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Eysenck's theory of crime revisited: Factors or primary scales?

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Purpose. This study aims to advance the original formulation of Eysenck's theory of criminality from the factorial level to suggest that primary scales of personality best determine reports of delinquency.

Method. Two self-report studies were conducted. The first consisted of 101 students and the second used an additional 101 students. The first study used measures of Self-Reported Delinquency (SRD) and Socialisation (Gough & Peterson, 1952) and the Eysenck Personality Questionnaire Revised Edition (EPQ-R; H.J. Eysenck & Eysenck, 1991). The second study complemented the first study to utilize the EPQ-R and SRD only.

Results. A series of exploratory hierarchical multiple entry regressions of the factors in the first study demonstrate that high Psychoticism predicts SRD, whereas high Psychoticism and Neuroticism predict Under-socialization. The primary scales of Disrespect for Rules, Depressed and Need for Stimulation significantly predict both criteria. The second study extends the first study through structural equation modelling to provide acceptable evidence of the concurrent validity of these primary scales with SRD.

Conclusions. We propose that the significant primary scales of personality provide a clear reformulation of Eysenck's original theory of criminality as they explain the variance in delinquency and socialization in a systematic manner. Furthermore, primary scales provide a theoretical framework for behavioural interventions, as required by Blackburn (2000).

Delinquency and crime take many forms and much theorizing from many disciplines addresses why such activities occur. One line of enquiry that helps to explain the potential causes of crime is personality (e.g. Blackburn, 2000). A controversial explanation of the causes of crime in terms of personality is that of Eysenck (e.g. Eysenck, 1996; Eysenck & Gudjonsson, 1991), who proposed that personality factors

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are the principal cause of criminal behaviour and are the only systematic method available for its investigation.

Theoretically, H.J. Eysenck (1996) considers criminal activity to be rational behaviour. As H.J. Eysenck (1996, p. 148) put it 'The real question is ... why do we behave in a socially desirable manner' rather than why should people commit crimes? The answer according to Eysenck is personality (Eysenck & Gudjonsson, 1991) which consists of three factors, namely psychoticism, extraversion and neuroticism (Eysenck, 1996; Eysenck & Eysenck 1992), although this solution to personality has been widely criticized by others (Costa & McCrae, 1992). In later models (Eysenck, 1996), all three factors have a biological basis, and consist of several primary scales. Thus, for example, extraversion is commonly thought to consist of impulsivity and sociability (but note that recent research suggests that sociability is probably a by-product of reward sensitivity; Lucas, Diener, Grob, Suh, & Shao, 2000).

Criminal behaviour is explained within the general paradigm of personality psychology (H.J. Eysenck, 1996, 1997). This paradigm suggests that distal antecedents (genetic personality determinants) and proximal antecedents (biological intermediates) cause psychometric trait constellations (i.e. Psychoticism, Extraversion and Neuroticism). Personality, in turn, has proximal (e.g. cognitions) and then distal consequences (e.g. social behaviours, one form of which is crime). This article addresses the psychometric constellations, namely the appropriateness of Eysenck to focus on personality super factors and not primary scales (Eysenck, 1996).

The rationale of the personality effects in Eysenck's theory of criminality (Eysenck, 1996) may be stated as follows. Extraversion is caused by lower levels of cortical arousal, which produces an increased need for stimulation and poor classical conditioning. Eysenck (1996) asserts that introverts are more influenced by punishment, whereas reward is more persuasive to extraverts. Recent evidence, however, suggests that the high levels of sociability of extraverts are a by-product of reward sensitivity which is a core feature of extraversion (Lucas *et al.*, 2000). Classical conditioning is essential to develop a 'conscience' that regulates a universal propensity to crime. The 'conscience' becomes underdeveloped either innately or through learnt means (i.e. classical conditioning). This point is central to the current paper, as Blackburn (1999, p. 117) notes: 'the theory does not assert that criminality *per se* is biologically determined', rather it '... depends on the quality of conditioning received in childhood as well as the child's degree of conditionability, but Eysenck is concerned with individual differences'. A consequence of Eysenck's focus on the factorial level is to impair targeted clinical interventions, whereas primary scales facilitate clinical direction by providing more precise direction than factors and so increase the chances of a successful intervention (e.g. Blackburn, 2000).

Neuroticism, according to Eysenck's original conceptualization, has its biological basis in the autonomic nervous system, although recent evidence disputes this view (e.g. Fahrenberg, 1988). Behaviourally, neuroticism acts as a natural drive that reinforces behavioural tendencies with habit. In terms of crime, high neuroticism makes people more persistent and so crime becomes a routine that is reinforced. Conversely, with regard to social rules, such as those learnt in school, high neuroticism interferes with efficient learning. Coupled with high extraversion, high neuroticism results in an inability to condition, and so increases the likelihood of criminal behaviour.

Psychoticism was originally thought to have its biological basis in the dopamine pathways, although this is now considered unlikely (Depue & Collins, 1999), and

therefore it appears that this aspect of Eysenck's theory is neither identified, nor clear. Psychoticism may be related to criminal behaviour as it makes a person Tough-minded and reduces sensitivity to guilt. Based on this reasoning, Eysenck (1996) postulates that high Extraversion, Neuroticism and Psychoticism are likely to cause delinquency and criminal activities.

Reviews of Eysenck's theory of crime (Eysenck, 1996) concur that there are severe methodological difficulties in testing the theory (e.g. Farrington, Biron, & LeBiron, 1982; Furnham & Thompson, 1991), particularly when using incarcerated samples. One problem is that neuroticism may increase due to imprisonment. A second difficulty is that incarceration seems to decrease extraversion and the questions on the extraversion scale often do not apply to prisoners (e.g. going to a party). Possibly, problems of putting sociability into practice may decrease the otherwise high extraversion scores of prisoners. A final problem with criminal samples is the adequacy of control groups. Conversely, a potential problem of self-reported delinquency within the general population is that it generally relates to relatively minor forms of delinquency.

Reviews of the empirical status of the theory provide mixed support for the contentions of Eysenck's (1996) model (e.g. Blackburn, 1999; Farrington *et al.*, 1982; Furnham & Thompson, 1991). Reviewers agree that high Psychoticism almost always relates to criminal activity irrespective of the methodology that is used (i.e. self-report within the general population or criminal samples). Neuroticism is higher in criminal groups than the normal population. Extraversion is generally higher when self-report methods are used in the general population, but not in criminal samples.

Despite his focus on the personality factors, inspection of Eysenck's work reveals that he considers some primary scales of the personality factors to be *more relevant* predictors of criminality than others (Eysenck & Eysenck, 1970). Potentially, therefore, primary scales offer a more specific test of the theory than the type level explanation. With respect to Extraversion: 'Sociability is one of the constituent parts of the E factor, but it may be less relevant than impulsiveness, or risk taking behaviour or sensation seeking to criminal conduct' (Eysenck & Eysenck, 1970, p. 227). Item-level examination of responses to 'a specially constructed personality inventory' designed to reflect 'P, E and N' by the Eysencks (Eysenck & Eysenck, 1971, pp. 50–51), leads to the conclusion that impulsiveness, but not sociability is responsible for the correlation between criminality and extraversion. With regard to Psychoticism, Eysenck focuses on the factor as a source of explanation. As Eysenck and Eysenck (1970, p. 227) explain, the traits 'enumerated' by Psychoticism 'resemble rather closely those often exhibited by criminals.' Item-level inspection, however, led S.B.G. Eysenck and Eysenck (1971) to the *post hoc* conclusion that Psychoticism items dealing with hurting people and animals differentiate prisoners from controls. With respect to Neuroticism, item-level analysis reveals that criminals 'are of the autonomic type, *i.e.* referring to direct manifestations of sympathetic arousal or else to introspective interpretations of such arousal in the form of worry, or feelings of tenseness, being highly strung, nervous, etc.' (Eysenck & Eysenck, 1971, p. 53). In fact, this item-level analysis of S.B.G. Eysenck and Eysenck (1971) led to the development of the criminality subscale of the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1991). This scale is criterion validated by design and is therefore empirically and not theoretically derived, a point acknowledged by the authors. As such, it is a scale without a theory and so provides no framework to assess behavioural change.

Irrespective of the item-level analysis conducted by S.B.G. Eysenck and Eysenck (1971), the focus on testing Eysenck's theory of crime has remained on factors rather than primary scales. Twenty years after the item-level analysis, H.J. Eysenck and Gudjonsson (1991, p. 45) state 'contributions to the prediction of everyday life behaviour come from the higher order factors rather than from the primaries'.

The issue of whether attention should be paid to broad-based personality constructs (factors) or specific primary scales is discussed at length in organizational psychology. To simplify, some researchers argue in favour of primary scales, as they show higher criteria-related validity and others suggest that broad factors hold greater potential as predictors of performance across jobs and settings (see Ones & Viswesvaran 1996; Schneider, Hough, & Dunnette, 1996, respectively). In delinquency research, for instance, Heaven (1996a) considers the relationship between the big five and self-reported delinquency at both the factor and primary scale level. At the factorial level, Heaven (1996a) finds that Agreeableness, Conscientiousness and Neuroticism were significant predictors of self-reported delinquency. At the primary scale level, trust and excitement-seeking predict both vandalism and theft, whereas self-discipline predicts only vandalism. Although tests of the effects of delinquency at the primary scale level exist (e.g. Heaven, 1996a), they do not test Eysenck's theory of criminality (e.g. H.J. Eysenck, 1996) and focus on primary scales in a generally atheoretical manner. Without theory, primary scales provide descriptions of behavioural patterns, but do not provide information about how change may be achieved (Blackburn, 2000).

One potential manner in which primary scales can provide direction for change is understanding those that are learnt and not learnt. Recently, by drawing on the learning styles literature, Jackson and Lawty-Jones (1996; see also Furnham, 1992) reanalyse the Eysenck Personality Questionnaire Revised Version (EPQ-R; Eysenck & Eysenck, 1991) to reveal the primary scales of each of Eysenck's personality factors. Jackson and Lawty-Jones (1996) explain each of the primary scales depending on whether they are experientially learnt or not learnt. Experientially learnt traits are those primary scales which are found to relate to learning style (e.g. Sociability). Experientially not learnt traits are those primary scales which do not relate to learning style (e.g. Depressed). It follows that those traits which have substantive relations to learning style should be more receptive to change and hence interventions (i.e. learnt primary scales) than those which do not (i.e. not learnt primary scales). The distinction between experiential learning and biological basis is not necessarily mutually exclusive. Current knowledge should guide consideration about the status of whether a trait is experientially learnt and, or, has a biological basis.

Identifying whether traits are learnt or not provides the theoretical framework for behavioural interventions, desired by Blackburn (2000). This allows us to assess issues such as the management of dangerous offenders and how to target interventions. The present study expands the earlier work of Jackson and Lawty-Jones (1996) to assess the construct and criteria validities of their primary scales and in so doing allows us to consider Eysenck's theory of crime at the levels of both factors and primary scales. It is noteworthy that other robust solutions to the EPQ-R exist (Barrett & Kline, 1980), although these do not draw on the distinction between whether primary scales are learnt or not which is a prerequisite for clinical interventions.

According to Jackson and Lawty-Jones (1996), the primary scales underlying Extraversion are Sociable/Lively, Impulsive and Need for Stimulation. Need for Stimulation is shown by Zuckerman (1994) to relate to criminality and 'Impulsivity appears to be more important to crime than sociability' (Eysenck & Eysenck, 1970, p. 227). Also,

longitudinal evidence demonstrates a relationship between impulsivity and various antisocial behaviours, such as vandalism (Luengo, Carrillo-de-la Pe a, Otero, & Romero, 1994). The primary scales underlying Neuroticism are Nervous/Worrier and Depressed (Jackson & Lawty-Jones 1996). Previous studies suggest that criminals say they have had a lot of bad luck (see Farrington *et al.*, 1982), implying that the Depressed primary scale may be indicative of a high score on self-reported delinquency due to a predisposition to depression. Primary scales underlying Psychoticism are Disrespect for Rules, Schizotypy and Tough-minded (Jackson & Lawty-Jones 1996). As a personality scale, Disrespect for Rules relates to criminality by its very nature. Previous studies of schizotypal personality disorder indicate that intermediate levels of schizotypy only can play a role in at least certain types of criminal behaviour (e.g. Raine, 1992; Raine, Lencz, & Benishay, 1997). Consequently, we hypothesize that the primary scale of schizotypy will relate to delinquency. Finally, with respect to Tough-minded, it is interesting to note that the EPQ-R manual (Eysenck & Eysenck, 1991) proposes 'Tough-minded' as an alternative label to 'Psychoticism'. This raises the issue of nomenclature (i.e. the labelling of factors), whereby the primary scale of Tough-minded presumably reflects a narrower definition of this latent construct than the factorial definition. Consequently, this yields two competing hypotheses, first the Eysenckian hypothesis that suggests tough minded relates to delinquency. The second possibility is our hypothesis, that Tough-minded does not relate to wrong-doing, rather delinquency is explicable in terms of the remaining primary scales of Psychoticism previously identified.

In summary, we hypothesize that self-reported socialization and delinquency may be related to personality factors of Psychoticism, Extraversion and Neuroticism (in that order of likelihood) as proposed by Eysenck's theory of crime (e.g. Eysenck, 1996). We expect, however, that the primary scales of Disrespect for Rules, Depressed, Impulsivity, Need for Stimulation and Schizotypy are more likely to predict the criteria of self-reported socialization and delinquency for two reasons. First, relevant primary scales are likely to have higher criteria-related validity than the broader factors of personality as indicated by previous research in the psychology of work. Second, the primary scales we identify as relevant provide a more precise and appropriate test of Eysenck's theory of criminality than Eysenck's test of his own model (e.g. Eysenck, 1996).

STUDY 1

Method

Participants and procedure

A total of 101 psychology students completed the questionnaires. Overall their average age was 22.2 years (SD = 8.58) and 89.1% (n = 90) were female. The demographic variables were coded so that a high score represents being female and older. All participants were approached individually or in classes. Participants were informed of the aims of the study and assured of absolute confidentiality by means of an introductory letter.

Questionnaires

The Eysenck Personality Questionnaire – Revised Edition (EPQ-R; H.J. Eysenck & Eysenck, 1991)

This inventory measures personality in terms of Extroversion/Introversion, Neuroticism/Stability and Psychoticism. A Lie scale is also included. People high in

Extraversion are described as impulsive, sociable and having a need for stimulation. People high in Neuroticism are described as nervous and depressive. People high in Psychoticism are described as tough-minded and uncaring. People high on the Lie scale attempt to present a positive self-image. These factors were split into primary scales in accordance with the methodology of Jackson and Lawty-Jones (1996). The primary scales of Extraversion are: Sociable/Lively, Impulsive and Need for Stimulation. The primary scales of Neuroticism are Nervous/Worrier and Depressed. The primary scales of Psychoticism are Disrespect for Rules, Schizotypy and Tough-minded.

Self-Reported Delinquency (SRD)

A shortened scale was developed based on earlier work by Furnham and Thompson (1991) for the purposes of the present study. This scale consisted of 22 items on theft, tax avoidance, cheating, drug use and violence. By item examination of the earlier results of Furnham and Thompson (1991) it was hoped that a shortened, but equally reliable assessment of SRD would be possible, without excessively narrowing the bandwidth of the construct. Items were responded to on a 5-point Likert scale ranging from *'Very Infrequently'* to *'Very Frequently'*. A sample item is 'I have sold an illegal drug'. The scale was coded so that a high score represents more delinquency.

Socialization–Under-socialization (Gough & Peterson, 1952)

The Gough scale acted as a measure of socialization. This scale is widely shown to discriminate delinquent and nondelinquent samples and is widely used in delinquency research (Gough, 1994; Gough & Peterson, 1952; Gudjonsson & Sigurdsson, 1999). The scale was reverse coded such that a high score represents under-socialization.

Results

The means, standard deviations, Cronbach's alphas and correlations with the dependent variables are shown in Table 1. Internal consistency, as indicated by Cronbach's alphas, was mostly respectable with the exception of Need for Stimulation and Tough-minded. As shown in Table 1, correlations with the dependent variables were reasonable. The correlations show, however, that the primary scales consistently correlate with both outcome measures, whereas the super factors do not.

Table 2 shows the factor pattern of the primary scales with coefficients >.3 underlined to aid interpretation. Factors were extracted by Promax rotation using a maximum likelihood algorithm. The results show that the model was a good fit to the data ($\chi^2(7) = 4.65$, $P = .71$). To determine the number of factors to be extracted we conducted a parallel factor analysis. Parallel factor analysis involves comparison of the eigenvalues of exploratory factor analysis of the actual data set with that a random data set consisting of random numbers that are the same as the actual data in terms of the number of variables and the sample size. When the eigenvalues of the actual data set are larger than those of the random numbers, the factors are accepted. This method of extraction is more objective than alternative methods of extraction, such as the scree plot technique, that are often used in exploratory factor analysis (Thompson & Daniel, 1996). Examination of the upper part of Table 2 shows the results of the parallel analysis. This reveals that the first three factors of the data are larger in their eigenvalues and percentage accounted for than random data, but not the fourth factor. Together this suggests that the three-factor solution provides a good fit of the model to the data. The results, which account for 67.58% of the variance, show that the first

Table 1. Descriptive statistics and correlations with outcome scales

Eysenckian factors					
Scale	M	*SD*	Alpha	SRD	Uns.
Extraversion	15.03	5.07	.86	.17	.08
Neuroticism	13.44	5.58	.87	.10	.23*
Psychoticism	6.21	3.67	.71	.49**	.45**
Lie scale	6.08	3.77	.78	–.34**	–.09
Primary scales					
Extraversion					
Sociable/Lively	11.35	3.49	.85	.14	–.04
Impulsive	2.67	1.73	.62	.18	.26**
Need for Stimulation	1.01	.83	.54	.14	.10
Neuroticism					
Nervous/Worrier	7.76	3.08	.82	–.19	.05
Depressed	5.68	3.25	.81	.02	.35**
Psychoticism					
Disrespect for Rules	4.12	2.65	.70	.50**	.32**
Schizotypy	1.52	1.50	.69	.28**	.38**
Tough-minded	.57	.73	.51	.09	.34**
Demographics					
Age				.06	–.07
Sex				–.31**	–.15
Dependent Variables					
Under-socialization (Uns.)	17.59	5.74	.72	.32**	
Self-reported delinquency (SRD)	40.96	12.09	.88		.32**

*$p < .05$, **$p < .01$ (2-tailed tests). For all scales $N = 101$.

factor represents Extraversion, the second factor Neuroticism and the third factor Psychoticism. With the possible exception of Tough-minded, this suggests that the scales used in this study adequately represent Eysenck's theory of personality at the primary level of description.

Before proceeding with the hierarchical entry regression analyses all the variables were standardized. Power analysis was conducted using GPOWER (Erdfelder, Faul, & Buchner, 1996). Compromise power analysis indicated good power for five predictors, namely, the demographic and Eysenckian factors; (Power = .91) and reasonable power (.86) with 10 predictors, namely the primary scales and demographic factors. Consequently, by increasing the number of predictors in the regressions, the results are virtually equivalent in terms of statistical power. Next, a series of directed hierarchical regression models was conducted to compare the ability of the primary scales with the Eysenckian super factors in predicting self-reported delinquency and self-reported under-socialization (see Tables 3 and 4 respectively).

Table 3 shows two hierarchical regression models for Self-Reported Delinquency, first by the Eysenckian super factors and then by the primary scales. The upper section of Table 3 shows the hierarchical regression model for the demographic variables and Eysenckian factors. In step 1, the demographic variables significantly account for 8% of the variance ($F(2,98) = 5.12$, $p < .01$). In step 2, the addition of Psychoticism significantly accounted for a further 18% of the variance ($F(3,97) = 12.47$, $p < .01$). In step 3

Table 2. Maximum likelihood parallel factor analysis of the primary traits of the Eysenck Personality Questionnaire

Random data eigenvalues	1.46	1.25	1.14	1.12
% Variance explained	18.27	15.65	14.30	14.00
Data eigenvalues	2.40	1.77	1.24	.81
% Variance explained	29.96	22.15	15.47	.10
Cumulative % variance explained	29.96	52.12	67.58	
Factor	I E	II N	III P	
Impulsive	.99	.13	.05	
Sociable/Lively	.69	–.14	–.13	
Need for Stimulation	.32	–.26	–.11	
Depressed	–.01	.92	–.09	
Nervous/Worrier	–.11	.50	–.44	
Tough-minded	–.02	.52	.30	
Schizotypy	.01	.30	.65	
Disrespect for Rules	–.13	–.08	.59	

Table 3. Hierarchical regression models of self-reported delinquency

	Step		ß	*t*	*p*	*R*	R^2	Adjusted R^2
Hierarchical regression by Eysenckian factor								
	1	Age	.09	.95	.35			
		Sex	–.14	–1.52	.13	.31	.09	.08*
	2	Psychoticism	.45	4.85	.00	.53	.28	.26*
	3	Extraversion	.10	1.12	.27	.54	.29	.26*
	4	Neuroticism	.03	.32	.75	.54	.29	.26*
Regression by primary scale								
Description								
Demographic	1	Age	.08	.85	.40			
		Sex	–.15	–1.59	.11	.31	.09	.08**
Psychoticism	2	Disrespect for Rules	.46	4.59**	.00			
		Schizotypy	.07	.65	.52			
		Tough-minded	.00	.04	.97	.54	.30	.26**
Neuroticism	3	Depressed	.24	1.99*	.05			
		Nervous/Worrier	–.11	–.90	.37	.56	.31	.26**
Extraversion	4	Need for Stimulation	.19	1.98*	.05			
		Impulsive	–.10	–.79	.43			
		Sociable/Lively	.12	.99	.32	.59	.35	.28**

*$p < .05$, **$p < .01$.

of the model, Extraversion did not significantly add to the variance explained although the model remained significant ($F(4,96) = 9.66$, $p < .01$). In step 4 of the model, Neuroticism did not significantly add to the variance explained although the model remained significant and in total accounted for 26% of the variance ($F(5.95) = 7.68$,

Table 4. Hierarchical regression models of under-socialization

	Step		ß	*t*	*p*	*R*	R^2	Adjusted R^2
Regression by Eysenckian factor								
	1	Age	.08	.84	.41			
		Sex	–.01	–.06	.95	.18	.03	.01
	2	Psychoticism	.49	5.27**	.00	.45	.20	.18**
	3	Extraversion	.12	1.34	.19	.45	.21	.17**
	4	Neuroticism	.35	3.68**	.00	.55	.30	.27**
Regression by primary scale								
Description								
		Age	–.04	–.44	.66			
Demographics	1	Sex	–.03	–.33	.74	.18	.03	.01
		Disrespect for Rules	.31	3.24**	.00			
		Schizotypy	.11	1.10	.27			
Psychoticism	2	Tough-minded	.07	.69	.49	.49	.24	.20**
		Depressed	.38	3.27**	.00			
Neuroticism	3	Nervous/Worrier	.00	–.01	.99	.57	.32	.27**
		Need for Stimulation	.23	2.51**	.01			
		Impulsive	.27	2.21**	.03			
Extraversion	4	Sociable/Lively	–.20	–1.77	.08	.64	.41	.34**

**$p < .01$.

$p < .01$). In sum, this suggests that the demographic variables and Psychoticism significantly accounts for 26% of the variance, whereas no other direct effects are observable.

The lower section of Table 3 shows the hierarchical regression model for the primary scales. Examination of Table 3 reveals that demographic factors explain 8% of the variance in Self-reported Delinquency ($F(2,98) = 5.12$, $p < .01$). In step 2, the primary scales of Psychoticism were entered (i.e. Disrespect for Rules, Tough-minded and Schizotypy) and these explained an additional 18% of the variance, but only in terms of Disrespect for Rules ($F(5,95) = 7.97$, $p < .01$). In step 3 of the regression, the primary scales of Neuroticism (i.e. Depressed and Nervous/Worrier) were entered into the model, and the primary scale of Depressed significantly added to the variance in the model ($F(7,93) = 6.00$, $p < .01$). In step 4 of the model the primary scales of Extraversion were entered into the model, namely Need for Stimulation, Impulsive and Sociable/Lively. Need for Stimulation incremented the variability explained by the model by a further 2% ($F(10,90) = 4.85$, $p < 0.01$). In sum, these results demonstrate that primary scales, which span the personality super factors, explain slightly more of the variance in self-reported delinquency than personality factors. Furthermore, this pattern of results implies that the relationship between Psychoticism and self-reported delinquency *may be* a by-product of the effects of the primary scale of Disrespect for Rules.

Table 4 shows the directed hierarchical regression analyses for under-socialization (Gough & Peterson, 1952), first, using the Eysenckian super factors and then second by the primary scales. The upper section of Table 4 shows the hierarchical regression models for the demographic variables and Eysenckian super factors. These results

reveal that the demographic variables entered in step 1 of the model did not significantly contribute to the variance explained ($F(2,98) = 1.59$, $p = .21$). The addition of Psychoticism in step 2 incremented the model by a further 17% of the variance ($F(3,97) = 8.31$, $p < .00$). The addition of Extroversion in step 3 of the model did not significantly improve prediction ($F(4,96) = 6.20$, $p < .00$). In step 4 of the model, Neuroticism significantly accounted for a further 10% of the variance explained ($F(5,95) = 8.32$, $p < .00$). In sum, these results demonstrate that under-socialization is explicable in terms of high Psychoticism and high Neuroticism.

The lower section of Table 4 depicts the hierarchical regression model for the primary scales. The primary scales were entered into the model in the following order demographic variables, Psychoticism, Neuroticism and Extraversion. These results demonstrate that demographic factors do not significantly effect low levels of socialization ($F(2,98) = 1.59$, $p = .21$). Disrespect for Rules, however, significantly increments the variance explained in the model by 19% ($F(5,95) = 5.99$, $p < 0.01$). In step 2 of the model, Depressed significantly incremented the variance explained by a further 7% ($F(7,93) = 6.26$, $p < 0.01$). In step 4 of the model, Impulsive and Need for Stimulation significantly incremented the variance explained by a further 7% ($F(10,90) = 6.16$, $p < 0.00$). This pattern of results suggests that Psychoticism and Neuroticism explain Socialization. The primary scales, however, were superior in that they relate antisocial behaviour to each of the personality super factors, unlike Eysenck's own factorial explanation that fails to demonstrate this systematic relationship. Furthermore, primary scales explain 7% more of the variance than the factors in under-socialization and 2% more of the variance in self-reported delinquency. It appears that the relationship between Psychoticism and socialization is explicable in terms of Disrespect for Rules and the Neuroticism relationship is by Depressed. Finally, Extraversion did not show any relationship with under-socialization, whereas the primary scales Impulsive and Need for Stimulation did.

Discussion

The results provide preliminary evidence that certain primary scales from each personality super factor explain self-reported delinquency and under-socialization. The efficacy of the factors in demonstrating concurrent validity varies by criterion, such that Psychoticism predicts both criteria, and Neuroticism predicts only self-reported delinquency. Of the primary scales, Tough-minded is a significant correlate of socialization only, and is not significant when other predictors are included in the analysis. Schizotypy, Disrespect for Rules, Depressed and Need for Stimulation are significant predictors of both criteria and Impulsive is predictive of under-socialization only. Therefore, these results suggest that the primary scales explain the criteria more comprehensively and consistently than the super factors.

This study, which explores the concurrent validity of the scales, suggests that a reinterpretation of Eysenck's theory of crime at a primary scale level provides a better explanation of crime than at the factorial level, as the significant predictors span the personality factors thought to relate to delinquency and socialization. As the analyses are exploratory, however, a second study is reported in which we use structural equation modelling. There are several reasons to use this approach, a first being the logical progression of research. In an exploratory analysis, (i.e. the previous study) patterns of relations are sought between variables, whereas confirmatory research represents an effort to determine if a hypothesized structure reasonably describes the

pattern of relationships among the variables (Fouladi & Steiger, 1999). Second, structural equation models facilitate a parsimonious test of a theoretical model. We use confirmatory factor analysis to address the factor structure of the secondary scales, as previously identified by Jackson and Lawty-Jones (1996), and also to address Eysenck's theory of crime (Eysenck, 1996) at the primary scale level. This model suggests that the demographic factors of age and sex have direct effects on the secondary scales that relate to delinquency (as previously identified in the first study), which in turn directly effect the variable of delinquency.

STUDY 2

Method

Procedure

Participants were approached individually or in classes. Participants were further informed of the aims of the study and assured of absolute confidentiality by means of an introductory letter. The demographic variables were coded so that a high score represents being female and older.

Participants

Psychology students (n = 101) of whom 52.5% (n = 53) were female and the average age was 22.31 years (SD = 4.28).

Questionnaires

Two questionnaires were used in the present study. Personality was assessed using the EPQ-R (Eysenck & Eysenck, 1991). Self-Reported Delinquency (SRD) was assessed by the scales of Furnham and Thompson (1991).

Analytical procedures

The data from Study 1 and Study 2 were combined. This resulted in item level data for the EPQ-R and a standardized Z-score for SRD and so increased the sample size to a total of 202 participants.

Results

Table 5 shows the descriptive statistics of the measures used in the present study. As can be seen from Table 5 the internal consistency, indicated by the coefficient alphas, ranged from an acceptable .87 to a weak .41. Overall pattern of correlations between SRD and scales was similar to that of the first study.

To provide further evidence for the construct validity of the primary scales approach in this combined sample, we conducted a confirmatory factor analysis (CFA) on the covariance matrix with maximum likelihood estimation (MLE) using LISREL 8.3 (Jöreskog & Sörbom, 1996). CFA extends traditional exploratory factor analysis to specify in advance which observed variables theoretically load on to each latent factor. This allows confirmation of hypothetical latent structures rather than merely their exploration. The analysis of scales rather than items is supported by Nunnally (1978), who notes that computations based on items never provide adequate results because

Table 5. Descriptive statistics

		M	*SD*	Reliability	*r* with SRD
Eysenckian super factors					
	Extraversion	16.26	4.72	.73	.21**
	Neuroticism	13.51	5.65	.87	−.09
	Psychoticism	7.65	4.43	.72	.46**
	Lie Scale	5.55	3.80	.79	−.34**
Primary scales					
Extraversion	Sociable/Lively	11.90	3.27	.69	.11
	Impulsive	3.21	1.68	.41	.18*
	Need for Stimulation	1.15	.80	.56	.20**
Neuroticism	Depressed	6.14	3.20	.78	.27*
	Nervous/Worried	7.37	3.24	.84	.05
Psychoticism	Disrespect for Rules	4.73	2.82	.72	.49**
	Tough-minded	2.12	1.88	.50	.05
	Schizotypy	1.81	1.09	.56	.31**
Demographics					
	Age	22.25	6.76		.19
	Sex				−.33
	Self-reported delinquency (SRD)	.00	1.00		

*$P < .05$, **$P < .01$, $N = 202$.
Note. SRD is a standardized composite of the self-reported delinquency scales from Study 1 and 2.

the range of items is too narrow and even a slight shift in item responses results in distortions of all the frequencies of all the computations. Consequently, a three-factor CFA of the primary scales of the EPQ-R was conducted by setting the factors to load on the primary scales as outlined by Jackson and Lawty-Jones (1996). The χ^2 goodness-of-fit index was significant which suggested that the data were a poor fit to the model. However, as χ^2 is sensitive to sample size we consider the absolute and incremental indices of model fit. The Adjusted Goodness-of-Fit Index (AGFI) compares how the model fits the data compared with no model and rewards parsimony by accounting for the degrees of freedom. The Non-Normed Fit Index (NNFI) compares the baseline model with a null model. Both the AGFI and NNFI fit indices are over .9, which suggests that the data are a good fit to the model. Finally, the Root Mean Square Error of Approximation (RMSEA) is a fit index used to assess the discrepancy of fit between the model and the data. The observed RMSEA is below the cut-off value of .06 proposed by Hu and Bentler (1999) and so suggested that the model is a marginally acceptable fit to the data ($\chi^2(18) = 44.13$ $P < .01$, RMSEA = .058, $N = 202$; NNFI = .90; AGFI = .90). This CFA is in agreement with the EPQ primary scales as proposed by Jackson and Lawty-Jones (1996). A full copy of the scale loadings is available from the authors upon request.

A latent path analysis was conducted using LISREL 8.3 (Jöreskog & Sörbom, 1996) on the covariance matrix using MLE to assess the utility of the significant predictors of Self-reported delinquency as identified and discussed in the first study. The goodness-of-fit indices suggested that the model had a marginally acceptable fit to the data ($\chi^2(7)$

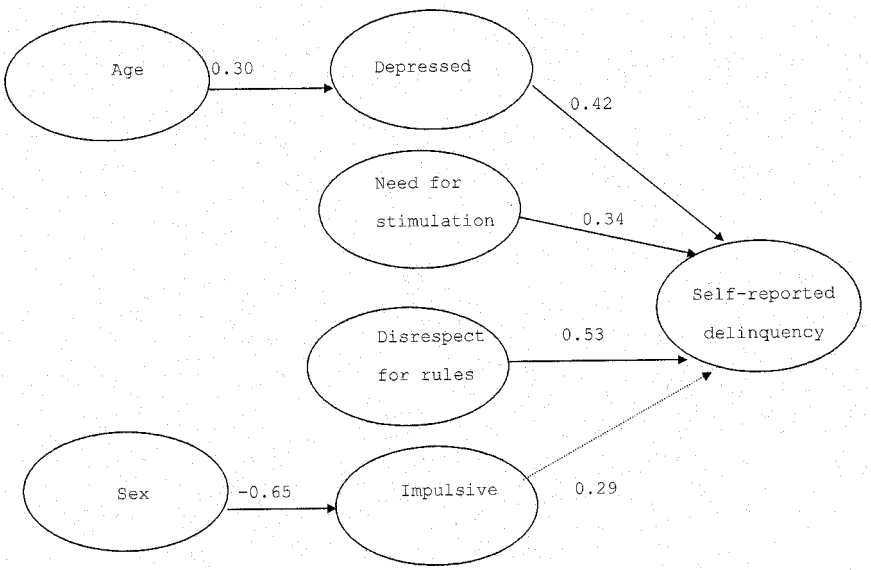

Figure 1. Structural equation model of the primary scales effecting self-reported delinguency.

= 16.69, N = 202, p = .02; NNFI = .92; AGFI = .91; RSMEA = .045 SRMR = .058). The model depicted in Figure 1 indicated that age was mediated by Depressed which in turn directly effected self-reported delinquency. Both Need for Stimulation and Disrespect for Rules directly effected delinquency. Sex directly effected Impulsive, but the path to Delinquency from Impulsive was not significant.

GENERAL DISCUSSION

The results support the hypothesis that the primary scales of personality can significantly predict delinquency and explain more of the variance than Eysenck's super factors. The results indicate that Disrespect for Rules, Need for Stimulation and Depressed (which span Psychoticism, Extraversion and Neuroticism respectively) repeatedly demonstrate concurrent validity with self-reported delinquency and socialization. Unlike the primary scales, the results demonstrate variations in the efficacy of the factors of Extraversion and Neuroticism, but not Psychoticism, in predicting the criterion variable. This leads to the conclusion that the primary scales of personality factors predict delinquency in a more systematic fashion than broad bandwidth personality factors. Meanwhile, the results of the wide bandwidth factors in predicting socialization and delinquency provide some support for the assertions of H.J. Eysenck (1996).

Psychoticism is both a significant correlate and predictor of both self-reported delinquency and socialization. This finding supports the hypothesis that Psychoticism is a robust indicator of inappropriate social activity, as theory, previous studies and earlier reviews indicate (e.g. Blackburn, 1999; Farrington *et al.*, 1982; Furnham & Thompson, 1991). Disrespect for Rules (a primary scale of Psychoticism), also consistently demonstrates concurrent validity with both criteria and explains the same amount of variance. This suggests that Disrespect for Rules, related to a lack of social

responsibility, is responsible for the Psychoticism – Delinquency relationship reported by others (e.g. Blackburn, 1999; Farrington *et al.*, 1982; Furnham & Thompson, 1991). S.B.G. Eysenck and Eysenck (1971) implied that cruelty towards animals and people might cause this relationship. Possibly, this relationship is more likely when some criminal groups are of interest, although less so when self-reported delinquency in noncriminal groups is of interest.

Schizotypy is a significant correlate, but not predictor in the multiple regression model of self-reported delinquency and sociability. This may be attributable to the shared covariance associated with multiple predictors and is consistent with Raine's (1992) contention of an intermediate association between Schizotypy and criminality.

Tough-minded correlates with low levels of socialization as measured in Study 1. If the Tough-minded primary scale reflects a narrower and possibly purer definition of the construct than Eysenck's factorial 'Tough-minded' (which he proposes as an alternative label to 'Psychoticism'), then the label of 'Tough-minded' may be inappropriate as a factorial label.

Neuroticism significantly correlates with and predicts under-socialization, but not self-reported delinquency. This partially supports the reasoning of Eysenck's theory of criminality and is consistent with current knowledge regarding the relationship between Neuroticism and crime that suggests that the relationship is equivocal (e.g. Blackburn, 1999; Farrington *et al.*, 1982; Furnham & Thompson, 1991). This finding concurs with the views of S.B.G. Eysenck and Eysenck (1971, p. 53) that criminals 'are of the autonomic type,' namely, that they are nervous, tense etc. and the assertions of others who imply this based on a criminal sample (e.g. Farrington *et al.*, 1982). Our results suggest that the Neuroticism relationship with crime is found at the primary level in populations that are not incarcerated, and that this relationship is a by-product of the Depressed primary scale.

Extraversion correlates only with self-reported delinquency in the second study. This finding partially converges with the consensus view indicated by previous reviews that the relationship is null (e.g. Farrington *et al.*, 1982; Furnham & Thompson, 1991). Also, 'of the three personality dimensions, Extraversion is the one that is least reliably and strongly related to criminality' (Eysenck & Eysenck, 1992, p. 331). The results of the primary scales analysis demonstrate that Need for Simulation directly effects both low socialization (Gough & Peterson, 1952) and self-reported delinquency in the regression models of the first study. Hence these results are consistent with Zuckerman's (1994) assertion of a relationship between Need for Stimulation and delinquent behaviour. Also, the results show a relationship between Impulsivity and delinquency and so support views asserting such a relationship (e.g. Eysenck & Eysenck 1970, p. 227; Luengo *et al.*, 1994). Interestingly, Sociable did not predict self-reported delinquency or socialization. This is consistent with Eysenck's suggestion that sociability is less relevant to criminality than other aspects of Extraversion (Eysenck & Eysenck, 1970).

Of the demographic variables, the results show that being male is the only significant correlate for two of the three criteria. This finding is consistent with previous studies (e.g. Furnham & Thompson 1991; Heaven, 1996b), meta-analysis of student cheating (Whitley, Nelson, & Jones, 1999), but contrasts with earlier findings by Gough and Peterson (1952). The structural equation model in Study 2 (see Figure 1) suggests that age is significantly mediated by Depressed in its relationship with self-reported delinquency. Our model allows us to follow the original contentions of H.J. Eysenck (1996), where personality directly effects criminal activity, although unlike H.J. Eysenck (1996), we suggest that demographic factors play a secondary role as they are

mediated by the primary scales in determining such activity.

A reformulation of Eysenck's theory based on these preliminary results suggests that, a high Need for Stimulation rather than Extraversion is associated with poor conditioning and is partly responsible for delinquency and socialization. Similarly, Impulsive is associated with poor conditioning, but, as the results indicate, predicts under-socialization rather than self-reported delinquency *per se*. As opposed to Neuroticism, high Depressed scores amplify the lack of conditioning. Disrespect for Rules represents a learnt component of Psychoticism (Jackson & Lawty-Jones, 1996), which relates to delinquency, more so than Psychoticism in general. Schizotypy represents a nonlearnt component of Psychoticism (Jackson & Lawty-Jones, 1996), but is only a significant bivariate correlate of delinquency rather than a predictor.

These findings imply that behavioural interventions may be more successful if they focus on the primary scale of Disrespect for Rules which is, according to Jackson and Lawty-Jones (1996), an experientially learnt personality trait, unlike Depressed and Need for Stimulation which, although they predict crime, appear to be unrelated to learning style. The focus on primary scales rather than factors enables us to differentiate from scales that are related to learning and those which are not. This provides a framework for targeted interventions with delinquent samples to encourage behavioural change. Together with the work of Jackson and Lawty-Jones (1996), this study provides clinicians with a preliminary theoretical basis for behavioural change based on primary scales related to delinquency which seem amenable to change. Consequently, we concur strongly with Blackburn's (2000, p.6) sentiments that change 'must come from a theory of Personality Disorders and personality change'. The first stage in building such a theory is provided by the integration of the Eysenckian model at the primary scale level with an understanding of the learnt and nonlearnt scales of personality.

Our attention now turns to potential limitations, and suggestions for future studies. First, it seems unlikely that common error variance (resulting from questionnaire methods being used to collect all the information used in this study) could completely explain these results. For example, it is unlikely that the Depressed – self-reported delinquency correlation is attributable to common error variance. Second, the Lie scale negatively correlated with self-reported delinquency in both studies. There are at least two interpretations of this relationship which include a dissimulation view and a personality trait perspective (Furnham, 1986). With a personality trait interpretation, the Lie scale operates as an index of social conformity and hence has an inverse relationship with delinquency. Third, from a dissimulation perspective, this previously observed negative relationship reflects 'perhaps the existence of some inaccurate reporting' (e.g. Furnham & Thompson, 1991, p. 591). Fourth, future studies may wish to consider the generalizability of these findings with incarcerated samples or to utilise a random sample of the general population. The latter point is pertinent as the present study did not utilise a balanced sex ratio or a random sample, and hence future study is warranted.

Fifth, a possible limitation of all studies considering self-reported delinquency is that those who admit to such activity may do so as a result of their honesty. This issue is contentious and dealt with at considerable length in the integrity at work literature. To summarize what is said elsewhere, those who consider self-reported delinquency as a confession note that, when Lie scale scores are accounted for, correlations decrease between integrity and measures of performance. Alternatively, those who consider

self-reported delinquency to be a reasonable criteria note that these partial correlations mostly remain in the direction originally predicted, a view reinforced by meta-analysis (e.g. Ones, Viswevaran, & Schmidt, 1993). Also, to provide a stringent test of our hypotheses, the present studies use two types of measure indicative of delinquency. Namely, two different self-reported scales consisting of self-reported delinquency and the Socialization scale of Gough and Peterson (1952). The scales emerge as predictors across both studies and criteria, supporting the robustness of the current findings.

Sixth, a limitation of the present study is that the reliability of some of the primary scales (i.e. Need for Stimulation, Tough-minded) is low. This does not detract from the substantive nature of these findings, but future work is appropriate before their use in applied settings. Seventh, future studies may wish to consider the role of the five-factor model at the domain and facet levels of analysis as determinants of criminality, as others have done (e.g. Heaven, 1996a). Alternatively, future studies may wish to use the Eysenck Personality Profiler (Eysenck, Barrett, Wilson, & Jackson, 1992; Jackson, Furnham, Forde, & Cotter, 2000) which is the only Eysenckian personality questionnaire to measure both factors and primary scales. Eighth, another avenue for future studies, that may result in more accurate prediction, is to relate the primary scales of delinquency to the primary scales of personality. Finally, there is evidence that the EPQ Lie scale consists of two components (e.g. Francis, 1991), and as we and others demonstrate that EPQ Lie scale scores relate negatively to delinquency (e.g. Furnham & Thompson, 1991), therefore future studies may wish to consider the role of Lie scales and their components in delinquency research.

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