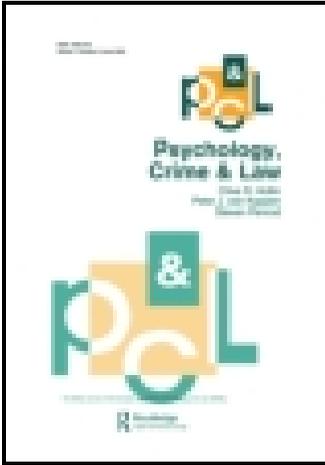


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Publisher: Routledge

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Psychology, Crime & Law

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/gpcl20>

Personality and crime: Where do we stand

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Published online: 04 Jan 2008.

To cite this article: H. I. Eysenck (1996) Personality and crime: Where do we stand, *Psychology, Crime & Law*, 2:3, 143-152, DOI: [10.1080/10683169608409773](https://doi.org/10.1080/10683169608409773)

To link to this article: <http://dx.doi.org/10.1080/10683169608409773>

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INVITED ARTICLE

PERSONALITY AND CRIME: WHERE DO WE STAND

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This article argues for a central role for personality in mediating between the genetic and environmental forces which act as causal agencies on the one hand, and the criminal behaviour that is to be explained on the other. Such a causal chain must of course also incorporate the biological-hormonal intermediaries between DNA and personality. In addition we require an explanation for the specific behaviours that make up anti-social conduct, and it is suggested that this is to be found in Pavlovian conditioning. The evidence relating to these theories is reviewed, and suggests a fairly definite framework which also leads to some suggestions concerning the reduction of criminality.

Key words: personality; crime; genetics; conditioning; prophylaxis.

INTRODUCTION

Crime has been an ever-present problem since recorded history began, and no doubt well before that. As old have been two usually opposed ways of explaining it, and attempting to reduce its impact. Sociologists blame social factors, like unemployment and poverty (Taylor, Walton & Young, 1973), while psychologists are more likely to look at personality and intelligence as causal factors (Eysenck & Gudjonsson, 1989). This difference in interest has resulted in very one-sided approaches to the problem, while it must be obvious that both sides are concerned with very relevant causes of criminal behaviour. Social conditions cannot be dismissed. The break-down of communism in the Soviet Union resulted in a tremendous increase in crime, but can hardly have affected the genetics, personality and intelligence of the Russian populations. Psychological differences cannot be dismissed. Whatever the social conditions, some people resort to crime, others do not, even though both groups are similar in income, prospects, and employment.

However, like the ski resort full of girls hunting for husbands, and husbands hunting for girls, the situation is not as symmetrical as it might seem. The first point is that sociological theories are not usually put in a way that makes them testable. If unemployment is a powerful factor, does it work immediately? Is there a delay, and if so, how long? Five years, ten years, twenty years. Similarly for poverty. And how do we define poverty? Is it absolute or relative? Arbitrary assumptions are usually made when sociologists are confronted with contrary evidence, but still there is no theory precise enough to make exact quantitative predictions. Such facts as are available certainly do not support common-sense ideas of this kind. Differences in personal wealth, a favourite sociological cause of crime, have declined considerably since the turn of the century, but crime has gone up several hundred per cent. Poverty? From 1979 to 1987, there has been a particularly steep rise in crime, but poverty has

decreased dramatically (Eysenck & Gudjonsson, 1989). Unemployment? Lester (1995) has analysed American crimes and found an inverse relation with crime. Gross national product, an indicator of national wealth? Ellis and Paterson (in press) found it to correlate positively and highly with criminality in a sample of thirteen industrial nations (.68 with total theft). The evidence, if anything, is strongly opposed to sociological theories. Of course poverty, unemployment and wide differences in wealth are undesirable and ought to be eradicated or at least diminished, but doing so might increase rather than diminish crime, counter-intuitive as such a prediction might seem. Possibly of course the regression is curvilinear—great poverty, unemployment and differences in wealth leading to low crime (as for example in the early days of the Weimar Republic?), middling poverty, unemployment and differences in wealth leading to high crime (United States of America?), and little poverty, unemployment, and differences in wealth leading to low crime (Switzerland?). My point is that sociological theories are hunches rather than theories, not based on thorough statistical analysis of historical records, and too inexact to be testable.

The second argument against sociological theories is that social “causes” of crime, even if they could be proved to exist, must act through psychological pathways. Individuals react differentially to poverty, unemployment, and inequality; clearly the personality and intelligence of the individuals concerned filter objective conditions, and determine their perception. Poverty may cause one person to rebel against society, blame the government, and seek refuge in crime, while another blames himself, his lack of cognitive ability, his ignorance and his lack of skill, and regards unemployment as just punishment. This great diversity of reactions to stress is well documented (Lazarus and Folkman, 1989); to disregard relevant factual knowledge is unscientific in the extreme. Ultimately sociology must be a part of psychology, because it studies a limited set of factors that affect human behaviour through psychological mechanisms.

THE NATURE OF PERSONALITY

To correlate personality and crime, and discover the causal pathways involved, we must have a good theory of personality. What would constitute such a theory? Figure 1 shows my own understanding of the evidence. Taxonomy, i.e. the correlational analysis of large numbers of traits in many different populations, tells us that there are three major dimensions of personality (Eysenck & Eysenck, 1985); Psychoticism (P), Extraversion (E); and Neuroticism (N). These will be considered presently. The causal chain begins with DNA, i.e. the genetic structure underlying individual differences. (The evidence shows clearly that most of the variance for individual differences in personality are due to genetic causes—Eaves, Eysenck & Martin, 1989.) DNA, of course, cannot directly influence behaviour, as little as can social conditions, and we must look for biological intermediaries in the central and autonomic nervous system. These two sources of individual differences constitute the distal and proximal antecedent conditions for individual differences.

We next turn to the proximal and distal consequences. If our theory is truly scientific, we should be able to predict with considerable accuracy the outcome of experimental studies of proximal consequences and differential social behaviour patterns (such as criminality), i.e. the distal consequences. Ideally, such a scheme should serve to link together in a factual

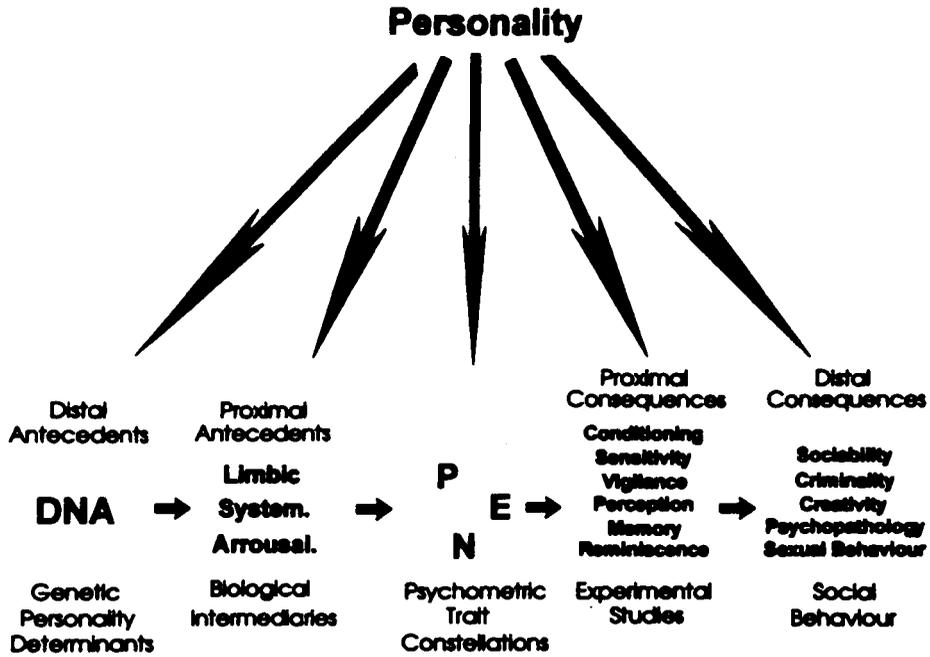


Figure 1 Chain linking DNA, personality, and criminality.

chain all the variables considered. It should also enable us to predict the individual effect of social conditions on people differing in P, E and N.

P, E and N are essentially dimensions of personality built in a hierarchical manner upon the predicted and observed correlation between primary (more elementary) traits. Figures 2,

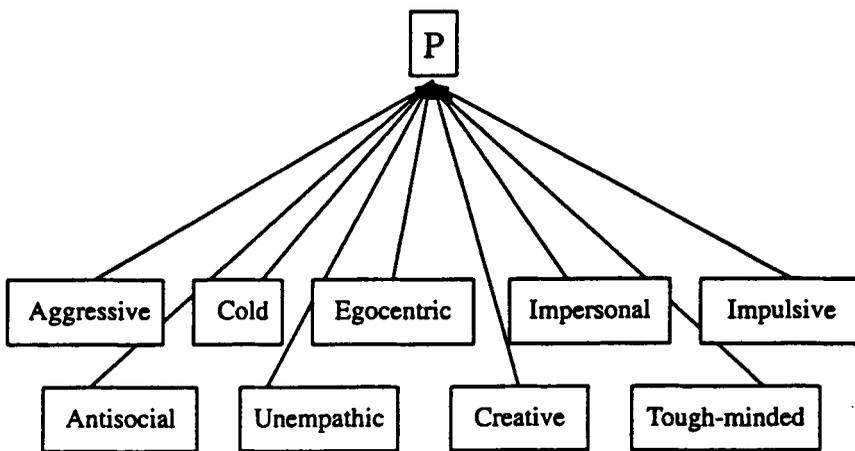


Figure 2 Traits correlating together to define Psychoticism.

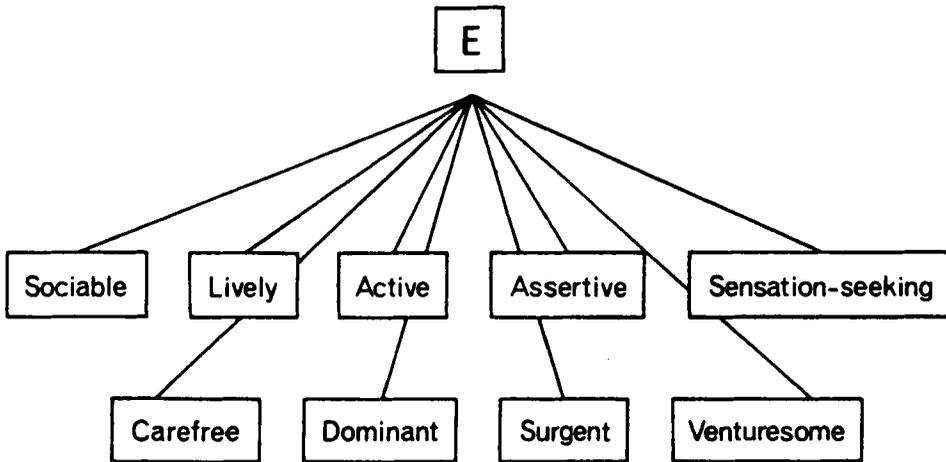


Figure 3 Traits correlating together to define Extraversion.

3, and 4 show the elements of such systems; there is of course strong empirical evidence for the relations shown in these figures (Eysenck, 1991). It is in these terms that I shall discuss the relation between crime and personality.

Before turning to a discussion of the relation of crime to the other links in this chain, I will briefly deal with the studies supporting the view that genetic causes play an important part in antisocial and criminal behaviour. This simple fact is no longer in doubt (Raine, 1993). There are two major sources of evidence. The first relies on twin studies looking for concordance between MZ (identical) and DZ (fraternal) twins. The former share 100% heredity, the latter on the average only 50%; hence if one twin is criminal, the likelihood that the other twin is also a criminal (concordant) is much higher for MZ than for DZ twins.

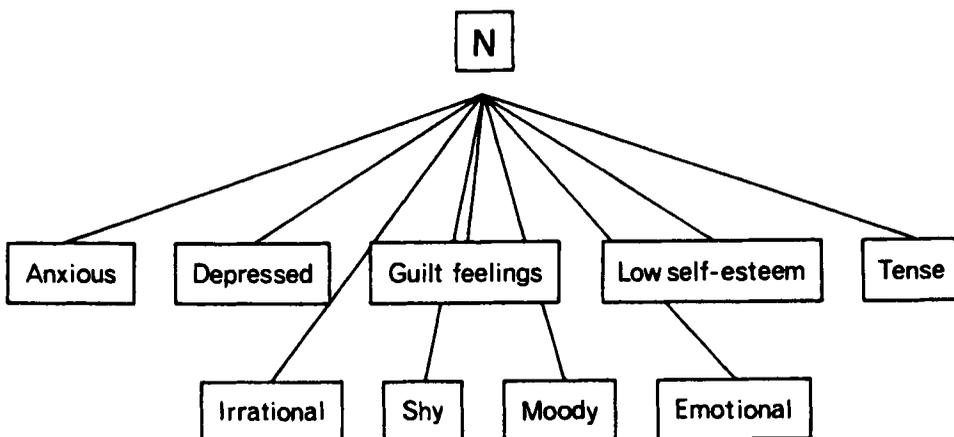


Figure 4 Traits correlating together to define Neuroticism.

Thirteen such studies have been carried out in many different countries (from Norway to Japan; from Germany to the U.S.A.), with predicted results in all. For 262 MZ twin pairs the concordance rate was 51.5%; for 375 DZ twin pairs the concordance rate was 20.6%, i.e. less than half. This would suggest a heritability for crime of 64%. Studies of MZ twins brought up in separation have also shown good concordance for anti-social criminal conduct (Raine, 1993).

The other source of evidence is the study of adopted children, who may come from criminal or non-criminal families and be adopted into criminal or non-criminal families. The question is simply whether their later criminal behaviour resembles more that of their biological family (heredity) or that of their adopted family (environment). Raine (1993) and Eysenck and Gudjonsson (1989) have surveyed the literature. With one exception, all 15 studies find evidence for some genetic predisposition; again researchers in different countries have discovered congruent evidence. This genetic predisposition relates to property crimes, but not to violent crimes. Why this should be so is not clear.

Bohman et al. (1982) state the conclusions we may come to: "It is important to realize that there are no genes for criminality, but only genes coding for structural proteins and enzymes that influence metabolic, hormonal and other physiological processes, which may inadvertently modify the risk of 'criminal' behaviour in a particular environment." (p. 1234).

THE PSYCHOPHYSIOLOGY OF CRIME

We must next turn to the proximal antecedents of criminal activity, i.e. "metabolic, hormonal and other physiological processes" involved in antisocial and criminal behaviour. This is a complex undertaking; Raine (1993) took almost 400 pages to summarize the literature which is now even more extensive than it was then. But essentially we may differentiate two approaches. The first is concerned with specific relationships. Thus Raine et al. (1994) demonstrated that, as suggested by previous work, murderers (as compared with matched controls) had significantly lower glucose metabolism in both lateral and medial pre-frontal cortex areas. They suggested that deficits localized in the frontal cortex may be related to violence. There are many such specific studies linking specific psychophysiological data to crime, or more usually certain restricted types of crime.

Another example is an isolated gene that was found to underly highly aggressive behaviour characteristics in a particular Dutch family. The same gene was found to be manipulable in mice, and be associated there, too, with highly aggressive behaviour. The advent of molecular genetics has led us to the point where we may be able, as in this case, to discover the specific action of single genes, although in the great majority of cases behaviour is of course governed by groups of genes, rather than by single genes (Brunner et al., 1993).

Other fairly special relations are differences in testosterone and in mono-amine oxidase (MAO). Persons indulging in various criminal activities tend to be characterized by high testosterone and low MAO (Zuckerman, 1991; Raine, 1993). The former is probably linked with the well-known fact that women are much less likely than men to indulge in criminal conduct, and that when they do, it is usually sex-related crimes (prostitution) which are essentially victim-less and arbitrarily defined as crimes by society. MAO is related to the catecholamines including norepinephrine, dopamine, and epinephrine which in turn are related

to psychosis. I shall return to this topic in the next section, in connection with psychoticism. Here let me only say that, of the neurotransmitters, serotonin is characteristically lower in antisocials, while dopamine goes the other way.

Of particular interest, and more relevant to the title of this article, are more general psychophysiological concepts which are theoretically tied to major personality variables. I shall here concentrate on the concept of **cortical arousal**, because for many years this has played a major part in personality theory (Strelau & Eysenck, 1987; Zuckerman, 1991). Cortical arousal is a state of the organism in which the brain is wide awake, attentive to outside stimuli, working at maximum pace, concentrating and fixing attention on central features of interest. Low arousal indicates lack of interest, sleepiness, lack of attention, loss of vigilance. The most clear-cut measure of low arousal is on EEG alpha that is slow and with high amplitude; in high arousal the alpha rhythm is fast with low amplitude. I linked this concept with the personality dimension of **extraversion**, in the sense that extraverts were characterized by poor arousal/arousability, and that for that reason they required stronger stimulation (sensation-seeking) than introverts (Eysenck, 1967). There is now a good deal of evidence to support this view (Eysenck, 1990; Zuckerman, 1991). Later work has suggested that psychoticism too, is characterized by poor arousal/arousability.

I have mentioned the arousal syndrome specifically because it is most clearly related to antisocial and criminal activity, and to personality. This special relationship will be discussed in the next section.

CRIME AND PERSONALITY

We have now arrived at the central portion of our Fig. 1, namely the psychometrically defined major dimensions of personality. I have suggested that antisocial conduct and crime would be positively associated with P, E and N, for various reasons (Eysenck, 1977; Eysenck & Gudjonsson, 1989); the evidence from numerous studies has on the whole upheld these predictions. P is always involved; E more in young samples, N in older ones. Why were these predictions made? My main concern was with the **causal problem**. It is often asked: Why do people act antisocially, and commit crimes? I felt that this question put the cart before the horse. It seems perfectly rational to act in one's own interest, and to take whatever one wants or needs. Babies and young children certainly do so, and so do animals. The real question is rather: "Why do we behave in a socially desirable fashion?" This is not an easy question to answer.

We may say: Because of the policeman on that beat, and the judge on his throne, but that does not make sense, even though it must play a part. As Napoleon said—you can do anything with bayonets except sit on them, and if social rules were really widely disregarded (as they are in some no-go areas even in our society), social behaviour breaks down completely. The police are dependent on social agreement; what causes that agreement? It cannot be reason and knowledge. Research has shown that criminals know what is right and wrong as well as anybody—they just prefer the wrong to the right! My answer was along rather different lines. I suggested that we behaved well because our conscience would trouble us if we did not; this is not an original notion because it agrees with common-sense and religious teach-

ing. However, I went on to suggest a natural history origin of this mysterious conscience, at variance with the religious notion of a God-implanted moral sense.

Conscience, I suggested, is a conditioned response acquired according to Pavlovian principles. Every time we transgress we are punished by our parents, our teachers, our peers; often when we act in a socially approved fashion we are lauded or rewarded. Each such occasion serves to reinforce our doing the right, socially approved thing, and not to do what is wrong. This huge amount of conditioning experience we conceptualize as "conscience," and we use language to generalize and tie together these varied experiences. Why then do we find differences between people in the degree of socially approved behaviour? There are three possibilities not mutually exclusive:

(1) The conditioning experiences are missing. A permissive society fails to install the required conscience by falling down on its duty, and parents, peers and teachers leave the child without proper reinforcers.

(2) The wrong experiences are reinforced. Some parents encourage their children to act aggressively, to steal, to behave anti-socially. These are undoubtedly more prevalent now than they used to be, perhaps accounting for the growth in crime.

(3) This is perhaps the most interesting. Low arousal makes conditioning less likely to occur, so that high-E and high-P persons, exposed to similar conditioning experiences of a social kind as low-E and low-P persons would have problems aggregating these experiences into a properly functioning conscience. Hence they would have less resistance to the actual given antisocial behaviours of our animal nature. There is considerable evidence for this theory, both from animal experiments and from human studies as well. On the human side, we can experimentally test a person's conditionability, i.e. the speed with which he forms conditioned responses; there is overwhelming evidence that antisocial and criminal people show relatively poor conditioning compared with ordinary people; a good review is given by Raine (1993). This, fundamentally, constitutes a natural philosophy theory of antisocial conduct that explains a great deal of the known facts, and has found strong experimental support.

Note that conditioning, experimentally studied comes into the "proximal consequences" part of Fig. 1, with "criminality" coming into the "distal consequences" part. The prediction comes via the "proximal antecedents" aspect, i.e. the psychophysiology of arousal, via the personality theory central to the Fig. We are thus dealing with a complex theory that can be tested (and has been tested) in many of its ramifications; here of course only a very cursory survey can be given.

Arousal has effects on criminality that can be studied directly, and not only via conditioning. Thus Raine, Venables and Williams (1990) studied the relationship between experimental measures of arousal at age 15, and connected it with criminality at age 24 years. They showed that on all measures used, future criminals showed less arousal in the experimental situation than future non-criminals. All three response systems (electrodermal, cardiovascular and cortical) were equally involved.

To complete this survey, let me only say that of the large number of studies done directly to test the predicted relationship between P, E and N and crime, the great majority has given strong support to the theory. P, in particular, has always distinguished very significantly between criminals and non-criminals, as has N (with adults) and E (with youngsters). The reason for N acting as a predictor is properly related to its drive properties, which multiply the

action tendencies present. There may also be other reasons, such as emotion over ruling reason in high N subjects; they tend to be aggressive and impulsive.

The conditioning paradigm must of course be taken together with the social realities mentioned, such as lack of conditioning experiences, or the wrong experiences being part of the child's life. The philosophy of permissiveness has abandoned the practices that used to act as reinforcers, so it is not surprising that antisocial and criminal behaviour is now much more common. Society consciously avoids putting into practice those mechanisms that have ensured social conformity in the great majority of children; hence a much weaker conscience than we used to implant. It is often said that these theories must be wrong because there cannot have been any change in the genetic basis of the population to account for the increase in crime. But that is not what is suggested. The theory suggests an interaction between social and psychophysiological factors; not a 100% biological chain of causation.

WHAT CAN BE DONE?

Socially, the main concern of psychological studies relates to the question of how to reduce crime and recidivism. Rehabilitation of the criminal, once one of the major aims of justice, became a dirty word during the 1970s (Rothman, 1980a), and the belief spread that "nothing works." This is one of many myths that shroud the whole field of criminology. Consider prison. It is often said to be useless, but 50% of criminals sent to prison do not re-offend—is the glass half full or half empty? Probation officers often quote statistics to show that criminals on probation do not re-offend more frequently than criminals sent to prison, but the statistics are meaningless because there is no random element involved—criminals given probation are chosen as being the least likely to re-offend!

Quite generally, it may be said that modern practices are usually the opposite of what psychology would recommend. The effects of prison depend on the conditioning history of the criminal, and that is being manipulated in a direction almost guaranteed to lower the preventive use of incarceration. Very young offenders cannot be touched by the law. Young offenders are cautioned any number of times, instead of being punished. Youths are usually given probation several times before being sent to prison. In other words, the conditioning process associates the unconditioned stimulus (UCS) with the unconditioned response (UCR) of (effectively) no punishment; consequently the conditioned response (CR) to the conditioned stimuli (CSs) tempting the crime will be giving in to temptation, there never having been any attempt to build up a conscience through appropriate punishment. There is ample evidence for *latent inhibition* (Lubow, 1989), i.e. in the fact that when the CS is not followed by a proper UCR, it will be more difficult to form the proper links later. Thus psychology suggests that at most one caution should be given on the occasion of the first offence, but that serious punishment should follow the next offence. Thus the restricted usefulness of prison in rehabilitation is understandable as a consequence of earlier misplaced lenience.

Is there any evidence that severity of treatment (UCR) is effective? The evidence from animal work is entirely in favour, but human evidence is almost entirely circumstantial. Thus the appointment of a new mayor of New York, tough on punishment, following a weak liberal mayor led to a very pronounced reduction in crime. Psychological research has mainly

concentrated on studying correctional treatment, with encouraging results (Andrews et al., 1990; Gendreau & Ross, 1987). The large body of empirical study has shown that behavioural approaches based on learning theory are most effective. "Traditional psychodynamic and non-directive client-centered therapies are to be avoided within general samples of offenders" (Andrews et al., 1990). The best studies show very acceptable levels of reduction in recidivism.

However, psychology does not encourage the belief that any single measure, such as increasing severity of punishment, would have a large effect. The evidence suggests, rather, that there are many causes of criminality, each only contributing a rather small amount of variance to the total of criminality. Correlates of later criminality can be found in early childhood; troublesome behaviour in kindergarten is predictive of later police contacts! Poor child-rearing practices and poor parental supervision are the most important precursors of future criminality, as might be expected from conditioning theory (Farrington, 1987). Of course genetic factors cannot be ruled out in this connection, but they cannot account for all the connections found. Furthermore, as Zigler, Tauniz, and Black (1992) have pointed out: "Major reports over the last decade have constantly shown that some early childhood intervention programmes have lasting effects on social competent behaviours" (p. 999). Zigler et al. discuss several such programmes where final delinquency was the outcome investigated, and concluded that in early childhood intervention programmes may reduce "juvenile delinquency and pre-delinquent behaviour" (p. 1002).

School of course also exerts a civilizing influence which has been studied in some detail (Farrington, 1992), although not as exhaustively as parenting. Rutter et al. (1979) have published the most carefully controlled account of an empirical study, looking at effects independently of intake factors (usually the most crime-prone pupils in primary school go to the most crime-prone secondary schools). There have been no accounts of intervention studies, so any conclusion would be premature.

Finally, it is important also to look at pre-natal and peri-natal factors (Farrington, 1994). Low birth weight, a relatively small baby, and peri-natal complications such as forceps delivery, asphyxia, a long duration of labour or toxæmia in pregnancy have been shown to predict later conduct problems and delinquency in children. As an example, it has been found that delivery complications significantly predicted later violent offending for males, as well as property offences.

References

- Andrews, D., Bonta, J., & Hoge, R. (1990) Classification for effective rehabilitation: Rediscovering psychology. *Criminal Justice and Behaviour*, 17, 19–52.
- Andrews, D., Zinger, I., Hoge, R., Bonta, J., Gendreau, P., & Cullen, F. (1990) Does correctional treatment work? A clinically relevant and psychologically informed meta analysis. *Criminology*, 28, 369–404.
- Bohman, M., Cloninger, C., Sigarodson, S., & van Korrning, A. (1982) Predisposition to petty criminalities in Swedish adoptees: Genetics of environmental heterogeneity. *Archives of General Psychiatry*, 39, 1233–1241.
- Brunner, W., Nelen, M., Breakfield, O., Ropers, H., & Oost, B. (1993) Abnormal behavior associated with a point mutation in the structural gene for monoamine oxidase A. *Science*, 262, 578–581.
- Eaves, L., Eysenck, H. J., & Martin, N. (1989) *Genes, Culture and Personality*. New York: Academic Press.
- Ellis, L., & Patterson, J. (in press) Crime and religion: An international comparison among thirteen identical nations. *Personality and Individual Differences*.
- Eysenck, H. J. (1967) *The Biological Basis of Personality*. Springfield, Ill.: C. C. Thomas.

- Eysenck, H. J. (1977) *Crime and Personality*. London: Routledge & Kegan Paul.
- Eysenck, H. J. (1990) Biological dimensions of personality. In: L. A. Pervin (Ed.), *Handbook of Personality*. Pp. 244–270. New York: Guilford Press.
- Eysenck, H. J. (1991) Dimensions of personality: 16, 5 or 3? Criteria for a taxonomic paradigm. *Personality and Individual Differences*, 12, 773–790.
- Eysenck, H. J., & Eysenck, M. W. (1985) *Personality and Individual Differences*. New York: Plenum Press.
- Eysenck, H. J., & Gudjonsson, G. (1989) *The Causes and Cures of Criminality*. New York: Plenum Press.
- Farrington, D. (1987) Early pre of frequent offending. In: J. Wilson and G. Lounsbury (Eds.), *From Children to Cortisan: Vol. 3. Familia, School, and Delinquency Prevention*. Pp. 27–50. New York: Springer.
- Farrington, D. (1992) Psychological contribution to the explanation, prevention and treatment of offending. In: F. Lösel, D. Bender & T. Bliesener (Eds.), *Psychology and Law*. Pp. 35–51.
- Farrington, D. (1994) Delinquency prevention in the first few years of life. *Justice of the Peace*, August 13, 531–533.
- Gendreau, P., & Andrews, D. (1990) Tertiary prevention: What the meta-analyses of the offender treatment literature tells us about “what works.” *Canadian Journal of Criminology*, 32, 173–184.
- Gendreau, P., & Ross, R. (1987) Recidivation of rehabilitation: Evidence from the 1980s. *Justice Quarterly*, 4, 249–407.
- Larzelere, R., & Murenda, J. (1994) How child distress influences the effects of discipline response to toddler misbehaviour. *Family Relations*, 43, 173–185.
- Lazarus, R., & Folkman, S. (1989) *Stress, Appraisal and Coping*. New York: Springer.
- Lubow, P. (1989) *Latent Inhibition and Conditioned Attention Theory*. Cambridge: Cambridge University Press.
- Raine, A. (1993) *The Psychopathology of Crime*. New York: Academic Press.
- Raine, A., Bucksbaum, M., Stanley, J., Lottenberg, S., Abel, L., & Stoddard, J. (1994) Selected reductions in pre-frontal glucose metabolism in murderers. *Biological Psychiatry*, 36, 365–373.
- Raine, A., Venables, P., & Williams, M. (1990) Relationships between central and autonomic measures of arousal at age 15 years, and criminality at age 24 years. *Archives of General Psychiatry*, 47, 1003–1007.
- Rothman, D. (1980) *Conscience and Convenience: The Asylum and its Alternatives in Progressive America*. Boston: Little, Brown.
- Rutter, M., Maugham, B., Mortimore, P., & Ouston, J. (1979) *Fifteen Thousand Hours*. London: Open Books.
- Strelau, J., & Eysenck, H. J. (1987). *Personality Dimensions and Arousal*. New York: Plenum Press.
- Taylor, I., Walton, P., & Young, J. (1973) *The New Criminology*. London: Routledge & Kegan Paul.
- Tremblay, R. (1994) Kindergarten, behavioural patterns, parental practices, and early adolescent antisocial behaviour. In: J. McCord (Ed.), *Coercion and Punishment in long-term Perspective*. Cambridge: Cambridge University Press.
- Zigler, E., Tauniz, C., & Black, K. (1992) Early childhood intervention: A primary presentation for juvenile delinquency. *American Psychologist*, 47, 997–1006.
- Zuckerman, M. (1991) *Psychobiology of Personality*. Cambridge: Cambridge University Press.