The *DSM-III-R* Impulse Control Disorders Not Elsewhere Classified: Clinical Characteristics and Relationship to Other Psychiatric Disorders

Susan L. McElroy, M.D., James I. Hudson, M.D., Harrison G. Pope, Jr., M.D., Paul E. Keck, Jr., M.D., and Harlyn G. Aizley, M.Ed.

Objective: *The authors reviewed available studies of* DSM-III-R *impulse control disorders not elsewhere classified in order to determine the relationship of these disorders to one another and to other psychiatric disorders.* *Method:* *The review focused on the demographic and clinical characteristics, phenomenology, family history, biology, and response to treatment of individuals with intermittent explosive disorder, kleptomania, pathological gambling, pyromania, and trichotillomania. Analysis was restricted to reports which either indicated use of operational diagnostic criteria or provided descriptions of the impulsive behavior detailed enough that patients could be judged as probably meeting the* DSM-III-R *criteria.* *Results:* *Although different impulse control disorders have different sex ratios, all have similar ages at onset and courses. Studies on phenomenology, family history, and response to treatment suggest that intermittent explosive disorder, kleptomania, pathological gambling, pyromania, and trichotillomania may be related to mood disorders, alcohol and psychoactive substance abuse, and anxiety disorders (especially obsessive-compulsive disorder). Biological studies indicate that intermittent explosive disorder and pyromania may share serotonergic abnormalities similar to those reported in mood disorders.* *Conclusions:* *The impulse control disorders not elsewhere classified appear to be related to one another and to mood, anxiety, and psychoactive substance use disorders. Thus, like major depression, obsessive-compulsive disorder, panic disorder, bulimia nervosa, and attention deficit hyperactivity disorder, they may represent forms of "affective spectrum disorder."*
(Am J Psychiatry 1992; 149:318–327)

Impulse control disorders are broadly defined as mental disorders characterized by irresistible impulses to perform harmful acts (1–4). In *DSM-III-R*, impulse control disorders are defined by three essential features: 1) failure to resist an impulse, drive, or temptation to perform some act that is harmful to the person or others, 2) an increasing sense of tension or arousal before committing the act, and 3) an experience of pleasure, gratification, or release at the time the act is committed. In addition, there may or may not be conscious resistance to the impulse, the act may be or may not be premeditated or planned, and immediately after the act there may or may not be genuine regret, self-reproach, or guilt (*DSM-III-R*, p. 321). Thus, the behaviors can be ego-syntonic and/or ego-dystonic.

Despite this elaborate definition, *DSM-III-R* does not have a formal category for impulse control disorders. Rather, it has a category termed "impulse control disorders not elsewhere classified," which includes intermittent explosive disorder, kleptomania, pathological gambling, pyromania, trichotillomania, and impulse control disorder not otherwise specified. Potential members of this latter residual category include repetitive self-mutilation (5), compulsive shopping ("oniomania") (6), compulsive sexual behavior (7), and compulsive facial picking (8). Also, alcohol and psychoactive substance use disorders and the paraphilias, although not described as impulse control disorders in

Received March 5, 1991; revision received July 3, 1991; accepted July 26, 1991. From the Biological Psychiatry Program, University of Cincinnati College of Medicine; the Biological Psychiatry Laboratory, Laboratories for Psychiatric Research, Psychotic Disorders Program, and the Adult Outpatient Clinic, McLean Hospital, Belmont, Mass.; and the Department of Psychiatry, Harvard Medical School, Boston. Address reprint requests to Dr. McElroy, Biological Psychiatry Program, University of Cincinnati College of Medicine, 231 Bethesda Ave. (ML 559), Cincinnati, OH 45267-0559.

Supported in part by NIMH Clinical Research Center grant MH-36224.

The authors thank Dr. Richard Rosenthal for his comments on the manuscript and Ms. Debbie Pennino and Ms. Lyn Dietrich for their assistance with the research.

TABLE 1. Overview of *DSM-III-R* Impulse Control Disorders Not Elsewhere Classified

Disorder and Studies	Description	Prevalence	M/F Ratio	Usual Time of Onset	Course
Intermittent explosive disorder (11, 15–21)[a]	Episodic aggressive outbursts	Rare?	M>F	Childhood, adolescence, or early adulthood	Episodic and chronic
Kleptomania (22, 23)	Impulsive or compulsive stealing	Rare?	F>M	Childhood, adolescence, or early adulthood	Episodic or chronic
Pathological gambling (24–34)	Compulsive or addictive gambling	0.2%–3.3%	M>F	Adolescence or early adulthood	Episodic or chronic, occurs in "bouts"
Pyromania (20, 21, 35, 36)[b]	Repetitive failure to resist impulses to set fires	Rare?	M>F	Childhood, adolescence, or early adulthood	Episodic or chronic
Trichotillomania (37–44)	Compulsive hair pulling	Rare?	F>M	Childhood, adolescence, or early adulthood	Episodic or chronic

[a]Most patients were described as having episodic behavioral dyscontrol, explosive rage, rage outbursts, or impulsive aggression. Although many had overt or subtle neurological abnormalities, some had no detectable neurological abnormalities and thus probably met the *DSM-III-R* criteria for intermittent explosive disorder.
[b]Most patients were described as being impulsive fire setters or impulsive arsonists; whether or not the patients experienced irresistible impulses to burn was not consistently documented.

DSM-III-R, are given as examples of such in the *DSM-III-R* section defining the impulse control disorders not elsewhere classified.

Despite their inclusion in the formal American diagnostic nomenclature since 1980 and a rich descriptive literature dating back to the late nineteenth century, the impulse control disorders as a group remain poorly studied. Except for alcohol and psychoactive substance abuse, little is known about them in terms of prevalence, demographic characteristics, course, associated psychopathology, family history, and response to treatment. Nor is it entirely clear why these individual conditions are grouped together. For example, while *DSM-III-R* characterizes impulse control disorders by the inability to resist "an impulse, drive, or temptation" to perform a harmful act, it does not explicitly require this criterion for intermittent explosive disorder, pathological gambling, pyromania, or the alcohol and psychoactive substance use disorders. Indeed, since nearly the inception of the concept of impulse control disorders, the validity of the so-called irresistible impulse has been questioned (9, 10), as has the diagnostic legitimacy of several specific impulse control disorders, including intermittent explosive disorder (3, 11), kleptomania (9, 12), and pyromania (9, 13, 14).

In an attempt to address some of these issues regarding *DSM-III-R* impulse control disorders not elsewhere classified, we surveyed the literature for studies of the epidemiology and phenomenology of these disorders and patients' associated psychopathology, family history, biology, and response to somatic and psychosocial treatments. We restricted analysis to reports which either indicated use of operational diagnostic criteria or provided descriptions of the impulsive behavior detailed enough that patients could be judged as probably meeting the *DSM-III-R* criteria. We omitted from analysis the paraphilias and alcohol and substance use disorders. Although given as examples of other impulse control disorders in *DSM-III-R* (p. 321), these disorders are presently assigned in *DSM-III-R* to separate diagnostic categories. Moreover, a detailed review of the paraphilias and alcohol and substance abuse, although needed, is beyond the scope of this article. We also omitted studies of behaviors meeting criteria for impulse control disorder not otherwise specified, because the number of patients studied (except for those with repetitive self-mutilation) was extremely small.

PREVALENCE, COURSE, AND PATIENT CHARACTERISTICS

Information about the prevalence and course of the impulse control disorders not elsewhere classified and about patients' demographic and clinical characteristics is provided in table 1. All of these disorders, with the exception of pathological gambling (26, 34), are presumed to be rare (19, 22, 36, 37). Although certain *behaviors*, such as shoplifting, gambling, and fire setting, are common in the general population, studies have generally shown that only a small portion of such individuals perform the behavior in response to irresistible impulses and hence represent cases of true impulse control *disorders* (e.g., kleptomania, pathological gambling, and pyromania) (22, 25, 35, 36, 45, 46). Moreover, although many studies have examined large groups of individuals who display impulsive aggression (commonly called "episodic behavioral dyscontrol"), many of the individuals studied do not appear to have had intermittent explosive disorder according to *DSM-III-R* criteria, because the dyscontrol was attributed to a primary neurological or organic mental disorder (11, 15–18). Nevertheless, except for pathological gambling, the prevalences of these impulse control disorders in the general population have not been well studied, and some authors have speculated that certain impulse control disorders, such as episodic dyscontrol (17), kleptomania (22), and trichotillomania (40, 44), may be more common than realized.

Although these impulse control disorders have different sex ratios, they appear similar with respect to onset and course (see table 1). Most cases begin in adolescence or early adulthood (except for trichotillomania, a substantial number of cases of which begin in child-

TABLE 2. Evidence From Phenomenologic Studies of Other Psychiatric Disorders in Patients With *DSM-III-R* Impulse Control Disorders Not Elsewhere Classified

Disorder and Studies	Degree of Association With Impulse Control Disorder[a]					
	Mood Disorders	Anxiety Disorders	Alcohol or Substance Abuse	Eating Disorders	Attention Deficit Hyperactivity Disorder	Personality Disorders
Intermittent explosive disorder (11, 16–18, 20, 21, 47, 48)	1	1	3	—[b]	2	2
Kleptomania (22, 23, 49–54)	3	3	3	3	—[b]	1
Pathological gambling (25, 27, 28, 31–33, 55–57)	4	3	4	—[b]	2	2
Pyromania (20, 21, 36, 58, 59)	2	—[b]	2	—[b]	1	1
Trichotillomania (38, 41–44, 60–64)	3	3	3	2	—[b]	1

[a]4=Supported by two or more studies using structured interviews to diagnose patients by operational criteria, 3=supported by one study using structured interviews to diagnose patients by operational criteria, 2=supported by studies using nonoperational diagnostic criteria, 1=supported by case reports or small case series, 0=not supported by balance of evidence.
[b]Insufficient data.

hood [44]) and follow a chronic course with exacerbations and remissions. However, little is known about the evolution of these disorders with advanced age.

ASSOCIATED PSYCHOPATHOLOGY

Studies examining the relationship between these five impulse control disorders and other psychiatric disorders are summarized in table 2. Operational diagnostic criteria have been used to systematically study phenomenology in four studies of intermittent explosive disorder (N=24) (20, 21), three of which used the same cohort of patients and were extensions of the first, in one study of kleptomania (N=20) (23), in five studies of pathological gambling (N=99) (27, 28, 31–33), three of which presumably used virtually the same cohort of patients, and in two studies of trichotillomania (N=76) (41, 42). Although none of these studies was controlled, all but one (20, 21) showed high rates of mood disorder, ranging from 43% among 14 trichotillomanic patients (41) to 100% among 20 kleptomanic patients (23). Of 99 pathological gamblers, 83 (84%) displayed mood disorder (28, 31, 33), and of 64 patients with trichotillomania, 46 (72%) had mood disorder (41, 42). In the only follow-up study located (32), of 38 pathological gamblers who were "abstinent" 6 months after inpatient treatment, seven (18%) were "still significantly depressed" despite improvement in work and family life.

Only one study compared the ages at onset of impulse control disorder and of mood disorder (23). Among 20 patients with concomitant kleptomania and mood disorder, the onset of mood disorder preceded the onset of kleptomania by at least 1 year in 12 (60%), occurred within the same year in three (15%), and occurred after the onset of kleptomania in five (25%). In a study of 25 pathological gamblers (31), 18 (72%) experienced episodes of major depression around the time that they first stopped gambling. Thirteen (52%) subjects experienced additional major episodes of mood disorders (major depression in 11 and mania in two) either before they stopped gambling or afterward. Of note, particularly high rates of bipolar disorders (types I and II and cyclothymia) were reported in patients with kleptomania (60%) (23) and in pathological gamblers (32% and 46%) (28, 31). Furthermore, some patients with kleptomania and pathological gambling reported relationships between their impulse control disorders and mood symptoms: their irresistible impulses would alter in intensity or frequency when they were depressed or manic, or their impulsive behaviors would affect their affective symptoms. In particular, patients reported that stealing or gambling produced a pleasurable "rush" that alleviated their depressive or manic symptoms (23, 28). Interestingly, some patients likened this "rush" to their hypomanic or manic episodes (23).

Phenomenologic studies also have shown high rates of concomitant anxiety (23, 31, 41, 42), alcohol and psychoactive substance abuse (20, 21, 23, 27, 28, 31, 33, 41, 42), and eating disorders (23, 42) in patients with these impulse control disorders. Specifically, of 24 impulsive offenders (20, 21), all met the *DSM-III-R* criteria for alcohol abuse. Of 20 patients with kleptomania (23), 16 (80%) each met the *DSM-III-R* criteria for at least one anxiety disorder (panic disorder, 40%; agoraphobia, 5%; social phobia, 40%; simple phobia, 30%; obsessive-compulsive disorder, 45%); 12 (60%) met the criteria for an eating disorder (bulimia nervosa, 60%; anorexia nervosa, 30%); and 10 (50%) met the criteria for a psychoactive substance use disorder (most commonly alcohol, amphetamine, and cocaine). Of 49 pathological gamblers from two studies (31, 33), 11 (22%) each had at least one anxiety disorder, most commonly obsessive-compulsive disorder, panic disorder, generalized anxiety disorder, and simple phobia. Of 100 pathological gamblers from three studies (27, 31, 33), 42 (42%) had histories of alcohol or substance abuse. Finally, of 74 patients with trichotillomania from two studies (41, 42), 39 (53%) had histories of anxiety disorders (including generalized anxiety disorder, panic disorder, and obsessive-compulsive disorder) and 17 (23%) had histories of alcohol or drug abuse.

These findings are further supported by numerous

case reports and case series of individuals with apparent impulse control disorders who also had concurrent or past mood disorders (22, 25, 38, 44–56, 60–64), obsessive-compulsive disorder (22, 35, 43), panic disorder (22, 50), eating disorders (22, 38, 50, 54, 62), or alcohol or substance abuse (16, 18, 22, 54). Studies have also shown relatively high rates of impulsive stealing or kleptomania among patients with eating disorders (22, 65, 66) and high rates of pathological or problem gambling among alcoholics (67). For episodic dyscontrol and pathological gambling, studies further suggest a relationship with attention deficit hyperactivity disorder (11, 16, 57) and personality disorder (12, 20, 21, 32).

We were unable to locate any systematic studies of individuals with rigorously diagnosed pyromania. Although there have been many studies of large groups of individuals who displayed impulsive fire-setting behavior (20, 21, 35, 36, 46), most of the individuals studied either were not clearly identified as having pyromania (20, 21) or did not appear to have pyromania as defined by the *DSM-III-R* criteria (35, 36, 46). Nevertheless, these studies consistently showed high rates of concomitant alcohol and substance use disorders (20, 21, 35), personality disorders (20, 21, 46), and depression (20, 21, 46). For instance, in a study of 22 impulsive arsonists (20, 21), 15 (68%) of whom met the *DSM-III-R* criteria for intermittent explosive disorder, 21 (95%) also met the *DSM-III-R* criteria for dysthymic disorder (N=18) or major depression (N=3), 20 (91%) met the criteria for alcohol abuse, and 20 (91%) met the criteria for borderline (N=17) or antisocial (N=3) personality disorder. Further, cases of individuals with apparent pyromania and concomitant mood disorder or obsessive-compulsive disorder have been reported (35, 58, 59). Finally, individuals with episodic dyscontrol have been reported to display high rates of fire-setting behavior (16).

FAMILY STUDIES

Family studies of individuals with impulse control disorders not elsewhere classified are less extensive than phenomenologic studies. However, the most consistent findings have been high rates of mood and substance use disorders in the first-degree relatives of individuals with intermittent explosive disorder or episodic dyscontrol (some of whom probably had intermittent explosive disorder) (16, 17, 20, 21, 68, 69), kleptomania (23), and pathological gambling (27, 31, 33). For instance, Mattes and Fink (68) reported that of 132 first-degree relatives of 33 patients with temper outbursts (22 of whom had intermittent explosive disorder), 11% had depression and 8% alcohol or drug abuse. Linnoila et al. (69) found that 44 (81%) of 54 violent offenders and impulsive fire setters (29 with intermittent explosive disorder) had first- or second-degree relatives with alcoholism. Among 103 first-degree relatives of 20 subjects with kleptomania (23), 22 (21%) had major mood disorder and 21 (20%) had alcohol or substance use disorders. Among 175 first-degree relatives of 25 pathological gamblers (31), 18 (10%) displayed major mood disorder and 19 (11%) displayed alcohol abuse or dependence. Similarly, Ramirez et al. (27) found that 50% of 51 patients with pathological gambling each had an alcoholic parent, and Roy et al. (33) reported that 33% and 25% of 24 pathological gamblers each had a first-degree relative with mood disorder and alcohol abuse, respectively.

Although not as striking, relatively high rates of anxiety disorders (in particular, panic disorder, agoraphobia, and obsessive-compulsive disorder) have been reported in families of individuals with kleptomania (23) and trichotillomania (44). Other findings include high rates of obsessive-compulsive personality disorder in families of individuals with trichotillomania (43), high rates of violence (16, 17, 68) and attention deficit hyperactivity disorder (68) in families of individuals with episodic dyscontrol, and possibly higher than normal rates of the same impulse control disorder in the families of patients with intermittent explosive disorder (6.9%) (68), kleptomania (2%) (23), pathological gambling (23%) (27), and trichotillomania (5%) (44, 64). Finally, Winokur et al. (70) noted an apparently high prevalence of pathological gambling in the families of bipolar probands.

STUDIES OF BIOLOGICAL TESTS

Studies of biological tests of subjects with impulse control disorders not elsewhere classified, summarized in table 3, have largely focused on the hypothalamic-pituitary-adrenal axis, on serotonin, norepinephrine, and glucose metabolism, and on EEG results. For the most part, the subjects have been individuals with impulsive aggression, impulsive fire setting, and pathological gambling. The most consistent findings have been abnormalities in serotonergic and, to a lesser extent, noradrenergic function (74, 75). For instance, Brown et al. (72) reported that a higher degree of impulsivity correlated with a higher aggression score and lower CSF 5-hydroxyindoleacetic acid (5-HIAA) but higher 3-methoxy-4-hydroxyphenylglycol (MHPG) concentrations in 26 men with personality disorders. Of note, the 11 subjects with histories of at least one suicide attempt had higher aggression scores and lower 5-HIAA and higher MHPG concentrations than the subjects with no history of suicide attempts. In a study of 58 violent offenders and impulsive fire setters, 33 (57%) of whom met the *DSM-III-R* criteria for intermittent explosive disorder, Virkkunen et al. (20, 21) found lower CSF concentrations of 5-HIAA and MHPG in the impulsive offenders and fire setters than in the nonimpulsive offenders and normal comparison subjects. Moreover, low 5-HIAA and MHPG concentrations were associated with a lifetime history of suicide attempts. More recently, Brown et al. (76) reported that mean platelet [^{3}H]serotonin uptake was significantly lower in 15 male outpatients with episodic aggression than in 15 nonaggressive comparison subjects.

By contrast, individuals with pathological gambling

TABLE 3. Biological Findings on Patients With *DSM-III-R* Impulse Control Disorders Not Elsewhere Classified

Disorder and Studies	Relation of Biological Findings to Normal			
	Cortisol	5-HT	Norepinephrine	Other[a]
Impulsive violent behavior (11, 16–18, 20, 21, 69, 71–76)[b]	No difference in urinary free cortisol	Lower CSF 5-HIAA; lower platelet 5-HIAA uptake	Lower CSF MHPG	Lower blood glucose on GTT; EEG abnormalities
Pathological gambling (29, 33, 77, 78)	Suppression on DST	No difference in plasma 5-HIAA	Lower plasma and higher CSF MHPG[c]; higher urinary norepinephrine	Differential EEG activation
Impulsive fire setting (20, 21, 69, 73, 79)	No difference in urinary free cortisol	Lower CSF 5-HIAA	Lower CSF MHPG	Lower blood glucose on GTT

[a]GTT=glucose tolerance test.
[b]Some, but not all, patients met the *DSM-III* criteria for intermittent explosive disorder.
[c]Only the centrally produced fraction of CSF MHPG was higher than normal. Total CSF MHPG was not higher than in comparison subjects.

TABLE 4. Efficacy of Psychosocial Treatments for *DSM-III-R* Impulse Control Disorders Not Elsewhere Classified

Disorder and Studies	Rating of Efficacy[a]				
	Insight-Oriented Psychotherapy	Behavioral Therapy	Group Therapy	Inpatient Treatment	Self-Help Groups
Intermittent explosive disorder (16, 17, 80)	1/0[b]	—[c]	1	—[c]	—[c]
Kleptomania (22, 23, 50, 53, 81)	1	1	—[c]	—[c]	—[c]
Pathological gambling (82–88)	2/0[b]	2	—[c]	2	1
Pyromania	—[c]	—[c]	—[c]	—[c]	—[c]
Trichotillomania (39, 44, 89–91)	1	3	—[c]	—[c]	—[c]

[a]3=Supported by one controlled study, 2=supported by at least one open study, 1=supported by single case reports or small case series, 0=not supported by balance of evidence, but limited evidence for efficacy may be present.
[b]Ratings of evidence for positive and negative findings, respectively.
[c]Insufficient data.

have been shown to have significantly lower plasma MHPG concentrations, greater centrally produced fractions of CSF MHPG, and greater urinary output of norepinephrine than comparison subjects, but similar CSF 5-HIAA concentrations (33). One study (77), however, demonstrated that pathological gamblers show normal suppression on the dexamethasone suppression test. Finally, studies have shown high rates of EEG and other neurologic abnormalities in individuals with intermittent explosive disorder (11), episodic dyscontrol (16–18), and pathological gambling (78).

RESPONSE TO TREATMENT

Studies of psychosocial treatments of impulse control disorders not elsewhere classified are summarized in table 4. We were able to find only two controlled studies of any form of psychosocial treatment for the five impulse control disorders analyzed. In the first (86), imaginal desensitization was more effective than aversive therapy in reducing the urge to gamble, gambling behavior, and anxiety in 20 compulsive gamblers—at both 1 month and 1 year after treatment. In the second (91), habit reversal was twice as effective as negative practice training in suppressing hair pulling in 34 patients with trichotillomania. Open studies of psychoanalytic psychotherapy, various forms of behavioral therapy, and inpatient treatment using relatively large numbers of pathological gamblers have shown varying degrees of success (24, 30, 32, 85, 88). In addition, isolated case reports and case series have shown psychoanalytic or insight-oriented psychotherapy and behavioral therapy to be effective for kleptomania (22, 50, 53, 81), pathological gambling (83–85), and trichotillomania (39, 44, 90, 91). Case reports and case series have also shown some success of various forms of psychotherapy and behavioral therapy for children with fire setting typically not due to pyromania (92). However, a number of authors have commented on the difficulties involved in treating some of these individuals (especially those with intermittent explosive disorder, pathological gambling, pyromania, and trichotillomania), citing patients' refusal to take responsibility for their behavior, lack of insight, denial, concomitant legal difficulties, and alcohol abuse (40, 44, 82).

Studies examining the response of these impulse control disorders to pharmacologic treatments are summarized in table 5. We located no placebo-controlled trials and only two controlled trials of pharmacologic agents for individuals with impulse control disorders not elsewhere classified diagnosed by means of operational criteria. In the first, Swedo et al. (41) found clomipramine to be more effective than desipramine in the treatment of 13 women with trichotillomania. In the second, Mattes (11) reported that carbamazepine and propranolol were equally effective in reducing rage outbursts in 80 patients with a variety of diagnoses, including intermittent explosive disorder (N=51) and attention deficit disorder, residual type (N=38). Of note, the diagnosis

of intermittent explosive disorder was associated with preferential response to carbamazepine, whereas the diagnosis of attention deficit hyperactivity disorder was associated with preferential response to propranolol. Additionally, a number of case reports and case series have shown a variety of thymoleptic agents to be effective in treating four of the five impulse control disorders analyzed. These included carbamazepine, lithium, desipramine, and clomipramine for apparent intermittent explosive disorder (47, 48, 93); amitriptyline, imipramine, nortriptyline, trazodone, fluoxetine, lithium, and valproate for kleptomania (22, 23, 51, 52, 54); lithium for pathological gambling (56); and imipramine, desipramine, clomipramine, isocarboxazid, fluoxetine, and lithium for trichotillomania (41, 43, 44, 60, 61, 63, 64). Also, individuals with kleptomania have been reported to respond to ECT (52). In most cases, the patients reported reductions in the frequency and intensity of their irresistible impulses and impulsive behaviors, usually after several weeks of treatment with doses of medication typically effective for mood disorder. In some instances, the irresistible impulses recurred after discontinuation of the medication and remitted again when the medication was reinstituted (52, 54). Finally, numerous case reports and open studies of individuals with impulsive aggression due to a variety of conditions (i.e., organic mental disorder, personality disorder, schizophrenia) showed amelioration of aggressive behavior in response to β blockers, carbamazepine and other antiepileptics, lithium, psychostimulants, antidepressants, and various hormonal manipulations (in particular, antiandrogen treatments) (15, 17, 93).

TABLE 5. Efficacy of Pharmacological Treatments for *DSM-III-R* Impulse Control Disorders Not Elsewhere Classified

Disorder and Studies	Rating of Efficacy[a]		
	Antidepressants	Lithium	Anticonvulants
Intermittent explosive disorder (11, 47, 48, 93)[b]	1	1	3
Kleptomania (22, 23, 51, 52, 54)	2	1	1
Pathological gambling (56)	—[c]	1	—[c]
Pyromania	—[c]	—[c]	—[c]
Trichotillomania (41, 43, 44, 60, 61, 63, 64)	3	1	—[c]

[a]3=Supported by one controlled study, 2=supported by at least one open study, 1=supported by single case reports or small case series, 0=not supported by balance of evidence, but limited evidence for efficacy may be present.
[b]Many patients, but not all, had neurological abnormalities.
[c]Insufficient data.

DISCUSSION

Although long recognized, the impulse control disorders in general remain a mysterious group of conditions. Even their diagnostic validity, individually and as a category, remains in question. Authors doubting the legitimacy of these disorders have generally argued that afflicted individuals do not really experience "irresistible" impulses but, rather, have voluntary control over their impulsive behaviors, or that their impulsive behaviors are nonspecific symptoms secondary to other underlying psychiatric disorders. Nevertheless, the literature contains numerous descriptions, from different countries and different historical periods, of individuals who perform harmful behaviors in response to overpowering, uncontrollable, irresistible, or "morbid" impulses. These reports date back to the early nineteenth century, when Esquirol (94) introduced the term *monomanies instinctives* (instinctive monomanias) to describe a form of insanity characterized by performance of impulsive acts without motive, in response to "instinctive" or involuntary, irresistible impulses. Subsequent writers (14, 35) have described similar syndromes with terms such as "partial moral mania," "impulsive insanity," "psychopathic forms of reaction," or "impulse neuroses." Thus, the consistency of the description of the irresistible or morbid impulse makes it difficult to dismiss its validity as a specific psychiatric symptom. That the *DSM-III-R* impulse control disorders not elsewhere classified appear to share a similar core disturbance of impulsivity and compulsivity (the so-called "irresistible" or "morbid" impulse)—regardless of the behavior performed—further suggests that they are related and should be grouped together.

The available studies of these impulse control disorders also suggest that they may be etiologically related to a variety of other psychiatric or medical disorders, including obsessive-compulsive disorder, addictive disorders, mood disorders, impulse control disorders in general, and organic mental disorders. First, morbid impulses and their consequent acts resemble obsessions and compulsions. Thus, kleptomania, pathological gambling, pyromania, and trichotillomania have been hypothesized to be forms of obsessive-compulsive disorder (22, 35, 41, 44, 95). This conceptualization is supported by studies showing high rates of obsessive-compulsive disorder in individuals with kleptomania (22, 23), pathological gambling (31), and trichotillomania (41, 42), studies showing higher than normal rates of obsessive-compulsive disorder in the families of individuals with kleptomania (23) and trichotillomania (44), and the finding that clomipramine may be more effective than desipramine in the treatment of trichotillomania (41).

Second, others (52, 88) have postulated that certain impulse control disorders (especially kleptomania and pathological gambling) would be better conceived as addictive disorders. For instance, the irresistible impulse to steal or gamble resembles the urge to drink or use drugs, and the "high" sometimes experienced with stealing or gambling is similar to that induced by alcohol or drugs (22, 53, 96). Indeed, gambling has been described as inducing "a stimulating, tranquilizing, or pain-relieving response" (29), and "self-medication" of benzodiazepine withdrawal symptoms through the thrill of kleptomanic stealing has been reported (52). Further, pathological gamblers may develop tolerance (96) and physiological withdrawal symptoms—includ-

ing tremulousness, headaches, abdominal pain, diarrhea, nightmares, and cold sweats—after abrupt discontinuation of gambling (97). Also, as reviewed in this paper, high rates of alcohol and substance abuse are seen among individuals with intermittent explosive disorder, episodic dyscontrol, kleptomania, pathological gambling, and impulsive fire setting, and high rates of pathological or problem gambling occur among individuals with alcohol or substance abuse (67). Finally, self-help groups based on Alcoholics Anonymous (e.g., Gamblers Anonymous) have been reported to be helpful in the treatment of some pathological gamblers (87).

Third, given the frequent occurrence of affective symptoms or mood disorders in individuals with each of the five impulse control disorders analyzed, the apparent relief of depressive symptoms in response to kleptomanic stealing and pathological gambling, and the response of intermittent explosive disorder, kleptomania, pathological gambling, and trichotillomania to treatment with thymoleptics, others have speculated that these impulse control disorders may be related to mood disorder (21–23, 28, 31, 47, 49, 51, 53).

Fourth, some authors have noted the phenomenologic similarities of alcohol and drug abuse, paraphilias, and bulimia nervosa to the *DSM-III-R* impulse control disorders not elsewhere classified (3). This observation plus the high rates of *other* impulsive behaviors in persons with these disorders have prompted some authors to suggest that *all* of these conditions should be viewed as sharing a fundamental problem in impulse control and thus should be classified as impulse control disorders. The impulsive behavior is seen either as a failure of self-soothing mechanisms or as an attempt to relieve a variety of uncomfortable symptoms (4, 5). Lacey and Evans (4), for instance, reported that a substantial number of patients with substance use disorders, eating disorders, "classic" impulse control disorders, self-harm, and personality disorders were characterized not just by the presenting symptoms but by multiple impulsive behaviors. They termed these individuals "impulsivists" and suggested that they had "multi-impulsive personality disorder." Indeed, cases of individuals displaying more than one "classic" impulse control disorder have been reported (23).

Finally, some authors (22) have postulated that impulse control disorders (especially intermittent explosive disorder, kleptomania, and pyromania) are caused by organic conditions that induce or increase impulsivity; such conditions include hypoglycemia, narcolepsy, head trauma, dementia, and epilepsy. The evidence supporting a relationship between the impulse control disorders and epilepsy, for instance, includes phenomenologic similarities between impulse control disorders and complex partial seizures (15, 17, 22) and reports of patients with intermittent explosive disorder and kleptomania who responded to treatment with antiepileptic agents (15, 17, 23).

None of these conceptualizations, however, seems sufficiently inclusive. The impulse control disorders not elsewhere classified share high comorbidity and other features not only with obsessive-compulsive disorder, alcohol and other substance use disorders, mood disorders, and eating disorders but also with anxiety disorders. What could account for this large overlap in features among these various disorders? In an earlier report (98), we summarized data suggesting that major depression and a group of seven other disorders—including obsessive-compulsive disorder, bulimia nervosa, panic disorder, and attention deficit hyperactivity disorder—represented a family of disorders sharing a possible common physiologic abnormality. We termed this hypothesized family "affective spectrum disorder." The apparent phenomenologic similarities of the impulse control disorders not elsewhere specified to obsessive-compulsive disorder and bulimia nervosa—both forms of affective spectrum disorder—together with evidence linking these impulse control disorders to several other forms of affective spectrum disorder (including panic disorder, obsessive-compulsive disorder, attention deficit hyperactivity disorder, and major depression) might be parsimoniously explained by the hypothesis that the impulse control disorders not elsewhere classified themselves are also forms of affective spectrum disorder. Note that this hypothesis does *not* argue that the impulse control disorders are caused by affective spectrum disorder but, rather, that they may share the same postulated underlying physiologic abnormality as the other forms of affective spectrum disorder.

This hypothesis derives support from many of the major findings reviewed in this paper. These include 1) high rates of mood disorders (as well as anxiety and eating disorders) among individuals with kleptomania, pathological gambling, trichotillomania, and behavioral dyscontrol and among members of their families, 2) findings of serotonin and norepinephrine abnormalities in episodic dyscontrol and impulsive fire setting similar to those occurring in depression (99, 100), and 3) the response of a variety of these impulse control disorders to thymoleptics. Viewing the impulse control disorders not elsewhere classified as forms of affective spectrum disorder would also account for a number of other individual or anecdotal observations noted in this paper. These include case reports describing individuals with concurrent pyromania and major mood disorder (58, 59), findings of high rates of attention deficit hyperactivity disorder among pathological gamblers and individuals with behavioral dyscontrol (16, 17, 57), and findings of EEG abnormalities in pathological gamblers similar to those in individuals with attention deficit hyperactivity disorder (78). Additionally, among patients with bulimia nervosa, stealing has been associated with greater degrees of depression and obsessive-compulsive behavior (65). Also, many patients with other impulse control disorders (e.g., compulsive shopping, compulsive facial picking, and paraphilias) have been reported to have concurrent mood disorders and to respond to thymoleptics (6, 8). Indeed, the link of impulse control disorders to alcohol abuse (given as an example of an impulse control disorder in *DSM-III-R*)

could be explained in part by the high rates of mood disorders found among alcoholics (101).

The hypothesis that impulse control disorders are forms of affective spectrum disorder is, of course, affected by several methodological limitations. Most important is the lack of systematic, controlled studies of impulse control disorders using operational diagnostic criteria. For instance, we were unable to locate any controlled phenomenologic or family history studies and only two controlled drug treatment trials.

Second, it might be argued that impulsive acts are not disorders in themselves but are merely nonspecific behaviors exhibited with greater than normal frequency in patients with mood disorders. These behaviors decline with thymoleptic treatment because the underlying, or primary, mood disturbance is corrected. This argument, however, fails to account for the observation that some patients experience irresistible impulses in the absence of affective symptoms and that most patients with mood disorders do not demonstrate irresistible impulses to perform harmful behaviors.

A third criticism is that the affective spectrum disorder hypothesis does not directly explain 1) the phenomenologic similarity of these impulse control disorders to complex partial seizures and the apparently high rates of epilepsy, EEG abnormalities, and other neurologic abnormalities among individuals with episodic dyscontrol, 2) the experience of withdrawal symptoms when the impulsive behavior is abruptly discontinued, 3) case reports and clinicians' impressions that some impulse control disorders may be associated with personality disorder, and 4) the response of behavioral dyscontrol to nonthymoleptic agents, in particular, β blockers.

Nevertheless, these criticisms aside, several lines of evidence suggest that the *DSM-III-R* impulse control disorders not elsewhere classified, or, more generally, disorders characterized by irresistible impulses or urges to perform specific senseless or harmful behaviors, may share a biological abnormality with other forms of affective spectrum disorder. The nature of this biological abnormality is unknown. However, accumulating findings from animal and human studies have implicated central serotonergic transmission in the regulation of sleep, appetite, sexual activity, and mood (behaviors typically deranged in mood disorder) (99); in the genesis of major depression and mania (99), suicide (74), obsessive-compulsive disorder (102), bulimia nervosa (103), panic disorder (104), and alcoholism (105); and in the expression of impulsive behavior (74, 75). Animal studies, for instance, demonstrate that serotonin deficit states are important in the expression of impulsive aggression (74, 75). Low CSF 5-HIAA concentrations similar to those found in impulsive arsonists and impulsive violent offenders have been found in individuals who have attempted or completed suicide (especially violent suicide) and homicide (74) and in patients with mood disorder (99). Taken together, these lines of evidence suggest that impulse control disorders, like other forms of affective spectrum disorder, may share an abnormality in serotonergic transmission.

However, it does *not* follow from this hypothesis that all forms of impulsivity or compulsivity are linked to one another or to mood disorder. Impulsive and compulsive behaviors are evident in a variety of psychiatric and neurologic conditions, including mood disorders, personality disorders, schizophrenia, Tourette's disorder, and epilepsy, as well as in normal mental life. Thus, various impulsive and compulsive behaviors most likely have different forms and etiologies. At this point, it appears only that "classic" impulse control disorders—disorders marked by irresistible, involuntary, and specific impulses or urges to perform harmful or senseless acts—may be forms of affective spectrum disorder.

In summary, despite a rich descriptive literature dating back over 150 years and their inclusion in the formal American psychiatric nomenclature since 1980, the impulse control disorders not elsewhere classified remain little studied. Debate over their diagnostic validity lingers, but many have argued that these and other impulse control disorders are legitimate mental disorders causing significant morbidity and that they are more common than realized. Substantial preliminary evidence, reviewed in this paper, suggests that intermittent explosive disorder, kleptomania, pathological gambling, pyromania, and trichotillomania are, in fact, valid diagnostic entities; that they are related to one another and should be grouped together; and that they are related to mood disorder and other forms of affective spectrum disorder. Systematic, controlled studies using operational diagnostic criteria should be done to clarify the validity and nature of this relationship and to determine the relationship of these disorders to other impulse control disorders.

REFERENCES

1. Frosch J, Wortis SB: A contribution to the nosology of the impulse disorders. Am J Psychiatry 1954; 111:132–138
2. Wise MC: Adjustment disorders and impulse disorders not otherwise classified, in The American Psychiatric Press Textbook of Psychiatry. Edited by Talbott JA, Hales RE, Yudofsky SC. Washington, DC, American Psychiatric Press, 1988
3. Popkin MK: Impulse control disorders not elsewhere classified, in Comprehensive Textbook of Psychiatry, 5th ed, vol 2. Edited by Kaplan HI, Sadock BJ. Baltimore, Williams & Wilkins, 1989
4. Lacey JH, Evans CDH: The impulsivist: a multi-impulsive personality disorder. Br J Addict 1986; 81:641–649
5. Favazza AR, Rosenthal RJ: Varieties of pathological self-mutilation. Behavioral Neurol 1990; 3:77–85
6. McElroy SL, Satlin A, Pope HG Jr, Hudson JI, Keck PE Jr: Treatment of compulsive shopping with antidepressants. Ann Clin Psychiatry (in press)
7. Barth RJ, Kinder BN: The mislabeling of sexual impulsivity. J Sex Marital Ther 1987; 13:15–23
8. Stout RJ: Fluoxetine for the treatment of compulsive facial picking (letter). Am J Psychiatry 1990; 147:370
9. Everts O: Are dipsomania, kleptomania, pyromania, etc, valid forms of mental disease? Am J Insanity 1887; 44:52–59
10. Peele S: Diseasing of America: Addiction Treatment Out of Control. Lexington, Mass, DC Heath, 1989
11. Mattes JA: Comparative effectiveness of carbamazepine and propranolol for rage outbursts. J Neuropsychiatry Clin Neuroscience 1990; 2:159–164
12. Antheaume A: La legende de la kleptomanie, affection mentale fictive. L'Encephale 1925; 20:368–388

13. Pilgrim CW: Pyromania (so-called), with report of a case. Am J Insanity 1885; 41:456–465
14. Geller JL, Erlen J, Pinkus RL: A historical appraisal of America's experience with "pyromania"—a diagnosis in search of a disorder. Int J Law Psychiatry 1986; 9:201–229
15. Monroe RR: Episodic Behavioral Disorders. Cambridge, Mass, Harvard University Press, 1970
16. Bach-y-Rita G, Lion JR, Climent CE, Ervin FR: Episodic dyscontrol: a study of 130 violent patients. Am J Psychiatry 1971; 127:1473–1478
17. Maletzky BM: The episodic dyscontrol syndrome. Dis Nerv Syst 1973; 36:178–185
18. Elliott FA: The neurology of explosive rage. Practitioner 1976; 217:51–60
19. Monopolis S, Lion JR: Problems in the diagnosis of intermittent explosive disorder. Am J Psychiatry 1983; 140:1200–1202
20. Linnoila M, Virkkunen M, Scheinin M, Nuutila A, Rimon R, Goodwin FK: Low cerebrospinal fluid 5-hydroxyindoleacetic acid concentration differentiates impulsive from nonimpulsive violent behavior. Life Sci 1983; 33:2609–2614
21. Virkkunen M, De Jong J, Bartko J, Linnoila M: Psychobiological concomitants of history of suicide attempts among violent offenders and impulsive fire setters. Arch Gen Psychiatry 1989; 46:604–606
22. McElroy SL, Hudson JI, Pope HG, Keck PE: Kleptomania: clinical characteristics and associated psychopathology. Psychol Med 1991; 21:93–108
23. McElroy SL, Pope HG Jr, Hudson JI, Keck PE Jr, White KL: Kleptomania: a report of 20 cases. Am J Psychiatry 1991; 148: 652–657
24. Bergler E: The Psychology of Gambling. New York, Hill & Wang, 1957
25. Moran E: Varieties of pathological gambling. Br J Psychiatry 1970; 116:593–597
26. President's Commission on the Review of the National Policy Toward Gambling: Gambling in America. Washington, DC, US Government Printing Office, 1976
27. Ramirez LF, McCormick RA, Russo AM, Taber JI: Patterns of substance abuse in pathological gamblers undergoing treatment. Addict Behav 1983; 8:425–428
28. McCormick RA, Russo AM, Ramirez LF, Taber JI: Affective disorders among pathological gamblers seeking treatment. Am J Psychiatry 1984; 141:215–218
29. Custer RL: Profile of the pathological gambler. J Clin Psychiatry 1984; 45:35–38
30. Allcock CC: Pathological gambling. Aust NZ J Psychiatry 1986; 20:259–265
31. Linden RD, Pope HG Jr, Jonas JM: Pathological gambling and major affective disorder: preliminary findings. J Clin Psychiatry 1986; 47:201–203
32. Taber JI, McCormick RA, Russo AM, Adkins BJ, Ramirez LF: Follow-up of pathological gamblers after treatment. Am J Psychiatry 1987; 144:757–761
33. Roy A, Adinoff B, Roehrich L, Lamparski D, Custer R, Lorenz V, Barbaccia M, Guidotti A, Costa E, Linnoila M: Pathological gambling: a psychobiological study. Arch Gen Psychiatry 1988; 45:369–373
34. Volberg RA, Steadman HJ: Refining prevalence estimates of pathological gambling. Am J Psychiatry 1988; 145:502–505
35. Lewis NDC, Yarnell H: Pathological Firesetting (Pyromania): Nervous and Mental Disease Monograph 82. New York, Coolidge Foundation, 1951
36. Robbins E, Robbins L: Arson with special reference to pyromania. NY State J Med 1967; 67:795–798
37. Mannino FV, Delgado RA: Trichotillomania in children: a review. Am J Psychiatry 1969; 126:505–511
38. Greenberg HR, Sarner CA: Trichotillomania: symptom and syndrome. Arch Gen Psychiatry 1965; 12:482–489
39. Friman PC, Finney JW, Christophersen ER: Behavioral treatment of trichotillomania: an evaluative review. Behav Ther 1984; 15:249–265
40. Muller SA: Trichotillomania. Dermatol Clin 1987; 5:595–601
41. Swedo SE, Leonard HL, Rapoport JL, Lenane MC, Goldberger EL, Cheslow DL: A double-blind comparison of clomipramine and desipramine in the treatment of trichotillomania (hair pulling). N Engl J Med 1989; 321:497–501
42. Christenson GA, Mackenzie TB, Mitchell JE: Characteristics of 60 adult chronic hair pullers. Am J Psychiatry 1991; 148:365–370
43. Benarroche CL: Trichotillomania symptoms and fluoxetine response, in New Research Abstracts, 143rd Annual Meeting of the American Psychiatric Association. Washington, DC, APA, 1990
44. Swedo SE, Rapoport JL: Annotation: trichotillomania. J Child Psychol Psychiatry 1991; 32:401–409
45. Bradford J, Balmaceda R: Shoplifting: is there a specific psychiatry syndrome? Can J Psychiatry 1983; 28:248–254
46. Bradford JMW: Arson: a clinical study. Can J Psychiatry 1982; 27:188–193
47. Cutler N, Heiser JF: Retrospective diagnosis of hypomania following successful treatment of episodic violence with lithium: a case report. Am J Psychiatry 1978; 135:753–754
48. Fava M, Anderson K, Rosenbaum JF: "Anger attacks": possible variants of panic and major depressive disorders. Am J Psychiatry 1990; 147:867–870
49. Janet P: La kleptomanie et la depression mentale. Journal de Psychologie Normale et Pathologique 1911; 8:97–103
50. Barag G: Clinical notes on kleptomania. Samiska 1953; 7:201–215
51. Ramelli E, Mapelli G: Melancholia and kleptomania. Acta Psychiatr Belg 1979; 79:57–74
52. Fishbain DA: Kleptomania as risk taking behavior in response to depression. Am J Psychother 1987; 41:598–603
53. Gudjonsson GH: The significance of depression in the mechanism of compulsive shoplifting. Med Sci Law 1987; 27:171–176
54. McElroy SM, Keck PE Jr, Pope HG Jr, Hudson JI: Pharmacological treatment of kleptomania and bulimia nervosa. J Clin Psychopharmacol 1989: 9:358–360
55. Israeli N: Outlook of a depressed patient, interested in planned gambling, before and after his attempt at suicide. Am J Orthopsychiatry 1935; 5:57–63
56. Moskowitz JA: Lithium and lady luck: use of lithium carbonate in compulsive gambling. NY State J Med 1980; 80:785–788
57. Carlton PL, Manowitz P, McBride H, Nora R, Swartzburg M, Goldstein L: Attention deficit disorder and pathological gambling. J Clin Psychiatry 1987; 48:487–488
58. Todd FA: Pyromania. Toledo Medical and Surgical Reporter 1898; 7:95–97
59. Rejlek J: Poriomanie. Cesk Psychiatr 1988; 84:245–248
60. Krishnan RR, Davidson J, Miller R: MAO inhibitor therapy in trichotillomania associated with depression: case report. J Clin Psychiatry 1984; 45:267–268
61. Scahdera JA, Sidhua BS: Trichotillomania associated with depression. J Indian Med Assoc 1987; 85:151–152
62. George MS, Brewerton TD, Cochrane C: Trichotillomania (hair pulling) (letter). N Engl J Med 1990; 322:470–471
63. Christenson GA, Popkin MA, Mackenzie TB, Realmuto GM: Lithium treatment of chronic hairpulling. J Clin Psychiatry 1991; 52:116–120
64. Kerbeshian J, Burd L: Familial trichotillomania (letter). Am J Psychiatry 1991; 148:684–685
65. Krahn DD, Nairn K, Gosnell BA, Drewnowski A: Stealing in eating disordered patients. J Clin Psychiatry 1991; 52:112–115
66. Hudson JI, Pope HG Jr, Jonas JM, Yurgelun-Todd D: Phenomenologic relationship of eating disorders to major affective disorder. Psychiatry Res 1983; 9:345–354
67. Lesieur HR, Blume SB, Zoppa RM: Alcoholism, drug abuse, and gambling. Alcoholism (NY) 1986; 10:33–38
68. Mattes JA, Fink M: A family study of patients with temper outbursts. J Psychiatr Res 1987; 21:249–255
69. Linnoila M, De Jong J, Virkkunen M: Family history of alcoholism in violent offenders and impulsive fire setters. Arch Gen Psychiatry 1989; 46:613–616
70. Winokur G, Clayton PJ, Reich T: Manic Depressive Illness. St Louis, CV Mosby, 1969
71. Virkkunen M: Urinary free cortisol secretion in habitually violent offenders. Acta Psychiatr Scand 1985; 72:40–44
72. Brown GL, Goodwin FK, Ballenger JC, Goyer P, Major L: Ag-

gression in humans correlates with cerebrospinal fluid amine metabolites. Psychiatry Res 1979; 1:131–139
73. Roy A, Virkkunen M, Guthrie S, Linnoila M: Indices of serotonin and glucose metabolism in violent offenders, arsonists and alcoholics. Ann NY Acad Sci 1986; 487:202–220
74. Asberg M, Schalling D, Traskman-Bendz L, Wagner A: Psychobiology of suicide, impulsivity, and related phenomena, in Psychopharmacology: The Third Generation of Progress. Edited by Meltzer HY. New York, Raven Press, 1987
75. Eichelman B: Neurochemical and psychopharmacological aspects of aggressive behavior. Ibid
76. Brown CS, Kent TA, Bryant SG, Gevedon RM, Campbell JL, Felthons AR, Barrat ES, Rose RM: Blood platelet uptake of serotonin in episodic aggression. Psychiatry Res 1989; 27:5–12
77. Ramirez LF, McCormick RA, Lowy MT: Plasma cortisol and depression in pathological gamblers. Br J Psychiatry 1988; 153: 684–686
78. Goldstein L, Manowitz P, Nora R, Swartzburg M, Carlton P: Differential EEG activation and pathological gambling. Biol Psychiatry 1985; 20:1232–1234
79. Virkkunen M, Nuutila A, Goodwin FK, Linnoila M: Cerebrospinal fluid monoamine metabolites in male arsonists. Arch Gen Psychiatry 1987; 44:241–247
80. Lion JR, Bach-Y-Rita G: Group psychotherapy with violent outpatients. Int J Group Psychother 1970; 20:185–191
81. Glover JH: A case of kleptomania treated by covert sensitization. Br J Clin Psychology 1985; 24:213–214
82. Greenson RR: On gambling. American Imago 1947; 4:61–77
83. Lindner RM: The psychodynamics of gambling. Annals of the American Academy of Political and Social Science 1950; 269: 93–107
84. Seager CP: Treatment of compulsive gamblers by electrical aversion. Br J Psychiatry 1970; 117:545–553
85. Greenberg D, Rankin H: Compulsive gamblers in treatment. Br J Psychiatry 1982; 140:364–366
86. McConaghy N, Armstrong M, Blaszczynski A, Allcock C: Controlled comparison of aversive therapy and imaginal desensitization in compulsive gambling. Br J Psychiatry 1983; 142:366–372
87. Brown IR: The effectiveness of Gamblers Anonymous, in Gambling and the Gambling Papers, Proceedings of the Sixth National Conference on Gambling and Risk Taking. Edited by Eadington W. Reno, University of Nevada, 1985
88. Blaszczynski A, McConaghy N, Frankova A: Control versus abstinence in the treatment of pathological gambling: a two to nine year follow-up. Br J Addict 1991; 86:299–306
89. Buxbaum E: Hair pulling and fetishism. Psychoanal Study Child 1960; 15:243–260
90. Philippopoulos GS: A case of trichotillomania (hair-pulling). Acta Psychother (Basel) 1961; 9:304–312
91. Azrin NH, Nunn RG, Frantz SE: Treatment of hair-pulling (trichotillomania): a comparative study of habit reversal and negative practice training. J Behav Ther Exp Psychiatry 1980; 11:13–20
92. Lowenstein LF: The etiology, diagnosis and treatment of the fire-setting behavior of children. Child Psychiatry Hum Dev 1989; 19:186–194
93. Mattes JA: Psychopharmacology of temper outbursts: a review. J Nerv Ment Dis 1986; 174:464–470
94. Esquirol E: Des maladies mentales. Paris, Baillière, 1838
95. Jenike MA: Obsessive-compulsive and related disorders: a hidden epidemic. N Engl J Med 1989; 321:539–541
96. Anderson G, Brown RI: Real and laboratory gambling, sensation-seeking and arousal. Br J Psychol 1984; 75:401–410
97. Wray I, Dickerson MG: Cessation of high frequency gambling and "withdrawal symptoms." Br J Addict 1981; 76:401–405
98. Hudson JI, Pope HG Jr: Affective spectrum disorder: does antidepressant response identify a family of disorders with a common pathophysiology? Am J Psychiatry 1990; 147:552–564
99. Meltzer HY, Lowy MT: The serotonin hypothesis of depression, in Psychopharmacology: The Third Generation of Progress. Edited by Meltzer HY. New York, Raven Press, 1987
100. Siever LJ: Role of noradrenergic mechanisms in the etiology of the affective disorders. Ibid
101. Weissman MM, Meyers JK, Harding PS: Prevalence and psychiatric heterogeneity of alcoholism in a United States urban community. J Stud Alcohol 1980; 41:672–681
102. Benkelfut C, Murphy DL, Zohar J, Hill JL, Grover G, Insel TR: Clomipramine in obsessive-compulsive disorder: further evidence for a serotonergic mechanism of action. Arch Gen Psychiatry 1989; 46:23–28
103. Kaye WH, Gwirtsman HE, Brewerton TD, George DT, Jimerson DC, Ebert MH: Serotonin regulation in bulimia, in The Psychobiology of Bulimia. Edited by Hudson JI, Pope HG Jr. Washington, DC, American Psychiatric Press, 1987
104. Charney DS, Krystal JJ, Southwick SM, Nagy LM, Woods SW, Heninger GR: Serotonin function in panic and generalized anxiety disorders. Psychiatr Ann 1990; 20:593–602
105. Ballenger JC, Goodwin FK, Major LF, Brown GL: Alcohol and central serotonin metabolism in man. Arch Gen Psychiatry 1979; 36:224–227