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Original Citation

Canter, David V. (2000) Offender profiling and criminal differentiation. Legal and Criminological Psychology, 5 (1). pp. 23-46. ISSN 1355-3259

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Offender Profiling And Criminal Differentiation

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Purpose. The psychological hypotheses that form the foundations for 'Offender Profiling' are identified and the research that has tested them is reviewed.

Argument. 'Offender profiling' is taken to be the derivation of inferences about a criminal from aspects of the crime(s) s/he has committed. For this process to move beyond deduction based on personal opinion and anecdote to an empirically based science a number of aspects of criminal activity need to be distinguished and examined. The notion of a hierarchy of criminal differentiation is introduced to highlight the need to search for consistencies and variations at many levels of that hierarchy. However, current research indicates that the key distinctions are those that differentiate, within classes of crime, between offences and between offenders,. This also leads to the hypothesis of a circular ordering of criminal actions, analogous to the colour circle, a 'radex'.

The radex model, tested using Multi-Dimensional Scaling (MDS) procedures, allows specific hypotheses to be developed about important constituents of criminal differentiation:

> *Salience*; MDS analyses reveal the importance of the frequency of criminal actions as the basis on which the significance of those actions can be established.

> *Models of Differentiation;* the research reviewed mainly supports distinctions between criminals in terms of the forms of their transactions with their explicit or implicit victims,

> *Consistency*; offenders have been shown to exhibit similar patterns of action on different occasions. The most reliable examples of this currently are in studies of the spatial behaviour of criminals.

> *Inference*; under limited conditions it is possible to show associations between the characteristics of offenders and the thematic focus of their crimes.

In general these results provide support for models of thematic consistency that link the dominant themes in an offender's crimes to characteristic aspects of his/her lifestyle and offending history.

Implications. Much of what passes for 'offender profiling' in practice and as reported in the factual and fictional media has no basis in empirical research. However, there are some promising results emerging in some areas of study. These results are most likely to be of value to police investigations when incorporated into decision support systems and the training of police officers. The results do also provide new insights into the psychology of crime.

When faced with a crime a police investigator has certain initial information on which to base decisions for the most appropriate way forward in order to identify and prosecute the culprit. The investigator's task is to draw conclusions from the information available about the crime that will facilitate enquiries. The investigator may decide that more information is needed before any conclusions can be drawn, but a point will eventually come where inferences need to be made. These are inferences that allow the association between the offender and the offence to be demonstrated. Often these inferences are of a direct kind. A fingerprint found at the crime scene can be linked to the fingerprint of a known individual in police records. An eyewitness may recognise a person and send the police in search of the specified individual. However, there are many aspects of police investigations in which the inference process is much less straightforward. These are particularly problematic when the police have no limited pool of suspects or no clear idea as to where they should search in order to find such suspects.

The challenge of a crime for which there is no obvious direction in which to look for the culprit have been at the core of crime fiction for nearly 200 years. The approach to facing this challenge was given archetypal form with the creation of Sherlock Holmes. With this creation the inference process was defined as the insightful deductions of a well-informed and brilliant mind. The model of expert deduction became synonymous with the Holmesian process of seeing links between particular clues and particular aspects of the perpetrator. This of course is a dramatised version of what police officers do on a day to day basis. As such it is an example of implicit person perception. Salient features of the crime are attended to in much the same way as people attend to salient features of a person with whom they come into contact. Then stereotypical cognitive models are drawn upon to make inferences about crime or the person that go beyond those particular salient cues.

In this context deduction is a form of implicit reasoning in which whatever experience or logic the reasoner can draw upon will be used to derive inferences about the culprit from aspects of the crime. An example that illustrates this well is a case in which the victim of an unidentified assailant noticed that the offender had short finger nails on his right hand and long nails on his left hand. Somebody with specialist knowledge suggested that this was a characteristic of people who are serious guitar players. It was therefore a reasonable deduction that the assailant was somebody who played the guitar. This example shows the fundamental weaknesses of the deductive approach. Without clear empirical evidence about the prevalence of this particular pattern of nail length it is difficult to know whether the claim that it is unique to guitar players is valid. It may not be true of many guitar players and it may be a pattern that exists in many other individuals. In fact in the case in question the offender who was eventually identified had no contact with guitars and had this peculiar pattern of nail length because of his job in repairing old tyres.

The collection of empirical evidence in order to support the inferences that may be made about the relationship between the crimes and the offender is of course the cornerstone of the inductive method of science. Indeed, it is a reasonable claim that the whole development of scientific psychology is essentially the introduction of an empirically based inductive approach to deal with issues that common sense has dealt with previously merely in terms of reasoning and other forms of deductive opinion. It therefore follows that many of the inferences that are important to police investigators can be re-defined as psychological questions open to empirical study.

Psychologists as the Original 'Profilers'

The mass media fascination with violent, sexually related crimes and criminals has encouraged the belief that the study of the differences between criminals, and the making of inferences about their characteristics, is some unique area of expertise quite divorced from the main currents of contemporary psychology. The myth that is promulgated, attempts to characterise this process as originating solely from the speculations of US special agents of the Federal Bureau of Investigation (Ressler et al 1988). These speculations have been termed 'profiling', or more fully 'offender profiling', 'psychological profiling' or 'criminal personality profiling'. These terms have taken on a quasi-mystical quality, with even scholarly authors seeing the need to introduce discussions of 'profiling' with reference to fictional illustrations (e.g. Grubin, 1995, Ormerod 1996).

Perhaps one of the powers of the term 'profile' comes form the implication that it is a full and rounded picture of the unknown individual. The term has gained use in journalism as a distilled account of everything that you need to know about the person being profiled. But, of course, only a fictional creation could be a full pen-picture. Any scientific analysis will require a focus on the components that are significant and on which there is a research literature. Some aspects of the account may be more well established than others, so taking all aspects of the account as of equal merit is bound to be misleading. However, the inferring of general characteristics of a person on the basis of a limited amount of information about them, has scientific roots in psychometric testing. This was a lively branch of psychology long before the FBI was created.

Furthermore, as Delprino and Bahn's (1988) survey of psychological services in US police departments shows, psychologists were giving opinions to their local police forces about the characteristics of criminals before the FBI 'Behavioral Science Unit' was established. This was a natural outgrowth of their major involvement in the development of predictive profiles of people applying for jobs in the police force. This procedure, otherwise known as 'assessment of applicants', as well as their advice on clinical matters relating to suspects, such as fitness to plead and other aspects of their mental health status, has been an enduring psychological contribution to the work of the police and the courts for some time.

The study of individual differences and related examinations of personality may be summarised as "what sorts of people carry out what sorts of actions?". The question at the heart of 'profiling'. Studies of personal development and learning strategies are also, in effect, examinations of the ways in which people who differ for example in terms of development or experience also differ in terms of what they will do and how they will do it. From this perspective then many attempts to derive inferences about offenders' characteristics from the ways in which they commit their crimes can be seen as a subset of problems that is part of many broader questions in general psychology.

Unfortunately, a number of popular writers have been unaware of the ways in which investigative inferences relate to questions in empirical inductive psychology. They have fostered the use of the term 'offender profiling' with the implicit and sometimes explicit implication that the process of profiling is something other than the application of psychology to a particular subset of applied problems. This confusion has been indicated

by the many statements which refer to 'profiling' as a craft based on the particular expertise of the individuals who purvey it (Ressler et al 1988)   It has been aggravated by many claims for the possibilities of creating 'profiles' despite the remarkably limited amount of research which attempts to test out the possibilities for making valid inferences about a criminal from information relating to the crime that he or she commits. The frequently asked question of 'how accurate' or 'how useful' are 'offender profiles' (cf Copson1995) therefore are premature before there is any thorough test of clearly defined psychological bases for this process.

Part of the reason for this confusion over the nature of 'profiling' and the unscientific haste with which the process has been promoted is that the popular origins of detective deduction is in the writings of crime fiction. This often confuses the process of psychological offender profiling with the actions of an expert detective. This confusion is understandable because the people who did most to promote the concept of offender profiling in its early days were law enforcement officers. These FBI agents, who were trainers at the FBI academy in Quantico, have presented models of the profiling process that rely very heavily on the particular personal perspective and expertise of the profiler (Ressler et al 1998).

This comparison between the deductive, 'fictional hero' approach and that of the empirical psychologist is not new to psychology. It is another example of the distinction between clinical and actuarial judgements that were explored by Meehl (1996). The clinician uses her or his judgements and experience to form an opinion about the patient in front of them. In contrast actuarial judgements are those based on careful measurements and the resultant statistical relationships. In a series of studies first published in the 1954 and followed up over the subsequent decades, it has been found that the actuarial decision processes were far more accurate and valid than those based on clinical judgement alone. Not surprisingly, the systematic scientific approach proved far more affective than that based upon personal opinion and judgement.

This raises fundamental questions for psychological offender profiling. Is possible to develop psychological measures of those aspects of criminal activity available to police investigators and of those characteristics of the offenders that are useful to help identify and prosecute those offenders? Can effective relationships between these measures be demonstrated?

Limitations on Sources and Types of Information

Although the problem of inferring the characteristics of an offender from information available in the context of his or her crime is clearly a subset of the problems faced by psychologists in many other domains it does have its own particular challenges and limitations. It may be these particular problems and challenges that have led people to think that the process of offender profiling is something different from developing inferences in conventional psychological contexts.

The major limitation is that the material on which the inference is based is limited to that which is available during an investigation. This can be quite rich information such as the details of the sexual behaviour of a rapist. It will also include such crucial factors as the time, place and nature of the victim, but it will not include the sorts of material that is the

stock in trade of psychologists, such as the mental processes and personality characteristics as indicated in personality questionnaires. Neither is the material available collected under the careful controls of laboratory research. It is therefore often incomplete, ambiguous and unreliable.

Similarly in order for the inferences to be of value to investigators they must connect directly with things that police officers can actually act on. Where an offender could be living is a clear example of useful information to an investigator, but more subtle material such as how others may regard the offender or his likely skills and domestic circumstances may also be of value. Nonetheless intensive psychodynamic interpretations of the offender's motivations or other material, that might only become available during in-depth therapeutic interviews, are less likely to be of direct assistance to police investigators. As in many crime novels the motivations, or possibly more accurately the reasons, why an offender carried out an offence can be of general interest to investigators but they are only of value if they allow inferences to be made that will facilitate the detective decision making process.

Any quest for motivation or motive is best seen as an informal attempt to develop some explanatory model that will help to link the crime behaviour to the offender. So, for example, if the motive is thought to be monetary gain then someone who would have a need for such money or who recently seems to have acquired a lot of money would be assumed to be a viable suspect. However, without clear empirical evidence the particular types of behaviour are associated with financially motivated crimes and that these crimes are carried out by people with such need for financial gain, the interpretation of the motive and the inference drawn from it are little more than speculation. The weakness of such speculation can be demonstrated by the finding that those who have carried out insurance fraud have not been in particularly straightened financial circumstances. Dodd (1998) for example, demonstrated that only 13% of the 209 fraudulent insurance claimants he examined were in financial difficulties, whereas 57% were earning a regular income.

What are required scientifically are explanatory frameworks that can lead to hypothesis about the sorts of offender characteristics that are likely to relate to particular offence behaviour. There are very few studies at present which have demonstrated such relationships and even fewer theoretically precise models that provide guidance as to where to search for such relationships. Rather, the stage has been reached at which the various constituents of such models are being explored and the tests of various components of general models are being carried out. The remainder of this paper will therefore review the more detailed empirical questions that are being explored and indicate the directions in which productive models may emerge in the future.

Investigative Problems

The research questions that are covered by the inferences required for police investigations relate directly to a family of problems with which investigators are faced.

1. *The selection of behaviours.* What are the important behavioural features of the crime that may help identify the perpetrator?
2. *Distinguishing between offenders.* What are the most appropriate ways of indicating the differences between crimes and between offenders?

3. *Inferring characteristics.* What inferences can be made about the characteristics of the offender that may help identify him/her?
4. *Linking offences.* Are there any other crimes that are likely to have been committed by the same offender?

All four are derivations of questions crucial to other areas of psychology. They involve concepts associated with the significant differences between one person and another and the features of one individual's behaviour that remain constant over different situations. It is therefore not surprising that many of the concepts and methods developed by psychologists over the last century, particularly in the field of personality and individual differences have relevance for the study of crime.

Areas of Concern

Psychological input can be valuable to the investigations of all crimes, not just those that catch the newspaper headlines like serial murder (Canter et al 1996). As the scientific base grows it is also likely that the range of applications will grow. The original search for assistance from psychologists and others with some behavioural science knowledge was based on particular difficulties the crimes posed to investigators. The most notable was the idea that the crime had no obvious 'motive'. These 'motiveless' crimes were assumed to be driven by subtle psychological process that required special expert insight. Taken together with the lack of any obvious relationship between the offender and the victim, these crimes were seen to pose very demanding challenges to investigators. However, motiveless, stranger crimes would seem to include many forms of casual vandalism, (Canter 1984), but it was serial killers that brought in 'profiling'. The reasons probably have more to do with the great public concern that stranger serial murders create and the consequent pressure on police to be seen to be using every available resource, than the special psychological basis of the criminal behaviour.

For similar reasons, in many parts of the world those investigating all forms of serious stranger crime, including rape and murder, now regularly look for psychological input. Yet if such input is possible for these serious violent crimes why should it not be possible for all other crimes, including what are known as the 'mass crimes' of burglary and theft. In these crimes police investigators still need to link crimes to a common offender, often without the help of forensic evidence. They need to make inferences about offender characteristics. Furthermore, these questions need to be answered when only one crime is being examined, whether it is a serious crime or a mass crime. Therefore psychological assistance may be of value for 'one-off' crimes as well as the serial crimes to which so much attention has been paid in the mass media.

Increasingly, also, it is becoming apparent that the questions of inference are relevant in a variety of other sorts of criminal investigations and police activities. For example, equivocal deaths, such as suspicious suicides (Canter 1999a), and ambiguous missing person investigations may benefit from psychological support. Events that have challenging behavioural components such as hostage taking and barricade siege also may yield to psychological examination (Wilson and Smith 1999). The anonymous threats and other questions relating to authorship also raise questions that are fundamentally psychological,

Aked et al 1999) although the crime scene is the actual written material rather than a physical location .

Organised crime and criminal networks take these psychological questions into a distinctly social psychological context. The inferences and discriminations relate to teams, groups and networks not just to the individuals who make them up (Canter and Alison 1999). Social psychological research will consider the roles in the teams (Wilson and Donald 1999) and nodes in networks (McAndrew 1999) as well as the characteristics associated with those roles (Johnston 1999).

A Hierarchy of Criminal Actions

The major premise for developing scientifically based profiling systems is that there are some psychologically important variations *between* crimes that relate to differences in the people who commit them. However, it is important to note that potentially there is a hierarchy of such possible distinctions. At the most general level there are questions about the differences between those who commit crimes and those who do not. This is an area of study that has a long history in psychology as Farrington's (1998) collection of papers makes clear. At a much more specific level there are questions about particular sub-sets of activities that occur in a crime, say whether a particular type of weapon was used (Lobato 2000). Between the general questions and the particular is a continuum of variations that can be examined. This would include questions about different sub-sets of crimes, such as the comparison of violent offenders and burglars (Farrington and Lambert, 1994). Or at a slightly more specific level questions about particular patterns of criminal behaviour, such as the comparison of offenders who prepare carefully in advance of a crime with those whose actions are impulsive and opportunistic.

Figure provides notional levels in this hierarchy. However, the linear ordering of this table is an over-simplification. Offenders are not necessarily specialists in one particular type of crime (Klein 1984). This may mean that, for example, it is more valid to consider the difference between an offender who came prepared to carry out his/her crime and one who just grabbed what was available, rather than focusing on differences in say whether it was a robbery or a burglary. In effect, this makes the description of crimes multi-dimensional. The notional hierarchy may be regarded as an inter-related set of dimensions for describing crimes.

Such a complex structure is extremely difficult to examine in total. Researchers have therefore usually focused on one or other of the 'levels' of this hierarchy. For example, there are many studies examining the differences between offenders and non-offenders. There are fewer comparing the differences between those convicted of one crime and those convicted of another, and very few considering the differences between people who carry out similar crimes (e.g.rape) in different ways. The results of all these studies have relevance for 'profiling' although studies that aim to contribute to 'profiling' tends to focus on the behavioural level. So far, no studies have been conducted to determine if the value and validity of inferences made on other dimensions are greater or less than those based on patterns of behaviour.
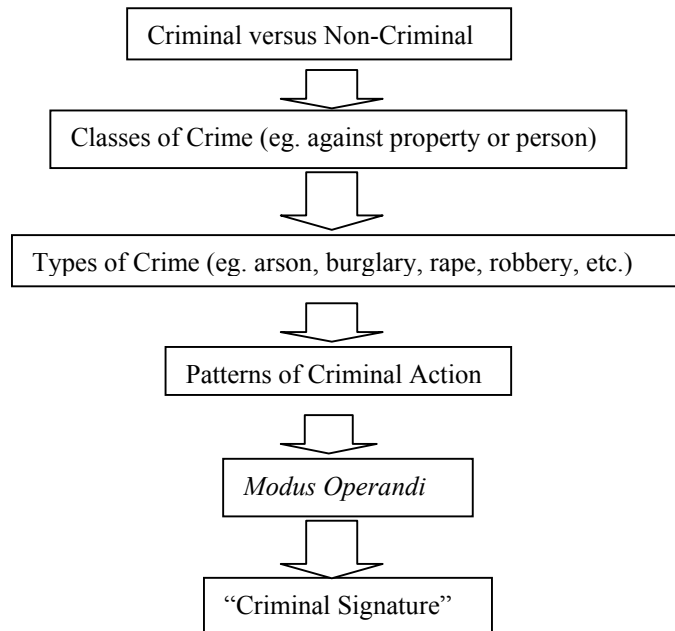
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┌─────────────────────────────────────┐
│      Criminal versus Non-Criminal    │
└─────────────────────────────────────┘
                  ⇓
┌─────────────────────────────────────────────┐
│  Classes of Crime (eg. against property or person)  │
└─────────────────────────────────────────────┘
                  ⇓
┌─────────────────────────────────────────────────┐
│  Types of Crime (eg. arson, burglary, rape, robbery, etc.)  │
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┌─────────────────────────────────┐
│     Patterns of Criminal Action   │
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│     *Modus Operandi*      │
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│    "Criminal Signature"   │
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Figure 1. A Hierarchy for the Differentiation of Offenders.

The focus on patterns of behaviour in popular, anecdotal crime publications as well as in the limited research literature is in part due to the many complications and unanswered questions within these multivariate issues. Some relate to the versatility of offenders. These raise questions of just what may be regarded as typical or characteristic of an offender. Other difficulties relate to the problem of defining the sub-group to which an offence should be assigned. Consider as an illustration a crime in which a house was burgled and at the same time a fire was set, giving rise to the death of an occupant. Would this crime be best thought of as burglary, arson or murder? The charge made against the accused is usually for the most serious crime, but psychologically that may not be the most significant aspect of the offender's actions.

One central research question, then, is to identify the behaviourally important facets of offences. Those facets that are of most use in revealing the salient psychological processes inherent in the offence. These carry great potential for answering questions posed by investigators.

The Radex Model – beyond 'Types'

There is one particularly important implication of this multivariate hierarchy of criminal actions. This is the challenge it presents to the notion of a criminal 'type'. There are some aspects of a criminal's activities that are similar across many offenders. These lie at the most general end of the 'hierarchy'. They involve the actions that define the individual as criminal. But there will be other actions that the criminal engages in that are located further towards the specific end, the activities that identify a particular crime. Furthermore, some of the actions will overlap with those of other offenders, for example whether the criminal carries out their crimes on impulse or plans them carefully. Indeed there will be relatively few aspects of offending, if any, that are unique to one given offender (these are often called, somewhat misleadingly, 'signature'). Even those may not be apparent in all the crimes that a person commits.

The actions of any individual criminal may therefore be thought of as a sub-set of all the possible activities of all criminals. Some of this sub-set overlaps with the sub-sets of many other criminals, and some with relatively few. It therefore follows that assigning criminals or crimes to one of a limited number of 'types' will always be a gross oversimplification. It will also be highly problematic to determine what 'type' they belong to. If the general characteristics of criminals are used for assigning them to 'types' then most criminals will be very similar and there will be few types. But if more specific features are selected then the same criminals, regarded as similar by general criteria, will be regarded as different when considered in relation to more specific criteria.

This is the same problem that personality psychologists have struggled with throughout this century. Their research lead to the identification of underlying *dimensions* of personality. This 'dimensional' approach assumed that there were distinct, relatively independent, aspects of personality that could be identified. In recent years rather more complex models have emerged that do not require the simplifying assumption of independent linear dimensions (Plutchick and Conte 1997).

An analogy that helps in understanding this debate is the problem of classifying colours. Colours come in a virtually infinite variety, but in order to describe them some points of reference are necessary. These points of reference must cover the full spectrum of colours and they must be distinct enough for people to understand the reference. So, for instance, it would be unhelpful to try and discriminate colours merely on the basis of how much grey they contained and how much turquoise. Many differences between colours could not be accommodated in this scheme and many people may be unclear as to what colour turquoise actually is.

Another approach may be classifying colours along dimensions of blueness, redness and greenness. Indeed, many computer colour manipulation systems use just such a dimensional approach. These three hues do account for all colours and they do have very clear meanings to people who are not colour blind. The psychological parallel of personality dimensions of extroversion and neuroticisim, or in intelligence of spatial, numerical and verbal ability, also seeks to describe people in their combined position along all the identified dimensions. As with colour naming, a great deal of research has gone into determining what the major dimensions of personality or intelligence are and of specifying how they may be measured as clearly as possible.

But even though the dimensional classification scheme can be very productive it does have a number of limitations. This can be illustrated by considering yellow in our colour example. Most people regard this as a distinctly different colour from red, blue or green.

Yet the computer, say, only gives us one of these three dimensions to use. How can yellow be produced? It takes special knowledge of the system and how colour combinations work to realise that red and green will generate yellow.   The reason why this difficulty arises is that colours are not perceived along distinct dimensions, but rather as blending into each other. Various oranges sit between red and yellow, browns between yellow and green, turquoises between green and blue, purples between blue and red, and so on. Indeed for some purposes, such as printing, it is more useful to think of the 'between' colours, or 'secondary colours' as they are known, as the defining dimensions, i.e. cyan, magenta, and yellow. This switch from one set of axes to another is only feasible because they all merge into each other in a continuous colour circle (as first pointed out by the artist Albert Munsell, 1960).

The existence of a circle of colours does not deny the value of defining the major points of this circle. But rather than treat them as independent dimensions they are dealt with as emphases from which other combinations can be readily derived.   The parallels with criminal actions are very strong. In order to describe those actions we need to identify the dominant themes, but it would be unproductive to regard these themes as independent dimensions. It would be even more misleading to regard them as pure types, just as it would be misleading to think that colours can only be pure red, green or blue.

The hierarchy of criminal actions also lends support to a circular ordering of criminal actions as a parallel with the colour circle. At the centre of the colour circle are those aspects of colour that all colours share. This is the degree of greyness. It depends on whether lights or pigments are being considered, but for simplicity it is just necessary to remember that Isaac Newton showed that white light contained all the colours. So if all lights of all colours are combined they produce white. This is the centre of the colour circle. As the colours move out from this central position they become more specific and more distinctly one colour or another. The same mathematical process can be hypothesised for criminal behaviour.   At the centre, are actions typical of all the criminals being considered.   These are the general aspects of the sorts of crimes that are the particular focus. As the actions become more specific to particular styles of offending so they would be expected to be conceptually further from the 'centre' of general criminality and thus more differentiating between criminals

It can thus be appreciated that this hypothesised model of the variations between criminals has two facets to it. One is the facet of specificity, moving from the general, shared by all offences and therefore conceptually in the middle, to the specific at the periphery. The other is the thematic facet that distinguishes between the different qualities of the offences, conceptually radiating around the 'core'. This model was recognised by Guttman (1954) as a powerful summary of many forms of differentiation between people and named a *radex*. This is the hypothesised model that a number of researchers are testing in order s the first step towards answering the psychological and investigative questions introduced above.
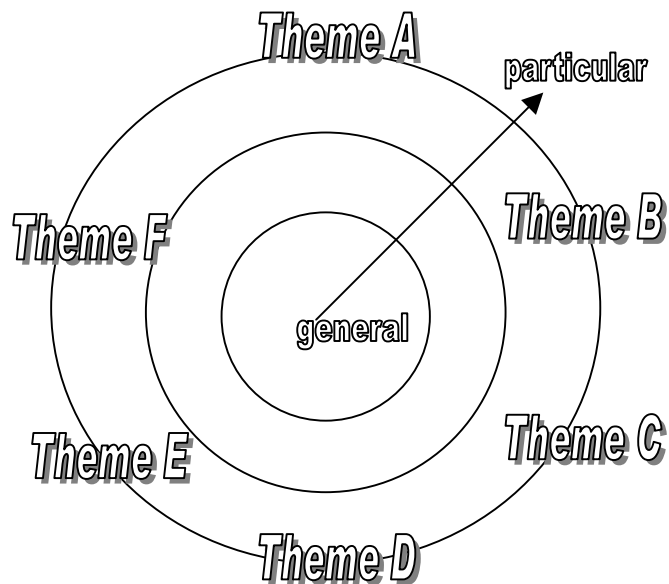
Figure 2. A General Model for a Radex as Applied to the actions of Criminals.

The crucial discovery in testing such a hypothesis is the identification of the dominant themes that can be used to classify any set of crimes. In the process it is often possible to give more substance to the meaning of specificity in that criminal context. In other words, the research may allow a determination of what the aspects of crime are that reveal the differences in the thematic emphases. For example, is it the degree of planning, or the forms of contact with the victim, or the intensity and legal seriousness of the actions, or some other underlying aspect of the crime, that produces the mixture of salient variations between crimes?

A number of different researchers have explored these possibilities in a variety of ways. Not all of them follow through the details of the radex hypothesis, either because of the weaknesses of the data they have available or the current impoverished levels of conceptualisations of criminal actions. But a growing number of studies are finding the radex model to be a powerful conceptual tool for differentiating criminals (Canter and Alison, 2000).

MDS Analysis as a Test of aspects of the Radex Hypothesis

The quest to find the underlying themes that will be most productive in answering investigative questions and help determine the characteristics of offenders can be conducted in many different ways. But, many researchers do find it fruitful to use an approach that relies heavily on what is known as non-metric multi-dimensional scaling

(MDS)(Canter 1983, Shye and Elizur 1994). It is worth emphasising that this is not the only procedure available and that every procedure has its own strengths and weaknesses. Doubtless as research develops in this area other procedures and approaches will be explored and a productive debate as to which is most worthwhile will ensue. However MDS, and especially its non-metric forms, clearly has much to offer this field.

MDS procedures in general and the particular ones utilised in much profiling research have a long and very wide history of use in psychology, the related social sciences and other areas of the biological sciences (Borg and Shye, 1995). They have been used for everything from; the classification of *cetacea* (whales) to the examination of neonatal heart defects; from the study of the genetic basis of behavioural differences in mice to reasons for taking up dieting; the effects of drug addiction in parents on their children to architects' development of the concepts of style, and so on. (Full reviews of the approach and details of these studies are given in Canter 1985 and Levy 1995)

In essence the procedures consist of calculating the correlations between a set of variables then representing these correlations as proximities in a notional 'space'. This has the great advantage of being able to examine each of the variables in relation to every other as part of one general visual pattern.   The consideration of the facets that differentiate the actions of offenders, that was discussed above by analogy with the colour circle, requires the examination of the way every action relates to every other in some notional space. MDS procedures therefore allow direct test of the radex hypothesis and simplifications of that hypothesis.

To carry out these tests the correlations between the actions need to be established. Often the best that can be hoped for, given the crudeness of the data, is that the co-occurrence of actions across a range of crimes can be examined. These co-occurrences are taken as the basis for measure of association between the variables and association coefficients that only take account of occurrences and ignore non-occurrences are often used (Jaccard 1908).

Another aspect of the approach that has been emphasised is that it is the dominant themes amongst these variables that are important. In other words, it is the relative distinctions between one set of actions and another rather than where they may sit on some absolute values of an underlying continuum. It is the relative associations between actions that is represented. To illustrate from the colour analogy, it may be the case that all the colours in a sample have a bluish tinge to them because of faults in the process used to reproduce them. A technique that would produce the colour circle would be helpful not one that was greatly biased to show the results as merely aspects of blue. The preferred MDS procedures are thus ones that represent the rank order of the associations as rank orders of the proximities in the notional space. It is this representation of the relative degrees of associations, through ranks, rather than the absolute or 'metric' values that gives the procedures the label of 'non-metric' MDS. This is an important technicality. It greatly facilitates the interpretation of what is often less than clear data.

Behavioural Salience

One way in which MDS analyses have proven productive is in the examination of the fundamental question of salience in a pattern of criminal behaviour. There are many things that occur in a crime. Therefore the challenge to the police officer, as for the researcher, is to identify those features that are of most relevance to deriving inferences about the offender. The determination of the salient characteristics is an empirical question in the sense that some knowledge of the base rate of behaviours of particular classes of crime is

essential before the characteristics that are particularly important in understanding a given offence can be appreciated.

The utilisation of MDS leads to the hypothesis that the hierarchy of criminal differentiation illustrated in Figure 1 should have an empirical correspondence in the radex structure illustrated in Figure 2. The more general aspects of a crime, typical of all criminals are hypothesised to be at the centre of the radex with the signatures at the periphery as shown in Figure 3.
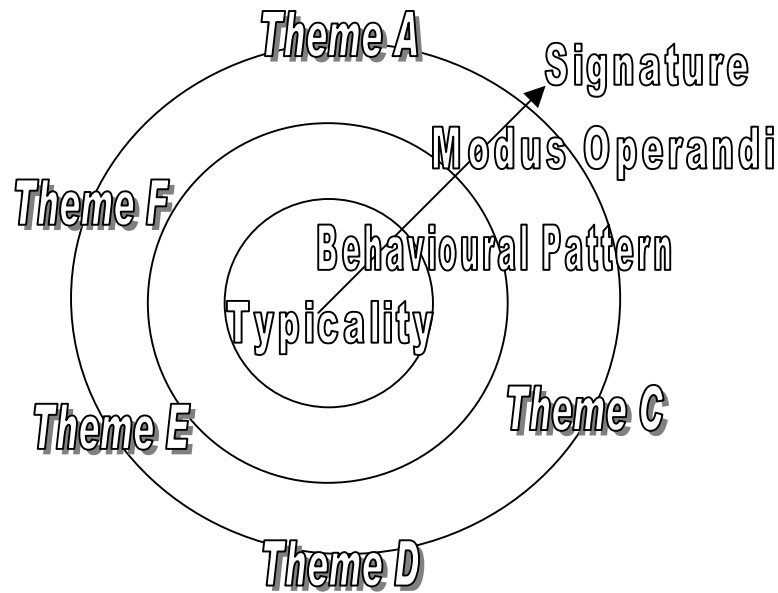

Figure 3. Representation of behavioural salience in a radex of criminal behaviour

The model of behavioural salience is a refutable hypothesis because it is possible that distinct sub-groups of actions could occur in any class of crime which, whilst frequent, were typically associated with distinct sets of rarer actions. In such a case the concentric circles that make up the radex would not be found. In this framework salience is the location of an action at different distances from the centroid of the pattern of actions revealed in the MDS analysis.

The first published study to demonstrate the existence of such a radial structure for crime was Canter and Heritage's (1990) study of rape. But a more recent study by Canter et al (1998) of paedophilia also serves to illustrate the power of the radex model in helping to indicate the salient aspects of a crime. For although in their study the three activities of "initial force used by offender", "the offender was recorded to have carried out the offence only once" and "the offender tried to desensitise the victim to the offence" all occurred in about 40% of the 97 cases they studied, the distribution in the MDS plot shows that they tended to occur in very different crimes. Furthermore, they co-occurred with rather different sorts of other actions. For example, initial force was related to a number of other less frequent violent actions carried out by the offender, whereas desensitisation tended to co-occur with rarer actions that implied attempts to develop an intimate relationship with the child victim.

In a number of studies salience has emerged as related to the social psychological context of the offence rather than the focal actions that define the offence. In Canter and

Heritage's (1990) sudy they report that "the use if the woman as a sexual object is at the core of sexual assault" (p.198). The salient differentiations therefore are those that relate to *how* this core activity is instantiated in any particular offence. In their study of arson Canter and Fritzon (1998) used Shye's (1985) action systems model to give a more precise definition of the variations in modes of criminal activity that provide the key to understanding differentiation. They demonstrate that differences "relate to the source of the action and the locus of its desired effects"(p.80).

 This concern with source and locus of the intended effects of crime follows the discussions of the role of emotion in offending that can be traced back to the consideration of instrumental aggression in violent crimes (e.g. Buss 1961, Fesbach 1964). Canter and Fritzon (1998) generalised the consideration of whether violent crimes were instrumental or expressive to cover other forms of crime, notably arson. They did this by regarding crimes as aimed at a variety of types of targets. Sometimes the target may be a modification of the feelings of the criminal, and thus essentially expressive, or they may be a search for a particular overt reward, thereby being essentially instrumental. It is this overlay, or elaboration, of the central criminal acts that give those acts their significance and investigative salience. The elaboration is clearest when the acts can be seen in the general context of other actions committed during similar crimes. If they can be modelled in relation to the overall frequency of actions that occur in that class of crimes then a reasonably precise definition of their salience can be determined.

Models of Differentiation

The examination of the salience of offence actions indicates that the consideration of any action in isolation from the others that may co-occur with it can be misleading. Any single action may be so common across offences or so ambiguous in its significance that its use as a basis for investigative inferences may suggest distinctions between offenders that are unimportant. Differentiation therefore needs to have foundations in an understanding of the processes that give rise to co-occurring patterns of criminal activity. Within the radex model the forms of salience derive their specific meanings from the psychological themes which they reveal. A number of researchers have followed the implications of this by testing the hypothesis that these themes reflect the mode of interpersonal transaction that the offender uses to carry out the crime.

 One elaboration of this mode of interpersonal transaction is that put forward by Canter (1995a). He takes a more social psychological perspective on what Canter and Fritzon (1998) call the "locus of desired effects". The locus here is role the offender assigns his victim during the crime. This model is a distillation of the findings reported by Canter and Heritage (1989). Rather than the five-fold model they proposed Canter (1995a) argued that in more general terms the five modes of transaction can be reduced to three general roles to which a victim may be assigned.

 1. Where the offender treats the victim as an object (something to just be used and controlled through restraint and threat, often involving alternative gains in the form of other crimes such as theft).

 2. Where the offender sees the victim as a vehicle for the offender's own emotional state, e.g., anger and frustration (the victim is subjected to extreme violence and abuse).

3. Where the offender sees the victim as a person (some level of pseudo-intimacy with attempts to create some sort of rapport or relationship).

Canter (1995a) presents some evidence for this model as a basis for differentiating rapists. More recently Canter et al (1998) have shown the model is supported with data from 97 paedophiles. Salfati and Canter (1999) used a somewhat different vocabulary in their study of 82 stranger homicides but still presented an analogous three-fold model. Hodge (2000) also found the model to be of value in her study of 88 US serial killers. Her particularly detailed argument and MDS results provide one of the clearest examples of this approach.

   She hypothesised that for those sexual serial murderers where the role of victim was as an object, the crime scene behaviours would reflect few emotional elements with little interpersonal interaction. The offender would be unlikely to be influenced by the victims' responses, acting out a personal ritualised script, in which the victim plays no part as a human being. She also hypothesised that post-mortem injuries and sexual acts as well as excessive violence and dismemberment would co-occur with these other indicators of the 'victim as object'.

   Hodge (2000) took the thematic focus on the role of victim is as a vehicle to reflect more overtly emotional reactions. She points out that although the offender may well subject his victim to extreme violence similar to the offender who sees his victim as an object, there will be a difference in concern the offender has for the sort of people his victims represent to him in his personal life. Therefore, there is likely to be a substantial level of interpersonal interaction between victim and offender. Associated crime scene behaviours may include the use of restraints and there may be evidence that the victim was kept alive for a period of time.

   Where the role of the victim is as a person, Hodge (2000) hypothesised that the crime scene behaviour will reflect the importance of the victim as a particular person. She proposes this will be shown in the co-occurrence of variables that indicate the degree and style of interaction between the two. Excessive violence would be rare, sexual activity would be more likely to be 'normal' ones such as full sexual intercourse prior to death and violence directed at specific areas of the body, especially the facial area.

   As the earlier discussion of the radex model makes clear this three-fold classification is not meant to indicate distinct type of offender but rather themes that will be present in all offences to some degree. The differences between offenders are in the emphases that any particular offender exhibits.

   Hodge (2000) tested these hypotheses by carrying out an MDS analysis of 39 crime related actions of the 88 killers she studied. The resulting two dimensional configuration is shown in Figure 4. For full details of this analysis the original paper should be consulted.
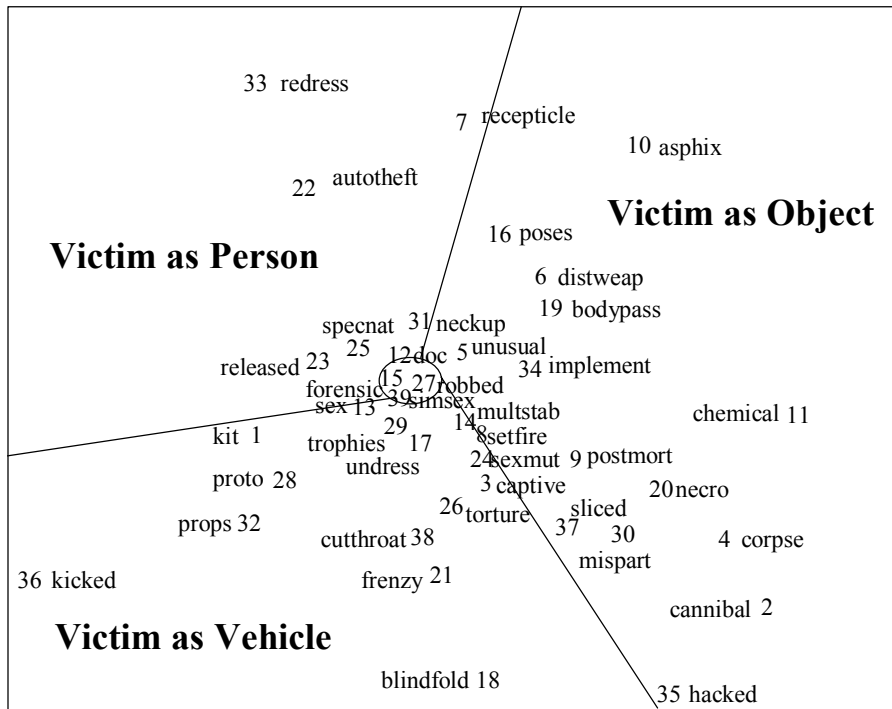
Figure 4. MDS Analysis (Smallest Space Analysis) of the actions of 88 US Serial Killers (from Hodge 2000). Numbers refer to the variable numbers in the original paper. Brief title for the variables are given on the plot, the full coding dictionary is given in the original paper.

As Hodge hypothesised regions of the MDS configuration can be distinguished that indicate the different emphases predicted by the three-fold interpersonal model. To the right of the plot are those variables that suggest that the victim is dealt with as 'an object'. These activities have similarities to those associated with sadistic/lust murderers (Becker and Abel 1978). Necrophiliac activity, cannibalism, hacking the body, leaving it in a posed postion as well as other post-mortem activities all are consistent with the victim being little more than something to use. There is no indication that the victim carries any emotional significance for the offender.

   To the bottom left of the plot are those actions that indicate that the victim acts as a vehicle for the offender. The victim being held captive and being involved in the script of the offender elaborate the underlying brutality of the offence. As Hodge (2000) points out the significance of the victim to the offender can result in the direction of excessive violence to areas of the body that hold importance for the offender. Specific types of victim are selected, and restrained sometimes using designed crime kits (kit) and restraints (blindfold).

   Hodge (2000) points out that to the top left of the plot are those behaviours that indicate that the offender perceives his victim as a person with whom his desire for some degree of interpersonal interaction is fulfilled. This theme may be indicative of the category of rape murder as proposed by Groth et al (1977). In such cases, the victim's responses are more likely to influence the offender's behaviour. In other words, the interaction is two way rather than from only offender to victim. Here, the victim is not only integral to the

offender's script but has a 'speaking part'. The variables sex (full sexual intercourse) and dressing the victim after the sexual assault (redress) suggest some degree of emotional significance to the victim as a person. The taking of personal documents and belongings from the victim also show an interest in the person rather than just her body.

This study of serial killers illustrates how crime related actions can be differentiated as a first step towards the development of models that will characterise the dominant themes in criminal behaviour. It is of especial interest because it replicates findings from a number of different studies of criminal behaviour, lending support to the proposition that there may be underlying themes that differentiate all crimes.

Consistency between crimes and non-criminal actions

The possibility of such consistencies has lead some researchers to seek general models of criminal behaviour that will explain and predict these differences. Canter and Fritzon's (1998) use of action systems theory is one such approach. A more directly psychological approach has been proposed by Bennell et al (2000). They developed the criminal consistency argument outlined by Canter (1995), in which crime is seen as an extreme form of non-criminal activity, and is therefore likely to reflect variations that occur in ordinary day-to-day interpersonal activities. They examine the abuse of children and argue that the variations in the forms of abuse will parallel the variations in the more conventional interactions between adults and children. They therefore propose that the structure found in MDS analyses of child abuse will be a variant of the circumplex model reported by Schaefer (1979) in his study of variations in maternal behaviour. The results of their study show that the coercive basis of child abuse typically mirror forms of control and the exploitation of trust that normally occur in conventional adult-child relationships.

These studies are, of course, not alone in generating classification schemes for considering offenders. Some very valuable clinical studies have been carried out, for instance in relation to sex offenders (Prentky et al 1985, Grubin and Kennedy 1991). However, such studies often combine the characteristics of the offender with aspects of their actions in ways that reduce the possibilities for inferring one from the other. Future research must therefore build stronger bridges between these clinical studies and those carried out in the context of offender profiling.

Behavioural Consistency

If any offender commits a series of crimes there are questions about what is consistent across them that can be used in understanding the offender. This is very closely related to the problem of reliability in all forms of psychological measurement. It is also a central problem in many police investigations where attempts are being made to determine which of a number of offences have been committed by the same person. Canter (1995b) reports some success in comparing the patterns of behaviour across crimes using a simple measure of association, the Jaccard's coefficient (Jaccard 1908). In a more detailed study Grubin et al (1997) examined 470 cases of sexual assault committed by 210 offenders. They used cluster analysis to show that offenders tended to have similar offending styles. They did this by dividing crimes into different component *a priori;* the form of control, the nature of

the sexual activities, the mode of escape as well as the overall nature of the crime. Each of these was then examined to determine if offenders tended to be consistent in each of these aspects.

The consistencies Grubin et al (1997) found are an important contribution to our understanding of criminal behaviour, but as the radex model illustrates there is a risk that their results are contaminated by relationships between the different components of the offence. The radex model also raises the possibility that the consistencies found are a product of the frequencies of offence actions rather than co-occurrences across offenders.

In order to overcome these difficulties Mokros (1999) used the positions of offenders' actions directly on an MDS analysis of rapists. Mokros (1999) used a smaller sample than Grubin et al (199), 126 sexual assaults committed by 42 offenders. He was nonetheless able to demonstrate that the actions of different crimes committed by the same offender were more likely to be close to each other on the MDS plot than the actions of different offenders.

Taken together the various studies of rapists' behaviours do show some limited degree of consistency. However, there are few studies that have been carried out on other forms of crime. One notable exception is the study by Green and Biderman (1976) that presciently used MDS techniques in combination with cluster analysis to demonstrate that the *modus operandi* of burglars did have a demonstrable statistical existence.

Spatial Consistency

These studies do show, therefore that whilst the individual actions of an offender may not all be identical from one crime to the next the themes that characterise those crimes may often be reasonably consistent. Conceptually this may be regarded as the offenders operating within a limited conceptual space, as can be defined by an area of an MDS configuration. But more directly spatial consistencies have been found amongst serial criminals.

Brantingham and Brantingham (1981) summarised the growing literature indicating the limited area over which many offenders operated. Since that time a number of researchers have demonstrated the practical utility of models of offender spatial consistency (Kind 1987, LeBeau 1987, Rossmo 1997, Godwin and Canter 1997). Canter and Gregory (1994) argued that the likely success of these models was a function of whether the offender was a 'commuter' or a 'marauder'. The latter tended to use some fixed base, often their home, as a focus for their activities. This means that gravitational models can be developed to derive the likely location of the home from knowledge of the location of their crimes. By contrast those who 'commute' into an area to commit their crimes are less open to having their home location modelled.

There are interesting similarities between the role of daily activities in the spatial behaviour of 'marauding' offenders and the view that crime is a reflection of the non-criminal activities of offenders. This accords well with the routine activity theory of crime (Clarke and Felson ,1985), which is usually applied to instrumental crimes such as burglary. However, the spatial studies tend to have been of serial rapists and killers, indicating that at least in the choice of location these criminals often draw on their daily routines in some logical way.

Inference

The considerations above show that there is a growing understanding of the forms of differentiation that it is valid to make between criminals. These distinctions appear in some circumstances to reflect other aspects of a criminal's life besides the particular crime they have committed. This provides a reasonable basis for hypotheses about the association between actions in relation to a specific crime and other characteristics of an offender. Canter (1995b) has characterised this inference of Characteristics from Actions as the 'profiling equation', suggesting that it potentially has all the complexity of canonical regression models. However, to date no researchers have tackled the full complexity of these equations preferring to model focused aspects of them.

As indicated, one recurring conceptual basis for these models can be seen as an elaboration of routine activity theory in which it is hypothesised that the offender will show some consistency between the nature of their crimes and other characteristics they exhibit in other situations. This is rather different from the many psychological models that attempt to explain criminality as being a product of psychological deficiencies (Farrington 1998). The inference models used for profiling are less concerned with the prediction of criminality than with unravelling the structure it takes and how that structure connects with features of the offender that will be of interest during an investigation.

These inference models draw upon the thematic approach that has been outlined above and in this regard show how far removed the approach is from the 'clues' of detective fiction. Any one criminal action may be unreliably recorded or may not happen because of situational factors. But a group of actions that together indicate some dominant aspect of the offender's style may be strongly related to some important characteristic of the offender. Davies et al (1997) showed the power of this thematic approach. They demonstrated from their analysis of 210 rapes that if the offender took precautions not to leave fingerprints, stole from the victim, forced entry and had imbibed alcohol, then there was a very high probability, above 90%, that the offender had prior convictions for burglary.

Unfortunately Davies et al (1997) do not provide a detailed structural analysis of the relationships between all the activities that they considered. They used a logistic regression that searches through the data to find the best matches, so that low level relationships that may add up to provide an overall picture are ignored. However, the actions that they bring together to predict prior burglary indicate an offender who is determined to commit the crime and get away with, treating the victim as a resource or 'object' rather than a significant person.

Salfati and Canter (1999) examined all the actions together with the characteristics in their study of 82 stranger homicides. Their analysis did reveal consistency in the themes across actions and characteristics. As with Davies et al's (1997) study the clearest associations of criminal actions were with previous offence history. Those murderers who stole non-identifiable property, who were careful not to leave forensic evidence and who hid or transported the victim's body were more likely to have had a custodial sentence, but interestingly were also more likely to have served in the army.

The most developed exploration of thematic inference hypotheses is Canter and Fritzon's (1998) the study of arsonists. They developed scales to measure four themes in the actions of arsonists derived from their action system model. They developed a further

four scales to measure themes in the background characteristics of the 175 solved arson cases they studied. Their table relating measures on all four background scales to all four action scales showed that the strongest statistically significant correlations were, as predicted, between actions and characteristics that exhibited similar themes, and lowest between those that did not.

These studies of inference are therefore slowly beginning to provide a basis for a more general theory of offender consistency. But they suffer from dealing with the criminal as an individual independently of the social or organisational context in which s/he operates. As Canter and Alison (1999) have argued the social processes that underlie groups, teams and networks of criminals can reveal much about the consistencies in criminal behaviour and the themes that provide their foundation. A clear example of this is the study by Wilson and Donald (1999) looking at the different roles that the are taken by teams of 'hit and run' burglars. They demonstrated, for example, that the offender who was given the task of driving the get away vehicle was most often likely to have a previous conviction for a vehicle related crime. In contrast the criminal assigned the task of keeping members of the public at bay, or controlling others who might interfere with their crime, the 'heavy', was most likely to have a previous conviction for some form of violence offence.

These results of consistency between social role and other forms of criminal endeavour are thus in keeping with the general thematic framework that is emerging through the studies of actual actions in a crime. They lend support to a general model of criminal activity that recognises the specific role that criminality plays in the life of the offender. It further supports the perspective that for the sorts of offenders considered in the studies cited, the style of criminality is an integral, natural part of the criminal's general lifestyle, not some special, atypical aspect of it.

Implications

Police forces throughout the world now regularly request descriptions from people with a psychological or criminological background of the likely characteristics of unknown offenders. They present the expert of their choice with details of the crime and then ask that individual to infer for them what those characteristics of the offender are likely to be. Until recently there has been very little research on which to base these inferences. As a consequence the process these 'profilers' go through are often little more than informed speculation. However this does not appear to limit the desire of police officers to request such information. There is therefore an important area of study that examines what it is felt is achieved by this 'expert' input.

A fruitful approach to understanding the reasons for the attractiveness of this input is provided by research that seeks parallels with the apparent attractiveness of astrology and psychic detection. The rhetorical devices used by psychic detectives have been shown by O'Keeffe and Alison (2000) to be influential in creating the impression of benefit through encouraging reinterpretation of ambiguities in self-referential ways by the target of these opinions. In much the same way as astrology charts are open to so many interpretations and the gullible reader will perceive the interpretation that makes most sense to them, so psychic detectives will offer ambiguous comments that whilst apparently seeming to offer

precise guidance are actually ambiguous. Research suggests that many offender profiles achieve their attractiveness to police officers by similar means (Copson, 1995). Copson also notes that in only 3% of any of the cases did the profiler help identify the offender. Therefore the current practice of seeking advice on a profile appears to be more of an insurance and reassurance policy than an investigative tool to aid directly in catching offenders.

This practice of bringing in an 'expert' as a form of insurance policy has many risks associated with it. For example police officers and psychologists may be engaged in an investigative *'folie a deux'*, where both parties are reinforcing each others personal beliefs until they become increasingly convinced of a particular line of enquiry (Alison and Canter 1999). The only way out of this is to follow Meehl's (1996) advice and develop beyond the 'clinical' to the 'actuarial'.

The various empirically based models that are emerging suggest that the days of the 'heroic' expert are numbered. In some cases the principles that research supports can be presented so directly that they can be incorporated into police training. This is a consequence of the power of valid theories to summarise a great deal of information. The thematic consistency models, once elaborated, would not be beyond the understanding of most detectives.

In other cases the research points to the possibilities of searching existing data bases (Davies 1997), or other forms of record of possible suspects and then assigning priorities to the possible offenders (Coffey et al 2000). There are many practical difficulties in implementing such systems (Ratledge and Jaccoby 1989). But there are many potential benefits if these difficulties can be overcome. Perhaps one of the most important potential benefits relates to civil liberties. Currently the personal opinion of 'experts' can lead to a person being dealt with as a prime suspect even though there is no overt basis for that judgement at all. At least with a computerised process, founded in explicit, empirically supported psychological models, the basis of the decisions can be overtly determined and tested for their reliability and validity.

The slow accretion of scientific evidence, the development and test of theories and implementation of findings into computer based decision support systems does not have the same dramatic power, or excitement, as the lone private investigator cracking the crime where the police have been unable to. But the systematic examination of the most appropriate ways to differentiate offenders has to be the proper basis for any professional derivation of inferences about offenders. It is also the basis for important new perspectives on the nature of crime and criminals.

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