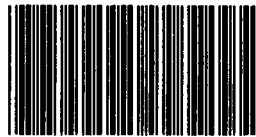




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**SENSATION SEEKING, IMPULSIVITY
AND VIOLENCE IN SCHIZOPHRENICS
FOUND UNFIT TO STAND TRIAL**

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**SENSATION SEEKING, IMPULSIVITY
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FOUND UNFIT TO STAND TRIAL**

S.Z. Kaliski

Pretoria
Human Sciences Research Council
1993

This is a publication of the main committee for the Co-operative Research Programme on Affordable Personal Safety.

The main committee does not necessarily agree with the views expressed and the conclusions drawn in this publication.

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ABSTRACT

This research project aimed to investigate whether a distinction can be made between violent and non-violent schizophrenics. The study attempted to determine whether violent schizophrenics are more impulsive, have higher levels of sensation seeking and are influenced by alcohol and drugs to a greater extent as compared with non-violent schizophrenics.

The research was funded by the Human Sciences Research Council's Co-operative Research Programme on Affordable Personal Safety and was undertaken at Valkenberg Hospital in Cape Town. The subjects were selected from in-patients who had been sent by the courts to the forensic psychiatric unit for observation. Inclusion and exclusion criteria were used to select the subjects who were grouped according to the violent or non-violent nature of their offence and the history of their violent behaviour. Forty-nine patients completed the study following informed consent.

A substantial amount of data were collected from the subjects, including results from the application of Barratt's Impulsivity Scale and Zuckerman's Sensation-Seeking Scale. The predominant findings of the research are that schizophrenics referred for violent charges are more likely to be married with more children than non-violent patients. However, no demographic variables separated habitually violent from non-violent patients. Self-reported impulsivity and sensation seeking failed to differentiate between the groups except that non-violent subjects scored higher on the thrill and adventure subscale of the Sensation-Seeking Scale, probably indicative of a higher degree of socially appropriate preferences for the trait.

Those referred for violent offences were more likely to have had paranoid delusions during the initial observation period. However, it was unclear whether symptoms motivated behaviour during the alleged offences. Moreover, symptoms did not distinguish those who had displayed a history of violence. A striking finding was that the nature of the offence which occasioned the referral was a reasonable indicator of past and subsequent violence.

The author concludes that violence in schizophrenics appears to be inextricably related to their psychopathology. He also makes recommendations for further research.

EKSERP

Hierdie verslag bespreek 'n navorsingsprojek wat daarop gemik was om te bepaal of 'n onderskeid gemaak kan word tussen gewelddadige en niegewelddadige skisofrene. Die studie was 'n poging om vas te stel of gewelddadige skisofrene impulsiewer en meer sensasiesoekend is en makliker deur alkohol en dwelms beïnvloed word as niegewelddadige skisofrene.

Die navorsing is deur die Raad vir Geesteswetenskaplike Navorsing se Koöperatiewe Navorsingsprogram oor Bekostigbare Persoonlike Veiligheid gefinansier en is by Valkenberg Hospitaal in Kaapstad gedoen. Die proefpersone is geselekteer uit die hospitaal pasiënte wat deur die hof vir observasie verwys is na die eenheid vir forensiese psigiatrie. Insluitings- en uitsluitingskriteria is gebruik om die proefpersone te selekteer. Hulle is gegroepeer op grond van die gewelddadige of niegewelddadige aard van hul oortreding en die geskiedenis van hul gewelddadige gedrag. Nege en veertig pasiënte het enduit aan die ondersoek deelgeneem nadat hul hul oorwoë toestemming gegee het.

'n Aansienlike hoeveelheid data is van die ondersoekgroep verkry, insluitende die resultate van die toepassing van Barratt se Impulsiwiteitskaal en Zuckerman se Sensasiesoekeskaal. Die hoofbevindings van die navorsing lui soos volg: Skisofrene wat vir gewelddadige aanklagte verwys is, was meer dikwels getroud en het meer kinders as niegewelddadige pasiënte. Tog het geen demografiese veranderlikes die gewelddadige van die niegewelddadige pasiënte geskei nie. Ten opsigte van selfrapportering oor impulsiwiteit en sensasiesoeke was daar geen onderskeid tussen die groepe nie behalwe dat niegewelddadige proefpersone hoër op die tinteling- en avontuursubskale van die Sensasiesoekeskaal geprester het, wat waarskynlik op 'n groter mate van sosiaaltoepaslike voorkeure vir daardie karaktertrek dui.

Diegene wat vir gewelddadige oortredings verwys is, was meer geneig tot paranoïese delusies tydens die aanvang van observasie. Daar kon egter nie vasgestel word of hul simptome hul gedrag tydens die beweerde oortredings beïnvloed het nie. Simptome het ook nie diegene onderskei wat 'n geskiedenis van geweld gehad het nie. 'n Opvallende bevinding was dat die aard van die oortreding wat die verwysing nodig gemaak het 'n redelike aanduiding was van die voorafgaande en daaropvolgende geweld.

Die skrywer kom tot die gevolgtrekking dat gewelddadigheid in skisofrene onlosmaaklik aan hul psigopatologie gebonde is. Hy maak ook aanbevelings oor verdere navorsing.

CHAPTER I

THE PROBLEM OF VIOLENCE

INTRODUCTION

Violence enjoys a peculiar status in human affairs. Although nations pursue warfare as a form of diplomacy they abhor violent behaviour among their own citizens.

From 1960 to 1980 the population of the United States increased by 26 %, but the homicide rate due to gunshot increased by 160 %. One million Americans die each year as a result of intentional homicide or suicide, and a recent survey revealed that about one third of students in 31 Illinois high schools carry weapons to school for self-defence (Koop & Lundberg, 1992). Reliable crime statistics for South Africa are not available, but it has been calculated that from 1985 to 1986 about 42 cases of murder and attempted murder, 41 incidents of rape and attempted rape, 302 aggravated assaults and 126 robberies occurred each day (Glanz, 1991). Although conviction rates for violent offences decreased between the 1950s and mid-1980s (possibly due to increased diversion of police resources to political unrest matters) crimes against the person in South Africa constituted 36 % of all convictions in 1987, as compared to the average of 10 % in developed countries (Glanz, Mostert & Hofmeyr, 1992).

Violence is therefore a leading cause of morbidity and mortality, and consequently deserves to be categorized as a health problem (Menken, 1992). There is also a growing realization that those in the helping professions are having to deal with a high rate, and broad spectrum, of violent behaviour in the community. Doctors are being called upon to assume responsibility for the management of intrafamilial abuse, as well as those types of assaultiveness the community does not wish to have 'criminalized', but rather 'medicalized'. Not surprisingly some insist that violence is a symptom, and that habitually violent individuals be subjected routinely to a battery of special investigations (Eichelman, 1992; Hancoff, 1990).

Furthermore, the Centers for Disease Control (CDC) in Atlanta, USA, has noted that most violence occurs between people who know each other, does not stem directly from planned criminal activity and therefore is beyond the reach of the criminal justice system (which nevertheless remains the most important means of combatting it). Consequently the CDC has accorded the prevention of violence a high priority, and is now

employing medical epidemiological methods to investigate the problem (Koop & Lundberg, 1992; Rosenberg, O'Carroll & Powell, 1992).

Philosophers and social scientists have traditionally undertaken the task of unravelling causes, effects and management of crime because of the generally accepted assumption that violent individuals are produced by, and are therefore victims of, the 'ills' of society (Newman, 1979). Such deterministic views have been confirmed, for example, by the now well-documented association between child abuse and adult violence. That child abuse has also been implicated in the development of borderline personality disorder, multiple personality disorder and bulimia indicates a more complicated relationship between early experience and adult violence. Accordingly investigators have become increasingly preoccupied with uncovering possible innate characteristics in violent individuals that produce vulnerability to, or co-determine, violent behaviour (Lewis, 1992). This is not to deny the importance of psychosocial and cultural factors, which are necessary, albeit not sufficient, as determinants (Tidmarsh, 1992).

DEFINITIONS OF VIOLENCE

Definitions differ, and variously have included verbal abuse, threatening behaviour, damage to property and self-harm, together with intentional physical harm (Beck, White & Gage, 1991; Lewis, 1992; Shah, Fineberg & James, 1991). Psychoanalysts argue that unconscious aggressive impulses are often expressed symbolically in overt behaviour ('acting out'), and consequently seemingly innocuous behaviour can attract the label of 'aggressive' or, 'violent' (Adler, 1979; Frosch, 1977; Zinberg, 1979).

'Dangerous' and 'violent' are sometimes used interchangeably, even though the former implies the potential for the latter. Some studies differentiate between 'potential violence', which depends on the subjective perception of threat as perceived by others, and assault or battery, which is defined as 'non-consensual touching'. Damage to property, certainly a physical expression of aggression, is also regarded inconsistently as an example of violent behaviour (Beck, White & Gage, 1991; Binder & McNiel, 1988; Tennent & Wood, 1990). Consequently those studies that have used broad or vague definitions are often difficult to interpret and compare with others (Volavka & Krakowski, 1989; Yesavage, 1983a).

Most current operational definitions therefore focus only on those deliberate acts that result in physical harm, especially if alternative forms of adaptive behaviour were possible (Krakowski *et al.*, 1989; Lewis, 1992; Rosenberg, O'Carroll & Powell, 1992; Rubin, 1987). This accords with FBI usage and has facilitated communication between researchers and law enforcement agencies (Heilbrun, Knopf & Bruner, 1976). Also the focus

on overt behaviour assists in distinguishing between violent episodes and violent tendencies ('dangerousness').

This study has relied on the narrow definition of violent behaviour, namely the production of overt actions that directly result in physical harm.

VIOLENCE AS A CONCEPT

Human aggression can be socially desirable, synonymous with assertiveness and ambitiousness. Successful, but ruthless, businessmen are revered, whereas murderers are reviled. Interestingly leaders of organized crime seem to occupy the intersection between notoriety and adoration. Aggression that physically threatens others is not usually socially acceptable (unless in self-defence), can be illegal, and often requires intervention. Isolated outbursts of assaultiveness can usually be understood as exceptional occurrences in otherwise non-violent individuals. Longitudinal studies have established that a substantial amount of violent crime is perpetrated by a minority of chronically violent individuals (Blackburn, 1986). Even habitually assaultive individuals pass most of their time doing something else, and only one third of released violent offenders recommit such offences (Prins, 1990; Reid, 1988). Violence is therefore a relatively rare event. Consequently current research tends to focus on the severely and repetitively aggressive person, who probably is disproportionately responsible for most incidents and most likely to need intervention (Eichelman, 1992). Also the repetitiveness of habitual violence suggests pathology that is amenable to investigation.

TYPES OF VIOLENCE

Ethology has lent us, by extrapolation, the distinction between predatory and affective aggression. The former is purely instrumental and accompanied by few autonomic signs suggestive of arousal. Affective aggression provokes intense autonomic (mostly noradrenergic) activity, especially in the context of fear, anger and hostility (Lader, 1988; Lewis, 1992). Human aggression and violence are mostly affective, even when premeditated. The contribution of anger, in particular, is often ignored, even when the behaviour is driven by psychopathology (Kennedy, 1992). Violence can be instrumental (to achieve particular goals), a means in itself (to discharge inner tension), or a combination of both.

Barratt (1992a) proposes that three types of overt aggression exist, namely:

- premeditated or learned aggression, which is acquired over time and often encouraged by training (such as warfare, and some forms of organized crime);
- psychopathologically or medically related aggression, which is secondary to illness, trauma, psychosis etc., and
- impulsive aggression, which includes those with 'hair-trigger tempers' (Barratt, 1992a; Barratt, 1991).

A person can be subject to any number of these simultaneously, and often the relative contribution of each may be difficult to determine.

THE VICTIMS

More than half of all homicides in the US claim victims known or related to the perpetrator, and most violent injuries occur as a result of arguments between people who know each other (Rosenberg, O'Carroll & Powell, 1992). The Epidemiologic Catchment Area Surveys in which 10 059 respondents in five major centres were interviewed, documented that 1,1 % of subjects admitted having hit a spouse or partner, 0,2 % a child, 1,8 % other people (Swanson *et al.*, 1990). A recent survey in South Africa indicated that 10 % of respondents (depending on the type of offence), or a close relative in their households, had been a victim of a violent offence at some time (Glanz, 1991). Although the relationship of perpetrator to victim was not established in the survey the high rate suggests that strangers, friends and family are as likely to be targeted here.

It is not clear whether the relationship of victim to assailant contributes to an understanding of the act. Psychotic patients are said to predominantly assault family and friends, yet in medical settings often direct aggression on to receptionists, clerks, ambulance personnel, doctors, psychiatrists and other therapists (Edelman, 1978; Swanson *et al.*, 1990; Tennent & Wood, 1990). The more disorganized the psychotic state the less dangerous and focussed the violent behaviour (Krakowski, Volavka & Brizer, 1986). Generally, premeditated homicide is directed at someone known to the perpetrator, regardless of psychiatric diagnosis (Heilbrun, Heilbrun & Heilbrun, 1978).

Virtually all studies have compared diagnostic categories, or have surveyed the targets of violence committed by specific groups. Few have investigated whether perpetrators who have the same psychiatric diagnosis differ with respect to their victims in the commission of non-violent versus violent crimes.

MENTAL ILLNESS, CRIME AND VIOLENCE

Penrose is often quoted as having discovered that, in pre-Second World War Europe, countries with large prison populations had small mental hospital populations, and *vice versa*. In time 'Penrose's Law' was often used as a truism that attention to the treatment of mental illness would help prevent the occurrence of serious crimes (quoted in Tidmarsh, 1990 and Gunn, 1977). Proving this relationship has remained elusive for want of convincing methodology. Data have varied depending on whether hospitalized, imprisoned or community samples were examined. Interpretations occasionally have been subordinated to politically correct ideals. For example, the deinstitutionalization of psychiatry that began in the 1970s compelled many to prove that discharging chronic hospitalized patients into the community was not only humane but posed no danger to fellow citizens (Steadman, Vanderwyst & Ribner, 1978).

Zitrin *et al.* (1976) collected data on convictions for the two years preceding, and the two years following, the admission of patients to Bellevue Hospital, New York. During the study period 23 % had been arrested at least once, 13,5 % for non-violent and 9,8 % for violent offences. Arrests involving bodily harm appeared to occur 1,5 times more frequently in the period following discharge, whereas other crimes occurred with equal frequency before and after discharge. Age-adjusted comparisons with US national crime statistics indicated that their sample had committed higher rates of serious offences. They concluded that arrested persons were being diverted from the criminal justice system to psychiatric hospitals. These findings have not been consistently replicated. Discharged patients have substantially lower arrest rates than released offenders, but between three to four times that of the general population. Analysis of these samples revealed that those patients who had not been arrested before admission had roughly the same rates as the general population. This obviously meant that a history of arrests predicted future contacts with law enforcement agencies, and not the psychiatric history *per se* (Steadman, Coccoza & Melick, 1978). Surveys of deinstitutionalized patients confirmed this: 97 % of released patients without prior arrests were not arrested in a 19-month follow-up period. However, in 1945 only 15 % of patients discharged from state hospitals had criminal records; in 1968 32 % had such records, and in 1975 this proportion increased to 40 % (Steadman, Vanderwyst & Ribner, 1978b). Unfortunately these surveys included patients with a great variety of diagnoses, such as psychosis, personality disorder and psychoactive substance abuse disorders. The rate for each diagnostic category was not calculated. Increasingly those with non-psychotic disorders (and criminal records) have succeeded in gaining admission to hospitals, often as a means of avoiding imprisonment, and

probably have contributed to the perception that psychiatric disorder and antisocial activity are somehow linked.

There are high rates of psychiatric disorder in prison populations (across all diagnostic categories), yet only about 0,7 % of all psychiatric patients in the United Kingdom were admitted to psychiatric facilities following a criminal charge in 1974 (Gunn, 1977). It is difficult to reconcile these seemingly conflicting phenomena. Perhaps this is due to the 'stage army' effect in which

... there is an important group of patients, mainly men, whose basic problem is that their disorder, whether it is alcoholism, personality disorder or schizophrenia, leaves them vulnerable and in need of asylum in the broadest sense. These men constitute the 'social litter' of our modern cities, and they move from hospital to prison, to doss house and back again, like a stage army tramping round and round, making a much greater impression than their numbers warrant simply because we have no facilities for them. They usually commit trivial offences, but serious offences are not unknown from this group (Gunn, 1977:321).

The typical mentally abnormal offender has been described as a vagrant male psychotic who mostly commits offences against public order (such as walking naked in the street, ripping aerials off cars, entering the houses of parliament to dispense justice etc.). Most of the violent offences reported in an earlier study (13 % of total offences) were assaults against police (Rollins, quoted in Gunn, 1977). This is surely a hint that deinstitutionalization has created a community of psychiatrically ill vagrants whose survival may depend on antisocial behaviour, which in turn is either aggravated or caused by their illness.

There has been only one major epidemiological study that has attempted to establish rates of psychiatric disorder and violence in the community. The Epidemiologic Catchment Area Surveys conducted in five major centres (10 059 respondents) found that generally less than 4 % of the population admitted to past violence (Swanson *et al.*, 1990). Yet 55,5 % of the violent individuals met criteria for some psychiatric disorder; 41,64 % had drug or alcohol disorders (compared to 4,9 % of non-violent respondents); 9,37 % had an affective disorder (2,9 % for non-violent individuals); 3,9 % had schizophrenia (1,03 % for the non-violent), and 20,13 % had anxiety disorders (14,13 % for the non-violent). More importantly there appeared to be an almost linear relationship between the number of diagnoses and the rate of violence. The rate tripled as the number of diagnoses increased from one to three and more. Another

consistent finding was that the combination of substance abuse with any other major psychopathology was more volatile than either alone. Two issues remain unanswered: Why are particular disorders associated with increased risk for violence, and, within each disorder, why are some violent and others not?

THE INTERSECTION BETWEEN VIOLENCE AND DIAGNOSIS

Antisocial activity and violence are woven into many diagnostic criteria and associated features in the DSM III-R (American Psychiatric Association, 1987). In some disorders violent behaviour is an important criterion, in others it is either an associated finding, or an occasional accompanying occurrence (refer Table 1).

Not uncommonly patients who act out violently are misdiagnosed because their behaviour is used as a diagnostic criterion, rather than regarded as a situational response to understandable circumstances. The finding that over half of violent individuals attract some diagnosis should therefore not be surprising. When violence is perceived as consequent to, or an integral part of the diagnosis, treatment tends to be more sympathetically administered (Krakowski, Volavka & Brizer, 1986). This must be one more compelling reason why violence has become medicalized.

ETIOLOGIES AND PREDICTION

Introducing violence into the medical fold compels practitioners to consider etiology, natural history and the prognosis of the condition. Yet few other behaviours can claim to be as associated with virtually every conceivable human activity. Psychosocial factors, cultural and subcultural influences (such as youth gangs), developmental and intrafamilial dynamics, modelling and other social learning determinants, political motivations, deindividuation in crowds, alcohol and substance abuse, innate biological characteristics and sequelae of pathological processes have all been invoked, either as dominant influences or in concert with the others, as determinants of violent behaviour (Bartol & Bartol, 1986; Burrowes, Hales & Arrington, 1988; Lewis, 1992; Linnoila & Virkunen, 1992; Rubin, 1987; Newman, 1979).

Although a full discussion is beyond the scope of this review a composite (derived from various research findings) can be offered to describe the so-called habitually violent individual. Usually male, he is between the ages of 18 and 40, derives from poor socio-economic circumstances, has a family history of violence (especially an alcoholic father who was often violent when intoxicated), and during his development was physically abused (and probably witnessed ongoing assaultive abusive

behaviour between his parents). During early adolescence he began to drink heavily and abuse various drugs to achieve disinhibition (during which he enjoyed fighting with peers), probably displayed many conduct disorder symptoms and now has many antisocial traits or a personality disorder (Cloninger, Bohman & Sigardsson, 1981; Krakowski, Volavka & Brizer, 1986; Lewis, 1992; Swanson *et al.*, 1990). Whatever his diagnosis he is probably impulsive, and therefore possesses the following biological markers: low cerebrospinal fluid concentrations of five hydroxy-indoleacetic acid (the metabolite of serotonin), low levels of platelet monoamine oxidase, low baseline serum concentrations of cholesterol and prolonged reactive hypoglycaemia during a glucose tolerance test (Roy *et al.*, 1986; Virkunen *et al.*, 1987a; Virkunen *et al.*, 1987b). Psychiatric diagnoses most likely to be attached to these individuals are either personality disorder, organic brain syndrome, or a psychotic disorder, often together with psychoactive substance and alcohol abuse/dependence disorder (Swanson *et al.*, 1990; Tennent & Wood, 1990). Surprisingly little research has been directed at determining the causes of violence within specific diagnostic categories.

Psychiatrists have been entrusted with the assessment of dangerousness (that is, the tendency to recommit violent acts), especially by the courts. Despite voluminous research, the prediction of future violent behaviour in particular individuals remains an act of faith by daring clinicians. The more immediate the duration of the prediction the more accurate it will be (McNiel & Binder, 1991; Monahan, 1988; Reid, 1988). A weapon rapidly descending on to a victim almost certainly will result in harm. Because violent behaviour is a relatively rare event, even in habitually violent people, the further into the future the prediction is projected the less accurate it becomes (Reid, 1988).

Particular attention has been given to predicting violence in psychotic individuals, possibly because of the common perception that madness causes badness, and that therefore treatment surely diminishes their dangerousness. Monahan (1988) concludes that because research findings are contradictory, generally the best risk assessment psychiatrists and psychologists can offer is 0,33 (that is, for every three persons predicted only one will eventually commit violence); the best predictors of violence among the mentally disordered are the same factors that are the best predictors in a non-disordered offender population, and that the poorest predictors among these are psychological factors such as diagnosis or severity of disorder, or personality traits.

**TABLE 1: DSM III-R DIAGNOSES ASSOCIATED WITH
VIOLENT BEHAVIOUR**

<p>Violent behaviour as an essential feature</p> <ul style="list-style-type: none">Antisocial personality disorderBorderline personality disorderConduct disorderImpulse control disorderIntermittent explosive disorderSexual masochism/sadism <p>Violent behaviour as an associated feature</p> <ul style="list-style-type: none">Attention deficit disorderBipolar disorderBrief reactive psychosisDelusional (persecutory) disorderMental retardationOrganic mental disordersPost-traumatic stress disorderPsychoactive substance use disorderSchizoaffective disorderSchizophrenia <p>Violent behaviour as an infrequent feature</p> <ul style="list-style-type: none">Adjustment disorder with disturbance of behaviourCyclothymiaLate Luteal Phase disorderMajor depressionParanoid personality disorderPsychogenic fuguePsychotic disordersSchizoid personality disorder
--

(Taken from Burrowes, Hales & Arrington, 1988.)

However vigorously argued, it cannot be denied that psychotic individuals are over-represented (as compared to the general population) as perpetrators of assaultive behaviour in prison, hospital and community surveys, even though the overwhelming majority of these patients are not violent (Binder & McNiel, 1988; Gunn, 1977; Krakowski, Volavka & Brizer, 1986; McNiel & Binder, 1991; Swanson *et al.*, 1990; Tennent & Wood, 1990).

The logical inference is that psychosis may be a necessary but not sufficient condition in particular subgroups of patients.

Most studies have compared psychotic to non-psychotic individuals, or patients with differing diagnoses, usually mood disorders to schizophrenia (Chuang, Williams & Dalby, 1987; Gunn, 1977; Kunjukrishnan & Bradford, 1988). No study in the last 20 years has attempted to compare violent with non-violent individuals within a given diagnostic category. It would be helpful to be able to identify factors, such as phenomenology, nature of antisocial activity and course of illness, that, for example, set violent schizophrenics apart from other schizophrenics.

CHAPTER II

REVIEW OF THE LITERATURE

SCHIZOPHRENIA

INTRODUCTION

The frequent depiction in literature, films and the media of the deranged, dangerous schizophrenic seldom fails to agitate the popular imagination. Whenever so-called 'criminally insane' patients (which usually refers to psychotic patients who have been found unfit to stand trial or criminally not responsible) abscond from hospital intense anxiety is generated in the community. Interestingly, the premature release of prisoners (many of whom have been convicted of violent offences) mostly elicits moral outrage, not fear.

The challenge is to establish whether schizophrenics are a special risk group, and if so, to identify those factors that isolate and enhance that risk.

SCHIZOPHRENIA AND CRIME

Criminal behaviour is defined by legislation, and therefore certain behaviours (such as homosexuality and drug abuse) are sometimes regarded as criminal, and other times not (Gunn, 1977). Countries also differ with respect to legislation and, more importantly, disposal of offenders. Whatever the laws in a particular place and time schizophrenics do seem to get entangled in the criminal justice system more often than the general population, as evidenced by:

■ Surveys of offender populations

Prisons contain more schizophrenics than would be expected from the frequency of the illness in the population (Tidmarsh, 1990). Taylor and Gunn (1984) discovered that 6,1 % of a remand population were schizophrenic, and most were charged with property offences. The majority of property offences were usually pathetic attempts by destitute homeless men to survive, and many of the violent charges arose from minor assaults either in resisting arrest or in response to provocation (Coid, quoted in Tidmarsh, 1990).

■ Surveys of patient populations

The most comprehensive studies of discharged patients have been completed in Sweden where detailed population registers are routinely kept. Lindqvist and Allebeck (1990) followed up 644 discharged schizophrenics over a ten-year period. The crime rate for female patients was about twice that of the expected value whereas that of the males was the same as the general male population (including recidivism rates). However, the group committed almost four times as many violent offences as the general population. A similar investigation of schizophrenics born between 1930 and 1959 in Stockholm identified a small group of patients who were responsible for a disproportionate number of violent offences (Lindqvist & Allebeck, 1989). The obvious conclusion was that chronically ill patients tend to end up in those strata of society where criminal behaviour is more prevalent, but that the commission of violent offences was somehow related to the illness itself.

Comparisons between schizophrenics attending medication clinics and matched medical out-patient controls revealed no differences in histories of antisocial activity (Chuang, Williams & Dalby, 1987). Pre-trial forensic assessments of schizophrenics seemed to indicate that schizophrenic offenders tended to have more past convictions, the most common crimes being property offences (26 %), minor crimes such as trespassing (13 %) and assault (13 %). Schizophrenics committed assaults and arson to levels approaching significance when compared to other diagnostic categories (Kunjukrishnan & Bradford, 1988).

In another analysis of patients discharged from psychiatric hospitals, in a two-year follow-up schizophrenics accounted for 52 % of all offences, and for almost half of all the violent offences. Yet only 10 % of the schizophrenics in the total sample were arrested for violent offences (Zitrin *et al.*, 1976). Although this study has been criticized for sampling bias, in that mental hospitals have increasingly admitted patients with past convictions, and that therefore a history of past convictions is probably a stronger determinant of future criminal activity (Steadman, Coccoza & Melick, 1978), there remains the strong impression that there is a group of schizophrenics who are inherently antisocial and violent.

■ Community surveys

An unselected Swedish birth cohort study of 15 117 persons followed from birth to age 30 years demonstrated that most violent offences were committed by non-psychotic individuals. However, an analysis of

the psychotics who had been violent revealed two populations: 'early starters' whose aggressive behaviour and conduct disorder pre-dated the emergence of psychotic symptoms during development, and 'late starters' whose violence occurred after the illness had already declared itself (Hodgins, 1992). This is partly borne out by the observation that many schizophrenics, whether antisocial in adulthood or not, have histories of conduct disorder (Chapman *et al.*, 1984; Tidmarsh, 1990).

Whether schizophrenics living in the community are arrested more frequently for violent offences has not been established by any recent epidemiological study. The Epidemiological Catchment Area Study only documented self-reports of past episodes of violent behaviour (Swanson *et al.*, 1990).

THE VIOLENCE CONUNDRUM

Even though schizophrenics do tend to be arrested more often for violent acts than the general population, this does not necessarily mean that the illness *per se* is directly responsible. There is also the possibility that schizophrenics are arrested more frequently because their poor judgement and careless execution of the crime ensure detection that others may be able to avoid.

The prevailing view is that among those with schizophrenia, or schizophreniform disorder, the relative risk of violence is substantial, namely 8 % as compared to 2 % among those without the disorder, but that the absolute prevalence was low (Swanson *et al.*, 1990).

Within hospital in-patient populations the general rate of assaultiveness is relatively low (although increasing and under-reported), probably involving between 8 and 15 % of chronic patients, again mostly schizophrenics (Karson & Bigelow, 1987; Pearson, Wilmot & Padi, 1986; Tardiff & Swellam, 1982). Patients admitted to psychiatric hospitals because of violent behaviour are most often schizophrenic, followed by personality disorder and organic brain syndrome (Krakowski, Volavka & Brizer, 1986). During any admission about 15 % of schizophrenics will commit at least one physical assault, and up to 60 % at least one danger-related act, including suicide attempts, self-mutilation and provocation of assault by others (Yesavage, 1984).

Unfortunately studies in psychiatric hospitals do not address the possibility that the rate of violent behaviour among schizophrenic in-patients is any higher than that for healthy individuals in group-living situations such as boarding schools, army barracks and nursing homes (Graham, Thienhaus & Somoza, 1990).

However, there remains the enduring impression that certain schizophrenics are assaultive because of their illness, both in the community and

within hospitals. The following discussion will attempt to examine possible causative factors in these patients.

CHARACTERISTICS OF THE VIOLENT SCHIZOPHRENIC

There have been no good studies which have compared violent and non-violent schizophrenics. Voluminous writings have been dedicated to comparing assaultive schizophrenics to normal controls, or mostly to listing their characteristics and symptoms without reference to any other group. Nevertheless a compendium of consistent data seems to be available, which includes the following:

■ **Demographic variables**

Assaultive schizophrenics tend to be male, single, younger than non-assaultive patients, under the age of 30 years, and occupy the lower socio-economic strata of society (Karson & Bigelow, 1987; Lindqvist & Allebeck, 1990; Steadman, Coccoza & Melick, 1978; Zitrin *et al.*, 1976). Homelessness (or living alone), although a common predicament for most chronic psychiatric patients, is believed to be an important indirect contributor to violent offences (Taylor, 1985). Race is inconsistently associated: Some insist that black patients display greater risk while others find no differences between races when socio-economic and education factors are controlled (Shore, Filson & Johnson, 1988; Swanson *et al.*, 1990).

Schanda *et al.* (1992) identified two groups of schizophrenic offenders: one better adjusted regarding profession and socialization, more frequently married, mostly chronically paranoid, and in general rather active and belligerent, and the other more passive, reserved, mostly unmarried and not generally violent.

Generally most schizophrenic offenders have a history of past convictions, although past convictions for violent offences are associated with habitual assaultiveness (Karson & Bigelow, 1987; Krakowski *et al.*, 1989; Kunjukrishnan & Bradford, 1988; Shore, Filson & Rae, 1990). Blackburn's (1968) contention that extreme assaultiveness and persistent aggression were negatively correlated (that is, homicidal aggression in schizophrenics occurs in those with little previous history of aggression) has not really been replicated, but if confirmed would indicate that factors peculiar to the disorder may operate in instances of isolated violence.

However, there is consistent consensus that the above characteristics are not especially peculiar to violent schizophrenics but are found in

most chronically violent individuals (Steadman, Coccoza & Melick, 1978; Tidmarsh, 1990; Zitrin *et al.*, 1976).

■ Symptoms

Acute psychosis is often associated with violent behaviour. This has been reinforced by the now well-established observation that most violence occurs just before admission, is prominent during the first 24 hours of admission and then usually diminishes over the following week as treatment improves the condition and control is re-established (Binder & McNeil, 1988; Krakowski, Volavka & Brizer, 1986; Yesavage, 1984). In some series only about 40 % of violent acts were clearly committed under the influence of symptoms (Virkkunen, 1974). Also, although psychotic during the execution of the act the person may not necessarily have acted on symptoms (Taylor, 1985).

Most first-rank symptoms are simultaneously present in acutely psychotic patients, probably indicating a general conceptual disorganization which overall predisposes to violent propensities (Krakowski, Volavka & Brizer, 1986). The more severe the psychotic symptoms, as measured by rating scales such as the Brief Psychiatric Rating Scale, the greater the risk (Yesavage, 1984). Delusions and hallucinations are held to be the most important driving symptoms (Krakowski & Volavka, 1989). Somatic hallucinations have occasionally been documented, but are so rare that their importance cannot be properly evaluated (Tidmarsh, 1990).

Paranoid delusions are most consistently associated with violent acts, both in single and multiple offenders (Lindqvist & Allebeck, 1989). Delusions of love and infidelity have on occasions caused outbursts of rage and homicide, whereas grandiose, religious and hypochondriacal delusions are not more frequent as precursors to assaultiveness (Tidmarsh, 1990).

Hallucinations, specifically command hallucinations, have often been assumed to direct schizophrenic behaviour, although findings with respect to assaultiveness have been conflicting (Shore, Filson & Johnson, 1988; Volavka & Krakowski, 1989). Taylor (1985) interviewed schizophrenic offenders and concluded that auditory hallucinations were rarely blamed by the patients for their actions. Recently Junginger (1990) demonstrated convincingly in 51 subjects who experienced command hallucinations that 40 % had complied with dangerous commands (such as to attempt suicide, harm self or others). Compliance was greatest in those who had hallucination-related delusions together with the command hallucinations.

Assaultive patients have also been noted to be more severely impaired on ratings related to inappropriate affect, bizarre behaviours, habits or rituals, agitation, negativism and catatonic excitement (Planansky & Johnson, 1977; Tardiff & Swellam, 1982).

Perhaps psychosis generally, whether manifested primarily as hallucinations or delusions, by preoccupying the entire psychic life and thereby disorganizing behaviour, is more important than particular symptoms in producing assaultiveness. This is supported by the negative correlation between treatment response and number of assaults during hospitalization (Yesavage, 1984).

■ Subtypes

Consistent with the almost constant finding that paranoid delusions often motivate assaultiveness and aggression, comparisons have been made primarily between paranoid and non-paranoid schizophrenics. Both subtypes are equally prone to acting out aggressively, but probably with different characteristics and determinants (Karson & Bigelow, 1987; Yesavage, 1983a).

Paranoid patients typically are violent outside hospitals, respond quicker to treatment (especially the containment admission offers) and are less likely to act out violently while hospitalized. Their violence usually follows a period of rumination during which delusional motivations gain intensity and become attached to particular people in the community (Krakowski, Volavka & Brizer, 1986; Tardiff & Swellam, 1982; Volavka & Krakowski, 1989). Lindqvist and Allebeck (1989) identified a small group of habitually assaultive patients, all distinguished by the persistence of paranoid delusions. They usually have histories of previous aggressive behaviour (Blackburn, 1968). Homicide is committed more frequently by paranoid schizophrenics, yet interestingly not all diagnosed as such had maintained the diagnosis at follow-up some years later (Planansky & Johnson, 1977).

Violence occurring in the disorganized (non-paranoid) psychotic tends to be less focussed, unplanned and often less dangerous (Krakowski, Volavka & Brizer, 1986). Their assaultiveness is typically not contained merely by admission and responds less well to treatment. Therefore they tend to be symptomatic and assaultive for longer periods subsequent to hospitalization (Krakowski & Volavka, 1989; Tardiff & Swellam, 1982).

■ **Course and control of the illness**

Offender samples indicate that the time lag between first psychiatric contact to first violent offence varies from 1,5 to 37 years (Lindqvist & Allebeck, 1989). Generally schizophrenics' initial contact with the criminal justice system occurs when their illness is well established (Tardiff & Swellam, 1982). Overt expressions of aggression are most frequent during the first active psychotic episode, occasionally appearing after a prolonged period (Planansky & Johnson, 1977). This is possibly due to the profound perplexity and distress these patients experience as their delusional ruminations expand. Habitually assaultive patients tend to have a greater number of previous hospitalizations which may indicate that assaultive behaviour is associated with a poorer prognosis (Karson & Bigelow, 1987).

The control of psychotic symptoms is important for the prevention of violence, as indicated by the negative correlation between serum neuroleptic levels and reported violent episodes in an in-patient sample (Yesavage, 1983a; Yesavage, 1984).

■ **Mood and affect**

Schizophrenics, particularly paranoid schizophrenics, exhibit higher risks for suicide and depression (Black & Winokur, 1990). Suicide and aggression seem to be linked in that both have been associated with low cerebrospinal fluid levels of serotonin metabolites, and the former is often conceptualized as the inward direction of the latter (Linnoila & Virkunen, 1992). Suicidal schizophrenics also have significantly lower CSF concentrations of 5-HIAA (Cooper, Kelly & King, 1992). Measures on the Buss-Durkee Scale for aggression have correlated self-reports of hostility to suicidal and self-destructive acts, such as mutilation (Yesavage, 1983b). Assaultive schizophrenics have been described as being more likely to cry and express feelings of depression (Tardiff & Swellam, 1982). Some have found a significant association between absence of depression and homicidal aggression, yet delineate those patients who have attacked others in a frenzy as also having had histories of suicidal threats and brutal slashings, which they insist derive from psychotic processes and not mood (Planansky & Johnson, 1977).

Anger, fear and panic as concomitants to psychotic behaviour are much neglected topics in psychiatric research. Patients experiencing delusions commonly present in hyperaroused states, and often act out as a result of the disinhibiting effect of anger and fear (Kennedy, 1992; Kennedy, Kemp & Dyer, 1992). Certainly there are many descriptions of schizophrenic violence occurring in the context of intense arousal,

often accompanied by the fear of loss of control, and followed by psychogenic amnesia and feelings of depersonalization (Planansky & Johnson, 1977; Tidmarsh, 1990; Virkunen, 1974).

■ Drugs and alcohol

Epidemiological surveys have highlighted that alcohol and substance abuse are independent risk factors for violence, but when added to a major disorder on axis I of the DSM III-R the risk far exceeds that of the additive effects of each (Swanson *et al.*, 1990). Substance and alcohol abuse is more widespread in schizophrenics, possibly for symptom relief (Newman & Miller, 1992). Usually the substance abusers are younger, whereas alcohol abuse spans the ages, but is especially a problem in those over 30 years. Drugs used range from amphetamines, opiates, cannabis, LSD and phencyclidine (PCP) to solvents (Lindqvist & Allebeck, 1989; Yesavage & Zarcone, 1983). Comparisons of violent to non-violent offenders do not reveal a clear pattern. Although the overall consensus is that alcohol and drug abuse do not significantly separate the groups, in some series the percentage who committed violent offences under the influence of alcohol or drugs was on average less than 30 %, and only about half had histories of abuse (Krakowski *et al.*, 1989; Lindqvist & Allebeck, 1989; Virkunen, 1974; Zitrin *et al.*, 1976).

Those who have found drugs to be good predictors of assaultive behaviour insist that PCP abuse is associated with the highest risk, and that in-patients who became 'loud' on drugs and alcohol tended to be assaultive (Convit, Zita & Volavka, 1988; Yesavage & Zarcone, 1983). These authors also insist that cannabis increases assaultiveness because it exacerbates psychotic symptoms. However, in their survey of offenders referred for psychiatric assessment Hemphill and Fisher (1980) concluded that alcohol and drug abuse, especially cannabis abuse, was not related to violence, and that cannabis probably reduces aggressiveness (especially in alcoholics).

Clearly alcohol and drug abuse operates by releasing usual control over impulses (disinhibition). In aggressive and impulsive personalities this logically leads to physical aggression. However, there is no consensus whether such disinhibition in schizophrenics releases underlying aggressive impulses or allows (possibly aggravated) psychotic processes free rein.

■ The victims

As stated earlier most violence occurs between people who know each other. It is now conventional wisdom that schizophrenics assault those to whom they are the closest, especially mothers and spouses (in fact Gillies (quoted in Tidmarsh, 1990) insisted "(m)atricide is the schizophrenic crime"). Usually some long-held resentment becomes entangled in a delusional web that sticks long after the act has been completed. Paranoid patients are regarded as the prime culprits; the more disorganized the psychosis the less the violence focusses on specific persons (Krakowski, Volavka & Brizer, 1986; Tidmarsh, 1990). Occasionally delusions are attached to strangers or prominent people, such as the pope or political leaders (Planansky & Johnson, 1977). These assertions are not generally supported. Lindqvist and Allebeck (1989) found that schizophrenics were as likely to assault strangers, friends, professional staff or family. An interesting observation is that schizophrenics generally have a higher rate (compared to other major disorders on DSM III-R) of previous violence against the person (Kunjukrishnan & Bradford, 1988). Few have compared the victims of violent to non-violent or schizophrenic to non-schizophrenic offences but indications are that no significant differences exist (Chuang, Williams & Dalby, 1987).

The behaviour of the victim is important, particularly if the victim has been rejecting or hostile (over a long period). That the victim can be classified as being more dangerous than the schizophrenic perpetrator is not a rare occurrence (Virkkunen, 1974). That schizophrenics themselves are victimized by family, acquaintances and strangers is an ignored area of research.

■ Other

Other determinants that have been advanced but not fully investigated include previous military combat experience, post-traumatic stress disorder, extraversion, childhood discipline, neurological impairment (perhaps a cause of disinhibition), co-morbid personality disorder, degree of socialization and depersonalization (Blackburn, 1968; Krakowski *et al.*, 1989; Planansky & Johnson, 1977; Schanda *et al.*, 1992; Steadman, Coccoza & Melick, 1978; Volavka & Krakowski, 1989; Yesavage, 1983c; Yesavage, 1984).

Despite their relatively higher risk, schizophrenics only differ consistently from other violent individuals by the presence of paranoid delusions. Yet non-paranoid schizophrenics appear to be as violent as the paranoids, even though the quality and motivation may differ. No

doubt all, or many of the above, factors and determinants exert their influence in concert. However, there remains the impression that either a combination of such factors peculiar to these patients, or other still undiscovered determinants, are important.

IMPULSE DYSCONTROL AND SCHIZOPHRENIC VIOLENCE

The schizophrenic's mental state, apart from the psychotic symptoms, before and during a violent act, has received scant attention. Wertham (quoted in Tidmarsh, 1990) in the 1930s described the 'catathymic crisis' in which the patient becomes prey to unbearable tension. After a prolonged inner struggle he acts and the tension is relieved. Many seem to be at peace with themselves afterwards. It is not unusual for patients (often with catatonic symptoms) to display unprovoked and explosive destructive behaviour, sometimes followed by amnesia (Krakowski, Volavka & Brizer, 1986). Virkunen (1974) asserts that, since only about a third of violent acts by schizophrenics are clearly committed under the influence of hallucinations or delusions, other explanations have to be found to understand them.

There are descriptions by patients of anxiety and increasing tension before their expression of overt hostility (Yesavage, 1983a). Often the preceding anxiety concerned a preoccupation with losing control, or a fear of dying. Planansky and Johnson (1977:71) report that

(l)oss of control appears to be the most significant factor bringing the aggression into the open. The gradual build up of the irresistible pressure (the patient's perceptions) preceding immediately the violent outburst suggests that threshold events are involved. The nature of the "pressure" is not clear. Descriptions furnished by articulate patients suggest that the feeling of pressure was connected with attacks of extreme anxiety, which certainly could deprive a schizophrenic of his autonomy.

No studies have as yet explored impulse control and impulsivity in schizophrenics, even though there is now well-documented evidence that impulsivity, violence and suicide are linked, in that all may be due to decreased serotonergic transmission in the brain (Linnoila & Virkunen, 1992). Although psychotic individuals have been found to have low platelet monoamine oxidase levels (an indication of low serotonergic levels in the brain) an inconsistent relationship has been found between assessments of violence, psychosis and serotonin indices (Belfrage, Lidberg & Oreland, 1992; Cooper, Kelly & King, 1992).

SENSATION SEEKING

INTRODUCTION: NOVELTY, EXPLORATION AND AROUSAL

Evolution has shaped behaviour so that animals generally approach sources of moderate stimulation, but withdraw from those of intense stimulation. This has ensured that curiosity and exploration occur so that advantageous discoveries can result, but also enables avoidance of potentially dangerous situations. The survival of species that live (and move) in groups is therefore enhanced by having in their midst members who are adventurous and willing to take risks. In our societies those who are cautious and more reflective in their actions make important contributions, but explorers, inventors and other risk takers (such as entrepreneurs and research scientists) are invaluable for our advancement. Unfortunately risk-taking is often dangerous, results in death and sometimes seems to fulfil no readily discernible purpose (Zuckerman, 1978; Zuckerman, 1983).

Novelty is a powerful attractant for exploration, and therefore is inherently rewarding, even though processing the unfamiliar is more difficult. Conversely, humans generally try to escape boredom (stimulus deprivation) and monotony and respond to new stimuli with curiosity and exploration. Curiosity and its corresponding emotion of 'wonder' are considered to be basic instincts. Many human drives, originally developed to optimize survival, are now recruited to achieve stimulation for its own sake, or to alleviate boredom (Ainslie, 1975; Panksepp & Siviy, 1984; Quay, 1965; Zuckerman, 1984).

Approaching novel stimuli is usually accompanied by physiological arousal which, if intense, translates into fear and possible withdrawal. However, the resolution of uncertainty, when exploration is complete or the outcome of a risky behaviour becomes known, is followed by a catharsis which also produces a sense of well-being (Moran, 1970; Zuckerman, 1984).

Each individual seeks to maintain an "optimal level of arousal" but differs from others with respect to the degree of arousal tolerated and desired, around a particular 'set point' (Farley, 1986; Zuckerman, 1983; Zuckerman, 1991; Zuckerman *et al.*, 1964). Some habitually seek stimulation in the environment to increase possibly low basal arousal levels, while others who have high basal levels (for example, anxiety) mostly attempt to reduce external stimulation. The tendency to seek stimulation has formed the theoretical basis for the investigation into sensation seeking as a personality trait.

DEVELOPMENT OF THE CONCEPT AND DEFINITION

While Zuckerman and colleagues were conducting experiments in the 1960s into the effects of sensory deprivation, they became intrigued by the characteristics of those college students who volunteered to be subjects in unusual experiments (Zuckerman, 1983; Zuckerman, 1991). Although initially enthusiastic about being shut in dark cupboards, the subjects became extremely bored and unco-operative if the seclusion continued for prolonged periods. Investigation of these volunteers revealed a consistent pattern that included enjoyment of risky and novel sports, a readiness to engage in unusual activities, preference for more complex intellectual pursuits (such as enjoyment of classical or jazz music rather than bland popular music), enjoyment of exotic foods and a tendency to become bored easily. They also functioned well and enjoyed themselves more in social settings than controls, and were less likely to be psychiatrically disturbed (Zuckerman, 1983; Zuckerman, 1991; Zuckerman & Link, 1968).

Thus Zuckerman (1983:37) eventually defined sensation seeking as "... a trait defined by the need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experiences".

Factor analysis of scores obtained during the development of the Sensation-Seeking Scale separated four constructs that appear to contribute to the general concept, namely:

- **Thrill and adventure seeking (TAS):** the seeking of sensation through risky but exciting sports and other activities, involving the elements of danger. Most of these activities are socially acceptable.
- **Experience seeking (ES):** seeking sensation through the mind and senses, rather than the autonomic arousal of danger. It includes enjoyment of travel, unusual dress and behaviour, use of mind-altering drugs, associating with unconventional people, and enjoyment of modern music and art. There is also a non-conforming life-style and a disregard for 'irrational' authority.
- **Disinhibition (Dis):** through social stimulation, variety of sexual partners, social drinking, 'wild' parties and gambling.
- **Boredom susceptibility (BS):** aversion to monotonous, invariant situations and restlessness such as when exposed to routine work, predictable, dull or boring people and unchanging environments (Zuckerman, 1984; Zuckerman, 1983).

The low sensation seeker seems to need order and predictability in his environment. He values social affiliation and is willing to give to, or give in to, others to maintain stability.

The trait is measured by the Sensation-Seeking Scale (see below) which provides a general score made up of scores from subscales that measure the above constructs. Clearly sensation seeking can be conceptualized both as a general concept and as a composite of complementary traits.

Sensation seeking has developed within the confines of Eysenck's dimensional and hierarchical model of personality which conceives of the following 'supertraits' with subtraits:

- **Extraversion (E):** sociable, lively, active, assertive, carefree, dominant, surgent, venturesome.
- **Neuroticism (N):** anxious, depressed, guilt feelings, low self-esteem, tense, irrational, shy, moody, emotional.
- **Psychoticism (P):** aggressive, cold, egocentric, impersonal, impulsive, antisocial, creative, tough-minded.

The above have been located orthogonally on axes so that scores on the Eysenck Personality Questionnaire (EPQ) yield profiles which can be plotted (Zuckerman, 1983; Zuckerman, 1991). Eysenck and Eysenck (1978) originally insisted that sensation seeking was synonymous with 'venturesomeness', which they subsumed under extraversion and included in a broader category of impulsiveness. Yet correlations between EPQ and Sensation-Seeking Scales generally are 0,3 with E, 0,4 with P and almost 0,0 with N. This suggests that sensation seeking lies somewhere between P and E (Eysenck, 1984; Zuckerman, 1984).

MEASUREMENT OF SENSATION SEEKING: THE SENSATION-SEEKING SCALE

The Sensation-Seeking Scale (SSS) was developed from the factor analysis of a questionnaire that attempted to identify characteristics that distinguished those who volunteered as subjects for unusual experiments (Zuckerman *et al.*, 1964). The questionnaire contained 54 items written in forced-choice form; both choices were made socially acceptable by means of the wording. Thus 14 items pertained to preference for extremes of sensation (heat, cold, noise, taste, colours etc.), eight to preferences for the new and unfamiliar, eight to preferences for irregularity as opposed to regularity and routine, 12 to the enjoyment of danger, thrills or 'kicks', six to social values based on the stimulation value of others as opposed to

their reliability and predictability, four contrasted preferences for security as opposed to adventure, and two items pertained to the need for general excitement. Repeated administration of refined and modified items to college students, delinquents, adult offenders, psychiatric patients and adult controls has resulted in the current 40-item scale, made up of four subscales (thrill and adventure, experience seeking, disinhibition and boredom susceptibility), each with a possible maximum score of ten (Zuckerman, 1983; Zuckerman, 1984). The SSS is a self-report questionnaire. Each item is presented as two conflicting statements, both couched in equally socially desirable terms. Subjects are forced to choose between them (Appendix A). Generally males scoring over 19 and females scoring over 16 are assigned as high sensation seekers; but no convincing benchmark divisions have really been established. The higher the scores the greater the tendency (McMillen, Smith & Wells-Parker, 1989; Zuckerman, 1991).

Validity

Scores on the SSS have been related to peer evaluations of the trait, and to collateral reports of varied sexual behaviour, use of illegal drugs, food preferences, risky driving habits, engaging in risky sports, cognitive and aesthetic preferences (especially for complexity and ambiguity). The SSS scores also appear to have predictive validity in that high scorers tended to volunteer for potentially dangerous assignments and became noticeably restless when exposed to monotony. The low SSS scorers reported stress when exposed to more stimulating and potentially risky situations (Zuckerman, 1984).

The construct validity of the SSS has been established by Rogers (1987) who administered the SSS together with a Keep Your Options Open (KYO) questionnaire which divides subjects into those who do or don't score on the extremes of any test that measures a particular construct. In this study the extremes of sensation seeking were set as over 27 (high sensation seeking) and below 18 (low sensation seeking).

SSS scores do not correlate significantly with most tests of impulsivity, which suggest that sensation seeking possesses its own construct validity, although high SSS scores, especially on the disinhibition subscale, correlate with scores on Barratt's Impulsivity Scale (Allcock & Grace, 1988; Zuckerman & Link, 1968; Zuckerman *et al.*, 1964).

Attempts to compare sensation seeking with the Type A personality (measured by the Jenkins Activity Survey) have been unsuccessful. However, significant correlations have been obtained between SSS scores and delinquency/antisocial behaviour assessments in both offender and control populations, especially on the experience-seeking and disinhibition

subscales (Haapsalo, 1990; Perez & Torrubia, 1985; Simo & Perez, 1991). Similarly significant correlations have been established with the F, psychopathic (Pd) and hypomania subscales of the MMPI (Blackburn, 1969; Zuckerman & Link, 1968). Scores that fall between the Psychotism and Extraversion dimensions on Eysenck's Personality Questionnaire have correlated with high SSS scores (Eysenck, 1983; Haapsalo, 1990). Correlations with the 16PF scale showed high positive correlation between disinhibition and surgency, paranoid tendency and negative correlations with control and super-ego scales (Zuckerman, 1978).

The SSS has been validated in Thailand, Sweden and Spain (Perez & Torrubia, 1985; Schalling, Edman & Asberg, 1983; Zuckerman & Link, 1968).

Biochemical correlates are consistent and contribute to the scale's validity (as discussed below).

Reliability

Test-retest reliability ($r = 0.94$) and internal reliability (ranging from 0.56 to 0.77, boredom susceptibility having the lowest reliability) have been established (Zuckerman, 1978).

DETERMINANTS OF SENSATION SEEKING

Sensation-seeking behaviour appears to diminish with age, although risk-taking surveys have failed to find significant differences between older and younger subjects, except that older people score higher on tests of risk avoidance which is negated if the rewards appear greater when they display as much risk taking as those much younger (Holliday, 1988; Okun, Stock & Ceurvost, 1980). Yet adolescence is commonly a period of development during which experimentation with many potentially perilous pursuits, related to violence, sex and substance abuse, occurs most often (Clark *et al.*, 1990; Greydanus, 1987). In animal studies older rodents explore less, and monkeys reared in isolation tend to be more fearful of novelty and show decreased preference for complex stimuli. First-born and only children score higher on the scales, possibly because of the increased attention they get from parents. Socio-economic class probably determines the form of the sensation seeking as a consequent of modelling behaviour and the availability of acceptable activities (Blackburn, 1969; Zuckerman, 1984).

The effects of learning and experience have not been adequately researched. No studies have investigated the influence of developmental factors on the formation of the trait. There is speculation that the rewarding nature of sensation seeking predisposes to repetition of the

behaviour (Katz, 1984). Psychological explanations are awaited to examine a set of behaviours that are not quite 'acting out' (although the form of the activities may possess significant unconscious symbolism) because of the presence of biologic correlates.

SOCIOBIOLOGICAL CORRELATES

Studies on temperament in children seem to have established that styles of behaviour are heritable and somewhat enduring despite the shaping influences of experience. In particular measures of activity and approach/withdrawal, probably indications of basal arousability, remain stable from childhood to early adulthood, which indicates that sensation seeking has temperamental derivatives (Rutter, 1987; Zuckerman, 1991). An analysis of the responses of 422 pairs of twins on the Sensation-Seeking Scale indicated that almost 70 % of the general sensation-seeking trait was genetic in origin. Experience seeking (ES) appeared to have the highest genetic contribution, whereas boredom susceptibility (BS) the lowest (Eysenck, 1983). The realization that sensation seeking is mostly heritable resulted in the search for biologic trait markers, presently consisting of psychophysiological phenomena and biochemical indices.

Psychophysiological findings

Most organisms respond strongly to novel stimuli with an orientation reflex (OR), and show habituation to repeated presentation of that stimulus. In general the high sensation seeker displays a stronger OR than the low sensation seeker, but does not differ with respect to habituation.

The amplitudes of the averaged evoked potentials on EEG vary according to the intensities of stimuli presented. In some subjects the averaged evoked potential amplitude increases rapidly with increasing stimuli ('augmenters'), while in others the amplitude decreases ('reducers'). High sensation seekers, especially those who score high on the disinhibition subscale of the Sensation-Seeking Scale, are 'augmenters', and low scorers are 'reducers' (Zuckerman, 1978; Zuckerman, 1983; Zuckerman, 1984; Zuckerman, 1991).

The tendency to 'augment' on evoked potentials suggests a readiness by the cortex to receive incoming stimuli (Haler, 1984; Zuckerman, 1991).

Biochemical indices

Platelet monoamine oxidase (MAO) levels correlate negatively with scores on the disinhibition and TAS scales. Males generally have lower MAO levels, and also usually score higher (Zuckerman, 1984). Platelet MAO is

regarded as an indicator of serotonergic transmission in the central nervous system, and the foregoing has been confirmed by analyses of CSF of cortical 'augmenters' who had low levels of 5-hydroxyindoleacetic acid (5-HIAA), a metabolite of serotonin, and homovanillic acid (HVA), the major metabolite of dopamine. Positive correlations were also found between sensation seeking and indices of noradrenergic transmission in the brain (Von Knorring, 1984; Zuckerman *et al.*, 1983).

Despite the general agreement that neurotransmitters interact to produce overt behaviour, the exact role of each remains to be elucidated. It appears that serotonin inhibits, and that noradrenaline released from the locus coeruleus enhances, the reward effects of dopamine-driven exploratory behaviour, particularly in the limbic and frontal lobes (Zuckerman, 1991). Therefore it is logical that decreased transmission of serotonin, the presumed trait marker, enhances catecholamine activity.

Gonadal hormones correlated with disinhibition scores (Zuckerman, 1978). Administration of androgens to hypogonadal men had no effect on their sensation-seeking scores, although eugonadal men scored higher, especially on the disinhibition subscale (O'Carroll, 1984).

SENSATION SEEKING AND ANTISOCIAL BEHAVIOUR

The pursuit of novelty, stimulation, risk and a variety of experience underlies many forms of antisocial activity. Criminals often report that they enjoy experimenting with drugs and dangerous pursuits and are eager to experiment with new experiences (Farley, 1986; Haapsalo, 1990; Simo & Perez, 1991).

Scores on the Self-Reported Delinquency Scale (SRD) correlate significantly with those on the Sensation-Seeking Scale in samples of delinquents, male offenders and medical students (Haapsalo, 1990; Perez & Torrubia, 1985; Simo & Perez, 1991). The highest correlations are between the SRD and the ES ($r = 0,52$) and Dis ($r = 0,45$) subscales, whereas lower correlations with the TAS subscale probably indicate that thrill and adventure seeking are socially more acceptable as forms of sensation seeking (Haapsalo, 1990; Simo & Perez, 1991). In offender samples psychopaths (diagnosed by ICD-8 criteria) did not differ from other offenders (Blackburn, 1969). Thorne (1971) compared juvenile delinquents, male prisoners and chronic psychotic patients and found no significant differences between the males when age was controlled. The younger delinquents tended to commit offences that were more impulsive and thrill seeking (for example car thefts followed by high speed chases), whereas the older offender tended to treat crime as a way of life rather than a means of excitement. Female psychiatric patients were much less sensation seeking.

SENSATION SEEKING AND SCHIZOPHRENIA

Blackburn's (1969) study of psychiatric patients admitted to a maximum security hospital concluded that psychotic patients tend to be sensation seeking, and that SSS scores correlated with the Pa, Sc and F scales of the MMPI (indicating psychopathic tendencies as well). In particular, he noted, paranoid schizophrenics seemed to be more extraverted and aggressive. Unfortunately he did not distinguish between violent and non-violent schizophrenics.

Yet Zuckerman (1983) notes that hospitalized schizophrenics tend to be cortical 'reducers' (on averaged evoked potentials), which indicates low sensation seeking. He interpreted this to be protective against painful overstimulation.

Low platelet MAO levels are associated independently with drug abuse, criminal convictions, sociability, psychopathy and chronic, especially paranoid, schizophrenia (Zuckerman, 1983).

Despite the inconsistent findings, sensation seeking in schizophrenics has not been adequately studied. Chronic schizophrenics are known to abuse substances to overcome negative symptoms or as an attempt to self-medicate (Newman & Miller, 1992). Perhaps there is a group of overtly psychotic patients, corresponding to the 'extraverted schizophrenics' described by Blackburn (1969), who are stimulus hungry (i.e. sensation seeking) and who therefore abuse drugs and alcohol. Whether such patients are also more likely to be violent remains to be investigated.

IMPULSIVITY

INTRODUCTION

Clinicians commonly label any precipitous, ill-considered behaviour 'impulsive'. Impulsivity is often used interchangeably with 'impulsiveness' and 'loss of impulse control'. This conceptual confusion is heightened within the DSM III-R (American Psychiatric Association, 1987) which describes impulsivity as a diagnostic criterion or associated feature of many disorders but does not formally define it (refer Table 2). Throughout the manual these terms are used synonymously yet, for example, intermittent explosive disorder and pathological gambling, which are impulse control disorders, are described as occurring in the absence of general impulsivity (Allcock & Grace, 1988).

Unfortunately investigations into the nature of impulse control and impulsivity are hampered by the lack of universal definitions and conceptualization.

ON DEFINING AN ELUSIVE CONCEPT

Historically the concept of 'impulse control' belonged within the domain of psychoanalytic theory, while that of 'impulsivity' proceeded from experimental psychology (Barratt & Patton, 1983). Not surprisingly communication between paradigms was difficult; the former tended to concentrate on the breach of ego defences by a surgent id, while the latter focussed on 'quickness' of response and the disregard of long-term for short-term rewards. However, there seems to be a modicum of agreement that 'impulse' refers to an unpremeditated welling-up of an inner tension or drive that impels action (behavioural or cognitive), which is rewarding or cathartic when discharged (Barratt & Patton, 1983; Frosch, 1977).

The struggle to characterize impulsivity has been narrowed down to the consideration of two bipolar dimensions, resistance versus surrender to urges, and immediate versus delayed responses (motor as well as cognitive) to stimuli, that is, it is essentially related to the control of thoughts and behaviour (Barratt, 1992a; Paulsen & Johnson, 1980; Plutchik & Van Praag, 1989). Impulsivity and impulsiveness are not clearly differentiated in the literature, although semantically the former would seem to be a state, and the latter a trait (that is, a tendency to be impulsive).

Impulsiveness usually refers to a generalized state (or possibly a trait) of high arousal which is characterized by hasty responsiveness, carefreeness ('rhythymia'), adventurous and varied behaviour patterns, impatience, low impulse control, preference for speed rather than carefulness, and rapid decision making without consideration of alternative actions or consequences (Barratt, 1965; Barratt & Patton, 1983; Chapman *et al.*, 1984; Rotenberg & Nachson, 1979; Schalling, Edman & Asberg, 1983). Most definitions imply that socially unacceptable or deviant behaviours predominate (Barratt, 1985a). Few investigators have entertained the possibility that impulsivity, by demanding rapid, decisive action, could be a positive attribute. There is also the phenomenon that poor impulsive people are labelled 'criminal' (and jailed), whereas rich impulsive people are admitted to hospital and labelled 'borderline' (Vaillant, 1979).

Experimental approaches have generally focussed on the concept of time and reaction times of subjects. Impulsives seem to experience time as passing more slowly, and tend to underproduce time periods (when asked to estimate given time periods they consistently produce shorter periods), which probably is due to their being 'present orientated'. Impulsivity is negatively correlated to reaction time, an association that is emphasized when the information presented increases in complexity, an indication that impulsivity may be related to inattention (Barratt, 1985a; Barratt, 1992a; Barratt & Patton, 1983; Edman, Schalling & Levander, 1983; Getsinger & Leon, 1979; Rotenberg & Nachson, 1979).

TABLE 2: IMPULSIVITY/IMPULSE DYSCONTROL IN DSM III-R

<p>As a diagnostic criterion</p> <p>Attention-deficit hyperactivity disorder Conduct disorder Bulimia Dementia Organic personality syndrome Alcohol idiosyncratic intoxication Sedative, hypnotic or anxiolytic intoxication Manic episode Exhibitionism Paedophilia Kleine-Levine syndrome Intermittent explosive disorder Kleptomania Pathological gambling Pyromania Trichotillomania Antisocial personality disorder Borderline personality disorder Adult antisocial behaviour</p> <p>As an associated feature</p> <p>Mental retardation Amphetamine intoxication Post-traumatic stress disorder Dream anxiety disorder</p>
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Barratt (1992a) therefore proposes that impulsivity consists of three possible subfactors, namely

- motor impulsiveness: acting without thinking;
- cognitive impulsiveness: rapid cognitive decisions;
- non-planning impulsiveness: lack of concern for the future.

'Loss of impulse control' occupies a seemingly contradictory position in theoretical formulations. In DSM III-R (American Psychiatric Association, 1987:321) the disorders of loss of impulse control occur following a variable period of "... an increasing sense of tension or arousal

..." which culminates in a "... failure to resist an impulse, or temptation to perform some act that is harmful to the person or others". Yet between such episodes the manual specifies that no signs of general impulsivity need be present. Barratt (1992a), however, insists that lack of impulse control is central to impulsivity. Therefore loss of impulse control is both a separate entity, and an essential component of general impulsivity. In the forensic context it contributed historically to the concept of 'irresistible impulse', a defence that recognized that a combination of inner tension or heightened arousal and particular circumstances can result in momentary loss of control (Lion & Penna, 1975). There is even the suggestion that patients displaying more than one type of impulse control disorder (including those disorders in which impulsivity forms part of the diagnosis) should be considered as having a 'multi-impulsive personality disorder' (Stanford & Barratt, 1992).

The obvious conclusion from the foregoing is that impulsivity exists within a continuum; as a state which temporarily can afflict most people, a trait which characterizes a general behavioural pattern, and possibly a personality disorder in which a number of impulsivity traits conspire to produce a long-term maladaptive, inflexible style of functioning.

This study has attempted to investigate impulsivity as a trait, which is characterized by a longitudinal pattern of motor, cognitive and non-planning impulsiveness.

THEORIES AND RESEARCH

Psychodynamic formulations

Freud (1973) described 'instincts' that arise from internal sources of stimulation and possess certain quotas of energy which press for expression. These drives (*trieben*) arouse anxiety in the ego which then employs defences to allow for their acceptable expression. During development the superego matures and assists with this task. Hence the 'impulse-ridden' person displays ego or superego defects such that he chronically allows his drives (impulses) to be expressed in their primitive forms (Adler, 1979; Lion & Penna, 1975).

Impulsiveness is therefore part of a developmental failure. Violent, alcoholic absent fathers and depressed, emotionally unavailable mothers have been invoked as primary causes. Thus the impulsive adult longs for a 'holding' environment, but has fantasies focussed on anger and mutual destruction that undermine the wish and result in flight. Not unusually the courts and prisons serve unconsciously to fulfil this wish for 'holding' (Adler, 1979). The failure of the superego to introject objects, which contributes to the formation of self, also results in a defective control of

the primitive drives and impulses. An interesting proposition then follows that during social transition, when an individual's superego may be out of phase with that sanctioned by society, more impulsivity possibly occurs (Zinberg, 1979). Their superego functioning is generally intact as evidenced by the guilt that most impulsive people express after the behaviour, which itself is ego syntonic because the impulse is so intense and demanding for expression (Frosch, 1977; Lion & Penna, 1975; Rome, 1992).

One of the important functions of the ego is to process incoming stimuli and organize resulting behaviour according to a compromise between internal drives and environmental demands, so effecting 'ego delay', a time-related phenomenon. The opposite of ego delay is impulsiveness, characterized by a tendency toward immediacy of discharge of response (also referred to as 'ego rupture', as the ego is unable to contain the surging impulses). Ego delay is usually accomplished by the use of defences that either re-direct gratification and delay it, or by calling up primitive hallucinations (probably present in memory traces) to provide illusory gratification (which during development successively employs play, fantasy and higher conceptual thought). Maturation eventually results in gratification being delayed for the long term, and in a sense of time. Impulsive behaviour can also be due to 'acting out', in which secondary processes partially modify the primitive impulses such that fantasies are expressed symbolically, yet precipitously (Frosch, 1977; Getsinger & Leon, 1979).

Eysenck's personality theory

Eysenck conceptualizes impulsivity as a component of Extraversion, and in turn divides it into a narrow impulsivity trait ("acting quickly on impulse") and venturesomeness, which embraces risk taking, non planning and liveliness (Eysenck, 1983; Eysenck & Eysenck, 1978; Zuckerman, 1984). Scores on the Eysenck Personality Questionnaire (EPQ) indicate that Impulsiveness (narrow) correlates with Psychoticism (P) and Neuroticism (N). But risk taking correlates positively with Extraversion (E) and P, non-planning positively with P and negatively with N, and liveliness positively with E and negatively with N (Eysenck & Eysenck, 1977; Eysenck & Eysenck, 1978). Gray *et al.* (1983) propose that anxiety and impulsivity interact to produce two types of impulsive individuals, one relatively fearless (high on E, low on N), the other impulsive despite high levels of anxiety (high on E and N). Subjects who score high on Psychoticism tend also to make more mistakes on reaction time tasks (Edman, Schalling & Levander, 1983).

These results suggest that impulsivity is a composite of many personality dimensions, both in its manifestations and influences.

Development and maturation

Two lines of investigation have contributed to an understanding of the development and maturation concept. Either children have been studied with respect to their styles of behaviour, or impulsive children have been identified and followed up into adulthood.

Impulsivity has always been contrasted with reflectivity. On psychometric tests, such as the Matching Figures Test, vocabulary and guessing games, and inductive tests, reflective children typically take longer to respond, consider more alternative forms of response and generally make fewer mistakes than impulsive children, who seem to have difficulty in placing effective inhibitions on tendencies to action. Reflectives are better at conceptual tasks, and are better able to control behaviour by using internalized, covert speech. Children become more reflective with age; boys are more impulsive and display greater advances towards reflectiveness as they mature (Kagan, Pearson & Welch, 1966; Messer, 1976).

Unfortunately many researchers have regarded impulsive behaviour in children and adolescents as being almost synonymous with delinquency. Therefore those factors thought to contribute to conduct disorder, such as physical abuse, poor parenting and regular witnessing of violence in the home, have been assumed to interact with heredity to produce impulsivity. Interestingly most longitudinal studies have replicated Lee Robins' seminal findings that a minority (less than 30 %) of such children, including those with attention-deficit hyperactivity disorder and learning disorders, develop into chronically impulsive adults (Paulsen & Johnson, 1980; Robins & Price, 1991; Vaillant, 1979).

The consistent finding that impulsivity decreases with age has created the presumption that its presence in adulthood indicates immaturity, either as a retardation of biological maturation or the arrest of psychological development. As yet no explanation can account for the observed greater impulsivity in boys.

Learning theory

Learning theorists conceptualize impulsivity as the production of behaviour to obtain an immediate but small reward in preference to delaying action in order to get a later but larger (or more intense) reward. The smaller but immediate reinforcement is 'specious' (because it seems to be the correct one), and individuals often have to resort to devices to prevent the 'specious' reward from unduly influencing behaviour. Oaths, groupings of

lesser specious rewards (for example, dieters often allow themselves very small quantities of bland food in order to be allowed an eventual large meal), rituals and 'side-bets' (rewarding inhibition of undesirable behaviour) are used to inhibit or delay impulsive actions (Ainslie, 1975).

Barratt (1992a) suggests that during development, conditioning may occur whereby precipitous actions become associated with, and therefore triggered by, particular stimuli (such as provocation). Gray *et al.* (1983) propose that impulsivity may be due to constitutional defects of conditioning; extraverts respond best to reward whereas intraverts are controlled best by punishment. Thus impulsives are relatively fearless and more driven towards potential rewards regardless of the consequences.

Biological research

High impulsives are also 'augmenters' on averaged evoked potentials on the EEG (Barratt, 1992a; Barratt & Patton, 1983). This, however, seems to be specific for motor impulsivity (Barratt, 1985a).

The association between impulsivity and low concentrations of 5-hydroxyindole acetic acid (5-HIAA) in cerebrospinal fluid is well documented (Brown & Linnoila, 1990). Peripheral markers of central nervous system transmission confirm that low serotonin (5-HT) neurotransmission may underlie the trait. Low platelet monoamine oxidase (MAO) (the enzyme primarily responsible for 5-HT metabolism), prolonged hypoglycaemia during the glucose tolerance test (5-HT tonically inhibits insulin secretion), and low baseline serum cholesterol concentrations (due to 5-HT influence on prostaglandin synthesis) have been found in impulsive offenders and suicide victims (Linnoila & Virkunen, 1992; Roy *et al.*, 1986; Virkunen, 1987; Virkunen *et al.*, 1987a). Low platelet MAO has been correlated with psychometric tests, such as maze tests, and shorter reaction times that measure impulsivity (Klinterberg *et al.*, 1987). Administration of fenfluramine, which indirectly releases 5-HT, to impulsive subjects results in fatigue and dysphoria to a greater extent than controls, suggesting that the former have increased sensitivity of serotonergic pathways (Fishbein, Lozovsky & Jaffe, 1989). As 5-HT increases in the central nervous system there is decreased sensitivity to environmental cues and decreased aggressivity and irritability (Barratt & Patton, 1983). The serotonergic system is therefore presumed to have an inhibitory effect on behaviour. These findings are not specific for impulsivity but have been documented in suicide victims (especially from violent means), depression, schizophrenia and habitually violent individuals (Cooper, Kelly & King, 1992).

Noradrenergic pathways emanating from the locus coeruleus subserve arousal and probably potentiate the effects of reward on the limbic system.

It appears that impulsives have increased noradrenergic transmission, possibly indicating a tendency to seek reward precipitously (Rubin, 1987; Virkunen *et al.*, 1987a). Documentation of disorders of dopamine transmission has been inconclusive despite the proposition that it is facilitatory on behaviour (Plutchik & Van Praag, 1989; Rubin, 1987; Virkunen *et al.*, 1989). Low CSF concentrations of gamma amino-butyric acid (GABA) have been associated with impulsivity, possibly by influencing 5-HT transmission (Burrowes, Hales & Arrington, 1988). Other possible candidates, such as cortisol and androgens, have been suggested as contributory, but thus far most studies have studied these in the context of antisocial (especially violent) behaviour which does not necessarily reflect on their influence on impulsivity *per se*.

Anatomic correlates consistently implicate frontal lobe and limbic system connections. There may also be hemispheric differences in that impulsives possibly have a dislocation of frontal lobe executive functions (especially those in the orbital cortex which is thought to exert primarily inhibitory influences) from parietal lobe sensory integration in the left hemisphere, which results in poor linking of verbal symbols and action programmes (Barratt, 1992a; Schalling, Edman & Asberg, 1983). The septo-hippocampal system has been postulated to be a behavioural inhibition system, and therefore also a candidate site (Newman, Widom & Nathan, 1985). Other areas that have produced impulsive behaviour in lesion studies are the supra-marginal gyrus, cingulum, amygdala (which probably mediates approach-avoidance behaviour), basal ganglia (which contain motor programmes), and cerebellum (Barratt, 1983; Barratt, 1992a; Barratt, 1992b). Even though low 5-HT neurotransmission has been consistently associated with impulsivity it has proven methodologically difficult to link it to raphe nuclei (reticular activating system) dysfunction (Brown & Linnoila, 1990). Most likely all motor and arousal systems, including the locus coeruleus and its diffuse connections, act in concert to produce manifestly impulsive behaviour.

IMPULSIVITY AND VIOLENCE

Violence that occurs explosively and in response to minor provocation, that has no economic motivation, that does not seem to have been premeditated and that is inflicted on strangers, is often presumed (for the purposes of research) to be impulsive (Heilbrun, Heilbrun & Heilbrun, 1978; Linnoila & Virkunen, 1992; Vaillant, 1979). Unfortunately these formulations tend to ignore the subjective experience of the perpetrator, who may appear to attack precipitously but in his thoughts has rehearsed and prepared for a given situation in advance (for example, "... the next time he says that to me I will stab him with the nearest available weapon ...").

No recent research has explored the phenomenological dimension of impulsive, violent offenders, although there are now suggestions that anger as both trigger and learned response should be examined (Barratt, 1992a; Kennedy, 1992).

Impulsiveness and aggression are not easily separated. Both are associated with similar genetic predispositions, conduct disorder, learning disabilities, soft neurological signs, frontal lobe dysfunction and decreased serotonin neurotransmission (Barratt, 1992a). Buss and Plomin (quoted in Barratt, 1991) noted that children with temperaments high in activity, emotionality and impulsivity tend to be aggressive. If impulsivity forms part of an inherent temperament then psychosocial and environmental factors are presumed to promote, predispose and trigger any consequent aggression. Factors that can precipitate impulsive aggression are frustration, provocation, air pollution, high levels of noise, overcrowding, warm ambient temperature, painful stimulation, and other external environmental factors that create heightened physical arousal, discomfort or stress. Factors that predispose to impulsive aggression are physical abuse (violent criminals usually have a history of spankings), and witnessing spouse abuse. Parent-child aggression is associated with conduct problems, anxiety-withdrawal, attention problems, and motor excess in boys (Barratt *et al.*, 1990; Lewis, 1992).

There are studies of impulsive offenders, mostly arsonists, who are not violent. Generally biochemical indices associated with impulsivity, such as CSF 5-HT and reactive hypoglycaemia, are more pronounced in the purely impulsive group compared to habitually violent offenders, who are usually alcohol dependent (Linnoila *et al.*, 1983; Virkunen *et al.*, 1987a; Virkunen *et al.*, 1989). To date there have been no systematic studies comparing violent with non-violent impulsive offenders.

Schizophrenia and impulsivity

Premorbid histories of aggressive schizophrenics often reveal a pattern of conduct disorder characterized especially by unsocialized impulsive aggression. Conversely high scorers on the Impulsive Non-conformity Scale were more likely to report psychotic symptoms, social maladjustment, and ongoing conflict with family and friends (Chapman *et al.*, 1984; Hodgins, 1992).

Some schizophrenics have been described as experiencing a crescendo of tension, either related to psychotic symptoms or due to ongoing conflict with significant others, which eventually results in explosive actions following minor, or no, provocation (Planansky & Johnson, 1977; Tidmarsh, 1990). Delusions, especially persecutory, often provoke anger and anxiety, which can result in a pattern of impulsive aggressiveness

(Kennedy, Kemp & Dyer, 1992). Also many psychosis-prone individuals display impulsive and non-conforming behaviour (Chapman *et al.*, 1984).

Schizophrenics who frequently attempted suicide (often taken to be an indicator of general impulsivity) had significantly lower CSF concentrations of 5-HIAA, the principal metabolite of 5-HT but habitually violent schizophrenics did not (Cooper, Kelly & King, 1992).

Thus it appears that some schizophrenics are impulsive, either as a co-existent trait or consequent to the illness itself; but the relationship between violence and impulsivity in these patients remains to be investigated.

IMPULSIVITY AND SENSATION SEEKING

Impulsiveness has often been presumed to include the related traits of sociability, liveliness, non-planning and venturesomeness, which have also been used synonymously with sensation seeking (Eysenck, 1983; Eysenck & Eysenck, 1978). Only scores on the Disinhibition subscale of the Sensation-Seeking Scale correlate significantly with measures of impulsivity (Allcock & Grace, 1988; Zuckerman, 1983). The essential difference between sensation seeking and impulsivity is in the perception of risk (Clark *et al.*, 1990; Sakolofske & Eysenck, 1983). Sensation seeking is usually a calculated activity in which potential dangers are minimized by planning. Mountain climbers, parachutists and explorers generally spend much time preparing for the activity. Impulsives act 'on the spur of the moment' and usually disregard potential danger in favour of obtaining immediate catharsis.

But there is surely an overlap between the concepts. Young delinquents tend to be impulsive as well as sensation seeking, by consciously courting danger and acting precipitously when confronted with risk (Thorne, 1971). Sensation seeking does seem to be related to an impulsive type of extraversion, characterized by surgency, changeability and exhibitionism (Zuckerman, 1984).

It is not clear whether the presence of sensation seeking together with impulsivity contributes to a greater risk of violent behaviour than each alone.

THE MEASUREMENT OF IMPULSIVITY

Originally impulsivity was employed as a comment on subjects' style of responding on psychometric tests. The realization that it demanded measurement in its own right resulted in a number of approaches:

- Established intelligence and personality tests, especially Eysenck's Personality Questionnaire (EPQ) and the MMPI, were adapted so that scores on various subscales were assumed to reflect the trait (Blacburn, 1986; Sakolofske & Eysenck, 1983).
- Tests were constructed that required rapid motor responses to cognitive cues. Generally used for testing children, they relied on the presentation of pictures, objects or diagrams that had to be either re-arranged or matched to given arrays. Scoring usually focussed on the speed of response and number of errors made. Hence results on the Matching Familiar Figures Test, Haptic Visual Matching Test, Picture Completion Reasoning Test, Embedded Figures Test and the Porteus Maze Test consistently concluded that impulsives respond quickly in situations where inferences are required, provide the first reasonable solution that presents and despite an inability to inhibit responses, they display minimal anxiety (Kagan, Pearson & Welch, 1966; Kendall, Moses & Finch, 1980; Messer, 1976; Paulsen, 1978; Riddle & Roberts, 1977).
- Self-report scales concentrate on subjects' general style of behaviour. The Karolinska Impulsiveness Scale has correlated self-reports of impulsivity to shortened reaction times and Psychoticism on the EPQ (Edman, Schalling & Levander, 1983). The scale used in this study was Barratt's Impulsivity Scale.

Barratt's Impulsivity Scale (BIS)

The BIS was developed in the 1950s to separate symptoms of anxiety from impulsiveness (Barratt, 1965). As the BIS underwent refinement its format changed, such that various versions are now in use. The simplest version is a list of 44 statements describing characteristic behaviours and responses, couched in socially desirable terms, that require true-false responses (Appendix B). The latest version, BIS 11, requires subjects to grade their responses on a 4-point scale (rarely/never - occasionally - often - always) (Barratt, personal communication). In this study the true/false version was used to simplify responses to ensure co-operation from a forensic sample.

Reliability and validity

The BIS has been administered to non-violent offenders, unwed mothers, juvenile delinquents, schizophrenics, bipolar affective disorder patients and substance abusers (Royse & Wiehe, 1988; Saunders, Reppucci & Sarata 1973; Stanford & Barratt, 1992). Scores have correlated significantly with

raters' assessments of subjects' behaviour, reaction time tasks and verbal learning tasks, although generally adolescents' scores were higher regardless of whether conduct was disordered or not (Barratt, 1965; Saunders, Reppucci & Sarata, 1973). There is a high correlation between BIS scores and psychiatrists' independent assessments of impulsivity ($r = 0,78$) (Barratt, 1972). However, the BIS does not correlate with scores on the Matched Familiar Figures Test, which possibly reflects on the non-validity, or specificity for children only, of the latter (Barratt, 1979; Barratt, 1992a). The BIS does seem to have validity because of the high correlation with other measures of impulsivity. The test-retest reliability of the BIS is $+0,74$, an indication of the stability of responses on the test (Barratt, 1972).

CHAPTER III

THE EMPIRICAL INVESTIGATION

RATIONALE: SCHIZOPHRENIA, VIOLENCE, IMPULSIVITY AND SENSATION SEEKING

Schizophrenia does seem to be associated with a slightly increased risk for violence, even though the majority of these patients are never violent. This implies that certain factors are perhaps peculiar to a particular group of patients, which increases the likelihood of their producing violent behaviour. These factors could be related to psychopathology, personality, demographics and alcohol and substance abuse. Few studies have compared violent and non-violent schizophrenics, especially in the forensic context. Schizophrenic offenders have been either compared to psychotic offenders, or simply surveyed without comparison to any reference group. Also no distinctions have been made between schizophrenics for whom violence is an exceptional occurrence and those who often resort to it.

Therefore, this study attempted to investigate whether distinctions could be made between violent and non-violent schizophrenics, and whether impulsivity and sensation seeking, which have been associated with violence in psychotic individuals, contribute to the phenomenon in this group of patients.

AIM OF THE INVESTIGATION

This study attempted to investigate whether violent schizophrenics were more impulsive, high sensation seeking, influenced by alcohol and drugs, or driven predominantly by psychopathology.

RESEARCH METHOD

The subjects were selected from in-patients in the forensic psychiatry unit at Valkenberg Hospital over a period of two months.* All had been certified and hospitalized under Section 28 or 19 of the Mental Health Act No. 18 of 1973, subsequent to a 30-day observation admission during which

* No distinction was made between those who had displayed violent behaviour before admission and those who had done so during the current admission since an analysis of data relating to subjects for whom a comparison between pre- and post admission behaviour was possible failed to reveal a significant difference.

a multidisciplinary team of at least two psychiatrists, a trainee psychiatrist (registrar), psychologist, occupational therapist and psychiatrically trained nursing staff had contributed to the assessment of the patient. Informed consent was obtained from each subject, it being emphasized that the results of the tests would not form part of their treatment, nor influence future clinical decisions made by the unit. The inclusion criteria were:

- Schizophrenia as diagnosed by DSM III-R criteria;
- fluency in English or Afrikaans;
- sufficient collateral information available about behaviour exhibited before the current admission;
- a stable clinical condition as evidenced by no medication changes in the previous month.

The exclusion criteria were:

- A history of an organic brain syndrome (especially mental retardation, or any medical or neurological condition that possibly could contribute to an altered mental state, which in this population included specifically epilepsy, neurosyphilis, neurocysticercosis, intracranial masses and a history of head injury);
- an inability to communicate (including catatonia);
- other concurrent major psychiatric disorders (on axis I), excluding alcohol and substance abuse disorders;
- female sex — too few were admitted to the unit, which precluded meaningful comparisons.

The following data were recorded:

- Demographics: age, marital status, number of children, occupation before admission, urban or rural background, educational level.
- The charge that resulted in the admission and the relationship of the victim to the offender.
- Psychiatric history, including the duration of disorder (from when first diagnosed to date of present admission), number of previous admissions, family history of psychiatric disorder.
- Duration of present admission.

- Criminal history, namely numbers of past convictions and previous convictions for violent offences. This information was provided by the courts.
- Collateral evidence of violent behaviour obtained from social reports compiled during the initial observation period, and ward notes made during the subsequent hospitalization. A history of at least one previous conviction for a violent offence, a social report that described a pattern of violent behaviour or more than two reports of assaultive behaviour during the present admission constituted a positive history of violence. The index offence was excluded from this consideration.
- Substance abuse: In the Cape Province, alcohol, cannabis (*dagga*) and methaqualone-cannabis (smoked together as a 'white pipe') are almost exclusively abused. The pattern of abuse as recorded during the initial observation period was noted. Dependence was not recorded separately because of the difficulty in deciding whether dependence behaviours as described by DSM III-R were related to the illness or solely to the substances, and also because of the difficulty of eliciting a history of dependency behaviours from this group of patients.
- The positive psychotic symptoms recorded during the initial 30-day observation period by the multidisciplinary team were listed.

Barratt's Impulsivity Scale (BIS) and Zuckerman's Sensation-Seeking Scale (SSS) were administered (Appendices A and B). The score sheets to be used for the scales are also given in the Appendices. Although usually administered as self-report questionnaires these were administered by a psychiatric nurse as a structured interview to afford the subject the opportunity of clarifying items, and the interviewer a means of assessing the subject's motivation and understanding of the questionnaires. Those whose motivation was obviously poor or who displayed poor understanding of the questions were excluded from the study.

The questionnaires were translated into Afrikaans by a translator from the Human Sciences Research Council who has training in the social sciences. Phrases and words were transposed to be compatible with the local idiom, for example 'cannabis' was changed to *dagga*, and 'swingers' to *jollers*.

The subjects were grouped according to (1) the nature of the charge that led to hospitalization (violent vs non-violent) and (2) the longitudinal history of violent behaviour (history positive vs history negative, as defined above). Although no patient was convicted, only charged, the charge that resulted in referral for observation will be also termed the 'index offence'.

Statistical analysis for categorical data was effected by the chi square (chi sq) test (Fisher's exact test was employed when cell numbers in two-dimensional tables were less than 5); continuous data were analyzed by the one-way ANOVA test, and linear regression methods were used to test correlations. A significance value of $p = 0,05$ (one-tailed) was used as differences in one direction only were being investigated.

The Ethics Committee of the University of Cape Town Medical School provided approval for the undertaking of the investigation.

RESEARCH RESULTS

Fifty-five subjects were initially identified for entry. However, three withdrew consent during testing, two did not appear to understand the questions during testing and one patient absconded from hospital before testing was completed. Fourty-nine patients therefore completed the study.

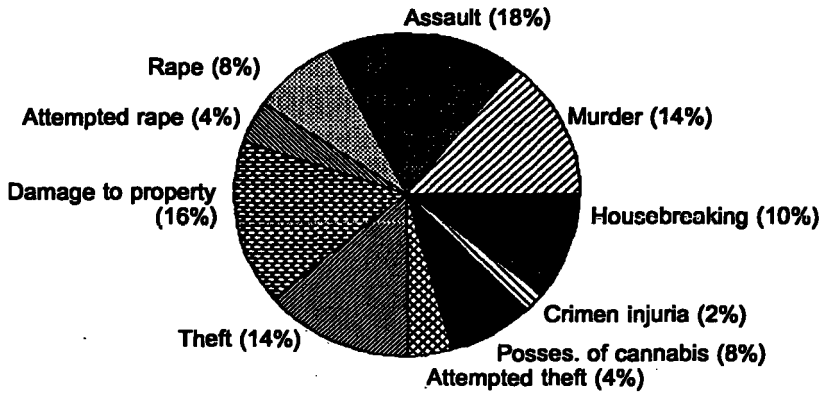
The average age of the sample was 31,49 (standard deviation (sd) = 8,14, range = 19 to 53 years). On average each had 1,04 children, although 27 had none and one subject had eight children. Most were from urban areas ($n = 31$), single ($n = 34$) and unemployed at admission ($n = 30$). Those who were employed had worked as labourers ($n = 11$), in semi-skilled ($n = 7$) and skilled jobs ($n = 1$). Five patients had acquired trades, 27 had at least a secondary education, 15 a primary schooling and only two were illiterate. Most were of urban origin (31 subjects).

The average duration of hospitalization was 2,82 years (sd = 3,05, range = 0 to 11 years), the mean duration of illness was 6,77 years (sd = 7,4, range = 0 to 31,5 years), number of previous hospitalizations was 3,2 (sd = 2,62). The mean for previous convictions was 1,78 (sd = 2,00, range = 0 to 7); 17 subjects had no previous convictions, and 11 had one.

The index offences (refer Figure 1) were wide ranging. Of the 22 violent offences most were assault and murder ($n = 16$), the remainder sexual offences ($n = 6$). None of the violent offences was for material gain. The non-violent offences were predominantly against property; however, four patients had been caught in possession of *dagga* (none had a history of violent behaviour) and one was charged with *crimen injuria* (for swearing at a family member).

Comparison of the nature of the charge that led to the admission ('index offence') to the past and subsequent history of violence indicated that most of those hospitalized for a violent offence had a history of violence, and likewise most non-violent offenders had no such history (Table 3). For five patients the index offence was the only violent outburst documented in their histories; one assaulted a stranger, one murdered a friend, one murdered a stranger, one raped his own child, and one attempted to rape a stranger (child).

**FIGURE 1: THE TYPES OF INDEX OFFENCES
(49 cases)**



**FIGURE 2: THE NATURE OF THE RELATIONSHIP
BETWEEN OFFENDER AND VICTIM
(Series 1 = violent; Series 2 = non-violent)**

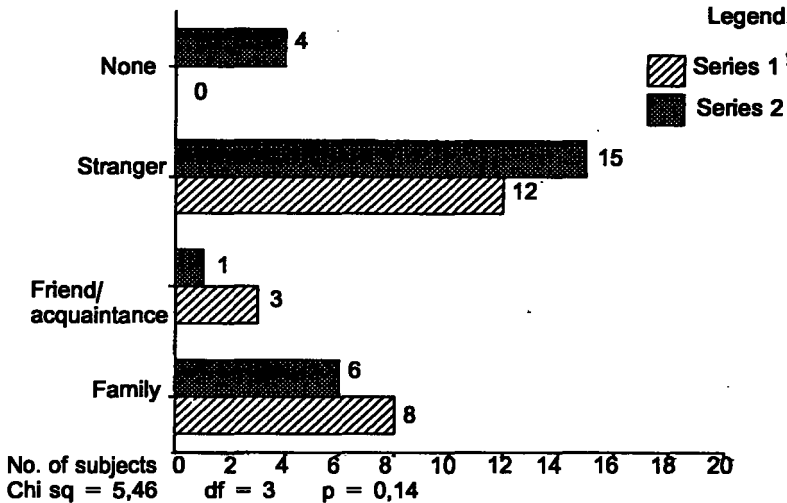


TABLE 3: INDEX OFFENCE COMPARED TO HISTORY OF VIOLENCE

	History positive	History negative	TOTAL
Violent offence	17	5	22
Non-violent offence	7	20	27
TOTAL	24	25	49

The groups did not differ significantly with respect to demographics (refer Tables 4 and 5), except that significantly more of those admitted following violent charges were married ($p = 0,005$, $\chi^2 = 10,43$, $df = 2$), and had more children ($F = 5,08$, $p = 0,03$). No significant differences emerged with respect to the duration of their illness and present admission, number of previous admissions, or criminal histories.

In this sample the victims of the index offences were as likely to be strangers as people known or related to the perpetrator (refer Figure 2). No statistical differences were found between the victims of violent and non-violent offences ($\chi^2 = 0,46$, $df = 5$, $p = 0,14$). There was, however, a slight tendency for strangers more often to be victims of the non-violent offences. The four victimless offences were the cannabis possession charges.

The mean scores for all the subjects on Zuckerman's Sensation-Seeking Scale and Barratt's Impulsivity Scale were:

Sensation-Seeking Scale: 17,06 (sd = 4,78, range = 6 to 28)

Thrill and adventure: 5,78 (sd = 2,23)

Experience seeking: 4,35 (sd = 1,83)

Disinhibition: 4,00 (sd = 2,01)

Boredom susceptibility: 2,94 (sd = 1,63)

Barratt's Impulsivity Scale: 22,14 (sd = 5,06, range = 9 to 33)

Sensation-Seeking Scale and Barratt's Impulsivity Scale scores did not differentiate between the groups, except that schizophrenics with negative histories of violence scored significantly higher on the subscale of thrill and adventure on the Sensation-Seeking Scale ($F = 4,90$, $p = 0,03$) (refer Tables 6 and 7).

The patients only abused alcohol, cannabis, cannabis-methaqualone mixtures, either alone or in combinations. No pattern of abuse distinguished between either those hospitalized for violent offences ($\chi^2 = 7,81$, $df = 5$, $p = 0,17$), or those who have displayed a pattern of violent behaviour ($\chi^2 = 8,02$, $df = 5$, $p = 0,16$).

TABLE 4: DEMOGRAPHICS: COMPARISONS ACCORDING TO INDEX OFFENCE

Demographic characteristics	Violent (n=22)	Non-violent (n=27)	Significance level (p)
Age (years)	mean = 31,1 sd = 7,5 range = 21-45	mean = 31,8 sd = 8,7 range = 19-53	0,78
Marital status			
Single	11	23	0,005**
Married	9	1	
Divorced	2	3	
Children (number)	mean = 1,6 range = 0-8	mean = 0,5 range = 0-3	0,03*
Origin			
Urban	13	18	0,58
Rural	9	9	
Educational level			
None	2	0	
Primary	7	8	
Secondary	11	16	
Post-school qualification	2	3	
Occupation			
Unemployed	11	19	0,31
Labourer	7	4	
Semi-skilled worker	4	3	
Other	0	1	
Family psychiatric history	5	8	0,59
Duration of illness (years)	mean = 7,9 sd = 7,6 range = 0-29	mean = 5,9 sd = 7,2 range = 0-32	0,66
Previous admissions	mean = 3,5 range = 0-10	mean = 3,0 range = 0-11	0,51
Duration of present (years) admission	mean = 2,6 range = 0,1-11	mean = 3,0 range = 0,4-11	0,64
Previous convictions	mean = 1,4 range = 0-6	mean = 2,1 range = 0-7	0,41
Previous violent convictions	mean = 0,6 range = 0-4	mean = 0,2 range = 0-3	0,08

* Significant at the 5 % level ($p < 0,05$).

** Significant at the 1 % level ($p < 0,01$).

TABLE 5: DEMOGRAPHICS: PAST AND SUBSEQUENT HISTORY OF VIOLENCE (INDEX OFFENCE EXCLUDED)

Demographic characteristics	Violent history (n=24)	Non-violent history (n=25)	Significance level (p)
Age (years)	mean = 31,4 sd = 8,3 range = 21-53	mean = 31,6 sd = 8,1 range = 19-50	0,95
Marital status Single Married Divorced	16 7 1	18 3 4	0,17
Children (number)	mean = 0,9 range = 0-4	mean = 1,2 range = 0-8	0,51
Origin Urban Rural	15 9	16 9	0,91
Educational level None Primary Secondary Post-school qualification	1 6 11 3	1 5 16 2	
Occupation Unemployed Labourer Semi-skilled worker Other	13 6 5 0	17 5 2 1	0,40
Family psychiatric history	5	8	0,38
Duration of illness (years)	mean = 6,2 sd = 6,3 range = 0-29	mean = 7,4 sd = 8,4 range = 0-32	0,58
Previous admissions	mean = 3,0 range = 0-8	mean = 3,4 range = 0-11	0,68
Duration of present (years) admission	mean = 3,0 sd = 3,4 range = 0,1-11	mean = 2,7 sd = 2,6 range = 0,4-9	0,77
Previous convictions	mean = 2,1 range = 0-7	mean = 1,5 range = 0-6	0,85

TABLE 6: COMPARISONS: SENSATION-SEEKING AND BARRATT'S IMPULSIVITY SCALE SCORES ACCORDING TO NATURE OF CHARGE

Scales	Violence charge		Non-violence charge		Significance level (p)
	Mean	sd	Mean	sd	
Sensation-Seeking Scale	16,14	5,69	17,82	3,85	0,22
Thrill and adventure	5,14	2,44	6,30	1,94	0,07
Experience seeking	4,50	2,04	4,22	1,67	0,61
Disinhibition	3,86	1,96	4,11	2,09	0,68
Boredom susceptibility	2,63	1,39	3,19	1,78	0,24
Barratt's Impulsivity Scale	22,14	5,05	23,26	5,11	0,55

Paranoid delusions were significantly more present in those charged with violent offences ($\chi^2 = 4,36, p = 0,03$). No other positive psychotic symptom elicited during the initial assessment period differentiated between the groups (refer Table 8).

Correlations between age and sensation-seeking scores ($r = 0,02$), thrill and adventure ($r = -0,015$), experience seeking ($r = -0,16$), disinhibition ($r = 0,19$), boredom susceptibility ($r = 0,20$) subscales and Barratt's Impulsivity Scale ($r = 0,05$) were not significant. Similarly duration of illness did not correlate significantly with sensation-seeking scores ($r = -0,09$), thrill and adventure ($r = -0,23$), experience seeking ($r = -0,06$), disinhibition ($r = 0,00$), boredom susceptibility ($r = 0,11$) subscales and Barratt's Impulsivity Scale ($r = -0,16$).

TABLE 7: HISTORY OF VIOLENCE: COMPARISONS OF THE SENSATION-SEEKING AND BARRATT'S IMPULSIVITY SCALES

Scales	History positive		History negative		Significance level (p)
	Mean	sd	Mean	sd	
Sensation-Seeking Scale	16,25	5,43	17,84	4,03	0,25
Thrill and adventure	5,08	2,39	6,44	1,87	0,03*
Experience seeking	4,33	2,06	4,36	1,63	0,96
Disinhibition	4,21	2,19	3,80	1,85	0,51
Boredom susceptibility	2,62	1,44	3,24	1,76	0,19
Barratt's Impulsivity Scale	23,04	5,86	23,48	4,26	0,70

* Significant at the 5 % level ($p < 0,05$).

DISCUSSION OF THE FINDINGS

The sample appears to be characteristic of most populations of hospitalized schizophrenics, which included recently admitted, newly diagnosed cases and chronic long-term patients. Despite this admixture the mostly non-significant comparisons of demographics between the study groups seemed to indicate that the patients were well matched and not only by diagnosis. This ensured that interfering variables were minimized.

Although this was an offender sample 17 patients (34,67 %) had no previous convictions. However, almost 65 % did, which far exceeds the rate among schizophrenics in the community (Swanson *et al.*, 1990).

others. It could be postulated that factors related to family functioning somehow contributed to the production of the violent offence.

Analysis of their victims does not suggest that if such stressors were present they caused the patients to act out against their families and friends. The finding that strangers were as likely to be their victims contradicts the traditional view that paranoid patients either ruminate about their intended (known) victim and then act, or lash out spontaneously at care-givers. Because this study confirmed previous findings that paranoid delusions are mostly associated with violent offences it would, however, seem that such patients do not necessarily strike at the subjects of their delusions. As Kennedy (1992) has insisted, the influence of anger and irritability that subjectively flow from a psychosis is often underestimated. Possibly these generate a state of constant readiness to act defensively and aggressively, which is unleashed upon anyone who may unsuspectingly provoke it. However, the behaviour of the victims cannot be ignored. Chronic patients are sometimes well known in the community, and have to endure taunts and threats from strangers. Indiscriminate retaliation may represent a maladaptive response to a rejecting environment. Unfortunately this study could not examine this.

There remains the possibility that the violent offences were committed for criminal gain, or for reasons unrelated to psychosis. The absence of robbery from the list of offences tends to suggest that their violence generally proceeded from unpremeditated circumstances. The six cases of rape and attempted rape do not appear to fit this pattern. These occurred either as aggressive attacks on children (five cases), or as a result of poor social judgement (one was the patient's mother). Probably the unavailability of willing partners and the defencelessness of the victims were contributory, which suggests that these perpetrators had been marginalized and could not tolerate the frustration of their sexuality.

The non-violent offences were predominantly for material gain, or related to property damage (either following provocation or seemingly aimless). Four patients had been charged for smoking cannabis openly in public and one for swearing at his mother. The view that these offences usually represent clumsy attempts to survive poverty, or are the manifestations of poor social skills and frustration tolerance was probably confirmed (Gunn, 1977; Schanda *et al.*, 1992; Tidmarsh, 1990).

Comparing the index offence to history of violence revealed that most of those charged with violent offences had been violent before or following admission (77,27 %), and those charged with non-violent offences mostly had non-violent histories (74,07 %). The forensic implication is that the index offence (i.e. the charge that led to the hospitalization) is a reasonably good indicator of the schizophrenic patient's propensities. This has possible implications for prognosis and future decisions with respect to

TABLE 8: PSYCHOTIC SYMPTOMS ELICITED DURING THE INITIAL OBSERVATION PERIOD

Symptoms	Violent vs. non-violent		History positive vs. negative	
	Significance level (p)	Chi squared	Significance level (p)	Chi squared
Hallucinations	0,15	1,98	0,68	0,17
Command hallucinations	0,56	0,03	0,09	1,85
Delusions	0,22	1,54	0,09	2,79
Delusions of grandeur	0,37	0,81	0,18	1,83
Passivity phen	0,36	0,12	0,47	0,19
Thought disorder	0,47	0,53	0,48	0,50
Thought withdrawal/insertion	0,52	0,01	0,33	0,70
Thought broadcasting	0,25	0,50	0,51	0,18
Ideas/delusions of reference	0,24	0,52	0,13	2,22
Paranoid delusions	0,03*	4,36	0,24	1,38

* Significant at the 5 % level ($p < 0,05$).

Some demographic variables distinguished those hospitalized following a violence charge. Such patients were more likely to be married and have more children. This could indicate contradictory situations. Possibly those who marry and have children are more likely to be better functioning, have a more benign course of illness, better personality integration and more favourable socio-occupational circumstances. This appears to confirm Schanda *et al.*'s (1992) findings. However, psychiatric, occupational, educational and criminal variables did not distinguish them from the

discharge. It may be reasonable to assume that schizophrenics referred for violence charges remain dangerous despite treatment. This possibility requires further study.

For the five cases for whom the index offence was an isolated violent event the violent offence could be considered to be an exceptional event, occurring as in some overcontrolled individuals (Blackburn, 1986; Heilbrun, Knopf & Bruner, 1976; Zinberg, 1979). Or they are false negatives: Either collateral sources failed to describe such behaviour (and hospitalization contained their aggressive impulses), or violent behaviour has still to appear during the current admission. Another possibility may be that they were not guilty of the charges (as a trial of facts did not occur), and should be part of the non-violent group of patients.

The duration of illness, length of hospitalization and number of previous hospitalizations (a reasonable indicator of relapse rate) did not discriminate between the groups. This is consistent with the contradictory findings of previous studies (Karson & Bigelow, 1987; Kunjukrishnan & Bradford, 1988). A possible explanation may be that schizophrenic offenders constitute a heterogeneous group. For some an early onset of illness followed by frequent relapses (that is, poorer control of symptoms) contributes to violent behaviour, especially during the initial breakdown. In others who have a late onset of illness there may be a predominantly paranoid presentation, also a risk factor for aggressivity. A history of convictions was not important as a determinant probably because criminal activity is part of the limited social repertoire of an impoverished group.

A history of alcohol and substance abuse did not distinguish between the groups. Because this aspect of the study was conducted retrospectively (by inspecting clinical records) it was not possible to determine whether the subjects were intoxicated at the time of the alleged offence. Previous studies have indicated that although schizophrenics abuse substances more frequently than the general population, only about 60 % are intoxicated during a violent offence (Lindqvist & Allebeck, 1989). Analysis of the SSS responses indicated that although most subjects answered truthfully with respect to their desire for substance/alcohol use, they nevertheless scored modestly on the disinhibition subscale. Perhaps they enjoy experimenting with substances without necessarily desiring loss of control. Although there is a hypothesis that schizophrenics abuse substances to self-medicate, it was not possible to deduce this in this study (Newman & Miller, 1992). Intoxication produced by methaqualone-cannabis (which may be exacerbated by alcohol ingestion) has been implicated in a so-called 'toxic psychosis' characterized by prolonged agitation or disinhibition, or in a relapse of a functional psychosis. Even if intoxication or ongoing abuse were precipitants, in most of the subjects no pattern of abuse distinguished the violent from the non-violent. This seems to contradict most studies

that implicate substance abuse as a determinant. As methaqualone-cannabis abuse does not seem to occur in other countries there is no corroborating evidence in the literature. The conundrum remains.

Overall the sample scored a mean of 17,06 on the Sensation-Seeking Scale, which indicates low sensation seeking generally (Rogers, 1987; Zuckerman & Link, 1968). There were high sensation seekers in the group, the highest score being 28. On the subscales they scored lowest on boredom susceptibility (that is, they tolerated boredom relatively easily), then disinhibition, followed by experience seeking. The subjects scored highest on the thrill and adventure subscale. Although outward loss of interest and volition are diagnostic of the disorder there has been speculation that schizophrenics desire stimulation. Not surprisingly schizophrenics in most surveys abuse stimulants more frequently than the general population (Newman & Miller, 1992). It therefore seemed logical that these patients would at least fantasize or desire sensation-seeking activities. It was not possible to characterize the minority of patients who had very high scores, but possibly there is a small group of atypical schizophrenics who are worthy of more intensive evaluation. That boredom susceptibility scores were the lowest is congruent with clinical observations that schizophrenics, particularly those who have negative symptoms, seem content to do very little.

The finding that schizophrenics who had negative histories of violence scored significantly higher on the thrill and adventure (TA) subscale is intriguing. The TA subscale measures socially acceptable sensation seeking, and usually has an inverse relationship with the disinhibition subscale (Zuckerman, 1983). This is probably due to differing appreciations of dangerous consequences. Possibly the non-violent group desire or enjoy activities that demand at least a modicum of caution, and an appreciation of consequences (that is, better impulse control). Perhaps violent schizophrenics are unable to discharge their impulses by socially acceptable means. Unfortunately the lack of significant differences on the disinhibition subscale does not entirely support this hypothesis. Sensation seeking appears not to explain violent behaviour in schizophrenics.

Although the group as a whole had a mean score of 22,76 on Barratt's Impulsivity Scale, the standard deviation of 5,06 does indicate that a relatively high number of subjects were scored as being impulsive. Analysis however failed to distinguish violent from non-violent offenders on the BIS. Although many schizophrenics may be generally impulsive, this does not contribute meaningfully to their violence (unlike many personality-disordered violent offenders). This has been recently reinforced by Cooper, Kelly & King, (1992) whose longitudinal study of schizophrenics found an association between low CSF concentrations of 5-HIAA (the

major metabolite of 5-HT) and impulsive behaviour (suicide attempts), but not violent behaviour in these patients.

Unlike previous studies no significant correlations were found between BIS, SSS and subscale scores, particularly between BIS and the disinhibition subscale (Eysenck, 1983; Zuckerman, 1984). This does lend credence to the view that sensation seeking and impulsivity are separate constructs.

Surveys of violent schizophrenics have implicated virtually every positive psychotic symptom as contributory to violence (Planansky & Johnson, 1977; Tidmarsh, 1990; Virkunen, 1974). In this study only paranoid delusions were found to distinguish significantly those referred following violent offences. There seems to be a difference between violence serious enough to warrant juridical intervention and that which commonly occurs in the community and hospital. Perhaps the former results from paranoid ideas and the latter more from a combination of psychosocial and disorder-related factors such as irritability and impaired judgement. However, not all serious assaults are reported to the police, and minor assaults often provoke prosecution after the victim has endured other more serious episodes. Despite the uncertain role of symptoms, the epidemiological evidence that the disorder itself is somehow associated with an increased risk of violent behaviour in the community cannot be ignored. Therefore psychopathology must be a necessary, albeit insufficient, cause.

Comparisons between individual symptoms do not seem to discriminate between the habitually violent and non-violent. Yet all psychotic symptoms have somehow been implicated for influencing assaultiveness. Perhaps symptom clusters should be compared, or other dimensions be examined.

Such a dimension, not yet investigated as a determinant of violence, is the positive-negative symptom dichotomy. Recent studies have reinforced the prevailing impression that those patients who experience predominantly positive symptoms (hallucinations, delusions, thought disorder etc.) tend to relapse more frequently but function better, whereas those with negative symptoms (avolition, flat affect, poor self-care and social withdrawal) have a poorer prognosis. In this study violence-history negative schizophrenics scored higher on the TA subscale of the SSS, which suggests that they possessed more socially acceptable behaviour. This may indicate a preponderance of positive symptoms because negative symptoms characteristically manifest as a disregard for social norms for dress, self-care and behaviour. Therefore it would have been interesting to investigate the possible interactions between measurements of positive and negative symptoms and those of sensation seeking and impulsivity.

A possibly intriguing avenue for research would be the investigation of the effects of the new atypical neuroleptics, such as clozapine, which purport to decrease negative symptoms by antagonizing serotonin receptors

(specifically 5-HT₂ receptors) (Kane, Honigfeld & Singer, 1988). These neuroleptics are possibly creating (pharmacologically) a biochemical state confirmed to be associated with impulsivity and violence. Already some clinicians have noticed anecdotally that some schizophrenics on clozapine seem to develop poor impulse control (Taylor, personal communication).

Symptoms and biochemical indices are not sufficient explanations for violence in these patients. Psychopathology, personality traits, psychosocial determinants and external factors, such as intoxication and context of the index behaviour (for example the presence of threat, victimization or provocation), possibly coalesce into particular constellations that predispose to violent acting out. Future research will need to focus on determining those profiles that promise better prediction.

LIMITATIONS OF THE STUDY

- As all the subjects were forensic patients, skewed sampling may hinder attempts to generalize these findings to schizophrenics generally, who overwhelmingly do not commit crimes (notably violent crimes). This study did not compare schizophrenic to non-psychotic offenders, although most researchers have concentrated on this dimension.
- Forensic patients tend to be less co-operative as they generally reject the reasons for hospitalization. Hence they are less likely to engage in any gratuitous activity which does not lead to discharge. Some patients attempted to negotiate privileges (such as week-end leaves and attendance at industrial therapy) during this phase. The questionnaires were administered orally and items were clarified to minimize this potential effect. The patients who completed the study did convey an impression of participating fully.
- The listing of symptoms elicited during the initial assessment may be questionable. Many psychotic patients behave despite, and others because of, their symptoms. A detailed interview probing for all possible motivations and the patient's compliance with psychotic symptoms should have been conducted during the initial admission. Unfortunately their subjective experiences during the offences could not be explored. To do so retrospectively when hospitalization and treatment had intervened would not have been valid. Future studies should concentrate on analyzing the content of the motivations for particular behaviours.

- Self-report questionnaires, particularly if used in forensic populations, do not necessarily produce accurate (i.e. truthful) responses. Barratt (1985a) points out that questionnaires often fail to distinguish between symptoms and traits, which are probably situated on a continuum.

Despite criterion-based validity trials there is the abiding problem as to whether the Sensation-Seeking Scale and Barratt's Impulsivity Scale really do measure their corresponding constructs. Impulsivity in particular suffers from construct vagueness, and accordingly cannot be easily measured. Future studies in impulsivity will have to combine disparate measures, such as collateral information, biochemical markers, interview and questionnaire responses, to arrive at an 'impulsivity score'.

CONCLUSION

The predominant findings of this study were that schizophrenics referred for violence charges are more likely to be married with more children than non-violent patients. However, no demographic variables separated the habitually violent from non-violent patients. Self-report measures of impulsivity and sensation seeking failed to differentiate between the groups except that non-violent subjects scored higher on the thrill and adventure subscale of the Sensation-Seeking Scale, probably indicative of a higher degree of socially appropriate preferences for the trait.

Those referred for violent offences were more likely to have had paranoid delusions elicited during the initial observation period. However, it was not clear whether symptoms motivated behaviour during the alleged offences. Symptoms, however, did not distinguish those who had displayed a longitudinal history of violence.

A striking finding was that the nature of the 'index offence' which occasioned the referral was a reasonable indicator of past and subsequent violence.

Hence violence in schizophrenics appears to be inextricably related to their psychopathology. Further investigation, possibly by examining symptom complexes (such as the positive-negative dichotomy) may yield more positive results.

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APPENDIX A

ZUCKERMAN'S SENSATION-SEEKING SCALE

Instructions: Each of the items below contains two choices, A and B. Please indicate which of the choices most describes your likes or dislikes, or the way you feel. In some cases you may find items in which both choices describe your likes or feelings. Please choose the one which better describes your likes or feelings. In some cases you may find items in which you do not like either choice. In such cases indicate the one you dislike the least.

It is important that you respond to all the items with only one choice, A or B. We are interested only in your likes or feelings, not in how others feel about these things or how one is supposed to feel. There are no right or wrong answers as in other kinds of tests. Be frank and give an honest appraisal of yourself.

- 1 A I like 'wild' uninhibited parties
B I prefer quiet parties with good conversation
- 2 A There are some movies I enjoy seeing a second or even a third time
B I can't stand watching a movie that I've seen before
- 3 A I often wish I could be a mountain climber
B I can't understand people who risk their necks climbing mountains
- 4 A I dislike all body smells
B I like some of the earthy body smells
- 5 A I get bored seeing the same old faces
B I like the comfortable familiarity of everyday friends
- 6 A I like to explore a strange city or section of town by myself, even if it means getting lost
B I prefer a guide when I am in a place I don't know well
- 7 A I dislike people who do or say things just to shock or upset others
B When you can predict almost everything a person will do and say he or she must be a bore

- 8 A I usually don't enjoy a movie where I can predict what will happen in advance
B I don't mind watching a movie where I can predict what will happen in advance
- 9 A I have tried *dagga* or would like to
B I would never smoke *dagga*
- 10 A I would not like to try any drug which might produce strange and dangerous effects on me
B I would like to try some of the new drugs that produce hallucinations
- 11 A A sensible person avoids activities that are dangerous
B I sometimes like to do things that are a little scary
- 12 A I dislike *jollers*
B I enjoy the company of real *jollers*
- 13 A I find that drugs make me feel uncomfortable
B I often like to get high on *dagga*/alcohol
- 14 A I like to try new foods that I have never tasted before
B I usually eat food with which I am familiar so as to avoid disappointment and unpleasantness
- 15 A I enjoy looking at other people's photographs ('snaps')
B Looking at other people's snaps bores me a lot
- 16 A I would like to water-ski
B I would not like to water-ski
- 17 A I would like to try surfing
B I would not like to try surfing
- 18 A I would like to take off on a trip with no pre-planned route or timetable
B When I go on a trip I like to plan my route and time-table fairly carefully
- 19 A I prefer 'down-to-earth' people for friends
B I would like to make friends amongst way out groups such as artists, musicians etc.

- 20 A I would not like to learn to fly an aeroplane
B I would like to learn to fly an aeroplane
- 21 A I prefer the surface of the water to the depths
B I would like to go scuba diving
- 22 A I would like to meet some people who are homosexual
B I stay away from anyone I suspect of being 'queer'
- 23 A I would like to try parachute jumping
B I would never want to try jumping out of a plane with or without a parachute
- 24 A I prefer friends who are excitingly unpredictable
B I prefer friends who are reliable and predictable
- 25 A I am not interested in doing things just for kicks
B I like new and exciting experiences even if they are frightening, unusual or illegal
- 26 A I prefer looking at pictures that are easy to make out and in which the colours and shapes do not clash
B I often like looking at pictures where the colours clash and it is difficult to make it out clearly
- 27 A I enjoy spending time in the familiar surroundings of home
B I get very restless if I have to stay around home for any length of time
- 28 A I would like to dive off the high board
B I don't like the feeling I get standing on the high board (or I would not go near it)
- 29 A I like to go out with members of the opposite sex who are physically exciting
B I like to go out with members of the opposite sex who are good company and understand me
- 30 A Heavy drinking usually ruins a party because some people get loud and difficult
B Keeping the drinks full is the key to a good party

- 31 A The worst behaviour is to be rude
B The worst behaviour is to be a bore
- 32 A A person should have much sexual experience before marriage
B It is better if two married persons begin their sexual experiences with each other
- 33 A Even if I were rich I would not like to mix with some of the 'wild' people in the 'jet set'
B I could see myself having a good time around the world with the 'jet set'
- 34 A I like people who are clever and funny even if they do sometimes insult others
B I dislike people who have fun by hurting the feelings of others
- 35 A There is altogether too much sex in movies
B I enjoy watching many of the sexy scenes in movies
- 36 A I feel best after taking a couple of drinks
B Something is wrong with people who need liquor to feel good
- 37 A People should dress according to standards of taste neatness, and style
B People should dress as they wish even if they look strange
- 38 A Sailing long distances in small sailing boats is foolish
B I would like to sail a long distance in a small but sea-worthy boat
- 39 A I have no patience with dull or boring people
B I find something interesting in almost every person I talk with
- 40 A Jumping from a high mountain on a hang-glider is a good way to end up in hospital
B I think I would enjoy the sensations of gliding down fast from a high mountain on a hang-glider

Aanwysings: Elk van die items hieronder bevat twee keuses A en B. Dui asseblief die keuse aan wat die meeste met jou voorkeure of afkeure ooreenstem of u gevoelens die beste beskryf. U mag dalk in sommige gevalle items vind waar albei keuses u voorkeure of gevoelens beskryf. Kies asseblief die een wat u voorkeure of gevoelens beste beskryf. U mag dalk ook items vind waar u nie van enige keuse hou nie. Dui dan die een aan wat u die minste pla.

Dit is belangrik dat u by al die items net een keuse, A of B, moet maak. Ons stel net in u voorkeure of gevoelens belang, nie hoe ander daarvoor voel of hoe 'n mens behoort te voel nie. Daar is nie regte of verkeerde antwoorde soos in ander toetse nie. Wees reguit en gee 'n eerlike opinie van jouself.

- 1 *A Ek hou van wilde partytjies waar mense maak soos hulle wil*
B Ek hou meer van rustige partytjies waar jy lekker kan gesels
- 2 *A Daar is party films wat ek twee of drie keer wil sien*
B Ek kan nie verdra om 'n film te sien wat ek al gesien het nie
- 3 *A Ek wens dikwels dat ek 'n bergklimmer kan wees*
B Ek kan nie mense verstaan wat hulle lewens waag om berg te klim nie
- 4 *A Ek haat alle liggaamlike reuke*
B Ek hou van sommige aardse liggaamlike reuke
- 5 *A Dit verveel my om dieselfde ou gesigte elke dag te sien*
B Ek hou van die rustige samesyn met my ware vriende
- 6 *A Ek hou daarvan om alleen in 'n vreemde stad of deel van 'n dorp rond te loop, al verdwaal ek*
B Ek wil liever 'n gids hê as ek in 'n vreemde plek is
- 7 *A Ek hou nie van mense wat dinge sê of doen net om ander mense te skok of om te krap nie*
B As jy omtrent alles weet wat iemand gaan doen of sê, dan moet daardie iemand vervelig wees
- 8 *A Gewoonlik hou ek nie van 'n film as ek weet wat gaan gebeur nie*
B Ek gee nie om om te kyk na 'n film as ek weet wat gaan gebeur nie
- 9 *A Ek het al dagga gerook, of ek wil dit graag doen*
B Ek sal nooit dagga rook nie
- 10 *A Ek sal nie graag enige dwelms gebruik wat 'n snaakse of gevaarlike effek op my kan hê nie*
B Ek sal graag van daardie nuwe dwelms probeer wat wilde drome veroorsaak

- 11 A 'n Verstandige persoon vermy aktiwiteite wat gevaarlik is
 B Somtyds hou ek daarvan om dinge te doen wat 'n mens skrikkerig maak
- 12 A Ek hou nie van jollers nie
 B Ek hou van die geselskap van regte jollers
- 13 A Enige dwelms laat my ongemaklik voel
 B Ek hou dikwels daarvan om van dagga of drank dronk te word
- 14 A Ek hou daarvan om nuwe kosse te eet wat ek nog nooit vantevore geproe het nie
 B Ek eet gewoonlik kos wat ek ken om teleurstelling en onaangenaamheid te voorkom
- 15 A Ek geniet dit om na ander mense se foto's te kyk
 B Dit is vervelig om na ander mense se foto's te kyk
- 16 A Ek sal graag wil waterski
 B Ek sal nie graag wil waterski nie
- 17 A Ek sal graag wil branderplank ry
 B Ek sal nie graag wil branderplank ry nie
- 18 A Ek sal graag wil reis sonder om my oor roetes of tydtafels te bekommer
 B As ek op reis gaan hou ek daarvan om die roete en tydtafel goed te beplan
- 19 A Ek verkies doodgewone mense as my vriende
 B Ek sou graag vriende wil maak met ongewone mense soos kunstenaars, musikante ens.
- 20 A Ek wil nie leer hoe om 'n vliegtuig te bestuur nie
 B Ek sal graag wil leer hoe om 'n vliegtuig te bestuur
- 21 A Ek verkies die oppervlakte van die water bo die diepte
 B Ek sou graag wil skubaduik
- 22 A Ek wil graag homoseksuele mense ontmoet
 B Ek bly weg van enigiemand wat na 'n 'moffie' lyk

- 23 A *Ek sal graag wil valskerm spring*
 B *Ek sal nooit, met of sonder 'n valskerm, uit 'n vliegtuig wil spring nie*
- 24 A *Ek hou van vriende wat opwindend onvoorspelbaar is*
 B *Ek verkies vriende wat betroubaar en voorspelbaar is*
- 25 A *Ek stel nie daarin belang om dinge te doen net vir die opwindende daarvan nie*
 B *Ek hou daarvan om nuwe en opwindende dinge te doen, al is dit skrikwekkend, ongewoon, of onwettig*
- 26 A *Ek verkies om na prente te kyk wat 'n mens maklik kan verstaan en waarin die kleure en vorms nie bots nie*
 B *Ek hou dikwels daarvan om na prente te kyk waar die kleure bots en dit moeilik is om alles te verstaan*
- 27 A *Ek geniet dit om in die bekende omgewing van my huis te wees*
 B *Ek raak baie rusteloos as ek vir 'n lang tyd by die huis moet bly*
- 28 A *Ek sal graag van die hoë duikplank wil duik*
 B *Ek hou nie van die gevoel wat ek kry as ek op die hoë duikplank staan nie*
- 29 A *Ek hou daarvan om uit te gaan met meisies/ouens wat liggaamlik aantreklik is*
 B *Ek hou daarvan om uit te gaan met meisies/ouens wat goeie geselskap is en my verstaan*
- 30 A *Suipery bederf partytjies omdat sommige mense raserig en moeilik raak*
 B *'n Partytjie is lekker as die glasies altyd vol bly*
- 31 A *Die slegste gedrag is om ongepoets te wees*
 B *Die slegste gedrag is om vervelig te wees*
- 32 A *Dit is belangrik dat 'n mens baie seksuele ondervinding voor die huwelik moet hê*
 B *Dit is beter as 'n man en vrou hul seksuele verhouding met mekaar begin*
- 33 A *Al was ek ryk, sou ek nie graag met sommige van die wilde mense in die 'jet set' wil meng nie*

- B *Ek verbeel my dit sal lekker wees om deur die wêreld te reis met die 'jet set'*
- 34 A *Ek hou van mense wat slim en snaaks is, al maak hul soms ander seer*
 B *Ek hou nie van mense wat lekker kry as hulle ander se gevoelens seermaak nie*
- 35 A *Daar is veels te veel seks in films*
 B *Ek hou daarvan om na baie van die sekstonele in films te kyk*
- 36 A *Ek voel die lekkerste as ek 'n paar drankies in het*
 B *Daar is iets verkeerd met mense wat drank nodig het om lekker te voel*
- 37 A *Mense behoort so aan te trek dat almal tevrede is met hul kleredrag*
 B *Mense moet kan aantrek soos hul wil, al lyk hul snaaks*
- 38 A *Dit is verspot om lang afstande in klein seilbote te vaar*
 B *Ek sou daarvan hou om 'n lang afstand in 'n klein maar betroubare seilboot te vaar*
- 39 A *Bot of vervelige mense maak my ongeduldig*
 B *Ek vind iets interessants in die meeste mense met wie ek praat*
- 40 A *Spring van 'n hoë berg af op 'n hangsweeftuig as jy in die hospitaal wil beland*
 B *Ek dink ek sal daarvan hou om vinnig van 'n hoë berg op 'n hangsweeftuig af te gly*

SENSATION-SEEKING SCALE SCORE SHEET

- 1A (D) 11B (T) 21B (T) 31B (B)
 2B (B) 12B (D) 22A (E) 32A (D)
 3A (T) 13B (D) 23A (T) 33B (D)
 4B (E) 14A (E) 24A (B) 34A (B)
 5A (B) 15B (B) 25B (D) 35B (D)
 6A (E) 16A (T) 26B (E) 36A (D)
 7B (B) 17A (T) 27B (B) 37B (E)
 8A (B) 18A (E) 28A (T) 38B (T)
 9A (E) 19B (E) 29A (D) 39A (B)
 10B(E) 20B (T) 30B (D) 40B (T)

Subscale Key:

- T = Thrill & Adventure
 E = Experience Seeking
 D = Disinhibition
 B = Boredom susceptibility

APPENDIX B

BARRATT'S IMPULSIVITY SCALE

Answer the following "true" or "false":

- 1 My friends think I am happy-go-lucky
- 2 I like being where there is something going on all the time
- 3 I like work that has lots of excitement
- 4 I change my plans often
- 5 I like to take a chance just for the excitement
- 6 My interests tend to change quickly
- 7 I like to do things on the spur of the moment
- 8 I consider myself always to be careful
- 9 I scan newspapers rather than read them carefully
- 10 I let myself go at parties
- 11 I don't like changes
- 12 As a youngster I enjoyed taking part in reckless stunts
- 13 I like work requiring patience and carefulness
- 14 I like a great deal of variety in my work
- 15 I often make people laugh
- 16 I like new situations
- 17 I don't like to work with slow people
- 18 I like to solve complicated problems
- 19 I easily become impatient with people
- 20 I usually have a ready answer
- 21 I don't like to wait for traffic lights to change
- 22 I usually think carefully before I do most things
- 23 I like work in which I must change often from one task to another
- 24 I like mathematics
- 25 I make up my mind quickly
- 26 I frequently forget things
- 27 I don't like having my plans changed
- 28 I make up my mind easily
- 29 I usually notice the furniture arrangements in a strange house
- 30 I (would) like to play chess
- 31 I have more trouble being able to concentrate than other people
- 32 When I see a train I wish I were on it
- 33 I like detailed work
- 34 I like to work on crossword puzzles
- 35 I spend most of my free time outdoors
- 36 I frequently feel "on top of the world"

- 37 I am always on time for social events
- 38 I like work where there is competition
- 39 I answer questions quickly
- 40 When watching games I often yell along with the others
- 41 I remember the names of people I meet
- 42 I keep a diary
- 43 In the morning I usually get out of bed full of energy
- 44 I like people who are always on time

Beantwoord die volgende: "Waar" of "onwaar":

- 1 *My vriende dink ek is onverskillig*
- 2 *Ek hou daarvan om te wees waar daar altyd iets aan die gang is*
- 3 *Ek hou van werk met baie opwinding*
- 4 *Ek verander dikwels my planne*
- 5 *Ek hou daarvan om net vir die opwinding kanse te waag*
- 6 *My belangstellings verander die hele tyd*
- 7 *Ek hou daarvan om dinge te doen sonder om te dink*
- 8 *Ek is iemand wat altyd versigtig is*
- 9 *Ek lees koerante vinnig sonder om stadig na alles te kyk*
- 10 *Ek laat waai by partytjies*
- 11 *Ek hou nie van veranderings nie*
- 12 *Toe ek klein was, het ek daarvan gehou om gevaarlike toertjies te doen*
- 13 *Ek hou van werk waar ek geduldig en versigtig moet wees*
- 14 *Ek hou van baie verskeidenheid in my werk*
- 15 *Ek laat dikwels mense lag*
- 16 *Ek hou van nuwe situasies*
- 17 *Ek hou nie daarvan om met stadige mense te werk nie*
- 18 *Ek hou daarvan om moeilike probleme op te los*
- 19 *Ek raak maklik ongeduldig met mense*
- 20 *Ek het gewoonlik altyd 'n antwoord reg*
- 21 *Ek hou nie daarvan om te wag vir die verkeersligte om te verander nie*
- 22 *Ek dink gewoonlik goed voordat ek die meeste dinge doen*
- 23 *Ek hou van werk waar ek dikwels van een taak na die ander moet gaan*
- 24 *Ek hou van wiskunde*
- 25 *Ek besluit vinnig oor iets*
- 26 *Ek vergeet goed dikwels*
- 27 *Ek hou nie daarvan dat my planne verander word nie*
- 28 *Ek besluit maklik oor iets*
- 29 *Ek kan gewoonlik die manier waarop meubels in 'n vreemde huis staan, raaksien*
- 30 *Ek sou graag skaak wou speel*
- 31 *Ek sukkel meer as ander mense om te konsentreer*

- 32 *As ek 'n trein sien, wens ek ek was daarop*
 33 *Ek hou van werk met allerhande kleinighede*
 34 *Ek hou daarvan om blokkiesraaisels te doen*
 35 *Ek bring die meeste van my vrye tyd in die buitelug deur*
 36 *Ek voel dikwels asof die hele wêreld myne is*
 37 *Ek is altyd betyds vir sulke goed soos partytjies*
 38 *Ek hou daarvan om te werk waar daar kompetisie is*
 39 *Ek beantwoord vrae vinnig*
 40 *As ek sport kyk, skreeu ek dikwels saam met die ander*
 41 *Ek onthou die name van mense wat ek ontmoet*
 42 *Ek hou 'n dagboek aan*
 43 *Ek is gewoonlik vol lewe as ek in die oggend opstaan*
 44 *Ek hou van mense wat altyd betyds is*

BARRATT'S IMPULSIVITY SCALE SCORE SHEET

- | | | | |
|-------|-------|-------|-------|
| 1. T | 12. T | 23. T | 34. F |
| 2. T | 13. F | 24. F | 35. T |
| 3. T | 14. T | 25. T | 36. T |
| 4. T | 15. T | 26. T | 37. F |
| 5. T | 16. T | 27. F | 38. T |
| 6. T | 17. T | 28. T | 39. T |
| 7. T | 18. F | 29. F | 40. T |
| 8. F | 19. T | 30. F | 41. T |
| 9. T | 20. T | 31. T | 42. F |
| 10. T | 21. T | 32. T | 43. T |
| 11. F | 22. F | 33. F | 44. T |

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