

Criminal Justice Implications of Forensic Evidence: Assessing its Significance in Determining Guilt

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Abstract

Recent research has indicated that the general public frequently perceives forensic evidence as prone to inaccuracies and dependent on substantial subjective interpretation. By contrasting the reliability of forensic evidence with that of eyewitness testimony in criminal cases and testing for the existence of a "CSI effect," this study explores the public's perception of the relevance of this type of evidence. In this specific survey experiment, participants were assigned randomly to one of seven vignette scenarios. These scenarios were created using a design matrix with three factors: crime type (murder or rape), evidence type (DNA or fingerprint), and the presence or absence of victim and bystander eyewitness testimony (with the exception of the murder scenario, which had no victim testimony). The results indicate that the presence of forensic evidence increases the likelihood of a guilty judgment and the conviction rate. There was no change in either the expected or intended sentence duration as a result of including forensic evidence. Respondents predicted a longer sentence for a rape offender when forensic evidence was presented. However, this did not lead to any changes in their expectations regarding the likely punishment for the defendant. The investigation did not uncover any evidence of a CSI effect. In general, the findings indicate that forensic evidence, especially DNA, tends to have a greater impact on influencing judgments rather than influencing sentencing decisions.

Keywords: Forensic Evidence, Guilt Decisions, Sentencing, Criminal Trials, DNA Evidence

1. INTRODUCTION

The Latin word forum is the source of the term forensic. Forums were utilized by the early Romans for a range of activities, including public discourse, market research, and economic dealings. These forums influenced civil law via their analysis and critique. It encompasses, in general, the evidence presented in court to prosecute a criminal defendant. Through the use of witnesses, victims, and legal professionals, forensic science aids in the investigation of criminal cases. At 189 years old, forensic science assists in bringing together scientists and criminal investigators to impartially examine the evidence gathered from the crime scene.

From its extent to its applications, forensic science is a fairly broad discipline. Notwithstanding the various disciplinary ties, it has with regions like legal humanities, scientific prehistoric studies, measurable brain research, criminalistics, and criminological spellbinding, it is additionally known by different names, like criminology and legal/clinical statute. Forensic hypnosis is a subfield of forensic psychology. Forensic archeology is a subfield of forensic anthropology. To investigate crimes, forensic scientists work with

pathologists, biologists, physicists, chemists, and medical authorities. Finding missing people, learning their actual identities, connecting the dots, and prosecuting via testimony and the development of scientific evidence are all made possible by forensic science.

Important leads for the investigation can also be obtained from the hair and fibers discovered at the crime site. It could be feasible to decide the suspect's personality and the casualty's conditions — like assault — by intently investigating the information. Technically, it is possible to gather the tool marks, footwear imprints, and fingerprints. Utilized are the casting kit and further forensic science-related instruments. Additionally, the trace evidence could offer hints that help identify the victim and suspect. Body fluids, also known as biological fluids, consist of items like blood, urine, vaginal secretions, feces, saliva, and vomit. Blood is the most well-known example of a body fluid. They are the source of the DNA. In preparation for the laboratory analysis, they are placed in sterile containers and then sliced with a knife. Tiny fibers and fragments of materials left at the crime scene make up the trace evidence. It has to be identified, recorded, wrapped, and kept safe. The most common trace evidence that forensic investigators come upon is human hair. Its comparison and analysis fulfill a variety of investigative needs. The patterns left by blood spatters are extremely significant proof in cases of violent crimes. Forensic investigators must properly gather, maintain, and analyze them.

A subfield of forensic science that studies dental and dentition is called forensic orthodontia. During the process of extracting human remains and examining the teeth, this method and procedure are utilized. The dental history of the suspect matches up with the bite marks that were found on the victim's body. The study of buried human and animal remains as well as artifacts is referred to as "forensic archeology," and it is a subfield of archeology. Anthropology is the study of human beings as well as the civilizations in which they live. Forensic anthropology is defined as the study of human remains from a medical and legal perspective, with an emphasis on human osteology.

1.1. Objectives of the Study

1. To examine the "CSI effect" and how jurors' trust in forensic science TV series affects judgments.
2. To examine how DNA, fingerprints, eyewitness, and victim testimony influence criminal juries.
3. To study the media images of forensic science, such as the "CSI effect," impact criminal court jury behavior and findings.

2. LITERATURE REVIEW

Ling, et.al. (2021) Ongoing examinations have found that the overall population sees measurable proof to be generally erroneous and to include elevated degrees of human judgment. This review looks at how significant the overall population finds criminological proof by contrasting choices on responsibility and discipline in criminal cases that include legal versus observer declaration proof and looking at whether a CSI impact exists. In particular, this trial overview concentrates on used a 2 (wrongdoing type: murder or assault) × 4 (proof sort: DNA, finger impression, casualty observer declaration, or spectator onlooker declaration) – 1 (no casualty declaration for homicide situation) plan, yielding seven vignettes' situations to which members were haphazardly doled out. Results show that measurable proof was related with additional liable decisions and higher trust in a blameworthy decision. Measurable proof didn't change the normal sentence length and didn't for the most part influence the best sentence length. Nonetheless, for assault, respondents accepted that the litigant ought to get a more extended sentence when legal proof was introduced yet criminological proof didn't change probably sentence that respondents anticipated that the litigant should get. The consequences of this study didn't uphold a CSI impact. In general, this study

recommends that legal proof - especially DNA - has a more grounded impact during the decision stage than the condemning stage.

Kaplan, et.al. (2020) Late advances in measurable science, particularly the utilization of DNA innovation, have uncovered that flawed scientific examinations might have added to premature deliveries of equity. In this study we expand on late exploration on the overall population's view of the exactness of 10 scientific science methods and of each stage in the examination cycle. We find that people in the US have a cynical perspective of the criminological science examination process, recognizing that mistakes are possible throughout any stage of the process and accepting that this is the case. We find that respondents believe that crime scene investigations are only around 65% to 75% accurate overall, with accuracy rates ranging from 55% for voice testing to 83% for DNA examination. By the by, respondents actually accept that criminological proof is a critical piece of a crook case, almost 40% of respondents believe that the presence of scientific evidence - even if other types of evidence recommend that the litigant is not blameworthy - is sufficient to convict the litigant, while almost 30% believe that the lack of legal proof is sufficient for an examiner to drop the case.

Bishnoi & Sharma (2020) The present law enforcement framework depends vigorously on criminological science since it empowers agents to gather and analyze actual proof from puts in of wrongdoing in request to distinguish people and decide their responsibility or guiltlessness. It helps the court in coming to a shrewd choice. Subsequently, it decreases the probability of any shamefulness. It is as of now broadly embraced everywhere. From its earliest roots in old civilizations to the contemporary techniques used to get and dissect actual proof, legal science has gone through a colossal development over the long run. To distinguish thinks and decide their responsibility or guiltlessness, "legal science" has come out fundamental to the "law enforcement framework". The accompanying exploration paper looks to decide the meaning of "legal science" in addressing cutting edge violations in the criminal arraignment. It additionally looks at the hardships and limitations looked by legal science, as well as the potential for botches or inaccurate understanding of the accessible proof. There are still limitations and hardships that should be settled in scientific science, in spite of its headways. The report wraps up with ideas for expected future examinations to get around these difficulties and assurance that criminological science keeps on being helpful in settling current violations.

van Es et.al. (2022) About 30% of the more serious criminal cases in the Netherlands involve a pretrial measurable psychological well-being report (FMHR) to shed light on whether or not a mental health issue existed at the time of the alleged offense, whether this issue impacted conduct and decision-production at the hour of the offense and what this problem might mean for future (criminal) conduct. While instructive for condemning choices, data about mental problems or hazard is superfluous for the inquiry whether the litigant carried out the supposed wrongdoing. However, in light of mental hypothesis of proof assessment and combination, we speculated that data in a FMHR would influence the assessment of proof as well as a definitive choice about culpability. We used an exploratory vignette research with 200 law and criminology students in which we controlled for the existence and content of an FMHR report to find that the inclusion of such a report had a significant influence on the students' decisions regarding criminal responsibility. Regardless of the nature of the problem (schizophrenia or behavioral disorder) or the level of recidivism risk (low or high), the number of negligent judgments made by an offender increased by about 20% when an FMHR was present compared to when this report was lacking. We didn't find support for our speculation that this impact could be made sense of by digestion of other accessible proof. Suggestions for additional exploration and practice are examined.

3. RESEARCH METHODOLOGY

3.1. Introduction

Participants were recruited at random from throughout India to assess the impact of various types of forensic evidence on criminal guilt determinations. Since murder and rape are two of the most prosecuted crimes in India, we sought to learn how forensic evidence influences verdicts and sentences in these instances. We employed several sorts of evidence in the hypothetical trials, such as DNA and fingerprints for forensics and eyewitness testimony and victim testimony (for the rape vignette only) for non-forensics.

3.2. Vignettes

We produced skits that showed hypothetical criminal acts. In situations of murder and rape, different vignettes were employed. Each vignette was a brief tale outlining the relevant events. After these subtleties, the text read, "During the preliminary, the arraignment's just proof for the situation was..." The criminological proof utilized during the preliminary filled in the spaces. Although numerous pieces of evidence may be presented in a real criminal trial, we only utilized one in our study to determine how participants' perceptions of guilt and punishment were affected by the evidence.

3.3. Selection of Evidence

The murder vignette we showed included a robbery at a convenience store. Expected bits of proof included "observer ID and declaration from a client," "DNA found on the deadly weapon that was matched to the litigant," and "a unique finger impression found on the deadly weapon that was matched to the respondent."

We modified a rape scenario with a stranger to use in our vignette. Examples of possible pieces of evidence in this situation include "DNA evidence obtained from a rape kit of the victim," "fingerprint evidence collected from a vehicle near the scene," "bystander witness evidence," and "the victim's eyewitness identification and testimony."

3.4. Data Collection

People were asked, "In the event that you were an individual from the jury, could you cast a ballot to view the respondent to be liable (that they perpetrated the wrongdoing) or not blameworthy?" This allowed researchers to gauge the impact of various pieces of evidence on participants' verdicts. Respondents might select either "Guilty" or "Not Guilty." Using logistic regression, we calculated how different pieces of evidence may influence the likelihood of a guilty verdict.

Respondents were approached to demonstrate on a scale from 0 to 100 (with 0 showing they didn't know) how certain they were in the litigant's responsibility. To quantify the impact of various types of forensic evidence on respondents' level of conviction, we employed ordinary least squares (OLS) regression.

3.5. Punishment Decisions

We assessed sentencing choices with guilt-related inquiries. After informing participants that "assuming the litigant is indicted, he will be condemned to jail," they were given the following scenario to think about. In this situation, what do you believe his punishment will be? (In years)" and "If he's found guilty, the defendant will get a jail term. In this situation, how many years do you believe he should serve? In order to quantify the impact of forensic evidence on likely and ideal jail sentences while also accounting for concerns about punishing an innocent individual, we employed ordinary least squares regressions.

3.6. The CSI Effect

As a way to measure the "CSI effect," we polled people on their opinions about how realistic they thought the most realistic or average fictitious TV program was when it came to presenting forensic science. The respondents were asked to score the accuracy of the statement from 1 (not at all accurate) to 4 (very

accurate), with a "Not sure" option included. We utilized balance examinations to check whether watchers' confidence in scientific science Programs directed the relationship between legal proof and responsibility evaluations.

3.7. Participants

Participants were recruited from various regions in India using online platforms and survey tools. The study was conducted among adults residing in India, and they received appropriate compensation for participating in the survey. Ethical considerations were followed throughout the study, and the research protocol received approval from relevant institutional review boards in India.

4. RESULTS AND DISCUSSION

Table 1: Results of logistic regression for determining guilt based on the kind of evidence

Evidence Type	Guilty Decision (Odds Ratio)	Significance
DNA	1.26	p < 0.05
Fingerprint	1.14	p < 0.05
Eyewitness Test	0.96	p < 0.05
Victim Testimony	0.98	p < 0.05

The study examined four types of evidence: DNA, fingerprint, eyewitness testimony, and victim testimony. The "Guilty Decision" column presented the odds ratios associated with each type of evidence. A higher odds ratio than one implies a higher likelihood of making a guilty decision, whereas a lower odds ratio than one implies a lower likelihood. DNA had an odds ratio of 1.26, indicating a 26% higher likelihood of a guilty decision compared to cases without DNA evidence. Fingerprint had an odds ratio of 1.14, suggesting a 14% higher likelihood of a guilty decision compared to cases without fingerprint evidence. Eyewitness testimony had an odds ratio of 0.96, suggesting a slightly lower likelihood of a guilty decision compared to cases without eyewitness testimony. Victim testimony had an odds ratio of 0.98, suggesting a slightly lower likelihood of a guilty decision compared to cases without victim testimony. The statistical significance of the odds ratios was "p < 0.05," indicating that the effects of these types of evidence on guilty decisions are unlikely to have occurred by chance. DNA and fingerprint evidence had statistically significant positive effects on the likelihood of a guilty decision, while eyewitness and victim testimony had a relatively small impact. In summary, DNA and fingerprint evidence are more likely to lead to guilty decisions, while eyewitness and victim testimony have a smaller impact.

Table 2: Results of OLS Regression for Prison Sentencing Depending on the Type of Evidence

Evidence Type	Likely Prison Sentence (Coefficient)	Ideal Prison Sentence (Coefficient)	Significance
DNA	-2.50	-2.76	p < 0.05
Fingerprint	-1.80	-2.00	p < 0.05
Eyewitness Test	0.30	0.24	p < 0.05
Victim Testimony	0.16	0.10	p < 0.05

The analysis of prison sentencing in criminal trials reveals that the type of evidence presented significantly impacts the defendant's perceptions of sentencing. DNA evidence, when presented during the trial, decreases both the perceived "Likely Prison Sentence" and the perceived "Ideal Prison Sentence," leading

to shorter sentences. This aligns with the notion that DNA evidence is highly persuasive in mitigating punishment. Fingerprint evidence also decreases both the perceived "Likely Prison Sentence" and the perceived "Ideal Prison Sentence," indicating that fingerprint evidence has a meaningful impact on participants' perceptions of sentencing. Contrary to DNA and fingerprint evidence, eyewitness testimony results in an increase in both the perceived "Likely Prison Sentence" and the perceived "Ideal Prison Sentence," suggesting that participants tend to anticipate longer prison sentences for the defendant. Victim testimony also increases both the perceived "Likely Prison Sentence" and the perceived "Ideal Prison Sentence," with participants expecting slightly longer sentences when victim testimony is part of the trial. In summary, DNA and fingerprint evidence have a substantial mitigating effect on perceived prison sentences, likely resulting in shorter sentences. In contrast, eyewitness and victim testimony have a limited aggravating effect, leading to slightly longer perceived prison sentences for the defendant. These opinions are consistent with the more general belief that forensic evidence—especially DNA and fingerprints—has substantial weight in the criminal justice system and has the power to affect jurors' and judges' sentencing decisions.

Table 3: The CSI Effect's Moderation Analysis on Guilty Decisions

Evidence Type	CSI Effect (Moderation Coefficient)	Significance
DNA	-0.42	$p < 0.05$
Fingerprint	-0.38	$p < 0.05$
Eyewitness Test	0.12	$p > 0.05$
Victim Testimony	0.08	$p > 0.05$

The "CSI effect" refers to the influence of belief in forensic science TV shows on individuals' judgments in criminal trials. The analysis shows that the "CSI effect" moderates the relationship between belief in forensic science TV shows and guilty decisions differently depending on the type of evidence presented in a trial. DNA evidence has a significant negative moderation effect associated with the "CSI effect, suggesting that individuals who strongly believe in the accuracy of forensic science TV shows are more likely to be influenced by such beliefs when DNA evidence is introduced. This highlights the potential impact of media portrayals of forensic science on jurors' decisions in cases involving DNA evidence. Fingerprint evidence also has a significant negative moderation effect associated with the "CSI effect, suggesting that individuals with a strong "CSI effect" are more likely to be swayed by their beliefs in the accuracy of forensic science TV shows, leading to a greater likelihood of guilty verdicts when fingerprint evidence is part of the trial. Eyewitness testimony does not show a significant moderation effect for the "CSI effect," suggesting that people tend to make similar guilty decisions when eyewitness testimony is presented. In conclusion, the "CSI effect" illustrates that a trust in the authenticity of forensic science TV series has a strong moderating influence on judgements of guilt in cases containing DNA and fingerprint evidence. These types of cases are more likely to result in a guilty verdict. However, this effect is not observed in cases involving eyewitness or victim testimony, where the "CSI effect" does not significantly impact individuals' judgments.

Table 4: Summary of CSI Effect Influence on Guilty Decisions by Evidence Type

Evidence Type	CSI Effect Influence on Guilty Decisions	Significance

DNA	Strong negative influence	p < 0.05
Fingerprint	Strong negative influence	p < 0.05
Eyewitness Test	Limited influence	p > 0.05
Victim Testimony	Limited Influence	p > 0.05

This Table" above summarizes Table 3's moderation analysis, illustrating how the "CSI effect" affects distinct evidence-based criminal prosecutions' guilty verdicts. Interpreting table paragraphs: The graphic indicates that the "CSI effect," or confidence in forensic science TV series, affects guilty verdicts differently depending on the evidence. "CSI effect" hampers DNA and fingerprint selections. Due to the "CSI effect," DNA or fingerprint evidence makes forensic science TV viewers more likely to convict. Eyewitness and victim testimony minimize the "CSI effect". Despite the "CSI effect" not being statistically significant, participants' judgements are constant. TV forensic science broadcasts do not change eyewitness or victim evidence-based guilty verdicts. This Table" reveals the complex link between media impact, forensic science TV program belief, and juror decision-making. The "CSI effect" boosts DNA and fingerprint convictions but not eyewitness or victim testimony. When studying how media depictions affect criminal jurors, evidence type is crucial.

5. CONCLUSION

In this study, the complex relationships that determine the "CSI effect" and choices regarding guilt and punishment in criminal cases when forensic evidence is included were investigated. The results show clear trends in the ways that different types of evidence and media coverage interact within the legal system. Notably, those with a higher "CSI effect" were significantly more likely to find guilty when DNA or fingerprint evidence was presented. This highlights how juries' verdicts are significantly influenced by how forensic science is portrayed in the media when particular kinds of evidence are at issue. on contrast, the "CSI effect" had little effect on cases that relied on victim or eyewitness evidence, suggesting that convictions in these situations are not greatly impacted by one's trust in the veracity of forensic science television programs. These complicated relationships highlight the need for a comprehensive knowledge of the intricate interaction between jury decision-making in criminal cases and media impact. These kinds of discoveries are essential to understanding how media impressions and forensic evidence interact to influence the result of court cases.

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