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# *Unobtrusive measurement: using police information for forensic research*

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ABSTRACT This article explores how unobtrusive research methods popularized by Webb et al. (1966) can be utilized in forensic research. In particular, the value of the approach is considered with special reference to examining investigative processes and criminal behaviour. Webb et al.'s three non-reactive types of unobtrusive measures (physical traces, archival material and simple observation) are discussed in relation to a variety of types of material collected across the course of police enquiries. The breadth and variation of this material is emphasized with special consideration of its utility for research. We illustrate how the limitations and benefits identified by Webb et al. are echoed within the forensic domain and how close attention to the methods of collecting such material developed by researchers may improve the effectiveness of investigations.

KEYWORDS: *data collection, forensic science, policing, unobtrusive measurement*

## *Introduction*

Information collected in police investigations has presented researchers with creative ways of exploring a whole range of forensic phenomena. This information, used in a wide range of studies, has included transcripts of police interviews (Auburn et al., 1995), crime scene evaluations – including photographs, pathologists' reports and scenes-of-crime officers' reports (Canter and Heritage, 1990) – the geographic locations of offences (Kind, 1987; Rossmo, 2000) and witness and victim statements (Fielding and Conroy, 1992). At present, few systematic evaluations or research protocols, agendas or models have been developed to explore the features of this type of information. In more practical terms, the identification of a methodological framework may highlight the limits and benefits of such material and present researchers with the apparatus to advise upon ways of improving investigative data collection processes.

### INFORMATION COLLECTION

In each of the aforementioned examples of police information a common thread exists with respect to the research methodology employed; information collected in police investigations is not gathered for the purpose of scientific research. Because forensic research relies heavily on the quality of information collected, the researcher cannot ignore the fact that it was collected for a very different purpose. The primary objective for the police is to secure the arrest and conviction of the individual responsible for a crime. This is clearly at variance with common methods of conducting research in tightly controlled conditions, where an experimenter sets up a context (e.g. questionnaire, interview, laboratory experiment, etc.) and pre-determined variables are measured to examine the effect on other variables. A brief step back into the history of the methodological endeavours of social scientists, however, reveals that this conventional means of gathering information is only one approach to research. In fact, previous studies illustrate many benefits of methods that do not involve the researcher designing the initial collection protocol (Lee, 2000).

This is reflected in the many interesting parallels between the processes employed by researchers examining investigative concerns and the work of Webb and his colleagues in the 1960s. Webb et al. (1966) argued that the use of interviews, questionnaires and traditional laboratory experiments represented a lamentable over-reliance on a single, fallible approach to research. The primary criticism of these more conventional approaches to research was the degree to which the researcher interfered with the collection process. In other words, although such research designs benefited from controlling the relationship between cause and effect, the very fact that the researcher designed the experiment created a 'foreign' element to the behavioural context within which the phenomenon was observed. Despite these criticisms, Webb and his associates were careful to add that the use of unobtrusive measures should not replace conventional controlled research paradigms, but should merely be used as additional tools to supplement and cross-validate such methods.

## *Unobtrusive measurement and three sources of information*

In order to draw together the range of activities that could be categorized under the umbrella term 'unobtrusive or non-reactive measurement', Webb et al. (1966) developed three broad thematic approaches to non-reactive research: physical trace measurement, archival information and simple observation. These are considered in the following sections and in Table 1 where we highlight examples of each, followed by forensic equivalents.

### PHYSICAL TRACE MEASUREMENT

Webb et al. (1966) identified two types of physical trace measurement: (a)

TABLE 1. *A brief list of the research that has used unobtrusive measures for non-forensic and forensic research*

| *Unobtrusive measures* | *Non-forensic* | *Forensic* |
|---|---|---|
| Physical trace | | |
| Erosion | Duncan (1966) | Mann et al (1990) |
| Accretion | Blake (1981) | Rossmo (2000) |
| Archival Information | | |
| Running record | Wechsler (1961) | Maltz (1998) |
| Episodic | Green (1961) | Leyton (1995) |
| Personal | Thomas & Znaniecki (1918) | Gregory (1999) |
| Simple observation | | |
| Exterior physical signs | Sigelman et al. (1990) | Burma (1959) |
| Expressive movement | Schubert (1959) | Edelman (1998) |
| Physical location | Festinger et al. (1956) | Sparrow (1991) |
| *In situ* conversation | Pinch & Clark (1986) | Rogan et al. (1997) |
| Time-related behaviour | Nash (1990) | Keppel & Weis (1994) |

erosion measures, where the measure is the degree of selective wear; and (b) accretion measures, where the deposit of materials is used as research evidence. In addition to their evidential utility, physical trace measurements may reflect certain behavioural qualities peculiar to the execution of an offence.

*Erosion measures* Lee (2000) outlined various examples of how social scientists have used natural erosion measures. One classic example is Duncan's (1966) examination of the replacement rate of vinyl tiles around exhibits at Chicago's Museum of Science and Industry. By observing higher tile replacement rates in certain areas, Duncan was able to deduce the most popular exhibits. Erosion measures are also a common source of data in forensic research. For example, Mann et al. (1990) used natural erosion measures relating to human body decomposition such as insect activity, body trauma, and body weight to establish time since death.

*Accretion measures* Social scientists have recognized that materials deposited by individuals are useful for exploring a wide variety of behaviours. A clear example of the usefulness of accretion data is Blake's (1981) examination of the ethnic content of graffiti appearing in male lavatories at the University of Hawaii. This allowed Blake to identify, among other things, stereotypes of ethnic groups from other ethnic group messages that are typically taboo in Hawaii. Accretion measures available to the police may consist of DNA information, ballistic evidence, fingerprints and body recovery locations. The geographical locations of the Yorkshire Ripper's attack sites, for example, provided Kind (1987) with information that allowed him to infer an area that

was likely to contain the offender's residence. This involved using the centre of gravity of the offence series to approximate the home location of Peter Sutcliffe. Similarly, Rossmo (2000) has developed the concept of geographic profiling using body recovery locations. It is these sorts of measures that help to ascertain complex behavioural traces that occur 'naturally' and without intervention from the social scientist.

## ARCHIVAL INFORMATION

Lee (2000) makes a distinction between archival material on the basis of whether or not the information is: (a) a running record that is a continuing record of a society; or (b) discontinuous information that is episodic or personal.

*Running record* An often untapped source of data comes from continuous hospital records and records of births, marriages, deaths, etc. One study that use such data was Wechsler's (1961) examination of census data on population change, mental-illness diagnosis in hospital records, and state-wide statistics for suicide incidence. Through the use of these three running records, Wechsler was able to identify relationships among suicide, depressive disorders, and community growth. Running records that are available to the police include a variety of sources such as the FBI's Uniform Crime Reports and criminal databases such as the Homicide Investigation Tracking System (Keppel, 2000). In an attempt to illustrate the utility of graphical methods in analysing homicide data, Maltz (1998) used running record data from the FBI's Supplementary Homicide Reports (SHR). In that study Maltz attempted to demonstrate that visual methods could be used as a useful alternative to more conventional statistical analyses to find patterns in criminal data.

*Episodic records* Discontinuous types of episodic records are usually found within bureaucratic institutions. For example, Green's (1961) seminal study on sentencing disparity demonstrated how judicial data could be used to determine whether there were any criteria by which sentencing was decided and if any uniformity of sentencing existed. Green (1961) collected 1,437 cases from 1956–7 through police and court records in Philadelphia, USA, and isolated three sets of variables for sentencing criteria: legal factors, legally irrelevant factors and factors in the criminal prosecution. The severity of sentences was measured by the extent of deprivation of civil liberty. As a result, he was able to show within-court consistency and across-court variation in judicial sentencing. In the policing context, episodic records might include police reports, interview tapes, informers' reports and witness reports. Other examples involve extortion letters, tapes of undercover liaisons or documentation relating to police officers' employee records. Data used in Leyton's (1995) *Men of Blood: Murder in Modern England*, for instance, used police reports to explore the historical, social and cultural origins of England's low homicide rate.

*Personal records* As well as utilizing running and episodic records, researchers have made use of private records. For example, Thomas and Znaniecki (1918) analysed letters obtained from a Polish peasant and Janowitz (1958) examined letters exchanged between German soldiers. Such efforts have led to fascinating insights into the very real concerns of individuals involved in unique contexts and have provided the opportunity for developing hypotheses about the nature and evolution of interpersonal relationships. In a forensic setting, personal records can take a variety of forms: diaries, letters, suicide notes, etc. Gregory (1999), for example, compared genuine and simulated suicide notes to determine whether and on what basis they might be discriminated. He determined that the two types of suicide notes differed with respect to five language components and revealed the extent to which individuals internalize the decision to die. Gregory's findings are likely to be of practical interest to police investigations where the reason for death is equivocal.

## SIMPLE OBSERVATION

In simple observation the observer plays an unobserved, passive and non-intrusive role in the research situation and has no control over the behaviour in question. Lee (2000) identified five types of simple observation: (a) exterior physical signs; (b) expressive movement; (c) physical location; (d) *in situ* conversation; and (e) time-related behaviour. A major advantage of simple observation is that the investigator has had no part in structuring the situation – and, therefore, he or she protects the research from participant reactions to the experimenter. Another advantage of the simple observation methodology is the fact that the data are collected first-hand, which reduces the probability of information contamination.

*Exterior physical signs* Webb et al. (1966) describes exterior physical signs such as tattoos, scars and types of clothing worn as a durable expression of behaviour. Sigelman et al.'s (1990, cited in Lee, 2000) examination of photographs in a political almanac, to identify the degree of baldness in male US legislators, is an interesting example. Sigelman and his colleagues showed that there was no significant association between baldness and assessment of attractiveness or voting intentions. An example in forensic research using this type of data includes Burma's (1959) observational studies of tattoos. Burma demonstrated that in a comparison study between 900 young inmates and a matched control group significantly more delinquents than non-delinquents tattoo themselves. Although Burma's study did not directly utilize police information collected across an investigation, it highlighted the type of information available to the police. For example, collecting data on tattoos could provide a source of information for police to determine gang membership.

*Expressive movement* The utility of expressive movement has been demonstrated through several studies of personal behaviour. For example,

Schubert (1959) suggested that the grimaces, speech and gestures of judges when hearing arguments and opinions in court were all rich sources of data for students of the court. Additionally, Krout (1951) suggested that the movement of the toes of witnesses in Hindu courts gave an indication of the truthfulness of their statements. Similar issues have intrigued researchers interested in non-verbal cues of deception in police interviews (Edelman, 1998). For example, Horvath et al. (1994) examined 60 videotaped interviews of actual criminal suspects to determine the effectiveness of trained evaluators' ability in detecting deception. Although controversial (see Memon et al., 1998), Horvarth et al. claimed, through an examination of different types of response behaviours, that the evaluators were able to distinguish between those attempting to conceal involvement in criminal activity and those telling the truth.

*Physical location* Lee (2000) suggests that examining the way individuals use and organize space and how people relate to each other in that space is a useful way of understanding processes of social interaction. For example, the theory of cognitive dissonance grew out of Festinger et al.'s (1956) participant observation study of rationalizations of members in religious sects. Similarly, Whyte (1943) joined an Italian street gang to observe the factions that evolved and the rituals of its members. Finally, Rosenhahn (1973) raised controversial issues of professionalism in psychiatric institutions.

An example of physical location being used as an unobtrusive measure in the forensic setting is Sparrow's (1991) exploratory study of criminal networks using criminal intelligence data. He suggested that law enforcement agencies are able to use reports about where two or more people have been seen together to answer a variety of questions regarding the structure of criminal networks and the role that specific individuals play within them. Such studies allow researchers to identify valuable information regarding group processes that provide the police with new ways of interviewing group members, disrupting group membership and deploying tactical strategies.

*In situ conversation* The fourth type of simple observation is *in situ* conversation. A study by Pinch and Clark (1986, cited in Lee, 2000) focused on the 'spiels' used by market traders. Essentially, an examination of the rhetorical strategies used by the traders highlighted the use of various devices likely to increase the chance of a sale. Some of these included prolonging the handing over of goods to show that other sales are being made, creating a sense of urgency, scarcity of products, indicating limits on the number of people who can buy products and using accomplices to indicate interest in order to encourage potential customers.

In a policing context, Rogan et al. (1997) use *in situ* conversations to explore the dynamic processes of crisis negotiations. They argued that

exploring the communicative features of crisis negotiation is founded on an assessment of the situation as it happens and is only made possible through the discourse between the negotiator and hostage taker(s). Rogan et al. (1997) argued that evaluating the dynamic interplay of the offender and negotiator conversation can potentially enhance the chances of a successful negotiation.

*Time-related behaviour* According to Lee (2000), the few studies that have examined time-related behaviour have largely relied upon time budgets, records of daily activities, perceptions of time and patterning of activities over time. One example of the use of time-related behaviour was Nash's (1990) study of procrastination among writers who use computers. Essentially, he found that authors using computers often engage in behaviour such as tidying files and folders to avoid the writing process.

The study of time and how it relates to the solvability of murder cases provides an interesting example of how time-related behaviour in the policing environment is open to observational study (Keppel and Weis, 1994). Keppel and Weis examined the relationship between time and the probability of a successful resolution of a murder case. They found a success rate of 82 percent when the victim disappeared less than 24 hours prior to the body being recovered. Generally, Keppel and Weis found that as time increased, the chances of solving the case decreased.

## *A framework for non-reactive research*

Researchers have long been aware of the wealth of differences between laboratory research and less conventional forms of research. In 'real-world' inquiries the emphasis tends to be upon solving problems and predicting effects rather than just gaining knowledge and finding causes. Although similar domains of interest may be exploited by both areas, for example Byrne's (1961) artificially tested examination of interpersonal attraction versus Schwartz and Lever's (1976) naturally occurring examination of interpersonal attraction, higher academic prestige is generally associated with the former. The main reason for this presumed superiority lies in issues associated with the greater degree of control that the laboratory format affords. As with conventional bivariate measures of association, laboratory observations are designed to measure which variable affects which other variable. Researchers working 'in the field', however, do not have the luxury of being able to separate independent from dependent variables and must rely instead on making sense of complex, multivariate phenomena. Clearly, researchers and police officers are not able to examine criminal phenomena in artificial laboratory conditions and, therefore, the employment of unobtrusive measures is not simply an alternative or a supplement to conventional techniques, but rather is often borne out of necessity. The

challenge then is to work with these unobtrusive measures and establish a framework that will aid in their development.

## *Limitations of unobtrusive measurement in the investigative domain*

The majority of the limitations of unobtrusive measures in the investigative domain exist mainly as a function of the original process of collection. Four fundamental problems include: variations in collection protocols; the pragmatic concerns of guiding statements to increase the probability of prosecution in court; the potential for distortions within elicited information; and a disregard for the meaning of behaviour within different contexts.

### VARIATION IN COLLECTION PROTOCOL

The first problem for researchers wishing to use information gleaned from crime reports is the variation in the way the material is collected. For example, in burglaries, scene-of-crime officers are generally asked to write a narrative account of what has been stolen, what damage has occurred and what the movements of the victim were in relation to the relevant period when the offence was thought to have occurred. In situations where there are no strict protocols or systematic guidelines for information collection it is likely that variation exists across accounts. This may vary as a function of individual differences in thoroughness or contextual features such as time constraints. As Lee (2000) points out, 'a common alternative and rather simple format for recording an observation is a checklist' (p. 51). These checklists are gradually being adopted in the recording of police information (see Merry and Harsent, 2000). For example, many police constabularies in the UK are adopting coding checklists for examining potentially relevant information. These checklists, however, are not consistent across all constabularies and often require thorough reassessment after the first phase of analyses. Clearly, the potential for discrepancies within the information collection process presents researchers with the problem of internal validity. It is quite possible that there are profound differences within, as well as across, police constabularies. As a result, researchers would need to explore whether or not behavioural variation is due to the actual differences in behaviour or whether it is simply a reflection of the differences in collection methods of the investigating officers.

### GUIDING THE ACCOUNT FOR THE COURTS

A second issue concerning the limitations of unobtrusive measures involves the fact that certain features of an account may be forced into a homogenized statement to better serve the prosecutor in court. The pressure on the police is twofold. On the one hand, there is a requirement to establish the facts of the incident under investigation, while at the same time presenting a convincing

account for the prosecution service. Subsequently, the use of this type of archival data creates limitations for the researcher. For example, using police reports to examine the situational factors that are potentially of importance for burglary prevention may prove difficult. In the UK, police reports usually include the offender's method of entry, type of property stolen, behaviours within the dwelling and methods of disposal – all features that will help to solve and prosecute the case. The situational context in which the crimes take place (e.g. amount of street lighting, whether the dwelling had observable security features, level of road traffic, socio-demographics of the area, the amount of undergrowth surrounding the dwelling, etc.) are rarely considered because they are less relevant issues for the police.

## DISTORTION

An additional consideration regarding the limitations of unobtrusive measures is that the researcher and the police officer often only have partial information on any given offence. This lack of comprehensive information increases the potential for distortion. Many distortions are a product of different individuals' agendas. For example, each person's version of a crime, whether as a witness or victim may affect the content of the statement taken. Furthermore, these different perspectives are likely to be influenced by the type of requirements placed upon the report. In other words, police officer(s), offender(s), victim(s) and witness(es) are likely to construct different accounts of an offence because of the different motives for giving the account. Moreover, accounts may vary over time and are likely to be strongly influenced by whom they are given to.

A method of testing whether an account was influenced by the joint action of the account giver and account receiver would be to compare a rape victim's initial account of the offence given to a close friend and the account that ended up in the police file. As suggested, it is possible that the prosecution will suppress features of the account that 'look bad', while highlighting features that more accurately depict the non-consensual, demoralizing, trauma-inducing experiences of the crime. This is not a comment upon what a victim actually undergoes as a result of the rape, but rather a reference to what features of discourse conventionally appear in accounts given by victims. Indeed, research suggests, for example, that 'pardoning the accused' commonly occurs in rape statements (Raskin and Esplin, 1991). However, this may prove problematic in court even though the act of pardoning the accused is potentially an additionally traumatic feature of the offence. That is, the victim inappropriately feels some responsibility and guilt (Cohen and Roth, 1987).

Additional to the joint action of account construction are issues associated with inaccuracy. There is considerable evidence to suggest that eyewitnesses are sometimes very inaccurate (e.g. Wells, 1993), so any given account of what occurred during the commission of an offence is potentially distorted.

Additionally, an account will typically reflect either one particular view (e.g. from one witness), a range of different and conflicting views (e.g. more than one witness with different perceptions of the same event), a view that was ultimately shaped by the individual gathering a hybrid account (e.g. the investigating officer compiling a general account from the statements of multiple witnesses), or any combination of these. Therefore, researchers relying upon this information should pay considerable attention to potential oversights, inaccuracies, embellishments and constructions. In doing so, they may be able to develop hypotheses about what types of behavioural information are less open to these types of distortions; that is, information that is least susceptible to an interpretative or subjective inference. To illustrate this point, the actual geographic location of an offence, or series of offences, is likely to have a high level of reliability. Even so, this broad level of observation of behaviour is also open to distortion. For example, the absolute certainty that all offences in a series were accurately linked to a common offender may be questionable (Grubin et al., 1997).

### THE EFFECT OF CONTEXT

The final concern in using unobtrusive measures for forensic research purposes is the interpretation of behaviours without recourse to examining the context within which they occurred (i.e. meaning is frequently imposed on a behaviour without considering the conditions under which it evolved). This predilection for mapping meaning onto discrete behaviours is then translated into formulating the meaning of these actions to the characteristics of likely offenders. For example, excessive facial trauma has been highlighted by some FBI profilers as signifying an emotional outburst. This purportedly increases the likelihood that the offender has an emotional tie and may in fact be related to the victim (Hazelwood and Douglas, 1980). It is likely that the same behaviour(s) in different situations may arise for different reasons yet they are interpreted in the exact same way. For example, the behaviour *binding* may be interpreted by one researcher as being controlling type behaviour and by another researcher as a method for obtaining sexual gratification.

## *Overview*

In sum, although many opportunities exist for forensic researchers to employ police information for their work, they are constrained by the limitations of the quality of information, which is subject to a variety of distortions. What this article does highlight, however, is the need to improve and take account of the ways in which information is gathered, and to garner this in the most parsimonious and effective way possible. This must also be a concern for the police who are collecting the information. Firstly, focused information collection would cut down on both cost and time. Secondly, high-quality

information should be a desirable outcome of any investigative process. This relates to Webb et al.'s (1966) concept of a high dross rate in unobtrusive research.

Attempts to align the information collection process with the requirements of social science have been made in certain UK police constabularies, both nationally and internationally (Van Duyne, 1999). Increasingly, a more healthy and effective relationship between social scientists and the police force is emerging. A major step in this direction is to familiarize researchers and investigators with the limits and benefits of using such information, as well as to outline and define the framework within which such research is set.

As outlined, there exist many different aims and purposes for collecting information for police enquiries and not all of these correspond with the aims of the social scientist. The disparity between the needs of the researcher and the requirements of the police officer are highlighted when the prosecution and defence call upon researchers to comment upon the nature of the information, or when a researcher is approached to give an opinion to an ongoing inquiry. The limitation of a framework in which the researcher is an outsider, pulled in to 'help out' or give advice at a particular stage, is that she or he is not directly involved with the information gathering strategy. In effect, the researcher has not 'designed the experiment' and, therefore, the extent to which they can gain control over specific aspects of behaviour is limited. Again, the researcher's function is to make sensible a range of complex and messy fragments of information.

However, as we have emphasized, there are many benefits in using material that has not been specifically designed for research purposes. Balanced between the two seemingly discrepant posts of control versus non-interference exists an interesting compromise that potentially could exploit many benefits from both approaches. This may involve the active role that researchers play in helping to design a procedure for collecting information within the limits and necessary parameters of an investigation. Although researchers should be minimally involved with inquiries at the investigative level, there are potentially many contributions that they could make to aid the police in the way information is collected and processed. One might refer to this as a process of 'guiding effective unobtrusive measurement protocol'. If the researcher is respectful of the parameters within which information is collected and is aware of what police officers must collect she or he could highlight those features that are likely to be most useful for research reports. For example, part of this role may be advising the police on what they need and do not need to collect – thereby helping reduce the dross rate.

In assessing interview processes, researchers have already advised upon the way in which interviews should be carried out in relation to established literature on the potential vulnerabilities of interviewees, as well as the potential interpersonal qualities of persuasion (Auburn et al., 1995; Fielding and Conroy, 1992). In relation to the collection of other sorts of information

for a police inquiry, however, research has had relatively little impact. For example, there have been precious few contributions in relation to collecting information for crime scene analysis, particularly in relation to the theoretical rationale of asking for information that is on a checklist. Clearly, the police may benefit from the researcher's experience in collecting information and in doing so would be made more aware of appropriate methods to avoid distortion, bias and dross. This is not to advocate a 'scientific' imperialization of the investigative domain, but rather to impose a more systematic framework upon the collection of information.

Finally, there is an issue of resources. Researchers are very familiar with problems in obtaining information that can be converted into 'data'. Police officers often collect information that they deem relevant, with little systematic effort devoted to grading its quality or relative reliability. Researchers, on the other hand, have experience and are trained in developing theoretical models and hypotheses. 'Blind' collection of all information wastes time and is devoid of any theoretical focus. Researchers may be able to contribute to developing the most efficient and quick checklists to find out the most relevant information for establishing and developing hypotheses.

All of these potential advantages rely heavily on observing many of the limitations and benefits of non-reactive, unobtrusive measurement. This is not an admonishment to discourage other research methodologies, but merely a reiteration of an earlier suggestion that a single, controlled approach to researching the investigative domain has its own fallibilities. In addition, unobtrusive methods are likely to present researchers with opportunities for deriving novel means of exploring relevant forensic issues and developing a supplemental approach to forensic research.

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