

What Good Is Forensic Evidence?: An update on current research and
potential on solvability in America

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Abstract

In September of 2010 the National Institute of Justice (NIJ - the academic arm of the Department of Justice of the United States of America) published *The Role and Impact of Forensic Evidence in the Criminal Justice System*, a report chronicling a study of the utility of forensic evidence conducted by Peterson, Sommers, Baskin, and Johnson (2010). Schroeder, in 2011, received funding from the NIJ to follow-up Peterson, et al's groundbreaking study into the utility of forensic evidence in solving crime. Schroeder's current study has introduced two variables not recorded in the previous study: did any available witness name a suspect or provide a description to police, and did the suspect make a statement.

Phase two will consist of qualitative interviews regarding case files randomly selected from the sample population listed above, with approximately 270 investigative and prosecutorial personnel. These interviews will further advance our understanding of how forensic evidence affects the use of investigative and prosecutorial discretion. These interviews will be centered on four themes: the exact nature of assistance provided by physical evidence in the identification of the offender, the use of forensic evidence in the interview and interrogation process of witnesses and offenders, the utility of forensic evidence in plea negotiations, and the effect of forensic evidence on sentencing.

The implications of replicating the results found by Peterson et al. (2010), with the above stated improvements, will be to give further credence to the recommendations made in that report, serve as a policy guide for prioritization of forensic evidence to reduce backlog, provide data to assist with interrogations, and to provide guidance for investigative and prosecutorial discretion within the criminal justice system.

Despite popular opinion forensic evidence is, even today, rarely a factor in solving crime. The notion that a scientific analysis conducted on a piece of physical evidence from a crime scene will result in information that will lead to a conviction in a criminal court is well established in U.S. popular culture¹. However, the realities of solving crime with physical evidence in the United States more commonly require somewhat different applications than those found in popular culture. Further, recent analyses regarding the utility of forensic evidence have failed to discover any *consistent* significant correlation between its use and solving crime. The examination below seeks to explore this research - analyses regarding the utility of the forensic analysis of physical evidence (FAPE) - and examine some of the most likely reasons FAPE has not been more effective in solving crime in the United States.

The most efficacious place to begin such an examination is by examining the concepts and legal parameters surrounding a successful case resolution – when the case can be called “solved”. The issues surrounding efficacy become clearer when trying to incorporate the definitions of the word “solved”. Even the most common word processor based thesaurus² will provide synonyms like “resolved” “cracked” and “deciphered”. Most of the concepts provided for within these synonyms have little to do with the actual standards used in the United States to indicate success in an investigation.

In the United States, a reported crime is determined to be “cleared” when an arrest has taken place, the arrestee is charged with the commission of the offense, and

¹ Wikipedia currently catalogues 388 television series that have aired in the United States centrally focused on crime, and most have some component that focuses on the forensic analysis of physical evidence (FAPE) as a central theme.

² Simply right click on the word “solved” in Word 2011 software and select “Synonyms”

the arrestee has been turned over to the court for prosecution (FBI, 2004)³. This is obviously a lower standard than that provided for by synonyms like “deciphered” or “resolved” and a much lower standard than to have been found “guilty beyond a reasonable doubt” in a court of law – e.g. “convicted”. The standard surrounding conviction is of course not the truest standard either, as the ubiquitous use of plea bargaining make the manipulation of the law, and it’s evidentiary standards, much more the norm. As such it would seem that we have three ways of determining whether a case is solved; an arrest; a conviction; or a plea-bargain – all three would need to be considered in determining the true effect of FAPE on solvability.

This paper will first examine the literature regarding the effectiveness of FAPE within these three standards from the 1960s through today. Then provide a detailed assessment of the most recent and relevant study regarding this issue, completed in 2010. Lastly this paper will address an ongoing research project – *The Impact of Forensic Evidence on Arrest and Prosecution* – an examination of this issue currently being conducted in the State of Connecticut, U.S.A. In all the below analysis makes clear that the advent and use of FAPE is a far cry from the boon for solving crime it has long been rumored to be. However, recent and current analyses provide avenues to discover more efficacious use of FAPE in the 21st century.

The Analysis of FAPE in the United States

³ Crimes can also be cleared as Exceptional and Justifiable. Exceptional clearances relate to circumstances beyond law enforcement’s control that prevent an arrest from taking place (FBI, 2004). Justifiable clearances involve acts that are deemed to be justified and therefore not illegal under the circumstances provided (FBI, 2004). As such, Exceptional and Justifiable clearances are not relevant to the current analyses.

The *President's Commission on Law Enforcement and Administration of Justice* (1967) was largely responsible for fostering what little interest there was at that time in the examination of the utility of forensic evidence in the United States. Since that time there have been only a handful of attempts to measure the utility of forensic evidence in many different settings. However, one finding seems almost ubiquitous - that there is plenty of evidence at crime scenes and that very little of it is ever analyzed. Some of the earliest work from that era (even pre-dating the President's Commission) was conducted using surveys of forensic laboratories (Parker, 1963) and the police (Parker and Peterson, 1972). Between these two studies, Parker (1963) and Parker and Peterson (1972) discovered that only one percent of criminal cases used forensic evidence but that it was available at 90 percent of crime scenes.

Since those modest beginnings little has changed. The Rand Corporation's seminal study on the behaviors and decisions of police personnel in solving crime, also found a very small effect of physical evidence in clearing cases (Greenwood, Chaiken, Petersilia, & Prusoff, 1975). However the Rand study provided a more critical attack on law enforcement by tying the under-utilization of physical evidence to the police's inability, or possibly even disinterest, in using it. This study was ground breaking in many ways, the most salient being that it provided the first indication that the way the police feel about forensic evidence can have a profound effect on whether or not it proves useful. An idea re-explored by Schroeder and White (2009) below.

Forst, Lucianovic, & Cox (1977) provided an analysis of convictions in determining the "tangible evidence" was one of three things that lead to a successful prosecution, and thereby providing the first examination of how forensic evidence

related to courts, pleas, and/or jury decision making. Several other studies regarding plea bargaining followed which commented on how the presence of forensic evidence was not determined to be a factor (Heumann, 1978; Rosett and Cressey, 1976), how it assisted in fostering what came to be known as the courtroom work group mentality (Neubauer, 1974), or how it very much did matter to what sentence or crime was negotiated (McDonald, Rossman and Cramer, 1979).

Heumann's (1978) analysis of judges, state's attorneys and public defenders in the Connecticut court system provided insight into how plea bargains were arrived at in that jurisdiction. Heumann concludes among other things, that new judges, prosecutors, and defense attorneys are not well prepared to deal with plea bargaining and that a learning curve exists until experience sets in. This is important to the investigation of crime today in that it clearly shows that the expectations of those within the system, of the system, can have a profound effect on their ability to understand the role of evidence in rendering a plea agreement.

Rosett and Cressey (1976) began their analysis by describing a single *imaginary* arrest – that of burglar Peter Randolph – and following it through the trial process to its completion. Their analysis is supplemented by data regarding real cases that represent similar situations to what Mr. Randolph would experience. They found that the court system is in such disarray as to make distinguishing the use of forensic evidence in plea agreements unfeasible.

Neubauer (1974) conducted an exploratory examination of the court process in Prairie City, Illinois, a town of 90,000 people with a primarily homogenous population

(white and Protestant). Neubauer makes several conclusions relevant to the proposed research, however they are best encapsulated as;

... ours is a government of law and of men. The difference between the law of the statute book and court precedents, and the living law – law in action – are the officials who apply the law. The law is much like the stage of a theater since it provides boundaries for the actors. And, it is somewhat like the script of the play because it provides the parts. But it is unlike the script because the dialogue is not predetermined (Page 251).

From this it seems clear that the idea of how lawyers utilize what evidence they are given within the investigation – the dialogue – provides them with plenty of room for discretionary differences in the use of such evidence in plea negotiations.

McDonald et al, (1979) conducted interviews and observations with prosecutors, judges, defense counsel, and other criminal justice professionals in 33 U.S. jurisdictions. They also used a modified decision simulation technique (involving a hypothetical situation where advice is given by the veteran lawyer to the less experienced) and a quasi-experimental design regarding choices to accept or offer pleas. They concluded;

... the three big factors of case strength, seriousness of the defendant, and seriousness of the offense are regarded by both prosecutors and defense counsel as important in the evaluation of cases for plea bargaining (Page 194)

... we found that when cases are strong both prosecutors and defense counsel can agree in estimating the probability of conviction.

But when the cases are weak, there is far less agreement (Page 195).

Clearly from these quotes it is evident that the presence of “strong” evidence and its relationship to the plea bargain have been a research concern from the beginning.

The 1980s ushered in an area of more exacting methodologies and generalizable analyses. Peterson, Mihajlovic, & Gilliland (1984) conducted a nationwide analysis of 2,700 randomly selected criminal cases within five crime types (homicide, rape, robbery, assault, and burglary) popularized in later research. A follow-up study in 1987 (Peterson, Ryan, Holden, & Mihajlovic, 1987) directly dealt with convictions and plea bargains. These studies collectively found that only a small amount of cases (20 – 30% of serious cases) analyzed forensic evidence, but when forensic analyses did exist arrests were three times greater. Also, that forensic evidence linking the defendant with the crime did effect (negatively) whether a plea was offered by a prosecutor and increased the length of the resulting sentence.

The 1990s seem somewhat devoid of research on this subject, however the new millennium brought with it a renewed interest in the topic, predominantly surrounding the uses of DNA evidence. Briody (2004) examined the effect of DNA evidence on the ability to bring a case to trial, plea bargaining and the conviction rate in a sample of cases in Australia. Using logistic regression their analysis generally supported the idea that when DNA evidence is used prosecutions and convictions occur more often. The greatest effect they found was that DNA greatly increased the probabilities of

prosecution and conviction in both homicide and sexual assault cases (odds-ratios of 22.1 and 33.1 respectively).

Schroeder (2007) conducted an analysis of the utility of DNA in homicide clearance in the City of New York. His analysis centered around the cohort of homicide case files from the Borough of Manhattan from the years 1996 – 2003. After assigning all located cases to one of four DNA groupings (case models) he found that the analysis of DNA was not associated with higher clearance in homicide cases – the lowest clearance rate among the four DNA case models examined were those cases that were afforded a DNA analysis pre-arrest. The case model with the highest clearance rate contained those cases in which evidence for DNA analysis was collected from the scene but never analyzed. A criticism of this finding (Wilson, McClure & Weisburd, 2010) suggested this was simply due to selection bias – that there is something within a case that uses DNA that sets it apart from other investigations. However, this was also a key finding in Peterson, et al (2010) – that arrests take place with greater frequency when forensic evidence (all types) has been collected, but is not analyzed. This finding, by both Schroeder (2007) and Peterson, et al (2010) is particularly concerning as it presents the idea that if all the evidence that could have produced a DNA analysis in both of these studies had been analyzed, then it certainly would appear that DNA is linked with higher clearance. However, in these cases it can be clearly seen that such an increase in clearance would have had nothing to do with the DNA analysis. This concern has not yet been adequately addressed by the research methodologies of any previous examination of DNA analysis and as such represents a clear next step in

understanding the utility of DNA evidence in homicide cases (see *The Impact of Forensic Evidence on Arrest and Prosecution* below).

Roman, Reid, Reid, Chafin, Adams, & Knight (2008) conducted an analysis of the use of DNA evidence in clearing burglary cases in five law enforcement agencies in the United States; Denver, Colorado; Orange County, California; Los Angeles California; Phoenix, Arizona; and Topeka Kansas. This experiment examined a total of 2,160 burglaries randomly assigned to one of two groups, those cases with DNA evidence to be analyzed immediately (the experimental group) and those cases in which DNA, if it exists, would not be analyzed for sixty days (the control group). The results were quite impressive with a minimum change in suspect identifications of 8% (Orange County, CA) to a high of 40% (Denver, CO). Denver and Los Angeles also experienced significant increases in the numbers of arrests and convictions in the experimental group. Many of Roman, et al's (2008) findings are relevant to the investigation of crime in America today, however when compared to the results found by Schroeder (2007) (above) and Schroeder and White (2009) (below) one important research question surfaces. Could the discrepancies in utility found in these studies be related to the differences in need between the investigation of burglary and the investigation of homicide? In other words, what DNA evidence can bring to any case (i.e. placing a suspect at a scene) may be more powerful in a burglary investigation than it is in an homicide investigation - this specific question is currently being examined (see *Impact of Forensic Evidence on Arrest and Prosecution*, below).

Dunsmuir, Tran, & Weatherburn (2008) examined whether the increase in the number of profiles in a DNA database causes a corresponding increase in number of

crimes cleared. They conducted their research in Australia, by calculating an expected increase in clearance rates via the increase in the size of the DNA database serving the area over a one year period. This study's results indicated that some crimes were better effected than others (e.g. sexual assault and robbery), and a macro-level analysis supported the positive relationship between the number of profiles in a DNA database and the clearance rate.

Schroeder and White (2009) examined the same dataset of NYPD case files examined by Schroeder (2007) to investigate how often detectives used DNA evidence in the course of their investigations, as well as how its use influenced the likelihood of case clearance. By applying the results found in Schroeder (2007) to a discussion of different investigative frameworks the authors suggest that NYPD detectives are using DNA evidence as a "tool of last resort," relying on it only when all other investigative means have failed. The authors conclude that the reason for the reluctance to use DNA more aggressively is complex and involves variables related to, among other things, operational protocols, training, and previous investigative experience. Ultimately the authors provide a discussion of a new diffusion framework that may be helpful in understanding detectives' use of DNA evidence in New York and elsewhere. These findings are somewhat in line with what Greenwood, et al (1975), suggesting that how detectives choose to use DNA evidence may follow patterns previously discovered with other forms of forensic evidence.

The Denver Cold Case Project (2009), *Using DNA to solve cold cases* (NIJ, 2009) and *Strengthening forensic science in the United States: A path forward* (National Research Council, 2009) are all recent projects by the Office of Justice Programs and/or

The National Institute of Justice. These studies have consistently found moderate to large increases in clearance and/or conviction when DNA evidence is used in the investigations of violent and property crime. However the resulting overall clearance and conviction rates still remain relatively low for property crime, have been decreasing steadily for the last 30 years for homicide, and can always be improved upon for other types of violent crime. As such it can be said that DNA may be helpful in the clearing of specific cases, however the existence of DNA as a science may be having an environmental effect on how investigations are conducted and plea bargains are negotiated.

In 2010 the United State's National Institute of Justice (NIJ) received the report *The Role and Impact of Forensic Evidence in the Criminal Justice Process* produced from a multi-site examination of the utility of forensic evidence in solving crime by Peterson, Sommers, Baskin, and Johnson (2010). This study represents the most comprehensive and exhaustive examination of the utility of FAPE since the widespread use of DNA came about (since the mid-1990s). The objectives of their study were to 1) "Estimate the percentage of crime scenes from which one or more types of forensic evidence is collected;" 2) "Describe and catalog the kinds of forensic evidence collected at crime scenes;" 3) "Track the use and attrition of forensic evidence in the criminal justice system from crime scenes through laboratory analysis, and then through subsequent criminal justice processes;" 4) "Identify which forms of forensic evidence contribute most frequently (relative to their availability at a crime scene) to successful case outcomes" (Peterson, et al, 2010, Pg. 11-12).

Peterson, et al's (2010) more salient findings also speak to the need for more research in this area. The unexamined forensic evidence that was associated with higher arrests, prosecutorial referrals, chargings and convictions (mentioned above) was most prominent in assault cases. These assaults primarily took place between people who knew each other and therefore the need for forensic analysis was not prevalent. However, the authors state that the presence of unexamined forensic evidence propelled the case forward. In burglary cases most of the forensic evidence collected were latent fingerprints, consisting of 84 percent of the evidence collected in those cases, resulting in a success rate of around 14 percent. Again, the presence of physical evidence, not it's analysis, was a predictor of case referral to the D.A. and conviction.

In the homicide cases examined the authors found that in cases with witnesses, or homicides committed between two people who were classified as non-strangers, that forensic evidence was not associated with arrest. Those cases without witnesses, or that took place between strangers werer 21 times more likely to be arrested and charged with the crime when crime scene evidence was available. Similar results were found for the other two crime types examined (Rape and Robbery). The authors conclude;

While the current study shows that forensic evidence can affect case processing decisions, it is not uniform across all crimes and all evidence types; the effects of evidence vary depending upon criminal offense, variety of forensic evidence, the criminal decision level, and other characteristics of the case (Page 7).

Peterson, et al (2010) analyzed crime lab, investigative, and prosecutorial case file information of crimes that fit into one of five crime categories: assault; burglary; homicide; rape; and robbery. Correlations were then examined between forensic evidence and solvability within these five crime types. Based on the results of this correlative analysis, Peterson, et al (2010) then produced ten recommendations regarding future research on the utility of forensic evidence.

The first Peterson, et al (2010) recommendation is generally related to simple replication - refining and performing a similar analysis in another jurisdiction. To accomplish this would require establishing access to crime lab, investigative, and prosecutorial case file information. However, it would seem that as Peterson, et al (2010) examined cases from five areas or cities (Los Angeles County, Indianapolis, Evansville, Fort Wayne and South Bend) within two states (California and Indiana, respectively), designed to represent, city, county and state crime lab services, a replication of this same methodology in a more homogeneous environment (a single crime lab covering a wide area with myriad offenses) may provide for productive and rich comparisons. Expanding the time frame from which cases are sampled may also yield helpful results, as Peterson, et al (2010) sampled cases from only a one or two year period (2003 – 2004).

The second recommendation made by Peterson, et al (2010) addresses a need for a further examination of the filtering process law enforcement utilizes, given the time and resource constraints of an investigation, in determining what forensic evidence they submit to be analyzed in any particular case. As such it seems evident that whatever

study endeavors to act on this recommendation must have access to a large number of case files in which forensic evidence is collected as well as the ability to communicate with those investigators as to their reasons for submitting requests for the forensic analysis of evidence.

The third of the Peterson, et al (2010) recommendations makes clear the need for a more detailed assessment of how the mere existence of available forensic evidence affects the arrest and prosecution of offenders. Peterson, et al (2010) states;

A major finding of the study was that most evidence goes unexamined, but its presence in cases was associated with arrest and movement of cases through the justice process. Added studies are needed to review how unexamined forensic and tangible evidence teams with other conventional investigative procedures to lead to arrests (Page 9).

As stated above, the same phenomenon has also been discovered in another recent analysis of the use of one type of forensic evidence, namely DNA. Schroeder (2007) discovered that among his sample of homicide cases from the City of New York (1996 – 2003) the group of cases that had the highest clearance rate, were those in which evidence for DNA analysis was collected from the scene but never analyzed.

There are three general areas of explanation for why unexamined evidence is associated with higher clearance rates. First, the collection of forensic evidence from crime scenes has become so commonplace that its collection is not contingent upon the needs of the investigation, but simply a matter of protocol. Therefore, when cases present non-forensic evidence (e.g. suspect interrogations, witness statements and identifications) sufficient to advance the case through the system the byproduct is a

great deal of collected, but unanalyzed forensic evidence. Second, the analysis of forensic evidence is so time-consuming as to influence its utility. Detectives may simply be relying on more traditional methods (e.g. suspect interrogations, witness statements and identifications) as these methods can produce the desired result in a more timely fashion. Third, that there is some latent interactive effect between *the existence* of forensic evidence and other non-forensic forms of evidence (as stated above by Peterson et al [2010] - again, most likely suspect interrogations, witness statements and identifications) which fosters a greater ability to make an arrest than those non-forensic forms of evidence do by themselves. Given the infrequency of the analysis of forensic evidence commented on in the reviewed literature all three of these explanations would seem likely. However, which of these occurrences is happening most frequently, or even more often, is currently unknown given the existing state of research. Moreover, there is no existing research that specifically examines how *the threat* (real or perceived) of analyzing collected forensic evidence may have affected the use of more traditional forms of evidence (e.g. suspect interrogations, witness statements and identifications). Therefore, to improve upon Peterson, et al (2010), regarding its third recommendation would require the ability to directly assess the decision-making effects of forensic evidence on the investigative function (the police and/or detectives) in dealing with suspects and/or witnesses based on the resulting totality of evidence and/or the ability to allude to existing but not analyzed forensic evidence.

Peterson, et al's (2010) fourth recommendation is to address a cost-benefit analysis of the various forms of forensic evidence used today. One way to accomplish

this would be to compare the number of arrests and successful prosecutions in which a particular type of forensic evidence was used to an overall cost for those analyses.

The fifth recommendation, regarding laboratory information management systems, speaks to the need for better and more specifically designed management systems. This need is predicated on the finding that more data regarding the effectiveness of FAPE is needed if more detailed and rigorous analyses are to be conducted in the future.

The sixth recommendation made by Peterson, et al (2010) states that “two or more forms of individualizing/linking forensic evidence in cases lead to higher rates of conviction [and] should be investigated in additional studies” (Pg. 9). This should come as no surprise as previous findings have indicated interactive effects between forensic evidence and witness or confession evidence. However, an examination designed to indicate the effectiveness of two or more forms of FAPE working together, as compared to other combinations of evidence would be most illuminating.

Peterson, et al's (2010) seventh recommendation relates to the prioritization of forensic evidence analysis as a means of reducing backlog and in making the analysis process more efficient to the needs of the existing criminal justice system. To accomplish this requires a three-step process. First, forensic evidence must be analyzed in relation to arrest and/or conviction rates for a significant number of cases within a number of offense categories. Second, once certain forms of forensic evidence have been associated with higher arrest and conviction rates for certain categories of offense, an analysis of other associated variables must take place to rule out any intervening variable which may account for these correlations. Third, a predictive

statement of probable efficacy can then be calculated and assigned to any incoming evidence given the type of evidence and the type of offense being investigated. Such an analysis would inform investigators and crime labs in prioritizing the analysis of any piece of forensic evidence. As such this recommendation is perhaps the most important of the ten discussed here. Research designed to elucidate prioritization would serve as guidance in creating a functional policy regarding which evidence to evaluate and in what order – such a calculation could radically decrease the time to examination for evidence that most likely would provide assistance to an investigation.

The eighth recommendation, regarding sexual assault kit backlogs states:

Sexual assault kit backlogs are a serious and pressing problem in many forensic crime laboratories around the nation. Added studies are needed that investigate the reasons for such backlogs, as well as research examining the role examined forensic evidence plays in sexual assault investigations and criteria for assigning priorities to collected evidence (Page 10).

The issue of prioritization is a recurring theme in research regarding the effectiveness of FAPE. How crime labs choose to order the requests for analyses they receive is an area of great potential for any future research on this subject, whether concerned with sexual assault kits or any other form of FAPE.

The ninth recommendation made by Peterson, et al (2010) addresses the need to better understand the relationship between DNA evidence and different types of crime (property and personal). Traditionally DNA has been seen as efficacious in the investigation of violent crime (i.e. homicide and sexual assaults) but recent research

indicates that DNA is a very useful tool in the investigations of burglary and other offenses (Roman et al, 2008). Peterson, et al (2010) specifically suggest a cost/benefit analysis including the cost of comparisons through the CODIS database system. This would require access to crime lab information, both administrative and case file, to generate the necessary information to provide a cost per analysis/comparison statement, followed by an application of that statement to the outcome of investigations using DNA in any given category of offense.

The last recommendation made by Peterson, et al (2010) specifically concerns the effect forensic evidence is having on prosecutorial decision-making.

In particular, the impact of forensic evidence in prosecutors' decisions to take cases to trial vs. offering pleas needs review, as well as the role played by forensic evidence in negotiating pleas and offering charge/sentence bargains (Pg. 10).

This recommendation can best be addressed by speaking with prosecutors about these issues directly within the context of specific cases that have been affected by the presence of a forensic analysis.

In summation the above existing literature makes clear the need for more detailed and exhaustive research regarding the utility of forensic evidence in arrests and prosecutions. The future research would seem best suited using a mixed methodological approach (quantitative and qualitative) and should encompass a large and varied set of research questions to be examined within a substantially large and pluralistic population of cases.

From the above itemization of Peterson et al.'s (2010) recommendations, it would seem clear that for a follow-up study to advance the research already completed the study should be performed in an area with a population of case files similar in category and number of crimes, which is serviced by a centralized crime lab. Further, that access is available to analyze a significant number of case files in these categories of crime over a longer period of time, at both the investigative and the prosecutorial level. Finally, that a qualitative component be employed that can directly record the perceptions of investigators and prosecutors as to the use and effect of forensic evidence on the movement of cases through the criminal justice system.

The Impact of Forensic Evidence on Arrest and Prosecution (IFEAP)

Peterson et al.'s (2010) recommendations establish ten areas of focus for research methodologies that examine the flow of forensic evidence from the crime scene, through any resulting arrest, to any eventual prosecution or plea bargain. To address eight of these ten areas of focus IFEAP proposes to track the collection, analysis and dissemination of forensic evidence for a significant number of cases in the State of Connecticut, from the years 2006 through 2009. This sample of cases will also be representative of the five crime categories examined by Peterson et al. (2010): assault; burglary; homicide; rape; and robbery.

The research statements this study seeks to examine are previously described above, contained in eight of the recommendations made by Peterson et al. (2010)⁴. As such IFEAP is exploratory in nature and therefore will not be testing any specific

⁴ These are recommendations one through four, six, seven, nine, and ten as described in Peterson, et al (2010) pages nine and ten. The IFEAP research will not address recommendation five, regarding LIMS systems, or recommendation eight, regarding sexual assault kit backlogs.

hypotheses per se. However, information will emerge which will speak directly to these eight recommendations posed by Peterson et al. (2010) in the hopes of furthering our understanding of how to better refine our criminal investigative process and achieve greater parsimony within the criminal justice system.

Phase one of this study's methodology will be similar to Peterson et al. (2010), however will differ from it in two important ways. First, in examining case file information, the coding of the existence of a witness will include a dichotomous indication as to whether the witness named a suspect, and also record the presence of any suspect interrogation. Also, to address the above mentioned concern regarding FAPE collection, analysis, and clearance, the dates of evidence collection, examination, and any subsequent report will be compared to the date of any arrest and/or plea bargain. This should better address the issue of how the information provided by FAPE *affects* the outcome of the investigation, not just whether or not FAPE and case outcome are correlated. Second, the proposed study will include a qualitative second phase in which case-specific structured interviews will take place with investigators (most commonly detectives) and prosecutors regarding their decision-making process regarding the existence of forensic evidence.

The State of Connecticut is an appropriate population from which to conduct the following analysis. The State of Connecticut has a population of approximately 3.5 million people and an overall crime rate (for all reported index crimes⁵ in 2009) of 2,650.58 per 100,000 residents (CT UCR, 2009). This is considerably lower than the United States - 3465.52 per 100,000 – however, overall crime trends experienced in

⁵ The Connecticut UCR index offenses include murder, rape, robbery, aggravated assault, burglary, larceny, and motor vehicle theft.

Connecticut greatly mirror the decrease experienced by the nation as a whole over the last six years (CT UCR, 2009). There are approximately 200 separate police or investigative agencies within the State of Connecticut, but the overwhelming majority of index crimes take place within the states five largest cities, Bridgeport, New Haven, Hartford, Stamford, and Waterbury (CT UCR, 2009). Connecticut has a long standing tradition of research conducted on the use of forensic evidence in making arrests and securing convictions, beginning with Heumann's analysis of Connecticut courts in 1978 and continuing to the opening of the Henry C. Lee Institute in 2010.

The Connecticut State Forensic Science Laboratory (hereto referred as the Crime Lab), located in Meriden Connecticut, is a full-service forensic laboratory. The Crime Lab staffs criminalistic divisions in the areas of forensic biology, DNA database entry and matching (CODIS), mitochondrial DNA, nuclear DNA, trace evidence, and arson/chemistry. The Crime Lab also staffs identification divisions in the areas of imprints/impressions, latent prints, questioned documents, and firearms/tool mark identification. The Crime Lab also has dedicated laboratories for forensic science, toxicology and controlled substances, computer crime and electronic evidence, and crime scene reconstruction. The Crime Lab is accredited by The American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB) and annually receives approximately 150,000 requests for analysis (18,000 of which are specifically for DNA analyses, and 4,000 for fingerprint analyses/comparison). The Crime Lab also has access/involvement with the CODIS (DNA), AFIS (fingerprints) and IBIS/NIBIN

(Firearms) databases. The Crime Lab services approximately ninety percent of the requests for forensic analyses by law enforcement within the State of Connecticut⁶.

By selecting a sample of cases from one single state, instead of multiple sites within multiple states, different methodological issues arise. First, by analyzing a sample of investigations conducted in the same state allows for an assumption of greater homogeneity on behalf of law enforcement training. As only a relatively small number of detectives in Connecticut would have received their academy training, and their subsequent detective experience, outside of the state, it would be reasonable to infer that their understandings regarding the use of forensic evidence be more similar than those involved in Peterson et al. (2010). Second, this same homogeneity would also most likely exist in deference to the crime categories analyzed – in this case: assault, burglary, homicide, rape, and robbery. As jurisdictions may define crimes differently, having one criminal code would eliminate any definitional discrepancies between codes. Third, the greater generalizability typically found with a multi-site study may be achieved by using a state with a diverse population and a wide a varied criminal history – The State of Connecticut. This study will also select cases from a longer time frame than Peterson et al. (2010) - four years as opposed to one (or two) year(s)⁷. This will decrease the chances of the anomalous nature of any single year fostering any challenges to content or external validity.

⁶ The cities of Bridgeport and Waterbury have certain forensic units in-house, and there is no law or protocol to prevent any agency from conducting their own analysis or contracting an analysis through another crime lab. As such this percentage was arrived at via discussions with the current (Kenneth Zercie) and past (Timothy Palmbach) directors of the Crime Lab and is believed to be a conservative estimate.

⁷ Peterson, et al (2010) analyzed data from 2003 primarily, but had to supplement certain crime types by location when not enough cases existed by adding cases from 2004.

What IFEAP may find

Given the improvements in method, population, and sampling employed by IFEAP, as compared to previous research, many possibilities emerge as outcomes of this research. However, three seem most salient in light of the current needs of those investigating crime in the United States. First, the comparisons made possible by coding for many different types of crime provide for a very distinct display of the different investigative needs fostered by different types of crime. All investigations of crime in the U. S. need to produce information regarding two components – the actus reus (the criminal act) and the mens rea (the criminal intent). This very rudimentary construct is often forgotten when discussing the utility of FAPE, in that FAPE seems to be very good at telling investigators “who” and “what,” but very rarely “when,” and almost never, “why” a crime occurred. In other words, FAPE seems far better suited to speak to the actus reus of crime than it does the mens rea of crime – however, no previous research has entertained the idea that FAPE may be better at establishing mens rea for certain crimes than it is for others. Therefore, IFEAP will shed some light on how the clearing of cases using FAPE relates not only to clearance, but specifically to the actus reus and mens rea of these individual crimes (homicide, rape, robbery, assaults, and burglaries).

Second, the correlations between clearance and the use of certain specific types of FAPE in each crime type will serve to assist crime labs in making parsimonious determinations regarding what to analyze first – prioritization. As indicated above, findings regarding prioritization will greatly assist in both the management of time and money without sacrificing probability of success in clearing cases. This goal, although rather ambitious, should be a focus of any research on the effectiveness of FAPE.

Lastly, the results of IFEAP provide for the potential of new avenues of investigative training – trainings derived from what *is* happening in the investigation of crime, as opposed to today's more anecdotal training, which seems to focus on what *can* happen in the investigation of crime. This more evidence-based approach will help guide newer, less-experienced detectives in making decisions surrounding FAPE in relation to other available evidence, resulting in less money and time spent and more arrests.

Conclusion

Despite popular opinion forensic evidence is, even today, not a consistent factor in solving crime. The notion that a scientific analysis conducted on a piece of physical evidence from a crime scene will result in information that will lead to a conviction in a criminal court is well established in U.S. popular culture. However, the realities of solving crime with physical evidence in the United States more commonly require somewhat different applications than those found in popular culture. Further, recent analyses regarding the utility of forensic evidence have failed to discover any significant and consistent correlation between its use and solving crime. The examination above explored this research – analyses regarding the utility of the forensic analysis of physical evidence (FAPE) – and provided reasons FAPE has not been more effective in solving crime in the United States. The most salient of these being the idea that forensic analyses seem far more adept at providing information regarding the actus reus of the crime, than the mens rea of the crime. Therefore, crimes that require less support in determining the mens rea (e.g. burglary, assault, and robbery) seem far

better assisted by FAPE than those crimes that require more support in determining the mens rea (e.g. rape and homicide).

The concepts and legal parameters surrounding a successful case resolution, the inconsistent nature of how forensic evidence can be applied to the differing investigative needs of the commonly examined five crime types (burglary, robbery, rape, assault, and homicide), and the paucity of research surrounding this issue serve to present interesting research opportunities. IFEAP, an ongoing analysis to conclude in early 2015 within the State of Connecticut, U.S.A., will address many of these issues in providing another point of guidance regarding the use of forensic evidence in solving crime in the United States.

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