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AN EYE FOR AN I: A 35-Year-Old Woman With Fluctuating Oculomotor Deficits and Dissociative Identity Disorder

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Abstract: Physiologic changes, including neurological or pseudo-neurological symptoms, occur across identity states in dissociative identity disorder (DID) and can be objectively measured. The idea that dissociative phenomena might be associated with changes in brain function is consistent with research on the brain effects of hypnosis. The authors report a case of psycho-physiologic differences among 4 alter personalities manifested by a 35-year-old woman with DID. Differences in visual acuity, frequency of pendular nystagmus, and handedness were observed in this patient both when the alter personalities appeared spontaneously and when elicited under hypnosis. The authors consider several diagnostic possibilities for these findings and discuss whether prevailing treatment recommendations for DID patients could possibly be modified to ameliorate such visual and neurologic symptoms.

Physiologic changes across identity states in dissociative identity disorder (DID) have been described in the literature and are a particularly interesting set of symptoms, because they can be objectively measured. Neurological or pseudo-neurological symptoms in particular have been noted among DID patients (Boon & Draijer, 1993; Bowman & Markand, 1996). Among these are findings indicative of autonomic arousal, consistent with comorbid PTSD present in many DID patients (Coons, Bowman, Pellow, & Schneider, 1989; Shalev, Peri, Canetti, & Schreiber, 1996; D. Spiegel, 1984). The idea that dissociative phenomena might be associated with changes in brain function is consistent

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with research on brain effects of the related phenomenon of hypnosis. Such changes include power spectral 2 differences in EEG, differences in the amplitude and latency of visual, auditory, and olfactory event-related potentials (ERP; Barabasz et al., 1999; De Pascalis, 1999; Jensen, Barabasz, Barabasz, & Warner, 2001; D. Spiegel 1991), and changes in hemispheric and regional cerebral blood flow in response to hypnotic alteration of pain (Hofbauer, Rainville, Duncan, & Bushnell, 2001; Rainville, Hofbauer, Bushnell, Duncan, & Price, 2002; Rainville et al., 1999), and color perception (Kosslyn, Thompson, Costantini-Ferrando, Alpert, & Spiegel, 2000). In addition, differences in dominant handedness and ophthalmological changes in different dissociative states have been reported (Miller, Blackburn, Scholes, White, & Mamalis, 1991).

Here, we report a case of psycho-physiologic differences among the four alter personalities manifested by a 35-year-old woman with DID. To our knowledge, only one similar case has been reported in the literature to date of a 33-year-old woman also with DID and a 13-year history of legal blindness who appeared to "recover" vision after psychotherapy (though not hypnosis) for her DID in the absence of medical explanations for this apparent reversal (Waldvogel, Ullrich, & Strasburger, 2007).

For our patient, differences in visual acuity, frequency of pendular nystagmus, and handedness were observed both when the alter personalities appeared spontaneously and when they were elicited under hypnosis. We consider several diagnostic possibilities for these findings and discuss whether prevailing treatment recommendations for DID patients could possibly be modified to ameliorate such visual and neurologic symptoms.

CASE HISTORY OF PRESENT ILLNESS

The patient, a 35-year-old Caucasian single mother, had been legally blind since birth with an unclear pathogenesis. By chart history, she had suffered a bilateral optic nerve injury from birth trauma, but a congenital disorder could not be ruled out, particularly since she did not know her birth parents' medical histories. She had one child, a son, with normal vision, normal development, and above-average intelligence. Prior to hypnosis, she could at baseline perceive some outlines and colors such as blue, tan, and white. She used a wheelchair in the hospital and a guide dog outdoors. In addition, she had pendular nystagmus since birth, presumably secondary to her visual deficits, in the absence of any documented organic brain syndrome, cerebellar, vestibular, or other neurologic injuries. She wrote using her left hand and identified herself as being left handed.

The patient was referred by the inpatient psychiatric unit for a hypnosis consultation. She had been admitted and placed on a hold for

severe self-mutilation, carving "fat pig" and "I hate you [her name]" on her forearms with a large kitchen knife, while continuing to deny any conscious memory of having inflicted these injuries. Similarly, she could not account for burn marks on her forearms suggestive of previous self-inflicted injury. Two months prior to this admission, she had been hospitalized emergently for a suicide attempt by laceration of her left brachial artery, requiring transfusion. One year prior to that emergent admission, the patient had discovered the words "Dumb shit" and "Mad" carved into her arms with a razor blade after what she called a "blackout" interval for which she had no conscious memory.

She had previously been diagnosed as having a dissociative disorder not otherwise specified, as well as depression and anorexia nervosa, restricting subtype, and borderline personality disorder. Her dissociative symptoms had included finding several shopping bags loaded with items she could not recall buying and would not have wanted, as well as experiencing several episodes of "lost time" since her early childhood, which she had always kept secret "for fear of being locked up." In keeping with her ever-present fear of being punished, the patient reported that as an adult she spent several hours of the day hiding in closets, with increased frequency in the months preceding her admission.

During a review of her history of remote and acute injuries at psychiatric evaluation, the patient expressed both a fear of future injuries and the fatalistic sense that her injuries had been inevitable, a way of "doing it so he won't have to do it," referring to her adoptive father and the wish to somehow preempt his violence by committing violent acts against herself. The patient was still in contact with her adoptive father at the time of her presentation to the inpatient psychiatric unit, and she felt certain that she herself had caused her burns and lacerations. Indeed, her adoptive mother and other reliable members of the family confirmed that she had been alone when they occurred, and her recognition of self-mutilation was increased by her growing recognition of the motivations behind the injuries.

Past Psychiatric History

The patient reported that her dissociative symptoms had begun in the setting of severe abuse in early childhood. Her medical and adoption records indicated that as an infant she had been removed from her biological mother because of sexual and physical abuse. At 6 months of age, child protection authorities found her conscious but malnourished locked in a closet along with an older sister from whom she was separated when they were placed in foster care. After a few temporary placements, she was adopted at age 2 by parents who subsequently divorced when she was 10. Details of specific neurologic or other injuries inflicted were not available, though subsequent neuroimaging performed during the patient's adulthood was within normal limits.

In the interim, her adoptive father physically and sexually abused her, repeatedly holding her under water during baths and squeezing her between his legs. The patient's adoptive brother, older than she by 9 years, also abused her by tying her up and attempting to strangle her. Both her adoptive parents and their three biological children blamed the patient for the divorce. A source of conflict between her adoptive parents was the issue of how the patient's blindness was to be managed. While her adoptive father wished to treat her as a seeing person, her mother argued for accommodations to her disability. The patient herself claimed that she was not aware of being blind until the age of 8, when her family physician helped arrange for her to attend a school for the blind. Until then, the patient reported, she had believed that her inability to see the blackboard or other objects meant that she was "stupid, bad, and defective." Soon after beginning her studies at the specialized school and after her parents' divorce, in early adolescence, the patient reported first having brief dissociative episodes of "lost time," during which minor injuries, such as small ecchymoses and abrasions on her arms and legs, occurred.

On presentation to Stanford Psychiatry for hypnosis evaluation, the patient expressed the belief that her adoptive parents' divorce was "her fault" because of the burden of her disability on the family and that subsequent abuse she suffered, as well as the self-mutilation, were forms of punishment for that original misdeed. Notably, her previous admission for left brachial artery laceration and near exsanguination appeared to coincide with a visit to her adoptive father's home 2 months prior to her admission for the knife injuries to her forearms. She could not recall whether any further sexual or physical assaults had taken place at that time in his home, the same environment where her childhood abuse had occurred, although she reported having had distressing flashbacks during the visit.

Two weeks prior to the current admission, she was with a male friend who knew about her dissociative disorder and pressured her to have sexual relations with him. Although she refused, she then "blanked out" and could not recall what happened during the lost time. Subsequently, she ceased having contact with that male friend. Her abuse history was also remarkable for a sexual assault at age 16 by her treating psychiatrist, which the patient felt was also "her fault" and for which she did not pursue any legal action despite the psychiatrist's continued harassment by phone for several years after the incident.

In addition to her dissociative symptoms, the patient experienced several episodes of major depression between ages 28 and 35, for which she underwent a total of 12 electroconvulsive-therapy (ECT) treatments with little amelioration of her symptoms. Prior to the current admission, she had recently been tried on fluoxetine, trazodone, and clonazepam, again without significant improvement. In addition, the patient was

continuing to receive sporadic outpatient psychotherapy for depression from a different therapist than the one who had sexually assaulted her in adolescence. During the hypnosis session at Stanford, she was on no active medications.

Her anorexia nervosa (AN) initially commenced at age 10, coincident with her parents' divorce but appeared to also be related in etiology to the erratic feeding in infancy and early childhood that accompanied the physical abuse she had endured, as well as her sexual abuse. On one of her admissions for ECT treatment of depression at age 28, 7 years prior to the current admission, the patient's AN necessitated feeding by percutaneous gastrostomy tube. On the current admission, the patient tolerated oral intake well, was thin but over 70% of expected body weight and characterized her AN as "in the past." She denied any recent attempt to restrict her caloric intake and denied having the perception that she was obese, despite having carved the words "fat pig" into her skin.

Social and Medical History

On admission, the patient was on full disability, living in an apartment by herself in a small town chosen for its low cost of living and access to services for the blind. She had been raised by her adoptive mother after the divorce until her late teens and stated that this was overall a supportive environment with minimal intrusion by her adoptive father and brother. On successful graduation from high school at age 18, she interned as a dental assistant, planning to train in this field until she made an error in patient care due to her visual deficits and was terminated. She then taught preschool until she became pregnant at age 22 with her son. Following the break-up of her relationship with the child's father, which the patient attributed to his refusal to assume parental responsibilities, she lived on public assistance but continued to volunteer at the local Sunday school and at her son's preschool. Her Social Security Income (SSI) for the blind provided a support network to the patient and assisted her in the care of her son, who remained in the patient's custody throughout his life with occasional support and involvement by the patient's adoptive mother.

In addition to the burn and knife injuries described previously, the patient's medical history was remarkable for right forearm cellulitis secondary to a cat bite 2 years prior to admission, followed by Volkmann's contracture of the medial three digits of her right hand. She had chronic osteomyelitis following puncture of the plantar surface of her right foot with a nail during a dissociative episode 3 years prior to admission. It was unclear to the team that had admitted her for the puncture injury whether this had been self-inflicted or accidental. Her osteomyelitis had required right metatarsal partial amputation. Her neurologic history was characterized by reflex sympathetic dystrophy of the right lower

extremity following her right foot injury, intermittently symptomatic and relieved by nonsteroidal antiinflammatories. She also suffered from classic migraine with visual aura since her pregnancy, well controlled by monthly over-the-counter medications (such as acetaminophen-aspirin-caffeine combinations). The migraines frequently occurred at menses, which had been regular for the year preceding the current admission following the stabilization of the patient's body weight.

The patient had a remote history of substance abuse and current history of tobacco use. She admitted to using LSD and amphetamines in her late teens and had a 20-pack/year smoking history on admission. She denied any use of alcohol or use of other drugs.

Neuropsychiatric and Laboratory Testing

On admission, the patient's routine chemistries, including metabolic panel and complete blood count, were within normal limits as was her urine toxicology. Brain imaging was not available on this admission, although a subsequent follow-up MRI was found to be unremarkable.

Her physical exam was notable only for the bilateral injuries to her arms and intact right metatarsal amputation site. Her fundoscopic exam revealed enlarged, somewhat pallid optic nerves bilaterally. Her neurologic exam revealed pupils fixed at 4 mm bilaterally, intact extra-ocular movements, optokinetic nystagmus to horizontally moving objects, and pendular nystagmus at rest, equal in frequency at all cardinal positions of gaze, with the remainder of her cranial nerve exam normal, her reflexes two-plus symmetric, her strength five out of five and muscle tone also within normal limits. Despite her use of a wheelchair as an inpatient, the patient's gait was unremarkable, with no ataxia, dysmetria, dysdiadochokinesia, dysarthria, or other cerebellar signs, and no resting or intention tremor.

Prior to her hypnosis, while on the inpatient unit, she had been seated near a window reading. A nurse observed that she was holding her reading matter at a much greater distance from her face than would be expected in a legally blind person and reading out loud. The patient spoke with the affect, mannerisms, and vocabulary of a 4-year-old alter personality on being approached by the nurse, who noted that the patient was able to identify people walking below her second-story window and alerted the primary team to her findings. At this encounter, it was also noted that her nystagmus was notably less pronounced, although at the primary team's examination prior to requesting the consultation for hypnosis the patient had returned to baseline more prominent resting nystagmus.

Mental Status Exam

The patient was a pleasant, thin, smiling woman seated in a wheelchair for her hypnosis consultation and subsequent inpatient

psychotherapy. During her evaluation for hypnosis, the patient was alert and oriented to person, time, and place. She showed no pressured speech or flight of ideas. She denied euphoric or agitated states. She denied depressed mood. She had no hallucinations, delusions, or evidence of disordered thoughts. While she had endorsed flashbacks, rapid heart rate, and feelings of dread on visiting her father's house for the holidays, 2 months prior to the current admission, she denied any symptoms of autonomic arousal at the hypnosis evaluation and appeared calm and reflective. Her Folstein Mini-Mental Status Exam results showed no cognitive deficits that would be consistent with a history of head trauma or other organic brain syndrome.

Hypnosis Interview

The patient's hypnotizability was assessed by using the Hypnotic Induction Profile (H. Spiegel & Spiegel, 2004). She was found to be highly hypnotizable, with an initial score of 9 out of 10 and subsequent score of 10 out of 10.

Subsequent hypnotic exploration of her dissociative symptoms was commenced by being figuratively "taken into the closet" and asked to describe what she saw. The patient described four individuals: an infant; an adult woman named "Franny F," who held the infant named "Cynthia"; a brown-haired, 10-year-old girl named "Sarah" whom she noted was "scary looking"; and a blond, "angelic-looking" 4-year-old girl she called "Kimmy." The patient identified these individuals as "different parts" of herself and acquiesced when asked to invite Kimmy to "come out." Speaking as Kimmy, the patient described physical abuse in detail: her father attempting to "flush her down the toilet" and "squeezing [her] ribs real tight so she couldn't breathe." She described playing age appropriate games, such as "bears," identifying an imaginary playmate as "Bill Bear." In response to questioning, she did not know the year, identified "her Daddy" as the president, recognized that "orange" refers to both a color and a fruit and said that she did not yet know how to print her name but that her brother was teaching her.

Notably, when asked to demonstrate her ability to write, the patient used her right hand, although she had used her left hand at baseline and identified herself as "left-handed" in her usual state. Her vision was markedly better than it had been prior to the hypnosis. On the Child's Recognition and Near Point test, she reached 20/60 without difficulty, despite having tested only at 20/200 at baseline.

In addition, her baseline pendular nystagmus remitted with the appearance of the child persona Kimmy, disappearing for the entire 15-minute discussion, until she was asked by the interviewer to "switch and let us talk to Sarah for a few minutes." The patient initially hesitated to speak as Sarah, stating, "She is scared." On being encouraged to do what made her comfortable, the patient then stated in the voice of an

older child, "I'll talk to you. I'm feeling better since Kimmy's my friend now. It was hard for me to give her a hug, it was scary." The patient's 10-year-old alter Sarah described how she had made a promise not to do any more cutting on her body and stated, "It's not their fault, I was bad," about her abusers when asked directly about the events Kimmy had narrated.

Her nystagmus during her discussion as Sarah returned but with a lower frequency and coarser quality than at baseline. In addition, her vision as Sarah was tested by the Child's Recognition and Near Point test as 20/80, still significantly more acute than at baseline.

The patient then was instructed to end the formal hypnosis experience, returning as [her name] without resistance, stating that she felt "safe" and "comfortable." She reported having a complete memory of the events that took place under hypnosis and stated that she "didn't quite understand how Kimmy and Sarah could write with their right hand" when presented with the samples she had produced.

Ten-Year Follow-Up

The patient was contacted 10 years later and once again examined and interviewed in detail. Initially she stated that she had not received any psychiatric treatment since the hypnosis evaluation described above. She expressly denied any episodes of amnesia and expressed her belief that she "read her way out of" her previous problems, including her eating disorder. She also characterized her previous hospital admissions, for self-mutilating injuries, cutting words such as "Fat pig" and "I hate [the patient's name]" into her skin, as "care for [her] accidents." She characterized the puncture wound to her right foot that had resulted in osteomyelitis as an "accident" as well, denying that it had occurred during "lost time" or a dissociative episode.

She appeared to be in no acute distress, with no injuries, and was well nourished. She stated that she was attending college and had nearly completed her BA; in addition, despite her serious psychiatric, medical, family, and financial problems, she had raised her son successfully. He was to be a graduate film studies student, had stable interpersonal relationships with a significant other and academic mentors and continued to offer the patient great emotional and financial support. Indeed he accompanied her to and sat with her during the follow-up psychiatric assessment. The patient initially identified her only current complaint as a chronic pain syndrome of the right lower extremity refractory to extensive management by the Stanford Pain Clinic, including nerve blocks, high outpatient regimens of methadone and other opiates, medications, such as mexelitine, lidocaine patches, and benzodiazepines, and psychosocial support from her family physician at Stanford, with whom she had remained in close contact over the 10 years.

Subsequently the patient spontaneously disclosed several unusual, distressing events in the interim history. The first occurred soon after her discharge from inpatient care 10 years previously: She had attempted to seek help from an outpatient psychotherapist, only to have that therapist disclose her own substance abuse and commit suicide about a year into the patient's treatment. The therapist's suicide coincided with the suicide of two of the patient's close friends. In addition, an ongoing problem with attack dogs raised in her neighborhood led the patient to relocate several times. Two years prior to the follow-up interview, she suffered a serious dog attack that she stated "was all over the media." Third, 5 years prior to follow up, her son was sexually molested by a male cousin. The patient volunteered this information with her son in the room during the interview. She stated that he was sodomized, which he confirmed, and that the rest of the family had failed to respond appropriately. Finally, the patient reported that she had had an episode of intense suicidal ideation 1 year prior to the follow-up appointment, with the plan of severing her left brachial artery as before. She denied having flashbacks, amnesic episodes, or hearing voices at that time. On confiding her suicide plan to her family physician, she was admitted to the hospital for acute psychiatric care. After the interview, medical records and news sources were consulted. Although accounts of a dog attack such as she described in the city where the patient lived could not be found, a fatal dog attack in the same state had been the subject of intense media attention, with the victim having a similar name as the patient, the same general physical description, and the same altercations with her neighbors that the patient claimed. Additionally, the patient's narrative during her inpatient admission characterized her relationship with her son somewhat differently. She had been homeless for several months prior to reporting her suicidal ideation to her family physician due to an argument with her mother and ongoing arguments with her son and his girlfriend, who had repeatedly refused to have the patient move in with them. The patient was argumentative and antagonistic, repeatedly threatened to sue members of her medical team, phoned Patient Services without specific complaints that could be addressed and left the hospital against medical advice before her disposition plan could be completed. She experienced similar conflicts with her Pain Clinic clinicians, demanding that they increase the doses of her pain medications, contracting to accept prescriptions from only one doctor at a time but then subsequently seeking opiates from multiple physicians, and characterizing several of the family physicians' colleagues as "bad," thereby splitting the team.

Remarkably, the patient's physical, neurologic, and mental status examination and hypnosis interview at 10-year follow-up were unchanged. At baseline her vision tested by hand-held Snellen chart

was 20/200. Hypnosis was then induced by reference to "Kimmy" and "Sarah," two of the alters she had manifested in her previous interview. When she spoke as Kimmy, her visual acuity was 20/60 by the same hand-held visual chart that had been used 10 years prior. As Sarah, her acuity was 20/80, as in the previous interview. Her nystagmus was no longer apparent when she spoke as Kimmy and similarly remitted when she spoke as Sarah. In the follow-up hypnosis interview, because of the patient's desire to learn self-hypnosis techniques as a possible tool in controlling her chronic pain syndrome, she was asked to envision her right lower extremity being immersed in warm water (after history had revealed that warmth alleviated the pain more effectively than cold). She experienced a significant abatement of her pain under hypnosis and, on the completion of the formal hypnosis experience, felt refreshed and less fatigued than at baseline.

DISCUSSION

The remission of the nystagmus and marked improvement in visual acuity in this patient with the appearance of her child alters "Kimmy" and "Sarah" was notable, observed by a large audience of psychiatry and medicine residents and reproduced during several video-taped hypnosis sessions as well as seen initially on the ward when the patient spontaneously manifested one of the alters. This finding, along with the improvement of her vision, was also reproduced during subsequent hypnosis sessions with consistent findings of 20/60 for "Kimmy" and 20/80 for "Sarah." The patient's two other alters, "Franny F" and "Cynthia" (the infant) corresponded more closely to her baseline both in visual acuity and in the presence of pendular nystagmus with vision 20-26/200 by hand-held Snellen chart. Changes in the presentation of the nystagmus raise possibilities of unusual dissociative effects on neural processing that may not be as readily dismissed as those suggested by the patient's apparent changes in visual acuity. The differential diagnoses of malingering for the secondary gain of extensive benefits provided to the blind and of somatization were considered, within the context of the patient's borderline personality traits that manifested with greater clarity on follow-up 10 years after the current admission, as discussed below. However, it is not clear how the patient, if malingering, could have caused her nystagmus to present differently with the emergence of different alters. In addition, malingering can involve "voluntary nystagmus," which can rarely be sustained for greater than 20 seconds at a time and can consist of back-to-back saccades or fine, rapid eye movements. Voluntary nystagmus is commonly accompanied by overt discomfort, grimacing, headache and grasping of the head, gait abnormalities, and normal vision, all clues that the apparent nystagmus

has its basis in malingering and all of which were absent in our patient's presentation.

Nystagmus and Conversion Disorder in DID

Conversion symptoms are among the five principal dissociation-related phenomena occurring in DID according to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. [DSM-IV]; American Psychiatric Association, 1994), the others being amnesia, alters, flashbacks, and voices. Two cases of nystagmus as a presentation of conversion disorder, or "hysterical nystagmus," have been reported in the literature (Biard, Godde-Jolly, & Perdriel, 1974; C. H. Smith, Beck, & Mills, 1983). Nystagmus as a manifestation of conversion disorder is associated with sudden, bilateral, reversible visual loss for which no organic cause can be found. The psychosomatic origin of this underlying visual loss can be detected by testing the patient for optokinetic nystagmus, a marker of visual perception in a patient with hysterical blindness. In our patient's case, however, this marker was not diagnostically helpful, as her 20-26/200 vision was compatible with optokinetic nystagmus and the perception of blue, tan, white, and the outlines of large objects that she endorsed at baseline.

To leave conversion disorder aside for the moment and to consider possible neurologic diagnoses, the patient's pendular nystagmus, in which the velocity of the nystagmus is equal in both directions, is most commonly seen as a consequence of congenital blindness. When acquired and presenting in adulthood, demyelinating disease is strongly suspected as the cause, in particular the internuclear ophthalmoplegia associated with multiple sclerosis (Stahl & Leigh, 2001). The time course of the patient's nystagmus, which appeared in infancy and remained consistent throughout her baseline state, does not correspond to such an etiology, although normal neuroimaging and the absence of additional neurologic signs on examination would not be sufficient to rule it out. The nystagmus of internuclear ophthalmoplegia would more likely be asymmetric, as well.

Other types of nystagmus associated with specific etiologies include vestibular and gaze-evoked. The patient denied that vertigo or dizziness had ever accompanied her nystagmus; her gait was normal, without Romberg sign on exam, making a central or peripheral vestibular lesion unlikely. Drug toxicity as a cause of nystagmus was considered in our patient, with her multiple risk factors for substance abuse-trauma history, borderline personality disorder, and chronic pain. Alcohol, sedative-hypnotics, meprobamate, ethchlorvynol, methaqualone, anticonvulsants (such as phenytoin), and hallucinogens (particularly PCP) have all been implicated in both acute and chronic nystagmus (Nakki, Sharp, & Sagar, 1996). Of these causes, phenytoin alone may spare cognitive function while producing nystagmus, whereas with other intoxicants it would produce a confusional state

that was absent from the patient's presentation. Hypomagnesia (associated with severe thiamine deficiency) and lithium intoxication have more rarely been associated with nystagmus (Du Pasquier, Vingerhoets, Safran, & Landis, 1998; Lee & Lessell, 2003) with the patient's history negative for these conditions as well as any other offending agents. Alcoholic or paraneoplastic spinocerebellar degeneration may produce nystagmus over time, with congenital degenerative conditions (like Friedrich's ataxia) also producing this finding (Wessel, Moschner, Wandinger, Kompf, & Heide, 1998). The patient's history was negative for findings consistent with these etiologies, as well as for Wernicke's encephalopathy associated with the chronic thiamine deficiency of alcoholism, with no mammillary body atrophy or hippocampal findings on imaging. Negative blood and urine toxicology screens supported the patient's denial of substance abuse on her multiple hospital admissions for depression, self-mutilation, and suicide attempts. In addition, social services, upon which she was dependent, reported her to be relatively high functioning on unannounced visits and allowed her to continue caring for her son as a single mother with minimal supervision and support. Finally, the patient was not taking gabapentin, a medication known to alleviate the acquired pendular nystagmus of multiple sclerosis (Stahl & Leigh, 2001), during her hypnosis evaluation nor during subsequent follow-up.

Thus, the neurological underpinnings of the observed changes in the patient's nystagmus and visual acuity are not clear. It is known that stress and anxiety may exacerbate neurological symptoms; for example, a patient with multiple sclerosis or Parkinson's Disease having an increase in difficulty walking at the moment of having to get on a bus (Buljevac et al., 2003; Cleesen et al., 2003; A. D. Smith, Castro, & Zigmond, 2002). The hypnosis literature also provides evidence that hypnotically induced alterations in subjective experience such as changes in perceived color vision or pain sensation produce congruent changes in blood flow in the cognate brain sensory-processing regions (De Pascalis, 1999; Faymonville et al., 2000; Hofbauer et al., 2001; Kosslyn et al., 2000; Rainville et al., 1999, 2002; Raz & Shapiro, 2002; D. Spiegel & Jasiukaitis, 1999). Thus, a change in the central nervous system perceptual set may alter perceptual processing and similarly could alter the higher neural management of specific components of motor function, such as the oculomotor nerves in the brainstem. Coordination of such higher neural activity would plausibly involve the frontal lobes (Boon & Draijer, 1993) and the anterior cingulate cortex (ACC; Hoeft et al., 2012; Williams & Goldman-Rakic, 1998), and there is evidence that hypnotizability is strongly correlated with levels of homovanillic acid (a dopamine metabolite) in the cerebrospinal fluid (D. Spiegel & King, 1992). Thus, higher cortical centers involved in inhibition (frontal lobes) and attentional focus (anterior cingulate gyrus) (Posner & Petersen, 1990) are involved in hypnotic alteration

of perception. When using resting state functional magnetic resonance imaging (fMRI), high hypnotizability has been found to be associated with functional connectivity between the left dorsolateral prefrontal cortex and the dorsal ACC (Hoeft et al., 2012). Hypnosis modulates activity in brain structures involved in the regulation of consciousness (Rainville et al., 2002) and may be involved in altering visual motor control and sensory systems. The ameliorating effect of hypnosis in nystagmus may also share neural circuitry with the mechanism of gabapentin in treating this feature of multiple sclerosis, as well as in treating congenital nystagmus associated with leukodystrophy due to peroxisomal assembly disorders. Two theories of action have been proposed for the clinical efficacy of gabapentin in the treatment of nystagmus: GABA-mimetic, anxiolytic actions (Singh et al., 1996), and interaction with cerebral glutamate transmission by antagonism at the NMDA receptor (Bandini, Castello, Mazzella, Mancardi, & Solaro, 2001; Shimoyama, Shimoyama, & Hori, 2000). The implications for the treatment of DID and these neurophysiologic aspects of hypnosis will be explored below.

This patient, with a provisional diagnosis of DID on presentation with acute injuries to an inpatient psychiatry unit, had a complicated trauma history, much of which was supported by the investigations and actions of child welfare agencies on her behalf. The lack of primary information or studies regarding the etiology of her blindness necessitated acceptance of her chart diagnosis of "congenital blindness due to bilateral optic nerve injury," which she had carried through the years along with a lack of information about her biological parents' neuro-ophthalmologic or psychiatric histories. Her history may have included specific injuries that could have accounted for the exam finding of blindness and pendular nystagmus in the absence of other measurable neurologic deficits, although normal neuroimaging in her adulthood lessens this possibility.

Supportive psychotherapy, cognitive behavioral therapy with an emphasis on dialectical behavioral therapy for the higher functioning patient, and adjunctive therapy with anxiolytics and antidepressants have all been utilized in the treatment of DID in past decades (Kluft, 1999). Individual psychotherapy facilitated by hypnosis, however, remains the mainstay of outpatient treatment endorsed by most psychiatrists working with DID patients (Coons et al., 1989; Maldonado, Butler, & Spiegel, 2002; Maldonado, Page, et al., 2002). The rationale of hypnosis for DID has been that it allows for "controlled dissociation" (Frankel, 1996; Maldonado & Spiegel 1998; H. Spiegel & Spiegel, 2004). Thus, it allows for the patient to access distressing memories in a safe space, with the therapist as audience and gentle interlocutor in partial reenactments by the patient that permit greater insight and, eventually, greater control over everyday behavior.

Ego-state therapy coupled with hypnosis has been shown to be effective for treating trauma-related disorders (Barabasz, Barabasz, Christensen, French, & Watkins, 2013; Christensen, Barabasz, & Barabasz, 2013). The theory underlying this approach involves the idea that trauma-related memories as associated with strong affect that make them less accessible to normal cognitive control (Barabasz, Barabasz, & Watkins, 2011). Indeed, their escape from conscious control is even more problematic in the more extreme forms of dissociative disorders and in other trauma-related disorders, such as the new dissociative subtype of PTSD in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed. [DSM-5]; American Psychiatric Association, 2013), which will include full PTSD symptoms plus depersonalization and/or derealization (Ginzburg et al., 2006; Lanius, Brand, Vermetten, Frewen, & Spiegel, 2012; Lanius et al., 2010; Stein et al., 2013). The therapeutic concept is that accessing disparate states of consciousness, identity, and memory associated with traumatic experience clarifies our understanding of the effective treatment of dissociation.

Given the psycho-physiological changes present in DID, along with the finding of chronic pain in our patient, an additional role for hypnosis in the treatment of DID might be considered. Through hypnosis, suggestions might be made to the patient that an alter with better visual acuity "help" the patient in his or her daily functioning. In light of the high hypnotizability scores of DID, PTSD, and other patients with anxiety disorders (Koopman et al., 2001; D. Spiegel, Hunt, & Dondershine, 1988), hypnosis could be considered a first-line adjunctive therapy in pain management as well as in the building of the patient-physician relationship, which was clearly a challenging enterprise for our patient and her numerous treating physicians. Baseline as well as follow-up exams would be required to document the efficacy of this approach in the treatment of DID patients with fluctuating oculomotor or other symptoms, and further data are required to elucidate the precise relationship between such presentations and conversion disorder. However, the increasing clinical acceptance of hypnosis as an integrative medicine modality bodes well for its use with DID patients not only in the classic psychotherapy context but in the setting of pseudo-neurologic as well as neurologic symptoms (such as pain) that differ between alters.

Thus, this patient with a partially treated dissociative disorder continued to have neurological symptoms that could not be explained by conscious effort or malingering and that appeared variable in different dissociative states, controllable through hypnosis but not fully controlled clinically. Her dissociated control of her pendular nystagmus went beyond what could be expected through attempts at voluntary control over eye movement, and yet she did not experience full control over the symptom. One of the ongoing difficulties in both

understanding and treating dissociative disorders is the ambiguous role of volition in dissociative symptoms. Dissociative amnesia, for example, is by definition reversible (there must be a memory there for it to be reversibly forgotten), yet access to the memory must be sufficiently difficult that the phenomenology of amnesia is present (Butler & Spiegel, 1997; D. Spiegel, 1998, 2003; van der Hart, 2001). Similarly, these neurological symptoms were to some extent controllable yet clinically uncontrolled, suggesting the existence of alternate pathways of neural control over eye movement and visual acuity that were activated in different dissociative states, perhaps involving frontal and anterior cingulate pathways (Anderson et al., 2004; Crawford, Gur, Skolnick, Gur, & Benson, 1993; Hoeft et al., 2012). This clinical evidence coupled with ERP and brain-imaging data (Barabasz et al., 1999; Jensen et al., 2001; Kosslyn et al., 2000) suggests that alternative neural network patterns (D. Spiegel & Li, 1997) may coexist and be selectively utilized via hypnosis or spontaneous dissociative changes.

Whereas research on the possible neural correlates of DID is emerging and riddled with controversies (Reinders, 2008), the growing literature on defined neurocircuitry abnormalities in borderline personality disorder and complex PTSD cases suggests that the biology of dissociation may be further explained in ongoing studies (Brendel, Stern, & Silbersweig, 2005). In addition, cortical visual processing and trauma-related dissociation may share structural similarities as biological systems utilizing parallel neural networks (Manning & Manning, 2009). This analogy may point the way for future studies of how dissociation might affect visual system development and functional disorders such as those observed in our reported case. It suggests that the fragmentation of identity may be subserved by a lack of integration of neural networks controlling eye movement and vision, an eye for an I.

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Ein Auge für ein I : Eine 35jährige Frau mit fluktuierenden okulomotorischen Defiziten und Dissoziativer Identitätsstörung

Chaya Bhuvaneswar und David Spiegel

Abstrakt: Physiologische Veränderungen, einschließlich neurologischer oder pseudo-neurologischer Symptome, treten in allen Identitätsstadien einer

Dissoziativen Identitätsstörung (DIS) auf und können objektiv gemessen werden. Die Idee, daß dissoziative Phänomene mit Veränderungen der Gehirnfunktion assoziiert sind, stimmt mit der Erforschung der Wirkung von Hypnose auf das Gehirn überein. Die Autoren berichten den Fall psychophysiologischer Unterschiede zwischen 4 verschiedenen Persönlichkeiten, die bei einer 35jährigen Frau mit DIS auftraten. Bei dieser Patientin wurden die Unterschiede in Sehschärfe, Frequenz eines pendelnden Nystagmus und die Händigkeit sowohl während des spontanen Erscheinens der alter-Egos als auch wenn sie durch Hypnose hervorgerufen waren, beobachtet. Die Autoren erwägen mehrere diagnostische Möglichkeiten bezüglich dieser Resultate und diskutieren, ob die vorherrschenden Therapieempfehlungen für DIS-Patienten unter Umständen so modifiziert werden könnten, daß solche visuellen und neurologischen Symptome verbessert werden könnten.

STEPHANIE REIGEL, MD

Le cas d'une femme de 35 ans atteinte de déficit oculomoteur cyclique et de trouble dissociatif de l'identité

Chaya Bhuvaneswar et David Spiegel

Résumé: Dans le cas d'un trouble dissociatif de l'identité, des changements physiologiques, y compris des symptômes neurologiques ou pseudo-neurologiques, se produisent dans divers états identitaires et peuvent être mesurés objectivement. L'hypothèse selon laquelle des phénomènes dissociatifs peuvent être liés à des changements dans la fonction cérébrale concorde avec les conclusions d'études de recherche portant sur les effets de l'hypnose sur le cerveau. Les auteurs signalent le cas de différences psychophysiologiques parmi quatre occurrences d'altération de personnalité manifestées par une femme de 35 ans atteinte du trouble dissociatif de l'identité. Des différences d'acuité visuelle, de fréquence du nystagmus pendulaire et de la chiralité ont été observées chez cette patiente durant l'apparition, tant spontanée que suscitée par l'hypnose, de ses autres personnalités. Les auteurs envisagent plusieurs possibilités de diagnostic pour ces résultats, et se demandent si les recommandations actuelles de traitement des patients atteints du trouble dissociatif de l'identité pourraient être modifiées afin d'améliorer ces symptômes visuels et neurologiques.

JOHANNE REYNAULT

Tr. (STIBC)

El ojo y el yo: Una mujer de 35 años de edad con déficits oculomotores fluctuantes y trastorno de identidad disociativo

Chaya Bhuvaneswar y David Spiegel

Resumen: Cambios fisiológicos, incluyendo síntomas neurológicos y pseudo-neurológicos, ocurren entre estados de identidad en el trastorno de identidad disociativo (TID) y pueden ser medidos objetivamente. La idea de una posible asociación entre fenómenos disociativos y cambios en el funcionamiento del cerebro es consistente con la investigación sobre los efectos de la hipnosis en el cerebro. Los autores reportan un caso de diferencias psicofisiológicas

entre 4 personalidades manifestadas por una mujer de 35 años de edad con TID. Se observaron diferencias en agudeza visual, frecuencia de nistagmus pendular, y lateralidad cuando las personalidades alternas aparecían espontáneamente y cuando se inducían bajo hipnosis. Los autores consideran varios posibles diagnósticos para estos resultados y discuten si las recomendaciones predominantes para el tratamiento de pacientes con TID pudiesen modificarse para mejorar estos síntomas visuales y neurológicos.

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