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Hypersensitivity to threat in paranoid personality

West, Jeffrey Allen, Ph.D.

The University of North Carolina at Greensboro, 1988

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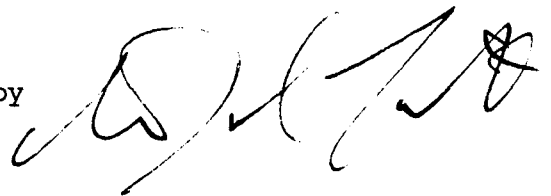
by

Jeffrey A. West

A Dissertation Submitted to
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of the Requirements for the Degree
Doctor of Philosophy

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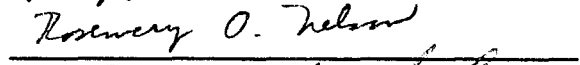
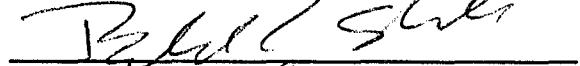
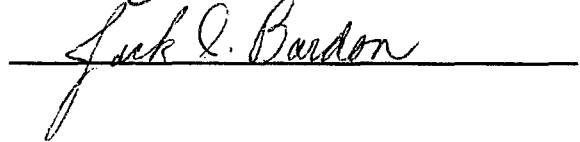
APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at The University of North Carolina at Greensboro.

Dissertation Adviser



Committee Members

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WEST, JEFFREY ALLEN, Ph.D. Hypersensitivity to Threat in Paranoid Personality. (1988) Directed by Dr. Ira D. Turkat. 132 pp.

Three groups of detoxified substance abuse inpatients, characterized by DSM-III-R criteria as Paranoid or Antisocial Personality Disorder, or no personality disorder, were compared in responses to six variations of the Stroop color-naming task designed to assess hypothesized attentional and discriminative aspects of paranoid hypersensitivity by incorporating threat and five types of non-threat control words as stimuli. Results supported experimental predictions that Paranoid Personality Disorder subjects would show greater differential increases in color-naming times on the Stroop task involving social threat words, relative to performance on tasks using matched non-threatening stimuli. This specific interference effect was not evidenced in the responses of the non-paranoid groups. Comparison of performance on a subsequent recognition task indicated that Paranoid Personality Disorder subjects showed significant differences in ability to recognize previously-seen threat versus non-threat words, relative to remaining subjects. Signal detection analysis of results indicated that the Paranoid group demonstrated significantly reduced ability to discriminate among threat words, whereas non-paranoid comparison subjects tended to show maximum discriminability indices with threat-related material. These findings have implications for current formulations of paranoid disorders and personality.

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A proliferation of clinical and research articles suggests that personality study is generating renewed interest (Millon, 1984). Attention has shifted from behavioral-consistency versus situational-specificity debates (e.g., compare Mischel, 1969, and Mischel, 1979), and new focus is directed toward investigation of important individual differences in behavior, particularly those characterizing maladaptive and dysfunctional personality styles. The call to analyze clinically-relevant personality phenomena has been joined by theorists formerly expressing little interest in this endeavor, including those advocating development of specific behavioral criteria to class so-called trait disorders and those rejecting the internal mediational framework of traditional personality theory altogether (e.g., Harzem, 1984). Researchers have directed attention to the lack of empirical investigation of many widely-described personality phenomena, and the more-carefully defined role assigned to Personality Disorders (PDs) in the multi-axial format of the current Diagnostic and Statistical Manual of the American Psychiatric Association (DSM-III-R; 1987) has reflected and promoted new emphases on assessment, study, and treatment of dysfunctional personality. In short, the field is experiencing enhanced interest and an expanded approach to the study of personality and pathology, and is beginning to address the insufficient empirical validation that underlies description of many of the most prominent or severe PDs encountered by clinicians.

Arguably, the most striking example of a time-preserved, extensively discussed, but essentially non-researched PD (c.f. Spitzer, 1984) has primary features of pervasive and unwarranted suspiciousness, mistrust of people, hypersensitivity, and restricted affectivity, the Paranoid Personality Disorder (PPD). Despite the lengthy history of the PPD concept and its acknowledged severity (Millon, 1981), there is a paucity of controlled investigation of this disorder. With limited recent exceptions, virtually no analysis of relevant behavior patterns nor account of individual differences in PPD subjects was based on more than clinical experience, case study, or intriguing speculation. The lack of systematic investigation of PPD results in part from the rarity with which such individuals seek treatment and the difficulty in obtaining data from them (Shapiro, 1965). However, despite the purported low incidence of treatment self-referrals, some authors believe PPD symptomatology to be relatively prevalent in the population at large (c.f., Manschreck, 1979).

History and Description of PPD

The concept of the paranoid personality style is long-lived. It was included in the 1938 U.S. Navy classification system, a precursor to DSM-I, and has been retained in all subsequent versions of DSM. Complete accounts of paranoid personality (PP) styles or characters, distinguished from psychotic paranoid conditions first described much earlier, appeared by the initial years of this century (e.g., Birnbaum, 1909, and Bleuler, 1906, both described by Millon, 1981; Meyer, 1908). These accounts typically depicted personality developments considered premorbid antecedents for psychotic or grossly delusional disorders.

For example, Meyer (1908) described the following "grades of developments" in the emergence of "paranoid character":

(a) Feelings of uneasiness, tendency to brooding, rumination and sensitiveness, with inability to correct the notions and to make concessions--paranoic constitution and paranoic moods.

(b) Appearance of dominant notions, suspicions or ill-balanced aims.

(c) False interpretations with self-reference and tendency to systematization (pp.256-257).

Meyer further depicted the possible development of hallucinatory falsifications and megalomania in such individuals. It is apparent that a key feature of this description, as in other contemporaneous accounts (e.g., Bleuler, 1906), is the contention that PP involves an essential inflexibility, i.e., "excessive stability" and "inadequate realization of need of correction", with regard to altering behavior in response to personal errors or misinterpretations. Accordingly, Meyer (1908) refers to the paranoid character as one of "recovery without insight" (p.257).

Kraepelin (1921) provided perhaps the classic early description of the paranoid style, his comprehensive account emphasizing feelings of distrust, uncertainty, and excessive self-valuation. The paranoid personality was said to ". . . feel himself on every occasion unjustly treated, the object of hostility, interfered with, oppressed " (p.268). In addition, these feelings of injustice and suspicion were said to be accompanied by restricted affect and irritable, discontented mood. More recent descriptions of PP emphasize suspicion, profoundly heightened sensitivity, and rigidity as essential descriptors. Tollefson (1983)

provides a representative characterization:

The paranoid personality type shows a pervasive apprehension of others, as typified by suspiciousness, mistrust, hypersensitivity and a restricted affect. These individuals frequently are angry or guilt-ridden, and they project these feelings to their environment. Suspicion becomes a pronounced trait that persists despite contradictory evidence. The paranoid personality type loses sight of the "big picture" while searching intensely for rejection and criticism. In novel situations, the person expects bias and trickery or both. Interpersonal relations are limited to a few people; others are seen as threatening or inferior and unworthy. (p.216).

Coleman, Butcher, and Carson (1984) summarize a related aspect of individuals with paranoid personality characteristics, that of actively and selectively seeking evidence of threats in their external environments:

They (PPD patients) tend to see themselves as blameless, instead finding fault for their own mistakes and failures in others - even to the point of ascribing evil motives to others. Such individuals are constantly expecting trickery and looking for clues to validate their expectations, while disregarding all evidence to the contrary (p.237).

These descriptions convey a sense of prevailing clinical impressions of paranoid personality, and highlight the central characteristics of PPD as defined by DSM-III, i.e., suspiciousness, hypersensitivity, and restricted affectivity. By definition, in a

paranoid personality disorder these characteristics comprise enduring patterns of perceiving, relating to, and thinking about the environment and self that are maladaptive and inflexible, resulting in impaired interpersonal/occupational functioning and subjective distress (DSM-III-R, 1987). The DSM-III-R Axis II gives a total of seven criteria for PPD. To fulfill requirements for the diagnosis, an individual's behavior must meet at least four of these and must not occur exclusively during the course of Schizophrenia or a Delusional disorder. By definition, a well-systemized delusional system cannot be evident. PPD is thus distinguished from two other disorders labelled paranoid, i.e., Delusional Paranoid Disorder, and Schizophrenia, Paranoid Type, which involve gross delusions, hallucinations, or other psychotic symptomatology. The relationship between these disorders is not well understood (DSM-III-R, 1987); indeed, the conceptualization and subclassification of diverse paranoid phenomena have served as foci for controversy over many decades (c.f., Kendler, 1980).

DSM-III-R PPD diagnostic criteria are as follows:

A. A pervasive and unwarranted tendency, beginning by early adulthood and present in a variety of contexts, to interpret the actions of people as deliberately demeaning or threatening, as indicated by at least four of the following:

(1) expects, without sufficient basis, to be exploited or harmed by others

(2) questions, without justification, the loyalty or trustworthiness of friends or associates

(3) reads hidden demeaning or threatening meanings into benign remarks or events

(4) bears grudges or is unforgiving of insults or slights

(5) is reluctant to confide in others because of unwarranted fear that the information will be used against him or her

(6) is easily slighted and quick to react with anger or to counterattack

(7) questions, without justification, fidelity of spouse or sexual partner

Thus, consistent with most available descriptions of paranoid personality styles, the DSM-III-R Axis II PPD diagnosis describes a chronically mistrusting and interpersonally-distant individual who is intensely focused on his environment, markedly sensitive to stimulus properties in unusual ways, and prepared to respond to any event perceived as threatening.

Formulation and Study of PPD

As stated above, published research on PP and PPD is almost nonexistent. Among theoreticians who have formulated accounts of the pathogenesis and behavioral presentation of the disorder, few have reported any sort of systematic empirical data base. Only two partial exceptions are known to this author. Millon's (1981) PPD formulation reportedly was derived in part from the results of extensive application of the Millon Clinical Multiaxial Inventory (MCMI; Millon, 1982) among

clinical samples. This account emphasizes covariation of paranoid personality characteristics with other PD pathology in the majority of PPD individuals, and proposes an etiology of the disorder based on Millon's influential biosocial-learning theory (Millon, 1969; Millon & Millon, 1974). Paranoid characters are seen as more severe extensions of certain other dysfunctional personality styles, described below, shown repeatedly by the MCMI to covary with PPD. Millon (1981) speculates that these basic personality types are particularly prone to decompensate into paranoid styles given the influence of certain types of learning histories, neuropsychological states, and/or genetic predispositions.

Millon's most recent account (Millon & Everly, 1985) delineates three PPD subtypes in addition to the rare prototypical "pure" case. The paranoid-narcissistic variation develops in an individual who exhibits a pretentious and naively self-confident manner that provokes frequent challenge and ridicule from others. The extended history of social rejection typically experienced by such persons is said to shape paranoid behaviors which function to avoid punishment and salvage self-esteem. The paranoid-antisocial personality exhibits belligerent, aggressive, and interpersonally manipulative behaviors to cope with the threats and humiliations of an environment perceived as unrelentingly hostile. Such individuals are described as "drifting into persecution" as they become increasingly alienated and suffer progressive social isolation. The paranoid-compulsive PD is said to occur in chronically rigid, nonspontaneous, perfectionistic, moralistic individuals who come to assert themselves in a hostile and overcontrolling manner that

functions to maintain independence from others. This style is particularly likely to result from a history of parental overcontrol; such persons seek the clarity of regulations and cannot tolerate suspense or disorder as they desperately seek freedom from fault and interference. Paranoid pathology develops following real or anticipated reprisals against the PPD individual's inflexible and sometimes violent attempts to impose control on others' behavior.

Millon (1981) also described paranoid-passive-aggressive and decompensated paranoid PD subtypes. The former evidence irritable, negativistic affectivity and were depicted as likely products of chronically inconsistent parental management and contradictory intrafamilial relationships. These persons typically suffered severe emotional disappointments at home which were perpetuated in the environment at large when interpersonal relationships failed to develop or endure. Such individuals were said to be at high risk for the development of increasingly irrational jealousy and suspiciousness which can culminate in the appearance of a full-blown paranoid style. Finally, a severe end-stage of PPD is represented by decompensated paranoid PD, in which paranoid individuals who are particularly vulnerable to stress become easily precipitated into psychotic episodes involving marked fragmentation of thought and behavior. This deterioration may be especially striking in that its victims tend to have presented themselves as overly organized, intimidating, and dominant prior to decompensation.

Millon, an original appointee to the Task Force on Nomenclature and Statistics that designed DSM-III, achieved particular impact as one of

the principal architects of Axis II. His formulations of dysfunctional personality styles including PPD have had substantial influence on conceptualization and assessment of these disorders by contemporary workers in the field and thus are deserving of review. However, systematic research addressing Millon's biosocial-learning theory applied to PPD is lacking. His hypotheses can be considered empirically-derived in part, in that they draw upon standardized MCMI testing results that identify differential patterns of covariation of personality characteristics upon which to base the formulation (Millon, 1982). Unfortunately, details of this process have been insufficiently described. In the context of nonextant PPD research, Millon's PPD formulation might best be construed as a well-informed hypothetical model requiring experimental validation.

Turkat and colleagues (Turkat, 1985; Turkat & Maisto, 1985) reported preliminary research designed to study PPD and test predictions derived from a general formulation of the pathogenesis of the disorder. Evaluative-uniqueness theory (Turkat, 1985) is based in part on case study of PPD individuals described by Turkat and Maisto (1985), including a single subject laboratory experiment involving assessment of electromyographic (EMG) response to criticism in a paranoid personality. Individual and family history data compiled from these cases suggested commonalities in developmental sequences and social experiences across PPD patients that may contribute to the emergence of the paranoid style. Drawing upon these data, Turkat's (1985) theory specifies five principal stage components in the unfolding of PPD, incorporating pathogenic early parental training, unusual social behaviors, subsequent social

isolation, and ultimate development of persecutory/grandiose ideation and self-perpetuating paranoid behaviors, as follows:

(1) Parental training. By Turkat's (1985) account, parents of a future paranoid individual commonly emphasize themes of uniqueness and evaluation within the family. From an early age, their child is taught that he or she is special and unique compared to peers, must always be on guard against making mistakes, and must be prepared for others' critical evaluations. Everpresent concerns in the home environment include family secrets, social guardedness, and family-nonfamily distinctions. Crucially, repeated reference is made to a specific distinguishing attribute (e.g., appearance, intelligence, belief system, or background) that sets the child apart from others. Thus, he or she is trained to perceive and respond to others in a particularly guarded manner even prior to encountering an extended social environment.

(2) Acting different. The child raised in the evaluative-uniqueness training environment behaves differently than peers outside the home, exhibiting prominent social anxiety, awkwardness, and interpersonal suspicion. He or she soon comes to be discriminated by others as different and unusual, and is rejected socially. This tends to reinforce parental training and increase the individual's social apprehension.

(3) Social isolation. As the child progresses through school and enters adolescence, social maladroitness and "uniqueness" - as perceived by child and peers - increase. Rejective social interactions distinguish him and increase anxiety and suspiciousness, which in turn invite additional rejection, often involving active attempts to

humiliate. His or her learning history becomes increasingly deficient in opportunities to acquire appropriate social interactive and coping skills or to consider his own behavior from another's perspective. Fearing further rejection and with few or no social avenues open, the individual withdraws.

(4) Explanations. It is hypothesized that the hypersensitive individual, having achieved a status of near social isolation, is highly motivated to reduce anxiety engendered by the situation but has neither ability nor opportunity to do so by interacting with an external social environment. Extended periods of rumination occur, during which the individual attempts to account for others' hostility and his own isolation. An explanation consistent with evaluative-uniqueness training holds that the individual is indeed different and that others are compelled to evaluate him critically. This explanation is anxiety-provoking, but can become modified to specify that external evaluations are negative because others are inferior and jealous. The implications of this conclusion, i.e., superiority of the hypersensitive person, are said to counteract anxiety engendered by negative evaluations. Thus, assumptions of grandeur and persecution become the "best" explanation for the isolated individual's predicament; they account for why people are against him, fit the data logically, are consistent with lifelong training patterns, and reduce anxiety. Once the explanatory system of PPD has developed, the characteristic paranoid style can be viewed as a "logical" means of interacting with a jealous, persecutory social environment.

(5) Cycle perpetuation. In the final stage described by evaluative-uniqueness theory, PPD behaviors perpetuate a cycle maintaining social isolation. The paranoid individual attends selectively to inappropriate cues and/or fails to respond to appropriate ones in the search for threat or rejection. Information is processed in an idiosyncratic manner consistent with the paranoid explanatory system. Social feedback is invariably construed as an attack, never as constructive. A host of suspicious and hostile interpersonal behaviors serve to alienate others and elicit the very responses that seem to confirm paranoid expectations. In addition, the PPD individual has become highly vulnerable to any type of social evaluation, negative or positive, because criticism continues to evoke rejection anxiety and positive evaluation taken at face value contradicts the explanatory system of envious persecution. Thus, paranoid response patterns become highly immune to alteration or challenge, as clinical reports readily attest.

Turkat (1985) has investigated certain hypotheses derived from evaluative-uniqueness theory. Nonclinical samples were studied predominantly, due to availability. Paranoid personalities were identified among several hundred college students by a protocol designed to assess the primary diagnostic characteristics required by DSM-III; i.e., those students scoring 1.5 standard deviations or higher above the mean on measures of suspiciousness (SCL-90 paranoid ideation subscale; Derogatis, 1975), hypersensitivity (Fear of Negative Evaluation Scale; Watson & Friend, 1969), and restricted affect (Lazare-Klerman-Armor Inventory, 1970) were labelled PPs. These individuals did not

necessarily meet requirements for PPD, because dysfunctional aspects of their behavior were not assessed. Individuals scoring at least 1.5 standard deviations below the mean on the test battery comprised nonparanoid comparison subjects.

The first in a series of studies (Turkat & Banks, in press) demonstrated that subject groups could be distinguished on the basis of significantly higher self-reported frequencies of paranoid thoughts and paranoid experiences among PPs. This finding, which provided initial support for the screening battery as a valid assessment procedure, was replicated in a later study in which additional comparisons were made to clinically diagnosed subjects who met DSM-III criteria for PPD. A second investigation found that reported rates of paranoid thoughts and experiences did not differ between PP and PPD groups, but were significantly lower in comparison subjects. Subsequent inquiry found PPs to have lower rates of prior research participation and higher refusal rates for a proposed research project that was to include videotaping of participants during social interactions. These studies marked a promising beginning for systematic study of PP styles, supported predictions of evaluative uniqueness theory, and tended to validate the hypothesis that presence of major PPD diagnostic characteristics (i.e., suspiciousness, hypersensitivity, restricted affect) would predict relevant behavioral and developmental differences among samples. Of particular interest is the finding that similar differences occurred in clinical PPDs and nonclinical PPs.

Recently, a second line of investigation by Turkat and his colleagues (Thompson-Pope & Turkat, in press) explored perceptual

differences among paranoid personalities. This work utilized a task previously employed to study paranoid differences among schizophrenics (McCormick & Broekema, 1978) to test a number of hypothesized response differences between PP, nonparanoid pathology, and normal comparison groups. Procedures required subjects to identify highly ambiguous stimuli, i.e., defocused projected photographic slides; participants viewed a series of ten slides of each of six animals, arranged so that successive slides within a series were progressively clearer and more recognizable. Following each presentation, subjects were instructed to identify the animal depicted by choosing from a list of possibilities (including I don't know and none of the above) and to rate their confidence in this decision. Targeted for investigation were latency, accuracy, rigidity, and efficiency of identifications, and level of suspicion regarding experimental procedures.

Results indicated that, compared to normals, PPs made significantly earlier attempts at identification and were significantly more accurate in their responses to early slides in the series. PPs also appeared to show more confidence in their responses to ambiguous slides than other groups and demonstrated significantly greater loss of confidence over the sequence of six series. With one exception, these findings supported a priori hypotheses formulated by the authors on the basis of existing conceptualizations of PPD in the literature. The enhanced early accuracy of paranoid subjects ran counter to predictions. Also contrary to expectation, the PP group could not be distinguished on the basis of response rigidity defined by presence of incorrect response strings, or perceptual response style defined by presence of correct

response strings. As hypothesized, PPs did not differ from remaining subjects in average number of slides required to make correct identification, but did select "none of the above" on a significant larger number of trials. The latter finding can be construed as evidence of greater suspiciousness among the paranoid subjects regarding experimental procedures.

The Thompson-Pope and Turkat (in press) study documents further differences in PP subjects; moreover, the inclusion of an "other personality" group supports the notion that at least some of these are specific to paranoid styles in particular rather than maladaptive personality traits in general. The major pattern of findings suggests that PPs were prone to respond more actively in difficult, highly ambiguous discrimination situations and, compared to other groups, were more likely to suspect that the correct answer was being withheld from the response list provided by the experimenters. PP results were also consistent with the hypothesis that these persons are relatively intolerant of ambiguity and that they tend to respond based on more fragmented or ambiguous information than normal controls, although this conclusion must be tempered by the finding that neither PP nor normal control groups differed significantly from "other personality" controls on early attempts at identification and accuracy of these attempts. Though PP performance was far from perfect, unlike that of normal controls it exceeded chance levels significantly. In addition, paranoid subjects appeared able to benefit from feedback and, surprisingly, did not evidence the response rigidity or fixed response styles attributed to them.

Although lacking the preliminary data-base of Millon (1981) or the experimental validation efforts of Turkat and associates, other theoretical accounts of PPD have been derived from case study of the paranoid character style. Most comprehensive is that of Cameron (1963, 1974), who is well known for his pseudocommunity theory applied to delusional and psychotic paranoid states. Unlike many writers on paranoia, he distinguishes paranoid PD from delusional paranoid conditions. In his view, paranoid personality is a necessary but not sufficient precondition for development of paranoid delusions, and not all PPD individuals become delusional.

According to Cameron (1963), the paranoid personality style originates in a history of cold, sadistic, and unreliable treatment by parents who may evidence suspiciousness or full-blown paranoid symptoms themselves. Such upbringing produces primary deficits in the future paranoid's repertoire including failure to trust others, reduced ability to tolerate suspense or novelty, and inability to shift perspective or respond to the environment from alternative points of view. These deficits severely compromise the possibility of forming appropriate social relationships and thereby preclude the development of adequate levels of self-esteem, particularly with respect to sexuality. Although the paranoid individual presents as emotionally controlled and self-sufficient, in Cameron's view he or she is secretly ashamed. Moreover, this person is spectacularly vulnerable to stressful situations that nonparanoid individuals readily cope with by means of interpersonal cooperation, deferred impulsivity, and assumption of alternative perspectives. The PPD individual becomes especially tensed

when exposed to social stressors and must withdraw or attack. Avoidance of such stressors becomes the paramount coping strategy, and leads to development of that exquisite sensitivity toward minute traces of hostility or inconsistency in others' behaviors for which the paranoid personality is known. This exhaustive focus on the external environment promotes the final characteristic deficit, a marked hyposensitivity to hostile or antisocial aspects of one's own behavior. With an externally-directed, hypersensitive, narrowly-focused, impulsive manner in evidence, the PPD individual is well primed to provoke in social situations the interpersonal rejection or hostility that will cue further paranoid behavior.

Overcoming Impediments To PPD Research

In designing an empirical study to enhance knowledge of Paranoid PD it was necessary to consider special problems confronting such research that had discouraged investigation in the past, and to develop solutions. Why is more not known about PPD? Two problem areas, one general and one specific, seemed particularly relevant to this question.

Accurate classification. A major impediment to systematic advance in understanding dysfunctional personality styles in general has been the failure of available classification schemes to permit accurate and reliable description of individual difference phenomena (Spitzer, 1984; Turkat & Levin, 1984). Although it is impossible to determine how much this problem has affected would-be PPD researchers, it undoubtedly has compromised systematic study of other PDs, and impacts on any proposed investigation of dysfunctional personality styles. The diagnostic systems in use until recently, i.e., the first two DSM versions, were

highly unsatisfactory from the standpoint of communicative, heuristic, and predictive value (Adams, 1981; Adams & Haber, 1984; Begelman, 1976). One inherent difficulty with these nosologies was their dependence upon nonoperationalized units of assignment which could not be accurately or reliably measured, including the use of abstract, inferred psychodynamic concepts as diagnostic criteria. This confounded accurate description and classification of pathological phenomena with the limitations of questionable criteria used to define them. Such problems were particularly severe with respect to personality classification (Frances, 1980). As a result, even those personality characteristics that over time have been most lavishly discussed, speculated upon, and examined in treatment--including PPD--have been assessed idiosyncratically and described inconsistently in the literature.

Nosological classification does not itself explain phenomena; it identifies and describes them. Ideally, scientific classification schemes organize and integrate the data of a given field of knowledge in order to develop scientific principles and laws. Such systems comprise models that describe order and commonality among complex phenomena, to highlight important relationships among the events or individuals of interest and allow useful communication. This facilitates subsequent development of explanation, prediction, and control (Adams, Doster, & Calhoun, 1977).

Adherence to a clear, reliable and valid nosology, using appropriate and germane assessment methods, is considered particularly important during the early stages of development of a data base within a given field, as is the case currently with PD study (Adams & Haber,

1984). Before analyzing personality styles, it becomes necessary to operationalize what will be studied. Naturalistic and experimental observations of responses, rather than theoretical postures, arguably should determine the initial development of a taxonomy of behavior pathology (Adams et al., 1977). In this manner there is the greatest likelihood of identifying functionally important variables and avoiding the perpetuation of spurious or untestable theorizing to explain behavior (Adams & Haber, 1984).

The DSM-III, adopted in 1980, was designed to address these concerns and offer significant improvements over its predecessors as a more useful nosology. Attempts were made to achieve a taxonomy that would be operationalized in application and free of specific theories or clinical orientations (DSM-III, 1980), with emphasis on reliability and clinical utility. Personality disorder diagnoses were formulated in accordance with these goals; for the most part they are constituted by diagnostic criteria that are potentially quantifiable and behavior-based, and avoid inferred causal states or etiological suppositions. Efforts reportedly were undertaken during development of the PD diagnoses to investigate and include all dysfunctional personality styles described in the literature in sufficient manner and detail to permit operationalized diagnostic criteria (Spitzer, 1984). For the first time, clinicians using the DSM framework code PD diagnoses (on Axis II) separate from major psychiatric syndromes (on Axis I). This system minimizes the possibility that PD diagnoses will be overlooked in the presence of florid Axis I conditions (Spitzer, Williams, & Skodol, 1980) and reflects growing awareness of the clinical

significance of PD classification. These trends have continued with further refinement in the revised DSM-III-R.

In sum, the DSM-III PD classification system was designed to operationalize, delineate, and cluster in a reliable manner individual behavior patterns and characteristics that have been described by researchers and clinicians as relevant to distinct personality styles and disorders (Frances, 1980). Research addressing the reliability and validity of the Axis II system has begun to appear (e.g., Drake & Vaillant, 1985), although this issue remains incompletely evaluated at present. Given at least minimal nosological adequacy, consistent use of this system with appropriate assessment procedures could enhance significantly the potential for achieving better understanding of personality and related phenomena (c.f. Turkat & Levin, 1984), including paranoid styles. Reliable diagnosis of PD should encourage additional investigation of characterologically dysfunctional behaviors found in a given PD class, including maladaptive cognitions, affect, perceptual styles, and other clinically-significant phenomena; ultimately, the interrelationships between these phenomena, and their functional relations to variables which produce and influence them, must be explored.

It is obvious that none of the above have been illuminated with respect to PPD, because there is virtually no research on this PD. However, even when PD categories have been researched in the past there has often been little empirical basis for asserting that given diagnostic criteria will differentiate consistent behavior patterns across situations or individuals; there has been even less empirical

analysis of such behavior patterns per se. This highlights the need and opportunity for such study in many areas of personality pathology, but the need is particularly acute in the case of PPD because there are so few empirical data. The derivation of a potentially quantifiable and operationalizable system of behavior-related criteria from a large body of clinical observations and descriptions, as approximated (albeit imperfectly) by Axis II, can be seen as an important precursor to understanding differences underlying different personality styles. It may provide the underpinnings for a systematic and replicable program of study rather than an accumulation of noncomparable findings, empirical or otherwise. This is especially fortuitous for PPD research, which might avoid problems arising from the use of inferior classification schemes altogether.

Obtaining subjects. Foremost among obstacles confronting PPD research undoubtedly has been the difficulty in obtaining a suitable sample of cooperative subjects. PPD cases are relatively rare among treatment populations (Koenigsberg, Kaplan, Gilmore & Cooper, 1985). By definition, the paranoid personality is guarded, suspicious, and intolerant of evaluative situations; obviously, persons so characterized may be especially likely to avoid or escape being studied, particularly if scrutinized in an inflexible systematic manner. Turkat and Banks (in press) have in fact documented that paranoid personalities are relatively unlikely to participate in voluntary psychological research.

Although there is no complete solution to the problem of subject recruitment, one approach is to seek paranoid individuals in large captive populations that are subject to evaluation irrespective of PD

status. This tactic, adopted by Turkat and his colleagues in studies of college students, can be applied to clinical populations as well. It has been noted (Millon, 1981) that PPD cases often come to clinical attention only indirectly, when they present with other problems (e.g., marital dysfunction, legal predicaments, substance abuse, social isolation). Using treatment of other problems as a context for informed data collection can facilitate cooperation and lessen suspicion in these patients, particularly when results potentially could be useful in addressing treatment goals.

Perception and PPD

Hypersensitivity. Given availability of subjects, a suitable classification system, and goals of establishing that PPDs exhibit distinct response patterns and exploring parameters of those responses, discussion turns to behaviors of interest in this population. Particularly striking in descriptions of the paranoid style are consistent references to unusual perceptual responses, notably hypersensitive patterns that seem to relate to the hypervigilant and suspicious aspects of the PPD individual's behavior. Although not defined formally in the literature with respect to paranoid phenomena, perceptual hypersensitivity has been described variously as unusually intense, wide-ranging, automatic, or frequent attending to environmental stimuli, unusually high likelihood of responding to certain features of the environment to the exclusion of others, and unusually heightened sensitivity to certain aspects of the environment (i.e., low response threshold, or the tendency to respond to very low levels of these stimuli). These phenomena figure prominently in major PPD accounts.

Millon (1981) writes:

Paranoids are constantly on guard, mobilized, and ready for any real or imagined threat. Whether faced with danger or not, they maintain a fixed level of preparedness, an alert vigilance against the possibility of attack and derogation. They exhibit an edgy tension, an abrasive irritability, and an everpresent defensive stance from which they can spring into action at the slightest offense. Their state of rigid control never seems to abate, and they rarely relax, ease up, or let down their guard (p.380).

Shapiro (1965) also has described the unusually vigilant hypersensitive responses, particularly the focused attention, observed among individuals exhibiting paranoid personality characteristics:

They are, in actual fact, extremely keen and often penetrating observers. They not only imagine, but also search. And they not only search, but also search with an intensity of attention and an acuteness that may easily surpass the capacity of normal attention. . . . The attention of these people is, furthermore, not only unusually acute and intense, but also unusually active. It is . . . an actively scanning and searching attention. Anyone who has come under the scrutiny of a paranoid and suspicious person is familiar with this quality. Nothing out of the ordinary will escape his attention and, certainly, nothing that is even remotely related to his concerns or his preoccupations of the moment (p. 58).

Interestingly, paranoid hyperacuity is not always associated exclusively with suspiciousness, and may be evident in responses across

a variety of situations and stimuli. Swanson, Bohnert, & Jackson (1970) illustrate this with reference to an individual given an unspecified paranoid diagnosis:

Sometimes this hyperalertness is directed toward nature. One patient suddenly noticed the fantastically beautiful reddish-golden color of the leaves. He described in detail how some leaves had taken on an almost blindingly green hue. He described birds "whose singing was as beautiful as Maria Callas's". (p.42).

However, as exemplified by the above passages, most authors emphasize that the environmental aspects or features most subject to paranoid hypersensitivity and hypervigilance are those that signal threat, or are ambiguous and thus potentially signal threat, and attentional differences characterizing the PPD are said to be maximized in situations involving threat-related stimuli.

Hypersensitivity to threat and related perceptual phenomena comprise an aspect of PP highly worthy of study. Shapiro's (1965) passage, above, illustrates the pervasiveness and magnitude ascribed to these phenomena in the literature. Descriptively, they have figured in most characterizations of the PPD style as one component of the more general hypersensitivity concept found in all modern formulations of the disorder, including the Axis II diagnosis. As such, they have been implicated in the pathogenesis of PPD by several authors, e.g., Millon's (1981) suggestion that hypervigilant patterns develop early on as a means of avoiding threat, and promote subsequent acceleration of paranoid patterns. Even more prominent in formulations of paranoid functioning is the contributory role played by hypersensitivity to

threat in maintaining paranoid behaviors through effects on the social environment, exemplified by Turkat's (1985) cycle perpetuation stage description.

These hypotheses argue for more thorough investigation of hypersensitivity to threat in the analysis of PP. Among criteria said to characterize PPD, hypersensitivity phenomena appear to be particularly amenable to empirical quantification, an important consideration. Although never operationalized or researched in relation to personality styles, similar phenomena have been studied formally in other populations; findings and procedures could facilitate progress with respect to PDs. In addition, the richness of the phenomena may support numerous avenues of inquiry.

In a more general sense, perception is a time-respected area of investigation relevant to a wide variety of studied phenomena in psychology; thus, the linking of perceptual and clinically-relevant personality phenomena may add significantly to command of knowledge of the latter. Study of individual hypersensitivity differences could be expected to improve the accuracy of predicting other behavioral phenomena, possibly including maladaptive aspects of personality. With certain exceptions, however, individual perceptual differences remain relatively unexplored in the clinical personality literature, even in comparison to the limited findings that have been accumulated by empirical means to describe, predict, or control behaviors as a function of individual differences. This is particularly true with respect to clinically significant dysfunctional personality styles. There have been few systematic attempts to collect perceptual data by which to enhance

theory or treatment.

Perceptual Organization and Behavior Pathology

In addition to his etiological formulation of PPD, Cameron (1951) has provided challenging theoretical discussion relating perceptual organization to behavior pathology, particularly paranoid disorders. This work is not a complete or updated account of perception but is valuable for detailing specific types, or classes of hypersensitive behaviors that may be expected to differentiate paranoid and nonparanoid individuals. Cameron assumes initial continuity between normal and pathological behaviors; that is, he postulates that all responses found in behavior pathology are related to and derived from normal biosocial behavior. Certain aspects of normal perceptual organization he considers especially pertinent to behavior pathology; of these, the following can be seen as particularly germane to formulations of hypersensitivity to threat.

Exclusion-inclusion equilibrium is related to an organism's ability to attend and respond to only certain aspects of the environment. "The achievement of stability, clarity, and definiteness in perceptual organization, the movement from diffuseness toward precision, depends as much upon what is left out as upon what is admitted" (Cameron, 1951, p.285). Wide variability is possible; an individual may tend to include a myriad of inconsequential details, or may exclude even the highly significant stimuli that are most salient in others' perceptions. Gross defects thus can occur, typically leading to behavioral disruption in the case of overinclusion, and behavioral impoverishment, inflexibility, or "distortion" in the event of overexclusion. However, extremes of

overinclusion or overexclusion can come to serve a defensive, or reactive coping, function for the pathological individual. For example, a person with a perceptual style that is highly inclusive initially may later evidence severe perceptual exclusion in reaction to the gross disorganization and behavioral disruption that result from the earlier style.

Closely related to exclusion-inclusion equilibrium is Cameron's description of reaction sensitivity, by which he refers to a readiness or tendency to respond selectively to certain components of a stimulating situation and not to others. For example, a perpetually anxious individual will tend to perceive frightening aspects of the environment far more acutely than will less fearful peers. According to Cameron such sensitivities may be influenced by phylogeny and the organization of sensory mechanisms, but are particularly shaped by experience and the "individual need" of the organism via a sensitization process described below. The development of a reaction sensitivity represents a perceptual reorganization that has the effect of maximizing one kind of stimulus component while minimizing all others, even if the organism potentially would be able to respond to any component.

Progressive reaction sensitization refers to the tendency of acquired reaction sensitivities to generalize. The individual whose perceptual reorganization leads to suspicion that a colleague is sabotaging his efforts at work, for example, may soon conclude that others will exhibit similar tendencies. Initial reaction sensitivities promote a perceptual reorganization that favors further sensitization along related lines. According to Cameron, this has threefold

significance for behavior pathology. First, it influences a given individual's immunity or susceptibility to behavior disorder, in that it affects inclusion and exclusion, and restricts the range and flexibility of behavior. This can lead to a relative vulnerability to development of pathological response patterns. Second, progressive reaction sensitization is operative in cumulative pathology. For instance, an anxious person may develop a selective tendency to respond to threatening aspects of the environment, and exhibit a lowered response threshold. This, in turn, raises the anxiety level further and renders the individual more susceptible to apparent danger, creating an escalating cycle. Third, progressive sensitization can be responsible for the differentiation of pathological responses into highly specific behavior disorders. Relatively slight initial differences in basic personality patterns may diverge considerably as a result of progressive sensitization to differing features of the environment.

It can be appreciated that atypical exclusion-inclusion equilibrium and reaction sensitivity as described by Cameron seem to apply to the hypersensitive PPD response style as described by Axis II and clinical accounts. In particular, the PPD individual may be hypothesized to be overinclusive with respect to threatening or potentially threatening (e.g., unfamiliar, ambiguous) stimuli, and to exhibit pronounced sensitivity toward such stimuli. These conditions promote hypervigilant response patterns that maintain and further shape the paranoid style. In fact, Cameron (1951) describes an etiological role for such a process in the exacerbation of PPD toward more severe delusional paranoid states. For example, he writes:

Individuals whose personal inadequacies dominate their thinking--whether this characteristic is accessible to their self-reaction ("conscious") or not--are likely to perceive slights, insinuations, and hostility in the behavior of those around them to a degree that is foreign to adequate individuals. And because persons who are hypersensitive to the opinions of others are often grossly deficient in social skills, they have considerable difficulty in avoiding the evolution of pseudocommunities in their thinking. We may say of such a paranoid person that, in the areas of sensitivity, his hypotheses become so strong that they not only maximize relevant confirming information, but also tend to be confirmed by ambiguous, and eventually by inappropriate, information. (pp.287-288).

Cameron's notion of the pseudocommunity describes a dramatic developmental end point of paranoid perception that is said to involve the emergence of "a perceptual organization, structured in terms of the observed or inferred activities of actual and imagined persons, which makes an individual mistakenly seem to himself a focus or a significant part of some concerted action." (p.300). Normal individuals may occasionally exhibit a transitory pseudocommunity perceptual style; However, it represents a lasting and pervasive perceptual reorganization in the fully delusional paranoid state (i.e. Paranoid Disorder; DSM-III-R Axis I). As such, it acts as if to provide a conceptual framework for selective observation. A final quote from Cameron (1951) describes this:

(The pseudocommunity's) salient characteristic is that of rendering a person selectively reaction-sensitive by providing such a framework. Paranoid individuals typically grow more vigilant as the pseudocommunity evolves, and they notice a great many actual phenomena which had previously escaped their observation and that of other persons around them. They develop a particular way of perceiving their world and this determines the direction of their further observation. (pp.301-302).

The relationship between PPD and the more severe paranoia characterized by a fully developed perceptual pseudocommunity has never been investigated adequately and remains unknown (DSM-III, 1980). Nevertheless, Cameron is not unique in proposing that these disorders represent different points on a continuum, with PPD a potential precursor for delusional paranoia (c.f., Magaro, 1980). The importance of the hypersensitive response style as a focus for inquiry is thus further supported by its hypothesized role as exacerbator of PPD pathology, e.g., through a process of "maximizing confirming information" for the paranoid individual.

Formulation of Hypersensitivity to Threat

The work reviewed thus far establishes the need for investigation of perception in paranoid personality styles and provides a basis for study of hypersensitive response patterns. Based upon the PP literature, it is proposed that the distinct perceptual hypersensitivity ascribed to PPD involves two interrelated but individually testable phenomena reflecting characteristic differences in the manner of attending to certain aspects of the environment, and in the nature of

discriminating among features of that environment. Specifically, it is proposed that PPDs can be differentiated from non-PP subjects as a function of behavioral differences reflecting enhanced attending to stimuli that are discriminated as threats. Support in the clinical literature for a significant attentional component in PPD hypersensitivity is well exemplified by Shapiro's (1965) contention that the paranoid character shows an intensity and acuteness of attention that surpasses normal capacities. The importance of a discriminative component is indicated by the consistent reports of Shapiro, Cameron, and others that the unusual attentional response patterns observed among PPDs are elicited specifically by the most threatening features of the environment.

To illustrate, consider the case of subjects responding in the presence of an array of stimuli, a varying proportion of which have been associated with threat. According to the present proposal, the PPD subject will tend to be distinguishable from the non-PP in this situation in two interrelated ways. First, the PPD will exhibit distinct response patterns reflecting heightened attention that are not noted in comparison subjects. These might include qualitative or quantitative differences, or both. Second, the PPD will demonstrate a tendency to respond differentially to threat versus nonthreat stimuli which is not noted in non-PP subjects under the same conditions. In combination, these phenomena constitute the perceptual hypersensitivity for which the paranoid personality is known. Thus, in the above situation, PPDs may show selective attention to details of threat stimuli, exaggerated scanning for threat, differential inability to

ignore threat stimuli, or other attentional phenomena that are not shown by non-PP subjects in this context. Such perceptual distinctions are well explicated in Cameron's (1951) description of paranoid reaction precipitated by overinclusion and progressive reaction sensitivity. Another potential example is the distinguishing tendency ascribed by Tollefson (1983) to the PPD for ignoring the "big picture" while being "captured" by evidence of threat in unusual ways. In other situations, PP differences in attending to the environment may be more a matter of altered magnitude, duration, or frequency of behavior rather than a fundamentally different functional response. Profound attentional differences of both types among paranoid personalities have been discussed in detail by Cameron (1951, 1963), Millon (1981), Shapiro (1965), Weintraub (1981) and many others. Further, these discussions suggest that such individual differences in attending to stimuli may be discernible as an "automatic" overlearned and/or inherited perceptual effect that arises independently of or in advance of the subject's immediate verbal or cognitive control.

The discriminative aspect of the hypersensitivity phenomena differentiating PPD individuals has also been illustrated in the above examples, in that the described attentional differences constitute responses having specific relations to threat stimuli. All descriptions reviewed have emphasized the special role of stimuli or situations that potentially threaten, confuse, or confound the PPD protagonist in eliciting the unusual perceptual phenomena that have been discussed. Socially-mediated threat stimuli are held to be particularly salient to the PP (cf. Cameron, 1963; Coleman, et al., 1984; Shapiro, 1965;

Tollefson, 1983). For example, Cameron (1963) highlighted the defensive aspects of hypersensitivity as a means of avoiding or altering threat:

The paranoid personality is one that has its origin in a lack of basic trust. . .Because of his basic lack of trust in others the paranoid personality must be vigilant in order to safeguard himself against sudden deception and attack. He is exquisitely sensitive to traces of hostility, contempt, criticism or accusation. (p.645).

Similarly, Millon (1981) summarized hypersensitive PPDs:

"They are notoriously oversensitive and disposed to detect signs everywhere of trickery and deception; they are preoccupied with these thoughts, actively picking up minute clues, then magnifying and distorting them so as to confirm their worst expectations." (p. 381).

In sum, the hypothesis that hypersensitive PPDs show unique attentional responses to particular types of stimuli, viz., those signaling threat, is prominent in the clinical literature and merits investigation. Although distinctive hypersensitivity patterns appear to occur on many levels of behavior in PPDs, of particular interest is the possibility that these people show significant differences in the manner in which they initially attend to the most threatening features of the environment, independent of verbal instructions, task demands, or prior exposure to the immediate threat stimuli. Hypersensitivity of this sort has been demonstrated with other types of stimulus materials in non-PD subjects. For example, since the early studies by Cherry (1953) and Moray (1959) it has been recognized that most normal persons will tend

to respond at least some of the time to the occurrence of certain highly salient or strongly associated verbal stimuli (e.g., their own names) even when such stimuli are presented under conditions in which subjects do not usually attend to or discriminate the semantic features of verbal material (e.g., in the unattended channel of a dichotic listening task wherein independent auditory material is presented to each ear). Thus, most people demonstrate what can be called a perceptual hypersensitivity toward certain types of stimulus materials such as their own names. Following the terminology of Kahneman and Treisman (1984), for particular individuals specific stimulus classes can be described as being highly primed for attention and discrimination. Among PPD subjects, it is proposed that threat-related stimuli function as if they are so primed. Although this phenomena has not been demonstrated systematically or empirically in paranoid samples, and its etiological basis is unknown, such hypersensitivity to threat stimuli would be in complete accord with descriptive and clinical descriptions of PPD.

Presumably, the hypersensitive priming of one's own name is a function of extended experience; however, other such priming effects have been shown to be subject to short-term experimental manipulation. For example, there is much evidence that designation of a target stimulus in a search task primes associated or related members of the stimulus class for hypersensitivity effects by the subject. As one illustration, subjects instructed to attend to pictures of a particular politician in an experiment by Bruce (1979) experienced difficulty (i.e., showed greater latencies) in rejecting pictures of other well-known political figures relative to nonpolitical stimuli; these

subjects demonstrated a temporary hypersensitivity to political stimuli as a function of the priming manipulation. Also of interest are findings that hypersensitivity to primed stimuli may involve non-instrumental responses (e.g., changes in skin conductance) that are independent of verbal discrimination and self-report by the subject, and can occur in the absence of any overt response to the stimulus even under conditions motivating an instrumental response (e.g., Corteen & Dunn, 1974). Kahneman and Treisman (1984) are among researchers who have argued that such priming and hypersensitivity effects reflect differential patterns of attending to particular stimuli in the environment, as is proposed here for the case of hypersensitivity to threat in PPDs. Thus, this formulation of paranoid hypersensitivity postulates that the unusual response patterns shown by PPDs in relation to threat stimuli are similar to other perceptual sensitivities involving nonthreatening material shown by non-PDs, and may be investigated using similar experimental procedures.

Investigation of Hypersensitivity to Threat

Stroop color-naming tasks. The goals of the present study are to verify and investigate hypersensitivity phenomena in relation to threat among individuals meeting criteria for PPD. To address these goals and to test the hypersensitivity formulation presented, it was reasoned that existing procedures developed for study of related phenomena in other populations could be applied to assess relative sensitivities to various stimulus types in PD samples. Selected for this purpose in the present study is the color-naming of emotionally salient words in an adaptation of the Stroop task (Stroop, 1935), which has long been used to study

attentional processes. In the original version of this task, subjects were asked to name as rapidly as possible the color of ink in which a word or other stimulus was printed while attempting to ignore remaining aspects of the item. Stroop (1935) found that subjects took longer to name ink colors when items were color names that conflicted with ink colors than when they were rows of meaningless stimuli. Color naming was facilitated when items were congruent color names. Among cognitive theorists, a common general interpretation of this Stroop effect posits that interference arises and disrupts performance when cognitive representations of irrelevant or conflicting word contents are simultaneously activated and compete for processing resources, although there is not complete agreement about the processing stage(s) at which these interference effects occur (e.g., encoding versus output) nor whether they can be attributed to a single processing mechanism (cf. Seymour, 1977; Stirling, 1979). Recently, Kahneman and Treisman (1984) have reviewed evidence indicating that the magnitude of Stroop interference produced by a stimulus is proportional to the degree to which the stimulus is attended to by the subject. Additionally, many researchers have suggested that the Stroop effect derives from a subject's inability to focus attention exclusively on the relevant feature (e.g., ink color) of the stimulus (cf. Glaser & Dolt, 1977; Treisman, 1969). In this analysis, the magnitude of the observed Stroop effect reflects the degree to which other stimulus aspects (e.g. semantic threat associations) command attention.

The basic Stroop interference effect has been replicated extensively. Although antagonistic color names tend to produce maximum

interference on this task, subsequent research has demonstrated that subjects' performance may be slowed on color-naming other types of stimulus materials. Klein (1964) has been cited as the first researcher to demonstrate that non-color words can interfere with color naming in proportion to their ability to command attention. For example, words that are associated with particular colors (e.g., grass, sky) produce longer response latencies compared to non-associated words (Scheibe, Shaver, & Carrier, 1967). More-recent experiments have indicated that speed of color-naming emotionally-salient words can be proportional to subjects' preoccupations or anxiety states. Geller & Shaver (1976) found that under conditions designed to increase subjects self-consciousness, self-relevant words were color-named more slowly than neutral words. Consistent with the notion that individual state or trait variables can interact with type of stimulus material to affect response times, Ray (1979) found that nonpathological test-anxious students in a pre-examination period were slowed on color-naming words related to test anxiety compared to their performance on control words, and this effect was proportional to the magnitude of anxiety state elevation. Bower (1981) and Gotlib and McCann (1984) are among other researchers who have demonstrated significant slowing effects of dysphoric and/or positive mood states on color naming of emotionally salient words relative to neutral words, although severe arousal states (e.g., as induced by amphetamines or threat of electric shock) have been shown to produce reduced interference effects on conflicting-color-naming tasks that correlate with attentional impairments produced by these manipulations (e.g., Agnew & Agnew, 1963;

Callaway, 1959).

Several recent studies have used variations of the Stroop task to examine perceptual differences among clinical samples. Mathews and MacLeod (1985) found that generalized anxiety was associated with increased color-naming latencies for words related to social threat. Within the generalized anxiety subjects, a subgroup reporting predominant physical anxieties was also slowed on physical threat words. Williams and Broadbent (1986) compared performance of depressed patients who had recently attempted suicide by overdose with that of nondepressed matched controls on color naming of neutral, "negatively-toned" (i.e., depression related), and suicide-specific word types. All groups showed greater latencies with non-neutral word types, but the extent of slowing was greatest for overdose subjects on suicide-related words. Watts, McKenna, Sharrock, and Trezise (1986) tested spider phobics and non-phobic controls on several versions of the Stroop task and found that phobics evidenced severe retardation on color-naming spider words but not more general threat words or conflicting-color names. Interestingly, subsequent desensitization of the phobic subjects significantly reduced their color naming latencies on the spider word task. Although results indicated a highly specific Stroop effect interaction between phobic status and word type, the standard conflicting-color-naming effect was virtually identical in phobics and normals, demonstrating that Stroop-type tasks can detect and quantify highly specific individual differences in susceptibility to interference by particular stimulus types.

These findings support the proposal that Stroop task performance can provide a sensitive measure of individual differences in response to particular stimulus classes (e.g., threat stimuli) having relevance within the context of specific types of psychopathology. Hypersensitivity can be operationally defined in such tasks as the degree of interference (i.e., increased latency) in color naming members of the target class relative to nonmembers that are matched on other characteristics such as length and average frequency of occurrence in popular media (hereafter referred to as frequency). An additional benefit of the Stroop task for this purpose is its comparative lack of confounding demand characteristics and the reactivity effects that can affect self-report measures (cf. Williams & Broadbent, 1986). Accordingly, this study used Stroop tasks involving the color naming of threat and various types of nonthreat words by independently-defined PPD and non-PPD subjects. The nonthreat words included conflicting color names to assess possible differences in susceptibility to the basic Stroop effect across groups, neutral words matched on length and frequency to the threat words to serve as control stimuli, and positive or appetitive words with matched neutral controls, to assess the effects of a semantically- and emotionally-related but non-threat-related stimulus set on color-naming performance. It was hypothesized that PPD subjects, as a function of their hypersensitivity (i.e., enhanced discriminating and attending) to threatening aspects of the environment, would show greater interference effects than would non-PPD subjects when color naming threat-associated words compared to matched nonthreat stimuli. That is, an interaction between stimulus type and subject

diagnosis was predicted such that PPDs would show greater differential increases in response times on the Stroop task involving threat words.

Word recognition test. To extend the investigation of hypersensitivity effects assessed in the color naming tasks, this study also included a word recognition test presented immediately following completion of the final Stroop. This test incorporated all of the word stimuli included on the prior color-naming tasks (i.e., old words), interspersed with an equal number of new distractor words that had not been seen during the prior procedures, matched to old words on semantic content (threat/positive/neutral), frequency, and length parameters. Thus, this recognition task assessed the accuracy with which subjects could discriminate the stimuli of the Stroop tasks from matched distractors following a short time interval. It constituted a test of incidental memory in that subjects were not informed beforehand that they would be required to identify the original words. The test was constructed in a manner permitting the application of Signal Detection Theory (SDT) analysis to derive an index of subjects' recognition sensitivity independent of any response bias or overall tendency toward reporting words as old or new. It was hypothesized that PPD subjects would show significant differences on this recognition test as a function of their hypersensitivity to the threat stimuli presented during the color-naming tasks. In addition to comprising an independent validation of PPD hypersensitivity to threat, it was reasoned that such differences could potentially allow additional analysis of significant Stroop task results.

Two predicted differences in recognition performance by PPDs were derived from the notion that these subjects would evidence enhanced attending to threat stimuli presented during the color-naming tasks. The differences involved overall recognition sensitivity (i.e., for all old versus new words), which was predicted to be significantly decreased in PPDs relative to non-PPDs, and specific recognition sensitivity for threat words, which was predicted to be significantly increased in PPDs compared to control subjects, and relative to PPD recognition for non-threat words. These specific predictions followed from the general hypothesis that, across subject and stimulus types, paranoid subjects attend most acutely to threat stimuli. A variety of evidence suggests that increased attending to given stimuli will promote enhanced recognition of that material upon subsequent testing (cf. Craik & Jacoby, 1979; Kahneman & Treisman, 1984; Mandler, 1975; Treisman & Gelade, 1980). This is consistent with theoretical accounts such as Craik and Lockhart's (1972) proposal that a record of the perceptual analyses of stimuli is made in memory, with the depth of a continuum of processing determining how and what can be remembered; e.g., the "deeper" semantic processing allowed by hypersensitive attending to threat stimuli may enable more effective encoding and retrieval of this material (cf. Schulman, 1971). Thus, it was hypothesized that PPDs would show maximum recognition sensitivity for threat words, relative to other stimuli, and that this would be significantly greater than that shown by comparison subjects.

The second prediction that was advanced based on existing experimental literature maintained that PPDs would show significantly

decreased recognition sensitivity overall, i.e., for all old versus new words, as a function of hypersensitivity to the threat stimuli. This hypothesis followed from the supposition that enhanced attending to threat stimuli would decrease or disrupt attention directed toward non-threat words during the initial Stroop tasks. Such an effect has been demonstrated, albeit with much shorter exposure times, in an experiment by Erdelyi and Appelbaum (1973). These investigators found that recognition sensitivity for eight briefly presented neutral visual stimuli was significantly decreased among members of the Rutgers Hillel Foundation (a Jewish organization) when the stimulus configuration also included a swastika or Star of David (both highly primed stimuli for these subjects) relative to a neutral configuration. Subsequent work in this laboratory extended demonstrations of such phenomena (called cognitive masking by these authors) with sequentially presented visual stimuli (Erdelyi & Blumenthal, 1973), and similar effects have also been reported in experiments presenting primed verbal material before or after neutral words (e.g., Tulving, 1969). Erdelyi and Blumenthal (1973) conceptualize these findings as reflecting reduced attending to neutral stimuli presented in physical or temporal proximity to primed material. In the present experiment, it was hypothesized that an analogous effect would occur in the word recognition task in those subjects showing hypersensitivity to threat stimuli. The hypothesized net effect of reduced attention directed toward the nonthreat stimuli among PPDs was inferior recognition sensitivity overall for old words in these subjects, despite the predicted enhancement of their recall for the minority of words that were threat-related.

As stated earlier, it was possible to quantify the sensitivity and response bias aspects of recognition performance in this experiment through the use of Signal Detection Theory (SDT) methodology, which has been developed to allow computation of separate indices for the two parameters in a variety of applications. In the most general case, the SDT index of discriminability measures the accuracy with which an individual distinguishes among stimuli of varying intensities; high values indicate high accuracy. In a variety of types of tasks, this index of perceptual performance has been shown to be little influenced by attitudinal or motivational variables; rather, it typically is considered to be related to relevant cognitive functioning and stimulus parameters. The second index of perceptual performance, the report criterion, measures the readiness or tendency of a subject to use a particular response. A relatively high criterion reflects decreased tendency to emit a given response; a low criterion indicates that a subject readily emits the response. This index generally has been conceptualized as reflecting influence of attitudinal, motivational, learning, and situational variables.

The general experimental paradigm for an SDT perceptual experiment involves two classes of stimulus events varying on some dimension and having fixed a priori occurrence probability. The subject is instructed to make a forced-choice response indicating which stimulus event occurred, e.g., signal versus no signal, or previously-seen versus new stimulus. This situation generates a 2 X 2 stimulus-response matrix exhausting the following four possible stimulus-response contingencies: (1) actual signal and "signal" response (a hit); (2) actual signal and

"no signal" response (a miss); (3) no actual signal and "signal" response (a false positive); and (4) no actual signal and "no signal" response (a correct rejection). However, for a complete description of the subject's performance, an estimate of the variation in the subject's response criterion must also be obtained. This can be obtained if the subject is instructed to make a confidence rating of his or her accuracy on each trial. A rating of high confidence is assumed to correspond to a strict criterion for a given response class, and a low confidence rating is assumed to correspond to a less stringent criterion (Price, 1966).

In the pioneering application of SDT to the study of verbal retention (Egan, 1958), groups were administered learning trials on a list of verbal stimuli. When these stimuli subsequently were readministered mixed with new items, subjects were required to indicate original items and provide confidence ratings for each decision. Recognition scores and confidence ratings obtained in this experiment, in conjunction with false alarm (i.e., false recognition) and correct rejection rates, enabled the calculation of SDT indices that proved vastly superior for measuring recognition-memory performance than procedures previously in common use.

For a comprehensive explication of SDT as applied to memory-related tasks, the reader is referred to Banks (1970). However, a brief summary will be presented here. A traditional approach to the application of SDT to memory posits the existence of a memory trace that a subject can potentially detect and respond to as a signal. However, such signals do not present in isolation; rather, they always occur in the presence of

noise. Sensory input (i.e. of signal plus noise) is assumed to vary continuously and randomly about one mean value for the signal. Given the occurrence of a "weak" signal, e.g., one which is not readily discriminable from the "noise" generated by similar new items in the recognition task under consideration, the observer's response might be inaccurate because of limitations in absolute ability to detect or discriminate the trace. Alternately, the person might respond inaccurately because he or she is overcautious and reports only those traces that are maximally discriminable from noise. SDT enables separate quantification of these two processes: detection and reporting bias. In the present experiment SDT procedures allowed independent measurement of sensitivity and response bias parameters. This represents one of the first times that SDT analysis has been applied to DSM-III-R PD-related phenomena.

Comparison groups

Analysis of hypothesized hypersensitivity differences in PPDs required quantification in relation to the performance of other, non-PPD individuals. In selecting appropriate comparison samples for the proposed study, several considerations were accorded importance. First, all subject groups were matched as closely as possible on non-PD variables to minimize confounding effects by other factors. Second, comparison groups included other PDs to permit evaluation of hypersensitivity to threat and paranoid characteristics distinct from more common aspects of PDs in general, e.g., maladaptive functioning, subjective distress. Third, comparisons also included non-PD individuals, to permit evaluation of hypersensitivity and paranoid

characteristics in relation to nonpathological personality.

These considerations were addressed in this study by utilizing a PPD sample and two comparison groups drawn from a common population. The comparison groups included individuals who met Axis II criteria for diagnosis of Antisocial PD (APD), and individuals who did not meet criteria for any Axis II disorder, respectively. Thus, PPD hypersensitivity to threat was studied in relation to response styles of both PD and non-PD subjects. Among Axis II PDs, APD was selected for comparative study on the basis of clinical and experimental data suggesting that such individuals, though capable of acute perceptual performance under certain conditions, would not exhibit the hypersensitive behaviors hypothesized to be fundamental in PPD. Because individuals meeting DSM-III-R criteria for APD were readily available and could be assessed reliably (Brantley & Sutker, 1984; Hare, 1985), APD subjects comprised a response sample that was practical and suitable for comparative testing of hypersensitivity in PPDs while controlling for more general effects of personality disorder as defined by DSM-III-R.

In contrast to most previous diagnostic schemes for APD, Axis II criteria are operationalized in relation to overt behavior and make reference to a history of parental irresponsibility, erratic employment and work-related behaviors, lawbreaking, inability to maintain long-term attachments to sexual partners, repeated physical assaults, and other reckless activity. Such characteristics are said to suggest "history of continuous and chronic antisocial behavior in which the rights of others are violated" (DSM-III, 1980). This exclusive emphasis on overt

antisocial behavior patterns has proven to be highly controversial, not only for those disdaining the lack of psychodynamic and etiological information (e.g., Vaillant, 1984) but also for the many clinical investigators who view APD as involving important additional cognitive, perceptual, or other behavior patterns rather than lawbreaking and interpersonal violation alone (c.f. Brantley & Sutker, 1984). Researchers have investigated such phenomena in variously-diagnosed APD samples; there is a need now to extend these findings in a systematically-defined population and to examine their relationship with antisocial behavior patterns such as those comprising the diagnostic criteria of APD in DSM-III-R.

The notion of a personality style defined by antisocial characteristics (often referred to as sociopathy, or sometimes psychopathy), usually thought to include poor ethical development, apparent inability to follow socially-sanctioned models of behavior, and limited capability for loyalty or emotional involvement with others, has been discussed by clinicians for many years. Although there has been disagreement concerning the best manner in which sociopathy may be conceptualized and described (Brantley & Sutker, 1984), survey data suggest that a large number of clinicians do report the concept to be meaningful and useful (Gray & Hutchison, 1964). APD represents the best-researched Axis II category by far; investigators have studied hypothesized behavioral features including sensation-seeking, deficits in avoidance learning, inability to delay reinforcement, and performance in choice situations, among many others (Brantley & Sutker, 1984; Hare & Schalling, 1978). Without attempting thorough review of the wealth of

APD research findings, prominent description and formulation of the concept will be considered in brief.

Probably the most influential and comprehensive description of antisocial personality (AP) has been that provided by Cleckley since 1941 in five editions of The Mask of Sanity (5th edition, 1976). Of several possible exemplars, Cleckley's work comprises the classic portrait of the AP and serves to illustrate clinical impressions of APD phenomena. Although Cleckley presents detailed description and interpretation of behavior without experimental support, his work is particularly noteworthy because experimenters have subsequently explored hypotheses derived from almost every aspect of his descriptions. Among the most influential has been his assertion that the primary sociopath exists within a severely restricted range of affective arousal, and that this emotional attenuation results in a relative inability to learn from experience.

On the basis of extensive clinical exposure, Cleckley detailed the following 16 main features that were said to define and describe the sociopath: superficial charm and good intelligence; absence of delusions and other signs of irrational thinking; absence of "nervousness"; unreliability; insincerity; lack of remorse; poor judgement; insufficiently motivated antisocial behavior; pathological egocentricity and incapacity for love; general poverty in major affective reactions; "specific lack of insight"; lack of responsiveness in interpersonal relations; uninviting behavior with and sometimes without intoxication; low risk of suicide; impersonal sex life; and failure to follow a life plan. To the extent that some of these features are positive or

adaptive, sociopathy cannot be considered simply a manifestation of disturbed or deficient functioning (c.f. Sutker, Moan, & Allain, 1974). According to Cleckley, the overriding characteristic of the sociopathic personality is an inability to experience the affective components of personal and interpersonal behavior. This produces selective learning deficits with complications of the incomplete socialization, failure to profit from experience, and various maladaptive behavior patterns said to characterize the sociopath.

Many early formulations of APD drawn from clinical experience, in similar fashion to that of Cleckley (1976), hypothesized that sociopaths are inherently deficient in ability to acquire learned responses. For example, Eysenck (1964) described them as poor learners who extinguish more rapidly than non-APD individuals. Such contentions are relevant to hypothesized performance differences in APDs on the hypersensitivity tasks, particularly if a generalized learning deficit is involved. Quay (1965) speculated that sociopaths require higher and more variable levels of stimulation to maintain positive affect. Specifically, he hypothesized that more intense sensory input is necessary to induce pleasure in such persons, and that they adapt more quickly to steady states of stimulation and thus require more rapid and changeable input. These characteristics were said to produce relative deficits in ability to acquire new responses in learning situations. Many studies have investigated aspects of this notion, with mixed results (Brantley & Sutker, 1984; Hare & Schalling, 1978). In certain situations, sociopaths have demonstrated relative inability to learn well from experience. For example, compared to controls, they have shown inferior

performance on tasks involving classical conditioning and generalization (Hare, 1965; Hare & Quinn, 1971), avoidance learning (Lykken, 1957), and verbal conditioning (Quay & Hunt, 1965; Stewart, 1972). Widom (1976) found that anxious sociopaths showed significantly less ability than did normals to tolerate monotonous tasks. On the other hand, a number of studies have examined learning situations in which performance of APDs was not deficient relative to non-APDs, including verbal conditioning with social reinforcement (Bryan & Kapche, 1967), social learning (e.g., Kadlub, 1956), and certain types of paired-associate learning (Sutker, Gil, & Sutker, 1971).

These and many other studies have established that individuals characterized as sociopathic do show comparatively inferior performance on certain types of learning tasks, but it is apparent that such individuals are not necessarily deficient in acquiring learned responses in general. In their recent comprehensive review of the research literature on antisocial behavior disorders, Brantley and Sutker (1984) concluded that sociopaths respond idiosyncratically or differently from most nonsociopathic individuals on learning tasks. It appears that certain variables affect learning-related behaviors differentially in APDs, and these can lead to performance that is equivalent or superior to that of control subjects. For example, learning in sociopaths has been shown to be improved by use of primary reinforcers (Painting, 1961) and/or monetary rewards (Schmauk, 1970) as opposed to social consequences, by the elimination of any time delay between the completion of a response and the onset of reinforcement (e.g., Gullick, Sutker, & Adams, 1976), and by the use of opposite-sex experimenters

(e.g., Stewart & Resnick, 1970). These variables may influence performance of controls, but they appear to be especially powerful in modifying behavior of APDs. The latter often show poor performance under conditions that produce competent learning in normals.

The mechanisms of such differences in APDs remain imperfectly understood. Controversy abounds, for example, over the existence and role of possible neurological correlates (Elliott, 1978). Although the phenomena addressed in the proposed investigation have not been studied in this population, the available literature suggested that APD subjects would not demonstrate hypersensitivity to threat as operationalized in the experimental tasks.

Population

The target population selected for the proposed study was that of hospitalized, abstinent alcohol and drug abusers. This population offered the advantages of inpatient samples as discussed previously. Primary substance abuse is a prevalent reason for inpatient admissions, and large proportions of alcohol and drug abusers receive PD diagnoses. For example, it has been estimated that 70-90% of substance abusers meet criteria for at least one PD category (Kosten, Rounsaville, & Kleber, 1982). A recent study of 2,462 patients seen at the New York Hospital-Cornell Medical Center for psychiatric evaluation revealed that substance use disorders were the most likely Axis I labels to be associated with Axis II disorders (Koenigsberg, et al., 1985). Although PPD cases are relatively rare, substance abusers have been shown to be heterogeneous with respect to personality disturbance with no one type of PD predominating (Cox, 1984; Owen & Butcher, 1979; Sutker & Archer,

1984). Beyond the practical advantages of studying this population, utility of DSM-III PD classification for substance abusers is a topic of considerable interest in its own right, as exemplified by a recent literature review reporting over 1500 articles on relationships between personality and substance abuse phenomena (Cox, 1984).

Personality Assessment

Methodological problems related to personality assessment required particular consideration in addressing the research goals of this project. Recent discussions in the literature have highlighted potential pitfalls in obtaining accurate diagnostic data by interview, including nonsystematic self-report data review, conflicting notions of primary or essential symptoms, and rater inexperience (Spitzer, Endicott & Robins, 1978; Strober, Green & Calson, 1981). The problem of obtaining valid self-report information is particularly complex with a substance abuse population. Lack of insight, perceptual distortions, and chronic lying among drug and alcohol abusers are problematic for assessment, and variables associated with transitory drug effects, changing mood states, retrospective reporting, and demand characteristics of the treatment environment may serve to compromise the validity of self-report data. For example, it is well documented that self-reported personality traits vary as a function of intoxication and anxiety state (Owen & Butcher, 1979). To enhance validity and reliability of data in the proposed study, the design included semi-structured interviews with patients. These procedures were designed to facilitate consistent data collection from converging sources, for improved reliability and validity relative to previously

used methods such as simple assignment by intake diagnosis.

Related methodological problems specific to Axis II also arose. In that PDs are conceptualized as enduring and pervasive, their assessment at a discrete point may be considered inadequate. From a methodological perspective, more extended observation offered advantages in the assessment of enduring personality features, particularly in comparison to intake data. For instance, upon admission to an inpatient program, substance abusers often show exaggerated symptoms associated with drug effects and lifestyle complications. Observation over time offered one mechanism to help separate transient characteristics from those that are more pervasive. In the present study, PD diagnosis was based on repeated patient observation during inpatient stay, with two weeks of monitoring preceding administration of the PD diagnostic interview. This allowed sufficient time for dissipation of acute drug-related effects and for collecting background and behavioral data to enhance the likelihood of eliciting representative interview data. It also permitted the more anxious, depressed or guarded patients to become acclimated to treatment demands and desensitized to the interview. The proposed methodology was consistent with recommendations that diagnostic evaluation should not be limited to a single examination at one point in time and should incorporate all data sources uniformly available (Blashfield & Draguns, 1976; Spitzer, 1983).

STATEMENT OF PURPOSE

This research project was designed to represent an exploration of characteristic response patterns involving hypersensitivity to threat, with comparisons between subject groups defined on the basis of Paranoid and Antisocial Personality Disorders and a group defined by the absence of personality disorder. It was intended to address one gap in empirically-derived knowledge related to the description, prediction, and modification of behaviors of individuals meeting PPD diagnostic criteria, to extend the findings related to perceptual phenomena among the more frequently studied APD group, and to compare findings for these groups with those for a non-personality-disordered control sample. The study involved investigation of unique features of different dysfunctional personality styles and comparison of dysfunctional and nondysfunctional individuals. A primary goal was to expand knowledge of one of the most salient and characteristic--but completely unstudied--aspects of behavior styles ascribed to PPDs. It can be noted also that certain aspects of pathological personality styles, possibly including perceptual differences, may in fact be adaptive in certain situations (c.f., Brantley & Sutker, 1984; Sutker, Moan, & Allain, 1974). Study of hypersensitivity therefore might eventually contribute to an analysis of ways in which factors interact to produce response styles seen as pathological versus those considered adaptive under a given set of conditions.

The foregoing considerations comprised the rationale underlying this research. The specific aim of the investigation was to compare responses of three groups of men on a series of six Stroop tasks. Two of the groups contained individuals exhibiting significant Paranoid or Antisocial Personality Disorder characteristics, respectively. The third group consisted of subjects who do not meet criteria for any personality disorder. The Stroop tasks were designed to assess hypothesized attentional and discriminative aspects of PPD hypersensitivity by incorporating threat and five types of non-threat control words as stimuli, including words selected on the basis of strong positive and/or appetitive associations. The latter provided a verbal stimulus set intended to be maximally salient for APD subjects. It was hypothesized that PPD subjects would show greater interference effects than would non-PPD subjects when responding to threat words, compared to matched nonthreat stimuli, on the Stroop tasks. That is, there would be an interaction between stimulus type and subject diagnosis such that PPDs would show greater differential increases in response times on the Stroop task involving threat words. A secondary hypothesis predicted similar interference effects among APD subjects color-naming positive words. However, on the basis of research findings indicating relatively poor control of APD responding by verbal stimuli, it was predicted that effects of positive words on APD color naming would be of lesser magnitude than those produced by threat stimuli among PPDs.

It was also hypothesized that PPD performance on a recognition task involving all stimuli presented on the four experimental word set Stroop

tasks and an equal number of matched distractor stimuli would differ in reliable ways from that of non-PPD groups. In particular, it was predicted that recognition sensitivity for threat stimuli (i.e., the ability to discriminate previously-seen threat words from threat distractors) would be significantly increased in hypersensitive PPDs relative to other subject groups, and would be maximized relative to recognition for other stimulus classes in PPDs. That is, it was hypothesized that discrimination of old from new threat words would be differentially enhanced in PPD subjects exhibiting hypersensitivity to threat. An analogous effect of lesser magnitude was hypothesized in APDs on recognition for positive words. A final hypothesis maintained that PPDs would show significantly decreased recognition sensitivity overall, i.e., for all old versus new words, as a function of hypersensitivity to the threat stimuli.

METHODS

Subjects

The potential subject pool included 192 male inpatients admitted consecutively to the Drug Dependence Treatment Unit (DDTU) at the Veterans Administration Medical Center, New Orleans (NOVAMC), over a six-month period. Following routine psychological and social history assessment, veterans meeting criteria for study inclusion were recruited individually and requested to participate in a psychology research investigation in addition to regular assessment procedures. Thirty-eight volunteers completed study procedures and comprised the experimental sample. No subject was maintained on methadone or psychotropic medications, and none showed evidence of Organic Brain Dysfunction, Major Depression, or Schizophrenic Disorder, using DSM-III-R criteria. All cooperated throughout administration of paper-and-pencil instruments, structured interviews, and the color naming and word recognition tasks. Subjects were predominantly Black (89%), ranged in age from 25 to 43 years, and reported a mean formal grade achievement of 12.2 years. These men were primarily abusers of illicit drugs, with cocaine (66%) and heroin (21%) most frequently reported as their drug of choice.

Assessment Instruments

Personality assessment. Axis II diagnoses were derived using the Structured Clinical Interview for DSM-III-R Personality (SCID-II: Spitzer & Williams, 1986). Currently the only comprehensive DSM-III-R

personality instrument (c.f. Reich, in press), the SCID-II was designed by a principal author of Axis II to facilitate rapid and valid assessment of all PD criteria, and closely follows DSM-III-R decision rules. It offers a procedural focus on usual rather than acute or hospital-related behavior, a scoring system based upon behavior patterns that have predominated during recent years, and a screening questionnaire and skip-out instructions that enable the interviewer to focus upon behaviors that are diagnostically relevant. Use of SCID-II to measure PD symptomatology for treatment and research has been endorsed by several reviewers as an improvement over alternative diagnostic procedures (Mackinnon & Yudofsky, 1986; Reich, in press). Although the most thorough psychometric evaluations of this recently-developed assessment tool and its companion for Axis I diagnoses, the SCID, are ongoing at the time of writing and remain unpublished, emergent empirical reports (e.g., Riskind, Beck, Berchick, Brown, & Steer, in press) have confirmed the potential of these instruments to differentiate selected DSM-III disorders reliably. As part of routine assessment on DDTU at the NOVAMC, the SCID-II has been administered to several hundred inpatients and has shown excellent utility and reliability. Results of a recent study of 165 DDTU inpatients that was designed to test internal consistency of DSM-III-R Antisocial and Borderline PD criteria confirmed that the SCID-II was used reliably across raters to diagnose these disorders, with Kappa values ranging from .71 to .97 for individual Antisocial PD criteria (Malow, Donnely, West, & Sutker, 1987).

Clinical assessment. Demographic, family background, substance abuse history, physical health, and social/economic functioning data

were collected during semi-structured individual interviews of subjects by psychology staff assigned to DDTU, using the Background Information Questionnaire (BIQ) currently in use at the NOVAMC (see Appendix A). This instrument was developed particularly for use with inpatient substance abusers and has been utilized continuously on DDTU to complete background assessment of more than 1500 inpatients. To confirm the validity of PD group assignments, selected domains of current psychopathology including anxiety states, depression, social nonconformity, paranoid ideation, and social introversion were assessed with appropriate scales of the Minnesota Multiphasic Personality Inventory (MMPI; Dahlstrom, Welsh & Dahlstrom, 1972), the A-State portion of the State-Trait Anxiety Inventory, Form X (STAI; Spielberger, Gorsuch & Lushene, 1970), and the Beck Depression Inventory (Beck; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The MMPI is the most frequently employed instrument for describing personality characteristics and psychopathology among substance abusers, offering specialized scale content of particular relevance both to drug use (Cox, 1984; Sutker & Archer, 1979; Owen & Butcher, 1979) and sociopathy (Hare & Schalling, 1978). The STAI and Beck are widely used paper-and-pencil instruments for assessment of anxiety and depressive states, with abundant normative data available (e.g., Spielberger, Gorsuch & Lushene, 1970). Intellectual functioning was estimated by the Shipley Institute of Living Scale (Shipley, 1967), a popular screening instrument that estimates abilities both in verbal and nonverbal performance areas.

Task Materials

Materials used in the color naming tasks consisted of six large (24cm X 38cm) white cards laminated in clear plastic, each card containing 96 words drawn from one of the six stimulus sets (i.e., threat, non-threat, positive/gratification, non-positive/gratification, simple color, and conflicting color) described below. Each set of 12 words was printed on a single card a total of eight times, arranged into 12 rows of 8 words on the card face, the set being presented in a new random order each of the eight times. Thus, one card containing repeated instances of all items in a given stimulus set was generated for each of six color-naming tasks. Words were computer printed in 0.5cm block capitals in either red, green, blue, or orange ink. Color order was random within a card with the constraint that each color appeared twice in each row. In the conflicting color set, ink color was never consistent with word content.

Threat stimuli. Nine of the 12 threat words in this study were selected from the Social Threat stimuli used by Matthews and MacLeod (1985). To minimize problems related to possible vocabulary limitations in the present subject sample, three relatively infrequent words used by those researchers (e.g., inept; Standard Frequency Index, SFI, = 36.1; Carroll, Davies, & Richman, 1971) were not included in the current study. As replacements, three more-frequent words (tricked, cheating, unintelligent) appearing in descriptions of PPD hypersensitivity by Millon and Cameron were used. See Table 1 for all word lists.

Positive/gratification stimuli. Six words were chosen from positive adjectives endorsed by 85% or more of all APDs examined by

Table 1

Experimental and Control Words

Threat	Non-Threat
PATHETIC	LITTERED
TRICKED	DRIPPED
FOOLISH	MOUNTED
LONELY	FROZEN
INFERIOR	REASONED
CRITICIZED	CLATTERING
CHEATING	LOUNGING
HATED	MERRY
INADEQUATE	STRENUOUS
STUPID	TRADED
FAILURE	WORKMEN
UNINTELLIGENT	INTERMEDIATE
Positive/Gratification	Non-Positive/Gratification
HANDSOME	FLOWING
COOPERATIVE	EMBROIDERED
REALISTIC	EXCLUSIVE
AROUSED	RETIRED
ADVENTUROUS	PHOTOGRAPHED
INTELLIGENT	SCRAMBLED
ALERT	TENTH
COOLNESS	PILGRIMS
CONSIDERATE	PAINSTAKING
WINNER	PADDLE
EXCITEMENT	ACTIVITIES
VERSATILE	SQUATTING

Sutker, DeSanto, and Allain (1985) in a study of self-description among antisocial personalities. Six additional words highly relevant to positive self-description and personal gratification (i.e., winner, aroused, handsome, versatile, excitement, coolness), appearing in APD descriptions by Cleckley (1976) and Brantley and Sutker (1984) completed

this stimulus list. These words were frequency-matched within 2 SFI units to the threat stimuli described above using tables presented by Carroll, Davies, and Richman, (1971).

Control stimuli. Two further sets consisting of 12 non-threat and 12 non-positive/gratification control words were chosen that were frequency-matched (within 0.1 SFI unit for all but two words; $F \pm 20\%$) and length-matched to the words within each set of experimental stimuli. These control words were selected by the first author from a larger pool of potential matched words on the basis of low rankings on 5-point rating scales of implied threat and implied positive quality made by three independent judges.

Simple color stimuli. Each item in this set consisted of a series of six Os, printed in one of the four colors described above. These stimuli were intended to assess subjects' response speed in color-naming stimuli devoid of semantic content.

Conflicting color stimuli. These were the four color names blue, green, red, and orange. This set essentially duplicated the original Stroop task and provided maximal conflict between semantic content and required response.

For the word recognition task, the 48 different words of the above stimulus sets (excluding the simple color and conflicting color stimuli) were printed on a two-page response form (see Appendix B), randomly interspersed with 48 distractor words chosen to be matched to the original words on frequency, length, and threat or positive/gratification content. Thus, there were 12 threat distractors, 12 positive/gratification distractors, 12 non-threat distractors, and 12

non-positive/gratification distractors, all appearing in random order with the original words. As with the original control words, most distractors were selected from a larger word pool on the basis of ratings made by three independent judges. Six of the positive/gratification distractors were new words selected from APD self-descriptors identified by Sutker, Desanto, and Allain (1985), as previously described. Each word on the response form was followed by the printed words old and new and a 3-point confidence rating scale (1 = little confidence, 2 = some confidence, and 3 = much confidence), on which subjects entered their responses for the task. Printed subject instructions were included on the form.

Procedure

Routine assessment occurred subsequent to drug detoxification, and was completed approximately 14 days after program entry. A staff psychologist permanently assigned to DDTU and/or a clinical psychology intern with advanced graduate training administered individually the self-report measures of symptomatology and cognitive sophistication, and conducted one or more individual interviews with each inpatient to complete the BIQ. Patients then filled out the SCID-II screening questionnaire and were interviewed by the psychologist following the latter's review of this questionnaire, the BIQ, and all charted medical and psychiatric data including results of a diagnostic interview by a psychiatrist on DDTU. These procedures were designed to bring to attention any Axis I or other concomitant pathology affecting diagnosis, and to enable the psychologist to probe and clarify lapses or inconsistencies in self-report data during administration of the

SCID-II, as per published instructions for that instrument. To derive PD diagnoses, the interviewer completed the Summary Score Sheet of the SCID-II using Spitzer and William's (1986) 3-point scoring scale. Diagnostic decision rules followed the guidelines specified by DSM-III-R, e.g., at least 4 criteria exceeded threshold for a PPD diagnosis.

Psychological assessment results for each inpatient were reviewed by the principal investigator to identify potential subjects for inclusion in each of three study groups: (1) Paranoid PD; (2) Antisocial PD; and (3) NonPD. To qualify for a PD group, patients met or exceeded DSM-III-R criteria for Paranoid PD or Antisocial PD but not both, as assessed by SCID-II. NonPD subjects received subthreshold ratings for all DSM-III-R PD diagnostic categories. Men scoring below 80 on the Shipley or reporting color-blindness during the BIQ interview were excluded from study participation. Any veteran giving evidence during psychological assessment interviews or the psychiatric evaluation of past or present psychotic symptomatology, or currently meeting DSM-III-R criteria for an Organic Mental Disorder, Major Depression, or Bipolar Disorder was also ineligible for inclusion.

During the period of the study, 38 qualifying volunteers were identified and completed experimental procedures: of this number, 10 subjects fell in each of the PD groups, and 18 subjects met NonPD criteria. Prior to participation, these men were provided with a description of the nature of the investigation and signed consent forms (see Appendix C). As may be seen in Table 2, groups did not differ significantly in age, Shipley IQ estimate, or years of formal

Table 2

Mean Subject Demographic Characteristics and Mean Scores on
Psychopathology Measures With Standard Errors by Group

Variable	Non		Antisocial		Paranoid		F(2,35)
	PD		PD		PD		
	<u>M</u>	<u>SE</u>	<u>M</u>	<u>SE</u>	<u>M</u>	<u>SE</u>	
Age	32.67	1.17	32.60	1.27	33.50	1.26	0.14
Education	12.78	0.31	11.70	0.45	11.70	0.40	3.14
Shipley IQ	111.70	2.77	106.70	2.92	105.90	2.79	1.28
STAI A-State	41.88	1.80	47.00	4.23	54.20	3.89	4.23*
Beck	11.94	1.81	15.70	2.87	26.20	3.11	8.83***
<u>MMPI scales</u>							
<u>Psychopathic</u>							
Deviate	70.78	2.14	83.80	3.08	79.80	2.71	7.38**
Paranoia	58.06	1.60	65.30	3.16	73.70	3.35	10.38***
<u>Social</u>							
Introversion	52.72	1.90	50.90	2.98	61.10	2.99	4.02*

Note. STAI = State - Trait Anxiety Inventory.

Beck = Beck Depression Inventory.

MMPI = Minnesota Multiphasic Personality Inventory.

*p<.05

**p<.01

***p<.001

education. Racial composition was approximately equally distributed across the three groups, each containing either 1 or 2 non-Black subjects. As expected, elevations on the MMPI's Psychopathic Deviate and Paranoia scales differed significantly across the groups, with Antisocials showing the greatest mean on the former scale and Paranoids the highest mean on the latter. Subsequent Fisher's least significant difference (LSD) tests indicated that both PD groups differed significantly from NonPDs on each of these two MMPI scales, with the Paranoid group scoring significantly higher than Antisocials on the Paranoid scale. Using the commonly accepted conservative cutoff T-score of 70 (K-corrected) as a lower threshold marker for clinically significant elevations, all groups evidenced significant pathology on the Psychopathic Deviate scale, reflecting the high base rate of antisocial behavior reported by inpatients on DDTU. Only the Paranoid group mean exceeded this clinical criterion on the Paranoia scale, however. Consistent with unvalidated DSM-III-R descriptions, Paranoids also showed significantly greater mean elevations on the MMPI's Social Introversion scale relative to the other groups, which were not differentiated by this measure. In accord with expectations that group assignment would reflect differences in self-reported distress levels between PD and NonPD subjects, groups differed significantly on mean A-State STAI and Beck scores. Both PD groups showed greater mean scores on these measures relative to NonPDs, with LSD tests indicating that the difference achieved statistical significance between Paranoid and NonPD groups on the STAI, and between Paranoid and both remaining groups on the Beck.

Subjects completed all portions of the color naming and word recognition tasks in single individual sessions occurring three to four weeks following admission to DDTU. Average duration of testing sessions was 25 min, with the experimenter present throughout. For the majority of subjects, tasks were administered by a female psychology graduate student completing a practicum on DDTU. Two subjects in each group had tasks administered by a female secretary with 12 years of experience on DDTU, who was used when the student was unavailable. Both experimenters received prior training in administering the tasks and were blind to experimental hypotheses. Reliability spot checks of experimenters' timing of color-naming task responses were conducted randomly by the first author for approximately one-sixth of all subjects. In all cases, reliability data agreed with experimenter's times within 1 s for each of the six task cards.

Each color naming task consisted of the presentation of one of the six stimulus cards described above, during which subjects named individual word colors (i.e., specific ink colors) of the 96 items on the card face as rapidly as possible while being timed with a digital stopwatch by the experimenter. The dependent variable for each task was the total time taken to name all colors on the card. Before the first task was presented subjects were familiarized with the colors used. They were then shown the simple color stimulus card and instructed to name the colors in order as quickly as possible without making errors (see Appendix D for subject instructions). Timing started when the first color on the card was named and ended when the last color was named. The experimenter recorded times to the nearest 0.1 s on a standard

recording form (see Appendix E). The conflicting-color card was the second task presented to all subjects, who were further instructed to ignore word content while color naming. Order of the remaining four color-naming tasks varied as follows: the appropriate control card task always immediately preceded an experimental card task, but the order of these pairs (i.e., non-threat and threat tasks, and non-pleasure/gratification and pleasure-gratification tasks) was counterbalanced across subjects. In addition to equalizing gross order effects across groups, this design ensured that any within-session practice effects tended to counteract the experimental hypotheses rather than provide an alternative explanation for specific slowing effects (c.f. Watts, et al., 1986). Task administration proceeded without interruption as rapidly as possible, with approximately 10-s intervals between cards. As in similar prior studies, errors in color naming were infrequent and tended to be corrected by subjects spontaneously, and were not recorded.

The word recognition test immediately followed the sixth color-naming task. This test was not timed. Subjects were presented with a pencil and the 96-word response form described above and were instructed to indicate whether each word was old, i.e., had appeared on a card in the first task, or was new, by circling their choice. Subjects also rated their confidence in each of these decisions by marking on the 3-point scales printed next to each word. Subjects were not informed prior to the onset of this task that they would be asked to recognize words from the cards. Upon completion of the response form subjects were debriefed (see Appendix F) and provided with feedback

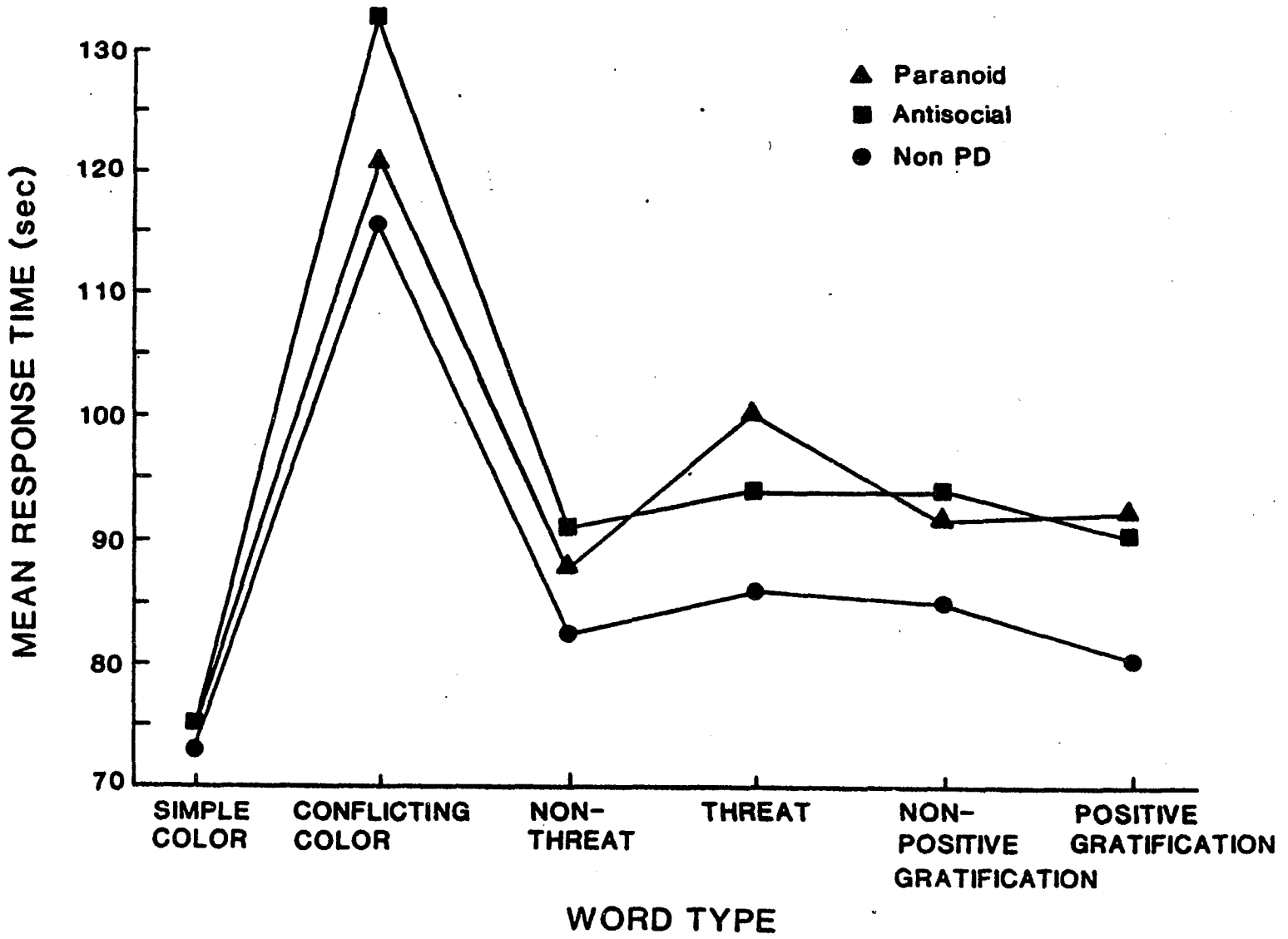
about their performance.

RESULTS

Color Naming Tasks

Mean times to complete color naming for each card by group are presented in Figure 1. All groups showed minimum completion times on the simple color (SC) card and maximum times on the conflicting color (CC) card. Consistent with experimental predictions, the Paranoid subjects evidenced longer completion times on the threat (T) card than on non-threat (NT), positive/gratification (PG), or non-positive/gratification (NPG) cards, an effect that was not apparent across Antisocial and NonPD groups. In order to evaluate effects of group and card type, separate 3 (group) X 2 (card) analyses of variance (ANOVAs) with repeated measures across cards were carried out on completion times for SC/CC, NPG/PG, and NT/T card type pairs. The first of these ANOVAs addresses the possibility of generalized color naming and Stroop test performance differences between groups, and the two latter analyses compare performance on each experimental card with that on matched control cards. Because the observed values of the dependent measure for this task exhibited a tendency to show increased variability as their magnitude increased, all analyses to be reported were performed on both raw elapsed-time scores and data derived from a natural log transformation of these scores. The latter theoretically permit more valid statistical testing by reducing the effects of the non-normal outcome distribution. However, in all cases raw and transformed data yielded identical results within a given level of statistical

Figure 1. Mean color-naming response times for six word types by personality group.



significance. To facilitate interpretation, only results derived from analysis of nontransformed data are presented.

Results for the ANOVA across SC/CC cards confirmed the significant main effect of these card types across groups, $F(1, 35) = 110.96$, $p < .001$ (see Table 3). As shown in Figure 1, all groups demonstrated the basic

Table 3

Two-Way ANOVA: Simple Color and Conflicting Color Cards by Group

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
<u>Within</u>	<u>35</u>			
Grand Mean	1			
Group	2	608.54	0.82	.45
<u>Ss(Group)</u>	<u>35</u>	<u>739.86</u>		
Card	1	42265.70	110.96	<<.01
Group X Card	2	379.87	1.00	.38
<u>Ss(Group) X Card</u>	<u>35</u>	<u>380.92</u>		

Stroop effect by producing longer completion times on the CC card. Group and Group X Card interaction effects were not significant in this analysis; thus, there was no indication of a systematic between-group difference in speed of simple color naming or performance on the relatively difficult Stroop task involving conflicting color names. Similarly, results for the ANOVA across NPG/PG cards showed no significant main or interaction effects involving groups or card types (see Table 4), indicating that groups did not respond differentially to positive/gratification versus matched control cards on the timed measure.

Table 4

Two-Way ANOVA: Non-Positive/Gratification
and Positive/Gratification Cards by Group

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Within	35			
Grand Mean	1			
Group	2	863.22	2.21	.13
<u>Ss(Group)</u>	35	391.40		
Card	1	113.34	2.27	.14
Group X Card	2	47.12	0.94	.40
<u>Ss(Group) X Card</u>	35	49.92		

In contrast to the above results, analysis of scores on T and NT cards yielded highly significant effects of card type, $F(1, 35) = 22.92$, $p < .001$, and a significant Group X Card interaction, $F(2, 35) = 4.78$, $p = .01$ (see Table 5). There was not a significant main effect of group. Planned contrasts indicated that men characterized as Paranoid PDs differed significantly from NonPDs ($t = 2.79$, $p < .01$) and Antisocials ($t = 2.68$, $p = .01$) on difference scores between NT and T cards, whereas the Antisocial group did not differ significantly from NonPD subjects on this measure (commonly referred to as the interference index). Figure 1 illustrates these effects which confirm experimental predictions of significantly increased response times in Paranoids on threat-related material. Relative to the other two groups, Paranoid PD subjects were significantly slowed on color-naming T words compared to NT control words.

Table 5

Two-Way ANOVA: Non-Threat and Threat Cards by Group

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Within	35			
Grand Mean	1			
Group	2	794.45	1.62	.21
<u>Ss(Group)</u>	35	489.56		
Card	1	689.06	22.92	<<.01
Group X Card	2	143.83	4.78	.01
<u>Ss(Group) X Card</u>	35	30.06		
<u>Planned contrasts:</u>				
			<u>t</u>	<u>p</u>
Paranoid PD vs. Non-PD			2.79	<.01
Paranoid PD vs. Antisocial PD			2.68	.01

In order to evaluate further the nature of group performance differences, additional analysis was conducted incorporating data for all four experimental cards: NPG, PG, T, and NT. A one-way multivariate analysis of variance (MANOVA) across the three groups with repeated measures over the four cards indicated no significant main effect of group (Pillais trace = .24, $F = .17$, $df = 6, 68$, $p > .10$). Thus, when performance of the three groups was analyzed over several cards containing predominantly nonthreat stimuli closely matched on length and frequency, between-group differences were nonsignificant, supporting the specificity of the significant interaction between group and threat stimuli shown in Table 5.

Table 6

Polynomial Contrasts Based On One-Way MANOVA:
Non-Threat, Threat, Non-Pleasure/Gratification,
and Pleasure/Gratification Cards by Group

	<u>t</u>	<u>p</u>
<u>Linear</u>		
Paranoid PD vs. Non-PD	1.05	.30
Paranoid PD vs. Antisocial PD	0.50	.62
<u>Quadratic</u>		
Paranoid PD vs. Non-PD	0.69	.49
Paranoid PD vs. Antisocial PD	0.92	.36
<u>Cubic</u>		
Paranoid PD vs. Non-PD	2.10	.04
Paranoid PD vs. Antisocial PD	2.01	.05

To provide additional confirmation of the specific effect of threat stimuli on Paranoid response times, polynomial contrasts were conducted in the above analysis comparing the functions described by each group's performance across the four experimental cards. The pairwise contrasts tested for linear, quadratic, and cubic component differences between these three functions. Because a substantial cubic component, i.e., indicating two angular deflections, occurs when a function includes a single point departing significantly from an otherwise linear trend, contrasts on this component comprised a test of between-group effects involving differences on only one of the four experimental cards. Results confirmed a significant Group X Card

interaction for the cubic component, with Paranoids differing significantly on this component compared both to NonPDs, $t = 2.10$, $p < .05$, and Antisocials, $t = 2.01$, $p = .05$ (see Table 6). The contrasts for linear and quadratic components did not approach statistical significance. Results substantiate the between-groups performance difference on the T card apparent in Figure 1, by demonstrating that increased response times among Paranoids on this one card were of sufficient magnitude to produce a significant cubic trend in Paranoid group performance across the four experimental cards relative to performance of the Antisocial and NonPD groups.

To evaluate the possibility of an overall or interactive effect of order of presentation of experimental card pairs during the color naming tasks, a 2 (order) X 3 (group) X 4 (card) ANOVA was performed across NPG, PG, NT, and T cards. Results indicated that neither a main effect of order nor an interactive effect involving Group and Order factors approached statistical significance. Thus, there was no evidence of significant practice, fatigue, or distraction effects in any group's performance.

Because groups differed significantly on A-State STAI and Beck measures, additional analyses were conducted to test the possibility that elevations on one or both of these indices of self-reported affective distress correlated significantly with color-naming task performance independent of PD diagnosis. Overall Pearson product-moment correlations relating STAI scores and response times for each of the six task cards were uniformly nonsignificant, disconfirming the hypothesis that differential STAI score elevations alone could account for

differences in performance on T across groups (see Table 7). Because correlations between Beck scores and response times were statistically significant for the four experimental cards, a 3 (groups) X 2 (cards NT and T) analysis of covariance with repeated measures on the Card factor, using Beck scores as covariates, was performed on color-naming response

Table 7

Correlations Between Color-Naming Response Times and Affective Distress Measures by Card Type

Card	STAI		Beck	
	<u>r</u>	<u>p</u>	<u>r</u>	<u>p</u>
Simple Color	-0.05	.38	0.14	.21
Conflicting Color	-0.24	.07	-0.07	.33
Non-Threat	0.02	.46	0.32	.02
Threat	0.15	.19	0.41	.01
Non-Positive/Gratification	0.04	.41	0.32	.03
Positive/Gratification	0.22	.10	0.46	.00

Note. STAI = State-Trait Anxiety Inventory A-State Scale.
Beck = Beck Depression Inventory.

times to adjust for effects of subject differences on the Beck. This analysis yielded a nonsignificant regression term for the covariate, $F(1,34) = 3.50, p > .05$. Thus, the hypothesis that significant Beck score differences accounted for the observed performance differences across groups on T and NT cards was also disconfirmed.

Word Recognition Task

Computation of SDT analysis indices of discriminability and response bias requires a defined signal- and noise-stimulus-event pair. For this study of word recognition, the signal event was the presentation of an old word (i.e., a word included in the prior color naming tasks) and the noise event was the presentation of a new word. To calculate the SDT indices in this experiment, subjects' confidence ratings (1, 2, or 3) for each response (old or new) on the word recognition task were recoded to range from 1 (indicating much confidence that a word was new) to 6 (indicating much confidence that a word was old). Thus, a series of six increasingly stringent criterion levels for reporting the occurrence of the signal event was generated for each subject.

In order to avoid assumptions concerning the shape of the underlying noise and signal-plus-noise distributions, commonly-used nonparametric indices of discriminability, $P(A)$ (McNicol, 1972), and response bias, B' (Grier, 1971; Hodos, 1970) were computed. Compared to the original SDT indices d' and Lx , these nonparametric counterparts are noted to offer greater stability when the number of observations is relatively low, as in the present study (McNicol, 1972). The discriminability index $P(A)$ represents the area under a receiver operating characteristic (ROC) curve derived by plotting hit rate against false-alarm rate at each confidence criteria location. It has an upper limit of 1.00, this value indicating perfect ability to distinguish signal and noise events. A $P(A)$ value of .50 corresponds to no discrimination, i.e. chance performance. B' can range in value from

-1.00 to 1.00, with higher scores representing a more conservative report criterion. Thus, in the present study, higher values of $P(A)$ indicated enhanced ability to identify previously-presented words accurately, and lower B' scores represented an enhanced tendency or bias to report that a word was old.

To evaluate the possibility that groups differed on overall ability to discriminate old words during the recognition task, a one-way ANOVA was conducted on individual $P(A)$ scores calculated by a computer program that plotted ROC curves for each subject, incorporating data for all four word types. This and all subsequent analyses included 35 subjects only; data from 3 subjects (1 from each group) were unusable because of obvious response sets, e.g., all words marked new, or failure to complete the response form in its entirety. As shown in Table 8, all three groups showed mean $P(A)$ values that indicated greater than chance performance. Statistical results demonstrated that groups did not differ significantly on these overall $P(A)$ scores, $F(2,32) = 2.23$, $p > .10$. Overall response bias differences were also tested by calculating B' for the criterion levels 2 through 6 for each subject, using Grier's (1971) computational formula (B' can only be computed for $N - 1$ of N criterion levels because cumulative frequencies of signal and noise equal 1.00 at the final level). These B' scores were entered into one-way ANOVAs across groups. Again results indicated that groups did not differ significantly on SDT indices describing recognition performance across all word types (see Table 8).

Table 8

Mean Scores on Discriminability and Response Bias Indices by Group

Criterion	NonPD		Antisocial PD		Paranoid PD		F(2,32)
	<u>P(A)</u>	<u>B'</u>	<u>P(A)</u>	<u>B'</u>	<u>P(A)</u>	<u>B'</u>	
	.6047		.6072		.5552		2.23 ns
6		.1830		.2417		.0618	1.27 ns
5		.0792		.1127		-.0277	1.22 ns
4		.0171		.0844		-.0499	1.19 ns
3		-.1549		-.0490		-.0411	1.15 ns
2		-.0004		-.1446		-.2130	0.63 ns

Note. $p > .10$ for all F-ratios

To test for possible between-group differences on recognition performance with specific word types, values of P(A) and B' were calculated for each set of old and new T, NT, PG, and NPG words separately. Because of the small number of observations per subject for each word type, separate SDT indices were calculated for the three groups as though each was a single observer receiving (N X 12) signal and (N X 12) noise trials, where N equalled the number of subjects per group. A rationale for such subject pooling in SDT experiments with limited numbers of observations has been explicated by Chapman and Feather (1971) and Lee (1969). Recently, Swets (1986) has provided numerous illustrations of the derivation of discriminability and response criterion measures from appropriately pooled data. In the present study, computational formulas published by Bamber (1975) expressly for this purpose were used to calculate values of P(A) (also

known as the Ag index) across group and word types. These values are presented in Table 9. Bamber's (1975) formulas also provided variance estimates for each P(A) value, which were used to conduct pairwise t tests to compare recognition discriminability for each of the four word types (i.e., for old versus new words of each type) among groups. These

Table 9

Mean Scores on Discriminability Indices by Word Type and Group

Word type	Group			Pairwise Comparison		
	NPD <u>P(A)</u>	APD <u>P(A)</u>	PPD <u>P(A)</u>	NPD APD <u>t</u> (622)	APD PPD <u>t</u> (430)	NPD PPD <u>t</u> (622)
NPG	.4821	.5600	.5318	28.90**	7.56**	18.37**
PG	.6498	.6466	.5934	1.27	15.10**	22.04**
NT	.6084	.5562	.6156	19.70**	16.41**	2.78*
T	.6746	.6403	.5260	13.59**	31.95**	57.31**

Note. NPD = Non-personality-disorder. APD = Antisocial Personality Disorder. PPD = Paranoid Personality Disorder.
NPG = non-positive/gratification. PG = positive/gratification. NT = non-threat. T = threat.

* $p < .01$

** $p < .001$

tests indicated highly significant between-groups differences on all but one comparison. Paranoids differed from nonPDs and Antisocials on all comparisons, showing significantly decreased sensitivity relative to

both remaining groups on PG and T word types. The most dichotomous between-group P(A) scores occurred with threat stimuli. As shown in Table 9, within-groups trends across card types differed between groups. Specifically, Paranoid PD subjects evidenced their lowest mean P(A) score on T material, whereas, both other groups showed their greatest or near-greatest P(A) scores on recognition of threat words.

Pairwise t tests were also conducted to compare group response bias indices (B') across word types, computed for ratings of 2 through 6 using the computational formulas of Grier (1971) as previously described (see Appendix G for B' and t values). Results did not approach statistical significance for any comparison. Thus, there was no indication of any systematic within or between-group response bias interaction involving the differing types of word stimuli used in this investigation.

DISCUSSION

The goals of this investigation were to validate the thesis that persons meeting criteria for Paranoid Personality Disorder evidence a significant hypersensitivity to threat that affects their responses to threat-related features of the environment in predictable ways, and to initiate study of these response patterns by operationalizing this hypersensitivity in terms of performance differences on color-naming and recognition tasks involving threat words. As predicted, PPD subjects showed significant differences in performance on both of these tasks when threat stimuli were involved, relative to non-personality-disordered persons and those meeting diagnostic criteria for Antisocial PD. The comparison groups did not differ significantly in performance on either of the two hypervigilance tasks with the exception of certain recognition discriminability scores, and, unlike PPD results, the latter differences did not constitute a between-groups divergence in overall discriminability score patterns for threat versus non-threat stimuli. Thus, this study was successful in demonstrating specific response style patterns differentiating the PPD individual from matched PD and non-PD controls drawn from the same population.

The main finding of this investigation was that, as hypothesized, only the PPD group was significantly slower in color-naming threat-related words relative to matched non-threat words. The high degree of specificity of this effect (i.e., a unique interaction between PPDs and threat stimuli) can be appreciated when performance of all

three groups is considered across all six Stroop tasks. There is no suggestion of a generalized performance deficit among PPDs on this type of procedure; in fact, performance levels across groups are remarkably similar on all color-naming tasks not involving threat words. Moreover, both non-PPD groups showed mean response time patterns that did not differ between experimental word sets and matched controls, just as PPDs' latencies did not differ between positive/gratification stimuli and matched controls. Multiple statistical analyses support the impression derived from visual inspection of results that a specific between-groups performance difference in the direction predicted occurred on and was limited to the color-naming task involving threat stimuli. In sum, the response-delay effect seen in the PPD group when color-naming threat words to support the conceptualization of hypersensitivity to threat in PPDs under these conditions. This represents the first time that hypersensitivity differences have been quantified under controlled conditions in a Paranoid Personality sample.

The nature of the increased latency effect observed among PPDs in the threat word Stroop task results is subject to various conceptualizations. For example, Mathews and MacLeod (1985) have suggested a theoretical framework for Stroop interference among anxious subjects which proposes that differences in the type, extent, or ease of activation of preexisting cognitive schemata present across subject groups can interact with congruent cues provided by specific Stroop stimuli to produce enhanced processing of schema-congruent information (e.g., threat content) that competes with alternative processing demands (e.g., color naming) in a limited-capacity system. This might suggest

that PPDs tend to maintain such threat-related schemata in relatively permanent states of activation. The Mathews and MacLeod (1985) account thus assumes that biased processing of threat signals gives rise to interference directly.

An alternative conceptualization has been provided by Harvey (1984), who argued that Stroop interference arises over trials because subjects experience difficulty in maintaining an attentional set aimed at reducing the amount of processing accorded to irrelevant stimulus aspects (e.g., semantic content) while responding on a color-naming task. Application of this explanation to results of the present study would imply that PPDs, unlike remaining subjects, experienced greater distraction effects from threat words and were less able to maintain their attending to relevant non-threatening aspects of the stimulus array. Both Harvey's (1984) and Mathews and MacLeod's (1985) conceptualizations are consistent with the formulation of threat-related discriminative and attentional differences in hypersensitive PPDs. The former account has the benefit of empirical support in that several predictions derived from the general model have been experimentally confirmed in laboratory studies (Harvey, 1984). Of note as a corollary of Harvey's account is the suggestion that emotional arousal can disrupt the maintaining of the attentional set required to minimize Stroop effects (cf. Mathews & MacLeod, 1985). Thus, the mechanism of distraction by threat stimuli in PPDs might be mediated by or at least correlated with alterations in arousal during the threat-word Stroop task, a potentially testable hypothesis, and PPD results on the color-naming tasks might be construed as a special example in support of

what has been called the perceptual defense and vigilance hypothesis (e.g., Erdelyi, 1974), which maintains that perception of stimuli may be inhibited (perceptual defense) or enhanced (perceptual vigilance) as a function of the input's emotionality.

Although the above accounts of Stroop interference have emphasized differences at the level of cognitive processing of threat-related information, other researchers have argued that any theory assuming only a single locus for interference effects is incompatible with the extended body of empirical findings pertaining to Stroop performance and is thus necessarily incomplete (cf. Stirling, 1979). For example, some investigators have stressed the importance of distinguishing the effect of a primed distractor on the encoding of information from its role in eliciting one or more responses (e.g., Seymour, 1977), and response competition may constitute a viable account of Stroop interference. This is the form an operant analysis might take; for instance, differing aspects (i.e., color, letter configuration) of the threat words of the Stroop task could be seen to function as discriminative stimuli for two or more incompatible responses on the part of the PPD subject, with each response maintained by robust histories of positive or negative reinforcement under similar conditions. In this scheme, the origin of these discriminative stimuli and the differential learning histories of the subjects remain to be explicated before the nature of the unique hypersensitive responses in PPDs is fully analyzed.

Contrary to experimental predictions, Antisocial PD subjects evidenced a nonsignificant trend towards reduced times on PG relative to NPG stimuli during the Stroop tasks. Thus, there was no indication

whatsoever among APDs of differential hypersensitivity to positive words, nor toward any of the stimuli tested. Although moderately increased sensitivity to positive or gratification-related words was predicted in these subjects on the basis of their documented tendency to respond under many conditions in a manner that maximizes short-term pleasure, the absence of a hypersensitivity effect can be viewed as consistent with accumulated findings of relatively poor control by verbal stimuli (Brantley & Sutker, 1984) and, possibly, relatively low tolerance of monotony (cf., Quay, 1965, Widom, 1976) among persons meeting APD criteria. It might be speculated that tasks incorporating primary and/or more immediate or salient reinforcement would be necessary to elicit differential hypersensitivity in Antisocial Personality subjects. For example, relative to non-antisocial individuals, APD learning-task performance has been shown to be differentially more improved by monetary rewards than verbal consequences (Schmauk, 1970). Thus, it seems plausible that more powerful or functional reinforcers such as money would be required to affect APD attention and discrimination in a selective manner. In this study, APD performance across word types did not differ significantly from that of non-PDs, and the APD group thus serves to provide additional validation of differential hypersensitivity to threat in PPDs by bolstering the breadth of the comparison sample and controlling for non-paranoid distinctions between PD and non-PD subjects.

On the word recognition task, PPDs did show significant differences in discriminability across word types relative to the non-PPD groups, as was predicted. However, the direction of these differences was opposite

to that hypothesized. PPDs evidenced their worst mean recognition performance on threat words relative to other stimuli, whereas APD and non-PD groups tended to show maximum discriminability indices with threat-related material. Moreover, mean PPD discriminability indices for threat words were significantly decreased compared to those of the remaining groups. Although these significant differences serve to establish additional systematic distinctions characterizing PPDs, the results appear to contradict a formulation of increased attending to threat stimuli in this hypervigilant population. It might be argued that the hypothesized pattern of differences in attending did occur during the Stroop tasks but was of insufficient duration or otherwise incapable of improving sensitivity during the relatively difficult recognition task, and similar conclusions have sometimes been derived from findings of dichotic listening and other studies (cf. Kintsch, 1977). However, this does not address the present findings of significantly reduced recognition sensitivity for threat words among PPDs, across remaining groups and stimulus types.

Three accounts of the observed recognition sensitivity outcomes will be considered. First, it is possible that selective hypersensitivity as shown in this study involves not increased attention directed toward members of a stimulus class, but rather an enhanced perceptual acuity that can be described by what has been called increased automatic processing of stimuli belonging to that class (e.g., Posner, 1978, 1982; Schiffrin & Schneider, 1977). Kahneman and Treisman (1984) have defined automatic mental operations of this sort as follows:

An automatic process is involuntary; that is, it can be triggered without a supporting intention and, once started, cannot be stopped intentionally. An automatic process does not draw on general resources, is not subject to interference from attended activities, and does not interfere with such activities . . . Three levels of automaticity can be distinguished in perception: (1) An act of perceptual processing is strongly automatic if it is neither facilitated by focusing attention on a stimulus, nor impaired by diverting attention from it . . . (2) It is partially automatic if it is normally completed even when attention is diverted from the stimulus, but can be speeded or facilitated by attention . . . (3) A perceptual process is occasionally automatic if it generally requires attention but can sometimes be completed without it. (p. 42)

If it is assumed that PPDs show a differential tendency to process threat-related material with greater automaticity, relative to other groups and different material, and particularly if they show more strongly automatic processing of threat, as defined above, this could account for their increased latencies on the threat-word Stroop task, and also could be expected to produce diminished recognition for threat-related material as a function of decreased encoding (Kahneman & Treisman, 1984). As Kahneman and Treisman (1984) point out (p.43), reading familiar words is often cited as a prototypical automatic process, and the Stroop task is frequently invoked to demonstrate the automaticity of reading, because subjects apparently read uncontrollably even though it is in their best interest not to do so. However, these

and other researchers (e.g., Francolini & Egeth, 1980), based upon review of a body of experiments involving various distractor stimuli, argue that the reading of words during Stroop tasks normally is not strongly automatic in the above sense, and that the automatic process of reading in the task depends on the manner in which stimuli are attended. Possibly, PPDs selectively process threat-related material in a more strongly automatic manner than normal subjects. It is generally accepted by cognitive theorists that the ability to encode and retrieve material in memory is inversely proportional to the degree of automaticity in initial processing (Neely, 1977; Underwood, 1976; Warren, 1974). Thus, one conceptualization of PPD hypersensitivity to threat that could account for differential Stroop and recognition performance on threat-related tasks in the present study maintains that the paranoid subjects evidenced a perceptual difference involving greater automaticity of processing for threat stimuli.

A second possibility to account for the reduced recognition sensitivity for threat in hypersensitive PPDs is that the presentation of stimuli highly primed for attention and discrimination further primed closely associated or related stimuli (e.g., distractor threat stimuli) in these subjects, and that this disrupted accurate recognition relative to that for less highly primed stimuli. Similar disruptive effects of experimentally primed stimuli on recognition were noted previously in the Bruce (1979) study involving search for political figures. This explanation essentially posits that threat-related stimuli are so salient for PPDs that they overwhelm or otherwise impair accurate discrimination and/or memory of the context in which they appear,

possibly by distracting attention from contextual cues. Thus, this general account could accord with the notion of differentiating patterns of attending to the environment related to differential discrimination of threat among PPDs, but it departs from the original prediction of enhanced recognition of previously-seen threat stimuli in emphasizing the narrow focus of this attention. The implications of this conceptualization of observed performance differences, i.e., that in discriminating and attending to threat stimuli the PPD individual shows relative insensitivity to context, frequency, or history of exposure to the threat, are consistent with many clinical descriptions of the behaviors shown by these people (e.g., Cameron, 1963).

The final account of PPD threat recognition differences that will be proposed is related to that last described, and follows the original formulation of PPD hypersensitivity including the prediction that such subjects will show enhanced attending to threat stimuli. However, this third explanation of findings postulates that the aspect of the stimulus that is hypersensitively attended - and possibly subject to increased recognition discriminability - is not the word itself but rather threat content per se. Thus, the PPD may perform relatively poorly on a recognition task in which old threat words are presented with equally-threatening distractors, but could show superior performance on a task involving previously-seen threat words and matched non-threat distractors. This account is similar to the previous one and is consistent with the formulation of heightened attending to threat stimuli in PPDs, but emphasizes an enhancement of recognition sensitivity for the occurrence of threat that is not necessarily

specific enough to discriminate particular words. This hypothesis is potentially testable within an experimental design using Signal Detection Theory analysis.

Although subject to diverse interpretations, the differences in recognition of threat versus non-threat words noted across groups appear especially significant given the pattern of differential Stroop results in this study. Moreover, the failure to observe similar group by stimulus-type interactions on recognition sensitivity measures in other studies involving significant Stroop effects raises the intriguing possibility that the effects seen in the present study reflect a highly distinctive process or perceptual effect that is specific to PPD hypervigilance, rather than a necessary concomitant of differences in Stroop performance. For example, the Mathews and MacLeod (1985) experiment involving anxious subjects and threat stimuli, described earlier, also assessed recognition sensitivity for threat and non-threat words following completion of Stroop tasks in a manner quite similar to that of this study. Despite highly specific differences in Stroop interference across groups in the predicted direction, there were no group differences in ability to discriminate the different types of stimuli from matched distractors.

In the present study, overall recognition sensitivity indices (i.e., for all old versus new words) failed to show significant differences across groups. Although PPDs' $P(A)$ scores did show a nonsignificant decreased trend relative to the other groups' sensitivity indices, consistent with the direction of experimental predictions, this decrease would appear to be explained at least in part by the lessened

abilities among PPDs to discriminate old from new threat stimuli. There was little support in the data for an effect of reduced discriminability of previously-seen non-threat words in paranoid subjects. Thus, threat stimuli did not appear to induce cognitive masking as defined by Erdelyi and Blumenthal (1973).

There was also no evidence among general or pooled B' indices for consistent between-groups differences in the tendency or bias to report that specific threat stimuli had already been seen during the first task of the study. Although negative results are problematic for deriving firm conclusions, the absence of significant response bias effects in the context of significant discriminability differences is of interest because it strengthens the suggestion that recognition performance distinctions occurred independent of motivational differences or demand characteristics (cf., Chapman & Feather, 1971). Erdelyi (1974) is among researchers who have argued that the failure to find response bias distinctions in such tasks supports the conceptualization that individual differences in perceptual organization underly observed discriminability differences. Compared to other SDT tasks that have been described in the literature, the recognition test of the present investigation can be seen as having relatively little differential incentive for a consistent response bias (e.g., reporting old threats did not shorten or simplify the task, nor afford negative consequences), and thus may not have maximized the likelihood of assessing response bias distinctions that do differentiate PPD and other groups (cf., Egan & Clarke, 1966).

Other limitations of this investigation must be acknowledged. Chief among these is the use of a drug abuse population whose constituents may not reflect the effects of personality disorders in other samples. It is also noted that the sample comprised almost exclusively Black subjects, which may limit external validity. Further research is clearly necessary to address this issue and replicate findings of this study among other samples. In addition, due to difficulties in generating volunteer PPD subjects, the number of subjects studied is small. However, it is argued that the examined groups comprise clinically valid samples that are representative of the type of population for which increased knowledge relevant to theory and treatment of personality disorders is sorely needed. The ability to demonstrate statistically significant differences in the behaviors of small samples points to the probable magnitude and robustness of the observed effects.

This study contributes to the small body of empirical findings describing important response differences among individuals meeting criteria for Paranoid Personality Disorder. It represents the first systematic demonstration of a unique hypersensitivity to threat that is frequently given as a key feature of the PPD style. In addition to offering the potential to extend theoretical knowledge, findings may contribute to improved treatment and management of this condition in clinical settings. For example, the demonstration that PPD individuals may respond more strongly to a given threat but show diminished ability to recognize whether that threat has occurred before could have important clinical implications in a treatment program addressing goals

of improved interpersonal relations and reduced work-related aggression, marital dysfunction, or legal difficulties. This is particularly relevant for PPDs in that the latter externally-orchestrated problems constitute some of the most common reasons given for treatment self-referrals among this distrustful population (c.f., Millon, 1981). Such findings also may lead to enhanced understanding of the few other empirical results obtained from paranoid samples, e.g., Turkat, Phillips-Keane, and Thompson-Pope's (1987) recent demonstration of increased revengeful reactions to perceived social hostility among PPs. On the DDTU ward serving as the site of this investigation, feedback regarding hypersensitivity effects appears to have been helpful for participating inpatients, and they uniformly allowed this information to be shared with treatment staff. Thus, the specialized threat-related Stroop tasks utilized in this study may also serve as a useful assessment device for therapeutic, referral or screening purposes.

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APPENDIX A

BACKGROUND INFORMATION QUESTIONNAIRE

BACKGROUND INFORMATION QUESTIONNAIRE

GENERAL INFORMATION

Identification Data		Current Date	Source (& mod- ality if applicable)	Note entry	
Sex	Race	Age	Birthdate	Birthplace	Last town residence

PERSONAL INFORMATION

Marital status	No. times married	Current family	No. household	Raised primarily by	Adopted Yes _____ No _____	No. Commn-law
Age disruption childhood home	Stepfather/Stepmother	Source income within childhood home: Mother worked _____ Father worked _____ Welfare _____ Other _____		Age left childhood home		
Siblings: Male _____ Female _____ Birth order: _____ of _____		Religious preference		Average monthly church attendance		

EDUCATION

Highest grade completed	Reason leaving school: _____
Self _____	No high school suspensions _____ in _____ yrs
Father _____	No high school expulsions _____ in _____ yrs
Mother _____	Truancy: Age began _____
Failed any grades _____	Average no. of times per year _____
	Ever diagnosed hyperactive child _____

EMPLOYMENT

If not currently employed, please list most recent employment and dates, where applicable.

Currently employed: Yes _____ No _____	Occupation: Self _____ Father _____ Mother _____	# times fired _____	
Length of current employment to _____			
No. months employed full-time during past year:	Length longest employment (mos)	Total time employed (mos)	% time fully employed

No. jobs held in past year: Full-time _____ Part-time _____
 If you have changed jobs in the past year, describe and list reason(s) for change(s)
 If you have lost jobs in the past year, describe and list reason

Was loss of job due to alcohol or drug use? If so specify: _____
 Income last mo. _____
 Annual income Legal _____ Illegal _____
 Highest legal annual income _____
 When did you earn highest income? _____

MARITAL AND CHILDBEARING HISTORY

Current marital status _____ Household composition _____
 No. children: living _____ deceased _____
 No. children out of wedlock _____
 No. miscarriages _____
 No. abortions _____
 Ever sexually abused _____ By whom _____ At what age _____

Marrriages: List each separately.

	1	2	3
Age married	_____	_____	_____
Age separated/divorced	_____	_____	_____
Occupation of spouse	_____	_____	_____
Criminal record spouse	_____	_____	_____
Alcohol abuse by spouse	_____	_____	_____
Drug abuse by spouse	_____	_____	_____
No. children	_____	_____	_____

ALCOHOL USE

Age first ever _____ Age first drank on own _____ Age first time drunk _____
 Reason for first alcohol use: experience seeking/pleasure _____ social influences _____ coping/self-medication _____
 Age onset: drank heavy drinking _____

Avg no drinking days per week/past yr.	Avg amount consumed	Alcoholic beverage preference	Reason for continued alcohol use
Number mos/years drinking	Drinking pattern this period qty./day/week		pleasure enhancement: ___ coping/medication ___ social influences ___ physical imperative

Which of the following symptom clusters apply to self/family. If applicable, please describe symptoms and age of first occurrence.

Symptoms	Self	Father	Mother	Siblings	Other relatives	Spouse/cohort
Drinking on awakening						

Blackouts:
number

Benders:
number

Fights while drinking

Think you drink too much

Driving trouble:
No. DWI arrests
No. other traffic offenses
No. accidents
No. license suspensions

Peace disturbances and other arrest while drunk:
No.

Medical Complications:
(e.g. liver disease, gastritis, withdrawal seizures, polyneuropathy, etc.)

ALCOHOL TREATMENT HISTORY

Please list all previous alcohol treatment contacts for self/family listing dates, duration, type of treatment, medications, etc.

Treatment Self Father Mother Siblings Other relatives Spouse/cohort

DRUG USE

Age first drug use	First drug used	Use reason (If non-user, indicate reason) experience seeking/pleasure _____ social influences _____ coping/self medication _____	Age first hard drug use	Reason (If non-use indicate reason) pleasure _____ social influence _____ coping/self medication _____
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Total mos addicted to opiates	Total mos addicted other drugs (list)	Support drug habit	Reason for continued use
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Longest period of complete abstinence (mos)	#periods of abstinence	Time elapsed since most recent drug use:	Check items that describe your drug habit for past and explain: _____ no problem. _____ slight problem. _____ moderate problem. _____ severe problem.
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Explain _____

Please indicate which of the following symptoms apply to family members, listing dates, duration, etc., where applicable.

Symptoms Self Father Mother Siblings Other relatives Spouse/cohor

Illicit drug use _____

Illicit opiate use _____

Drugs used _____

Drug choice _____

Addicted opiates _____

Addicted to other drugs _____

Drug related arrests _____

Drug Sales _____

Medical complications _____

(e.g., hepatitis, abscesses, overdose, endocarditis, etc.) _____

DRUG TREATMENT HISTORY

Please list all previous drug treatment contacts for self/family, listing dates, duration, type of treatment, medications, etc.

Treatment Self Father Mother Siblings Other relatives Spouse/cohort

MENTAL HEALTH HISTORY

Please list all previous psychiatric, psychological, mental health, etc., treatment contacts, including inpatient, outpatient, evaluation, etc. List dates, duration, type of treatment, medications, etc.

Treatment	Self	Father	Mother	Siblings	Other relatives	Spouse/cohort

Medications prescribed: Major tranquilizers _____ Minor Tranquilizers _____
 Anticonvulsants _____ Antidepressants _____

ARRESTS AND PRISON EXPERIENCE

Juvenile history:		Date	Sentence	Outcome
Age at arrest	Charge			

Juvenile summary:
 No. juvenile arrest _____ No. juvenile convictions _____ No. juvenile incarcerations _____
 _____ incarcerated as Juvenile _____
 Juvenile fights _____

Adult history:		Date	Sentence	Outcome
Age at arrest	Charge			

7. Were there any particular circumstances or set of events that happened to you to trigger your need or desire to drink or use drugs that time? _____

8. How did the drink(s) or drugs feel? What feeling did you get from them? _____

9. If you had to check one of the three reasons for using drugs or drinking the first time after your period of abstinence, which one would you check?

- _____ Negative emotions, such as depression, anger
 _____ Social pressure from your friends or girl/boy friend, husband/wife
 _____ Enhancement of interpersonal positive emotional states, or to have a good time

DISEASES AND SYMPTOMS. Please describe, listing dates, treatment, etc.

Hypotension/hypertension

Circulatory problems

Cardiac problems

Hepatitis/liver diseases

Kidney disorders

Diabetes

Thyroid disorders

Ulcer (GI problems,
gastritis, etc.)

Pancreatitis

Respiratory problems (Pneum. emphy.)

Syphilis - VD

Abscess

Sexual dysfunction

Weight loss/gain

Head injuries

Concussion

Seizures

Neurological problems

Hyperactivity

Physically abused/child

Injured/wounded in service (describe) Did you ever see a military/psychiatrist/psychologist? List type of treatment, duration, reason, diagnosis, etc.

Service connected disability. Describe injury, treatment, impairment, ___? compensation, etc.

Pattern military alcohol use

Pattern military drug use

marijuana

opiates

psychedelics

other drugs

No. of military awards

Combat exposure

In service 1965-75	yes___ no___	Responsible for death of enemy military yes___ no___
Stationed in VietNam	yes___ no___	Wounded in combat yes___ no___
Saw injury or death of U.S. serviceman	yes___ no___	Responsible for death of enemy civilians yes___ no___
Fired weapon/fired upon in combat	yes___ no___	Served third tour of duty in Viet Nam yes___ no___

DRUG RELAPSE ASSESSMENT

1. Please give the date and time of your first relapse episode, or the first time you used alcohol or drugs after your hospital release. _____

2. When you took your first drink or consumed drugs, the situation was _____

3. Where were you? _____

4. Who were you with? _____

5. How much did you drink, or about how much drugs did you take? _____

6. What would you say the main reason was for taking that first drink or using drugs? _____

APPENDIX B

WORD RECOGNITION RESPONSE FORM

This form contains a list of words. Some of these words appeared on the colored cards you have already seen--these are old words. The other words are new words that you have not been shown before. For each word on this form, please circle "old" if you think the word appeared before on one of the colored cards, or "new" if you think the word did not appear on the cards. Also, please rate your confidence about whether each word is old or new (that is, how certain you are about each decision), by circling "1", "2", or "3" as follows:

1 = little confidence; 2 = some confidence; 3 = much confidence.

Please circle either "old" or "new" and rate your confidence (1, 2, or 3) for every word. Thanks.

CIVILIZED	Old	New	1	2	3	MERRY	Old	New	1	2	3
INADEQUATE	Old	New	1	2	3	CLEVERNESS	Old	New	1	2	3
ALERT	Old	New	1	2	3	MILLIONAIRE	Old	New	1	2	3
OUTWITTED	Old	New	1	2	3	PRODIGIOUS	Old	New	1	2	3
ADVENTUROUS	Old	New	1	2	3	STRENUOUS	Old	New	1	2	3
INTELLIGENT	Old	New	1	2	3	CONTAGIOUS	Old	New	1	2	3
TENTH	Old	New	1	2	3	LITTERED	Old	New	1	2	3
PATHETIC	Old	New	1	2	3	BATTLES	Old	New	1	2	3
HATED	Old	New	1	2	3	PHOTOGRAPHED	Old	New	1	2	3
HANDSOME	Old	New	1	2	3	PAINSTAKING	Old	New	1	2	3
DAMAGING	Old	New	1	2	3	ABBREVIATED	Old	New	1	2	3
AUTOMATED	Old	New	1	2	3	CAPABLE	Old	New	1	2	3
EXCITEMENT	Old	New	1	2	3	ACTIVE	Old	New	1	2	3
ARTIFICIAL	Old	New	1	2	3	CHEATING	Old	New	1	2	3
TUNNEL	Old	New	1	2	3	ACTIVITIES	Old	New	1	2	3
BONUS	Old	New	1	2	3	PADDLE	Old	New	1	2	3
COOPERATIVE	Old	New	1	2	3	RETIRED	Old	New	1	2	3
FRIENDLY	Old	New	1	2	3	LASTED	Old	New	1	2	3
WORKMEN	Old	New	1	2	3	SPECIFIED	Old	New	1	2	3
TROPICAL	Old	New	1	2	3	DEPENDABLE	Old	New	1	2	3
ENTERTAINED	Old	New	1	2	3	PATTED	Old	New	1	2	3
UNINTELLIGENT	Old	New	1	2	3	BUTTGNED	Old	New	1	2	3

TRIUMPHANT	Old	New	1	2	3	BOTHER	Old	New	1	2	3
MAINTAINING	Old	New	1	2	3	ABROAD	Old	New	1	2	3
MOUNTED	Old	New	1	2	3	TRADED	Old	New	1	2	3
SNEAKED	Old	New	1	2	3	FLOWING	Old	New	1	2	3
SHALLOW	Old	New	1	2	3	AROUSED	Old	New	1	2	3
COOLNESS	Old	New	1	2	3	TRICKED	Old	New	1	2	3
DRIPPED	Old	New	1	2	3	CONDENSED	Old	New	1	2	3
FROZEN	Old	New	1	2	3	EMBROIDERED	Old	New	1	2	3
THREATEN	Old	New	1	2	3	EXCLUSIVE	Old	New	1	2	3
HEALTHY	Old	New	1	2	3	BETRAYED	Old	New	1	2	3
CLATTERING	Old	New	1	2	3	PORTABLE	Old	New	1	2	3
VERSATILE	Old	New	1	2	3	EXPRESSION	Old	New	1	2	3
MISTAKES	Old	New	1	2	3	INTERMEDIATE	Old	New	1	2	3
SQUATTING	Old	New	1	2	3	FAILURE	Old	New	1	2	3
INFERIOR	Old	New	1	2	3	RIDICULES	Old	New	1	2	3
LONELY	Old	New	1	2	3	DELAYED	Old	New	1	2	3
THREATENING	Old	New	1	2	3	TEMPTING	Old	New	1	2	3
DORMANT	Old	New	1	2	3	REASONED	Old	New	1	2	3
REALISTIC	Old	New	1	2	3	OLDEST	Old	New	1	2	3
FORCED	Old	New	1	2	3						
ASSORTED	Old	New	1	2	3						
CRITICIZED	Old	New	1	2	3						
FEATURE	Old	New	1	2	3						
FOOLISH	Old	New	1	2	3						
PRESSED	Old	New	1	2	3						
LOUNGING	Old	New	1	2	3						
SCRAMBLED	Old	New	1	2	3						
STUPID	Old	New	1	2	3						
GEOGRAPHICAL	Old	New	1	2	3						
WINNER	Old	New	1	2	3						
CONSIDERATE	Old	New	1	2	3						
RUINED	Old	New	1	2	3						
PILGRIMS	Old	New	1	2	3						

APPENDIX C

SUBJECT CONSENT FORMS

ATTACHMENT TO VA FORM 10-1086: INFORMED CONSENT AGREEMENT

I, _____, do hereby consent to participate in research investigation conducted to examine the nature of human perception and personality. I have been informed that the project may not benefit directly but that it is hoped that it will increase our understanding of human behavior and thereby benefit me indirectly.

Dr. Malow or his associates have explained to me the details and reasons for this study. I am aware that I will be asked to divulge personal information. I have been informed that all information received from me will be kept confidential and at no time will any of my recorded responses be associated with my name. Further, I have been informed that the following coding system will be employed to ensure confidentiality:

Each participant will be assigned a subject number which will be recorded on the Informed Consent Agreements. All records pertaining to subject responses to survey questions or forms will be identified and filed by number only. Informed Consent Agreements and identifying information will be stored and locked in a separate master file. This master file will be located in a different site than the working files which will contain non-personal identity information.

Dr. Malow or his associates have explained to me the nature of the stimuli used in this study. I have also observed samples of the stimulus material used in this study, and have had these described to me.

Risks/Discomfort: There is only minimal risk or discomfort involved in the collection of individual perceptual data. I do understand that possible fatigue and some anxiety due to personal disclosure could occur while answering questionnaires.

I have been informed and fully understand the procedures and purpose of this investigation. I voluntarily agree to participate. I release Tulane University School of Medicine and its agencies from responsibility or liability relating to my participation.

In case of any adverse effect or physical injury resulting from this study, eligible veterans are entitled to medical care and treatment. Compensation may be payable under Title 38 USC 351 or in certain circumstances under the Federal Tort Claims Act. Non-eligible veterans or non-veterans are entitled only to medical emergency care and treatment on a humanitarian basis. Compensation would be limited to situations involving negligence and would be controlled by the provisions of the Federal Tort Claims Act.

I also understand that I am free to withdraw my consent and discontinue participation at any time.

Witness

Signature

Date

PART I-AGREEMENT TO PARTICIPATE IN RESEARCH BY OR UNDER THE DIRECTION OF THE VETERANS ADMINISTRATION		DATE
<p>1. I, _____, voluntarily consent to participate as a subject: <small>(Type or print subject's name)</small></p> <p>in the investigation entitled <u>RELATIONSHIPS BETWEEN PERSONALITY AND PERCEPTUAL PROCESSES IN SUBSTANCE USE PATIENTS</u> <small>(Title of study)</small></p> <p>2. I have signed one or more information sheets with this title to show that I have read the description including the purpose and nature of the investigation, the procedures to be used, the risks, inconveniences, side effects and benefits to be expected, as well as other courses of action open to me and my right to withdraw from the investigation at any time. Each of these items has been explained to me by the investigator in the presence of a witness. The investigator has answered my questions concerning the investigation and I believe I understand what is intended.</p> <p>3. I understand that no guarantees or assurances have been given me since the results and risks of an investigation are not always known beforehand. I have been told that this investigation has been carefully planned, that the plan has been reviewed by knowledgeable people, and that every reasonable precaution will be taken to protect my well-being.</p> <p>4. In the event I sustain physical injury as a result of participation in this investigation, if I am eligible for medical care as a veteran, all necessary and appropriate care will be provided. If I am not eligible for medical care as a veteran, humanitarian emergency care will nevertheless be provided.</p> <p>5. I realize I have not released this institution from liability for negligence. Compensation may or may not be payable, in the event of physical injury arising from such research, under applicable federal laws.</p> <p>6. I understand that all information obtained about me during the course of this study will be made available only to doctors who are taking care of me and to qualified investigators and their assistants where their access to this information is appropriate and authorized. They will be bound by the same requirements to maintain my privacy and anonymity as apply to all medical personnel within the Veterans Administration.</p> <p>7. I further understand that, where required by law, the appropriate federal officer or agency will have free access to information obtained in this study should it become necessary. Generally, I may expect the same respect for my privacy and anonymity from those agencies as is afforded by the Veterans Administration and its employees. The provisions of the Privacy Act apply to all agencies.</p> <p>8. In the event that research in which I participate involves certain new drugs, information concerning my response to the drug(s) will be supplied to the sponsoring pharmaceutical house(s) that made the drug(s) available. This information will be given to them in such a way that I cannot be identified.</p> <p>_____ <small>NAME OF VOLUNTEER</small></p> <p>HAVE READ THIS CONSENT FORM. ALL MY QUESTIONS HAVE BEEN ANSWERED, AND I FREELY AND VOLUNTARILY CHOOSE TO PARTICIPATE. I UNDERSTAND THAT MY RIGHTS AND PRIVACY WILL BE MAINTAINED. I AGREE TO PARTICIPATE AS A VOLUNTEER IN THIS PROGRAM.</p> <p>9. Nevertheless, I wish to limit my participation in the investigation as follows:</p>		
<small>VA FACILITY</small> <p style="font-size: 1.2em; text-align: center;">NO VAMC</p>	<small>SUBJECT'S SIGNATURE</small> <p style="font-size: 2em; text-align: center;">X</p>	
<small>WITNESS'S NAME AND ADDRESS (Print or type)</small> <p>JEFFREY A. WEST LOUISIANA AVE NEW ORLEANS</p>	<small>WITNESS'S SIGNATURE</small> <p style="font-size: 1.5em; text-align: center;">J. A. West</p>	
<small>INVESTIGATOR'S NAME (Print or type)</small> <p>ROBERT M. MALOW, Ph.D</p>	<small>INVESTIGATOR'S SIGNATURE</small> <p style="font-size: 1.5em; text-align: center;">Dr. R. Malow</p>	
<input checked="" type="checkbox"/> Signed information sheets attached. <input type="checkbox"/> Signed information sheets available at _____		
<small>SUBJECT'S IDENTIFICATION (I.D. show or give name - last, first, middle)</small>		<small>SUBJECT'S I.D. NO.</small>
<p>AGREEMENT TO PARTICIPATE IN RESEARCH BY OR UNDER THE DIRECTION OF THE VETERANS ADMINISTRATION</p> <p>VA FORM 10-1086 SUPERSEDES VA FORM 10-1086 JUN 1975, WHICH WILL NO LONGER BE USED.</p>		

APPENDIX D**SUBJECT INSTRUCTIONS: COLOR NAMING TASKS**

Instructions: Color-Naming Tasks

In this task you are going to be looking at some words that are printed on cards in four different colors of ink: RED, BLUE, GREEN, and ORANGE. All you have to do is name the word colors--that is, the color of the ink that they're printed in--out loud to me as quickly as you can. Don't worry about what the words say, just tell me the colors. Start at the top and work across in rows as fast as possible. On the first card, the "words" are just zeroes. Instructions are exactly the same for each of the cards--just name the ink color of each word as fast as possible.

APPENDIX E

RECORDING FORM

Stroop test.

Name:

Date:

Examiner:

	Time (secs)
Card 1 (000000)	_____
Card 2 (Red)	_____
Card 3 T1 P1	_____
Card 4 T2 P2	_____
Card 5 T1 P1	_____
Card 6 T2 P2	_____

APPENDIX F

DEBRIEFING STATEMENT

Debriefing Statement

The purpose of the present research is to further our understanding of certain personality styles among residents of the substance dependence treatment units. To some extent all individuals possess personality characteristics, and we are interested in the characteristics which could be described as "being cautious in nature", and those which could be described as "being pleasure-seeking". Little is known about how such personality styles effect perception as in the tasks you completed. The results of testing and interviews you have completed on the Unit suggest that you may (HERE INSERT EITHER be cautious OR be pleasure-seeking) by nature.

We expected that in tasks such as the ones you have completed, more cautious individuals may respond differently in the way they perceive the different items we included. For example, such individuals might be more distracted by negative or threatening words in the color-naming task. On the other hand, pleasure-seeking individuals might be more distracted and take longer with more positive words. We also expect that different people might remember positive or negative words more easily, even when they are not expecting to have to remember them. In summary, what is being attempted is to increase our knowledge about the relationship between certain personality characteristics, and styles of responding to various types of information. In the long run, we hope that this may enable us to offer more effective feedback and treatment.

We appreciate your helping with this project, and will be happy to answer any questions. Thank you.

APPENDIX G

RESPONSE BIAS INDICES ACROSS WORD TYPES BY GROUP

NPG Words

Criterion	$\frac{NPD}{\bar{B}'}$	$\frac{APD}{\bar{B}'}$	$\frac{PPD}{\bar{B}'}$
6	.0000	.2430	.1768
5	-.0026	.1139	.0437
4	-.0048	.1061	.0078
3	.0367	-.0034	.0106
2	.1340	-.0200	.2459

Pairwise Comparison		\underline{t} (4)	
NPD/APD		0.3587	ns
APD/PPD		0.0602	ns
NPD/PPD		0.7959	ns

PG Words

Criterion	$\frac{NPD}{\bar{B}'}$	$\frac{APD}{\bar{B}'}$	$\frac{PPD}{\bar{B}'}$
6	.1684	.0803	.0457
5	-.0200	-.0800	-.0457
4	-.1628	-.1117	-.0821
3	-.2519	-.1717	-.2462
2	-.3455	-.1896	-.7641

Pairwise Comparison		\underline{t} (4)	
NPD/APD		0.2752	ns
APD/PPD		0.4842	ns
NPD/PPD		0.4942	ns

Note. NPD = Non-personality-disorder. APD = Antisocial Personality Disorder. PPD = Paranoid Personality Disorder. NPG = non-positive/gratification. PG = positive/gratification. NT = non-threat. T = threat.

NT Words

Criterion	<u>NPD</u> <u>B'</u>	<u>APD</u> <u>B'</u>	<u>PPD</u> <u>B'</u>
6	.1598	.1491	.2587
5	.0958	.1305	.0756
4	.0126	.1102	.0573
3	-.1700	-.0109	-.1329
2	-.3070	.0000	-.3652

Pairwise Comparison

	<u>t</u> (4)	
NPD/APD	0.9492	ns
APD/PPD	0.5628	ns
NPD/PPD	0.3361	ns

T Words

Criterion	<u>NPD</u> <u>B'</u>	<u>APD</u> <u>B'</u>	<u>PPD</u> <u>B'</u>
6	.1823	.1069	.0486
5	.0769	-.0437	.0009
4	-.1089	-.0561	-.0037
3	-.2784	-.1290	-.0248
2	-.3472	-.2903	-.3204

Pairwise Comparison

	<u>t</u> (4)	
NPD/APD	0.1154	ns
APD/PPD	0.3425	ns
NPD/PPD	0.2299	ns

Note. NPD = Non-personality-disorder. APD = Antisocial Personality Disorder. PPD = Paranoid Personality Disorder. NPG = non-positive/gratification. PG = positive/gratification. NT = non-threat. T = threat.