The use of hypnosis in the treatment of children and adolescents with dissociative disorders has been advocated by many with clinical experience in this area. It should be noted that, although abundant clinical experience and opinion exist to support this application, therapeutic efficacy has not yet been established in controlled clinical trials. As is so often the case under such circumstances, clinicians would do well to consider applying therapeutic strategies reported effective by those with considerable experience in the field, while awaiting more definitive validation. In this spirit, we review some of the history of, rationale for, and techniques of application of hypnosis in the treatment of children with dissociative disorders.

HISTORICAL CONSIDERATIONS

Since its introduction to modern medicine by 18th-century Austrian physician Franz Anton Mesmer, hypnosis has had difficulty escaping the shamanistic shadow cast on it by the conceptual misformulation of animal magnetism as its psychobiologic mechanism. It was not until Jean-Martin Charcot’s luminous tenure at the Salpetriere in 19th-century Paris that hypnosis was taken seriously by the medical establishment.
as an effective treatment. Charcot's student Pierre Janet wrote *L'Automatisme Psychogique* in 1889; it was in this doctoral thesis that Janet advocated the use of abreaction and age-regression hypnotherapy for the treatment of dissociative sequelae of forgotten traumas. 12, 44, 46, 47

Janet viewed dissociation as a response to trauma in which there is a disorder of memory that interferes with effective action. The failure to abreact and master the traumatic experience leads, in Janet's view, to dissociation from the traumatic memories and their expression as fragmentary reliving experiences. Janet suggested that the traumatized individual becomes attached to the trauma and therefore is arrested in personality development. The uncovering of traumatic memories, facilitated by hypnosis, was viewed as an essential ingredient of recovery from dissociative disorders.

Freud was initially significantly influenced by Janet's belief that dissociative symptoms were the results of actual early trauma, usually sexual, that had been long forgotten. 45 Freud later abandoned this seduction theory in favor of the notion of the repressed oedipal conflict. Actual sexual trauma was not necessary, as repression of an instincual wish for the sexual conquest of the parent of the opposite sex sufficed in this formulation to result in hysteria. Freud restated Janet's notion of attachment to the trauma as repetition compulsion, which was viewed as a function of repression. Freud did not emphasize a link between repression and dissociation in the genesis of hysteria, although this point has been elaborated by Nemiah. 27 Freud early on abandoned the use of hypnosis in favor of the more gradual and time-consuming psychoanalytic method. At least part of this change was related to early concerns regarding sexualization of the transference. 8 In subsequent years, however, Freud became more comfortable with the prospect of a more active role for the psychotherapist, as he foresaw that public health needs would reanimate a role for the psychodynamically informed use of hypnosis. This would allow more widespread therapeutic applications of psychoanalytic insights than the protracted and expensive method of psychoanalysis could permit. 9

Contemporary research has led to the recognition that the sexual abuse of children and adolescents is a much greater public health problem than Freud realized. 13, 18, 32 Although actual childhood trauma and intrapsychic conflict regarding forbidden oedipal wishes or other matters each may contribute independently to childhood psychopathology, the contemporary clinician is best advised to assess each clinical case with a primary focus on available and appropriately elicitable data, rather than relying on ideologically based preconceptions. Furthermore, an appreciation of the important role of dissociation in the phenomenology of somatoform disorders, the current repository of hysteria, enables the clinician to formulate a rational basis for the application of hypnosis in these disorders.

Putnam 31 has outlined some of the historical issues associated with the decline of interest in multiple personality disorder (MPD) and other dissociative disorders during the early to mid-20th century, followed by a renewed interest in the 1970s and 1980s. This culminated in the inclusion of MPD and other dissociative disorders in DSM-III. 1 Concomitantly, a renewed interest in the systematic study of hypnosis provided a parallel track for the exploration of dissociative phenomena in both adults 18, 41 and children. 28, 49

DSM-IV 2 categorizes five disorders formally under the rubric of dissociative disorders: dissociative amnesia, dissociative fugue, dissociative identity disorder (DID; formerly MPD), depersonalization disorder, and dissociative disorder not otherwise specified. (The phenomenology of these disorders is further addressed elsewhere in this issue.) Acute stress disorder (ASD) and post-traumatic stress disorder (PTSD) are classified under the anxiety disorders, although their symptom profiles are strongly dissociative. Finally, somatoform disorders, also inherently dissociative, are categorized separately to emphasize the necessity of considering a careful medical-neurologic differential diagnosis. Despite the disparate groups in the formal nosology, it can be said reasonably that these disorders all present substantial dissociative phenomena. Hypnosis has been used with clinically reported benefits in the treatment of children in all of the general categories of dissociative disorders. 20, 28, 30

**RATIONALE FOR USING HYPNOSIS IN CHILDREN WITH DISSOCIATIVE DISORDERS**

Most experts in the formal study of hypnosis and its clinical applications concur in viewing hypnosis as a structured dissociative experience. Thus, Spiegel 48 defines hypnosis as a "state of intensely focused concentration, with a relative suspension of peripheral awareness." He describes hypnosis as having three essential components—absorption, dissociation, and suggestibility. Absorption denotes the characteristic state of attentive, receptive focal concentration that is essential to hypnosis. Dissociation denotes the relative suspension of peripheral awareness that is a by-product of absorption. Inherent in this process, less emotionally invested perceptions, which would ordinarily be part of consciousness, become split off and repressed during the trance experience. Suggestibility denotes the tendency to accept instructions uncritically in trance, a reflection of the receptive, trusting rapport that is another key feature of hypnosis.

How do these features of hypnosis relate to the pathologic dissociative symptoms that so often characterize children and adolescents who have been traumatized? In this regard, delineation of the continuities and discontinuities between normal and pathologic dissociation is important.

Both clinical experience and experimental studies 20 indicate that children normally exhibit significantly more dissociative behavior than adults and are more hypnotizable. Hilgard 16 observed that one of the factors in childhood associated with later high hypnotizability in college students was a history of punishment in childhood that was uncorre-
HYPNOSIS IN DID/MPD

Other articles in this issue review the substantial data delineating
the traumatic precipitants of DID/MPD and the initially adaptive role
of dissociation in mitigating overwhelming trauma during childhood
physical and sexual abuse. The most compelling contemporary model
of DID/MPD is based on evidence that repeated childhood trauma
enhances normal dissociative capacities, which in turn provide the basis
for the creation and elaboration of alternate personality states over time.

The use of hypnosis with DID/MPD patients should always be

construed as a therapeutic adjunct and never as a sufficient treatment
by itself. Hence, the clinician will need to be versed in overall treatment
strategies for such patients, as outlined in other articles in this issue
before considering application of hypnosis. Noting this, it can be said
reasonably that there is no convincing evidence that appropriate clinical
use of hypnosis iatrogenically engenders DID/MPD symptoms. Furthermore, a consensus exists among experienced clinicians and research-ers in the field that hypnosis is a valuable therapeutic adjunct in working
with these patients.

Presuming that one has established a therapeutic rapport with the
child and family, the probability of a diagnosis of DID/MPD, and the
abuse is not ongoing, one is in a position to consider applications of
hypnosis. Diagnostically, a significant advantage of hypnosis is its capac-
ity, in the hands of a benevolently perceived therapist, to diminish
the host personality's suppression of other alternates, allowing their
emergence. If there is any reason to believe, however, that legal proceed-
ings may be necessary, it is wise to document clearly what has been
discovered prior to hypnosis and to videotape the hypnotic assessment.

The admissibility of hypnotically retrieved information varies widely
among jurisdictions. Also, one must be cautious in interpreting clinical
data, elicited with or without hypnosis, and look for independent corre-
ation of reports pointing to child abuse.

Tactically, recommendations regarding initial therapeutic uses of
hypnosis in DID/MPD focus on the cognitive benefits of identifyin:
trance capacity and the ability then to generate benign trance
"relaxation" experiences. These have the effect of enhancing the patient's
comfort as well as the therapeutic rapport. In children, particularly
those involving assertiveness or confronting frightening situations.
With adolescents, direct suggestion with a cognitive emphasis may be most effective; with
younger children, identification with a culturally sanctioned superhe-
ror, such as using evocative play therapy, can be helpful.

One of the most valued applications of hypnosis in adult patient
with DID/MPD is to penetrate amnestic barriers for the purposes of
contacting alternates and abreacting past traumas.31 These two tasks
appropriately are viewed as essential for both diagnostic clarification
and eventual therapeutic integration. In children, versatility in hypnoti-
metaphor, such as using evocative play therapy, can be helpful.24 It is
important to note that following an abreaction, the therapist needs to
help the patient "restructure" the experience by supportively identifying
residual affects and doing some preliminary processing of the material.
In this context, focusing the child's attention on something constructiv-
that the child had done to protect himself or herself or a sibling in an abuse situation can help vitiate the feelings of terror, powerlessness, and demoralization that otherwise can be the overwhelming residue of an unstructured abreaction.

Because immature, helpless alternates are often evident in child DID/MPD patients, hypnosis-facilitated age-progression fantasies, usually involving imagery, can often be helpful in implicitly suggesting and progressively fostering integration. Previously disparate personalities begin to feel more alike and are encouraged to communicate, reconcile, and eventually integrate.19,20

Case Illustration. Carla, a 12-year-old girl of Caribbean family background, was referred to a child psychiatry outpatient department because of episodic strange behavior of several months' duration. She had been evaluated by the pediatric neurology service because of apparent altered states of consciousness. Repeated neurologic evaluations, including repeated electroencephalogram studies, failed to substantiate a diagnosis of seizure disorder. Careful review of the history clarified that the altered states of consciousness involved voice modulation, with varying speech content and body language, sometimes aggressive and violent (subsequently clarified to represent the Devil) and sometimes regressive and suggestive of a much younger child.

The father, who declined to participate in the psychiatric evaluation, was reportedly a strong believer in voodoo and reportedly had erratic behavior. The mother, whose brother reportedly had a history of epilepsy, became convinced that both Carla and Carla's younger brother, age 7 years, had epilepsy as well. Mother became very invested in substantiating this diagnosis and securing a disability status for both children. A1 mother, outlining the reasons why a dissociative disorder plausibly accounted for the presenting symptoms and epilepsy did not. He then explained that hypnosis could be a helpful added diagnostic and treatment resource when integrated with ongoing individual and family psychotherapy. This supportive explanation was then reviewed with Carla, who, on subsequent formal assessment, proved to be highly hypnotizable. Hypnosis was used in the context of ongoing psychotherapeutic endeavor to recreate the dissociative symptoms in a controlled, therapeutic environment and to help Carla see that she could terminate these symptoms with a structured strategy suggested to her by the therapist. This strategy included visualizing God, embodied as a warrior, helping her to fight off the Devil, who had frequently appeared and frightened her during the violent dissociative episodes, sometimes speaking through her in an altered voice. An associated dialectic formula was recorded on audiotape for Carla to use as a reinforcing self-hypnosis exercise between sessions. This dialectic formula read

1. Frightened feelings can build up inside a person and create a picture of the Devil.
2. By getting help to understand and overcome these feelings, I can get rid of the Devil and I can feel better.

Concomitantly, psychotherapy sessions addressed the fact that the metaphor of the Devil represented intense, angry feelings, which needed to be acknowledged and addressed. Acknowledging and encouraging more appropriate expression of anger made progressively less necessary the alternate forms of passive submission/repression, replaced at intervals with explosive, satanic rage.

Similar supportive imagery and verbal structuring was used in taped hypnosis exercises to help integrate the regressed alternate, "baby Carla." A major focus was placed on enabling Carla to gradually become able to discuss more directly in sessions a variety of feelings, but particularly fear and anger, that she had previously been repressed and shunted into dissociative symptoms. Concomitant ongoing counseling of Mother and family-therapy efforts were geared to address both the reported abusive pattern of interaction at home and the misguided pursuit by the mother of a disability status for her children. As psychotherapy efforts were pursued on all these fronts, Carla's symptoms were abated, permitting discharge from the hospital after 6 weeks. Weekly individual and family sessions were continued on an outpatient basis, and the dissociative symptoms subsided completely over a period of 6 months.

HYPNOSIS IN ASD AND PTSD

It is clear that only a minority of traumatized children proceed to develop a full-blown DID/MPD. It appears that a larger proportion of children experience earlier-onset dissociative and anxiety symptoms, characterized in DSM-IV2 as either ASD (lasting 2 days to 4 weeks) or PTSS (lasting more than a month). The inclusion of PTSD with its designated criteria in DSM-III1 prompted an increased interest among child psychiatrists in this area.4 Terr described four characteristics common to all traumatized children:

- Strongly visualized memories or perceived memories
- Repetitive behaviors
- Trauma-specific fears
- Changed attitudes about people, aspects of life, and the future

She proceeded to distinguish between two types of traumas. Type I traumatic conditions (single-blow traumas) have characteristic symptoms including full, detailed memories; preoccupation with omens; and misperceptions. Type II traumatic conditions (repeated or long-standing traumas) have characteristic symptoms including denial and psychic numbing, dissociative symptoms, and rage. These formulations appear to have been influential in the formulation of the DSM-IV categories of ASD and PTSD.

Friedrich has outlined considerations and strategies regarding the therapeutic use of hypnosis with traumatized children. Applications of hypnosis to address cognitive, affective, and behavioral consequences of trauma include

Symptom stabilization and removal. This can be facilitated by teaching self-hypnosis for use as a relaxation exercise at times of distress or agitation. Stabilizing overt symptoms helps the child
develop a sense of greater control over the trauma and its aftermath. 35

Uncovering or abreacting. Under the protective rubric of a therapeutically induced trance, the child can be led through a symbolic reworking of the traumatic event or events, with a subsequent more direct revivification if necessary. Age regression may be a helpful technique in this regard. 21 As with DID/MPD, the therapist must be sensitive to the potential for retraumatization from proceeding prematurely or too aggressively. Hence, there is potential value for coupling the uncovered material with protective imagery and offering suggestions that allow for temporary amnesia, which can be dispelled gradually at a pace the child can tolerate. Suggestions about the capacity of the therapeutic relationship to foster greater self-protective efficacy in the patient can further mitigate the need for unwarranted reliance on maladaptive dissociative symptoms.

Reintegration at a more healthy developmental level. Insofar as cognitive, affective, and behavioral symptoms in the traumatized child are viewed as regressions in the face of overwhelming stress, working through the traumatic material in the manner described previously allows the child to relinquish symptomatic regression as he or she feels more secure about coping in a developmentally more appropriate manner. 40 For example, the child may utilize trance as a way of identifying with idealized self-representations whom the therapist presents as overcoming adversity with metaphorically depicted therapeutic intervention and eventually achieving restitution to full functioning.

Case Illustration. Sam was the 13-year-old son of divorced, immigrant parents, living in an urban ghetto with his mother and younger sister. He was brought by his mother to the emergency room with a history of persistent headaches, nightmares, and daytime “flashbacks” after having been shot in the face by a male “friend” 2 years previously. There was no discernable precipitant of the attack, although this friend had a history of physical attacks against the patient and others in the past. Sam permanently lost vision in his left eye as a result of the wound and began experiencing in both daytime and nighttime recurring images of the attack that would disrupt his ability to concentrate in class or to sleep at night. His mother did not press charges against the perpetrator for fear of retribution from his family, leaving Sam with a great residue of rage as well as a continuing fear and sense of vulnerability regarding the minimally punished grave trauma that had been inflicted upon him. The symptoms noted, coupled with those of anxiety, depression, and social withdrawal, led to a diagnosis of chronic-type PTSD.

After several psychotherapy sessions geared to history-taking, clarifying the diagnosis, and establishing a therapeutic rapport, a treatment plan was outlined to Sam and his mother. This included, first, the use of clonazepam to improve sleep and attenuate the anxiety-symptom component of the PTSD syndrome. Second, a format of ongoing psychotherapy was recommended involving both Sam and his mother, to deal with the unresolved psychological residue of Sam’s trauma, with adjunctive use of hypnosis. Psychotherapy actively but supportively addressed the issues noted previously, as well as Sam’s previously unaddressed grief reaction to the loss of binocular visual capacity essential to his prior fantasies of becoming a baseball or basketball star. Hypnosis was used initially to illustrate the dissociative phenomenon inherent in the “flashback” experience. The suggestion then was made that the patient could, by using self-hypnosis, learn to control this dissociative phenomenon, diminishing or preventing its spontaneous, disruptive emergence during school or sleep, by restricting it to controlled review either in therapy sessions or in regular, home-based self-hypnosis sessions. Sam was taught a “split-screen” technique for processing and controlling dissociative phenomena: In the hypnotic trance state, he focused first on the “left” screen in his mind, on which he visualized the painful memories of the past trauma, acknowledging both his rage about what happened and the need to take precautions in evaluating prospective new friends or social situations. He was then encouraged to shift to the “right” screen in his mind, on which he visualized a pleasant, relaxing vacation scene in a secure setting, which he could share with friends who had earned his trust by demonstrated sensitive and considerate behavior. The hypnosis exercise was integrated with psychotherapy geared to strengthen Sam’s confidence in his ability to make appropriately self-protective judgements in social situations and to find satisfying and achievable goals despite a circumscribed and limiting but not disabling visual deficit.

Sam and his mother reported that with the initiation of treatment, both sleep and daytime school functioning improved considerably, with diminished frequency of nightmares, headaches, and daytime “flashbacks.” The patient’s and mother’s apprehensions regarding “drug dependence” led to discontinuation of clonazepam within 1 to 2 weeks, but symptom attenuation has continued over several months with continued supportive psychotherapy and adjunctive use of self-hypnosis.

SOMATOFORM DISORDERS

As noted earlier in this article, consideration of the phenomenology of somatoform disorders discloses a significant dissociative component. 51 This is exemplified by the curious phenomenon of a conversion paralysis that involves intact innervation of the voluntary musculature but is, by definition, not under the conscious, voluntary control of the patient. This presents a conceptual paradox that is best understood in the framework of dissociation. There are many other significant etiologic considerations relevant to an adequate understanding of the child with a somatoform disorder, including psychodynamic conflicts, dependency needs, environmental stresses, symptoms as nonverbal communication, the role of depression, and neurophysiologic predisposition. Nevertheless, the recognition that dissociation is an essential ingredient in the symptom formation of somatoform disorders makes hypnosis a valuable therapeutic resource.

By demonstrating in a routine hypnotic induction experience how an environmental influence (the therapist) can generate the altered perceptions inherent in the trance experience, the frequently difficult con-
ceptual formulation for patients of how psychological phenomena can generate physical symptoms becomes more plausible. With the help of the ceremony of hypnosis, the patient and family can come to appreciate how dissociation, as a manageable psychological attribute, can be channeled therapeutically in the service of symptom alleviation.49

Admonitions sometimes expressed against the use of hypnosis with such youngsters by clinicians uncomfortable with its use are based on the erroneous assumption that hypnosis necessarily involves the simplistic and heavy-handed use of authoritarian suggestion, without generating insight and more adaptive coping strategies in the patient. Enlightened clinical use of hypnosis in youngsters with somatoform disorders, however, emphasizes the need for a thorough initial diagnostic evaluation and for establishing an effective therapeutic rapport with the patient and family, as well as the integration of hypnosis with other modalities, including both individual and family psychotherapy, behavior modification strategies to deal with secondary gain, and psychopharmacotherapy when indicated.49,50

It is noteworthy that in describing the clinical phenomenology of child and adolescent dissociative disorders, Hornstein and Putnam17 list somatoform symptoms as four of the seven items defining the "dissociative symptoms" factor that characterizes these disorders. It is not possible from the data presented in their report to discern what portion of their patient sample manifested these four symptoms (involuntary movements, conversion symptoms, fluctuating somatic complaints, and pseudoseizures), but it seems reasonable to postulate that somatoform symptoms are a frequently presenting clinical component in youngsters with DSM-IV-defined dissociative disorders.

From another perspective, clinical studies that have focused either on specific somatoform disorders, such as psychogenic seizures,51 and psychogenic movement disorders,52 or on broader-spectrum surveys of somatization disorders53 have found substantial comorbidity rates, including high incidences of trauma and particularly histories of physical and sexual abuse.

It thus seems reasonable not only to view somatoform disorders phenomenologically as part of the spectrum of dissociative disorders, but also to use hypnosis as part of the spectrum of therapeutic interventions appropriate for treating children with these disorders. Further studies are clearly needed to refine our knowledge regarding both treatment specificity and efficacy.

Case Illustration. Bob, an 11-year-old boy of Indian descent, was transferred to the pediatric neurology service of our medical center from another hospital because of worsening headaches over a 6-day period, blurred vision of 3 days' duration, and the associated emergence of abnormal movements. The latter were noted to be at times quick and jerking or writhing in nature, which raised the suspicion of myoclonus or chorea, and at times rhythmic and continuous, suggestive of a coarse tremor. The abnormal movements were diminished when Bob was engrossed in conversation, increased with worsening complaints of pain, and absent in sleep. A neurologic work-up included spinal tap, electroencephalogram, computed-tomography scan, magnetic resonance imaging, and a variety of routine and special laboratory studies, all of which were within normal limits.

Psychiatric consultation was requested to evaluate possible psychogenic factors contributing to a highly atypical clinical picture, not clearly suggestive of a neurologic disorder. Interviews of the patient and parents disclosed no prior personal or family psychiatric history. Bob previously had been an "A" student, enrolled in several enrichment classes. He was noted to have an internalizing temperament, with high expectation of himself both academically and interpersonally. Recent stresses included the death of his favorite aunt from breast cancer and the return of his mother from a trip to India, ill with malaria. The evaluating psychiatrist noted that Bob's abnormal movements, as observed in the hospital, had similarities to shaking chills that Bob had clearly observed during his mother's recent illness.

A psychodynamic formulation was discussed first with the parents and then with Bob, to help explore the diagnostic impression of a conversion disorder involving Bob. This formulation included Bob's unconscious affiliation with his mother's symptoms in reaction to a variety of accumulated stresses. These stresses included anxiety and fear regarding illness and death of close relatives and associated concern regarding his own vulnerability in this regard. Furthermore, pressures from parents for high academic achievement, coupled with a lack of adequate outlets for expression of distress or disagreement with parental imperatives, predisposed Bob to the development of unconsciously based conversion symptoms.

A multimodal treatment program was started in the hospital, including alprazolam, 0.25 mg twice daily and 0.5 mg at bedtime for symptoms of anxiety, depression, and insomnia; physical therapy to encourage ambulation, because Bob had been bed-bound; and hypnosis as an adjunctive aid in helping Bob to better understand and overcome the psychodynamic issues contributing to his apparent conversion symptoms. Bob was a good hypnotic subject and was offered the following dialectic to review as part of a self-hypnosis exercise:

1. Worried feelings can cause tension.
2. Tension can bring on physical symptoms.
3. By relaxing this way, I can reduce the tension and help overcome the symptoms.

Within 6 days, Bob was sufficiently improved, with diminished headaches, markedly less abnormal movements, and independent ambulation, that he could be discharged from the hospital for return to home and school with follow-up outpatient psychotherapy. Within 2 months, the headaches and movement symptoms had fully cleared; ambulation was normal and school attendance regular. Medication, the patient's use of self-hypnosis, and family-oriented psychotherapy all were tapered over the next 2 months and discontinued as Bob continued to remain symptom-free.

SUMMARY

Hypnosis can be a valuable tool in the treatment of children with dissociative disorders, by virtue of its capacity to bridge the sometimes-gaping chasm between normal and pathologic dissociative experience.
The vast majority of normal children are hypnotizable, reflecting a dissociative capacity that is a relatively stable part of their psychological repertoire. Numerous studies support the contention that dissociative disorders represent a chronic and maladaptive overutilization of this dissociative capacity in response to overwhelming life stresses, particularly those occurring in childhood. The technique of hypnosis, as part of a comprehensive treatment plan, can provide a powerful resource in helping the patient to understand and reverse the process of dissociative-symptom formation. The effectiveness of hypnosis in such a venture depends on several variables, including the severity and chronicity of pathogenic environmental stressors, the capacities of the patient and family to respond to therapeutic interventions, and the skill of the clinician in integrating hypnosis with other elements of an effective treatment plan.

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OVERVIEW OF COGNITIVE SCIENCE

The cognitive sciences offer insights into the functioning of the human mind and brain that can help inform an understanding of dissociation. This perspective can expand the capacity of clinicians to evaluate and treat individuals with dissociative disorders. This article provides an introduction to relevant cognitive-science concepts and their clinical applications.

Cognition and Mental Models

The brain is composed of billions of neurons interconnected by trillions of synapses. Activation of patterns of neurons, or a neural net, is the basic activity of the brain. Further, the brain is capable of multiple parallel processes occurring simultaneously, many of which are out of conscious, general awareness. Infinite combinations of neural-network activations form the basis of cognitive processes. Thus, phenomena such as thinking, remembering, feeling, seeing, self-reflection, and speaking are all forms of cognition that are products of neural net activations. Cognition is a term applied to the processes that occur between "input" and "output" in the standard information processing model. Thus, concepts such as imaging, attention, memory (short, working, long-term), thought, generalization, differentiation (noting sim-