gustave L. Levy Place, New York, NY 10029; 102504.2330@compuserve.com (e-mail).

Supported in part by a National Alliance for Research on Schizophrenia and Depression Young Investigator Award to Dr. Guralnik and NIMH grant MH-55582 to Dr. Simeon.

The authors thank Bonnie Aronowitz, Ph.D., and Philip Harvey, Ph.D., for help in compiling the assessment battery and Laura Fink, Ph.D., for her comments on the article.

mous documentation of the "hidden observer" phenomenon in experiments that involved hypnotically induced analgesia and deafness is particularly illustrative of this theory (4). Operationalizations of these theories rest on the prediction that the ability to dissociate should facilitate performance on dual-task situations such as divided and selective attention. However, studies have failed to show differences between hypnosis-prone and comparison subjects on task-interference conditions (6). Many of these experiments rely on the premise that proneness to hypnosis is a reliable marker of dissociation proneness, whereas it appears that only a small subgroup of people are both highly dissociative and highly hypnotizable (6). Waller et al. (7) have argued that pathological dissociation is a categorical taxon rather than a continuous entity, which implies that normal populations would not be applicable to studies of dissociative disorders.

Several studies have examined the relationship between dissociation and cognitive functioning in patients with dissociative identity disorder. These mostly point to deterioration and excessive scattering of interest on intelligence tests, with some signs of neuropsychological deficits on distractibility measures (8, 9). There was one early study (10) that compared the cognitive functioning of depersonalized subjects to matched depressive and anxious patients in which tests of psychomotor abilities did not differentiate between the groups. Otherwise, to our knowledge, there has been no systematic study of the cognitive profile involved in depersonalization to date. Assessing this profile was the purpose of this study. Since neodissociation theories implicate changes in executive control functions and memory, and since patients' subjective reports include disruptions in attention and memory, we decided to focus particularly on those areas in the context of general intellectual functioning. Our hypotheses were that the depersonalized group would show deficits in functioning on measures of attention and memory in relation to the comparison group but that it would exhibit uncompromised intelligence on the WAIS-R.

METHOD

Subjects

Fifteen subjects with DSM-IV depersonalization disorder and 15 comparison subjects were recruited through local newspaper ads. The depersonalized subjects were enrolled as part of a larger, ongoing treatment study. The comparison subjects were paid $75 each for participation. Written informed consent was obtained from all subjects. The subjects were aged 18–65 years. The comparison subjects had no lifetime history of axis I or II disorders, as assessed by the Structured Clinical Interview for DSM-IV Axis I Disorders, Patient Edition, version 2 (11), and the Structured Interview for DSM-IV Personality (12). The subjects with depersonalization disorder met the DSM-IV criteria for depersonalization disorder by a semistructured interview and by the Structured Clinical Interview for DSM-IV Dissociative Disorders, revised (13). Subjects with lifetime psychotic disorders or current substance use disorders were excluded. No subjects had taken any medications for at least 5 weeks before testing. People with a history of medical or neurological disorders were excluded.

Measures

A 6-hour test battery, to be described, examined the subjects' general intelligence, attention, and memory. A single licensed clinical psychologist (O.G.) administered all the neuropsychological measures and strictly followed the test manuals' standardized administration procedures.

The WAIS-R (14) is the most widely used adult intelligence test. It yields IQs for verbal, performance, and general intelligence. Administration and scoring are standardized, and extensive normative data are provided.

The Wechsler Memory Scale—Revised (15) is widely used to evaluate verbal and visual-spatial memory and is particularly sensitive to subtle memory disorders (16). Administration and scoring are standardized, and normative data are provided. In this study, we used only measures of immediate recall.

The Stroop Color-Word Test (17) is a widely used measure that is sensitive to subtle neuropsychological problems in attention (18).

The emotional Stroop task (19) is gaining popularity in psychiatric research and has been applied to the study of various disorders to assess the interference of emotional material with selective attention. Subjects are shown words of varying affective significance and are asked to name the colors in which the words are printed and to ignore the meaning of the words. Patients are often slower to name the color of a word associated with concerns relevant to their condition. In this study, we included four lists: a neutral list (e.g., carpet, tree), a negative affect list (terror, rage), a positive affect list (ecstasy, elation), and a list of depersonalization-related words (dreamy, spaced). The lists were presented in the order used here, against our working hypothesis. The dependent variable was time for completion of reading the list.

We added an incidental learning component to the emotional Stroop task. One minute after the administration of all four lists, the subjects were asked to recall all words on the lists and were encouraged to guess. It is established in the literature that mood-congruent memory biases are more evident on implicit memory tasks (20); the premise is that the learned information changes perceptual response systems without being accessible to conscious recollection.

Trail Making Tests A and B (21) are known as measures of attention, visual-motor and sequencing skills, and cognitive flexibility. They are sensitive to the presence of brain damage and do not correlate with verbal tests (22).

The Wisconsin Card Sorting Test—Computerized Version (23) is widely used in psychiatric research to measure conceptualization, executive functioning, and set shifting. It discriminates well between brain-damaged and comparison subjects (23).

The Facial Recognition Test (24) taps complex visual-spatial processing that is independent of memory. It is sensitive to visual neglect and other forms of visual-spatial and visual-search difficulties (22).

Vigil's Continuous Performance Test (25) is a computerized attention test that taps attention and impulsivity. Briefly, this version involved the successive presentation of letters on the screen of a computer monitor. In the standard administration, subjects are presented with four conditions. In the first (K), a series of letters are projected, and the subject is to respond when he or she sees a target letter (K). The next condition (AK) is complicated by the added instruction to respond only if the target letter is preceded by a decoy—another letter (A); this task is more demanding in that it requires memory for successive stimuli. In the last two conditions, the first two conditions are repeated with the addition of visual noise in the form of small pixels on the screen (AN and AKN, respectively). The addition of noise degrades the image and burdens early stimulus analysis and encoding processes. For each condition's number of responses and correct hits, omission and commission errors are recorded.

Data Analysis

All neuropsychological test scores, except for scores on the Continuous Performance Test, were compared in the two groups by use of Student's independent t tests. Since our hypothesis was that the depersonalized group would perform poorer than the comparison group, significance tests were one-tailed; Bonferroni corrections were employed according to the number of subtests and summary

TABLE 1. Scores on the WAIS-R for 14 Patients With Depersonalization Disorder[a] and 15 Normal Comparison Subjects

	Depersonalization Disorder Group		Comparison Group		Analysis	
WAIS-R Item	Mean	SD	Mean	SD	t (df=27)	p
IQ						
Full	105.5	9.8	109.4	11.9	–1.0	0.17
Verbal	111.2	9.8	108.6	10.9	0.7	0.25
Performance	98.4	10.6	108.6	11.9	–2.4	0.01
Information	11.7	2.3	11.8	2.3	–0.2	0.44
Digit span	11.4	2.1	11.7	2.5	–0.4	0.36
Vocabulary	12.6	1.7	11.3	2.1	1.7	0.05
Arithmetic	10.6	2.9	11.1	2.5	–0.5	0.30
Comprehension	11.7	2.0	11.4	2.7	0.4	0.34
Similarities	11.9	1.6	10.8	2.4	1.3	0.09
Picture completion	10.2	2.2	10.8	2.1	–0.7	0.23
Picture arrangement	9.2	1.9	9.9	1.9	–0.9	0.19
Block design	9.8	2.4	12.8	2.8	–3.1	0.003[b]
Object assembly	8.9	2.6	10.4	2.4	–1.6	0.06
Digit symbol	10.4	1.9	11.8	1.9	–1.9	0.03

[a] One subject with depersonalization disorder was not given the WAIS-R.
[b] Significant after Bonferroni corrections for 14 comparisons ($p<0.05$).

scores within a test (family of hypotheses). The family and number of corrections for each comparison are explicated in the footnotes of the tables. For each subject, the standard deviation among the 11 standardized subtest scores of the WAIS-R was calculated as a measure of intertest scatter. Groups were compared on this measure by use of Student's t tests. In order to rule out the confounding effects of gender, a two-way analysis of variance (ANOVA) (diagnosis-by-gender) was applied to test scores to assess interaction effects. Two separate analyses were performed on the Continuous Performance Test. The first examined evidence of a differential decline between the groups in attentional performance over time. Each of the four conditions (A, AN, AK, and AKN) was divided into four blocks of equivalent time, and the numbers of omissions and commissions were analyzed by a 2×4×4 (group-by-decoy-by-block) repeated measures multivariate analysis of variance (MANOVA). In the next analysis, to compare the groups' functioning on each of the conditions, the time blocks were collapsed so that each condition was represented by its average. A four-way repeated measures ANOVA was employed, with group as the between-subjects independent variable and decoy (A or AK), distraction (noise or no noise), and type of error (omissions or commissions) as the within-subject independent variables. After the analyses, all statistically significant (after use of the Bonferroni correction) differentiating variables were entered into a forward stepwise logistic regression analysis to determine which variables were the most powerful in distinguishing the groups.

RESULTS

Demographic Variables

The groups did not differ significantly on sex (depersonalized: five women and 10 men; comparison: nine women and six men) (χ^2=2.14, df=1, n.s.), age (depersonalized: mean=32.2 years, SD=8.6; comparison: mean=29.0, SD=7.4) (t=1.1, df=28, n.s.), or education (depersonalized: mean=16.0 years, SD=2.2; comparison: mean=16.1, SD=2.5) (t=–0.2, df=28, n.s.). When we used a 2×2 ANOVA, we found no interaction effects between diagnostic group membership and gender on any of the variables assessed. All but one of the comparison subjects were right-handed.

Intellectual Functioning

WAIS-R scores and comparisons are summarized in table 1. In comparison to existing norms, the IQs for the comparison group were within the average range. The groups did not differ on IQs. Whereas the comparison group scored a substantial difference of 10 points higher than the depersonalized group on performance IQs, this difference was not significant after use of the Bonferroni correction. The depersonalized group had a large discrepancy between verbal and performance IQs (an average 14-point difference, as opposed to near zero in the comparison group), but the depersonalized subjects did not differ from the comparison subjects on intertest scatter. Of the 11 WAIS-R subtests used, the depersonalized group scored significantly lower on block design.

Scores on the Wechsler Memory Scale—Revised, Facial Recognition Test, Stroop Color-Word Test, and Wisconsin Card Sorting Test are summarized in table 2. The groups did not significantly differ on the Wisconsin Card Sorting Test, a measure of executive functioning and flexible problem solving. On the Wechsler Memory Scale—Revised, the depersonalized group had significantly worse scores on the general and visual memory summary measures and on the logical, figural, and visual paired memory subtests. On the incidental learning addition to the emotional Stroop task, the depersonalized subjects had a significantly superior recall for words related to depersonalization. A closer look reveals that they also had a better memory for negative words and overall recall—differences that were not significant after use of the Bonferroni correction.

Scores on the Continuous Performance Test revealed that on the repeated measures MANOVA, there were no effects of the time-by-group or time-by-condition-by-group interaction, which revealed no vigilance decrements over time that were unique to the depersonalized subjects. A four-way ANOVA was em-

TABLE 2. Scores on Six Neuropsychological Tests for 15 Patients With Depersonalization Disorder and 15 Comparison Subjects[a]

	Depersonalization Disorder Group		Comparison Group		Analysis		
Test	Mean	SD	Mean	SD	t	df	p
Wisconsin Card Sorting Test							
Number of categories	4.9	1.6	5.5	1.1	–1.1	27	0.13
Number correct	69.8	9.7	69.5	12.0	0.1	27	0.46
Percent of perseverative errors	16.5	9.8	11.5	7.2	1.5	27	0.07
Wechsler Memory Scale—Revised							
General memory	132.4	16.6	150.5	12.9	–3.3	28	0.002[b]
Verbal memory	72.8	12.9	84.9	12.0	–2.6	28	0.005
Logical memory	25.2	6.3	31.7	5.2	–3.1	28	0.003[b]
Verbal paired association	21.0	2.0	21.5	3.5	–0.5	28	0.31
Visual memory	59.6	7.4	65.7	4.2	–2.8	28	0.005[b]
Figural memory	6.9	1.2	8.2	1.5	–2.7	28	0.006[b]
Visual paired association	13.7	4.3	16.9	1.6	–2.6	28	0.006[b]
Visual reproduction	39.0	2.7	39.9	2.1	–0.9	28	0.17
Facial Recognition Test	11.1	7.9	8.5	3.2	1.0	25	0.15
Trail Making Tests							
A	31.7	7.9	29.5	10.3	0.6	27	0.26
B	74.0	28.5	62.2	22.3	1.2	27	0.11
Stroop Color-Word Test							
Word	45.1	8.9	43.2	4.5	0.7	28	0.24
Color	57.6	12.6	56.5	8.0	0.3	28	0.39
Color word	86.2	16.7	78.7	15.0	1.2	28	0.11
Emotional Stroop task							
Neutral words	83.2	21.8	79.8	14.2	0.5	25	0.32
Negative words	84.2	20.6	79.8	13.7	0.6	25	0.26
Positive words	84.9	19.5	79.5	26.9	0.6	25	0.28
Depersonalization words	89.0	24.1	84.1	19.4	0.6	25	0.28
Incidental learning addition to emotional Stroop task							
Overall recall	4.4	2.1	2.7	1.9	2.2	25	0.02
Neutral words	0.4	0.5	0.8	1.1	–1.2	25	0.11
Negative words	1.1	0.9	0.5	0.8	1.8	25	0.04
Positive words	0.8	1.0	0.6	0.7	0.6	25	0.28
Depersonalization words	2.1	1.4	0.8	1.1	2.7	25	0.006[c]

[a] Number of subjects varied among tests.
[b] Significant after Bonferroni corrections for eight comparisons ($p<0.05$).
[c] Significant after Bonferroni corrections for five comparisons ($p<0.05$).

ployed to test the hypothesis that distracters would more deleteriously affect the subjects with depersonalization disorder. The group main effect was significant; the depersonalized group had more errors than the comparison group ($F=4.82$, df=1, 26, $p<0.03$). The distraction (noise) main effect and group-by-distraction interaction effect were significant ($F=37.00$, df=1, 26, $p<0.001$, and $F=4.96$, df=1, 26, $p<0.04$, respectively). Specifically, depersonalized subjects were more deleteriously affected by visual noise than were comparison subjects. The negative effect of noise was more prominent in their omission responses than in their commission responses; the group-by-distraction-by-type of error (omission or commission) interaction effect was significant ($F=7.30$, df=1, 26, $p<0.02$). Although there was a significant main effect for the decoy, with more errors committed during a decoy with increased complexity by all subjects ($F=35.02$, df=1, 26, $p<0.001$), the group-by-decoy interaction was not significant ($F=2.37$, df=1, 26, n.s.). On the Stroop Color-Word Test and the emotional Stroop task, there were no significant differences between the groups in interference effects (table 2). The groups also did not differ on the Facial Recognition Test and Trail Making Tests A and B (table 2).

The six variables entered into the logistic regression analysis were scores on the Wechsler Memory Scale—Revised logical memory, visual paired association, and figural memory subtests; the WAIS-R block design subtest, the emotional Stroop task subtest for incidental recall for depersonalization disorder words, and the number of omissions for the noise-plus-decoy condition of the Continuous Performance Test. Block design score was the best single predictor of group membership ($\chi^2=7.31$, df=1, $p<0.007$; 68% correct prediction), followed by the logical memory and recall of depersonalization disorder words subtests. The combination of the three resulted in an 80% correct prediction of diagnostic group membership, after which none of the other variables made a statistically significant additional contribution.

DISCUSSION

Results of the assessment test battery indicated that depersonalized subjects differed from comparison subjects on key features within a general context of comparable intellectual ability. These differences closely mirror their subjective reporting of difficulties in per-

ception, attention, and memory. The groups' comparable general intellectual functioning is crucial for the interpretation of the rest of the findings in suggesting that depersonalized subjects do not demonstrate the general and diffuse deterioration in functioning that is often seen in conjunction with psychiatric disorders such as schizophrenia or depression (26). The groups did not differ in various measures of sequencing or reaction time that could intimate a disorganization or a slowing down of cognitive processing.

The depersonalized subjects did, however, demonstrate clear impairments on visual-spatial tasks. They did poorly on some performance tasks of the WAIS-R—significantly so on a measure of spatial reasoning (the block design subtest). The block design subtest score was the single best predictor of diagnostic group membership in the regression analysis; it emphasized the importance of this factor in differentiating between the groups. Attributing this impairment to problems in visual-motor coordination should be ruled out since the groups did not differ on scores on graphomotor tests such as the digit symbol subtest, Wechsler scale visual reproduction subtest, and Trail Making Tests A and B. The materials used in the block design subtest are three-dimensional cubes, which is of great interest since depersonalized subjects often report a subjective flattening of their visual-perceptual world into two dimensions. It is not uncommon for them to have been referred for psychiatric help after consultations with ophthalmologists, whose standard examinations yielded no findings. In fact, on the Wechsler scale, depersonalized subjects had difficulties on tasks involving memorizing geometric figures (the figural memory subtest) and pairs of colors (the visual paired association subtest)—both abstract visual stimuli. These findings lead us to conclude that depersonalization is associated with deficits in visual perception and visual-spatial reasoning with both three- and two-dimensional stimuli.

Comparable scores of the groups on the WAIS-R information and vocabulary subtests imply that depersonalized subjects do not suffer from gross impairments in long-term-memory. They also did well on various verbal short-term memory tasks, including the incidental learning test, digit span, and verbal paired association memory subtests—all sensitive to learning deficits that involve complex or novel information. However, the depersonalized subjects did much worse than the comparison subjects on the logical memory subtest; the test is unique in that it employs sentences rather than words and provides a measure of what is retained when more information is presented than most people can remember. Thus, the depersonalized subjects' short-term verbal memory capacity tended to significantly drop in relation to that of comparison subjects when it was presented with an overload of information.

So far it is apparent that depersonalized subjects demonstrate certain compromises in both visual and verbal short-term memory with stimuli of both an abstract and meaningful nature. It is still questionable whether these deficits can be attributed to difficulties in taking in new information—i.e., in perception and attention or in retrieval—although the subjects' adequate long-term memory supports the former. One of the symptoms that they describe is a disruption in their sense of familiarity with both themselves and their surroundings. Although they know better, they feel as if all is new, whereas their self is at an unbridgeable distance from ongoing perceptions. The blunted sense of familiarity could blatantly compromise their functioning on memory tasks that rely on recognition. Support comes from the fact that many of their visual perception and discrimination problems were not apparent when the stimuli were right in front of them, as in the Facial Recognition Test.

One of the key findings in this study is the depersonalized subjects' impaired functioning on the Continuous Performance Test. The features of attention that are targeted in this test are the ability to selectively attend to the stimuli presented and the ability to sustain attention, as measured by decrements in functioning over time. Depersonalized subjects showed significant deficits only when visual noise was added—in response to which they tended to have more omissions, as opposed to an increased rate of false alarms—and did not differ in their ability to sustain attention over time. Degrading stimuli are among the methods used to isolate the stimulus-encoding, information-processing stage, as opposed to the response-selection and organizational stages. The addition of noise lowered the subjects' perceptual sensitivity, which made it difficult for them to rapidly extract relevant stimulus features. The findings so far suggest that depersonalization is marked by a particular vulnerability at the level of perception and attention. Deficits in short-term memory could be, therefore, secondary to difficulties focusing, perceiving, and taking in new information.

Unlike we predicted, on the emotional Stroop task, the depersonalized subjects did not demonstrate more interference effects; they were therefore different from other clinical groups, such as patients with panic disorder and posttraumatic stress disorder, who reportedly demonstrate a strong attentional bias on the emotional Stroop task (19). Their superior incidental learning test scores revealed that they did not ignore—and actually remembered—more emotionally charged words than did the comparison subjects; unnecessary information could potentially disrupt their task. Clearly, they can be highly perceptive and demonstrate good memory—at least when the information is of emotional significance to them. Possibly, their internal preoccupation is at the expense of allocating resources toward other aspects of their environment. Their awareness of these words weakens the hypothesis that their dissociative symptoms serve a defensive function and can be interpreted from a psychodynamic and structural point of view as a failure in repression. Repression is posited to defend the ego from anxiety-provoking information by making such material unavailable to conscious perception. Although both mechanisms aim to ward off pain,

dissociation differs in that it involves a splitting off of whole chunks of experiences or self-states, which leads to an altered state of being, whereas repression is a more selective riddance of information and, in that respect, can be more adaptive. This issue will need to be further studied.

When we integrated some of our findings, it appeared that on the Continuous Performance Test, the depersonalized patients exhibited difficulties attending to target stimuli in the presence of noise; this is a task that involves selective attention. On the emotional Stroop task, they attended to irrelevant and potentially disruptive information. Our interpretation is that they find it difficult to willfully control and direct attention toward the key features of the stimulus. In terms of the neodissociation theory, the depersonalized subjects' functioning on the emotional Stroop task and the incidental learning test supports the main hypothesis that their use of dissociation facilitates their performance on simultaneous tasks and reduces task interference. There were fewer clear-cut signs of a weakening of the executive-supervisory system, since on direct measures such as the Wisconsin Card Sorting Test, the patients showed no decline. However, on certain tasks that require the supervisory function of allocating attentional resources in response to task demands, such as the Continuous Performance Test, they did show impairment. The ability to cope with divided and selective attention tasks needs to be further studied.

The cognitive profile of the depersonalized group in this study differs from reports on patients with dissociative identity disorder. Depersonalized subjects' scores were equivalent to those of comparison subjects on the intelligence test, whereas some case reports suggest that patients with dissociative identity disorder show above-average intelligence profiles (27), and more recent studies demonstrate that dissociative identity disorder is associated with cognitive inefficiency and intertest scatter on intelligence tests (9). Both patients with dissociative identity disorder and those with dissociative disorder not otherwise specified were reported to manifest abnormal intertest scatter on the verbal subtests of the WAIS-R (10). This was attributed to deficits on the distractibility factor (arithmetic and digit span), which led the authors to recommend evaluating this population for comorbid attention deficit disorder by using the Continuous Performance Test. Depersonalized subjects did not show more verbal scatter or deficits on the distractibility factor of the WAIS-R. They did demonstrate significant deficits on the Continuous Performance Test; however, these subjects differ from typical patients with attention deficit disorder (28) in that they have no particular difficulties sustaining attention over time, no increase in commission errors, and no problems on the Stroop-Color Word Test. The Continuous Performance Test's profile of the subjects with depersonalization disorder was actually similar to reports on the functioning of patients with schizophrenia spectrum disorders. A low perceptual sensitivity on Continuous Performance Test items with degraded stimuli was demonstrated with relatives of schizophrenic patients (29), replicated in later studies with schizotypal subjects, and found to be independent of anxiety and depression measures (30). Low perceptual sensitivity on the Continuous Performance Test was also shown to be associated with the type B personality and with more frequent daydreams (31).

Limitations of this study include the small number of subjects in each group in addition to use of a wide number of tests. The findings will need to be replicated. Future areas to focus on in studying depersonalization are primarily visual-spatial processing, attention, and short-term memory. Visual, auditory, and somatosensory modalities need to be studied in parallel and in intermodal integration. The logistic regression analysis shows the feasibility of using such tests as the Objective Diagnostic Criteria for Depersonalization. However, the fact that the same subjects were used for the regression analysis limits the inferences that can be drawn from it, and it will need to be validated on another group of subjects. To test the hypotheses regarding the defensive functions of dissociation, it would be helpful to study whether deficits are content dependent. Finally, it would be useful to study the connection between neuropsychological deficits and the depersonalized subjects' sense of unreality. It still needs to be determined how their sense of unreality is related to disruptions in perception, an inability to connect preexisting memory traces, affective tags (familiarity), or to an altogether separate mechanism that removes from experiences their "realness."

REFERENCES

1. Simeon D, Gross S, Guralnik O, Stein DJ, Schmeidler J, Hollander E: Feeling unreal: 30 cases of DSM-III-R depersonalization disorder. Am J Psychiatry 1997; 154:1107–1113
2. Janet P: L'automatisme psychologique. Paris, Felix Alcan, 1889
3. Appelbaum PS, Uyehara LA, Elin MR: Trauma and Memory: Clinical and Legal Controversies. New York, Oxford University Press, 1997
4. Hilgard ER: Neodissociation theory, in Dissociation: Clinical and Theoretical Perspectives. Edited by Lynn SJ, Rhue JW. New York, Guilford Press, 1994, pp 32–51
5. Woody EZ, Bowers KS: A frontal assault on dissociated control. Ibid, pp 52–79
6. Green JP, Lynn SJ: Hypnosis, dissociation and simultaneous task performance. J Pers Soc Psychol 1995; 69:728–735
7. Waller NG, Putnam FW, Carlson EB: Types of dissociation and dissociative types: a taxometric analysis of dissociative experiences. Psychol Methods 1996; 1:300–321
8. Armstrong JG, Loewenstein RJ: Characteristics of patients with multiple personality and dissociative disorders on psychological testing. J Nerv Ment Dis 1990; 178:448–454
9. Rossini E, Schwartz DR, Braun BG: Intellectual functioning of inpatients with dissociative identity disorder and dissociative disorder not otherwise specified. J Nerv Ment Dis 1996; 184: 289–295
10. Sedman G: An investigation of certain factors concerned in the aetiology of depersonalization. Acta Psychiatr Scand 1972; 48:191–219
11. First MB, Spitzer RL, Gibbon M, Williams JBW: Structured Clinical Interview for DSM-IV Axis I Disorders, Patient Edition (SCID-P), version 2. New York, New York State Psychiatric Institute, Biometrics Research, 1995

12. Pfohl B, Blum N, Zimmerman M: Structured Interview for DSM-IV Personality: SIDP-IV. Iowa City, University of Iowa, Department of Psychiatry, 1995
13. Steinberg M: Structured Clinical Interview for DSM-IV Dissociative Disorders (SCID-D), revised. Washington, DC, American Psychiatric Press, 1994
14. Wechsler D: Manual for the Wechsler Adult Intelligence Scale—Revised. San Antonio, Tex, Psychological Corp (Harcourt), 1981
15. Wechsler D: The Wechsler Memory Scale—3rd ed. San Antonio, Tex, Psychological Corp (Harcourt), 1997
16. Reeves D, Wedding D: The Clinical Assessment of Memory. New York, Springer, 1994
17. Stroop JR: Studies of interference in serial verbal reaction. J Exp Psychol 1935; 18:643–662
18. Golden CJ: Stroop Color and Word Test: A Manual for Clinical and Experimental Uses. Wood Dale, Ill, Stoelting Co, 1978
19. Williams JM, Mathews A, MacLeod C: The emotional Stroop task and psychopathology. Psychol Bull 1996; 120:3–24
20. Bradley BP, Mogg K, Williams JMG: Implicit and explicit memory for emotional information in non-clinical subjects. Behav Res Ther 1994; 32:65–78
21. Army Individual Test Battery: Manual of Directions and Scoring. Washington, DC, War Department, Adjutant General's Office, 1944
22. Lezack MD: Neuropsychological Assessment, 3rd ed. New York, Oxford University Press, 1983
23. Heaton RK, Chelune GJ, Talley JL, Kay GG, Curtiss G: Wisconsin Card Sorting Test Manual. Odessa, Fla, Psychological Assessment Resources, 1993
24. Benton AL, Des Hamsher K, Varney NR, Spreen O: Contributions to Neuropsychological Assessment: A Clinical Manual. New York, Oxford University Press, 1983
25. Vigil/W: Continuous Performance Test: User and Technical Manual. NH, ForThought, 1996
26. Veiel HOF: A preliminary profile of neuropsychological deficits associated with major depression. J Clin Exp Neuropsychol 1997; 19:587–603
27. Rosenstein LD: Potential neuropsychologic and neurophysiologic correlates of multiple personality disorder: literature review and two case studies. Neuropsychiatry Neuropsychol Behav Neurol 1994; 7:215–229
28. Carter CS, Krener P, Chaderjan M, Northcutt C: Abnormal processing of irrelevant information in attention deficit hyperactivity disorder. Psychiatry Res 1995; 56:59–70
29. Neuchterlein KH: Signal detection in vigilance tasks and behavioral attributes among offspring of schizophrenic mothers and among hyperactive children. J Abnorm Psychol 1983; 92:4–28
30. Lenzenweger MF, Cornblatt BA, Putnick M: Schizotypy and sustained attention. J Abnorm Psychol 1991; 100:84–89
31. Perry AR, Laurie CA: Sustained attention and the Type A behavior pattern: the effect of daydreaming on performance. J Gen Psychol 1992; 119:217–228