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Risk-taking Behaviour and Criminal Offending:  
An Investigation of Sensation Seeking and the Eysenck Personality Questionnaire

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## **Abstract**

The main objective of the current study was to investigate the relationships between Zuckerman's (1979) sensation seeking and Eysenck and Eysenck's (1976) personality scales, and how these relate to hostility within a prison population, to explore whether they could be conceptualized in terms of two socialized and unsocialized sensation seeking factors. Participants included 79 adult male offenders (age range = 18-62), imprisoned in correctional centers in South East Queensland. The findings of the present study support the distinction between socialized and unsocialized sensation seeking, and suggest that these factors represent more overarching personality factors characterized by Zuckerman's and Eysenck and Eysenck's sub-traits. In particular, Eysenck and Eysenck's (1976) psychoticism trait was demonstrated to be a clear marker of the more broad impulsive, unsocialized sensation seeking factor, rather than representing a super-trait in its own right. This factor was also represented by lie, disinhibition and boredom susceptibility scales. The findings relating to hostility also supported such a reformulation, in that scales earlier identified as unsocialized factors did cluster together to predict the unsocialized hostility factor, whereas unsocialized scales did not. The results demonstrate the need for a theoretical reformulation of the two given theories of personality.

## Risk-taking Behaviour and Criminal Offending: An Investigation of Sensation Seeking and the Eysenck Personality Questionnaire

One of the most persistent debates of the twentieth century is the issue of personality traits, and whether theories of personality are effective in explaining and predicting various behaviours. Two of the most popular and widely explored theories of personality include Zuckerman's (1979) Sensation Seeking theory and Eysenck and Eysenck's (1976) Personality theory. Due to their ability to predict some similar behaviors, these two models have frequently been investigated in conjunction with each other. However, recent research has demonstrated that these two models may share more than predictive ability and that Zuckerman's and Eysenck and Eysenck's personality theories may actually conceptualize and describe very similar rather than distinct personality traits.

The overall aim of the present study was to investigate the relationships between Zuckerman's sensation seeking scales and Eysenck's personality dimensions, and to explore how these sub-scales related to hostility within a prison population. Specifically, this study was interested in whether Zuckerman's sub-scales and Eysenck's sub-scales should be reformulated to conceptualize two overarching socialized and unsocialized forms of sensation seeking plus extraversion and neuroticism scales, and whether such a reformulation was supported by the observed relationship between hostility and the given personality scales. A prison population, characteristically high in hostility and antisocial behaviour, was utilized to enhance the findings relating to hostility. It was anticipated that the investigation of these aims would demonstrate the theoretical link and perhaps overlap between two competing theories of personality, Zuckerman's (1979) sensation seeking model and Eysenck and Eysenck's (1976) three factor personality model.

Theories of sensation seeking were originally developed in response to studies investigating sensory deprivation and optimal levels of arousal. The general sensation seeking

trait is described as, “a trait defined by the seeking of varied, novel, complex and intense sensations and experiences, and the willingness to take physical, social, legal and financial risks for the sake of such experience” (Zuckerman, 1994: 27). Typically, this personality trait is conceptualized in terms of its four sub-traits or sub-scales. First, thrill and adventure seeking (TAS) describes a trait which predisposes individuals to seek adventure through socialized, but risky and exciting activities such as adventure sports (Trimpop, 1994). Second, experience seeking involves seeking sensation through the mind, senses and through a non-conforming lifestyle (Zuckerman, 1979). Disinhibition is described as a sensation seeking trait common among criminals and juvenile delinquents (Zuckerman, 1979), which typically involves seeking behaviours such as the consumption of alcohol, drugs and involvement in illegal acts. The fourth sensation seeking factor, boredom susceptibility represents an aversion to monotonous, invariant situations. It is suggested that those high on boredom susceptibility experience restlessness when exposed to such monotonous situations (Zuckerman, 1979). Zuckerman described these four sub-scales as representing four very different modes of sensation seeking, which comprise a component of an individual’s personality structure.

Eysenck and Eysenck’s (1976) three factor model describes three personality super-traits; introversion-extraversion, neuroticism and psychoticism. The first of Eysenck’s super-factors, introversion-extraversion, is characterized by various sub-traits including sensation seeking, sociableness, liveliness, assertiveness, and dominance, with extraversion reflecting high prevalence of such traits. Typically, extraversion is understood as sociability (Zuckerman, 1989). Neuroticism, is described as a factor which predisposes individuals to develop neurotic symptoms under stress, and is referred to as arousability in response to threats (Zuckerman, 1994). The neurotic super-trait includes sub-traits such as anxiousness, depression, low self-esteem, tension, moodiness, emotionality and irrationality (Eysenck, 1994). Psychoticism is a more recently developed and controversial super-trait, which

predisposes individuals to possible psychotic breakdowns. Psychotic symptoms have been commonly identified in criminal populations (Eysenck, 1994), and are also quite apparent in individuals possessing impulsive, hostile, schizoid, affective, schizoaffective and schizophrenic characteristics. Sub-traits of psychoticism include aggressiveness, anti-social behaviour, impulsiveness, unempathic behaviour, coldness and egocentricity (Eysenck, 1994). A fourth factor, lie, was introduced in the Eysenck and Eysenck Personality Scales (EPQ) (1985), as a measure of social conformity. Within the three factor model, Zuckerman's general sensation seeking trait is categorized as a behavioural tendency of the extraversion trait, rather than a trait in its own right.

Although sensation seeking was originally conceptualized as a behavioural tendency of the extraversion trait, with some of its more impulsive characteristics loading on the psychoticism scale (Eysenck & Eysenck, 1985), there have been recent suggestions that it is in fact psychoticism which is subsumed by a more broad and overarching sensation seeking factor. Extraversion and neuroticism traits are suggested to lie separate to this factor. Such an idea was originally proposed by Zuckerman, Kuhlman, & Camac (1988) who conducted factor analyses of the sensation seeking and EPQ scales. Zuckerman et al., (1988) identified a broad personality factor which they termed 'impulsive unsocialized sensation seeking' (ImpUSS). Essentially, this factor was characterized by aggression, impulsiveness, disinhibition and boredom susceptibility sub-scales. Further investigation uncovered that psychoticism also loaded quite highly on this 'impulsive unsocialized sensation seeking' factor, and was also significantly correlated with the disinhibition and boredom susceptibility sensation seeking sub-scales. Zuckerman et al., (1988) then renamed this factor P-ImpUSS, describing it as a more overarching unsocialized sensation seeking factor, under which psychoticism was subsumed. Taking this further, Goma (1995) demonstrated that the remaining sensation seeking factor of thrill and adventure seeking loaded positively on a

separate overarching factor, which was characterized by venturesome traits, and was labeled a 'socialized sensation seeking' factor. Additionally, the 'unsocialized' ImpUSS factor also clearly discriminated antisocial offenders from three other socialized groups (Goma, 1995). This therefore lends support for the theoretical distinction between socialized and unsocialized sensation seeking factors.

Such ideas received little attention until recently reinvestigated by Glicksohn and Abulafia (1998). Based on the original ideas of Eysenck and Eysenck (1976), Glicksohn and Abulafia (1998) investigated both the EPQ and the Sensation Seeking scales to determine whether sensation seeking could be reduced to extraversion and psychoticism factors. Results supported the more recent work of Zuckerman et al., (1988), and demonstrated that it is in fact psychoticism that loads on the sensation seeking traits. Factor analyses of the sensation seeking and EPQ scales identified four factors. Glicksohn and Abulafia (1998) labeled the first factor P-ImpUSS, characterized by disinhibition, experience seeking, boredom susceptibility, psychoticism and lie scales. All of these scales with the exception of the lie scale loaded positively on this first factor. The second factor was identified as neuroticism, and the third as extraversion. Finally, the fourth factor was comprised only of the thrill and adventure seeking scale (TAS). The loading of TAS on an independent, socialized sensation seeking factor, prompted Glicksohn et al. (1998) to suggest that it is not sensation seeking which loads on psychoticism, rather psychoticism which loads on P-Imp-USS, a more unsocialized and impulsive form of sensation seeking. Such findings suggest that personality may be represented by two more general sensation seeking factors, which comprise sensation seeking sub-traits and the hypothesized psychoticism super-trait.

A personality dimension related to this theoretical distinction between socialised and unsocialised sensation seeking is the personality variable, hostility. Hostility and aggression are considered traits related to antisocial tendencies and common among unsocialised

individuals (Blackburn, 1998). It is therefore conceivable that hostility may be related to the unsocialised sensation seeking trait first hypothesised by Zuckerman et al, (1988). In fact, factor analyses demonstrated that aggressive and hostile tendencies were particularly characteristic of the 'impulsive unsocialised sensation seeking' factor, and were not representative of the more socialised sensation seeking factor (Zuckerman, et al., 1988). Such relationships were supported by Glicksohn and Abulafia (1998). Their findings demonstrated the loading of sub-scales represented by hostile and aggressive tendencies (disinhibition and psychoticism) on the unsocialised sensation seeking factor, and showed no relationship between such variables and the more socialised sensation seeking factor. Such ideas were extended by Goma (1995), who demonstrated that such an 'unsocialised personality factor' clearly discriminated groups high in antisocial behaviours or tendencies from other socialised groups not demonstrating antisocial behaviour. Such evidence argues the necessity to include a dimension of hostility in the current study, as hostility and aggressive tendencies appear to be related and perhaps characteristic of the identified 'unsocialised sensation seeking trait' and not related to the more socialised personality factor. Such evidence will help clarify the theoretical distinction between Eysenck and Eysenck's (1985) Personality model and Zuckerman's (1979) sensation seeking theory.

The current study attempts to explore these issues by investigating personality dimensions within a prison population. Prison populations are generally considered to be elevated in antisocial behaviour and hostility and are often considered unsocialised in nature (Blackburn, 1998; Goma, 1995; Haapsalo, 1990). Specifically, findings have demonstrated that prison populations do often possess stronger unsocialised (disinhibition, psychoticism and boredom susceptibility) than socialised personality traits (Goma, 1995; Haapsalo, 1990). Given that hostile tendencies have been related to the unsocialized sensation seeking trait (Zuckerman et al., 1988), and given that unsocialized sensation seeking has been

demonstrated to discriminate between antisocial and non-antisocial groups, it is possible that hostility may be trait which clusters together and interacts with some of Eysenck's and Zuckerman's traits to represent a more overarching and unsocialized mode of sensation seeking.

By exploring the relationships between Eysenck and Eysenck's Personality model and Zuckerman's sensation seeking theory in such a sample, it will allow us to clarify the hypothesised difference between socialised and unsocialised personality factors. Findings will not only indicate whether there is a theoretical overlap between the two models, but will also illustrate whether another personality factor, hostility, directly relates to and supports the distinction between the two overarching sensation seeking factors. Although the prison population utilised in this study may not be representative of all offenders, it will allow the investigation of the given theoretical constructions within a concentrated group elevated in unsocialised, antisocial and hostile tendencies.

This paper addresses these issues in a study designed to investigate both Eysenck and Eysenck's (1976) and Zuckerman's (1979) personality traits among a prison population. The findings have significant implications for the theoretical understanding of personality and hostility. Results will contribute to the recently ignited debate concerning the independence or overlap of Eysenck and Eysenck's (1976) and Zuckerman's (1979) personality traits. Findings will provide an insight into whether a reformulation of the two personality theories may be necessary, and whether the sensation seeking and psychoticism scales need to be re-conceptualized as sub-traits of two more overarching personality factors. Furthermore, the findings of this study will allow an insight into the relationship between hostility and unsocialized behaviour. If hostility can be demonstrated to be related to unsocialized sensation seeking, then it may be possible to identify effective methods through which 'hostile' offenders could be rehabilitated. It may be possible for these 'hostile' offenders to

learn how to redirect some of their unsocialized sensation seeking tendencies into more legitimate sources.

First this study will investigate the possible reformulation of the two personality theories, and evaluate the extent to which the sub-scales represent more overarching socialized and unsocialized sensation seeking factors. Second, to investigate whether hostility characterizes the unsocialized sensation seeking factor, and to investigate how the direct relationship between hostility and personality scales may support the proposed theoretical distinction, this study will also investigate the prediction of hostility by both socialized and unsocialized personality scales. The central hypothesis predicts that psychoticism, lie, disinhibition, boredom susceptibility and experience seeking scales will cluster together to load positively (lie negatively) on an Impulsive Unsocialized Sensation Seeking factor (P-ImpUSS), whereas the thrill and adventure seeking (TAS) scale will load positively on a socialized sensation seeking factor, with extraversion and neuroticism representing separate factors. The second hypothesis predicts that the unsocialized scales of psychoticism, lie, disinhibition, boredom susceptibility, and experience seeking scales will cluster together and predict high hostility scores, whereas the more socialized factors, extraversion, neuroticism, thrill and adventure seeking scales will not be related to hostility scores.

## **Method**

### Participants

Participants included 92 male offenders currently incarcerated in two South East Queensland prisons, whose ages ranged from 18 to 62 (Mean age = 31.54 years, SD = 10.1). Fifty seven (72%) offenders were of white Australian origin, 6 (7%) were of Aboriginal and Torres Strait Islander origin and 16 (21%) were of another ethnic origin. The distributions of offenders across offence type and level of involvement in offending are given in Table 1.

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Insert Table 1

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### Measures

#### Zuckerman's (1978) Sensation Seeking Scale

Sensation Seeking traits were measured through Zuckerman, Eysenck and Eysenck's Sensation Seeking Scale (SSS) Form V (1978), an inventory for assessing sensation seeking traits on four sub-levels; thrill and adventure seeking (TAS), experience seeking (ES), disinhibition (Dis), and boredom susceptibility (BS). Form V of the SSS represents an improvement of several earlier sensation seeking scales, with internal reliabilities of .77, .61, .14, .57, .84 for TAS, ES, Dis, BS and Total Sensation Seeking scores respectively (Zuckerman et al., 1978). The Sensation Seeking Scale Form IV has demonstrated convergent validity with several other personality scales (Trimpop, 1994) and has also demonstrated predictive ability with many criterion measures including involvement in risky sports, illegal drug use and promiscuous sexual behaviours.

#### Eysenck and Eysenck's (1985) Personality Questionnaire

Major dimensions of personality were measured through Eysenck and Eysenck's (1985) Personality Scale Revised (EPQ-R-Short Scale). The EPQ-R-S is an improved version of the EPQ, and measured the three broad dimensions of Eysenck's personality theory; psychoticism or tough mindedness, neuroticism or emotionality and extraversion. The EPQ-R-S also includes a lie scale measuring conformity. The EPQ-R-S demonstrates internal reliabilities of .62, .88, .84, and .77 for psychoticism, extraversion, neuroticism and lie scales respectively (Eysenck & Eysenck, 1985). The extraversion and neuroticism scales in particular have demonstrated high convergence with corresponding personality trait measures (Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993) and the EPQ has demonstrated a general predictive ability for a variety of criterion measures including depression, criminal involvement and schizophrenia (Eysenck, 1994).

### Buss-Durkee (1957) Hostility Inventory

Participants' level of hostility was measured through the widely used Buss-Durkee Hostility Inventory (BDHI) (1957), which measures eight different types of hostility. Hostility sub-scales were not of interest to the present study, rather the total hostility score was evaluated using the BDHI (Biaggio, Supplee and Curtis, 1981). Test-retest reliabilities of .82 have been reported for the total hostility scale (Biaggio, et al, 1981). Additionally, the predictive ability of the BDHI is evident through a number of self-report criterion measures including physical antagonism, physical and verbal expression and authoritarianism.

### Procedure

Participants were recruited using a purposive sampling technique (Babbie, 1998). Questionnaires were administered by two researchers to groups of four to ten offenders. Participants were instructed of the voluntary and confidential nature of the study and the procedure that would follow. The questionnaire package took approximately 45 minutes to complete. Permission to access offenders' criminal files was gained and demographic information recorded. Criminal information taken from files included category and number of previous convictions, number of court appearances, number of times sentenced to prison, and total time sentenced to prison. Twelve questionnaire responses were removed from further analysis due to incomplete questionnaires, unavailability of files or incomplete consent forms, and one was removed due to large amounts of missing data. To provide an accurate profile of each offender, participants were categorized as either personal or property offenders based on both the 16 offence classifications of the Australian Standard Offence Classification (ASOC) (Australian Bureau of Statistics, 1997). An inter-rater reliability of .96 was demonstrated. For the two cases where categorization was inconsistent among scorers, offenders were classified according to their current charge.

## Results

### Initial Analyses

Correlations between each of the personality sub-scales are given in Table 2.

Preliminary investigations of the correlation matrix identified several significant relationships both within and between the two personality measures, suggesting some support for the central hypothesis.

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Insert Table 2  
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Means and standard deviations obtained on each of Zuckerman, Eysenck and Eysenck and Buss-Durkee's personality scales, together with population norms provided by Zuckerman (1979), Eysenck and Eysenck (1985) and Buss-Durkee (1957) are presented in Table 3.

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To investigate whether any systematic differences were evident in EPQ and Sensation seeking scores between the offenders and norms of a non-offender population, a series of one-sample t-tests were conducted. A Bonferroni correction was introduced to minimize familywise error rates, with  $t$  values tested at  $\alpha = .006$ .  $t$  values are also given in Table 3.

Offenders demonstrated significantly higher psychoticism scores, higher extraversion scores, higher hostility and lower boredom susceptibility scores than the general population.

Given that offenders are a heterogeneous group and may systematically differ in their EPQ and sensation seeking scores, a multivariate analyses of covariance (MANCOVA) investigating personality scores across offence category (personal and property) and level of criminal involvement (high and low) was conducted. Significant relationships were evident only between age and sensation seeking and EPQ scores. No significant results were found for

offence category, ( $F(8,67) = .72, p > .05$ ), for level of involvement, ( $F(8,67) = 1.41, p > .05$ ), or for the offence category by level of involvement interaction ( $F(8,67) = .52, p > .05$ ). That is, there were no differences among offenders (type and level of offending) in sensation seeking and EPQ scores.

#### Relationships among EPQ and Sensation Seeking Scales

The central hypothesis of the present study stated that psychoticism, lie, disinhibition, experience seeking and boredom susceptibility sub-scales would cluster together and load on an unsocialized and impulsive sensation seeking factor (lie negatively), whereas extraversion, neuroticism and thrill and adventure seeking (TAS) would remain separate factors, with TAS representing a more socialized form of sensation seeking. Preliminary investigations identified several significant correlations both within and between the two personality measure supporting such a hypothesis.<sup>1</sup>

Principal axis factoring was employed, and three factors were extracted. Only two of the factors extracted had initial eigenvalues exceeding one, however, following examination of the point of change of direction as demonstrated in the scree plot, extraction of a third factor was justified because of the large amount of variance it accounted for (11.74%). Before rotation the three extracted factors accounted for 68.44% of the total variance explained. Loadings of variables on factors and communalities after oblique rotation are given in Table 4. In line with the cut-off point for inclusion reported by Comrey & Lee (1992), items with loadings of .32 and above were interpreted in the factor solution. The majority of the variables, with the exception of neuroticism, all demonstrate high communalities, above .4, indicating that these variables share a large proportion of variance in the solution provided.

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Psychoticism, disinhibition, and boredom susceptibility all loaded positively, and lie negatively on Factor 1, with loadings of above .64 on this factor, which can conceivably be

While an item analysis would have produced more accurate results, the sample size did not allow for such an analysis. Therefore, principal factor analyses were conducted on the eight sub-scales, rather than on the individual items.

referred to as impulsive unsocialized sensation seeking. Further supporting hypothesis 1, extraversion and neuroticism scales loaded on separate factors to the disinhibition, psychoticism, lie, boredom susceptibility, experience seeking and thrill and adventure seeking scales, demonstrating loadings of .71 and -.33 respectively on Factor 2. Unexpected however, was the finding that neuroticism and extraversion both loaded together on a second factor rather than on separate factors, although the contribution of neuroticism was small, as demonstrated in the communalities. Also supporting hypothesis 1, thrill and adventure seeking clearly loaded on a third factor separate from these 'unsocialized' psychoticism, lie, disinhibition and boredom susceptibility variables (loading = .71). Contrary to expectation, experience seeking (ES) also marked this factor quite highly (loading = .65) rather than loading on factor 1. It is conceivable to suggest that both these TAS and ES scales together represent a more socialized, non-impulsive form of sensation seeking (Zuckerman, 1994), and that they therefore are theoretically distinct from the other more unsocialized scales. The three factors together accounted for 49.97% of unique variance following rotation, with the first factor explaining 38.15% of the unique variance. As such, the results partially support the central hypothesis, in that a clear distinction was made between what can be conceived as socialized and unsocialized forms of sensation seeking.

#### Relationships between Hostility and Personality scales

The second hypothesis of the current study stated that variables representing unsocialized sensation seeking factor (P-Imp-Uss) would account for a significant proportion of variance in hostility scores, whereas extraversion, neuroticism and thrill and adventure seeking should not be related to hostility. Correlations between the scales are given in Table 2. As a significant relationship was evident between age and hostility, a hierarchical multiple regression was employed with total hostility as the dependent variable. Age was entered first to control for the relationship

between age and hostility, and was followed by the entry of the eight EPQ and sensation seeking sub-scales as independent factors. Results are given in Table 5. One outlier was identified, and its removal had no effect on subsequent results.

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Insert Table 5

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Age was significantly related to total hostility ( $F(1,75) = 16.9, p < .001$ ), accounting for 18.4% of the variance. After the EPQ and sensation seeking scales had been entered as predictors, there was a significant increment in the prediction of hostility ( $F_{change}(8,67) = 12.43, p < .001$ ). Together, these eight predictors accounted for 67.1% of the variance in hostility scores. In the final regression model, psychoticism, neuroticism, lie and disinhibition scales were all significant predictors of hostility. Over and above the unique contribution of these predictors, the eight variables together shared 52.1% of the variability in hostility. Such results largely support the second hypothesis, in that several of the ‘unsocialized’ sensation seeking variables, psychoticism, lie, and disinhibition, were all significant predictors of total hostility, after the effects of age were controlled for.

Despite the significant correlations between total hostility and boredom susceptibility, the inter-correlations with other sensation seeking and psychoticism and lie scales appear to be mediating the relationship between boredom susceptibility and total hostility. Also supporting hypothesis 2, extraversion and thrill and adventure seeking (socialized personality factors) were unrelated to total hostility scores. Contrary to expectation, however, neuroticism too was a significant predictor of total hostility, in fact accounting for the largest proportion of unique

variance. Overall, results demonstrate that hostility scores were more closely related to unsocialized rather than socialized sensation seeking factors.

### **Discussion**

The results of this study supported the reconceptualization of Zuckerman's (1979) sensation seeking and Eysenck and Eysenck's (1985) personality scales. Specifically, the results partially replicated those of Glicksohn and Abulafia (1998), in that there was a clear distinction between socialized and unsocialized forms of sensation seeking. Two factors representing socialized and unsocialized sensation seeking were evident. The findings of the present study contribute to the literature by demonstrating that the results of Glicksohn and Abulafia (1998) are also evident in an offender population. Specifically, the findings demonstrate that the notion of two socialized and unsocialized forms of sensation seeking holds in an offender population who have demonstrated to differ from the general population, in fact possessing significantly higher levels of hostility.

The thrill and adventure seeking scale clearly loaded on a separate factor to the other sensation seeking scales, and as Glicksohn and Abulafia (1998) suggest, in this study, this scale can reasonably be construed as a form of socialized sensation seeking characterized more by venturesome traits. Unlike Glicksohn and Abulafia (1998), the results of this study suggest that experience seeking is also a marker of this socialized form of sensation seeking. Seeking experiences through the mind and through a non-conforming lifestyle as originally defined by Zuckerman (1979) appears to represent a more socialized than unsocialized form of sensation seeking in an offender population. Given that the experience seeking scale includes items pertaining to seeking encounters with homosexual individuals and the likes thereof, which has become

more socially acceptable in the present society, it is reasonable to conceive that this may therefore represent a more socialized form of sensation seeking.

Disinhibition and boredom susceptibility sensation seeking scales on the other hand, appeared to cluster together and represent an impulsive, unsocialized form of sensation seeking (ImpUSS), first described by Zuckerman, et al. (1988). Supporting the idea introduced by Zuckerman et al. (1988), that psychoticism is intrinsically related to the sensation seeking trait, results demonstrated that the psychoticism scale was in fact the highest marker of this unsocialized sensation seeking factor. Such findings dispute the early ideas of Eysenck which conceptualized sensation seeking as a trait primarily linked to the extraversion factor.

Furthermore, results demonstrated that extraversion and neuroticism variables both loaded on a factor separate to the socialized and unsocialized sensation seeking factors. This demonstrates that extraversion and neuroticism appear to be independent traits, not subsumed by the overarching sensation seeking traits. Contrary to expectation however was the finding that extraversion and neuroticism were significantly correlated and that both traits marked the same rather than separate factors. These results suggest that extraversion and neuroticism may not be so distinct. However, given the ongoing results which demonstrate that neuroticism loads negatively on Factor 2, unlike extraversion, which loads positively on the factor, and given that neuroticism is not clearly related to any of the other variables, it is possible that in the appropriate conditions, it may have loaded on a separate factor. The sample size of the present study, while sufficient, was small for the purposes of factor analysis, restricting the number of factors that could be extracted. Had a fourth factor been extracted, it is possible that this may have been marked by the neuroticism trait. It must also be noted that due to the small sample size, an item analysis was not conducted, which would have

provided a much clearer representation of the underlying factors. Nevertheless, the neuroticism and extraversion traits demonstrated to mark a factor separate to the hypothesized socialized and unsocialized sensation seeking factors.

Importantly, a clear distinction was made between socialized and unsocialized sensation seeking factors, and Eysenck's psychoticism factor demonstrated to be a clear marker and perhaps sub-trait of the unsocialized personality factor. As such, the results support the recent suggestions of Glicksohn and Abulafia (1998), which dispute the existence of a psychoticism super-trait. Given that thrill and adventure seeking loaded on an independent, socialized sensation seeking factor, separate to that of the other sensation seeking scales, it is likely that it is not sensation seeking which loads on psychoticism, rather it is psychoticism that loads on this unsocialized form of sensation seeking. Instead of a psychoticism super-trait, there seems to be an overarching factor, an unsocialized form of sensation seeking, which is represented by psychoticism, along with lie, disinhibition, boredom susceptibility and experience seeking scales.

The second hypothesis, that the unsocialized personality scales (psychoticism, lie, disinhibition, boredom susceptibility and experience seeking) would relate positively to hostility, whereas the socialized factors (extraversion, neuroticism and thrill and adventure seeking) would not relate to hostility, was supported. Disinhibition, psychoticism, and lie scales, all markers of the unsocialized sensation seeking factor, were all significant predictors of hostility, such that higher psychoticism and disinhibition and lower lie scores were associated with higher hostility. Also, the results demonstrated that the 'socialized' sensation seeking factor, marked by the thrill and adventure seeking scale, did not relate to hostility.

Such findings support the split between socialized and unsocialized sensation seeking, in that the unsocialized scales did relate to an additional unsocialized hostility factor, in a similar way that they loaded on the unsocialized impulsive form of sensation seeking (P-ImpUSS). It is also quite possible then, as Zuckerman, et al. (1988) originally proposed, that hostility too, is a marker of this P-ImpUSS factor. In addition, extraversion and thrill and adventure seeking, as predicted, demonstrated no relationship with the unsocialized personality factor of hostility. This supports the idea that such scales are representative of more socialized personality factors, and as such, they do not influence the hostility levels of offenders. Alternatively, such results could be inferred to suggest the unsocialized nature of hostility and it could therefore be suggested that 'socialized' individuals do not possess high levels of hostility.

Contrary to expectation, boredom susceptibility, a trait which typically loads on the unsocialized sensation seeking factor, did not significantly relate to the unsocialized hostility scores, this suggesting that it may need to be considered separate from psychoticism, lie and disinhibition. On the other hand, it is quite possible that boredom susceptibility merely represents a less aggressive, but still unsocialized component of sensation seeking, and for this reason, did not relate to the hostility scale. Also contrary to expectation was the lack of significant relationships between hostility and experience seeking. Although originally proposed to represent an unsocialized trait, the earlier factor analysis identified it as a more socialized trait, and therefore, the insignificant relationship with hostility would be expected. Also contrary to prediction was the finding that neuroticism, a scale not typically loading on the unsocialized sensation seeking factor, did in fact significantly predict hostility scores. However, given the inconsistent relationships demonstrated by the neuroticism scale, such results should be interpreted with caution.

The findings support the predictions that the antisocial hostility trait would be related to the earlier established unsocialized personality factors, rather than the more socialized forms of sensation seeking. As such, they also support the idea that there are two clear socialized and unsocialized forms of sensation seeking, the latter which is undoubtedly marked by Eysenck's psychoticism factor.

Some of the unexpected findings of the present study could possibly represent an unreliability of answers provided by offenders, yet an exploration of Eysenck's lie scale revealed no elevated levels of social conformity in the offender sample. An alternative explanation may be that the sensation seeking questionnaire items developed 20 years ago were not especially relevant to the current time. Specifically, several slang words, or language terminologies may no longer be applicable, thus affecting results. Furthermore, an obvious methodological issue was the restricted sample size. Due to practical and resource constraints, a sample of 79 offenders was the maximum allowed for this study. Although sufficient, such a sample size places restrictions on the analyses performed. Factor analyses were performed with the sub-scales of the personality measures, the restricted sample size not allowing for a factor analysis of the individual questionnaire items, which may have permitted the extraction of additional factors. Therefore, the distinction between socialized and unsocialized sensation seeking may have become clearer with a larger sample size.

The results of the current study have significant implications for the theoretical understanding of personality and aggression. In particular, the identification of two forms of socialized and unsocialized sensation seeking has important implications for the theoretical underpinnings behind Eysenck and Eysenck's (1976) three factor personality model and Zuckerman's (1979) sensation seeking model. The findings suggest that a reformulation of Zuckerman and Eysenck and Eysenck's original personality theories may be necessary, and that the psychoticism scale should

not be considered a super-trait. Rather, it should rather be considered a trait that marks a more broad and overarching impulsive, unsocialized form of sensation seeking. Such findings support years of research, which has criticized the psychometric value of the psychoticism trait and scale. Furthermore, the results suggest that sensation seeking is comprised of two rather than four sub-traits, and that these traits are far more important than first imagined.

The results relating to aggression also support such findings, and imply that within a typically aggressive population of offenders, the unsocialized sensation seeking factors are able to predict higher 'unsocialized' hostility. Therefore, the results imply that the unsocialized trait also carries with it some aggression tendencies, which is particularly applicable in prison populations. The findings of the present study contribute to the literature by demonstrating that the results of Glicksohn and Abulafia (1998) are also evident in an offender population. Specifically, the findings demonstrate that the notion of two socialized and unsocialized forms of sensation seeking holds in a prison population who have demonstrated to differ from the general population, in fact possessing significantly higher levels of hostility.

Subsequently, the findings of the current study also have some implications for offender rehabilitation programs. If hostility and aggression are typically related to unsocialized sensation seeking, and if such offenders are typically high on hostility, then it may be possible to implement some rehabilitation strategies which focus on redirecting offenders unsocialized sensation seeking tendencies into more legitimate sources.

Before socialized and unsocialized forms of sensation seeking can be offered as replacements for the four sensation seeking, psychoticism and lie scales, further research is needed to determine the structure of factors extracted from analyses. Item analyses need to be performed on a

large sample of responses, not only to achieve an accurate representation of the number of factors to be extracted from the eight sub-scales, but also to determine the position of extraversion and neuroticism items, which are far from clear in the present study.

Furthermore, before such relationships between hostility and sensation seeking traits can be interpreted to support the existence of socialized and unsocialized sensation seeking, further research is necessary to substantiate this position. It may also be important to further investigate how such a relationship between unsocialized personality and aggression may relate to and explain offending behaviour. Subsequently, ideas regarding rehabilitation programs may be implemented.

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Table 1  
Frequencies of Offenders across Offence Categories (personal and property) and Level of Involvement (high and low)

Level of Involvement	Offence Category		
	Personal	Property	Total
Low	30	10	40
High	19	20	39
Total	49	30	79

Table 2  
Correlations between Hostility, Sensation Seeking and EPQ, Sub-scales.

Scale	Sub-Scale	1	2	3	4	5	6	7	8	9	10
EPQ	1. Psychoticism	1.00	.16	-.49**	.04	.02	.34**	.56**	.62**	.64**	-.32**
	2. Neuroticism		1.00	-.13	-.23*	-.12	.03	.10	.11	.41**	-.16
	3. Lie			1.00	-.11	-.15	-.31**	-.56**	-.46**	-.57**	.30**

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	4. Extraversion	1.00	.28*	.07	.17	.06	-.00	-.18
Sensation	5. TAS		1.00	.42**	.22*	.14	.09	-.20*
Seeking	6. Experience Seeking			1.00	.40**	.41**	.29*	-.17
	7. Disinhibition				1.00	.59**	.59**	-.37**
	8. Boredom Susceptibility					1.00	.62**	-.45**
BDHI	9. Total Hostility						1.00	-.43**
	10. Age							1.00

\*  $p < .05$

\*\*  $p < .01$

Table 3  
Offender and Non-offender Population Norms on EPQ and Sensation Seeking Scales

EPQ Scales	Offender Sample		Population Norms		<i>T</i>
	Mean	S.D	Mean	S.D.	
Psychoticism	4.09	2.61	3.08	2.20	3.44*
Extraversion	8.04	3.26	6.36	3.80	4.60*
Neuroticism	5.50	3.17	4.95	3.44	1.54
Lie	4.22	2.63	3.86	2.71	1.21
<b>Sensation Seeking Scales</b>					
TAS	7.11	2.61	7.7	2.2	-2.00
Experience Seeking	6.01	2.01	6.1	2.2	-.39
Disinhibition	5.51	2.64	5.9	2.6	-1.32
Boredom Susceptibility	3.41	2.40	4.2	2.3	-2.93*
Total Sensation Seeking	22.04	6.98	23.9	5.9	-2.37
Total Hostility	41.02	13.35	30.87	10.24	6.76*

TAS = Thrill and Adventure Seeking,

\* *t* value significant at  $\alpha = .006$ , pre-adjusted  $<.05$

Table 4  
Communalities and Loadings of Variables on Factors<sup>a</sup>.

Sub-scale	$h^2$	Pattern Matrix		
		Factor 1	Factor 2	Factor 3
Psychoticism	.61	.80		
Disinhibition	.63	.76		
Boredom Susceptibility	.61	.73		
Lie	.43	-.64		
Extraversion	.52		.71	
Neuroticism	.14		-.33	
TAS	.61			.71.
Experience Seeking	.47			.61

Factor 1 = Unsocialized Sensation Seeking variable (P=Imp-USS),

Factor 2 = Extraversion and Neuroticism.

Factor 3 = Socialized Personality variable.

a = Items with loadings of .32 and above are interpreted in the factor solution in line with cut-off points for inclusion reported by Comrey & Lee (1992).

Table 5  
 Summary of Hierarchical Multiple Regression Analysis Results: Predictors of Hostility

	B	SE	$\beta$	<i>t</i>	$R^2$	$Sr^2$
Age (Block 1)	-.11	.11	-.08	-.99	.18	
Psychoticism	1.32	.51	.26	2.61*		.03
Extraversion	-.18	.32	-.04	-.55		
Neuroticism	1.25	.32	.29	3.93*		.08
Lie	-.91	.46	-.18	-1.99*		-.02
TAS	.22	.44	.04	.51		
Experience Seeking	-.22	.58	-.03	-.38		
Disinhibition	1.12	.51	.22	2.18*		.02
Boredom Susceptibility	1.09	.58	.20	1.88		
Total Scales (Block 2)					.67	

TAS = Thrill and Adventure Seeking, *t* value significant at  $\alpha = .05$

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