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**Dissociative states in temporal lobe epilepsy and multiple  
personality disorder**

**Kinscherff, Robert Thomson, Ph.D.**

**City University of New York, 1988**

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DISSOCIATIVE STATES IN TEMPORAL LOBE EPILEPSY  
AND MULTIPLE PERSONALITY DISORDER

by

ROBERT THOMSON KINSCHERFF

A dissertation submitted to the Graduate Faculty in  
Psychology in partial fulfillment of the requirements  
for the degree of Doctor of Philosophy, The City  
University of New York.

1988

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This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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**Abstract****DISSOCIATIVE STATES IN TEMPORAL LOBE EPILEPSY  
AND MULTIPLE PERSONALITY DISORDER****By****Robert Thomson Kinscherff****Adviser: Professor Louis Gerstman**

Dissociative states are associated with both temporal lobe epilepsy (TLE) and multiple personality disorder (MPD). A group of subjects with TLE are compared on three measures with a group of subjects with MPD, and a group of controls. These measures assess indices of interictal behavioral alterations and a variety of dissociative experiences. A semi-structured interview was used to gather further information on reported experiences. Case materials are presented and special attention is given to data on subjects with dual diagnoses of TLE and MPD. A neuropsychological model is presented to account for the presence of severe dissociative states in temporal lobe epilepsy and multiple personality disorder.

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## INTRODUCTION

"...that from nothing else, but thence, from the brain, comes joys, delights, laughter and sports, and sorrows, griefs, despondency, and lamentations....And by this same organ we become mad and delirious, and fears and terrors assail us."

Hippocrates, 4th Century B.C.

It used to be said that the line between psychiatry and neurology is drawn at the Sylvian fissure. Renewed interest in brain-mind relationships over the past fifty years makes that view obsolete. Indeed, interest in the biological basis of human behavior has prompted increasing collaboration between psychiatry and neurology, and given birth to the specialty field of neuropsychology. With new investigatory techniques, rich clinical observations, and increasingly sophisticated conceptualizations of the links between the human brain and the mind it serves, clinical researchers are addressing areas of medicine and human behavior that have puzzled healers since antiquity.

This manuscript reports an investigation into the dissociative phenomena of temporal lobe epilepsy, including multiple personality. Specifically, this investigation examines the coincident presentation of temporal lobe epilepsy and multiple personality disorder in a group of patients referred for neuropsychiatric evalua-

tion at an urban teaching hospital. Some of these patients present with multiple personalities believed secondary to temporal lobe seizure activity. These patients are compared to psychiatric patients diagnosed with multiple personalities believed to have originated in chronic physical and/or sexual abuse in childhood. A central question to this investigation is the issue of how these two groups of patients came to present with profound dissociative states that are generally thought to occur rarely.

Traditionally, dissociative phenomena in temporal lobe epilepsy have been attributed to organic causes while those of multiple personality have been understood in psychodynamic terms. The results of this study suggest that a common neuropsychological mechanism underlies dissociative experiences originating from temporal lobe seizure activity or from chronic psychological trauma. These results reopen a nineteenth century debate about dissociative phenomena in epilepsy and multiple personality; this debate is reviewed below. However, advances in experimental and clinical neuroscience allow new understandings of the neuropsychology of dissociation.

This study is particularly prompted by two lines of research undertaken in recent years. The first line of

research is a series of cases of temporal lobe epilepsy presenting also with possession states, dual, or multiple personality (Benson, Miller, & Signer, 1986; Schenk and Bear, 1981; Mesulam, 1981). These cases were reported in the context of an ongoing controversy about the existence and nature of an interictal behavior syndrome associated with temporal-limbic abnormalities.

The second line involves investigations of psychophysiological and neurological phenomena associated with multiple personality disorder (Condon, Ogston, & Paoe, 1969; Pitblado & Densen-Gerber, 1986; Ischlonsky, 1955; Brende, 1984; Braun, 1983a; Putnam, 1984; Ludwig, Brandma, Wilbur, Bendfeldt, & Jameson, 1972; Larmore, Ludwig, & Cain, 1977); Bahnson & Smith, 1975; Cocores, Bender & McBride, 1984).

Both lines of research are discussed in detail in reviews of the literature below. Each directs attention to the biological substrates of behavior change, particularly those serving dissociative mechanisms. This renewed attention is actually a return to a line of inquiry that occupied some of the most productive neurologists and psychologists of the last century, including Hughlings Jackson, Charcot, Freud, Prince, Janet, Bleuler, and William James (for an excellent review see Ellenberger, 1970).

Of particular interest to these clinicians were the amnesias and alterations of consciousness reported by epileptic patients, and the relationship between these phenomena and those found in hypnotic states, hysterical symptoms, and multiple personalities. An association between epilepsy and multiple personalities was so frequently and enthusiastically reported that, during the period of fascination with this dual diagnosis in Europe and America between 1860 and 1910 "if someone was an epileptic or had been injured in an accident this was likely to be accepted as a cause of multiple personality, rather than a bar to that diagnosis" (Sutcliffe and Jones, 1962, p. 242). Charcot believed there existed an essential connection between epilepsy and multiple personality (Charcot, 1892).

Observations in cases of multiple personality, hysteria, and epileptic illness were important to the controversy which raged in the late nineteenth century between the "associationists" and "organicists." "Associationists" evoked psychological mechanisms in which connections are forged or lost between groups of mental associations while "organicists" argued that mental processes involved organic modifications in the nervous system.

Physiological mechanisms thought to underlie the clinical manifestations of multiple personality were proposed, including models of cerebral localization (Azam, 1887), hemispheric asymmetry (Luys, 1879), and metabolic differences (Ribot, 1885).

These strictly biological theories were opposed by Janet and those influenced by his concept of psychological "dissociation," including Sigmund Freud. Freud gradually moved from his early neurological pursuits towards study of hysterical phenomena, and then towards the elaboration of his own psychoanalytic theory. He sought to distance his theoretical work from that of Janet by criticism of the associationist approach, and abandoned his use of hypnotic technique and interests in the "hypnoid states" of hysteria (Ellenberger, 1970). The rise of psychoanalysis as a main force in psychiatry corresponds to a period of twenty years that saw: (a) the rejection of multiple personality as a diagnosis and its gradual replacement with Bleuler's "schizophrenia" (Rosenbaum, 1980); (b) loss of interest in hypnotic phenomena; and, (c) differentiation of the roles and body of professional knowledge thought appropriate to psychology, neurology, and psychiatry.

There is little doubt that the reaction against the concept of multiple personality was due to a variety of factors. One factor that contributed to its decline was the introduction of "schizophrenia" into psychiatric nosology (Rosenbaum, 1980). Indeed, the conceptual and clinical distinctions between "schizophrenia" and the dissociative phenomena of multiple personality were minimized by Bleuler:

It is not alone in hysteria that one finds an arrangement of different personalities one succeeding the other. Through similar mechanisms schizophrenia produces different personalities existing side by side. As a matter of fact there is no need delving into those rare though most demonstrable hysterical cases, we can produce the very same through hypnosis.

(Bleuler in Rosenbaum, 1980, p. 1384)

A less appreciated factor was increasing sophistication in clinical description and diagnosis. This development led to the recognition that many case reports of multiple personality were actually cases of epilepsy with ictal alterations of consciousness, or cases involving organic brain syndromes, fugue states, or psychotic regressions. Appreciation of the role suggestion plays in hypnosis and hysteria led figures such as Freud and Bleuler to propose that many reported cases were actually created by hypnotic investigations; a consensus emerged that Prince, Despine, Charcot and others had been duped by their own gullibility and their suggestible patients

(Larmore, Ludwig, & Cain, 1977; Bliss, 1984; Ellenberger, 1970; Rosenbaum, 1980). Advances in neurological description and diagnosis also led to reduced interest in hysterical and hypnotic phenomena at the turn of the twentieth century as psychiatry and neurology emerged as distinct specialties. By the 1920's the wealth of reports of multiple personality had ceased, and for more than fifty years multiple personality was considered a rare and enigmatic curiosity of nature--if it existed at all.

Nineteenth century neurologists had intensively studied their epileptic patients, and by the turn of this century had carefully described both the motor and psychological phenomena associated with seizures. Hughlings Jackson (Goldensohn, 1983) and others had not only firmly established the physiological origins of seizure activity, they had also catalogued the psychic components they observed to accompany some seizures--even in the absence of convulsions. Among the psychic components that Jackson, Gowers, Janet, Turner and others described were: "dreamy states," "doubling of consciousness," varied hallucinations and illusions, affective disturbances (anxiety, rage, fear), alterations of consciousness (clouding, derealization, depersonalization, *deja vu*), and cognitive disturbances (forced thinking, amnesias,

and illusions of memory). These psychic components have been variously grouped under terms such as "psycho-epilepsy," "uncinate seizures," "psychic variants," "psychomotor seizures," "temporal lobe epilepsy," and "complex partial seizures" (Lennox, 1960; Fenton, 1983).

A variety of explanations have been offered since antiquity for observed associations between epilepsy and changes in behavior, ranging from demonic possession to social stigmatization (Temkin, 1971). Even the recognition that epilepsy represents an illness rather than evil, and that the behavioral difficulties of many epileptics can be attributed in large measure to social and organic factors have not always protected the patient from fear and discrimination. This study is presented with the understanding that not all persons suffering from temporal lobe epilepsy present with pronounced disturbances of behavior. It is intended to help those patients whose behavioral alterations have an organic basis, without labeling those who present without behavior changes or whose changes are due to social stigmatization.

The twentieth century has seen continuing controversy about the frequency, origins, and nature of behavioral

alterations in epilepsy. The first thirty years of this century saw the rise of the term "epileptic character," a term that gradually gained currency through the latter nineteenth century as epilepsy came to be seen as a constitutional disorder with profound consequences for psychological functioning (Guerrant, et al, 1962). Traits thought to be specific to the epileptic personality "included egocentricity, eccentricity, irritability, religiosity, impulsiveness, emotional instability, hypersensitivity, paranoid [sic]" (Fenton, 1983, p. 198). Both seizures and these traits were thought to be manifestations of a constitutionally determined disorder with a deteriorating course.

This view eventually moderated since it failed to characterize the majority of epileptic patients or the course of their illness. However, influential papers in the late 1940's and early 1950's reported an association between epilepsies involving mesial temporal lobe structures and interictal behavioral changes (Gibbs et al., 1948; Gibbs, 1951; Gastaut, 1953). "Interictal" behavior changes are understood as those that are not the direct product of immediate, clinically detectable seizure activity (ictal); discussion of these behavior changes is complicated by the possibility of "subclinical" seizures

which are assumed to be occurring although not clinically detectable. Still, while acknowledging that social stigma and other psychological factors might play a role in developing psychiatric difficulties, it was asserted that "all the same, there is a particular kind of partial epilepsy with its origins in the temporal lobe or in structures bordering it...which does cause very peculiar behavior disturbances..." (Gastaut, 1953).

Since that time, clinical research involving the nature and frequency of psychiatric disturbances and interictal behavior changes among patients with temporo-limbic abnormalities has generated a controversy remarkable for its complexity and intensity. Simultaneously, researchers have begun to report increasing numbers of cases of multiple personality disorder, including observations and laboratory research upon the psychophysiology of multiplicity. In both areas, contemporary research and theory has been informed by recent investigations in neurophysiology and neuropsychology. In particular, recent advances in the areas of limbic system functioning and hemispheric specialization have been drawn upon to account for the observations in temporo-limbic epilepsy and multiple personality, and to generate more compelling theoretical accounts of clinical phenomena.

This study focuses upon a particular dimension of behavioral alterations in temporal lobe epilepsy, those associated with profound dissociative states such as multiple personality. Reports of major dissociative phenomena such as possession states, dual, and multiple personality in the clinical literature of temporal lobe epilepsy have prompted considerable interest and debate. This study is unique in its use of comparison samples of neurology patients with temporal lobe epilepsy and psychiatric patients with multiple personality disorder, as well as a nonpatient control group.

As indicated above, a central question of the study is the issue of what accounts for the appearance of highly unusual, profound dissociative states in two different populations. The occurrence of such unusual and dramatic dissociative phenomena in two distinct populations (victims of chronic childhood trauma, patients with temporal lobe epilepsy) raises a number of compelling clinical and theoretical questions regarding dissociative states and neurological functioning.

This dissertation is relevant because it investigates the appearance of profound dissociative states in these populations, and:

- 1) Examines previously published case accounts for data that indicates hemispheric laterality effects upon dissociative experiences;
- 2) Examines the neurophysiological model proposed by Bear (1979) to account for interictal behavior alterations, emphasizing its relevance to dissociative states in TLE;
- 3) Demonstrates a conceptual contiguity between this model and models of the neurophysiological effects of chronic and/or extreme psychological trauma. Central to this effort is the model of "kindling" in the limbic brain.
- 4) Extends the study of temporo-limbic epilepsy and profound dissociative states beyond case collections by comparison of two experimental groups (temporal lobe epilepsy, multiple personality) with a control group. The hypotheses tested were generated by review of major findings in the literature about interictal personality changes in temporo-limbic epilepsy, multiple personality disorder, hemispheric lateralization of function, and limbic system function and neurophysiology.

Findings are reported and a theoretical account offered for the clinical observations and research results of this study and other case accounts. Of particular importance to this theoretical account is an understand-

ing of limbic kindling (Goddard, 1969; Goddard & Morrell, 1971; Livingston, 1977; Adamec, Stark-Adamec, Perrin, & Livingston, 1981), a phenomenon thought by some to result from both seizure discharges and chronic and/or extreme psychological trauma. The kindling model and its implications for neurophysiology will be discussed in greater detail below and placed in the context of Bear's "hyperconnection" model of limbic seizure discharges (Bear, 1977).

Admittedly, this continues to be an area of considerable controversy. On one level, presenting a kindling model might be seen as simply an exercise in clinical anthropology, noting the use of similar language among different communities of researchers who lay claim to a particular theoretical model. This study certainly relies upon the common invocation of a kindling model among some investigators of psychological trauma and some investigators of seizure activity in the human brain. However, to the extent that the theoretical kindling model also corresponds to neurophysiological events that are observable and accessible to a scientific account, this study accepts both the virtues and liabilities of the model. This means that use of the kindling model should lead to generation of testable hypotheses and principles

for clinical management of patients presenting with profound dissociative states.

Some aspects of nondominant hemispheric functioning are reviewed for their relevance to dissociation. Of particular interest is the role of nondominant hemisphere function in assigning affective valence to ongoing experience, contributing to identity experience (Harris, 1986; Bear, 1986; Flor-Henry, 1979), and the association of nondominant hemisphere activity with altered states of consciousness.

Finally, the role of psychodynamic defenses is considered as a response to intensified affect and instinctual drives associated with the interictal behavior syndrome of temporal lobe epilepsy. While the theoretical account is admittedly speculative, it is offered for its clinical implications and as a spur to further research in the neurophysiology and neuropsychology of dissociative states. Ultimately, the contribution of this disseration lies in the explication of the conceptual and clinical links between temporo-limbic epilepsy and profound dissociative states, particularly multiple personality.

## LITERATURE REVIEW

### I. Temporal Lobe Epilepsy, Interictal Behavior Change, and Dissociation

A reader of the modern literature on interictal behavior changes and psychopathology associated with temporo-limbic seizures is impressed by the complexity of the controversy. Two areas of research bear on this investigation. First, descriptions of an "interictal behavior syndrome" specific to temporo-limbic epilepsy and a model of limbic "kindling" thought to underlie this syndrome are presented. The relationship between this kindling model and psychological trauma will be made in order to establish the conceptual links between temporo-limbic epilepsy and multiple personality. Secondly, because nondominant hemisphere dysfunction is implicated in reported cases of coincident multiple personality and temporo-limbic epilepsy, some speculative models of hemispheric involvement in dissociative states will be briefly reviewed. Recent cases in the literature of coincident temporo-limbic epilepsy and multiple personality will then be presented.

It is important to recall the features of the clinical hallmark of temporo-limbic epilepsy: the complex

partial seizure (Aird, Masland, & Woodbury, 1981). This seizure type is characterized by a variety of motor, autonomic, sensory, affective and psychic symptoms. While complex partial seizures are defined as involving both temporal and limbic structures the relationship of the variety of symptoms listed above to temporo-limbic seizures has also been established by experimental stimulation of these brain areas. Electrical stimulation of the human brain in temporal and limbic regions has yielded the ictal phenomena (Penfield, 1951, 1955; Penfield & Perot, 1963; Gloor, Olivier, Quesney, Andermann, & Horowitz, 1982; Gloor, 1986), and myriad surface and stereotaxic EEG studies have documented the coincidence of symptoms and seizure activity in these brain areas.

Many patients report prodromal mood changes of mounting tension, irritability, anxiety, or depression that are seldom accompanied by detectable surface EEG abnormalities (Blanchett & Frommer, 1986). Psychological stress or strong emotional states can trigger seizures (Blumer and Benson, 1982; Balis, 1979; Temkin and Davis, 1984) or contribute to the onset of episodic, limbic-related behavior disorders (Monroe, 1978, 1986). Prodromal mood changes, the triggering of seizures by emotional and stress factors, and limbically driven behavior disorders must be

seen as both brain and psychosocial events. These may interact in ways that can contribute to further seizure activity. For example, feelings of irritability may lead to behaviors that generate further tensions in the environment, possibly triggering subclinical seizure activity or seizures.

The ictal events themselves include a variety of symptoms reflecting paroxysmal involvement of limbic structures and the sensory-association areas of the temporal lobe. These ictal events are typically experienced by the patient as episodic, intrusive, alien, and overwhelming. They are of several dimensions: affective: abrupt and intense affective intrusions of fear, rage, elation, sadness; somatosensory: autonomic activations manifested as "butterflies," nausea, cardiac arrhythmias, sweating; alterations of experience of body schema; sensations of "floating"; cognition: amnesia and paramnesias such as *deja vu* and *jamais vu*; memory flashbacks; forced thinking; confusion; impaired spatial relations; altered experience of time; perception: complex visual and auditory hallucinations; illusions such as *micropsia* and *macropsia*; consciousness: states of depersonalization and derealization are commonly reported, such as "dreamy states," "doubling" (the patient's perspective is shifted as

though there were two observers, or as if she is viewing herself as an object of her own perception); loss of consciousness; autoscopy (psychosensory hallucination of one's own body perceived externally); fugue states; behavior: motor automatisms or more rarely, more complex motor sequences. [For discussions of ictal manifestations see: Sherwin, 1982; Fenton, 1983; Feindel, 1974; Gastaut, 1953; Daly, 1975; Balis, 1979.]

The issue of behavior changes specific to temporal lobe epilepsy is significant for a number of reasons. First, this disorder is the most common form of epilepsy in adults, roughly 3 per 1000 (Bear, Freeman, & Greenberg, 1986). Onset in most cases is due to infarct, granuloma, or head trauma. Secondly, some estimates suggest that 30-40 percent of patients present with enduring behavioral changes that can become the most incapacitating aspect of the disorder (Blumer & Benson, 1982; Lishman, 1978; Bear, Freeman, Schiff, & Greenberg, 1985). These range from changes that are not pathological per se to prolonged but atypical psychotic states in a small minority of patients. Lastly, there is evidence that this disorder "may serve as a valuable model illness in neuropsychiatry by allowing a direct correlation between localized, electrical dysfunction within the limbic

structures of the temporal lobe and specific features of human emotion, cognition, and personality" (Bear, Freeman, Schiff, & Greenberg, 1985, p. 191).

While general clinical wisdom acknowledges the link between temporo-limbic seizures and behavior changes, it has been difficult to establish those links empirically. The notion of the inevitably deteriorating "epileptic personality" prominent in the first decades of this century gave way to views stressing the normalcy of the vast majority of epileptic patients, and focused upon psychosocial causes of psychopathology (Guerrant et al., 1962). The modern debate was launched in 1948 by Gibbs, who, in a series of papers, asserted an association between temporo-limbic seizures and psychiatric disturbances that were "clinically indistinguishable from those encountered in purely psychiatric disorders" (Gibbs, 1951, p. 526). Drawing upon other research in limbic functioning, Gibbs and his associates proposed that dysfunction of temporo-limbic structures led to alterations in memory and emotion, and hence to psychopathological states (Gibbs et al., 1948; Gibbs, 1951).

Studies over the next decade were consistent with the notion of a "psychomotor peculiarity" in which temporal lobe epilepsy was linked to disturbances such as violent

impulsivity, depression, mania, sexual dysfunction, schizophrenia, and a variety of personality disorders (Bingley, 1958; Hill et al., 1957; Vislie & Henriksen, 1958; Gastaut, 1954; Falconer, Hill, Myer, & Wilson, 1958; Ervin, Epstein, King, 1955; Pond, 1957, 1962; Rodin, DeJong, Waggoner, & Bagehi, 1955). These persistent findings reported in the literature led to optimism that study of temporo-limbic abnormalities and behavior would readily lead to a greater understanding of mind-brain relationships and complex human behaviors (MacLean, 1954).

A critical review of this body of literature was published by Tizard in 1962, detailing a host of clinical and methodological flaws in reports associating temporal epilepsy and psychopathology (Tizard, 1962). More carefully controlled studies were published in the 1960's and 1970's. These studies contributed to an appreciation of psychological and psychosocial variables in the manifestation of interictal behavior change, but failed to establish the relationship between temporo-limbic dysfunction and specific syndromes attributable primarily to neurological factors.

Some investigators continued to find specific links between temporal lobe abnormalities and schizophrenia,

manic-depressive disorder, atypical psychotic states, depression, aggression, and episodic dyscontrol syndromes (Flor-Henry, 1969a, 1969b, 1974; Falconer, 1973; Slater, Beard, & Glithero, 1963; Mendez, Cummings, & Benson, 1986; Tucker, Price, Johnson, & McAllister, 1986; Pritchard, Lombroso, & McIntyre, 1980; Monroe, 1978). Others opposed these views and argued that the studies were methodologically flawed by errors including: (a) selection of the most impaired patients for study, (b) failure to adequately control for psychosocial and medication factors, (c) failure to define or control for seizure type as a variable, and (d) failure to control for a host of potentially confounding factors such as seizure etiology, seizure control, age at onset of seizures, multiple seizure types, and duration of seizure disorder (Stevens, 1975; Mignone, Donnelly, & Sadowsky, 1970; Rodin, 1973; Hermann & Whitman, 1986). Stevens reflected a more sophisticated understanding emerging from the controversy as she concluded her review of the literature:

In summing up, the data indicate that patients with major and psychomotor epilepsy are subject to an increased risk of psychiatric disturbance but that, except for the immediate postictal psychotic state, the risk appears to reflect the site and extent of brain damage and the individual's psychosocial history and opportunities more than a diagnosis of epilepsy.

(Stevens, 1975, p. 102, emphasis added)

In the past decade much of the debate has been focused on attempts to clarify the relationship between temporo-limbic dysfunction and affective disorders, schizophreniform psychotic states, and episodic disorders (Flor-Henry, 1976, 1985; Robertson, 1984; Post, 1986; Monroe, 1986; Post & Uhde, 1986). Debate has also been prompted by a proposed "interictal personality syndrome" particular to temporo-limbic epilepsy (Waxman & Geshwind, 1975; Bear & Fedio, 1977; Geshwind, 1983; Bear, 1979). Neither the persistent attempts to link severe psychiatric disorders to temporo-limbic dysfunction, nor the proposal of an interictal behavior syndrome have been universally accepted. Indeed, challenges to these findings continue to be made on methodological and conceptual grounds (Rodin & Schmaltz, 1984; Mungas, 1982; Tucker, Novelly, & Walker, 1987).

Still, while there continues to be considerable controversy about the specific nature of the relationship between temporo-limbic dysfunction and particular behaviors or disorders, the following points appear to have won some general agreement:

1. Temporal lobe epilepsy patients presenting with major behavioral alterations or psychiatric disorders represent a subset of patients characterized by extensive and/or chronic limbic system dysfunction (Blumer, 1979). These patients are likely to be poorly controlled medically and/or experience prolonged "subclinical" paroxysmal activity in temporo-limbic structures. The precise relationship between these neurological factors, psychosocial factors, and interictal behavior or psychopathology is currently unknown and a matter of dispute (Pond, 1974; Zielinski, 1986).
2. "It may be more appropriate to regard the temporo-limbic involvement as one of a number of aetiological agents that make people 'vulnerable' to break down when exposed to more acute stress, biological and/or psychosocial. Whether such a vulnerability factor as temporal lobe dysfunction actually leads to frank psychopathology will depend not only on the extent and severity of the temporo-limbic disorder but also on the extent and severity of other vulnerability factors and the impact of the precipitating or provoking stress" (Fenton, 1983, p. 192).
3. It would be a mistake to overlook the clear documentation of behavioral symptoms in many patients with temporal lobe epilepsy.

In fact, much apparent controversy has no bearing on the reality of the behavioral changes per se, but on independent, secondary, and often confused issues: the frequency of such changes among temporal lobe epileptics; the specificity of these behavioral changes to this neurological illness; or the differentiation of particular behavioral features from those of idiopathic psychiatric syndromes" (Bear, Freeman, Schiff, & Greenberg, 1985, p. 191).

4. Important differences exist between patients with temporo-limbic seizure activity and patients described by orthodox psychiatric nosology. For example, epilepsy patients who present with signs of schizophrenia typically do not show affect blunting or social withdrawal. The manic-depressive presentation in epilepsy can cycle or resolve within hours.

In general, there is no reason to believe that schizophrenia or other diagnostic categories constructed from observations of psychiatric patients should accurately describe the behavioral consequences of a neurologic process at a specific locus" (Bear and Fedio, 1977, p. 454).

#### Brain function and interictal behavior alterations in temporal lobe epilepsy

An influential neurophysiological model has been presented to account for the interictal behavior changes in temporal lobe epilepsy. This model, elaborated by Bear (1979), proposes that epileptiform seizure activity produces a "syndrome of sensory-limbic hyperconnection" as a result of repeated abnormal discharges in the

limbic structures in deep temporal lobe regions. This model and related investigations are reviewed below. Of special interest are attempts to associate specific patterns of psychopathology to hemispheric function and interhemispheric regulation.

The model of sensory-limbic hyperconnection was initially presented in an attempt to explain the phenomena of the "interictal personality syndrome" of temporal lobe epilepsy. The description of this syndrome departed from reliance upon psychiatric categories and its adherents stress that not all the behavioral alterations are psychopathological per se (Bear, Freeman, & Greenberg, 1986). That is, features such as increased philosophical interest or humorlessness cannot automatically be equated with psychopathology.

Waxman and Geshwind first claimed that "a distinct syndrome of interictal behavior changes occurs in many patients with temporal lobe epilepsy" (Waxman and Geshwind, 1975, p. 1580) and includes hyposexuality, religiosity, and hypergraphia. Blumer and Walker (1967) had earlier presented observations of alterations in sexual activity among temporal lobe epileptics, primarily hyposexuality. Bear and Fedio reported upon attempts to quantify these behavioral alterations using patient

self-reports and rater reports on 18 trait measures (Bear & Fedio, 1977). These 18 traits were extracted from the literature on interictal psychopathology and reviewed by Bear in his influential paper proposing the sensory-limbic hyperconnection syndrome (Bear, 1979). These interictal personality traits are summarized in Table One:

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TABLE ONE: BEAR-FEDIO INTERICTAL PERSONALITY SYNDROME TRAITS (1977)

Emotionality	Elation/Euphoria
Sadness	Anger
Aggression	Guilt
Altered Sexual Interest	Hypermoralism
Obsessionalism	Circumstantiality
Interpersonal Viscosity	Hypergraphia
Sense of Personal Destiny	Religiosity
Philosophical Interest	Humorlessness
Dependence/Passivity	Paranoia

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Bear and Fedio concluded that "a consistent profile of changes in behavior (obsessionalism, circumstantiality), thought (religious and philosophical interest), and affect (anger, emotionality, and sadness) thus appears to be the specific consequence of a temporal epileptic focus" (Bear & Fedio, 1977, p. 464). They noted that the behavioral characteristics constituted a consistent profile, and that frequency of clinically detectable seizures was not a relevant factor in the development of the behavioral alterations. Instead, the duration of illness correlated with interictal behavior changes, a finding consistent with some other research (Slater & Moran, 1969).

Additionally, these Bear and Fedio (1977) reported characteristic response patterns depending upon hemispheric lateralization of the epileptic involvement that they termed "distinctive hemispheric styles" (p. 645). Nondominant hemispheric functioning is found to be "emotive, impulsive, and dispositional," consistent with a profile of mood disorders, and prone to deny dysphoric or socially disapproved behavior. Dominant hemisphere subjects were more ideative, verbally conceptual, and prone to be overly harsh in self-descriptions (p. 465). In a companion paper, nondominant temporal subjects were also de-

scribed as "more overtly or externally emotive (aggressive, depressed, emotionally labile)" in a way that suggested that "each hemisphere has the capacity to develop (or overdevelop) emotional associations utilizing its own characteristic style of cognitive processing" (Bear, 1977, p. 19). Raters distinguished nondominant temporal subjects by their hypermoralism, remonstrations of helplessness, emotional reactivity, altered sexuality, and obsessionalism (p. 14).

These findings were widely but not universally accepted (see Stevens, 1982). One critical report raised methodological issues and reported studies suggesting that the Bear/Fedio measure tapped nonspecific psychopathology rather than specifically temporo-limbic features (Mungas, 1982). Mungas explicitly called for further studies of biologic and psychosocial factors that could discriminate between temporal epileptics with and without psychopathology.

Bear and Fedio, and subsequently Geshwind, rejected these criticisms and argued for the neurological specificity of the behavioral alterations. They explicitly ruled out "psychological stress, the effects of anticonvulsant therapy, and the actual occurrence of seizures or convulsions" as explanations for these behavioral alterations

Geshwind, 1983, p. S23). They also argued that the behavioral features did not represent compensatory strategies for neurological deficits, pointing out that many of the behaviors did not appear in other types of neuropathology. For example, list-making may be a strategy to compensate for poor memory, but poor memory alone could not account for the dramatic hypergraphia, nor the philosophical content of much of the writing.

Perhaps most convincingly, they argue that the distinctiveness of the interictal personality alterations lies precisely in the syndromatic quality of the clinical picture. That is, "the critical observation, both clinically and statistically, is the simultaneous occurrence of generally uncorrelated behavioral characteristics among temporal lobe epileptics" (Bear, Freeman, Schiff, & Greenberg, 1985, p. 206). They also point to the clinically distinctive quality yielded by the shared behavioral traits, such as morally justified aggressive acts followed by sincere remorse, and paranoid ideation along with a desire for close interpersonal relations and warm emotions.

Bear and Fedio attributed the clinical and experimental observations of the interictal behavior changes to an underlying sensory-limbic "hyperconnection" syndrome:

The proposal that an epileptic focus in the limbic system brings about enhanced affective associations permits correlation with theoretical and experimental accounts that anatomical connections between sensory and limbic structures are established within the temporal lobe. Whereas destructive lesions appear to produce sensory limbic dissociation through disconnection, it is our suggestion that the epileptic process brings about functional hyperconnection, leading to a suffusion of experience with emotional coloration. The effect of a temporal focus may be to establish new functional connections between neocortical and limbic structures or to disrupt mechanisms that normally inhibit fortuitous sensory-limbic associations. (Bear and Fedio, 1977, p. 465)

At the heart of the syndrome is "an alteration in the responsiveness of the limbic system, so that the patient's emotional responses are altered in a characteristic fashion, i.e., there is heightened emotional response to many stimuli, and diminished sexual responsiveness" (Geschwind, 1983, p. S28). This alteration of limbic structures is thought to account for the generally heightened emotionality, as well as the alterations in biological drives such as aggression and sexuality. Fortuitous associations are created in this process, infusing experience with excessive affective valence, that in turn results in presentations of circumstantiality, nascent paranoia, interpersonal "stickiness," and philosophical/religious preoccupations.

The reader will note the special vulnerability of mesial limbic structures (amygdaloid complex and hippocampus) to epileptogenesis. It is also important to recall the susceptibility of limbic structures and adjoining areas to secondary epileptogenesis (Morrell, 1985). The actual mechanism for the formation of "hyperconnections" is posited to be "kindling"--the development of altered patterns of neural discharge following repeated stimulation of specific brain areas. Bear, Fedio, and Geshwind note that there are extensive neural connections between the limbic system and the primary receiving areas of the cortex, and that a critical role of these connections is to incorporate ongoing stimuli into basic biological drive states by endowing them with emotional meaning. An additional role is to process and integrate these stimuli with memory processes mediated by the hippocampus.

In short, the "limbic hyperconnection" model asserts that underlying the interictal behavior alterations is a dysfunction of emotion and association. This dysfunction is itself a consequence of altered limbic system function and regulation caused by clinical and "subclinical" seizure discharges. These discharges essentially act as an electrode discharging erratically into limbic structures with their wealth of associations to sensory areas, thus

"kindling" those structures. This results in "the development of new synaptic connections between the limbic system and association cortices" and "previously neutral stimuli events or concepts are given an emotional labeling" (Fenton, 1983, p. 202).

The fact that epileptiform excitatory events tend to propagate (Engel, Rausch, Lieb, Kuhl, & Crandall, 1981) and to influence other structures emphasizes the dynamic nature of this model. That the interictal behavior syndrome, once established, tends to persist to some degree despite successful medical or surgical control suggests that its origins are neurophysiological rather than psychosocial or psychodynamic (Bear, personal communication, 1986).

This model is also consistent with clinical and experimental data about limbic function and the process of "kindling." It is beyond the scope of this dissertation to review in detail this body of literature (for clinical and theoretical reviews see: Adamec & Stark-Adamec, 1983; Gloor, 1986; Racine & Zaide, 1976; Adamec, 1976; Doane, 1986; Racine & McIntyre, 1986). It is perhaps sufficient to note the following properties of kindling observed in animal studies: a) kindling can be produced in animals without induction of seizures (Racine, 1972a,

1972b); b) kindling produces long-lasting alterations in neuronal excitability, with consequent behavioral changes (Post, 1983); c) similar kindling results may be obtained by exposure to intermittent electrical stimulation of limbic structures, repeated administration of psychostimulant drugs, or chronic stress (Antelman, Eichler, & Black, 1974; Segal, Weinberger, & Cahill, 1980; Kramer, Ebert, & Lake, 1984; Sato, 1983).

Of particular interest to this investigation are indications that the heuristic value of the kindling model is not limited to explicating limbic seizure phenomena (Adamec & Stark-Adamec, 1983). Harris (1986) has noted that kindling is most likely to occur at times when, on a physiological level, coping mechanisms have been depleted and overwhelmed. Van der Kolk (1987; personal communication, 1987) Kolb (1987), and Harris (1986) have invoked limbic alterations in describing physiological responses to trauma and subsequent post-traumatic psychological and behavioral phenomena.

While admittedly speculative, this line of reasoning is consistent both with existing laboratory data and clinical observation. One study has been published demonstrating increased autonomic responses to neutral and emotional stimuli in temporal lobe epilepsy patients, a

finding consistent with the hyperconnection model (Bear, Schenk, & Benson, 1981). Kindling and hyperconnection have been evoked in efforts to link episodic disorders (Monroe, 1978) and atypical psychoses (Tucker, Price, Johnson, & McAllister, 1986) to temporo-limbic dysfunction. Van der Kolk considers kindling-like processes in traumatized humans as a kind of "behavioral sensitization" that may lead to "lasting neurobiological changes", especially in victims of chronic or repeated trauma (van der Kolk, 1987, p. 68). Harris even more boldly writes:

Kindling produces imperative changes in the structures of consciousness...Indeed, prolonged and repetitive new experience gives rise to new neural and psychological structures....Essentially, these changes are made either on the basis of fixation, which may be defined as unexpected profound pleasure, or on the basis of trauma, which is to say on the basis of unexpected and profound pain. Both fixation and trauma lead to kindling phenomena and consequent brain-mind change. (Harris, 1986, p. 44)

It is through the model of limbic hyperconnection, as generated through kindling, that both seizure disorder and dramatic dissociative states such as multiple personality are conceptually linked. Kindled "hyperconnections" and consequent "behavioral sensitizations" or interictal syndromes may be created by the internal activity of epileptogenic neural firing, or by external condi-

tions of repeated trauma. Stevens (1982) notes that the psychiatric traits attributed to temporal epilepsy are commonly found in post-traumatic psychopathologic states. As will be discussed below, multiple personality is a condition born of extreme repeated trauma during years when brain development is ongoing. It is intriguing that Doane has noted that multiple personalities are "apt to manifest symptoms similar to a temporal lobe aura at times when they are most likely to dissociate spontaneously or when they are undergoing hypnotic trance" (Doane, 1986, p. 301).

The hyperconnection model may also help account for why some patients seem particularly predisposed to development of the interictal behavior syndrome, including dissociative states. Current studies have not systematically investigated the factors differentiating those temporo-limbic epilepsy patients who develop interictal behavior syndrome from those who do not. No studies address what factors might predispose some patients to develop significant interictal dissociative states. One might predict that patients with prior histories of chronic stress or repeated trauma would be more likely to display the interictal syndrome since the hyperconnection process might already be underway prior to development of seizures.

As indicated in the review of the Bear-Fedio contributions, there is data indicating that interictal behavior patterns are influenced by laterality of the abnormality. Data from this investigation and the cases reviewed below point to an overrepresentation of patients with nondominant hemisphere involvement among dual diagnosis cases of multiple personality and temporal epilepsy.

It is beyond the scope of this dissertation to thoroughly review the vast and complex literature on hemispheric specialization (reviewed in: Benson & Zaidel, 1985) and psychopathology. However, a brief review of some points of consensus regarding hemispheric contributions to ongoing experience and psychopathology will set the stage for a discussion of biological models of dissociation.

Any biological model of dissociation would have to be consistent with increasing evidence relating psychopathology to specific patterns of hemispheric dysfunction (Flor-Henry, 1979a, 1979b, 1969; Gianotti, 1972; Flor-Henry & Koles, 1980; Bear, 1983, 1986; Wexler, 1983). Emerging concepts in this area include:

1. In patients with temporal lobe epilepsy who develop severe psychopathology, nondominant hemisphere dysfunction is associated with affective disorder. Dominant

hemisphere dysfunction tends towards a schizophrenia-like clinical presentation (Flor-Henry, 1979, 1969, 1983; Bear, 1982, 1986; Bear & Fedio, 1977; Coffey, 1987).

2. The nondominant hemisphere has a greater role in perception of and reaction to stressful or affectively negative stimuli, the dominant hemisphere in reaction to affectively positive stimuli (Dimond, Farrington, & Johnson, 1976; Harman & Ray, 1977; Schwartz, Davidson, & Maer, 1975; Tucker, Roth, & Arneson, 1977). Nondominant hemisphere dysfunctions constitute failures in emotional surveillance, detection, perception, and attribution (Bear, 1983).

3. The transition from normal to altered states of consciousness is characterized by increased activity of the nondominant hemisphere and relative suppression of dominant hemisphere functions (Frumkin, Ripley, & Cox, 1978; Gur & Gur, 1974; Kinsbourne, 1972). Nondominant hemisphere dysfunction can involve alterations in attention, processing modes (verbal to nonverbal), and identity processes (Harris, 1986; Hilgard, 1986).

4. Patients with nondominant hemisphere dysfunction tend to experience behaviors, impulses, or affects originating in that hemisphere and insufficiently modified or inhibited by dominant hemisphere processes as ego-alien, intru-

sive, and impulsive (Bear, 1977, 1983; Robert Stowe, personal communication, 1988).

Brain function and dissociation in temporal lobe epilepsy

Models of dissociation subsequent to temporo-limbic dysfunction should be consistent with these features. It is also important to recall that temporal dysfunction itself can create conditions of: disruptions of ongoing experience (recent memory); disorientations in time or space (spatial, temporal functions); "fractionation of experience in terms of individual psychodynamic patterns or response to single facets or qualities of objects in the environment" (integrative functions)" (Ferguson et al, 1969, p. 495). Nondominant hemispheric dysfunction further predisposes a patient to the disruptions of experience that temporal abnormalities generate. A model of dissociation must account for these features in cases of temporo-limbic epilepsy.

One model points to dysfunction in interhemispheric transfer leading to failures in hemispheric integration of function (Benson, Miller, Signer, 1986). This would result in relatively autonomous hemispheric functioning secondary to disruption of interhemispheric integration by limbic discharges and, hence, dissociation. This model is based upon research on callosal disconnection,

and is unlikely for a variety of reasons. In addition to being inconsistent with data regarding brain function, for example, one would also expect on the basis of this model that so-called "split-brain" patients would then experience dissociative states. This is clearly not the case despite their difficulty in accounting for some of their behaviors and cognitions under experimental conditions (Gazzaniga, 1985; Marks, 1980).

Another model proposes that that hyper- or hypoactive functioning in hemispheres can be sufficient to disrupt the reciprocal inhibition or facilitation required to maintain stability of affective, cognitive and identity processes (Harris, 1986; Bear 1979, 1983). This model would be consistent with the hyperconnection theory of limbic involvement, as well as the data on nondominant hemisphere function. In this model a dissociative state would be the result of a neurologically driven imbalance of limbic and hemispheric function that yields psychological epiphenomena such as ego-alien affects and behaviors, altered states of consciousness, and shifts in cognitive processing.

Psychodynamic defenses might add another layer of psychological activity as efforts to cope with intense,

discontinuous, uncontrollable experiences that are neurologically based. Schenk and Bear (1981) account for the emergence of multiple personality subsequent to onset of seizure disorder by a variant of this model: hyperconnection leads to heightened affect, thus to psychodynamic defenses, including severe dissociative states.

Finally, another model characterizes dissociation as a "selective filtering of attention that depends on limbic circuits" that is commonly induced under conditions of sensory overload or extreme anxiety (Doane, 1986, p. 302). This view accepts dissociation as a capacity that has survived in the behavioral evolution of our species because of its high survival value under extreme conditions. In this model, epileptiform alterations in temporal and limbic functioning can lead to errors in affective surveillance, assessment, and reaction by the nondominant hemisphere. These errors can result in affective and cognitive misattribution of sensory stimuli. The negative bias and ego-alien quality contributed by a dysfunctioning nondominant hemisphere is likely to result in the triggering of intense anxiety states. These states yield dissociative reactions psychologically and,

physiologically, the differential activation of cell assemblies (Hebb, cited in Doan, 1986, p. 302; Pribram, 1971). While this model does not rely upon the hyperconnection syndrome proposed by Bear, it is also not inconsistent with this proposal.

#### Multiple personality and temporal lobe epilepsy

In the neurology literature, there have been three recent papers proposing an association of temporo-limbic seizures and multiple personality disorder. Mesulam (1981) reported a series of seven patients with temporal epilepsy who also met criteria for multiple personality. All were female. Psychophysiological phenomena reported among alter personalities ("alters") included switches in handedness, and color blindness. Four of the personalities lacked the amnesias present in the classic presentation of multiple personality, and one case (#7) is probably misclassified when termed multiple since it is not clear this patient actually experienced different identity states. With the exception of this case, each patient reported 3-4 total personalities. Mesulam noted that five of the seven had primarily nondominant hemisphere abnormalities on EEG and noted:

Under usual conditions, the affective tone imparted to perception or thought is expected to reflect the subject's past experience, present internal state, and the value of the

relevant mental experience. In patients with temporal lobe epilepsy, this relationship may be severely disrupted by the presence of an autonomous and paroxysmal focus of neural discharge. This focus may lead to unpredictable affective coloring of mental activity and may disrupt the balance between affect on one hand and perception and thought on the other....It is conceivable that autonomous mental events that originate in the nondominant hemisphere are more likely to lead to dissociative states, whereas those that originate in the hemisphere dominant for language may be more likely to be adopted as part of the self.

Schenck and Bear (1981) reported three cases of multiple personality; these cases may be duplicate reports of three of Mesulam's cases. These authors emphasized features of the interictal behavior syndrome in their analysis of the cases, referring to the hyperconnection model:

If, as is generally accepted on a psychodynamic level, dissociation is a defensive maneuver to disavow affects threatening to the ego, it follows that a condition like temporal lobe epilepsy which produces altered and unusually strong affective associations, would predispose to use of this defense (Schenck & Bear, 1981, p. 1314).

These authors stress that the multiplicity developed after the development of the seizure disorder in these cases, and that the multiple personalities were not ictal events. They also hypothesized that, similarly to non-epileptic multiples, strong affects and restrictive superego functions would predispose patients to dissociate.

Schenck and Bear (1981) reviewed 13 cases they had collected with major dissociative states and found a possible predominance of bilateral hemispheric involvement; they noted the specific association of right-hemisphere activation in production of ego-alien experiences and surmised that this might lead to dissociative states. Interestingly, the observation that major dissociative states was overrepresented among women patients led them to consider as potential contributing factors both biologically determined sexual brain dimorphism and lower social acceptability for aggression and sexuality in women. They apparently did not consider the overrepresentation of histories of sexual abuse among women and the association of such histories with multiplicity.

Benson and his associates (1986) reported two cases of dual personality with polarized behaviors and mutual amnesias. Both cases had developed dual personality subsequent to a first clinically diagnosable seizure, and involved alters who insisted that family members were imposters in a fashion reminiscent of Capgras syndrome. Both patients were female, with nondominant hemisphere involvement. No unusual psychophysiological phenomena were reported. In both cases hostile alters appeared

during a prodromal period, persisted from hours to weeks, and resolved following a major seizure. They concluded that too little is known about the links between major dissociative states and temporal epilepsy, but speculated about state-specific learning models and limbic involvement.

The few remaining case reports vary in the data they convey about critical factors such as: seizure type, onset of multiplicity relative to onset of seizure disorder, psychophysiological phenomena such as switches in handedness, number of alters, and interictal syndrome features. With the exception of this study and a project currently ongoing at the National Institute of Mental Health (Putnam, personal communication, 1987), there are no contemporary reports of efforts to systematically investigate the relationship between temporal epilepsy and multiple personality, or major dissociative states.

These remaining cases of temporal epilepsy and multiplicity in the literature are incompletely reported in many respects. A case of a male multiple personality with seizures and left temporal and frontal EEG abnormalities was presented by Brende and Rinsley (1981). Unfortunately, while their paper offers a comprehensive psychoanalytic profile of this patient, the issue of his sei-

zure disorder was not addressed. Another paper reports a female with bitemporal abnormalities, a severe psychic component to her complex partial seizures, and multiple personalities (Tucker, Price, Johnson, & McAllister, 1986). Treatment with carbamazepine and phenobarbital led to decreased seizure-related phenomena, but had no impact upon her memory disturbance or multiplicity. No mention is made of the number of personalities or any psychophysiological oddities.

Velek and Balon (1984) reported a female patient with five alter personalities. This patient presented with bilateral temporal abnormalities, handedness switching and dramatic weight fluctuations; treatment with carbamazepine, phenobarbital, and phenytoin failed to have an impact upon her symptoms. No mention was made of the onset of multiplicity relative to the onset of seizure disorder. A case reported by Devinsky and Bear (1984) is used to illustrate the contribution of limbic hyperconnectivity to interictal aggression. A few other cases reported by clinicians interested primarily in the psychophysiological manifestations of multiple personality disorder will be presented in the review of that literature in the next section.

### Summary

Individuals presenting with temporo-limbic epilepsy are considered at risk for development of interictal behavioral alterations and/or psychopathology. This risk develops as a result of physiological alterations of limbic structures and the creation of fortuitous associations of cell assemblies in the limbic structures and cortical association areas. Kindling is presented as a model for epileptic alterations of limbic structures. Its use as a model for accounts of psychological and behavioral alterations following exposure to chronic trauma is presented as a link to cases of psychogenic multiple personality.

Recent reports of coincident presentations of multiple personality and temporal lobe epilepsy are reviewed. The overrepresentation of nondominant temporal lobe dysfunction in this sample is noted (9 of 12 cases involving multiplicity presented with nondominant or bilateral abnormalities on EEG). The reader will recall evidence of laterality effects in psychopathology, especially those involving the nondominant hemisphere. Three competing models of dissociative states linked to neurological dysfunction, derived from views implied or explicitly presented in the literature, are presented.

The reports of cases with coincident multiple personality and temporal lobe epilepsy do not systematically examine the possibility of predisposing factors to dissociation. In general, the literature supporting the notion of characteristic interictal behavior changes secondary to limbic alterations does not account for psychological or psychosocial variables that might contribute to development of prolonged dissociative states, including multiplicity. More basically, there is little consideration of the ways in which epilepsy-related multiplicity may be contrasted with allegedly psychogenic multiplicity, or what clinical implications might flow from such a comparison. In the next section, reports of physiological studies of multiple personality will be reviewed to consider evidence that "psychogenic" cases of extreme dissociative states present with concomitant neurological manifestations.

## II. Multiple Personality Disorder

This investigation relies upon the definition of dissociation offered by Putnam (1985) and the DSM-III/R (1987) criteria of multiple personality for guidance.

Putnam defines dissociation as:

...a complex psychophysiological process, with psychodynamic triggers, that produces an alteration in the person's consciousness. During this process, thoughts, feelings, and experiences are not integrated into the individual's awareness or memory in the normal way. Two characteristic features are found in most major dissociative reactions. The first is a disturbance in the individual's sense of self-identity. This may take several forms, such as the loss of all self-referential memory in psychogenic amnesia, or the existence of several alternating identities, as is the case with multiple personality. The second feature is a disturbance in the individual's memory that is usually manifested by amnesia for past events or complex acts. (Putnam, 1985, pp. 66-67, emphasis added).

The DSM-III/R requires that two criteria be fulfilled for diagnosis of multiple personality disorder:

- A. The existence within the person of two or more distinct personalities or personality states (each with its own relatively enduring pattern of perceiving, relating to, and thinking about the environment and self).
- B. At least two or more of these personalities or personality states recurrently take full control of the person's behavior. (American Psychiatric Association, 1987)

It is important to note that, while Putnam specifically refers to the function of "psychodynamic triggers" in producing dissociative states, the DSM-III/R does not

demand the identification of such "triggers." Neither does it require specific identification of patterns of behavior that could be understood as reflecting psychodynamic processes. The DSM-III/R criteria permit inclusion of forms of multiplicity with high degrees of coconsciousness between personalities, as well as the classical amnesias between personalities.

It is not a trivial consideration for this investigation that the DSM-III/R does not require the presence of amnesia for the intrapsychic or behavioral experiences that may occur in the dissociated states of multiple personality. Indeed, if amnestic states are diagnostic requirements for multiplicity, then many of the cases reported in the neurological literature may not be multiple personality at all.

More fundamentally, the question of amnesia also involves the issue of classification of multiple personality disorder as a form of hysteria, borderline, or post-traumatic disorder. Some authorities insist upon the presence of amnesias for diagnosis (Coons, 1984; Thigpen and Cleckley, 1984; West, 1967), while others argue that although amnestic states are commonplace, they are not essential to diagnosis (Ellenberger, 1970; Ludwig, Brandsma, Wilbur, Bendfeldt, & Jameson, 1972).

Thigpen and Cleckley (1984) sharply challenge the recent "multiple personality epidemic" (Boor, 1982, p. 302) of reported cases. They argue that misdiagnoses are occurring because clinicians are failing to appreciate that the "true multiple personality experiences total amnesia for...ideations, perceptions, and actions of the alter personalities" (p. 64). Coons (1984, p. 53) calls amnesia an "absolute essential criterion for the diagnosis" and specifically criticizes Mesulam (1981), and Schenk and Bear (1981) for including cases of epilepsy patients without amnesia among their sample of multiple personalities. Thigpen and Cleckley warn that patients may have "a pseudo- or quasi-dissociation that functions...to maintain an acceptable self-image, or even escape responsibility for actions...as a way out of a difficult psychological or emotional dilemma" (Thigpen and Cleckley, 1984, p. 65). They would undoubtedly also be suspicious of diagnoses of "multiple personality" when a patient is struggling with the psychological disruptions of temporo-limbic dysfunction, and whose amnesias may be secondary to seizures.

Those insisting upon amnesias operate from a model of multiplicity in which there is an identifiable and discrete "core" or "birth" personality that has deployed a number of psychodynamically distinguishable "alters" in

the service of defense. This model underlies the understanding of such popular cases as those presented in "Three Faces of Eve" (Thigpen and Cleckley, 1950, 1957), "Sybil" (Schreiber, 1973), and "Billy Mulligan" (Keyes, 1981) and is considered the "classic" presentation. This model is derived from the view that multiplicity is a form of hysterical disorder. Those who uphold the "classic" presentation as the only form warranting the diagnosis are receiving stiff challenges from those holding other views.

Other cases have been considered from alternative perspectives, with different implications for the issue of amnesia and other diagnostic criteria, dynamics, and treatment. Stern has categorized theoretical accounts of the phenomena of multiple personality into three major categories: physiological, psychological, and sociological (Stern, 1984). Physiological investigations will be discussed in greater detail below. Efforts to account for the psychophysiology of dissociative states and multi have been scant although there is currently much greater interest.

A few reporters have stressed sociological factors in the functioning of multiple personalities. Murphy argued that "most cases of multiple personality appear essentially to represent the organism's effort to live, at differ-

ent times, in terms of different systems of values" (in Stern, 1984, p. 151). Others have described factors such as the misperception of social cues due to "loss of self-reference memories and confusions and delusions about particular identity in time and place" (Sutcliffe and Jones, 1962, p. 231). Responsiveness to particular social roles and situations has also been stressed in the formation and functioning of alter personalities (Taylor & Martin, 1944; Ludwig, Brandsma, Wilbur, Bendfeldt, & Jameson, 1972). These models tend to focus on the role of social cues and behaviors rather than the issue of amnesia. Ludwig, et al (1972) minimized the role of amnestic states by linking multiplicity with more common altered states of consciousness, and normative alterations of identity due to mood states or social demands.

Psychological, and particularly psychodynamic, models have dominated discussions of multiple personality. These accounts have tended to focus upon psychodynamic processes and rarely comment specifically about the range of psychophysiological phenomena, except to note them in passing. They have not been particularly useful for understanding the physiological phenomena associated with dissociative states and multiple personality disorder. Worse, "even when a seizure history or a significant EEG abnormality is reported, a psychodynamic theory is usual-

ly offered to explain the occurrence of multiple personality" (Benson, Miller, & Signer, 1986, p. 473), and inquiry is limited to the psychological domain alone.

Psychodynamic accounts of multiplicity dominate the psychological literature. The theoretical language used to account for multiplicity has followed the fashions of psychoanalytic thinking. Following disillusion with hysteria and multiplicity early in this century, there were claims that the alter personalities or dissociative states are an iatrogenic artifact, forms of malingering, or a sort of folie a deux between a suggestible patient and eager clinician (see: Ellenberger, 1970). These views have been explored over the years by unconvincing efforts to experimentally create multiple personalities with hypnosis (Erikson, 1980; Harriman, 1942; Kampmann, 1976), but are occasionally still asserted by critics of the concept of multiplicity (see: Stern, 1984; Kluft, 1982).

Between 1910 and roughly 1970 multiplicity was relegated to intellectual and clinical obscurity with the exception of scattered case accounts. Interest in dissociative states was maintained by a few clinicians in major hospitals who reported on psychogenic fugue states (Abeles & Schilder, 1935; Kanzer, 1939), and by observers

of traumatic reactions to combat in World War Two (Parfitt & Gall, 1944; Sargant, 1944; Sargant & Slater, 1941; Stengel, 1941, 1943). Psychoanalytic accounts of dissociative states during this period tended to stress the role of psychosexual fantasies framed in psychoanalytic drive theory (Fenichel, 1945). With the rise of psychoanalytic ego psychology and the influence of Erikson (Erikson & Kubie, 1939; Erikson & Rapaport, 1980), there began to be some discussion of a continuum of dissociative disturbances characterized by variable degrees of integration of affect, fantasy, cognition, and behavior with a core identity (Bychowski, 1962).

The rise of the object relations school of thought led to introduction of "splitting" as both a process and a defense (see: Fairbairn, 1952; Guntrip, 1969; Volkan, 1976; Rinsley, 1983; Kernberg, 1975, 1976; Freedman, 1980). This movement has delineated the structural features of so-called "borderline" personality organization. Several authors have specifically stressed the dual and multiple identity processes that commonly occur in such patients (Searles, 1977; Nadelson, 1977; Horowitz, 1977; Fast, 1974) in which compartmentalized and incompatible identity organizations are maintained in clear consciousness and often without amnesias.

Recently, efforts have been made to describe the dissociative mechanism underlying the splitting of identity processes (Scialli, 1982; Gruenewald, 1978) and to categorize multiple personality as a borderline disorder (Benner & Joscelyne, 1984) or variant (Clary, Burstin, & Carpenter, 1984) rather than an hysterical disorder. This perspective tends to minimize the role of amnesias between alters and can be applied to cases characterized by profound fragmentation of identity in which there may be no discrete "core" or "birth" personality (see: Chase, 1987). It is also extremely compatible with emerging evidence of the strong association between borderline psychopathology, multiplicity, and histories of severe trauma in childhood (Herman & van der Kolk, 1987; Horevitz & Braun, 1984; Putnam et al, 1986).

The psychoanalytic views (drive, ego psychology, object relations) of multiple personality offer useful accounts of the psychodynamics of dissociation and are compatible with current knowledge of etiology. However, they do not speak to the psychophysiological manifestations of multiplicity, nor are they readily operationalized for empirical study. As indicated above, authors relying upon psychoanalytic conceptions are divided in their assessment of the role of amnesia in multiplicity. Those adhering to the traditional view that multiple

personality belongs to hysteria tend to insist upon amnesias, while those who view it as a form of pre-oedipal psychopathology are less likely to insist upon this cognitive feature.

Other psychological models include explications of varying "ego states" (Watkins, 1982a, 1982b; Federn, 1952), and Hilgard's (1986) "neodissociation" model. The latter is a cybernetic model in which executive ego functions lose control/integration with subordinate cognitive structures. Hilgard's model is most directly compatible with research in the area of hypnosis, including induction of some psychophysiological phenomena also seen in multiplicity such as changes in perception, analgesia, muscular movement, and complex skills (Hilgard, 1986). Indeed, Hilgard explicitly discusses the role of hypnotic states in multiplicity in terms of his broader neodissociation model. While both of these models can account for amnesias in multiplicity, they do not seem to insist upon them as a diagnostic criteria.

Psychological and sociological models have greatly enriched clinical understanding and offer important perspectives on the etiology, dynamics, and phenomenology of multiple personality. Still, with the possible exception of Hilgard's model they are notoriously difficult to investigate empirically. And, as indicated above, with

the exception of his "neodissociation" model they do not speak at all to the psychophysiology of dissociation or its occurrence in temporal epilepsies.

The issue of the relationship between amnesias and the category termed "multiple personality" remains controversial. A primary concern in this investigation is the role of neurologically mediated alterations of experience on identity processes, either through direct action on neural circuitry or mediated through psychodynamic defenses.

In exploring case descriptions of phenomenologically discrete organizations of affect, cognition, and behavior that persist for prolonged periods of time, a question arises: Does a subject whose identity processes include experiences felt to be utterly alien and foreign to her sense of self qualify for designation as "multiple personality" if such states occur in clear consciousness and without amnesia? For purposes of this study, the cases of multiplicity secondary to interictal behavior syndrome will be considered "multiple personality" if they meet criteria of DSM-III/R. They will be regarded as multiple personality even in the absence of pervasive, psychodynamically motivated amnesias.

Recall that the child who is immersed in an environment of chronic, inescapable abuse is also an organism with a developing nervous system. Many cases of multiplicity involve histories of abuse that begin in infancy and early childhood and extend through adolescence, thus having an impact on biological as well as psychological development. Ultimately, a far more interesting question than the issue of amnesias is the question of what brain processes underlie the biological and psychological manifestations of multiplicity.

It will be many years before researchers are able to explain these brain processes. Indeed, at this point clinical observation far outstrips the objective study of multiplicity, and theory construction is highly speculative. Before reviewing the psychophysiological observations and studies that do exist, it is worth setting the stage for that discussion by noting these points:

1. "Psychiatric disorders have often been associated with stressful early life experiences and developmental processes. Such experiences and patterns of development could have differing effects on each hemisphere, or they might affect the development of interaction between the hemispheres" (Wexler, 1980, p. 283).

2. Conditions of chronic stress and anxiety can yield kindling-like "behavior sensitizations" in limbic structures (van der Kolk, 1987), with enduring impact upon social behavior and psychological experiences of self and other (Harris, 1986).

3. "While current data are very scanty, multiple personality disorder appears to be unique among the dissociative disorders in that without treatment, it is a chronic condition compared to the generally self-limited course of the other dissociative reactions" (Putnam, 1985, p. 87). This suggests that the psychobiological functions that underlie the overt manifestations of the multiplicity are long-standing and not readily altered.

4. A central mechanism in the psychopathology of multiple personality is a spontaneous self-hypnosis (Hilgard, 1986; Bliss, 1983, 1984a, 1984b; Beahrs, 1982, 1983) reminiscent of the "hypnoid states" of Freud and Breuer (Breuer and Freud, 1957). Nondominant hemisphere activation is associated with hypnotic states and susceptibility (Frumkin, Ripley, & Cox, 1978; Gur & Gur, 1974).

Psychophysiological investigations of dissociation in multiple personality disorder

Of particular interest to this investigation are reports from those seeking to understand the psychophysiological dimensions of the dissociation and multiplicity.

Perhaps the only related field of study has been the investigation of psychological and psychophysiological phenomena by hypnosis. The interested reader is invited to read reviews of this area by Hilgard (1986), Bliss (1984, 1986), McKellar (1977) and Braun (1983a). Suffice it to say that most of the psychophysiological phenomena observed in multiple personality have been elicited under hypnosis. As with multiple personality, the exact neurological mechanisms are still a mystery, particularly those playing a role in alterations of immune function, metabolism, pain control, memory, and autonomic functioning.

As indicated above, clinical observation currently outstrips laboratory study and theoretical conceptualization in this area. Reports published since 1980 continue to catalogue extraordinary psychophysiological signs. Differences among "personalities" sharing a single body have been noted in metabolism, behavior, immune response, and sensory function. These have included alterations in: handedness, weight fluctuations, perception of color and color blindness, allergic sensitivity, medication responses, level of autonomic arousal, menstrual cycle, diabetic metabolism, pain threshold, dermatologic reactions, bilateral skin conductance, rate of healing and immune response, seizure activity, respiratory and cardi-

ac rates, handwriting, vocal intonation, facial musculature, body posture, hearing, visual acuity, headache, personality specific complex skills, susceptibility to a variety of dramatic hysterical symptoms (Velek & Balon, 1986; Braun & Braun, 1983; Chu, 1984, personal communication, 1987; Bliss, 1984; Braun, 1983a, 1984; Rose, 1987; Putnam et al., 1986; Goleman, 1986).

These clinical observations are consistent with those in the literature of the late nineteenth century (Ellenberger, 1970), and are not uncommon observations among clinicians working with multiple personality patients. Putnam reports a 1984 National Institute of Mental Health review of 100 Case Registry patients meeting DSM-III criteria for multiple personality disorder. According to Putnam:

More than one third of the clinicians surveyed indicated that they had seen handedness changes in their patients. Approximately half of the patients were reported to have alternate personalities who responded differently to the same medications. Three quarters of these MPD patients had alternate personalities with different physical symptoms, and one quarter had alternate personality specific allergies. (Putnam, 1984, p. 32)

Any neurological study of dissociative mechanisms in multiplicity is greatly complicated by the probability that different ego-states or "personalities" involve activation of discrete patterns of cell-assemblies among

functional anatomical structures. This problem is no different in kind than would occur in any attempt to study the biological substrates of consciousness (Hebb, 1948; Pribram, 1971; Lilly, 1972). This problem was appreciated by Sidis and Goodhart, who in 1905 presented a neural network model of multiplicity. They warned their contemporaries against confusing temporal lobe ("psychic") epilepsy and multiple personality ("multiple consciousness") states, commenting:

If now the phenomena of multiple consciousness were nothing but a form of epilepsy, a "masked epilepsy," or, as some term it, a "psychic epilepsy" [temporal lobe], then we are all of us confirmed epileptics. One thing...is perfectly clear from the study and analysis of the cases of multiple consciousness, and that is the preliminary condition of such states. The prerequisite of multiple consciousness is either a highly complex organization, or, what is more frequent, an unstable neural equilibrium (Sidis & Goodhart, 1905, p. 449, emphasis in original).

Theoretical accounts of the psychobiology of multiplicity have barely evolved beyond Sidis and Goodhart's (1905) neural activation model of "hypnoleptic states." Study of the neurobiology of dissociation has been also been plagued by disinterest and, until recently, limited samples and questionable methodological design. Still, there is extremely suggestive evidence that neurophysiological changes are associated with the dissociative states and functioning of "alters" in multiplicity.

This evidence is not unequivocal. In some cases, there are no indications of EEG abnormality, despite patient reports of seizure activity or neurological abnormality (Lipton, 1943; Bliss, 1980; Schreiber, 1973). In still other cases, there are disputes about the interpretation of data. For example, in some studies the authors refer to differences in the alpha band on EEG among personalities (Ludwig, Brandsma, Wilbur, Bendfeldt, & Jameson, 1972; Larmore, Ludwig, & Cain, 1977) while others sharply challenge the utility of even discussing such differences (Corcores, Bender, & McBride, 1984).

More frustrating to this investigation are reports that fail to report data regarding lateralization of anomalies, handedness of the subjects, or sufficient psychiatric or neurological histories. In the absence of this information it is often difficult to evaluate the findings.

Efforts to investigate the psychophysiology of multiple personality date back to the early part of this century when Morton Prince published his pioneering reports (1906, 1908). In a galvanometer study he and a colleague tested the reactions of the three personalities of his famous Miss Beauchamp to emotionally-laden words buried in a list of neutral words. Prince and Peterson (1908) were satisfied that the results were compatible with the

differential activation of alter personalities although modern researchers would recognize a number of methodological flaws in the protocol.

The 1950's saw a flurry of interest following the famous report of the "Three Faces of Eve." An EEG study of "Eve" reported differences in muscle tension and background alpha frequency among personalities (Thigpen and Cleckley, 1950). Morselli (cited in: Putnam, 1984; Ellenberger, 1970) reported similar findings in his EEG investigation of a patient in 1953. "Eve" was also the subject of a study of differences in the frequency of micro-transient strabismus across her four personalities (Condon, Ogston, & Paoe, 1969). These authors reported distinctive differences among "Eve's" personalities in three types of eye micro-movements that cannot be simulated.

Ischlondsky (1955) reported two cases of young women with dual personality in which the personalities were associated with signs of neurological lateralization. In the first case, asymmetries between personalities were noted in sensory threshold, pupil size, olfactory sensitivity, and perspiration. In the second case similar lateralized phenomena were noted. Ischlondsky noted that with the switches of personality, the neurologic manifestations also shifted. He observed that hyposensitivity

or hyporesponsiveness on one side of the body was never combined with normal signs on the other, but was associated with heightened sensitivity or excitability.

Flor-Henry remarks of these cases that:

a relative hyperaction of the nondominant hemisphere was correlated with subdued, depressive personality and of the dominant hemisphere with aggressive disinhibition. Neurophysiological investigations confirm that alternate personalities correspond to different brain states (Flor-Henry, 1985, p. 578).

The next report of an instrument study was in 1972, when the results of galvanic skin response (GSR), visual evoked response (VER) and EEG evaluations of "Jonah" (four personalities) were published. Psychological instruments had earlier revealed that when affective materials were involved, differences among personalities were clear and consistent; however, when the material is emotionally neutral "the discrete differences among personalities seems to vanish (Ludwig, Brandsma, Wilbur, Bendfeldt, & Jameson, 1972, p. 306). Personality specific differences were found on GSR, VER, and EEG measures, and the authors concluded "...it is also possible to speculate that the differences on VER and EEG tests may likewise reflect differences in emotional status among personalities" (p. 305).

A brief report of a patient followed through eight months of therapy was submitted by Bahnson and Smith in 1975. They reported bradychardia, respiratory pauses, and drops in galvanic skin response (GSR) values with the emergence of alters, and personality specific GSR patterns in response to the issues that emerged in therapy (Bahnson & Smith, 1975).

Data on the four personalities of "Faith" were published (Larmore, Ludwig, & Cain, 1977). Neurophysiological measures included EEG, electrocardiogram, galvanic skin response, blood pressure, and electromyogram. The only measure that showed an unequivocal differential response among personalities was the average visual evoked response (AER) of the EEG measures. The authors note that the AER is indicative of the manner in which the brain processes an increasing intensity of visual stimulus, and concluded that "each personality had its own AER type, as if four different people had been tested" (p. 40).

Putnam and his associates (Putnam, Buschsbaum, Howland, Brassfield, Braun, & Post, 1982) gave a conference report on a study of eleven patients with at least three alter personalities each. Visual evoked potentials (VER) and EEG topographic mappings were taken on at least 4 days in a random order. Normal controls simulated multi-

ple personalities. Putnam has noted that the data suggests that "normal control subjects are not able to simply 'fake' this condition" (Putnam, 1984a, p. 35). He further asserts that there were significant statistical differences on EEG and VER among the alter personalities of the research subjects, and that the VER results were consistent with "neurophysiologic differences in perception across alternate personalities" (p. 36).

Putnam has also observed differential cerebral blood flow patterns activated in alter personalities. This observation was made using xenon washout techniques of cerebral blood flow measurement while alter personalities were solving similar mathematics problems (Putnam study cited by Braun, 1983b).

An EEG study with a control compared two patients with a single control (Coons, Milstein, & Marley, 1982). The authors claim to have found that "results of the frequency analysis of the resting and photically stimulated EEGs revealed a number of significant differences among the personalities of each subject" (p. 824). Interestingly, the control displayed statistically significant differences in right hemisphere amplitude as he simulated alter personalities. One subject showed the same pattern of statistically significant right hemisphere activation,

the other showed greatest amplitude increases in the left temporal lead.

Unfortunately, Coons, et al did not report on the handedness of the subjects or control. And, they concluded that the data represented variations in "intensity of concentration, mood changes, degree of muscle tension...rather than some inherent difference between the brains of persons with multiple personalities and those of normal persons" (p. 823). Accordingly, these authors concluded that "it is not as if each personality is a different individual with a different brain. Instead, to put it simply, the EEG changes reflect changes in emotional state" (p. 825). The authors did not indicate what data might suggest "different brains" in such studies.

In 1983, Braun presented preliminary findings of neurophysiologic changes following integrations in two right-handed female subjects treated for multiple personality disorder (Braun, 1983). Topographic maps of visual evoked potential measures made in pre- and post-integration phases were constructed. Braun argues that the maps show shifts in the zones of activity and complexity frontally as integration is accomplished. He claims that this represents neurophysiological changes due to psychotherapeutically induced integrations of personality states.

Brende has reported bilateral electrodermal response (EDR) measurements in a single subject with three personalities (Brende, 1984). He notes that the limbic system has been linked to electrodermal responsivity, and relative activation of hemispheric function. He argues that his data shows a contralateral activation of hemispheric function with the emergence of the two most distinct alters, a conclusion reminiscent of Flor-Henry's (1985) view of Ishchlondsky's cases. A childlike, emotional alter that was troubled by intrusive imagery was associated with right hemisphere activation. An unemotional, verbally fluent alter was associated with relative activation of left hemisphere function, along with corresponding decreases in measures of right hemisphere function. Brende also noted that transition between the alters was marked by EDR desynchronization, and that the data points to a model of differential hemispheric contribution to the functioning of the alters.

State-related changes in the visually-evoked responses of persons with multiple personality disorder have been reported in recent years. These studies are significant because the results represent changes in involuntary central nervous system activity that cannot be deliberately manipulated by the subject. Results of these studies have demonstrated consistently different

patterns of evoked potential across alters under laboratory conditions, and presented some data indicating differential hemispheric activation (Pitblado & Densen-Gerber, 1986; Pitblado & Cohen, 1984; Yarbrough, Magaro, & Manchester, 1985).

Two major models have been used to account for psychophysiological data. The first, represented by Flor-Henry (1985) and Brende (1984), points to data interpreted to reflect functional dissociation of hemispheric activity in which the affective and cognitive processing modes of one hemisphere predominate over another. These hemispheric shifts are offered as explanations for personalities, changes in handedness, and hemispecific neurological phenomena such as described by Ischlondsky (1955). This model is derived from the study of patients with two or three personalities and it is difficult to extrapolate from this model to patients that may present with dozens of alters. Data indicating nondominant hemisphere hyperactivation in some cases could be used for consideration of an hypnosis model. These measures may be adapted for analysis of temporo-limbic multiplicity as well as application to psychophysiological data.

Braun (1984) has presented a highly speculative model derived from studies of "state dependent learning." Ludwig and his colleagues had also referred to state

dependent learning in their study (1972). Braun proposes that experiences coded in discrete, neurophysiologically mediated states of consciousness will tend to be elaborated in those same states. In cases of multiplicity, this normative process has been taken to an extreme and sufficient state-dependent experiences (memory, affect, cognitions) have been linked to form alter personalities.

Braun considers the emerging body of knowledge indicating that conditions of severe stress result in neurophysiological processes in the limbic system that generate profound altered states. He suggests that the hallmark history of extreme trauma in childhood found among multiple personalities would be sufficient to produce extraordinary altered states and enduring alterations in neural networks.

#### Summary

Dissociation is a psychophysiological processes characterized by alterations in identity and memory. Traditionally, dissociative states are thought to have psychodynamic triggers. A range of these states are found normatively and in a variety of psychiatric disorders. Multiple personality is an extreme form of dissociative process characterized by its chronicity and its origins in severe, chronic childhood trauma. Classically, it is considered a form of hysterical neurosis presenting with

the hallmark feature of amnesia between alter personalities and the original personality.

In recent years, ego psychology and object relations theorists have proposed that multiple personality is better understood as the consequence of profoundly disturbed object relations and ego functioning. As a variant of preoedipal pathology rather than hysterical neurosis, these theorists argue that amnesias are not essential to diagnosis of this disorder. This problem is considered in light of criticisms that, lacking the hallmark criteria of amnesia, some alleged cases of multiple personality associated with temporal lobe epilepsy do not actually represent this diagnosis.

Both the psychological and neurobiological processes underlying multiple personality are thought to have their origins in the profound trauma of childhood. The kindling model earlier described is applicable to the extreme and chronic stresses to which the chronically abused child is subjected. This model may also help understand the differential activation of nondominant hemisphere functions that are thought to underlie the dissociative states of multiplicity.

A wide variety of psychophysiological signs have been noted for many years by clinicians working with multiple personalities. In recent years, interest has increased

in exploring the biological processes that underlie these signs, the "switching" process among alters, and interpersonality variations on laboratory measures of metabolic and cerebral functioning.

These investigations are in their infancy and have often been hampered by limited samples, weak methodological design, and disagreement about interpretations of data. Although some modern investigators mention the association between seizure disorders and dissociation there has been no investigation of that link other than the case reports reviewed earlier.

However, it is clear that the psychological phenomena of multiplicity have discernible biological processes associated with them. Some investigators have relied upon models of hemispheric function in analysis of their data, noting the association between particular personality manifestations with patterns of hemispheric activation and inhibition. Others have considered "state-specific learning" and kindling as heuristic models. Some researchers have noted the heightened emotional reactivity of these research subjects, as well as the fact that alters appear to be organized in affective constellations. This observation is consistent with both psychodynamic thought and the kindling model of trauma.

Further research is required to identify the neurobiological processes associated with multiplicity, to clarify the relationship between major dissociative states of psychogenic and neurological origin, and to test models of the psychobiological origins and function of dissociation. The relationship between neuropathology and psychological development is of particular relevance to investigations of temporal lobe epilepsy.

### PROBLEM

Alterations of behavior and psychopathology have long been associated with the epilepsies. While it now appears that sociological and psychosocial factors play a predominant role in the behavioral disturbances associated with most epilepsies, there is reason to believe that temporo-limbic dysfunctions may be an exception.

Temporo-limbic dysfunction has been persistently linked with interictal behavioral alterations and, for a minority of these patients, severe psychopathological processes such as major affective disorders and schizophrenia.

Neurological investigators have recently reported an association between temporal lobe epilepsy and multiple personality. Two promising models have been presented in the literature to account for this association. First, chronic epileptiform stimulation of the limbic system is said to generate a condition of limbic "hyperconnection" resulting in a broad amplification of affect and alterations in cognition. This, in turn, results in an interictal personality syndrome specific to temporo-limbic epilepsy. In this model, the multiplicity is thought to be a psychodynamic response to the cognitive disruptions, heightened affect, and interictal behaviors prompted by the limbic hyperconnections.

A second model points to the overrepresentation of patients with nondominant hemisphere involvement among those who develop multiple personality subsequent to onset of a seizure disorder. In this view, the impairment of nondominant hemisphere function results in a disequilibrium of interhemispheric functions that results in altered states of awareness. The dissociative states, including multiplicity, are considered to be a psychological manifestation and elaboration of this pattern of dysfunction.

Most accounts of multiple personality outside of the neurological literature are confined to a psychological level of analysis. With a few exceptions they are variants of traditional psychodynamic models. In recent years, however, there have been increasing attempts to explore and account for the psychophysiological changes associated with multiple personality. Although investigations of the psychophysiology of multiple personality disorder are still in their infancy, there is evidence to suggest that there are interpersonality differences of brain function.

Some of these differences appear to involve differential activation of hemispheres. Nondominant hemisphere activation is argued to be involved with the altered states of consciousness in which alters are formed and

manifested; differential hemispheric activation is cited particularly in cases of dual personality. Changes in handedness, contralateral neurological signs, and variations in cognitive processing style between personalities have been cited as evidence of differential activation of hemispheres. Other factors are less well understood, such as the degree of affective arousal or the nature of the cognitive task facing the subject.

Some research documents the heightened affective responsiveness of multiples, biophysical changes during "switching", and the tendency for differences between alters to diminish when test stimuli are affectively neutral. These findings are consistent with psychodynamic models of multiplicity that stress the central role of trauma in creating alters that are structured in affectively organized constellations of emotion, cognition, and behavior. The heightened affective sensitivity and stimulus overgeneralization characteristic of multiplicity also has its origins in chronic abuse in childhood.

The features of heightened affective sensitivity and endowment of stimuli with affective associations are reminiscent of the interictal behavior syndrome. This raises the possibility that the model of limbic kindling stemming from chronic abuse in childhood may be applicable, perhaps as the mechanism of a limbic hyperconnection

syndrome born of trauma and psychosocial distortion rather than epileptic disruption.

Questions remain after a review of the literature:

- 1) In what ways are the dissociative states and "multiplicities" of psychogenic or neurologic etiology alike or dissimilar? Are the psychodynamics and phenomenology of these conditions similar? Are there non-neurological factors that predispose some temporal lobe epilepsy patients towards dissociative experiences as they develop other features of interictal personality alteration?
- 2) Is there a model of neuropsychological development or function that can account for the emergence of multiple personality disorder under such apparently dissimilar conditions as temporo-limbic epilepsy and extreme traumatization in childhood?

This study proposes to measure the responses of subjects with temporo-limbic epilepsy, psychogenic multiple personality disorder, and a group of controls with no major psychiatric or neurological illnesses. Measurements are made on instruments designed to assess interictal behavior syndrome, and dissociative states. A semi-structured interview further probes dissociative states reported by the subjects, and gathers history to screen for factors believed to predispose people to use of psychodynamically motivated dissociative states.

To the best of this investigator's knowledge, no reports of this kind have previously been completed and published. Based upon a review of the literature, the following formal hypotheses are offered:

1) Both experimental groups (temporal lobe epileptic, multiple personality) will score higher than controls on the measure of interictal personality syndrome. Because this measure is claimed by its authors to be specific for interictal changes secondary to temporal lobe epilepsy, the epileptic experimental group will score higher than the multiple personality group.

2) Both experimental groups will score higher than controls on the measure of dissociation. The multiple personality group will score higher than the epileptic group on this measure. These effects are predicted by: a) the intensification of affect expected among temporal lobe epileptic subjects, with the subsequent manifestation of dissociation beyond that expected in the control group; and, b) the profound and pathognomic nature of dissociation in multiple personality disorder.

3) Among the temporal lobe epileptic group, subjects with nondominant hemisphere involvement will score higher on the measure of dissociative experiences than epileptic subjects with dominant hemisphere involvement. This

effect is predicted by the association of dissociative states with nondominant hemisphere dysfunction.

4) The most dissociative temporal lobe epilepsy subjects will present as a form fruste of psychogenic multiple personality disorder.

#### METHOD

##### SUBJECTS:

This investigator recruited right-handed female Caucasians for assignment to three groups. Two left-handed females with strong family history of sinistrality were admitted to the TLE group. No remuneration or inducements for participation were offered to subjects. The groups were:

1) Temporal Lobe Epilepsy (N=10): A list of sixty potential research subjects was assembled from cases seen through the neurology service of a university hospital. This list was provided by a staff neuropsychiatrist who agreed to assist this investigator. These cases had been diagnosed prior to the study. Criteria included clinical signs and technical reports (EEG, BEAM, CT, PET) sufficient to warrant neurological diagnosis. Lateralization of seizure focus was assigned by review of clinical signs and available technical reports in each case. Each subject was to have been assigned to a subgroup of dominant, nondominant, or bilateral hemispheric involvement.

In fact, the recruited subjects were all patients with bilateral, predominantly nondominant dysfunction, or patients with documented dysfunctions only on the nondominant side. Therefore, this group should be considered an experimental group of subjects with nondominant hemisphere involvement. This group, in the literature, has been most closely associated with dissociative states and multiple personality thought secondary to epilepsy.

Patients were excluded from the potential pool if they were psychotic, had a concurrent neurological diagnosis, or were judged by the neuropsychiatrist to be likely to be disturbed by the recruitment contact. The investigator was aware of the diagnosis of these subjects prior to interview, but blind to laterality, psychiatric history, medication, or manifestations of interictal personality changes.

A recruitment letter (see Appendix A) was sent to these patients and ten were ultimately enrolled.

2) Multiple Personality Disorder (N=7): Seven subjects with multiple personality disorder were recruited for this study. Contact was made with six of these subjects through clinicians who are members in a professional association devoted to the study and treatment of dissociative disorders. One subject was a patient of the investigator who expressed interest in participating in the

study. Therapists were asked to use their professional judgement regarding the possible impact of participation upon their patients prior to informing them of the study. All subjects had to be in ongoing treatment at the time of the study. One subject was a long-term inpatient at the time of the study.

Because multiples often have personality-specific handedness changes it was established that at least one major personality was right-handed. Therapists for these subjects initially informed them of the study and arranged for telephone contact with the investigator. The investigator was blind for psychiatric (other than the multiple personality disorder) and neurological history except for one patient.

3) Controls: (N=9): Some controls were recruited from the staffs of a mental health clinic and probation division of a municipal court. Other controls were persons known to associates of the investigator but unknown to the investigator personally. In order to assure the confidentiality of controls they were screened for neurological diagnosis or significant psychiatric diagnosis by use of a form that inquired about relevant history (see Appendix B). This form also inquired after some information covered by semi-structured interview with the other groups. One potential subject was excluded because of a

history of seizure disorder revealed on the questionnaire.

All groups were matched on sex, race, and handedness. Subjects were not matched on age or socioeconomic status. There was rough parity in age and socioeconomic status among subjects in all groups. Subjects were not matched on IQ but all subjects presented as in at least the average range of cognitive capacities on interview. Specifically, review of records indicates that there are no borderline or mentally deficient subjects in the temporal lobe epilepsy group.

#### DEPENDENT MEASURES

1. Bear-Fedio Interictal Behavior Questionnaire (IBQ):

This measure is a 100 item questionnaire of subject self-reports of behavior and experience (see Appendix C). Included in their measure is the MMPI L-scale as a control for random or highly unreliable response patterns. The test questions yield 18 categories thought to reflect behavioral traits associated with interictal alterations in behavior: hypergraphia, altered sexuality, hypermoralism, religiosity, aggression, obsessionalism, paranoia, guilt, humorlessness, sadness, emotionality, circumstantiality, philosophical interest, sense of personal destiny, interpersonal viscosity, dependence, elation, and anger.

There is no formal validity or reliability data available for the IBQ. The measure was originally derived from a review of the literature in the field and the clinical observations of Bear and Fedio (1977). As indicated in the literature review, it has been used to measure interictal behavior in studies utilizing temporal lobe epileptics, patients with other neurological illness, functional (psychiatric) patients, and controls.

2. Dissociative Experiences Scale (DES): This 28-item self-report questionnaire asks the subject to make marks on lines marked from zero to 100 to show where they fall on a continuum for each question (see Appendix D). Directions before the measure instruct the subject on how to mark the lines and provide an example of a correctly marked line. These instructions also specify that the questions apply only to experiences not associated with drugs or alcohol. Questions are all pertinent to disturbances in identity, memory, awareness, cognitions, and altered states related to dissociation. Items that might reflect alterations or dissociation of moods or impulses are not included in order to avoid confusion with criteria for affective disorders. Scores in this study were derived by dividing the line into tenths and assigning a score from zero to ten for each item. Subject marks that

fell between score cut-offs were always given the lowest, most conservative score.

Reliability and validity data has been published on this scale (Bernstein & Putnam, 1986). Test-retest reliability coefficient is 0.84, and internal reliabilities range from .19 to .75 with 25 of 28 items reaching a significance level of .05, and 16 of the items reaching a level of .001. Validity measures among and between sample groups of adolescents, post-traumatic stress disorder, alcoholics, phobics, agoraphobics, schizophrenics, and multiple personalities were performed. Results showed good construct validity in that item scores and scale scores were highly correlated, and good criterion-related validity since item scores differentiated sample group members similarly. This scale was able to differentiate subjects with dissociative diagnoses from those without such a diagnosis.

3. DES Addendum (DA): This measure was devised by the investigator for the purposes of examining whether subjects acknowledged specific experiences thought to be related to particular diagnostic categories in the literature (see Appendix E). This 17 item measure utilizes the same format as the DES and was appended to the DES in this protocol. Items thought to represent commonly reported experiences in post-traumatic stress phenomena

(sexual abuse), schizophrenia, and temporal lobe epilepsy were included.

These categories were derived from a review of the pertinent literature. Questions in the post-traumatic stress phenomena category were derived from patient accounts of intrusive imagery or flashbacks, sense of fore-closed future, reenactment of traumatic somatic experience or manipulation, and affective constriction (questions 29, 32, 33, 34, 35). Questions in the temporal lobe epilepsy category were derived from patient accounts of mystical experiences, derealization, perceptual intensification, alterations in experience of temporal flow, phenomena in peripheral vision, unusual experiences of body sensation, and auditory hallucinations of machinery or music (questions 30, 31, 36, 38, 40, 41, 44). Schizophrenia-related items included forced or channeled thinking, sense of special powers, and delusions of influence (questions: 37, 39, 42, 43, 45).

There is no data on reliability or validity of these items. These items serve only as markers of experiences associated with potentially psychopathological states. The specific relationship of these experiences and specific diagnostic categories is not well documented. The scores derived indicate only acknowledgment of experiences that are potentially psychopathological. Data from

this section is essentially qualitative. The primary goal of using this measure is to see if subjects from different groups acknowledged experiences reported in the literature as being seen frequently in these diagnostic categories.

4. Semi-Structured Interview Form: This form was generated for use in this study as a way of eliciting further information about severe dissociative states and gathering pertinent history (see Appendix F). This data is used for qualitative analysis in this investigation.

#### PROCEDURE

Recruitment procedures are described above. All subjects in the experimental groups signed an informed consent form (see Appendix G). Approval was asked for use of a tape recorder and/or antedating during the interview period, and, in addition to the written informed consent statement, the subject was reminded verbally by the examiner that she could ask to have the tape recorder turned off or terminate the protocol at any point. Because of scheduling demands, the protocols were administered in different settings, including offices in a university hospital, a mental health clinic, homes of the subjects, and an inpatient service of a state psychiatric facility.

All subjects were given a packet containing the Interictal Behavior Questionnaire, the Dissociative Experiences Questionnaire, and the DES Addendum. Each packet presented the measures in the order above. Instructions were reviewed with each subject prior to beginning the protocols. As indicated above, the control subjects were not interviewed since many of them worked in the same facility as the investigator.

Following completion of the questionnaires the investigator quickly reviewed them in the presence of the subject. More specific inquiry was directed to those areas or items scored most highly. This typically led to an opportunity to gather history and gather more self-reports about these and other experiences which were noted or taped. At the request of the referring clinician, the multiple personality subject seen on the inpatient service of a state psychiatric facility was not interviewed after completing the questionnaires. Extensive records were made available for review and the clinician provided history; this information covered much of the data that would have been provided by the semi-structured interview, but did not yield the phenomenological data possible with the DES.

After some discussion, the Semi-Structured Questionnaire was introduced by the investigator at a time when

it could be done with minimal disruption of the flow of the interview. Questions from this measure were read verbatim to the subject and noted, and followed-up as appropriate to get more detailed information about experiences of possession, alien impulse, or multiplicity. Finally, aspects of family history and history of trauma not previously covered were elicited according to the question list that concludes the Semi-Structured Interview form.

Following administration of the research protocol the subject was invited to ask questions or make comments about the procedure to the investigator. There were no indications of adverse reaction to the procedure by any subject, either by investigator observation or comments by subjects. Several subjects commented that they had had difficulty communicating these experiences to their caretakers and expressed appreciation that the investigator was trying to understand them.

A variation in the protocol was used in giving instructions to the subjects in the multiple personality group. Given that different alters may have different experiences, the investigator requested that one personality most familiar with the experiences of the others complete the questionnaire as though completing it for the entire group. This was done in order to use the

greatest possible degree of coconsciousness available to the subject's internal personalities. The purpose was to gain access to data about experiences that the reporting personality might otherwise deny as belonging to another alter. Subjects were instructed to inform the investigator in the event that the alter completing the protocol was changed during administration.

These subjects were also invited to tell the investigator during the interview of any "minority opinions" or experiences among alters on items in the protocol. Three subjects shifted alters during the protocol administration. Three others reported that various alters dominated or contributed significantly to the completion of the protocol.

## RESULTS

Analysis of the interview material and medical records of experimental subjects revealed two additional subgroups. Two of the temporal lobe epilepsy (TLE) group present with multiple personalities of the type described by Mesulam (1981), and Schenk and Bear (1981). These subjects reported the onset of experiences of multiplicity subsequent to the onset of seizure disorder. Two subjects initially recruited for the multiple personality (MPD) group also had documented histories of temporal lobe epilepsy, but in their cases the multiplicity antedated the seizure disorder. These two subgroups profile differently from their groups on the Interictal Behavior Questionnaire and the Dissociative Experiences Scales. Because of the small sample sizes in this study and the effects introduced by the responses of these two subgroups, the measures are presented in a qualitative and descriptive, rather than statistical, fashion.

Subgroup subjects with signs of both TLE and MPD score higher than do other subjects. This effect holds for the Interictal Behavior Questionnaire (IBQ), the Dissociative Experiences Questionnaire (DES), and the Addendum to the DES (DA). Because the subjects with combined seizure disorder and multiplicity appear to be

different from others in their experimental groups, they will also be presented as separate variant subgroups. All experimental groups and subgroups showed global elevations on scores over controls on all measures, although some items on the measures appeared to be more sensitive than others.

For convenience in data tables and discussing the results, the following abbreviations will be used to refer to specific groups and subgroups:

- Group 1 Controls (all subjects in control group):  
CON
- Group 2 Temporal Lobe Epilepsy (including those with MPD subsequent to onset of seizure disorder): TLE
- Group 3 Multiple Personality Disorder (also including subjects with TLE disorder with onset after the multiplicity): MPD
- Group 4 Temporal Lobe Epilepsy, minus Multiple Personality variant (all TLE subjects except those with MPD subsequent to onset of seizures): TLE-Minus
- Group 5 Multiple Personality Disorder, minus diagnosis of TLE (all MPD subjects except those with TLE with onset after that of MPD): MPD-Minus

Group 6 Temporal Lobe Epilepsy, Multiple Personality variant (restricted to those with MPD subsequent to onset of seizure disorder):  
TLE-Var

Group 7 Multiple Personality Disorder with TLE (restricted to subjects with a seizure disorder with onset after the multiplicity): MPD-Var

Findings on Measures:

I. Interictal Behavior Questionnaire (IBQ)

This measure looks at 18 dimensions claimed to be specifically related to interictal alterations of behavior in temporal lobe epilepsy. The 100 questions of the measure are grouped into clusters of five items apiece that reflect these dimensions. Each item is scored on the basis of whether the subject acknowledged the item. Clusters of items are thus given overall scores of 0-5 depending upon how many of the five possible items the subject reported. The remainder of the 100 items are comprised of the Lie scale from the MMPI, and are also scored. On this measure, scores equal to or greater than a two point discrepancy among group means are emphasized. The eighteen dimensions of the Bear-Fedio (1977) interictal behavior syndrome are presented in Table Two. Table Three displays the mean score on each

dimension as well as the total mean score on the IBQ for each group. Table Three also displays the mean number of dimensions in which group members acknowledged four or more of the five items in the cluster.

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TABLE 2

Dimensions of the Bear-Fedio Interictal Behavior Syndrome

Hypergraphia	Altered Sexual Consciousness
Religiosity	Aggression
Paranoia	Guilt/Remorse
Sadness/Depression	Emotionality
Philosophical Interest	Personal Destiny
Dependence/Passivity	Happiness/Elation
Hypermoralism	Obsessionalism
Humorlessness	Circumstantiality
Anger	Interpersonal "Stickiness"

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TABLE 3

Group Means on Interictal Behavior Questionnaire (IBQ)

Dimension on IBQ	Group Number						
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Hypergraphia	2.3	2.7	4.0	2.5	3.6	3.5	5.0
Altered Sexuality	1.4	2.1	1.5	2.0	1.4	2.5	2.0
Hypermoralism	.5	2.6	1.4	2.1	.8	4.5	3.0
Religiosity	.9	2.1	2.8	1.6	3.8	4.0	.5
Aggression	.6	2.1	3.1	1.6	3.2	4.0	3.0
Obsessionalism	1.9	3.0	4.2	2.5	4.2	5.0	4.5
Paranoia	.8	2.6	3.1	2.2	2.6	4.0	4.5
Guilt/Remorse	1.0	2.1	3.7	2.1	3.2	2.0	5.0
Humorlessness	.4	1.8	2.5	1.5	2.0	3.0	4.0
Sadness/Depressed	.3	2.5	3.5	2.6	3.4	2.0	4.0
Emotionality	1.4	3.5	3.8	3.1	4.2	5.0	3.0
Circumstantiality	.6	2.9	3.0	2.5	2.8	4.5	3.5
Philosophical	.8	1.8	2.3	1.1	2.0	4.5	3.0
Personal Destiny	1.4	2.4	3.3	1.9	3.0	4.5	4.0
"Stickiness"	.8	3.2	3.3	2.9	3.2	4.5	3.5
Dependent/Passive	.9	1.8	2.3	1.6	2.4	2.5	2.0
Happiness/Elation	.5	1.9	2.6	1.6	2.8	3.0	2.0
Anger	.8	1.5	2.0	1.5	1.8	1.5	2.5
[Lie Scale]	.9	1.6	2.3	1.2	2.4	3.0	2.0
<u>Group IBQ Means</u>	17	44	54	38	51	65	60

The TLE and MPD groups show global elevations above the control mean on the IBQ. Both groups score two or more points above the control group mean on dimensions of: Guilt/Remorse, Sadness/Depression, Emotionality, Circumstantiality, and Interpersonal Stickiness (5/18). The TLE group also shows a two point elevation over control group means on the dimension of Hypermoralism (total: 6/18). The MPD group has an additional elevation of two or more points on Aggression, Obsessionalism, Paranoia, Humorlessness, and Happiness/Elation (total: 10/18).

"Strong endorsement" is defined as scoring four or more items on the five item cluster comprising each dimension. Much of the effect is due to the high scores of the variant subgroups on the mean, as will be seen below. The TLE group strongly endorses a mean of 5 of the 18 dimensions. Modal endorsement is four dimensions. Half or more of the TLE subjects strongly endorse Emotionality (60%), Circumstantiality (50%), and Interpersonal Stickiness (50%).

The MPD group strongly endorse 7 of 18 dimensions. Modal endorsement is four dimensions. Half or more of the MPD subjects strongly endorse Aggression (57%), Obsessionalism (71%), Paranoia (57%), Guilt/Remorse

(57%), Emotionality (71%), and Interpersonal Stickiness (57%). The control group fails to reach a mean of one dimension, and only two categories are strongly endorsed by any control subjects (Hypergraphia: 40%, Religiosity: 12%). Modal endorsement of controls is zero categories.

Scores of the MPD and TLE groups are examined for those in which there is at least two points discrepancy between scores. The TLE and MPD group means do not vary by two points or more on any dimension (0/18). The MPD group shows elevations over the TLE group of between one and two points on Hypergraphia, Obsessionalism, and Sadness/Depression. The TLE group shows one to two point elevations over the MPD group only in Hypermoralism. On all other dimensions the TLE and MPD groups are within one point of each other, with a tendency for the MPD group to be slightly elevated over the TLE group.

When group scores are calculated without the variant subgroups (TLE-Var, MPD-Var), the MPD-Minus and TLE-Minus groups are two points above the control group mean only on the Sadness/Depression measure (1/18). Variance from the control group mean for the IBQ is below two points for both MPD-Minus (+1.9) and TLE-Minus (+1.0) groups when the variant subgroups are not included. Mean variation from controls on the IBQ for TLE-Var (+2.4) and

MPD-Var (+2.6) subgroups are both above two points. This suggests that much of the variance in the interictal behavioral dimensions is due to the elevated scores of the variant subgroups.

Both the TLE-Var and MPD-Var tend to score more highly on each dimension than the subjects in the TLE-Minus and MPD-Minus groups. The MPD-Var score more highly than MPD subjects on 13 dimensions (13/18). There is an elevation of at least two points of the MPD-Var over the MPD-Minus on dimensions of Hypermoralism and Humorlessness. Scores are elevated by one to two points on Hypergraphia, Paranoia, Guilt/Remorse, Philosophical Interest, and Personal Destiny. The only dimension on which the MPD-Minus group score more highly than the MPD-Var group is Religiosity (3.3 points difference).

The variant subgroups presenting with both temporal lobe epilepsy and multiple personalities are also compared (groups 6 and 7). The TLE-Var show several elevations (12/18) over the MPD-Var subgroup, although their mean variations above the control group IBQ mean are quite similar (TLE-Var: +2.6, MPD-Var: +2.4). The TLE-Var group is two or more points higher than the MPD-Var on the dimensions of Religiosity and Emotionality. The TLE-Var group is one to two points

higher than MPD-Var on dimensions of Hypermoralism, Aggression, Circumstantiality, Philosophical Interest, Interpersonal Stickiness, and Happiness/Elation.

The MPD-Var is elevated over the TLE-Var by two or more points only on Guilt/Remorse. MPD-Var is elevated by one to two points over the TLE-Var on Hypergraphia, Humorlessness, and Sadness/Depression. The MPD-Var is elevated by less than a point over TLE-Var on Paranoia and Anger.

The TLE-Var subjects strongly acknowledge ten categories (10/18) and the MPD-Var strongly acknowledge nine (9/18). This compares to two categories for the MPD-Minus group, zero for the TLE-Minus, and zero for the control group. The strongly acknowledged categories are:

TLE-Var: Hypermoralism, Religiosity, Aggression, Obsessional, Paranoia, Emotionality, Circumstantiality, Philosophical Interest, Personal Destiny, Interpersonal Stickiness.

MPD-Var: Hypergraphia, Obsessionalism, Paranoia, Guilt, Humorless, Sadness/Depression, Personal Destiny.

MPD-Min: Obsessional, Emotionality.

This pattern of scores suggests that the TLE-Var group presents with more severe manifestations of interictal behavior syndrome than do other TLE subjects, and that MPD-Var show a similar elevation over other multiple personality subjects.

II. Dissociative Experiences Scale (DES) & Addendum (DA)

Inspection of the protocols and results broken down by main groups (TLE, MPD, CON) and subgroups (TLE-Var, MPD-Var) reveals that the subjects who scored most highly on the IBQ are also the subjects that scored most highly on the Dissociative Experiences Scale (DES) and Dissociative Addendum (DA). That is, the scores of the variant subgroups are elevated across all measures and appear to reflect distinct and consistent differences in those subgroups.

Table Four displays the scores of the main groups, controls, and variant subgroups for the 28 items of the DES. The group mean scores for the 17 items of the DA are presented in Table Five. Table Six presents the group mean scores for all groups for the DES, DA, and a combined score. Text of the individual statements comprising the DES can be found in Appendix D, and those comprising the DA can be found in Appendix E.

Table 4

Group Mean Scores for Dissociative Experiences Scale (DES)

<u>Item</u>	<u>Group</u>						
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
1.	1.0	4.0	4.4	3.4	4.0	6.5	5.4
2.	1.1	4.8	6.3	4.4	5.2	6.5	9.0
3.	.0	2.3	3.6	1.6	3.0	5.0	5.0
4.	.0	.6	2.1	.0	1.6	3.0	3.5
5.	.0	.9	4.8	.0	4.4	4.5	6.0
6.	.5	1.7	3.6	.9	1.8	5.0	8.0
7.	.0	3.2	4.3	2.6	2.2	5.5	9.5
8.	.1	1.6	2.0	1.4	.4	2.5	6.0
9.	.0	3.4	5.1	1.9	4.4	9.5	7.0
10.	.6	1.7	5.0	1.6	5.0	2.0	5.0
11.	.0	.5	4.8	.5	4.0	.5	7.0
12.	.0	3.0	2.3	2.4	2.0	5.5	3.0
13.	.0	2.7	4.6	2.6	2.8	4.0	9.0
14.	1.1	2.8	4.8	2.6	4.2	3.5	6.5
15.	.0	3.3	6.1	2.9	5.0	5.0	9.0
16.	.0	3.2	5.0	2.6	4.0	5.5	7.5
17.	.9	2.8	3.4	2.5	3.2	4.0	4.0
18.	.0	3.9	2.3	3.1	1.4	7.0	4.5
19.	.8	2.3	5.8	.7	4.6	8.5	8.5
20.	.1	5.2	5.3	4.1	4.0	9.5	8.5

Table 4, continued

<u>Item</u>	<u>Group</u>						
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
21.	1.6	3.0	6.8	1.5	6.0	9.0	9.0
22.	.4	2.3	8.4	1.2	8.2	6.5	9.0
23.	1.3	5.1	8.1	4.2	7.8	8.5	9.0
24.	.9	5.6	6.6	4.2	6.0	9.5	9.0
25.	.0	2.6	6.0	1.6	4.8	6.5	9.0
26.	.0	2.3	6.4	1.5	5.4	5.5	9.0
27.	.1	1.6	6.6	.9	7.8	4.5	3.5
28.	.1	3.7	2.6	3.0	2.8	6.5	2.0

Table 5

Group Mean Scores for Dissociative Addendum (DA)

<u>Item</u>	<u>Group</u>						
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
29.	.0	1.4	1.6	1.6	.8	.5	3.5
30.	.0	2.3	2.6	1.7	1.6	4.5	5.0
31.	.4	4.0	5.9	3.5	5.8	6.0	6.0
32.	.0	3.4	4.7	3.1	4.0	4.5	6.5
33.	1.4	1.5	4.4	1.1	2.6	3.0	9.0
34.	.0	2.2	3.9	2.7	4.4	.0	2.5
35.	.0	1.7	2.3	1.2	1.6	3.5	4.0
36.	.0	3.9	2.7	2.9	.4	8.0	8.5
37.	.0	3.6	4.6	2.4	4.8	8.5	4.0
38.	.6	4.0	4.6	2.7	4.4	9.0	5.0
39.	.3	3.9	7.6	2.5	6.8	9.5	9.5
40.	.8	4.9	6.6	4.2	5.8	7.5	8.5
41.	.4	4.2	6.7	3.7	6.6	6.0	7.0
42.	.3	3.5	6.3	2.6	5.4	7.0	8.5
43.	.0	2.4	4.6	1.7	4.0	5.0	6.0
44.	.0	2.4	2.3	1.5	1.4	6.0	4.5
45.	.0	2.2	2.0	1.6	1.0	4.5	4.5

Table 6

## Group Mean Scores for Dissociative Scales (DES and DA)

Dissociative Experiences Scale (DES)

Maximum Score = 280

<u>Group</u>						
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
11	80	137	59	115	157	191

Dissociative Addendum (DA)

Maximum Score = 170

<u>Group</u>						
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
4	51	103	42	103	93	103

Combined Mean Scores for DES and DA

Maximum Score = 450

<u>Group</u>						
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
15	131	210	100	176	252	294

All experimental groups scored much higher on the DES and DA than controls. Both TLE and MPD scores are much higher than those of controls on the summary scores of these two measures. However, TLE-Var scores are quite elevated over the TLE scores. On the DES full score, the TLE-VAR are also higher than the MPD and MPD-Minus scores although still lower than the MPD-Var scores. The TLE-Var scores are within ten points (possible score: 290) of the MPD, MPD-Var, and MPD-Minus groups on the DA summary score. On the full DES/DA summary score the TLE-Var score is above all measures except the MPD-Var score. In short, in overall scores the TLE-Var and MPD-Var subgroups are more akin to each other than to the TLE or MPD groups.

On the DES, the TLE and MPD group means are comparable to each other, and above the control means. Exceptions are found on higher MPD scores on items that: imply amnesia for complex behaviors (items 5, 10, 25, 26); significant alterations in body image (item 11); and, classic signs of multiplicity or hysteria (items 19, 22, 23, 27). On most items (19/28) there are no appreciable differences between the TLE and MPD groups.

As with the IBQ, the variant subgroups are different than the main experimental groups. Both subgroups tend to be elevated over the experimental groups. The TLE-Var

subgroup is two or more points higher than the TLE-Minus group on most items (21/26), and five or more points on six items (items 9, 19, 20, 21, 22, 24). These items include classic signs of multiplicity (i.e., no memory for key life events, capacity to ignore pain, acting very differently in situations), and signs suggestive of altered cognition (i.e., staring and unaware of time, can't recall if she did something or just thought about it).

The MPD-Var group is two or more points higher than the MPD-Minus group on most items (18/28). It is five or more points higher on three items (items 6, 7, 8). Of particular interest is the elevation of the MPD-Var group on an item that describes a "doubling of consciousness" phenomena that is often associated with temporal lobe seizures (item 7). The MPD-Minus group is appreciably higher than the MPD-Var group only on the experience of hearing voices that urge them to act (item 27).

Most striking about the MPD-Var and TLE-Var groups are the items in which there are two points or less between them (12/28). These items cover many of the classic signs of multiplicity including experiences that imply amnesia for complex behaviors, significant alterations in behavior, and capacity to ignore physical pain. These items also include experiences suggesting absence-type seizures (item 20), jamais vu (item 16), and

dream-like states (item 24). The MPD-Var and TLE-Var groups tend to have appreciably higher scores than other groups on these measures.

The MPD-Var acknowledge more experiences in which they discover evidence of behaviors for which they have no memory (items 10, 25, 26) than do TLE-Var subjects. They also acknowledge more memory anomalies such as being approached by unfamiliar people, or failing to recognize family members (items 6, 8). In addition to items related to memory, the MPD-Var subjects also acknowledge more depersonalization (item 11, 13) than do TLE-Var.

On the other hand, the TLE-Var subjects more strongly acknowledge items suggesting derealization (items 12, 28) or altered experiences of reality (item 18, 24). The TLE-Var subjects also strongly acknowledge an item that involves having no memory for key life events (item 9), but interview material indicates that this is most likely a memory problem secondary to temporal lobe dysfunction rather than a dissociative state, as it is in the case of the multiple personality subjects.

On the Addendum (DA), the MPD, MPD-Minus, MPD-Var, and TLE-Var are within ten points on the group means for the measure. The TLE and TLE-Minus groups are also within ten points, but well above the control group mean for the measure (See Figure Two). Again, the variant sub-

groups most strongly acknowledge the test items. There is no clustering by groups among the questions thought to represent experiences characteristic of post-traumatic stress phenomena (sexual abuse), schizophrenia, or temporal lobe epilepsy.

For example, the MPD-Minus group also acknowledges episodes of unusually intense sensory perception (items 41, 38, 31), mystical experiences, and objects in peripheral vision thought characteristic of temporal lobe epilepsy. The TLE-Minus and TLE groups both acknowledge experiences of intrusive memories, flashbacks, constricted emotionality, and experiences of their bodies feeling manipulated (items 29, 32, 33, 35, 45). These items are thought to be characteristic of some post-traumatic experiences related to sexual abuse, and the TLE related groups acknowledge them at rough parity with the MPD and MPD-Minus group.

Of particular interest is the association of the MPD-Var and TLE-Var groups on items involving experiences of thinking two or more lines of thought simultaneously, derealization, altered time flow, alien or imposed affects and behavior, and feelings that their bodies are being entered or manipulated (items 36, 39, 40, 42, 45). The MPD-Var more strongly endorse two post-traumatic items involving somatic (item 29) and affective dissocia-

tions (item 33). The TLE-Var more strongly endorse experiences of forced or channeled thoughts (item 37), mystical experiences (item 38), and auditory hallucinations of machinery or music (item 44).

Summary of Measurement Results:

The scores of the experimental groups and subgroups are higher on the IBQ than those of the controls. The scores of subjects with some combination of multiplicity and temporo-limbic epilepsy (MPD-Var, TLE-Var) are elevated above the full experimental groups (TLE, MPD), the experimental groups minus the variant subjects (MPD-Minus, TLE-Minus), and controls. On the IBQ, there is no variation of more than two points between the TLE and MPD groups on any of the 18 dimensions. The experimental groups together score two or more points higher than controls on 16 of the 18 dimensions.

Overall, the TLE and MPD groups score more highly than controls on measures tapping guilt, sadness, emotionality,, circumstantiality, and interpersonal "stickiness" than controls. The MPD subjects also acknowledge more aggression, obsessionalism, paranoia, humorlessness, and elation than controls (total: 10/18). The TLE subjects acknowledge hypermoralism relative to controls in addition to the attributes mentioned above (total: 6/10). In considering the results it is important to recall Bear's

(1977) finding that subjects with nondominant hemisphere dysfunction also tended to underreport socially undesirable behaviors, so it is likely that the scores from the TLE group represent a conservative estimate of their behaviors and attitudes.

Experimental group scores are elevated by subgroups of subjects who are discovered to have both multiplicity and a seizure disorder (MPD-Var, TLE-Var). Analysis of their scores results in a lowering of the variance of the MPD and TLE scores so that only the dimension of Sadness/Depression is two or more points above the control group mean. This strongly suggests that these subgroups have a powerful effect.

The TLE-Var acknowledge more measures of religiosity and emotionality than do the MPD-Var subjects, and also score somewhat higher on measures of hypermoralism, aggression, circumstantiality, philosophical interest, and interpersonal viscosity. The MPD-Var subjects acknowledge more guilt than do the TLE-Var subjects, and score somewhat higher on measures of hypergraphia, sadness, and humorlessness.

The TLE-Var group presents with elevations of two or more points in 12 of 18 categories of interictal syndrome, strongly suggesting that they are at special risk for associated behavioral alterations. The MPD-Var sub-

jects also show similar elevations in 12 categories, suggesting a remarkably similar risk profile.

What appears to be at the heart of the elevated risk for interictal behavior alterations is the concurrent presentation of multiplicity and temporal lobe epilepsy, with the generally higher scores on the TLE-Var group suggesting that temporo-limbic dysfunction is a critical predisposing factor. This is true not only for the measure of interictal behavior alterations, but also for the DES measures of dissociation.

The variant subgroups are also those that acknowledge the most items measuring dissociative experiences on the DES. Both subgroups strongly acknowledge a number of items thought to represent classic signs of multiple personality disorder, or signs of temporo-limbic epilepsy. The MPD-Var acknowledge more items implying amnesia for complex behaviors, or depersonalization than do TLE-Var subjects. TLE-Var acknowledge more experiences of derealization, or altered cognition secondary to ictal events. More striking than their differences, however, are the similarities in their experiences. Whether of psychogenic or organic origin, it appears that the alterations of consciousness, memory, and identity found in these subjects are functionally identical in their disruption of the subject.

The responses on the DA indicate that clustering of experiences thought to be characteristic of some diagnostic categories cannot readily discriminate among the subjects, other than controls. Both experimental groups and variant subgroups acknowledge experiences thought to be characteristic of temporal lobe epilepsy, schizophrenia, and post-traumatic phenomena of sexual abuse. The variant subgroups more frequently and strongly acknowledged the items. Of particular interest is the strong acknowledgment by subjects in both variant groups of such experiences as intrusive memories, altered time flow, alien affects and impulses, and thinking two or more lines of thought simultaneously.

In summary, the results indicate that the experimental groups show mild differences from controls on the IBQ once the variant subjects are removed and analyzed separately. These variant subjects, however, show strong differences from controls and from their related experimental groups. A similar effect is found on the DES and DA. Although the experimental groups show more pronounced differences than controls on this measure than on the IBQ, it is the variant subjects who again yield the greatest differences from controls. Scores on the DES and DA indicate that the variant subjects show extreme dissociative states and cognitive disruptions, be they of

psychogenic or organic origin. They also acknowledge a variety of experiences typically considered to signal psychopathology.

### III. Semi-Structured Interview

Interview results point to some differences among subjects. All MPD group members, including the MPD-Var subjects, have histories of severe, chronic physical and/or sexual abuse in childhood. The number of alter personalities known to the subject and/or their clinician range from eight to forty-four. The two subjects in the MPD-Var subgroup have eleven and thirty-seven personalities, respectively. In these cases where the multiplicity preceded the onset of ictal episodes, interview material suggests that dissociative strategies are also deployed to cope with experiences such as ictal fear, rage, prodromal irritability, and the like. Also important is the belief system that organizes the dissociative experiences for the subject. For example, two MPD subjects described at least some of their alters as being either directly demonic, or influenced by Satan.

Among the TLE subjects there is a range of dissociation and a variety of accounts of the alterations of consciousness, memory, and identity that stem from the seizure disorder. Some subjects report few, if any, dissociative phenomena. Most subjects reported signifi-

cant alterations of consciousness, intrusive affects, alien and compelling thoughts or impulses, and distortions or disruptions of ongoing identity processes.

It is difficult to precisely date the onset of brain dysfunction in these subjects since most report episodic affective or behavior outbursts or altered states prior to onset of clear complex partial seizures. Most subjects report having received psychiatric diagnoses prior to neurological diagnosis, most commonly borderline personality disorder.

A variety of belief systems are employed by the TLE subjects to account for their experiences. In most cases the subject utilizes a biomedical belief system. She ultimately believes that her ictal and interictal experiences are "tricks" that her brain is playing due to the epilepsy. Other subjects draw upon alternative belief systems. One subject denied multiple personality but then described a belief system in which many beings are nested within the lives of each other, with varying degrees of awareness of each other. Various ictal and interictal experiences were attributed to the influences of these beings. Another describes her hallucinatory and dissociative experiences as contacts with a spiritual domain. There was no clear relationship between dissociative experiences or use of belief system, and history of

factors such as physical abuse that might predispose towards dissociative defenses.

Finally, two subjects accounted for their experiences by explicitly attributing some of them to another person, an alter personality with its own will, thoughts, feelings, and behaviors. These are the TLE-Var subjects, who scored highest on the IBQ, DES, and DA measures. These subjects describe affects, impulses, and thoughts that they experience as alien and intrusive. They also report having significant difficulties with memory, major dissociative states, and a high level of affective intensity. Both subjects also described some of their experiences as being imposed by Satan.

The behaviors they describe as being those of the alter personality appear to be associated with prodromal irritability, emotional lability, aggressive outbursts, paranoia, and anger. The emergence of the alter is closely associated by them with ictal affects and alterations of consciousness. However, it is important to note that manifestations of the alter appear to be interictal although the subjects associate appearance of the alter with seizures or seizure-like experiences. The hypermoral, religious, guilty, and obsessive interictal attributes make it difficult for the subjects to tolerate the other expressions of their illness, which might in-

clude temper outbursts, assaults, contemplation of sadistic acts, or simply being irritable.

Amnesia is not always present for the behaviors of the alter, although the subjects did report some amnesias. These subjects report often experiencing a "doubling" of consciousness in which they experience themselves as observers of their behavior. In these "doublings" they may retain a sense of separate identity, but they also describe a loss of sense of identity in which they experience themselves simply as a point of perception with no executive ego functions. At times that alter emerges without doubling, with a total loss of identity for the subject. Other subjects in the TLE group report similar phenomena but do make attributions of a separate "self" behaving or experiencing.

The TLE-Var subjects reported dramatic problems with memory that disrupted their lives and disoriented them since they could not confidently anchor themselves in time. Interview material indicates that many of the memory difficulties are likely to be neurocognitive rather than psychodynamic in origin. Memory lapses did not tend to correspond with the emergence of the alter; when alters did emerge the subjects could recall many of the actions of the alter. The TLE-Var subjects reported amnesias for events that seemed unassociated with inter-

personal stress or strong affect, unlike the typical pattern for the MPD subjects. Only one of the TLE-Var subjects reported being in psychotherapy and she denied having reclaimed any memories in therapy, unlike the typical pattern for MPD subjects. However, the result of the memory difficulty is a disruption of ongoing experience and identity functioning that seems functionally identical to disruptions described by the MPD subjects.

In contrast to the more significant fragmentation of the MPD group, the two TLE-Var subjects report only dual personality. In each case, the emergence of the secondary personality was subsequent to the seizure disorder. Both subjects acknowledged histories of physical discipline as children, high levels of family tension, and psychologically abusive conditions at some point in their development. Both have high and rigid ego-ideals of themselves and cannot conceive of themselves acting so "badly" even though they intellectually appreciate that the lability, aggression, irritability, and so forth are part of their neurological illness. For them, recourse to a biomedical belief system is insufficient to distance themselves from the alien, intrusive, and dystonic experiences associated with the alter, or to make sense of the alterations in consciousness, identity, and behavior they associate with the emergence of the alter.

#### IV. Selected Case Reports

Names and identifying details have been changed to preserve confidentiality.

Case One: Barbara is a 41 year old white, right-handed female employed in academia. Family history is negative for epilepsy or sinistrality; subject has no reported history of head injury, birth trauma, or febrile convulsions. She was 20 years old at onset of complex partial seizures characterized by an olfactory aura hallucination and ictal fear. Records describe the ictal state as including "a sudden feeling of change in her perception of consciousness and an overwhelming feeling that death was nearby" and a sense that her mind and body had become "disconnected." History and EEG indicate right hemisphere foci. Records indicate interictal behavior changes including hypergraphia, emotional lability, obsessionalism, and circumstantiality. Seizures are not well controlled by medication.

Barbara acknowledges dissociative episodes and alterations in identity processes, particularly related to ictal fear. She relies upon psychodynamic and biomedical belief systems to understand her experiences:

When people say they leave their bodies I think what they are trying to say is that they separate the self and the body--that's how I interpret it--and I'm pretty sure I feel a lot of things like this but what I feel is my brain.

[Referring to dissociative experiences:] You have different ways of coping with it--especially if you go, "I am leaving" you have a wonderful denial. I tell myself "in a way I'm leaving" but not because I'm leaving my body. It's that I'm losing total control. If you say, "I'm leaving and another thing is happening" then you've got more of a denial and separateness. And I think it's a coping mechanism. It may be more scary, too.

Barbara also acknowledges experiences of alien impulses and affects but understands them in psychodynamic terms. She acknowledges feeling that there is "another side or aspect" of herself with its own attributes, but indicated that "deep down" she "knows" it is simply another dimension of herself that is probably the result of brain dysfunction.

Case Two: Lisa is a 28 year old, left-handed visual artist with a family history of neurological illness and sinistrality. History is positive for birth trauma, early childhood febrile convulsions, and multiple traumatic losses of consciousness in childhood. Adult history is positive for head injuries, including one in 1979 that resulted in loss of consciousness, right temporal lobe contusion, and a left-sided weakness that resolved after some weeks. History is negative for sexual or physical abuse in childhood, but positive for a violent sexual assault in adulthood for which she has little memory.

Substance use was limited to alcohol and cannabis products that Lisa stopped when the seizures began in 1979.

TLE was diagnosed in 1984 based on history, interictal behavior alteration, and EEG and polysomnogram consistent with "bilateral temporal abnormalities, left greater than right, in the midtemporal region." Seizures have not been well controlled with medication.

Lisa reports that as a child she was "spacy," had difficulty keeping herself oriented in space, often had a dreamy quality to her consciousness, and had periods of increasing tension and irritability before having strong feelings of elation, melancholy, or anger. She reports experiences strongly suggestive of absence seizure activity as a child. Beginning at age three she began drawing for hours daily. She also recalls seeing animals that she knew were not physically there but also seemed "more than a dream." Lisa remembers hearing a voice that was "partially inside" but that seemed alien to her.

Following the head injury in 1979, Lisa experienced intensification of these experiences, as well as feeling as though "electricity" were running through her body. This was accompanied by onset of micropsia, macropsia, *deja vu*, and *jamais vu*. She reports the onset of complex visual and auditory hallucinations that she experiences in clear consciousness with extreme feelings of elation,

dread, or awe. Lisa reports that she began to experience alien impulses "as though another being or force is involved" that include impulses to flee, jump out of windows, or leap out of moving cars. Forced and channeled thoughts began to disrupt cognition, as did increasing memory difficulties.

Lisa reports classic doubling of consciousness, as well as some she calls "weird experiences" such as the sensation of flying, prolonged out of body experiences, and "sitting and feeling as though I'm not solidly a person, but two kaleidoscope people." She entered psychotherapy in 1985 because she felt overwhelmed by many of these experiences, and because she was disturbed by an increasing polarization in the "doubled" personality experiences. One aspect was "immature, childlike, nonsexual, and dependent" while the other was "assertive, vampish, sexual." Medical records noted at the time that "she also has the sense of being "like two people", perhaps a form fruste of prolonged dissociative experience or multiple personality...."

This subject has drawn upon her altered states of consciousness for material for her paintings. At one point she had been concerned that medical treatment might diminish those experiences and that this possibility had been a dilemma for her. She has accepted a mystical

belief system that she uses to understand the experiences she has had since childhood. She continues to be distressed by problems with memory, spatial-temporal orientation, alien impulse experiences, and dramatic mood swings.

Case Three: Judy is a 29 year old, right-handed subject who works as an allied health professional. History is positive for "strict" physical discipline in childhood, head and neck injuries, and some experimentation with hallucinogens prior to onset of seizures. Encephalitis at age 11 coincided with onset of prolonged dream-like states and vivid internal imagery. History is negative for sexual or physical abuse.

In 1981 she had an evaluation after a head injury because she claimed seeing animals in her peripheral vision, and was numb on left side of the body. Scalp EEG was unremarkable and she was diagnosed as "hysterical." In 1983 she experienced an atypical depression with brief episodes of manic excitement, hypersexuality, agitation, and impulsive aggression. EEG at the time was "marginally irregular" and she received diagnosis of borderline personality disorder. Complaints at the time included "little animals" in peripheral vision, extreme affects, aggressive outbursts, absence episodes, and sadistic ruminations.

Between 1983 and diagnosis of TLE in 1985, this subject experienced prolonged states of derealization and depersonalization, rumination, intrusive memories, and agitated states that she felt compelled her to act aggressively. Incidents included attempts to choke her psychotherapist, laying in wait for a physician with a knife, impulses to run over children, carrying a knife to work with the intent to kill a coworker. BEAM-EEG results in 1985 indicated bilateral dysfunction with greatest abnormality in right temporal regions. The TLE is not well controlled by medication.

Judy reports prolonged out of body experiences that began in adolescence, predating the seizure activity. Memory is impaired, emotion is labile, and she has chronically impaired perceptions of time. Primary complaint currently is an "agitation" that "drives" her to hurt herself or others for relief, and which is also associated with ruminations and episodic impulses to hurt others: "Out of the clear blue sky, I'll be listening to music on the radio and I'll see the children and I'll want to run them over." Judy explicitly denies that anger is a component to this agitation, and explains that the agitation, aggression, and ruminations are experienced as alien, imposed, and ego dystonic. The agitated states can last from minutes to days.

Consciousness often takes on a dream-like quality; Judy says "I visually hallucinate attacking people...I can feel myself doing it." This dream-like consciousness also impairs memory, spatial and temporal relations, and impulse control. Judy has a difficult time acknowledging her aggression because she views herself as passive and kind.

Sometimes I think that my ruminating is really not me. Because how could it be be? I'm a nice person and I can think of stabbing, blood and guts, and strangling, and seeing somebody's head turning purple.

At the times when Judy is experiencing the episodic agitations that she seeks to relieve through aggression, she feels as though:

I'm gone, Judy is gone. And its very frightening because I feel there is nothing I can do about it, and I know I'm going to get in trouble and I know I'm going to hurt someone. [You mean that Judy ceases to exist somehow?] Yes, everything about Judy disappears. [And then what happens?] I want to do it, I want to see blood, I want to see a blue face....Maybe that's why I want to do them so bad, I want Judy back.

Judy explicitly describes these as death experiences for herself although she does not have amnesia for the episodes. At the time that Judy "dies" then she is "just gone, not anywhere, not even outside herself, just gone." Acting on the impulses restores Judy rapidly but she experiences great remorse for the aggression.

This subject reports these states as though there is another person acting through her, but ultimately relies upon a biomedical belief system and explains them to herself as a product of her epilepsy. When pressed explicitly, she indicates it is "as if" there were another person.

Case Four: Lilly is a 56 year old female with a college education. From a traditional European family, she was considered so unruly as a child that her mother accused her of literally being possessed by the devil. Childhood history is positive for "beatings" by her father. Psychiatric history is positive for depression after the birth of her first child. Treatment included ECT, and Lilly believes that the numerous treatments "erased" many memories of her childhood and early adulthood. It is unclear whether she might have had temporal dysfunction in adolescence.

She first had motor seizures about 15 years ago when being withdrawn from medications prescribed by a psychiatrist. Diagnosis of TLE was made about 11 years ago. Right temporal lobectomy was performed in 1976 due to tumor growth and uncontrolled complex partial seizures but seizure activity has continued.

A 1983 EEG report indicates Lilly continues to have bilateral abnormalities that are more prominent on the

right. Medical records indicate that she presents with interictal behavior syndrome, including pronounced deepening of emotions, intense depressions, and explosive anger. She has frequent memory anomalies, dreamy states, and intrusive "flashback" memories of episodes in which she has acted violently.

A 1983 medical report states:

Thus she is intensely emotional and...worried about her temper, which has led to attacks on her husband and both her daughters. Her sense of "two personalities" is related to the feeling that there is an angry or aggressive side of herself, which is threatening to overcome the caring, loving, warm side.

This report concludes that "she certainly borders on the schizophreniform psychosis which may be associated with epilepsy." A 1984 reports characterizes her complex partial seizures as involving an olfactory aura, the onset of of a state of extreme anxiety, and

"in the twinkling of an eye" she feels as if she is in a fantasy world or "apart" or "in another dimension." She feels agitated, often is violent, and it is as if she changes into "another person." She tells me that she swears, throws things, hates people....

These reports are consistent with interview material obtained by this investigator. The alter appeared in early adulthood when Lilly became increasingly emotional-

ly labile with aggressive outbursts. Lilly wonders if the alter was the cause of her turmoil in adolescence but says she cannot be certain. Lilly says she cannot remember much of her history before ECT, including high school graduation or the birth of her first child. Reminiscent of reports of classical multiple personality are Lilly's use of another name for the alter (Lilla), and amnesias for some particularly violent behaviors. Lilly explains that:

You see I am Lilly, very nice, very intelligent and all the good things, and yet then I would have this spell and there would be this angry Lilla--and it would show. I would look in the mirror and I would actually see another person, my face would change, and my husband would say it changed, my mother said it changed, my sister said it changed. I was--my eyes, my mouth would change.

Lilla is out "from seconds to hours" and not only engages in behaviors that are ego dystonic to Lilly, but also has different tastes in clothes, activities, friends, and interests. Lilly reports that Lilla's handwriting is different than hers. Lilly and Lilla apparently have considerable access to each other's memories and experiences except when Lilla has been particularly violent, such as assaulting persons with knives. Records indicate that Lilly sometimes has "flashback" memories of those events. Although at other times Lilly has doubling

of consciousness, it is not characteristic of the switching of personalities:

[When having a "spell"] it's like I'm starting to break away, almost, but once it does then it's just that one person....It's not like two people standing there...I'm changing...and I'm here and Lilla comes, but then once the other one is there--she's there and the other one goes..until it reverts back. [What happens to you?] She just disappears.

Lilly is generally hyposexual but has homosexual impulses on occasion that she experiences as alien. She believes them to be imposed by Satan, and also believes that she has had experiences imposed by angels.

Lilly reports that she has had greater success in resisting Lilla since entering psychotherapy. She attributes this to greater acceptance of herself and enhanced self-esteem. Other than fewer appearances by Lilla, there has been no improvement in the interictal behavior syndrome.

Case Five: Karen is a 32 year old health professional with a history of physical abuse and incest from infancy until mid-adolescence. Handedness is difficult to determine because among the 37 alter personalities there are personalities that have right, left, and mixed dominance for handedness. Karen is herself an alter, and acted as the conduit for the research protocol. History is positive for head injuries sustained due to physical abuse,

an auto accident at age 11, and striking her head at age 19. EEGs in 1972 reported "moderate abnormalities" centering in the right temporal region. No neurological diagnosis was made at that time.

Karen reports depression, memory problems, and varying capacity for attention dating back to childhood. History is positive for classic signs of multiple personality since at least adolescence, and psychotherapy has confirmed the formation of alters beginning in very early childhood. History includes drug use, promiscuity, and impulsive self-risking behaviors for which she is amnesic, coincident with excellence in a very demanding professional role. First contact with mental health professionals was in her last year of professional training when an instructor referred her for treatment of depression.

She resumed psychotherapy in 1982 after experiencing deepening depression and suicidality. After reporting onset of experiences including tinitis, deja vu, and absence-like episodes, she received a neurological evaluation. Polycystic ovaries were diagnosed and, although her EEGs were within normal limits, she was diagnosed with TLE on the basis of history and clinical presentation. Signs of complex partial seizure activity increased over the next year (olfactory, auditory, gustato-

ry hallucination; automatisms; rumination; deja vu; absence; "bugs" in periphery of vision). Medication failed to control rumination, extreme compulsivity, anorexia, interictal behavior alterations, and depression during this time.

Beginning in 1984, the TLE symptoms responded better to medication. A problem that persists is that alters have different rates of metabolism of her anti-seizure medication. The ictal signs diminished in frequency and intensity, particularly those classic signs of complex partial seizures. However, the dissociative states persisted, as well as the amnesias. Some of the amnesias seemed associated with neurocognitive dysfunction but others seemed related to psychodynamic defense. For example, some lapses of memory are also associated with ictal events while in other cases they are associated with stress and the memory is available to an alter but not to Karen. Karen continued to have an extraordinary ability to distance herself from physical pain.

She remained in individual psychotherapy and began group psychotherapy. Karen reports that under the stress of the group process she began to "lose time" and other alters would emerge in the group. At these times she would present in strikingly different ways, claim to be both men and women, and would have no memory for these

events. Around this time her hypergraphic writing began to change, with increasing numbers of entries by alters seeking to communicate with each other. A diagnosis of multiple personality disorder was made in 1984 following these events and recovery of an incest memory in individual psychotherapy.

Karen reports that both seizures and switching are accompanied by a loud buzzing shortly before she loses consciousness. She reports that when the buzzing occurs in her right ear an alter is emerging. Karen notes that this experience most frequently occurs under stressful conditions or when in psychotherapy sessions. Buzzing in the right ear is not generally accompanied by other signs of complex partial seizure, unlike buzzing in the left ear. Left ear buzzing is not associated with emergence of another alter, only seizure onset, and increases in frequency and intensity when her medication blood levels are low. Karen also distinguishes between dissociative states that lead to switching, and others that seem to be artifacts of the seizure disorder.

Thirty-seven alters have been identified by the psychotherapist of this subject. These alters, of which Karen is one, form a complex intrapsychic system. Some interview material suggests that some psychodynamically formed alters also function to contain ictal affects or

interictal variations in emotionality. For example, one alter that handles anger is "Big-Jeff," and his assaultiveness on the body is reminiscent of the tension-relief of "agitation" described by Judy in Case Three, above. It is not clear from the interview material that the inner tension states that "Big Jeff" relieves by harming the body are all psychodynamically determined. Karen herself distinguishes between self-mutilations intended to terminate a "numbness," and compulsive efforts to terminate anger or agitation. "Big-Jeff" is also said to handle anger that at times seems unrelated to environmental or intrapsychic stresses or conflicts.

Karen presents as a multiple personality who has developed a seizure disorder in adulthood. More adequate management of the seizure disorder has made it easier to address the psychodynamics of the multiplicity, but the two conditions are persistent and interactive. For example, Karen presents with dissociative states, heightened emotionality, hypergraphia, auditory hallucinations, intrusive affects and memories, and amnesias of both neurocognitive and psychodynamic origin. Ictal and interictal experiences also trigger psychodynamic operations, and Karen also reports that she is more susceptible to seizures when fatigued or under stress.

## DISCUSSION

### I. Review and Discussion of Findings

Two research questions were asked in this investigation. First, in what measurable ways do subjects with temporal lobe epilepsy differ from subjects with psychogenic dissociative disorders, and specifically, multiple personality? This question is prompted by literature that proposes similar concepts for understanding the neurophysiological basis of interictal behavior changes ("limbic hyperconnection" through epileptiform kindling) and chronic trauma ("behavioral sensitization" through limbic kindling). The literature also describes the role of nondominant hemisphere dysfunction in altered states, and is associated with dramatic dissociative states in temporal lobe epilepsy, including multiplicity.

Secondly, in what ways are the multiple personalities of temporal lobe and psychogenic origin alike or dissimilar? This question stems from attempts to understand how an unusual condition such as multiple personality is related to both chronic child abuse and a seizure disorder. The most compelling literature discussing dissociative states in temporal lobe epilepsy proposes that, while dissociative alterations of consciousness occur in this form of epilepsy, the multiplicity comes from psychodynamic attempts to cope with the heightened af-

fects and behavioral changes found in the interictal behavior syndrome.

This study investigates the characteristics of subjects with temporo-limbic epilepsy based on measures of interictal behavior alterations and dissociation previously described in the literature. These subjects are compared to a group of controls, and a group of subjects with multiple personality disorder. Despite efforts to recruit temporal lobe epilepsy subjects with dominant hemisphere involvement, this experimental group actually presents with primarily nondominant hemisphere dysfunction and bilateral involvement. Therefore, it was not possible to investigate the impact of dominant hemisphere dysfunction on the measures used in this study.

Two important subgroups were detected in the course of the investigation. One subgroup is comprised of subjects who have developed multiple personalities subsequent to the diagnosis of temporal lobe epilepsy. The second subgroup represents subjects with multiple personalities dating to childhood, but who have subsequently developed temporal lobe epilepsy. These subgroups are compared to each other, the temporal lobe epilepsy group, the multiple personality group, and to controls.

The comparison group of multiple personality subjects is used in an attempt to clarify which effects are specific to temporal lobe epilepsy. One measure (Interictal Behavior Questionnaire) thought to reflect interictal behavioral alterations specific to temporal lobe epilepsy is used in this study. It was hypothesized that the temporal lobe epilepsy subjects would score higher on this measure than either controls or the multiple personality subjects. Results indicate that the multiple personality group tends to score higher than the temporal lobe epileptic group, but that the differences are unremarkable. Both groups were moderately elevated over the controls. These results are consistent with the model of limbic hyperconnection discussed earlier, a finding similar to earlier studies on temporal lobe epilepsy, but it is new data for multiple personality disorder.

Multiple personality disorder is a classic dissociative disorder. It was hypothesized that multiple personality disorder subjects would score higher on a measure of dissociation (DES) than either temporal lobe epileptic subjects or controls. Overall, the group mean for the multiple personality is higher than that of the temporal lobe epileptic group, and both are appreciably higher than controls. Multiple personality subjects tended to acknowledge more classic signs of multiplicity than did

temporal lobe epileptic subjects, but both groups acknowledge far more dissociative experience than controls.

The two subgroups of subjects presenting with both multiplicity and temporal lobe dysfunction were compared. These subgroups scored more highly on both measures than the experimental and comparison groups, and are greatly elevated over controls. While they present differently in some respects, what is most striking is the similarity of the subgroups to each other. This comparison holds when the subgroups are compared to the full experimental (TLE) and comparison (MPD) groups, and when compared to those groups minus the subgroup members (TLE-Minus, MPD-Minus).

There are no studies in the literature comparing these groups on objective measures. As indicated in earlier in this paper, an association between multiple personality and temporal lobe epilepsy has long been noted but has never been clearly established. Observations have been made in both conditions of heightened emotional sensitivity and lability, unusually intense affective associations, hypergraphia, paranoia, depression, moralism, obsessionalism, philosophical interest--in short, the dimensions of the interictal behavior syndrome described by Bear and Fedio (1977).

Case accounts in the literature suggest that temporal lobe epilepsy patients with particularly intense manifestations of the interictal behavior syndrome also report increased dissociative states and disturbances in identity processes. At the extreme, the TLE subjects present with multiple personality that emerges following onset of the seizure disorder. Schenk and Bear (1981) have argued that the limbic hyperconnections underlying the interictal behavior syndrome create intensified affect states and fortuitous associations that trigger psychodynamic defenses--including dissociation.

In psychogenic multiple personality disorder, the dissociative states originating in severe, chronic trauma in childhood act as defenses against overwhelming anxiety, affording protection against emotions, stimuli, and internal object relations associated with the abuse. Specifically, the dissociative states (alters) are deployed to disavow emotions and behaviors experienced as threatening to the ego. Viewed as a whole, the intrapsychic system of multiples is reminiscent of the characteristics described as interictal personality syndrome. The system as a whole presents with deepened affective sensitivity and lability, and intense affective associations. However, the specific behavioral manifestations (aggressive outbursts, philosophical interests, dependency, and

so forth) appear "encapsulated" by specific alters. Perhaps this is the result of limbic hyperconnection (secondary to chronic trauma) that has its onset at a time when early childhood developmental processes are still underway.

The responses on the Interictal Behavior Questionnaire (IBQ) in this investigation are consistent with these observations. The TLE and MPD groups were comparable, even when considered without subgroup subjects. Both subgroup cells were also comparable to each other, and tended to be greatly elevated over experimental, comparison, and control groups. This suggests that, for the multiple personalities, development of temporal lobe epilepsy further intensifies the psychological challenges posed by already hypersensitive limbic, emotion-mediating structures. Temporal lobe epilepsy patients who subsequently develop multiple personalities score higher than any other group measure of interictal behavior alterations said to be specifically a temporal lobe syndrome. This suggests epileptic subjects manifesting the most extreme forms of the interictal syndrome are at greatest risk for dissociative states, including multiple personalities.

This understanding of the IBQ data would predict that both the experimental and comparison group would score

more highly than controls on the measure of dissociative experiences (DES). Because this measure has been shown to be a valid and reliable screening instrument for multiple personality and other extreme dissociative disorders (Putnam, 1986), it was also expected that the multiples would score more highly than the temporal lobe epilepsy subjects. These predictions are consistent with the scoring. Of greatest interest, however, is the extraordinary elevation of the scores of temporal lobe epilepsy patients who have developed multiple personalities. Surprisingly, their scores were higher than any group except the multiple subgroup with seizure disorder. This indicates that there is a strong association between dissociative states and more severe manifestations of interictal personality syndrome.

The highest scores on the DES were obtained by multiples with onset of complex partial seizures in adulthood. The absence of data on their dissociative states prior to the onset of the seizures makes it impossible to unequivocally state that the seizure disorder has contributed to an intensification of their dissociative states. However, this subgroup of multiples also scored appreciably higher on the IBQ, and interview material that suggests that they have incorporated ictal and interictal experiences into their dissociative defenses. Given

this, it is not unreasonable to surmise that an epileptiform limbic hyperconnection has contributed to an intensification of already intolerable affect states, thus prompting increased use of dissociative defenses.

An Addendum (DA) to the DES was constructed as a crude measure of some experiences thought closely associated with different diagnostic categories. Items are drawn from literature describing experiences characteristically found in temporal lobe epilepsy, post-traumatic phenomena (sexual abuse), and schizophrenia. Again, the experimental and comparison groups (TLE, MPD) are elevated above controls, but not as much as the subgroups. The experimental and comparison group subjects tend to be within two points of each other (12/17 items), and acknowledged items in each diagnostic category. The subgroups tend to show elevations over the experimental and comparison groups from which they were derived, in all diagnostic categories.

The DA fails to discriminate among the temporal lobe epileptic subjects and multiple personality subjects. The representation of TLE, MPD, and variant subgroups in each diagnostic category indicates that no particular set of experiences is pathognomic. The elevation of subgroups over controls and main groups indicates that they are at greater risk for experiences thought to represent

complex partial seizures, schizophrenia, and post-traumatic phenomena.

The semi-structured interview produced some particularly relevant information. It was interesting to note that both temporal lobe epilepsy and multiple personality subjects were familiar with many of the dissociative states mentioned in the protocol and interview, although many of these states are extremely difficult to articulate. Some key factors shaping the experiences of temporal lobe epilepsy subjects include:

1. Belief System: Alien, imposed experiences and behaviors have been experienced by most TLE subjects (8/10), and all reported disturbances in identity and memory. However, most of them (6/10) ultimately resorted to a biopsychological belief system to explain their experiences: "my brain is playing tricks on me." Two more relied upon spiritualistic belief systems to help account for their experiences, not including possession experiences. The two temporal lobe subjects with multiple personalities explicitly deny that they act and feel "as if" there were other persons acting through the same body. Both of these subjects also explicitly acknowledge Satanic influences upon their behavior, although denying direct possession.

2. Predisposing Factors: Psychodynamic theory and clinical observation of multiple personalities has led to the commonly held view that an imbalance between affects or drives and the rigidity of the self-image and superego functions predisposes to dissociation. Two predisposing factors are: a) Abuse: None of the TLE subjects reported histories of sexual abuse. Both of the TLE-Var subjects reported histories suggestive of physical abuse. One was raised in a family with high levels of tension and an impulsively aggressive father. The other admits to being "beaten" by her father. b) Rigid superego functions: The two TLE subjects who subsequently developed alters are highly religious, view themselves as exceptionally nice people, and view their "alter" impulses, affects, and behaviors as extremely ego-dystonic. In both cases, the subjects specifically ascribed these ego-dystonic characteristics to the alter personality.

Among the other TLE subjects, one admitted to a "strict" upbringing that involved occasional physical discipline, and none of these subjects reported conditions of physical or sexual abuse in childhood.

3. Interictal Dissociation: Most subjects reported extremely disrupting ictal events that yielded disruptions in consciousness and identity. However, many of the behaviors ascribed to alters appear to occur in clear

consciousness, without amnesia, and involve acts in which they were alert, active, and in full command of motor movement. It is interesting to note, however, that the seizure disorder subjects described the emergence of their alters in language similar to that used by multiple personalities to describe their switching process. While both refer to doubling experiences, drawing outside of themselves, and identity diffusions, these experiences do not seem to represent clearly ictal events in the seizure subjects.

This investigator did not interact with any of the alters of TLE subjects during the protocol, unlike his experience with five of the multiple personality subjects. No dissociations were observed, and the investigator did not seek to elicit the alters. However, from the interview material it seems unlikely that the alters were simply ictal phenomena. This observation is consistent with that of Schenk and Bear (1981), as well as the model of a limbic hyperconnection underlying the interictal behavior syndrome.

The temporal lobe subjects differed from the multiple personality subjects in several ways:

A. History: None of the temporal lobe subjects reported chronic sexual or physical abuse in childhood of the

severity reported in the histories of all the multiple subjects.

B. Alters: Temporal lobe subjects with multiplicity reported only dual personalities while the multiples present with as many as forty-four alters. The TLE subjects did not report having an interpersonal relationship with their alter. The alters manifest with behaviors, thoughts, and impulses that are experienced as intrusive and ego-alien. Some, but not all, of the multiple personality subjects reported alters with whom they have cooperative coconsciousness. Neither TLE subject reported cooperative coconsciousness. It is important to note that cooperative interactions among alters of MPD subjects are often the result of psychotherapy.

C. Dissociation: Judged simply on the basis of the frequency of dissociation and the intrapsychic complexity of the system of internal alters, the MPD subjects appear much more prone to dissociation than TLE subjects, but also tend to have some degree of coconsciousness among alters. Presumably, these states are not triggered by seizure activity and do not have their origins in ictal events.

The precise relationship between ictal and interictal dissociative states in the TLE subjects was not systematically explored in this study. Some have proposed that

ictal dissociative states might predispose persons to utilize dissociative mechanisms of defense (Schenk & Bear, 1981). However, precisely how ictal dissociative states are elaborated in the service of interictal defense remains unknown and unanswered by this study.

D. Amnesia: Amnesias for the MPD subjects generally appear to be psychodynamically dissociated memories that are retrievable under hypnosis, or available to another alter.

The temporal lobe subjects have memory difficulties attributable to both ictal and interictal temporal lobe dysfunction. These are experienced as extremely disruptive of ongoing experience and identity functions even by TLE subjects without multiplicity.

The TLE subjects with multiplicity present with a very complex picture. They present with organically based deficits, episodes in which the alter acted but for which there is no amnesia, and episodes for which the subject was amnesic for the behaviors of the alter. There were some reports by the TLE subjects with multiplicity of having been informed by others of extended behaviors executed by their "alter" for which they had no memory. In these cases (for example, a wife humiliating herself and her husband throughout a lengthy dinner party), there could certainly have been psychodynamic moti-

ations for dissociation and attribution of the behaviors to an alter. Without exploration of the experience of the alter, however, it is difficult to assess precisely the relative roles of organic and psychodynamic contributions to amnesias in these subjects. Notably, the one temporal lobe patient with multiplicity who is in psychotherapy did not report any recovery of memories.

E. Adaptation: Many of the alters in multiple personality patients have specific characteristics or skills that function adaptively in work or interpersonal situations. Most of the dissociative states described by the temporal lobe patients lacked such sophisticated adaptive functions. Most temporal lobe epilepsy subjects reported dystonic affects, impulses, or behaviors that disrupted their lives. Exceptions to this were reports by two subjects who felt they received spiritual or creative information from entities that communicated with them while they were in dissociative states.

In psychogenic multiplicity the dissociation permits both expression and disavowal of otherwise intolerable aspects of experience. In this regard, the alters of the TLE subjects with multiplicity appear to function similarly, with the intolerable aspects of experience having their origins both in ictal events and in interictal affective intensification.

F. Psychophysiology: Temporal lobe subjects denied changes in handedness, allergic sensitivity, or other events commonly reported in multiple personality. One TLE subject with multiplicity thought her alter might shift handedness but was not certain.

Nondominant hemisphere hyperactivity has been implicated in the generation of altered states of awareness, including hypnosis. Epileptic hyperactivation of the nondominant hemisphere has also been observed to result in ego-alien experiences (Bear & Fedio, 1977; Stowe, personal communication, 1988). These observations imply that dissociative experiences should appear with greater frequency and intensity among subjects with nondominant temporal lobe dysfunction. Unfortunately, the subjects ultimately recruited for this study did not include any with dominant hemisphere dysfunction, and a test of this prediction could not be completed. However, the findings in this investigation are consistent with previous reports of severe dissociative states and multiplicity among patients with nondominant hemisphere hyperactivation (Mesulam, 1981; Schenk & Bear, 1981; Benson, Miller, & Signer, 1986).

The "limbic hyperconnection" model proposed by Bear (1977) has been elucidated in the review of the literature. As Schenk and Bear have noted (1981, p. 1314-

1315), application of this model to the dissociative states implies several predictions about the incidence and nature of the dissociation:

1. A high incidence should be found in cases of epilepsy where limbic, emotion-mediating structures are involved:

This study was restricted to subjects with temporo-limbic epilepsy. However, results consistent with this prediction indicate a high incidence of dissociative states in these subjects. Because of sampling bias (discussed below) as well as the limited methodological design, these results cannot be considered conclusive.

2. The dissociative episodes will be interictal rather than ictal phenomena: The results of this study are consistent with this prediction and suggest that the attributions of multiplicity are primarily psychodynamic responses to interictal affective intensification, fortuitous affective association, and behavioral alterations. This study also reveals that the organically based amnesias secondary to temporal dysfunction are, in the experience of the epileptic subject, phenomenologically isomorphic with the amnesias of the multiple personality. It is not known the extent to which amnesias become psychodynamically motivated as the patient deploys dissociative defenses in response to intensification of the interictal behavior syndrome. It appears that ictal dissocia-

tive experiences can enhance the likelihood of interictal dissociation.

3. Dissociative states result from a "mismatch" between unusually intense affects and restrictive superego functions: This study reports two TLE subjects with rigid ego-ideals and superego functions, who deny that the interictal behaviors attributed to them could actually be "them." Rather, they attribute the extremely ego-dystonic interictal experiences to an alter personality. A further prediction would be that persons with unusually harsh or restrictive developmental histories would be at risk for this "mismatch" between affect and superego function. Previously stable characterological and defensive alignments would be at risk from the press of intensified affects and other manifestations of the interictal syndrome. Both subjects confirm histories consistent with this prediction. Both are particularly distressed by their aggressive outbursts, and committed to viewing themselves as absolutely incapable of intense anger or violence.

Based on the literature, other predictions follow from the model of limbic hyperconnection:

4. Limbic hyperconnection and nondominant hemisphere hyperactivity will predispose towards dissociative states: While this study did not compare subjects with

dominant and nondominant hemisphere dysfunction, there was a strikingly high incidence of dissociative states reported by the study subjects. Additionally, there was an association between high measures on indicators of the interictal behavior syndrome and high scores on the measure of dissociation.

5. When onset is in adulthood, the dissociative manifestations of the limbically-mediated interictal behavior syndrome will present as a form fruste of multiple personality disorder: This study suggests that there are some differences in psychodynamic structure, adaptive function, and phenomenology between psychogenic multiple personality disorder, and multiplicity originating in temporo-limbic epilepsy. The differences are probably due to the onset of ictal and interictal phenomena in adulthood, when the central nervous system is not in such critical phases of development, and when character and defensive structures have had an opportunity to stabilize and mature.

However, the multiplicity of temporo-limbic epilepsy can legitimately be considered a form fruste of more classic forms of multiple personality disorder. The structural similarities revolve around dissociative alterations in identity and memory in the service of defense against intolerable experiences. These defenses permit

both expression and disavowal of the experiences and behaviors associated with the ictal disruptions and inter-ictal behavior syndrome associated with temporo-limbic epilepsy.

## II. Issues of Methodology

This study was a case control type in which subjects were selected for the presence of temporo-limbic epilepsy. This group was then compared to a group of subjects with multiple personality disorder, and a group of controls. Differences between groups are understood as a function of the temporo-limbic epilepsy since those subjects comprised the experimental group. Exclusion criteria and protocol method are described in the Methods section above.

There are a number of areas in this study design that future investigators should improve upon. Among the problem areas are:

- 1) The design is retrospective in nature, leaving the possibility that variables other than the temporal lobe epilepsy might contribute to differences among groups. Some steps were taken to minimize this possibility. For example, subjects were matched for sex and race. Subjects were also matched for right-handedness, except for two left handed subjects with strong family histories of sinistrality. Although not carefully matched, there was

rough parity between groups for age and socioeconomic status. No effort was made to control other potentially confounding variables such as medication response, etiology of seizure disorder, time between diagnosis of seizure disorder and the study, frequency of seizures, and level of functioning prior to onset of seizures.

2) Experimental group subjects were recruited from patients seen at the neurology service of a major university hospital. It is likely that the incidence of neurological and psychiatric difficulties is higher among patients at this specialized facility than among temporal lobe epilepsy patients who are managed elsewhere. This may have contributed to the high rate of interictal and dissociative phenomena reported, particularly since referrals of these patients to this service have been skewed in recent years by the presence of a prominent researcher-clinician in this area on staff. Recruitment relied upon volunteers, and it is unknown in what ways subjects who volunteered for the study differ from those who did not.

3) The study relied upon self-reports by subjects. Patients with nondominant hemisphere epileptic involvement have been reported to underreport on items they consider socially inappropriate (Bear, 1977). There was no rater report for manifestations of interictal behavior

syndrome. It is also possible that these subjects under-reported on interview items asking about histories of sexual and physical abuse due to the sensitive nature of these items. Further, childhood experiences of abuse are often unavailable to consciousness of the victim in adulthood, thus complicating self-report of these experiences.

4) The Interictal Behavior Questionnaire has not been clearly demonstrated to be valid and reliable. However, it is used clinically with these populations and appears in the professional literature as a measure frequently used in research of this population. There is no data on the reliability or validity of the Addendum to the Dissociative Experiences Questionnaire devised by this investigator.

5) A weakness of this study is the small sample size in all groups. This problem was further complicated by the discovery of two variant subgroups. While these subgroups provided rich clinical information and a point of comparison on a number of the key hypotheses of the study, they were too small (each  $N=2$ ) to warrant statistical analysis. Future studies should recruit more subjects in order to permit fruitful statistical analysis of group and individual differences among groups and subgroups.

6) Recruitment of subjects did not yield subjects with dominant hemisphere dysfunction. Therefore, as indicated above, comparisons on dependent variables could not be obtained among subjects with strongly lateralized dominant hemisphere involvement.

### III. Directions for Future Research

A relationship between the limbic hyperconnection model proposed to account for the interictal behavioral syndrome of temporal lobe epilepsy, and the "kindling" model of "behavioral sensitization" of chronic trauma has been proposed in the review of the pertinent literature. In the review of the literature, theoretical, empirical, and clinical grounds for an association between temporo-limbic dysfunction and dissociation was established, particularly when the dysfunction involves limbic hyperconnection and nondominant hemisphere hyperactivation.

This study represents a first effort to investigate dissociative states and temporo-limbic dysfunction using objective measures for comparison with another subject group presenting with profound dissociative states. Further research is required in this area for development of neuropsychological theory and clinical management. Four critical areas for research are proposed:

1. Factors that predispose persons to development of interictal dissociative states secondary to temporo-limbic epilepsy, and subsequent psychodynamic elaboration of those states in the service of defense.
2. More systematic, controlled comparison studies of dissociative states and phenomenology among subjects with temporal lobe epilepsy and subjects with severe dissociative states of psychogenic origin.
3. Comparison of the alter personalities on neurological laboratory measures and neuropsychological tests. These comparisons should be made with the primary and alter personalities of temporal lobe patients, and with similar data obtained from the alters in multiple personality disorder. Such study would help clarify the relationship between ictal events and the emergence of alters. While the clinical data indicates it is unlikely that alters in either temporal lobe epilepsy or multiple personality are associated with seizures or seizure-like neurological events, this question has not yet been empirically studied. Studies should also further investigate such features as hemispheric activation and state-specific processing of stimuli.
4. Further empirical study of the model of limbic hyperconnection. For example, a pilot study has been published indicating that temporal lobe epilepsy patients

with significant manifestations of interictal behavior syndrome show heightened autonomic responsiveness to neutral as well as emotionally charged stimuli under laboratory conditions (Bear, Schenk, & Benson, 1981). Similar studies conducted with subjects with multiple personality disorder will shed light on whether their affective intensification is entirely psychodynamic in origin.

There is clearly a continuum of dissociative experiences with varying degrees of associated neurological involvement. At one extreme appear to be the cases of purely psychogenic dissociative disorder. These, in turn, range from the normative to the reactive, to the chronic cases of dissociation. At the other end of the continuum lie those cases in which dissociation has its origins in neurological dysfunctions secondary to brain damage or dysfunction. The power of the model of limbic hyperconnection, as generated through the mechanism of kindling, lies in its ability to connect these superficially disparate conditions.

#### IV. Concluding Comment

Whatever pain achieves, it achieves in part through its unsharability, and it ensures this unsharability through its resistance to language.

Elaine Scarry (1985, p.4)

Repeatedly, persons with temporal lobe epilepsy and multiple personality disorder who agreed to be subjects in this study struggled with the investigator to find words for their experiences. In talking with these persons, the immense isolation of their condition was a constant presence in the interviews, and they often spontaneously asked the investigator if he had ever spoken to anyone with experiences like those they were attempting to describe. However different they may be, the isolation and powerlessness of what one subject termed "a brain in revolt," and the fragmented legacy of being tortured while still a child have in common their unsharability.

The problem of unsharability becomes insurmountable when others have difficulty listening to them. Particularly demoralizing to them are occasions when they try to communicate the fearsome uniqueness of their own experiences to those from whom they seek help, only to be promptly categorized or dismissed. Admittedly, it is very difficult to appreciate experiences that lie at the limits of human experience. But when they do feel heard, however briefly, the terrible isolation is broken and their pain submits to the language of words or unspoken understanding. One subject commented of her physician,

"I gave up hope long ago. When he can't hear me anymore and gives up hope, that's when I'll commit suicide."

This study is intended to broaden our understanding of experiences that often lie beyond language for those who must endure them. It is especially intended to help us listen to those who must attempt to communicate the unspeakable, and to wonder at the singularity of each mind that dwells within its brain.

APPENDIX A

## TEXT OF RECRUITMENT LETTER

The kinds of experiences people have as a result of illness is important to investigate in order to better understand and treat persons who are ill. We are currently researching various experiences that some persons with neurological illnesses sometimes report, and we would like to invite you to participate as a research subject. We have sought to include you in our study, either because you have been seen at the Deaconess Hospital due to neurologically related difficulties, or because you would make a good member of a comparison group. Having a comparison group helps us better understand what experiences are due to the illness, and which might be due to age, education, or other factors.

Our research involves no drugs or medical procedures. You would be asked to fill out three questionnaires and participate in an interview. This process should take approximately two hours during a single interview that will be arranged at your convenience. While we do not anticipate that the questionnaires or interview would be upsetting or uncomfortable for you, we would like to stress that you can end your involvement at any time. Further, the results of the research will be handled with strictest respect for your privacy.

Enclosed is a preaddressed, prestamped envelope and a form for you to complete. Please check the appropriate box and place it in the envelope provided for you. While we will not be able to compensate you for your participation, we hope that you will assist us in this important study. If you would like to participate, or would like to discuss the research more fully, please check the appropriate box. If you have any questions please feel free to call Robert Kinscherff at (617) 725-8535. Those of you who live out of Massachusetts or some distance from Boston but would like to participate please check the appropriate box and Robert Kinscherff will contact you.

Sincerely,

Robert Kinscherff  
Deaconess Hospital

APPENDIX B

## CONTROL GROUP HISTORY FORM

Please check the appropriate box provided below:

1. Have you ever been diagnosed and/or treated for a major neurological illness?

\_\_\_\_\_Yes      \_\_\_\_\_No

2. If "yes" to number one, please check the box if the diagnosis was:

\_\_\_\_\_Stroke

\_\_\_\_\_Epilepsy

\_\_\_\_\_Head Injury

\_\_\_\_\_Other

3. Have you ever been diagnosed and/or treated for a major psychiatric illness?

\_\_\_\_\_Yes      \_\_\_\_\_No

4. If "yes" to number two, please check the box if the diagnosis was:

\_\_\_\_\_Schizophrenia

\_\_\_\_\_Depression

\_\_\_\_\_Manic-depression

\_\_\_\_\_Other

5. Please check the box if you have a history of:

Sexual abuse in childhood or adolescence

Victim of sexual assault in adulthood

Physical abuse in childhood or adolescence

Victim of physical assault in adulthood

Alcohol and/or drug abuse

Head injury due to fall, auto accident, or  
other trauma

6. Is there a history of psychiatric disorder in  
your immediate family?

Yes  No

7. Is there a history of neurological disorder in  
your immediate family?

Yes  No

8. Is there a history of alcoholism in your  
immediate family?

Yes  No

Below are questions about several kinds of exper-  
iences. Please check the box most appropriate to  
your own experience.

9. Have you ever had the experience of feeling  
that strong emotions or urges to do something  
were being placed into you by another being?

Yes  No

10. If "yes" to question nine, did it seem to you that this other being or creature was a demon, or Satan, or an angel, or some other creature?

\_\_\_\_\_Yes            \_\_\_\_\_No

11. Have you ever had the sense that there is another side or aspect of you that has its own thoughts, feelings, will, or ways of behaving?

\_\_\_\_\_Yes            \_\_\_\_\_No

12. If "yes" to number eleven, does this other aspect or side of you ever do or say things through you over which you have no control?

\_\_\_\_\_Yes            \_\_\_\_\_No

13. Have you ever had the sense that there is another person who is inside of you, who is more than just another side or aspect of you, who has their own existence and ways of behaving that are separate from yours?

\_\_\_\_\_Yes            \_\_\_\_\_No

14. If "yes" to question thirteen, does this person "come out" or "take over" and act through the body?

\_\_\_\_\_Yes            \_\_\_\_\_No

15. If "yes" to question fourteen, please check the box that best describes your own experience at those times when the other person "comes out" and acts through the body:

\_\_\_\_\_ I am like an onlooker but I am aware of what is happening and can influence what happens.

\_\_\_\_\_ I am like an onlooker but I cannot do anything but observe and cannot influence what happens.

\_\_\_\_\_ I "go away" and have no memory of what happens during those times.

APPENDIX C

## INTERICTAL BEHAVIOR QUESTIONNAIRE

	<u>TRUE</u>	<u>FALSE</u>
1. I think people would learn a lot from the story of my life.	[    ]	[    ]
2. I have stronger feelings of happiness than most people.	[    ]	[    ]
3. I feel like a pawn in the hands of others.	[    ]	[    ]
4. I can never forgive myself for some of the things I have done.	[    ]	[    ]
5. I have a habit of counting things or memorizing numbers.	[    ]	[    ]
6. It makes good sense to keep a detailed diary.	[    ]	[    ]
7. Recently more of my thoughts have something to do with sex.	[    ]	[    ]
8. I never get angry.	[    ]	[    ]
9. For me, feelings often take the place of feeling.	[    ]	[    ]
10. Things which never attracted me before have become sexually appealing.	[    ]	[    ]

11. I think that I have a special mission in life. [ ] [ ]
12. I interpret things more deeply than most people. [ ] [ ]
13. My religious beliefs have undergone major changes. [ ] [ ]
14. I am more sensitive to distractions than most people. [ ] [ ]
15. I have gotten people angry by asking them to do so much for me. [ ] [ ]
16. I never gossip. [ ] [ ]
17. Powerful forces outside my control are working with my life. [ ] [ ]
18. I keep a diary. [ ] [ ]
19. It makes me personally furious to see people disobeying the law. [ ] [ ]
20. Little things make me angrier than they used to. [ ] [ ]
21. If things are not just right it upsets me. [ ] [ ]
22. Fate appears to be working against me. [ ] [ ]

23. Almost everything triggers  
some emotional reaction in me. [ ] [ ]
24. The Bible has a special meaning  
which I am beginning to  
understand. [ ] [ ]
25. My temper has gotten me  
into trouble. [ ] [ ]
26. Sometimes I get terribly  
confused by little details. [ ] [ ]
27. Powerful forces are acting  
through me. [ ] [ ]
28. I seem to depend on other  
people for many things. [ ] [ ]
29. Few things are really funny. [ ] [ ]
30. My table manners are just as  
good at home as when I am out  
in company. [ ] [ ]
31. Often I get into such a good  
mood that I do foolish things. [ ] [ ]
32. I am sure there is a  
significant meaning behind my  
suffering. [ ] [ ]
33. I have had periods of weeks  
or months when I could not  
get going. [ ] [ ]

34. I am open to attack from  
many sides. [ ] [ ]
35. I cannot get off the point  
sometimes. [ ] [ ]
36. I am losing control of my  
temper more frequently. [ ] [ ]
37. Nothing is more important than  
trying to understand the forces  
that govern this world. [ ] [ ]
38. Life is a strain for me much  
of the time. [ ] [ ]
39. Sometimes I feel so helpless  
that I want people to do  
everything for me. [ ] [ ]
40. I never put off until tomorrow  
what I ought to do today. [ ] [ ]
41. Often I am the only one to  
stand up for what is right. [ ] [ ]
42. Sometimes my mind gets stuck  
on so many different ideas  
that I cannot make a decision  
or do anything. [ ] [ ]
43. When I get angry I often  
explode. [ ] [ ]

44. Once I start to talk to  
someone, I have trouble  
breaking off. [ ] [ ]
45. People do not seem to  
appreciate my jokes. [ ] [ ]
46. I spend a lot of time thinking  
about the origins of the world  
and life. [ ] [ ]
47. At elections I never vote for  
men about whom I know very  
little. [ ] [ ]
48. I have had some very unusual  
religious experiences. [ ] [ ]
49. Almost every day I am  
infuriated by cases where  
justice has not been done. [ ] [ ]
50. It is useless to tell people  
something without giving them  
all the details. [ ] [ ]
51. I have come to place faith in  
astrology, meditation or other  
spiritual ways of relating  
myself to the universe. [ ] [ ]
52. My sexual activity has  
decreased. [ ] [ ]

53. I write down or copy many things. [ ] [ ]
54. Emotions control my life. [ ] [ ]
55. Much of the time I feel as if I have done something wrong or harmful. [ ] [ ]
56. My feelings of hatred can be very intense. [ ] [ ]
57. I like everyone I know. [ ] [ ]
58. Before I make a decision I like to know every detail. [ ] [ ]
59. Sometimes I feel so good that ideas come into my mind faster than I can handle them. [ ] [ ]
60. Sometimes my mind gets stuck on one idea so that I cannot make a decision or do anything. [ ] [ ]
61. I have not lived the right kind of life. [ ] [ ]
62. I try to keep track of special details about my life and thinking. [ ] [ ]
63. People tend to take advantage of me. [ ] [ ]

64. I always tell the truth. [ ] [ ]
65. I have had periods when I felt  
so full of pep that sleep did  
not seem necessary for several  
days. [ ] [ ]
66. People should think about the  
point of many jokes more care-  
fully instead of just laughing  
at them. [ ] [ ]
67. I need more details than most  
people before I understand  
something. [ ] [ ]
68. I have a tendency to break  
things or hurt people when I  
get angry. [ ] [ ]
69. I am subject to big shifts in  
mood--from very happy to very  
sad. [ ] [ ]
70. When I accidentally hurt  
someone's feelings I cannot  
forgive myself for a long time. [ ] [ ]
71. I tend to get bogged down with  
little details. [ ] [ ]

72. Finally I am beginning to  
understand the real meaning  
or nature of this world. [ ] [ ]
73. I really am down in the dumps  
most of the time. [ ] [ ]
74. I never laugh at a dirty joke. [ ] [ ]
75. I would go out of my way to  
make sure the law is followed. [ ] [ ]
76. I have more of a feeling than  
most people for the order and  
purpose of life. [ ] [ ]
77. I am strongly attracted to  
members of my own sex. [ ] [ ]
78. Sometimes I keep at a thing so  
long that others may lose their  
patience with me. [ ] [ ]
79. Sometimes without any reason  
or even when things are going  
wrong I feel excitedly happy,  
on top of the world. [ ] [ ]
80. I really make myself suffer  
after even a small mistake. [ ] [ ]

81. People sometimes tell me that  
I have trouble getting to the  
point because of all the  
details. [ ] [ ]
82. I would like to rip some  
people to shreds. [ ] [ ]
83. I despise people who try to  
break the rules. [ ] [ ]
84. I have trouble becoming  
sexually aroused. [ ] [ ]
85. I have often felt so bad that  
I was close to ending my life. [ ] [ ]
86. I read every editorial in the  
paper every day. [ ] [ ]
87. The thought of revenge burns  
inside me. [ ] [ ]
88. Most jokes do not seem funny  
to me. [ ] [ ]
89. My emotions have been so  
powerful that they have  
caused trouble. [ ] [ ]
90. Sometimes a particular thought  
will run through my mind and  
bother me for days. [ ] [ ]

91. I am often said to be  
hotheaded. [ ] [ ]
92. The future seems hopeless  
to me. [ ] [ ]
93. I am fortunate to receive so  
much help from people around  
me. [ ] [ ]
94. I am very religious (more than  
most people) in my own way. [ ] [ ]
95. I never feel like swearing. [ ] [ ]
96. When I think of some of the  
things people have done to me  
it makes me absolutely furious. [ ] [ ]
97. Sometimes I think an illness  
has been given to me so that I  
would meet certain people at  
the right time. [ ] [ ]
98. I would like to write a book  
about my life. [ ] [ ]
99. Religion and God are more  
personal experiences for me  
than for most people. [ ] [ ]
100. There is too much foolishness  
in the world these days. [ ] [ ]

SCORING GROUPS FOR INTERICTAL BEHAVIOR QUESTIONNAIRE

Bear and Fedio (1977) have eighteen categories of interictal behavior changes and an additional lie scale. Scoring is assigned by assigning a score of one for each statement marked "true" in the categories. The numbers of the questions comprising each category are listed below. There are five points possible in each interictal behavior category. There are ten points possible in the lie scale.

Hypergraphia:	(6), (18), (53), (62), (98)
Altered Sexual Consciousness:	(7), (10), (52), (77), (84)
Hypermoralism:	(19), (41), (49), (75), (83)
Religiosity:	(13), (24), (48), (94), (99)
Aggression:	(25), (36), (43), (68), (91)
Obsessionalism:	(5), (14), (21), (42), (71)
Paranoia:	(12), (17), (22), (34), (63)
Guilt/Remorse	(4), (55), (61), (70), (80)
Humorlessness:	(29), (45), (66), (88), (100)
Sadness/Depression:	(33), (38), (73), (85), (92)
Emotionality:	(9), (23), (54), (69), (89)
Circumstantiality:	(26), (50), (58), (67), (81)
Philosophical Interest:	(37), (46), (51), (72), (76)
Sense of Personal Destiny:	(1), (11), (27), (32), (97)
Interpersonal "Stickiness":	(35), (60), (44), (78), (90)

Dependence/Passivity: (3), (15), (28), (39), (93)  
Happiness/Elation: (2), (31), (59), (65), (79)  
Anger/Hostility: (20), (56), (82), (87), (96)  
Lie Scale (MMPI): (8), (16), (30), (40), (47),  
(57), (64), (74), (86), (95)

APPENDIX DDISSOCIATIVE EXPERIENCES SCALE

This questionnaire asks about some experiences you may or may not have had in your daily life. Some of the experiences are reported by some persons to occur quite often, others are less common. It is important, however, that your answers show how often you have these experiences when you are NOT under the influence of alcohol, or drugs that have not been prescribed by your physician.

Below are brief descriptions of some experiences. Below each description is a line that runs from 0 to 100. The 0 means that you have never had the experience. The 100 means that you have the experience all of the time. Please mark the point on the line that reflects how often you have had the described experience. Different people have different experiences. What is important is to try to respond as accurately and honestly as possible. If the instructions are unclear please ask me to clarify them before you begin.

1. Some people have the experience of driving a car and suddenly realizing that they don't remember what has happened during all or part of the trip. Mark the line to show how often this happens to you.

0-----100

2. Some people find that sometimes they are listening to someone talk and they suddenly realize that they did not hear all or part of what was just said. Mark the line to show how often this happens to you.

0-----100

3. Some people have the experience of finding themselves in a place and they have no idea of how they got there. Mark the line to show how often this happens to you.

0-----100

4. Some people have the experience of finding themselves dressed in clothes that they don't remember putting on. Mark the line to show how often this happens to you.

0-----100

5. Some people have the experience of finding new things among their belongings they they do not remember buying. Mark the line to how often this happens to you.

0-----100

6. Some people sometimes find that they are approached by people they do not know who call them by another name or insist that they have met them before. Mark the line to show how often this happens to you.

0-----100

7. Some people sometimes have the experience of feeling as though they are standing next to themselves, or watching themselves do something, and they experience themselves as if they were looking at another people. Mark the line to show how often this happens to you.

0-----100

8. Some people are told that they sometimes do not recognize friends or family members. Mark the line to show how often this happens to you.

0-----100

9. Some people find that they have no memory for some important events in their lives (for example, weddings or graduation). Mark the line to show how often this happens to you.

0-----100

10. Some people have the experience of being accused of lying when they do not think they have lied. Mark the line to show how often this happens to you.

0-----100

11. Some people have the experience of looking into a mirror and not recognizing themselves. Mark the line to show how often this happens to you.

0-----100

12. Some people at times have the experience of feeling that other people, objects, and the world around them are not real. Mark the line to show how often this happens to you.

0-----100

13. Some people at times have the experience of feeling that their body does not belong to them, that it is somehow different or foreign to them. Mark the line to show how often this happens to you.

0-----100

14. Some people have the experience of sometimes remembering a past event so vividly that they feel as if they were reliving that event. Mark the line to show how often this happens to you.

0-----100

15. Some people have the experience of not being sure if things that they remember happening really did happen, or whether they just dreamed them. Mark the line to show how often this happens to you.

0-----100

16. Some people have the experience of being in a familiar place but finding it strange and unfamiliar. Mark the line to show how often this happens to you.

0-----100

17. Some people find that when they are watching TV or a movie that they become so absorbed in the story that they are unaware of other events around them. Mark the line to show how often this happens to you.

0-----100

18. Some people at times find that they become so involved in a fantasy or daydream that it feels as though it was really happening. Mark the line to show how often this happens to you.

0-----100

19. Some people find that they are able to ignore pain. Mark the line to show how often this happens to you.

0-----100

20. Some people find that they sometimes sit staring off into space, thinking of nothing, and are not aware of the passage of time. Mark the line to show how often this happens to you.

0-----100

21. Some people find that at times when they are alone they talk out loud to themselves. Mark the line to show how often this happens to you.

0-----100

22. Some people find that in one situation they may act so differently compared to another situation that they feel almost as if they were two different people. Mark the line to show how often this happens to you.

0-----100

23. Some people find at times that in certain situations they are able to do things with amazing ease and spontaneity that would usually be difficult for them. Mark the line to show how often this happens to you.

0-----100

24. Some people find that at times they cannot remember whether they have done something, or just thought about it. An example might be not knowing whether they have mailed a letter or just thought about it. Mark the line to show how often this happens to you.

0-----100

25. Some people sometimes find evidence that they have done things they they do not remember doing. Mark the line to show how often this happens to you.

0-----100

26. Some people sometimes find writings, drawings, or notes among their belongings which they must have done, but they cannot remember doing. Mark the line to show how often this happens to you.

0-----100

27. Some people at times find that they hear voices inside their head which tell them to do things or comment on things they are doing. Mark the line to show how often this happens to you.

0-----100

28. Some people at times feel as if they are looking at the world through a fog so that people and objects appear far away or unclear. Mark the line to show how often this happens to you.

0-----100

APPENDIX EDISSOCIATIVE ADDENDUM

29. Some people at times have had the experience of feeling as though another person were touching them or holding them, only to realize that there was nobody there. Mark the line to show how often this happens to you.

0-----100

30. Some people have had the experience of parts of their body feeling odd, numb, or even paralyzed, without doctors being able to find anything medically wrong. Mark the line to show how often this happens to you.

0-----100

31. Some people have the experience of seeing something directly, or out of the corner of their eye, only to discover when they look again that what they thought they saw was not really there. Mark the line to show how often this happens to you.

0-----100

32. Some people repeatedly experience particular thoughts, memories, or dreams. These thoughts, memories, images and so forth, are often experienced as intrusive or disturbing. Mark the line to show how often this happens to you.

0-----100

33. Some people find that at times when others are usually more emotional, like weddings or funerals, they themselves do not feel particularly emotional. Mark the line to show how often this happens to you.

0-----100

34. Some people feel as though there is really no point in making long-range plans because they believe that they will not live long enough to reach their goals. Mark the line to show how often this happens to you.

0-----100

35. Some people have had the experience of believing that they were in another place or earlier time in their lives, and acting as though that were the case. After starting to respond as though they were in that time or place, they realize they were wrong and are actually in the present. Mark the line to show how often this happens to you.

0-----100

36. Some people have had experiences in which familiar objects or persons may seem peculiar or unreal to them, as though they were in a dream. Mark the line to show how often this happens to you.

0-----100

37. Some people have had experiences in which it feels as though their thoughts are being forced or channeled, no longer under their control. Mark the line to show how often this happens to you.

0-----100

38. Some people have had experiences that were deeply emotional and significant for them, which felt profoundly mystical or religious to them. Mark the line to show how often this happens to you.

0-----100

39. Some people have had experiences in which they feel as though they were thinking two or more lines of thought at the same time. Mark the line to show how often this happens to you.

0-----100

40. Some people have had experiences in which the flow of time seems very different. For example, they might feel suspended in time, or as though time were passing unusually quickly. Mark the line to show how often this happens to you.

0-----100

41. Some people have had experiences in which their perception seem unusually intense. For example, sounds might seem unusually loud or colors unusually bright. Mark the line to show how often this happens to you.

0-----100

42. Some people have had experiences as though feelings, desires, or behaviors were being imposed upon them by forces outside of themselves. Mark the line to show how often this happens to you.

0-----100

43. Some people have had the experience of realizing that they have special powers or a special mission for their life on earth. Mark the line to show how often this happens to you.

0-----100

44. Some people have had the experience of hearing mechanical or musical sounds that others around them could not hear. For example, some people hear music but are unable to determine the source of the sound, or it seems as though the music were coming vividly from inside their own head. Mark the line to show how often this happens to you.

0-----100

45. Some people have experiences in which it feels as though their bodies were being entered or manipulated. Mark the line to show how often this happens to you.

0-----100

APPENDIX FSEMI-STRUCTURED DISSOCIATIVE EXPERIENCES INTERVIEW FORM

Now I am going to ask you about whether you have had several kinds of experiences. As with the experiences we just finished reviewing, different people have different experiences. What is most important is that you answer as honestly and accurately as you can. If you have had any of these experiences I would like to talk to you in more detail about them.

1. Have you ever had the experience of feeling that strong emotions or urges to do something were placed into you by another being?  
\_\_\_\_\_ (1=Y, 2=N)
2. (If yes) Did it seem that this other being or creature was a demon, or Satan, or an angel, or some other familiar creature?  
\_\_\_\_\_ (1=Y, 2=N)
3. Have you ever had the sense that there is another side or aspect of you that has its own thoughts, feelings, will, or ways of behaving?  
\_\_\_\_\_ (1=Y, 2=N)
4. (If yes) Does this other aspect or side of you ever do or say things through you over which you have no control?  
\_\_\_\_\_ (1=Y, 2=N)

5. Have you ever had the sense that there is another person who is inside of you, who is more than just another side or aspect of you, who has their own existence and ways of behaving that are separate than yours?

\_\_\_\_\_ (1=Y, 2=N)

6. (If Yes) Does this person ever "come out" or "take over," and if so, what happens to you during those times?

\_\_\_\_\_ (1=Y, 2=N)

7. (If Yes) Are there times when this other person or persons influences your behavior but without actually taking control of your body?

\_\_\_\_\_ (1=Y, 2=N)

8. If answers are yes to any question 1-7:

- a. When did you begin having these experiences?
- b. Why do you think you began having them?
- c. Where do you think these (aspects, beings, persons) came from?
- d. How does this (aspect, etc.) communicate to you?
- e. What impact do they have on your other relationships?
- f. What impact do they have on your work?

- g. What impact do they have on your daily life?
- h. What is your relationship with this (aspect, etc.)?
- i. Do they come or go at particular times?
- j. Do you have these experiences more or less often when you have been having seizures?
- k. Does medication have an effect on them?

Appropriate follow-up questions are to be asked, and responses noted or taped by the examiner.

## APPENDIX G

TEXT OF INFORMED CONSENT

The following informed consent statement was approved for use in this research project by the Institutional Review Board on Human Studies of the Deaconess Hospital in November 1986. All experimental group subjects signed this form prior to administration of any portion of the research protocol.

By signing this statement I agree to participate in this study. This study is intended to help gather information about various kinds of experiences that some persons with neurological illnesses sometimes report, as well as the impact of neurological illness upon psychological functioning. I understand that participation in this study is unlikely to yield any specific benefits to me, although it is possible that information may be generated that might potentially aid in the diagnosis or treatment of my condition. If such information is generated I understand this information will be shared with me and appropriate steps recommended by the research team.

I understand that the research will involve no medical procedures and will be limited to interviews and the filling out of the questionnaires. The time commitment involved is expected to be approximately two hours sched-

uled in a single appointment. Additionally, I understand that I can withdraw from the study at any point before the interview and questionnaire appointment, or at any point during the appointment. I agree to allow the interviewer to tape record portions or all of the interview with the understanding that my privacy will be strictly guarded, and the understanding that I may ask the interviewer to stop tape recording at any point. The research team does not foresee any significant risks to me. Still, as indicated above, if I should for any reason wish to end participation in any part or all of the research, I may do so with no consequences for me or impact upon my medical treatment.

Information derived from this study may be used for research purposes, which may include publication, subject to the condition that I will not be identified. Any research results will be handled in a way to ensure my privacy. Some 50-70 persons may participate in the study, thus making statistical procedures to ensure privacy possible.

REFERENCES

- Abeles, M., & Schilder, P. (1935). Psychogenic loss of personal identity. Archives of Neurology and Psychiatry, 34, 587-604.
- Adamec, R. E. (1976). Normal and abnormal limbic system mechanisms of emotive biasing. In K. E. Livingston & O. Hornykiewicz (Eds.), Limbic mechanisms: The continuing evolution of the limbic system concept (pp. 405-455). New York: Plenum Press.
- Adamec, R. E., & Stark-Adamec, C. (1983). Limbic kindling and animal behavior: Implications for human psychopathology associated with complex partial seizures. Biological Psychiatry, 18, 269-293.
- Antelman, S. M., Eichler, A. J., & Black, C. A. (1974). Interchangeability of stress and amphetamine in sensitization. Science, 207, 329-331.
- Adamec, R. E., Stark-Adamec, C., Perrin, R., & Livingston, K. E. (1981). What is the relevance of kindling for human temporal lobe epilepsy? In J. A. Wada (Ed.), Kindling 2 (pp.303-313). New York: Raven Press.
- American Psychiatric Association. (1987). Diagnostic and statistical manual of mental disorders (3rd edition, revised). Washington, DC: Author.
- Azam, E. (1887). Hypnotisme, double conscience, et alterations de la personnalite [Hypnotism, double consciousness, and alterations of personality]. Paris: Bailliere.
- Bahnson, C. B., & Smith, K. (1975). Autonomic changes in a multiple personality. Psychosomatic Medicine, 37, 85-86.
- Balis, G. U. (1979). Behavioral disorders associated with epilepsy. In G. U. Balis, L. Wurmser, & E. McDaniel (Eds.), Clinical psychopathology: The psychiatric foundations of medicine. Boston: Butterworth Publishing.
- Behrs, J. O. (1982). Unity and multiplicity: Multilevel consciousness of self in hypnosis, psychiatric disorder, and mental health. New York: Brunner/Mazel.

- Beahrs, J. O. (1983). Co-consciousness: A common denominator in hypnosis, multiple personality, and normalcy. American Journal of Clinical Hypnosis, 26, 100-113.
- Bear, D. (1977). The significance of behavioral change in temporal lobe epilepsy. In D. Blumer & K. Levin (Eds.), McLean Hospital Journal (special issue): Psychiatric complications in the epilepsies--current research and treatment (pp. 9-21). Belmont, MA: McLean Hospital.
- Bear, D. (1979a). Interictal behavior in temporal lobe epilepsy: possible anatomic and physiologic bases. In J. A. Wada (Ed.), Epilepsy: Neurotransmitter, behavior and pregnancy (unpaginated). Vancouver: Canadian League Against Epilepsy/Western Institute on Epilepsy.
- Bear, D. (1979b). Temporal lobe epilepsy: A syndrome of sensory-limbic hyperconnection. Cortex, 15, 357-384.
- Bear, D. M. (1983). Hemispheric specialization and the neurology of emotion. Archives of Neurology, 40, 195-202.
- Bear, D. M. (1986). Hemispheric asymmetries in emotional function: A reflection of lateral specialization in cortical-limbic connections. In B. K. Doane & K. E. Livingston (Eds.), The limbic system: Functional organization and clinical disorders. New York: Raven Press.
- Bear, D. M., & Fedio, P. (1977). Quantitative analysis of interictal behavior in temporal lobe epilepsy. Archives of Neurology, 34, 454-467.
- Bear, D., Freeman, R., & Greenberg, M. (1984). Behavioral alterations in patients with temporal lobe epilepsy. In D. Blumer (Ed.), Psychiatric aspects of epilepsy (pp. 197-228). Washington: American Psychiatric Association.
- Bear, D., Freeman, R., Schiff, D., & Greenberg, M. (1985). Interictal behavioral changes in patients with temporal lobe epilepsy. In R. E. Hales & A. J. Frances (Eds.), American Psychiatric Association Annual Review (Vol. 4, pp. 190-210). Washington, D.C.: American Psychiatric Association.

- Bear, D., Levin, K., Blumer, D., Chetham, D., & Ryder, J. (1982). Interictal behavior in hospitalised temporal lobe epileptics: Relationship to idiopathic psychiatric syndromes. Journal of Neurology, Neurosurgery, and Psychiatry, 45, 481-488.
- Bear, D. M., Schenk, L., & Benson, H. (1981). Increased autonomic responses to neutral and emotional stimuli in patients with temporal lobe epilepsy. American Journal of Psychiatry, 138, 843-845.
- Benner, D. G., & Joscelyne, B. (1984). Multiple personality as a borderline disorder. Journal of Mental and Nervous Disease, 172, 98-104.
- Benson, D. F., Miller, B. L., & Signer, S. F. (1986). Dual personality associated with epilepsy. Archives of Neurology, 43, 471-474.
- Benson, F., & Zaidel, E. (1985). The dual brain: Hemispheric specialization in humans. New York: Guilford Press.
- Bernstein, E. M. & Putnam, F. W. (1986). Development, reliability, and validity of a dissociation scale. Journal of Nervous and Mental Disease, 174, 727-734.
- Bingley, T. (1958). Mental symptoms in temporal lobe epilepsy and temporal lobe gliomas. Munksgaard: Copenhagen.
- Blanchett, P., & Frommer, G. P. (1986). Mood change preceding epileptic seizures. Journal of Nervous and Mental Disease, 174, 471-476.
- Bliss, E. L. (1980). Multiple personalities: A report of 14 cases with implications for schizophrenia and hysteria. Archives of General Psychiatry, 37, 1388-1397.
- Bliss, E. L. (1983). Multiple personalities, related disorders and hypnosis. American Journal of Clinical Hypnosis, 26, 114-123.
- Bliss, E. L. (1984a). Hysteria and hypnosis. Journal of Nervous and Mental Disease, 172, 203-206.
- Bliss, E. L. (1984b). Spontaneous self-hypnosis in multiple personality disorder. Psychiatric Clinics of North America, 7, 135-148.

- Bliss, E. L. (1984c). A symptom profile of patients with multiple personalities, including MMPI results. Journal of Nervous and Mental Disease, 172, 197-202.
- Bliss, E. L. (1986). Multiple personality, allied disorders, and hypnosis. New York: Oxford University Press.
- Bliss, E. L., & Jeppsen, E. A. (1985). Prevalence of multiple personality among inpatients and outpatients. American Journal of Psychiatry, 142, 250-251.
- Blumer, D. (1977). Treatment of patients with seizure disorder referred because of psychiatric complications. In D. Blumer & K. Levin (Eds.), McLean Hospital Journal (pp. 53-73). Belmont, MA: McLean Hospital
- Blumer, D. (1979). Psychiatric aspects of temporal lobe epilepsy: A review. In J.A. Wada (Ed.), Epilepsy: neurotransmitter, behavior, and pregnancy (unpaginated). Vancouver: Canadian League Against Epilepsy/Western Institute on Epilepsy.
- Blumer, D. (1982). Specific psychiatric complications in certain forms of epilepsy and their treatment. In H. Sands (Ed.), Epilepsy: A handbook for the mental health professional (pp. 97-110). New York: Brunner/Mazel.
- Blumer, D., & Walker, A. E. (1967). Sexual behavior in temporal lobe epilepsy. Archives of Neurology, 16, 37-43.
- Boor, M. (1982). The multiple personality epidemic: Additional cases and inferences regarding diagnosis, etiology, dynamics and treatment. Journal of Nervous and Mental Disease, 170, 302-304.
- Braun, B. G. (1983a). Psychophysiologic phenomena in multiple personality and hypnosis. American Journal of Clinical Hypnosis, 26, 124-137.
- Braun, B. G. (1983b). Neurophysiologic changes in multiple personality due to integration: a preliminary report. American Journal of Clinical Hypnosis, 26, 84-92.
- Braun, B. G. (1984). Towards a theory of multiple personality and other dissociative phenomena. Psychiatric Clinics of North America, 7, 171-193.

- Braun, B. G., & Braun, R. E. (1983). Clinical aspects of multiple personality. Unpublished manuscript.
- Brende, J. O. (1984). The psychophysiological manifestations of dissociation: electrodermal responses in a multiple personality patient. Psychiatric Clinics of North America, 7, 41-50.
- Brende, J. O., & Rinsley, D. B. (1981). A case of multiple personality with psychological automatisms. Journal of the American Academy of Psychoanalysis, 9, 129-151.
- Bruens, J.H. (1971). Psychoses in epilepsy. Psychiatrica, Neurologia, Neurochirurgia, 74, 175-192.
- Breuer, J., & Freud, S. (1955). Studies on hysteria. In J. Strachey (Ed. and Trans.), The standard edition of the complete psychological works of Sigmund Freud (Vol. 2). London: Hogarth Press. (Original work published in 1895).
- Bychowski, G. (1962). Escapades: a form of dissociation. Psychoanalytic Quarterly, 131, 155-173.
- Charcot, J. M., & Marie, P. (1892). On hystero-epilepsy. In H. Tuke (Ed.), A dictionary of psychological medicine (Vol. 1, pp. 627-641). London: Churchill.
- Chase, T. (1987). When Rabbit howls. New York: E.P. Dutton.
- Chu, J. A. (1984). Multiple personality disorder: A clinical perspective. Paper presented at the Academic Conference, McLean Hospital, Belmont, Massachusetts.
- Clary, W. F., Burstin, K. J., & Carpenter, J. S. (1984). Multiple personality and borderline personality disorder. Psychiatric clinics of North America, 7, 89-100.
- Cocores, J. A., Bender, A. L., & McBride, E. (1984). Multiple personality, seizure disorder, and the electroencephalogram. Journal of Nervous and Mental Disease, 172, 436-438.
- Condon, W. S., Ogston, W. D., & Pacoe, L. V. (1969). Three faces of Eve revisited: A study of transient microstrabismus. Journal of Abnormal Psychology, 74, 618-620.

- Coons, P. M. (1984). The differential diagnosis of multiple personality: A comprehensive review. Psychiatric Clinics of North America, 7, 51-67.
- Coons, P. M., Milstein, V., & Marley, C. (1982). EEG studies of two multiple personalities and a control. Archives of General Psychiatry, 39, 823-825.
- Devinsky, O., & Bear, D. (1984). Varieties of aggressive behavior in temporal lobe epilepsy. American Journal of Psychiatry, 141, 651-656.
- Dimond, S. J., Farrington, L., & Johnson, P. (1976). Differing emotional response from right and left hemisphere. Nature, 261, 690-692.
- Doane, B. K. (1986). Clinical psychiatry and the physiodynamics of the limbic system. In B. K. Doane & K. E. Livingstone (Eds.), The limbic system: Functional organization and clinical disorders (pp. 285-315). New York: Raven Press.
- Ellenberger, H. F. (1970). The discovery of the unconscious: The history and evolution of dynamic psychiatry. New York: Basic Books.
- Engel, J. Jr., Rausch, R., Lieb, J. P., Kuhl, D. E., & Crandall, P. H. (1981). Correlation of criteria used for localizing epileptic foci in patients considered for surgical therapy of epilepsy. Annals of Neurology, 9, 215-224.
- Erikson, M. H. (1980). Hypnotic investigation of psychodynamic processes. In E. L. Rossi (Ed.), The collected papers of Milton Erikson (Vol. 3). New York: Irvington.
- Erikson, M. H., & Kubie, L. S. (1939). The permanent relief of an obsessional phobia by means of communication with an unsuspected dual personality. Psychoanalytic Quarterly, 8, 471-509.
- Erikson, M. H., & Rapaport, D. (1980). Finding on the nature of the personality structures in two different dual personalities by means of projective and psychometric tests. In E. L. Rossi (Ed.), The collected papers of Milton Erikson, (Vol. 3, pp. 271-286). New York: Irvington.

- Ervin, F., Epstein, A. W., & King, H. E. (1955). Behavior of epileptic and nonepileptic patients with temporal spikes. Archives of Neurology and Psychiatry, 74, 488-497.
- Fairbairn, W. R. D. (1952). An object relations theory of the personality. New York: Basic Books.
- Falconer, M. A. (1973). Irreversibility by temporal lobe resection of the behavioral abnormalities of temporal lobe epilepsy. New England Journal of Medicine, 289, 451-455.
- Falconer, M. A., Hill, D., Meyer, A., & Wilson, J. L. (1958). Clinical, radiological and EEG correlations with pathological changes in temporal lobe epilepsy and their significance in surgical treatment. In M. Baldwin & P. Bailey (Eds.), Temporal lobe epilepsy (pp. 396-410). Springfield, Il: Charles C. Thomas.
- Fast, I. (1974). Multiple identities in borderline personality organization. British Journal of Medical Psychology, 47, 291-300.
- Federn, P. (1952). Ego psychology and the psychoses. New York: Basic Books.
- Fenichel, O. (1945). The psychoanalytic theory of neurosis. New York: Norton.
- Fenton, G. W. (1983). Epilepsy, personality and behavior. In F. C. Rose (Ed.), Research progress in epilepsy (pp. 188-209). London: Pitman.
- Ferguson, S. M., Rayport, M., Gardner, R., Kass, W., Weiner, H., & Reiser, M. F. (1969). Similarities in mental content of psychotic states, spontaneous seizures, dreams, and responses to electrical brain stimulation in patients with temporal lobe epilepsy. Psychosomatic Medicine, 31, 479-498.
- Flor-Henry, P. (1969a). Schizophrenia-like reactions and affective psychoses associated with temporal lobe epilepsy: Etiological factors. American Journal of Psychiatry, 126, 400-404.
- Flor-Henry, P. (1969b). Psychosis and temporal lobe epilepsy: a controlled investigation. Epilepsia, 10, 363-395.

- Flor-Henry, P. (1972). Ictal and interictal psychiatric manifestations in epilepsy: Specific or nonspecific. Epilepsia, 13, 773-783.
- Flor-Henry, P. (1973). Psychiatric syndromes considered as manifestations of lateralized temporal-limbic dysfunction. In L. V. Laitinen & K. E. Livingston (Eds.), Surgical approaches in psychiatry (pp. 22-26). Baltimore: University Park Press.
- Flor-Henry, P. (1976a). The endogenous psychoses: a reflection of lateralized dysfunction of the anterior limbic system. In K. E. Livingston & O. Hornykiewicz (Eds.), Limbic mechanisms: The continuing evolution of the limbic system concept (pp. 389-404). New York: Plenum Press.
- Flor-Henry, P. (1976b). Lateralized temporal-limbic dysfunction and psychopathology. Annals of the New York Academy of Science: Vol. 12. Neural parallels and continuities (pp. 777-797).
- Flor-Henry, P. (1979). Laterality, shifts of cerebral dominance, sinistrality and psychosis. In J. Gruzelier and P. Flor-Henry (Eds.), Hemisphere asymmetries of function in psychopathology (pp. 3-19). Amsterdam: Elsevier/North Holland Biomedical Press.
- Flor-Henry, P. (1979). On certain aspects of the localization of the cerebral systems regulating and determining emotion. Biological Psychiatry, 14, 677-698.
- Flor-Henry, P. (1983). Determinants of psychosis in epilepsy: Laterality and forced normalization. Biological Psychiatry, 18, 1045-1057.
- Flor-Henry, P. (1985). Psychiatric aspects of cerebral lateralization. Psychiatric Annals, 15, 429-434.
- Flor-Henry, P. (1985). Hysteria. In J. A. M. Frederiks, (Ed.), Handbook of clinical neurology: Vol. 2. Neurobehavioral disorders (pp. 573-583). Amsterdam: Elsevier Science.
- Flor-Henry, P., & Koles, Z. J. (1980). EEG studies in depression, mania and normals: Evidence for partial shifts of laterality in the affective psychoses. Advances in Biological Psychiatry, 4, 21-43.

- Freedman, N. (1980). On splitting. Psychoanalysis and Contemporary Thought, 3, 237-266.
- Frumkin, L. R., Ripley, H. S., & Cox, G. B. (1978). Changes in cerebral hemispheric lateralization with hypnosis. Biological Psychiatry, 13, 741-750.
- Gastaut, H. (1953). So-called psychomotor and temporal epilepsy. Epilepsia, 2, 59-76.
- Gastaut, H. (1954). Interpretation of the symptoms of psychomotor epilepsy in relation to physiological data on rhinencephalic function. Epilepsia, 3, 84-88.
- Gazzaniga, M. S. (1985). The social brain. New York: Basic Books.
- Geshwind, N. (1983). Interictal behavioral changes in epilepsy. Epilepsia, 24(Suppl. 1), S23-S30.
- Gianotti, G. (1972). Emotional behavior and hemispheric side of lesion. Cortex, 8, 41-55.
- Gibbs, F. A. (1951). Ictal and non-ictal psychiatric disorders in temporal lobe epilepsy. Journal of Nervous and Mental Disease, 113, 522-528.
- Gibbs, E. L., Gibbs, F. A., & Fuster, B. (1948). Psychomotor epilepsy. Archives of Neurology and Psychiatry, 60, 331-339.
- Gloor, P. (1986). Role of the human limbic system in perception, memory, and effect: Lessons from temporal lobe epilepsy. In B. K. Doane & K. E. Livingstone (Eds.), The limbic system: Functional organization and clinical disorders (pp. 159-169). New York: Raven Press.
- Gloor, P., Olivier, A., Quesney, L. F., Andermann, F., & Horowitz, S. (1982). The role of the limbic system in experiential phenomena of temporal lobe epilepsy. Annals of Neurology, 12, 129-144.
- Goddard, G. V., & Morrell, F. (1971). Chronic progressive epileptogenesis induced by focal electrical stimulation of the brain. Neurology, 21, 393-411.

- Goddard, G. V., McIntyre, D. C., & Leech, C. K. (1969). A permanent change in brain function resulting from daily electrical stimulation. Experimental Neurology, 25, 295-330.
- Goleman, D. (1985, May 21). New focus on multiple personality: biological changes can coincide with personality. New York Times, pp. C1, C6.
- Gruenewald, D. (1978). Analogues of multiple personality in psychosis. International Journal of Clinical and Experimental Hypnosis, 26, 1-8.
- Guerrant, J., Anderson, W. W., Fisher, A., Weinstein, M. M., Jaros, M. R., & Deskins, A. (1962). Personality in Epilepsy. Springfield, Il: Charles C. Thomas.
- Guntrip, H. (1969). Schizoid phenomena, object relations and the self. New York: International Universities Press.
- Gur, R. C., & Gur, R. E. (1974). Handedness, sex, and eyedness as moderating variables in the relation between hypnotic susceptibility and functional brain asymmetry. Journal of Abnormal Psychology, 83, 635-643.
- Harman, D. W., & Ray, W. J. (1977). Hemispheric activity during affective verbal stimuli: An EEG study. Neuropsychologia, 15, 457-460.
- Harriman, P. L. (1942). The experimental production of some phenomena related to multiple personality. Journal of Abnormal Psychology, 37, 244-255.
- Harris, J. E. (1986). Clinical neuroscience: From neuroanatomy to psychodynamics. New York: Human Sciences Press.
- Hebb, D. O. (1949). The organization of behavior: A neuropsychological theory. New York: John Wiley.
- Herman, J., & van der Kolk, B. (1987). Traumatic antecedents of borderline personality disorder. In B. van der Kolk (Ed.), Psychological trauma (pp. 111-126). Washington, DC: American Psychiatric Association.

- Hermann, B. P. & Whitman, S. (1986). Psychopathology in epilepsy: A multietiologic model. In B. P. Hermann & S. Whitman (Eds.), Psychopathology in epilepsy: Social dimensions (pp. 5-37). New York: Oxford Press.
- Hilgard, E. R. (1986). Divided consciousness: Multiple controls in thought and action. New York: John Wiley and Sons.
- Hill D., Pond D. A., Mitchell, W., & Falconer, M. A. (1957). Personality changes following temporal lobectomy for epilepsy. Journal of Mental Science, 103, 18-23.
- Horevitz, R. P., & Braun, B. (1984). Are multiple personalities borderline? Psychiatric Clinics of North America, 7, 69-87.
- Horowitz, M. J. (1977). Cognitive and interactive aspects of splitting. American Journal of Psychiatry, 134, 549-553.
- Ischlondsky, N. D. (1955). The inhibitory process in the cerebrophysiological laboratory and in the clinic. Journal of Nervous and Mental Diseases, 12, 15-18.
- Kampmann, R. (1976). Hypnotically induced multiple personality: An experimental study. International Journal of Clinical and Experimental Hypnosis, 24, 215-227.
- Kanzer, M. (1939). Amnesia: A statistical study. American Journal of Psychiatry, 96, 711-716.
- Kernberg, O. F. (1975). Borderline conditions and pathological narcissism. New York: Jason Aronson.
- Kernberg, O. F. (1976). Object relations theory and clinical psychoanalysis. New York: Jason Aronson.
- Keyes, D. (1981). The minds of Billy Mulligan. New York: Random House.
- Kinsbourne, M. (1972). Eye and head turning indicates cerebral lateralization. Science, 176, 539-541.
- Kluft, R. (1982). Varieties of hypnotic interventions in the treatment of multiple personalities. American Journal of Clinical Hypnosis, 24, 230-240.

- Kluft, R. (1984). Childhood antecedents of multiple personality disorder. Washington, DC: American Psychiatric Association Press.
- Kolb, L. C. (1987). A neuropsychological hypothesis explaining post-traumatic stress disorders. American Journal of Psychiatry, 144, 989-995.
- Kramer, G. W., Ebert, M. H., & Lake, C. R. (1984). Hypersensitivity to d-amphetamine several years after early social deprivation in rhesus monkeys. Psychopharmacology, 82, 266-271.
- Larmore, K., Ludwig, A. M., & Cain, R. L. (1977). Multiple personality: An objective case study. British Journal of Psychiatry, 131, 35-40.
- Lennox, W. G. (1960). Epilepsy and related disorders (Vols. 1-2). Boston: Little, Brown, & Co.
- Lilly, J. (1972). Programming and metaprogramming in the human biocomputer: Theory and experiments (rev. ed.). New York: Julian Press.
- Lipton, S. (1943). Dissociated personality: A case report. Psychiatric Quarterly, 17, 35-56.
- Lishman, A. W. (1978). Temporal lobe epilepsy in organic psychiatry. Oxford: Blackwell Scientific.
- Livingston, K. E. (1977). Limbic system dysfunction induced by kindling: Its significance for psychiatry. In W. H. Sweet, S. Orbrador, & J. G. Martin-Rodriguez (Eds.), Neurosurgical treatment in psychiatry, pain and epilepsy (pp. 63-75). Baltimore: University Park.
- Ludwig, A. M. (1983). The psychobiological functions of dissociation. American Journal of Clinical Hypnosis, 26, 93-99.
- Ludwig, A. M., Brandsma, J. M., Wilbur, C. B., Bendfeldt, F., & Jameson, D. H. (1972). The objective study of multiple personality. Archives of General Psychiatry, 26, 298-310.
- Luys, J. (1879). Review of memoirs to academie de medicine [Review of letters to the academy of medicine]. Review Philosophie, 8, 105-106.

- MacLean, P. (1954). The limbic system and its hippocampal formation: Studies in animals and their possible application to man. Journal of Neurosurgery, 11, 29-44.
- Marks, C. E. (1980). Commissurotomy, consciousness, and unity of mind. Montgomery, Vt: Bradford Books.
- McKellar, P. (1977). Autonomy, imagery, and dissociation. Journal of Mental Imagery, 1, 93-108.
- Mendez, M. F., Cummings, J. L., & Benson, F. (1986). Depression in epilepsy. Archives of Neurology, 43, 766-770.
- Mesulam, M. M. (1981). Dissociative states with abnormal temporal lobe EEG. Archives of Neurology, 38, 176-181.
- Mignone, R. J., Donnelly, E. F., & Sadowsky, D. (1970). Psychological and neurological comparisons of psychomotor and non-psychomotor epileptic patients. Epilepsia, 11, 345-359.
- Monroe, R. (1978). Episodic behavioral disorders. In G. U. Balis, L. Wurmser, & E. McDaniels (Eds.), Psychiatric problems in medical practice (pp. 51-69). Boston: Butterworth.
- Monroe, R. (1986). Episodic behavioral disturbance and limbic ictus. In B. K. Doane & K. E. Livingston (Eds.), The limbic system: Functional organization and clinical disorders (pp. 229-250). New York: Raven Press.
- Morrell, F. (1985). Secondary epileptogenesis in man. Archives of Neurology, 42, 327-335.
- Mungas, D. (1982). Interictal behavior abnormality in temporal lobe epilepsy. Archives of General Psychiatry, 39, 108-111.
- Nadelson, T. (1977). Borderline rage and the therapist's response. American Journal of Psychiatry, 134, 748-751.
- Parfitt, D., & Gall, C. (1944). Psychogenic amnesia. Journal of Mental Science, 90, 511-531.
- Penfield, W. (1951). Memory mechanisms. Archives of Neurology and Psychiatry, 67, 178-191.

- Penfield, W. (1955). The permanent record of the stream of consciousness. Proceedings of 14th International Congress of Psychology (pp. 47-69). Amsterdam: Acta Psychologica, Vol. 11.
- Penfield, W., & Perot, P. (1963). The brain's record of auditory and visual experience: A final summary and discussion. Brain, 86, 595-696.
- Pitblado, C., & Cohen, J. (1984). State-related changes in amplitude, latency and cerebral asymmetry of average evoked potentials in a case of multiple personality. International Journal of Clinical Neuropsychology, 6, 70.
- Pitblado, C., & Densen-Gerber, J. (1986, September). Pattern-evoked potential differences among the personalities of a multiple: some new phenomena. Paper presented at the Third Annual Conference on Multiple Personality and Dissociative States, Chicago, IL.
- Pond, D. A. (1957). Psychiatric aspects of epilepsy. Journal of the Indian Medical Profession, 3, 1141-1150.
- Pond, D. A. (1962). The schizophrenia-like psychoses of epilepsy. Proceedings of the Royal Society of Medicine, 55, 316-322.
- Pond, D. A. (1974). Epilepsy and personality disorders. In P. J. Vinken & G. W. Bruyn (Eds.), Handbook of clinical neurology: Vol. 15. The epilepsies (pp. 576-592). Amsterdam: North Holland.
- Post, R. M. (1986). Does limbic system dysfunction play a role in affective illness? In B. K. Doane & K. E. Livingston (Eds.), The limbic system: Functional organization and clinical disorders (pp. 229-250). New York: Raven Press.
- Post, R. M., & Uhde, T. W. (1986). Carbamazepine in the treatment of affective illness. In B. K. Doane & K. E. Livingston (Eds.), The limbic system: Functional organization and clinical disorders (pp. 267-284). New York: Raven Press.
- Pribram, K. H. (1971). Languages of the brain. Englewood Cliffs, NJ: Prentice-Hall.

- Prince, M. (1906). Hysteria from the point of view of dissociated personality. Journal of Abnormal Psychology, October 1906, 170-187.
- Prince, M., & Peterson, F. (1908). Experiments in psychogalvanic from co-conscious ideas in a case of multiple personality. Journal of Abnormal Psychology, 3, 114-131.
- Pritchard, P. B., Lombroso, C. T., & McIntyre, M. (1980). Psychological complications of temporal lobe epilepsy. Neurology, 30, 227-232.
- Putnam, F. W. (1984a). The psychophysiologic investigation of multiple personality disorder: A review. Psychiatric Clinics of North America, 7, 31-39.
- Putnam, F. W. (1984b). The study of multiple personality disorder: General strategies and practical considerations. Psychiatric Annals, 14, 58-61.
- Putnam, F. W. (1985). Dissociation as a response to extreme trauma. In F. W. Putnam (Ed.), Childhood antecedents of multiple personality (pp. 66-97). Washington: American Psychiatric Association.
- Putnam, F. W., Buchsbaum, M., Howland, F., Brassfield, P., Braun, B., & Post, R. (1982, May). Evoked potentials in multiple personality disorder. Paper presented at 135th annual meeting of the American Psychiatric Association, Toronto, Canada.
- Putnam, F. W., Guroff, J. J., Silberman, E. K., Barban, L., & Post, R. M. (1986). The clinical phenomenology of multiple personality disorder: Review of 100 recent cases. Journal of Clinical Psychiatry, 47, 285-293.
- Putnam, F. W., Loewenstein, R. J., Silberman, E. J., & Post, R. M. (1984). Multiple personality disorder in a hospital setting. Journal of Clinical Psychiatry, 45, 172-175.
- Racine, R. J. (1972a). Modification of seizure activity by electrical stimulation: Afterdischarge threshold. Electroencephalography and Clinical Neurophysiology, 32, 269-279.

- Racine, R. J. (1972b). Modification of seizure activity by electrical stimulation: Motor seizures. Electroencephalography and Clinical Neurophysiology, 32, 281-294.
- Racine, R., & McIntyre, D. (1986). Mechanisms of kindling: A current view. In B. K. Doane & K. E. Livingston (Eds.), The limbic system: Functional organization and limbic disorders (pp.109-119). New York: Raven Press.
- Racine, R., & Zaide, J. (1976). A further investigation into the mechanisms underlying the kindling phenomena. In K. E. Livingston & O. Hornykiewicz (Eds.), Limbic mechanisms: The continuing evolution of the limbic system concept (pp. 457-493). New York: Plenum Press.
- Ribot, T. (1885). Diseases of memory (3rd ed.). London: Kegan Paul.
- Rinsley, D. (1983). Borderline and other self disorders. New York: Jason Aronson.
- Robertson, H. A. (1984). Epilepsy, kindling and the schizophrenias [Abstract] (p. 56). Proceedings of the 7th Annual Scientific Meeting of the Canadian College of Neuropsychopharmacology. Halifax, Nova Scotia, Canada: Canadian College of Neuropsychopharmacology.
- Rodin, E. A. (1973). Psychomotor epilepsy and aggressive behavior. Archives of General Psychiatry, 28, 210-213.
- Rodin, E. A. (1978). Psychiatric disorders associated with epilepsy. Psychiatric Clinics of North America, 1, 101-115.
- Rodin, E. A., DeJong, R. N., Waggoner, R. W., & Bagehi, B. K. (1955). Relationship between certain forms of psychomotor epilepsy and schizophrenia. Archives of Neurology and Psychiatry, 77, 449-463.
- Rodin, E. A. & Schmaltz S. (1984). The Bear-Fedio personality inventory and temporal lobe epilepsy. Neurology, 34, 591-596.
- Rose, G. J. (1987). Trauma and mastery in life and art. New Haven: Yale University Press.

- Rosenbaum, M. (1980). The role of the term schizophrenia in the decline of diagnoses of multiple personality. Archives of General Psychiatry, 37, 1383-1385.
- Sargant, W. (1944). Discussion of a paper by Parfitt and Gall. Journal of Mental Science, 90, 529.
- Sargant, W., & Slater, E. (1941). Amnestic syndromes in war. Proceedings of the Royal Society of Medicine, 34, 757-764.
- Sato, M. (1983). Long-lasting hypersensitivity to methamphetamine following amygdaloid kindling in cats: The relationship between limbic epilepsy and the psychotic state. Biological Psychiatry, 18, 525-536.
- Schenk, L., & Bear, D. (1981). Multiple personality and related dissociative phenomena in patients with temporal lobe epilepsy. American Journal of Psychiatry, 138, 1311-1316.
- Schreiber, F. R. (1974). Sybil. New York: Warner Books.
- Schwartz, G. E., Davidson, R. J., & Maer, F. (1975). Right hemisphere lateralization for emotion in the human brain: Interactions with cognition. Science, 190, 286-288.
- Scialli, J. V. (1982). Multiple identity processes and the development of the observing ego. Journal of the American Academy of Psychoanalysis, 10, 387-405.
- Searles, H. F. (1977). Dual and multiple identity processes in borderline ego functioning. In P. Hartcollis (Ed.), Borderline personality disorders (pp. 441-456). New York: International Universities Press.
- Segal, D. S., Weinberger, S. B., & Cahill, J. (1980). Multiple daily amphetamine administration: Behavioral and biochemical alterations. Science, 207, 904-907.
- Sidis, B., & Goodhart, S. P. (1905). Multiple personality: An experimental investigation into the nature of human individuality. New York: D. Appleton.
- Slater, E., Beard, A. W., & Glithero, E. (1963). The schizophrenia-like psychoses of epilepsy. British Journal of Psychiatry, 109, 95-150.

- Slater, E., & Moran, P. A. P. (1969). The schizophrenia-like psychoses of epilepsy: Relation between ages of onset. British Journal of Psychiatry, 115, 599-600.
- Stengel, E. (1941). On the aetiology of fugue states. Journal of Mental Science, 87, 572-599.
- Stengel, E. (1943). Further studies in pathologic wandering. Journal of Mental Science, 89, 224-241.
- Stern, C. R. (1984). The etiology of multiple personalities. Psychiatric Clinics of North America, 7, 149-160.
- Stevens, J. R. (1975). Interictal clinical manifestations of complex partial seizures. In J. K. Penry & D. D. Daly (Eds.), Advances in Neurology (Vol. 11, pp. 85-112). New York: Raven Press.
- Stevens, J. R. (1982). Risk factors for psychopathology in individuals with epilepsy. Advances in Biological Psychiatry, 8, 56-80.
- Sutcliffe, J. P., & Jones, J. (1962). Personal identity, multiple personality, and hypnosis. International Journal of Clinical and Experimental Hypnosis, 10, 231-269.
- Taylor, W. S., & Martin, M. (1944). Multiple personality. Journal of Abnormal and Social Psychology, 39, 281-300.
- Temkin, D. (1971). The falling sickness (2nd ed.). Baltimore: Johns Hopkins Press.
- Temkin, N. R., & Davis, G. R. (1984). Stress as a risk factor for seizures among adults with epilepsy. Epilepsia, 25, 450-456.
- Thigpen, C. H., & Cleckley, H. (1950). A case of multiple personality. Journal of Abnormal and Social Psychology, 49, 135-151.
- Thigpen, C. H., & Cleckley, H. M. (1957). The three faces of Eve. New York: McGraw-Hill.
- Thigpen, C. H., & Cleckley, H. M. (1984). On the incidence of multiple personality disorder. International Journal of Clinical and Experimental Hypnosis, 32, 63-66.

- Tizard, B. (1962). The personality of epileptics: A discussion of the evidence. Psychological Bulletin, 59, 196-210.
- Tucker, D. M., Novelly, R. A., & Walker, P. J. (1987). Hyperreligiosity in temporal lobe epilepsy: Redefining the relationship. Journal of Nervous and Mental Disease, 175, 181-184.
- Tucker, D. M., Roth, R. S., & Arneson, B. A. (1977). Right hemisphere activation during stress. Neuropsychologia, 15, 697-700.
- Tucker, G. J., Price, T. R. P., Johnson, V. B., & McAllister, T. (1986). Phenomenology of temporal lobe dysfunction: A link to atypical psychosis. Journal of Nervous and Mental Disease, 174, 348-356.
- van der Kolk, B., Greenberg, M., Boyd, H., & Krystal, J. (1985). Inescapable shock, neurotransmitters, and addiction to trauma: Toward a psychobiology of post-traumatic stress. Biological Psychiatry, 20, 314-325.
- Velek, M., & Balon, R. (1986). Multiple personality: Clinical syndrome of multiple etiology. Resident and Staff Physician, 32, 70-78.
- Vislie, H., & Henrikson, G. F. (1958). Psychic disturbances in epilepsy. In A. M. Lorentz de Haas (Ed.), Lectures on epilepsy (pp. 29-90). Amsterdam: Elsevier/Van Nostrand.
- Volkan, V. D. (1976). Primitive internalized object relations. New York: International Universities Press.
- Watkins, J. G., & Watkins, H. H. (1982a). We, the divided self. New York: Irvington.
- Watkins, J. G., & Watkins, H. H. (1982b). Ego-state therapy. In R. Corsini (Ed.), Handbook of innovative therapies: A sourcebook (pp. 136-155). New York: Van Nostrand Reinhold.
- Waxman, S. G., & Geshwind, N. (1975). The interictal behavior syndrome of temporal lobe epilepsy. Archives of General Psychiatry, 32, 1580-1586.

- West, L. J. (1967). Dissociative reaction. In A. M. Freedman & H. S. Kaplan (Eds.), Comprehensive textbook of psychiatry (pp. 885-899). Baltimore: Williams and Wilkins.
- Wexler, B. E. (1980). Cerebral laterality and psychiatry: A review of the literature. American Journal of Psychiatry, 137, 279-291.
- Yarbrough, R., Magaro, P., & Manchester, C. (1985, October). Hemispheric lateralization of subpersonalities in multiple personality disorder. Paper presented at the 2nd International Conference on Multiple Personality and Dissociative States, Chicago, IL.
- Zielinski, J. J. (1986). Selected psychiatric and psychosocial aspects of epilepsy as seen by an epidemiologist. In S. Whitman and B. P. Hermann (Eds.), Psychopathology in epilepsy: Social dimensions (pp. 38-65). New York: Oxford University Press.