The Repercussions of Inaccurately Portraying Forensic Science in Television Shows

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This interdisciplinary thesis is dedicated to my grandfathers, Aubra Eugene Hedger and Kermit Ward.
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Since the start of the 21st century many television dramas have focused on crime and have incorporated a number of scientific disciplines into their plotlines. When crime drama is interwoven with forensic science, the result is profitable television. Television shows such as *NCIS*, *Law & Order*, *CSI*, and *Bones* have all been renewed for multiple seasons. With an audience so entertained by shows focused on catching criminals and using scientific evidence to do so, it is important to examine the ripple effects these television dramas cause. A hot topic within the forensic science realm has been the “CSI Effect.” The CSI Effect is the term used for the effect that watching crime drama has on jury pools.\(^{12}\) Some researchers believe that, jurors who watch crime dramas are more likely to expect technologically advanced evidence to be presented in court cases and if this evidence is not presented then it is viewed as reasonable doubt.\(^{12}\) Others credit the spreading use of technology in our society for this expectation.\(^{16}\)

The CSI Effect is also diffusing into the academic world of forensic science undergraduate and graduate programs. Studies have found that there has been an increase in the number of forensic science programs in existence at both the graduate and undergraduate level.\(^{30}\) In this interdisciplinary thesis I examine the ways in which popular crime dramas inaccurately represent the field of forensic science and how these misrepresentations affect the judicial system, forensic science educational system, as well as the methods that could be implemented in order to resolve these issues.

**Forensic Science**

Forensic science is the field in which researchers interpret and analyze evidence for the purpose of a legal investigation.\(^{2}\) Under the broad category of forensic science are a variety of careers that specialize in analyzing evidence and obtaining information including toxicology, psychiatry, pathology, medicine, chemistry, engineering, genetics, and biology. Within these
fields, highly trained professionals work to make criminal investigations run more smoothly. For example, forensic toxicologists look for the presence of poisons or drugs in body fluids. Forensic odontologists examine dental evidence to identify the deceased, as well as analyze bite marks for the purpose of linking the bite marks on the victim to the assailant. Forensic linguists identify the authors of written documents based on the examination of handwriting, syntax, word usage, and grammar. Forensic geneticists are responsible for analyzing DNA to provide evidence that may be incorporated in the courtroom to help a jury decide a person’s guilt or innocence. A medical examiner is a public official responsible for investigating unexplained, unnatural or sudden deaths. All of the work that these professionals do comes together to make criminal investigations more effective.

**CSI Effect: Real or Imagined?**

Some individuals who frequently view *CSI* and other forensic science/crime drama-themed television shows develop unrealistic expectations for the amount of scientific evidence that should be presented in court cases and the time it takes to develop that scientific evidence. These individuals also mistakenly believe that they have a good understanding of the methods surrounding forensic investigation. A juror who regularly views forensic science programming may be disappointed by the sparse amount of scientific evidence presented in court as compared with the evidence shown on television. This individual is more likely to acquit a defendant than a juror who does not watch forensic science programs regularly. In one example, jurors acquitted a man who was accused of stabbing his estranged girlfriend because the police did not perform DNA tests on the bloody sheets on which she was found. The defendant ended up going to prison because of a parole violation. Upon release, however, he again stabbed his ex-girlfriend, this time fatally.
When a jury asks for “that test they do on T.V.”, prosecutors end up with the undue burden of providing forensic evidence that validates and equates with what the juror has seen on television. A group of researchers from Saint Mary’s University were investigating the CSI Effect and commented, “It’s only recently that professionals in the legal system, like lawyers and judges, are beginning to notice that how frequently someone views forensic science programs might actually have significant repercussions. Lawyers are noticing that cases they might have won 10 years ago, they’re losing now because jurors are saying, “Where was the evidence? Where was the DNA evidence? Where was the fingerprint evidence.”

Another problem that arises from misrepresenting forensic science in television shows is that regular viewers begin to think that their societies are the same as what they see on T.V. This notion is called “cultivation theory.” Cultivation theory is the idea that those who frequently view a phenomenon, even if fictional, are more likely to believe that only science provides ultimate certainty, not the judicial system. This idea is reinforced in CSI: Las Vegas when the main character, a forensic entomologist named Grissom, says, “I tend not to believe people. People lie. But the evidence doesn’t lie.” The notion that scientific evidence is more reliable than witnesses is further strengthened when Horatio, the head of CSI: Miami’s crime lab says, “We certainly wouldn’t want to rely on an eyewitness.” This quotation implies the inaccuracy of eyewitnesses and the foolproof reliability of scientific evidence.

An example in which scientific evidence is presented as trumping all else is found in the trial of a former television star, Robert Blake. Blake was acquitted of murder, even though more than one witness testified that Blake asked them to kill his wife. The jurors explained their decision by saying that they were not presented enough evidence to support a guilty verdict. Thus, the CSI Effect has influenced the thinking of this jury’s thought processes.
Unfortunately, scientific evidence that conclusively provides us with the answers is rare. One investigator has expressed his distaste for the glorification of scientific evidence in the courtroom by saying, “On CSI, every case they deal with has slam-dunk evidence, but in reality there’s often no good forensic evidence and even when there is it’s often not of the definitive nature that they show.” The problem with relying on scientific evidence alone is that the evidence may not be accurate; it could have been tampered with or handled improperly. Research shows that inaccurate scientific evidence is accidentally, though sometimes intentionally, used in court and commonly sends innocent individuals to jail. 

It is not uncommon for forensic labs to make mistakes in their scientific analyses. For example, a false fingerprint identification led the FBI to incorrectly accuse a lawyer, who was a recent convert to the Muslim faith of being involved in the al Qaeda-linked Madrid train bombings. Later the FBI recanted their accusations saying that the fingerprint was of poor quality. Jurors should critically analyze evidence presented to them even when it seems to be straightforward. This example is another reason why jurors should continually question what they are told in court, even if what is being presented to them is coming from an individual within a highly ranked division of the government, such as the FBI. Jurors should not blindly accept the evidence presented to them based upon the person who presents it, whether that person is a highly decorated officer, or a doctor with four degrees. Jurors should closely examine the information and or evidence that is used in court regardless of who presented it or how it was presented.

Wrongful convictions are frequent enough that an industry has developed out of providing legal help to those who have been falsely convicted. “The Innocence Project” is an organization that is dedicated to exonerating these wrongfully convicted individuals by checking
the biological evidence of the cases in question. In 2014 alone, The Innocence Project has exonerated eight individuals from their wrongful convictions with a total count of 321 exonerations since 1974, thus making the possibility of false imprisonment seem all the more plausible.  

Another issue that should be taken into account concerning forensic evidence in television shows and the judicial system is the feasibility of scientific evidence in American courtrooms. *Law & Order* makes presenting scientific evidence in courtrooms look simple since it is done so regularly and without question but in our society the justice system struggles to accept scientific evidence.  

Scientific evidence has come into question recently in different ways. One concern is over the availability and malleability of expert witnesses. The expert witness must be unbiased and present the facts as clearly as possible to the court. Another conflict between scientific evidence being used in the courtroom is the ability of judges to determine the admissibility of evidence in terms of whether or not the evidence is essential and reliable.  

The unease of the court system to accept scientific findings can be better understood by considering the fundamental themes underlying both disciplines. The court system functions and strives to stabilize society using predetermined laws whereas science thrives in a more fluid environment and is constantly considering and testing new theories. Rapidly expanding bodies of new information and theories are the norm in science but the judicial system is quite different. Though the science behind forensic science is rapidly changing, the judicial system, because of the complex nature of its governing bodies and law, those in the judicial system are often reluctant to change, and if it does allow changes these changes may be inconclusive, or inconsistent.
Many jurors believe so strongly in the validity of forensic science as evidence that they vote to convict defendants based solely on this evidence, even when the evidence may be inaccurate. For example, Sandra Anderson and her dog Eagle, who once assisted police in finding crime scene evidence such as droplets of blood, bones, and other body parts, worked on cases in Indiana, Ohio, Wisconsin, Louisiana, and Michigan and even at the World Trade Center after the September 11th terrorist attacks. Anderson was observed, multiple times, planting evidence she is credited for finding.. She was convicted and served two years in prison after a plea agreement.12,13 This may be an extreme example but jurors should not feel comfortable with making convictions based only upon evidence. They should critically question both the process of gathering evidence, and the evidence itself, that is presented to them in court otherwise, potentially, innocent individuals will suffer the consequences or the guilty individuals may go free.

While some blame television watching for changing jury expectations, others identify different changes in culture as the cause. Donald Shelton, chief judge in Washtenaw County, Michigan, surveyed potential jurors regarding their expectations for scientific evidence to be presented in a variety of scenarios for different criminal trials. Over 2,000 jurors reported their TV watching habits and gave details of where they got their ideas of how the criminal justice system works. Shelton found that jurors’ expectations to see scientific evidence in court cases had nothing to do with the TV shows they watched, thus suggesting that the correlation between the CSI Effect and juror TV viewing is invalid. Judge Shelton speculated that jurors are more likely to be affected by advancement in technology around them rather than the television shows they watch. Thus, according to Shelton’s study, owning the latest BlackBerry has a bigger impact on how jurors evaluate scientific evidence than the television shows they watch.16
A different study, which surveyed 1,027 potential jurors, found that a jurors’ expectation of evidence at trials had no correlation to crime show viewing. Instead, the researchers suggest, a juror’s expectation for evidence at trial arises from popular culture, based upon their increased exposure to scientific and technologic advances. In a third study, a mock-trial that incorporated hair evidence was conducted with forty-eight college students who were eligible for jury duty. The researchers asked the students about the crime shows they watched, and again, there was no correlation between the individuals who watched crime shows and the likelihood of obtaining a conviction. In fact, those who watched crime shows were more critical of the hair evidence that was presented. These results ultimately undermine the notion that viewing forensic science television shows is correlated to an increased expectation of forensic tests to be incorporated into court cases. Clearly, though, juror expectations of forensic science evidence have changed, at the same time that crime shows have grown popular.

**Forensic Science Television Programs Effect on Education**

Dr. Kimberlianne Podlas, Assistant Professor of Media Law at the University of North Carolina, says that *CSI* and programs like it have increased awareness of careers in the fields of forensic science. When *LA Law* was in its prime, law schools saw a dramatic influx of applications. The *CSI* craze has not only affected professional schools but also changed the way one middle school conducts their after-school program. Montana’s Hamilton Middle School has a crime-scene investigation educational unit in which scientists from a nearby laboratory discuss DNA, infectious diseases, and genetics. They include simulated murder mysteries along with instructional forensic activities. One activity challenges children to remove doctors’ gloves soaked in red dish detergent without getting any of the “blood” on themselves. A teacher at the school commented, “This goes so far beyond what we can do in ordinary classes at school. It
also puts them [the students] in contact with professional adults from outside the school, and that can’t help but be good for them.”16 This program shows that the popularity of forensic science shows has brought about changes in both youth and adult attitudes towards crime investigation, science and medicine.

Currently there are a total of 41 accredited universities that have forensic science programs either at the undergraduate or graduate degree level.31 A study done by Glen Paul Jackson, associated with Ohio University, examined the increase in the number of forensic science bachelor degree programs. In his study, he examined the number of graduates with a bachelor’s degree in forensic chemistry from Ohio University from 1977 up to 2006.30

![Figure 1: Histogram showing the number of graduates with a BS in forensic chemistry from Ohio University from 1977-2006. Female students account for 62% of the 257 graduates.30](image)

Ohio University’s forensic chemistry program was established in 1976. Throughout the 1980’s and early 90’s the number of forensic chemistry graduates remained steady, but by the late 90’s the number of graduates was considerably higher (see Figure 1). This datum indicates that the most significant growth in the number of students enrolled in the forensic chemistry program at Ohio University developed in the early to mid-1990’s making the namesake of the “CSI Effect”
seem suspect. Thus, based on this information, if the increase in the number of students enrolled in the forensic chemistry program was correlated to the first airing of CSI, then the increase Ohio University experienced should have been called “Law & Order Effect” rather than “CSI Effect”. Note that the small number of graduates in 2001 was caused by the University administering a chemistry placement exam for incoming freshman for the first time in 1997, which decreased the number of enrollees by approximately 40%.\textsuperscript{30}

\textit{Figure 2:} Histogram showing the cumulative number of forensic science-related bachelor’s degree programs in the United States containing the words ‘forensic chemistry,’ ‘forensic science,’ or ‘criminology’ from 1977-2007. Data were compiled from \textit{The College Blue Books} and the AAFS Web site.\textsuperscript{30}

Another study found that there was an inclusive average of 1.3 new forensic science-related programs from 1997 to 2002 for all three degree types. Conversely between 2002-2007 110 new forensic science-related programs were established. The growth was split almost evenly between the three programs of forensic chemistry, forensic science, and criminology. The study shows that forensic science programs have indeed grown since the first airing of CSI but it would be risky to say that there was a causal relationship between program growth and the airing of the first CSI episode in 2000.\textsuperscript{30}
Another study asked 215 Australian forensic science students for their impressions of how their profession is depicted in popular culture. The participants thought the portrayal of the forensic sciences in popular television shows would encourage recruitment, as well as, advertise the wide variety of specialties and technology available in the career. They also found that forensic science shows attract individuals who otherwise may have never heard of the field. Interestingly, a majority of the students surveyed agreed that the way forensic science is portrayed on television is inaccurate and unrealistic, and one student stated “they exploit the science and aren’t true to it, [be]cause people spend their whole lives trying to learn this stuff and they just throw it around like it doesn’t matter.” While this study does have a remarkably small sample size, it provides an insider’s view of forensic television programs. There may also be differences in Australian television programming when compared to North America’s television programs. Australia may have forensic science dramas that are not made available for those in North America and vice versa.

**Examination of Misrepresentation**

Very few may be familiar or even aware of exactly how television shows inaccurately portray the field of forensic science. Quite often, forensic science is misrepresented in three main ways, the first is the division of labor. The second inaccurate representation involves the facilities that are used and the third is the ease of solving cases as it relates to how evidence is collected. Within the next few pages I will analyze various popular forensic science crime shows and how they have inaccurately portrayed the field of forensic science.

**“Quincy, M.E.” (1976-1983)**

*Quincy, M.E.* is an older forensic science television program that revolves around a Medical Examiner and his daily activities investigating suspicious deaths. *Quincy, M.E.* includes
an introduction segment that shows Quincy, played by Jack Klugman, introducing new police officers who have recently joined the force to an autopsy. Six young men stand shoulder-to-shoulder, adjacent to a body covered with a sheet, laying on a metal cart. Quincy comes from behind the officers and stands opposite them so that the body and its cart rest squarely between them. Quincy says, “Gentlemen, you are about to enter the most fascinating sphere of police work, the world of forensic medicine.” By the end of Quincy’s introduction all six of the new detectives are clearly nervous, looking down or away from the body on the table. Next, Quincy pulls the sheet from the body, and two officers faint while a third covers his mouth and then collapses. Next, Quincy lifts a large syringe to inspect it, and another police officer goes to the floor. Finally, Quincy pulls out a bone saw and starts to rev it up, and with that sound, the two remaining officers collapse to the floor. Quincy is shown peering over the autopsy table, with bone saw still in hand, with a look that faintly hints at gratification. The images below, trace the chronological progression of the scene. This part of the introduction provides comic relief for each intense and nerve rattling episode, which may have been much needed, considering that *Quincy, M.E.* was one of the first television shows of its kind.

![Figure 3.1](image1.png)  
*Figure 3.1:* Top Left: Quincy removes sheet from body. Top Right: Three men pass out. Bottom Left: Quincy revs up the bone saw. Bottom Right: All officers are on the floor.

![Figure 3.2](image2.png)  
*Figure 3.2:* Top Left: Quincy inspecting his syringe. Top Right: One police officer about to pass out. Bottom: Quincy appearing contented.
“C.S.I Miami” (2002-2012)

In *C.S.I. Miami*, the head of the crime lab, a former NYPD detective named Horatio “H” Caine, is very protective of his team and is willing to help them in whatever way he can. The medical examiner, played by Khandi Alexander, is Dr. Alexx Woods. Oddly enough, quite regularly Dr. Woods acts as the “motherly” figure in the lab. She speaks tenderly to her patients’ even though they are dead. Another significant character on the show is Detective Ryan Wolfe, played by Jonathan Togo who is a police officer and typically is regularly involved in the process of examining evidence.

“Blood in the Water” is the name of the second episode in the fourth season of *C.S.I. Miami*. At the start of this episode a family is on their yacht when suddenly the boat runs aground. The boat begins to sink in shark-infested waters, but before it does it catches on fire. In order to avoid being burned to death the daughter jumps into the water, and she treads water very briefly before a shark pull her under. The son, trying to save his sister, dives in after her and neither are to be seen again. The CSI team is called in to help search for the bodies of the two siblings and in the process find a “John Doe”, an unidentified male. The John Doe is transported back to the forensic crime lab and Dr. Woods performs an autopsy.

Once at the forensic lab, Dr. Woods is seen standing adjacent to the body and Wolfe enters the room and asks if there is any information on the John Doe, to which Woods reports that there was no soot in his lungs and no esophageal burning. From this, Ryan Wolfe concludes that the body was already dead before it was placed on the boat. He then asks Dr. Woods what killed the John Doe, and Woods replies, “Someone shot him,” pointing to a bullet hole in John Doe’s chest. She then picks up a bullet with her forceps (medical version of tweezers) and shows it to Wolfe (See Figure 4.1).
This scene may seem normal to most observers but to someone who is familiar with forensic science, picking up a bullet with forceps is a huge mistake. The metal that makes up the forceps will scratch the bullet; this is a tremendous problem for the police if they need to compare the bullet to a gun. This comparison process typically would use a comparison microscope which allows the viewer to compare two objects, or bullets, side by side (See Figure 4.2). If the bullet found in the body was scratched by the forceps, the police may no longer be able to match the bullet to a gun, so instead any well-trained forensic technician would know not to pick up or handle a bullet with forceps, only with their hands. A well-trained forensic technician would know not to pick up or handle a bullet with forceps making this mistake by Dr. Alexx Woods particularly problematic since she likely has had the most educational training compared to the other crime scene investigators.

After Woods shows Wolfe the bullet, he asks if she was able to identify the body. Woods replies, “It may take a little work,” as she proceeds to examine John Doe’s hands. She remarks that they were lucky the sharks did not eat his hands, to which Wolfe then asks, “Do you want me to hold or cut?,” thus implying that what is about to happen happens quite regularly. Woods says, “I’ll cut.” Woods uses a special scissor-like autopsy tool to cut through John Doe’s right thumb (See Figure 4.3). Wolfe catches the thumb in a plastic container and it is taken to the
fingerprints are unusable for fingerprint analysis. He or she could use dental records, or
hair samples, and could search missing persons records. The very last resort would be to cut off
the individual’s thumbs. This extreme may make people less likely to request an autopsy on their
loved ones when they indeed should.

During my internship experience with the Associate Chief Medical Examiner I learned
that a tremendous amount of care goes into making sure that all of the suspicious abnormalities
on the deceased are fully investigated. The body is respected throughout the entire autopsy
procedure and even still during the removal of organs and/or tissues for Kentucky organ/tissue
donation process, if that is taking place. Care is taken towards, cleaning the body off prior
toward sending it to the funeral home and all the organs are returned to the deceased’s body after
examination, dissection, and tissue sample collection. The autopsy technicians are careful not to
cut or remove any more than what is absolutely necessary so that the funeral home does not have
to do extra work to prepare a body for a funeral, if that is the case. One book explains the
respectful manner in which an autopsy is performed by saying:
“It is important to remember that, although seemingly rather intrusive, the autopsy is a medical procedure carried out by professionals who take great care in preserving the dignity of the decedent throughout the entire examination. As the last doctor to attend to the decedent, forensic pathologists perform their final duties ensuring that surgical incisions do not alter the decedent’s appearance or preclude open casket viewing at the funeral home. With such care, survivors are better able to come to terms with their loss and begin the grieving process.”


In the sixth episode of the sixth season of “CSI: NY” a software executive is shown lying prone over a crosswalk in the dark of night. After processing the scene, investigators go back to their lab to complete their forensic work. Sid Hammerback, played by Robert Joy, is the medical examiner. During the autopsy he discovers trace elements of an unknown solid on the victim’s shoulder. He takes samples and gives them to Stella Bonasera, played by Melina Kanakaredes, who is to give them to Lindsay Monroe. Monroe, played by Anna Belknap, is a crime scene investigator who works both in the field and the lab. Monroe, explains how she figured out what the sample was composed of and says, “After Edna identified it, I ran it through the GCMS, it contains deltamethrin and cypermethrin.”(See Figure 5.1.) Edna is a specialized robotic arm-like machine that can find specific pre-cut, and pre-stained microscope...
These microscope slides are neatly organized perpendicularly to the wall and far enough apart so that Edna can identify the sample, locate its match, and deposit the match in a receptacle for the investigator to retrieve. We might compare Edna to a high-tech vending machine, but instead of getting food a scientist gets a microscope slide that matches the sample in the evidence.26

This is an unrealistic representation of forensic science because Edna is not real. Currently there are no specialized robotics available to fetch pre-made microscope slides to match to evidence samples. It is highly unlikely that a single room would have enough wall space to house a microscopic slide sample of even the most basic components found on earth let alone all that exist. In an actual forensic science laboratory a test that determines the components of a sample would take a series of complex steps that would require human input and/or manipulation. Careful handiwork and precise measurements may not be enough to get the answer, or if they can determine the components of a sample, the results may not be entirely conclusive.

Another factor that plays into this example of inaccurate representation is sample size. The sample that the medical examiner obtains appears to be quite small; in fact when he explains what he found to Stella Bonasero he describes it as “some sparse granular trace.” When he was
collecting the sample from the software executive’s shoulder he gently pushed small pieces of the sample into a paper envelope. Sid, the medical examiner, is aware of his small sample because he describes it as “sparse” yet he only collects a fraction of the sample that he finds and submits it for testing. If a medical examiner knows that he only has a small sample size to work with then he/she would try to obtain as much of the sample as possible, even if it means the accidental submission of things that are not part of the sample.

Sid’s small sample may be due to time constraints for television purposes, or it may be that the producers do not think that the audience wants to watch sample collection. The latter of these explanations could be another reason why people have incorrect perceptions of occupations in forensic science, because television shows have edited out the boring tasks associated with the careers and have emphasized the more glamorous or gory ones.

In many cases the sample size that a medical examiner, or the autopsy technician, can obtain has everything to do with being able to identify the material that is found. In one scene, Sid is removing a small sample from a victim and two scenes later laboratory technicians are analyzing it. Only nine minutes and two seconds later the results are printed out and are in hand. Laboratory analysis of samples usually takes longer than the process of performing an autopsy. It would not be out of the ordinary for toxicology results to take between four to six weeks or longer to be processed. In some instances, if more complex testing is required, results may take even longer. It is understandable that in making television episodes time is manipulated, so clearly on television they cannot wait four to six weeks for test results. The effect, though, may cause viewers to misunderstand the processes involved in forensic work and the time frame that work requires.
**Bones (2005-present)**

*Bones* is another forensic science drama that thrives on an intertwined relationship between the law and science. What sets *Bones* apart from the *CSI* shows is that *Bones* focuses on the forensic anthropological aspect of the forensic science industry rather than just the crime scene investigation. While it is refreshing to see more diversity in forensic specialties shown by the television industry as it pertains to the field of forensic science, it is just as disheartening to find that this series does not represent forensic anthropology any more realistically than do others that represent forensic investigation. The show is titled for the nickname of the forensic anthropologist protagonist. Temperance Brennan, played by Emily Deschanel, spends an unusual amount of time in the field, chasing after bad guys with her partner Seely Booth, played by David Boreanaz. This is surprising because typically a forensic anthropologist would not have the responsibility of chasing down the bad guys or even regularly going to crime scenes. Booth has served in the army as a sniper and is now a federal agent who helps Bones piece together crimes to find the killers. Bones and Booth go to crime scenes in almost every episode and solve cases with help from a group of laboratory specialists who typically stay at the lab.

Season three, episode one began by showing two rowdy young adults and one designated driver in a car. The vehicle is going under an overpass when the

*Figure 6.1: Skull in the windshield.*
driver suddenly slams on his breaks to avoid something that has fallen off the bridge overhead, and bounced off of the garbage truck in front of him. A human skull crashes through the windshield but lodges perfectly so that it is staring right at the driver. Booth and Bones arrive on the scene; Bones examines the skull and determines it is the skull of a “male, Caucasian, late teens, early 20’s, completely devoid of flesh or odor.”

A forensic anthropologist may go to a crime scene to note the conditions in which bones were found and perhaps to examine the bones as they were found before they are moved or transferred by the coroner or police, but it is extraordinarily unlikely for a forensic anthropologist and a sidekick federal agent to solve crimes by going to the field to chase after the culprit. The term forensic science is an umbrella term that encompasses a variety of different specialties that all perform varying tasks. Normally, it would be the police’s or coroner’s job to talk with witnesses, investigate cases, and speak with the family. The forensic anthropologist’s main focus would be to “primarily focus their studies on the human skeleton.”

Bones and Booth work together to identify the skull, which proved to be quite a challenge, but eventually they discover that the skull has an osteoma. Bones informs the viewer that an osteoma “is a type of bone spur that grows down the skull and into the sinus cavity”; and
that an osteoma would commonly cause a significant amount of pain and discomfort. This is a significant help for Booth and Bones in finding the identity of the skull. They check with the local ear, nose, and throat doctors and find medical records that matched the skull. In Figure 6.2, Bones is pointing out the similarities between the skull that was found (left) and the previously taken X-rays of the deceased individual’s head (right). By doing this, she is able to identify the victim.

In Figure 6.3, Dr. Brennan is pointing to a high-resolution flat screen computer monitor. The state government typically funds forensic science laboratories; large plasma screen televisions are unusual in these labs. For example, the computers and technology available to the staff at the Central Kentucky Medical Examiners office were not brand new, top of the line equipment. The technology and equipment was still able to do the job, but it was not up to date with the modern Mac and HP world. While advancing technology is an exciting development for forensic science, it does not mean that every forensic lab will be able to afford such accommodations. In fact, one of the main characters on the original CSI: Crime Scene Investigation has testified in Congress to request that more federal funds be allocated to local labs.
Another astounding resource in the lab that is depicted in the series can be seen in Figure 6.3 where Bones and Zack (another forensic anthropologist) examine the skull and discover a unique scratching pattern. At their convenience they have well lit drawers that contain bones, a table that lights up and another high-resolution television to help them examine specimens more closely. Once again, the work environment of a forensic anthropologist is depicted accurately. On “Bones”, everything is completely modernized and advanced technologically speaking. This is shown by the table that lights up, the drawer filled walls that have lights on the inside that are always on and again a large flat screen television. All of which would likely not be funded by the state government for the forensic anthropologist’s laboratory.\(^{39}\) There are however, some federal grants that are allocated to states and units of local government to improve “the quality and timeliness of forensic science and medical examiner services.” These federal grants are called Paul Coverdell Forensic Science Improvement grants. Unfortunately medical examiners and coroners in forensic laboratories must compete with public safety agencies for these grants and as a result, the funding for forensic science laboratories is insufficient.\(^{11,39}\)

A little further in the same episode, Booth and Bones discover the quarters where a cannibal has been displaying some of the bones of his victims. False bones have been covered in
a silver-looking coating (Figure 6.4).\textsuperscript{27} A few scenes later we see all of the main laboratory scientist personnel as well as the lawyer who represents the forensic science department. They have gathered at the crime scene to discuss how bizarre the case is and to talk about what they plan to do next.

Under no circumstances would the entire forensic science laboratory visit a crime scene. The other forensic personnel who do visit the scene have a wide variety of occupational specialties ranging from entomology and forensic artistry. There is no logical reason for Angela, the forensic artist, to be present at the scene. Other than hinting at her own personal excitement of the possibility of there being a cannibalistic serial killer on the loose, there really is not any valid reasoning behind the lawyer’s presence either. The problem with this depiction lies with who all is involved in investigating crime scenes. Based on this depiction, someone may decide they want to be a forensic artist because in \textit{Bones} the forensic artist gets to go to crime scenes. This is unfortunate for the forensic science education system since they are left to deal with the product of this inaccuracy by having to explain to the potential forensic science program enrollees that their understanding of their dream occupation is severely flawed.

**Potential Methods to Avoid or Correct for Misrepresentation of Forensic Science in Television**

Shows that emphasize forensic science and show scientific evidence being processed by a laboratory should have a disclaimer that appears before the beginning of each episode. This
would be similar to the disclaimers that are seen prior to other types of television shows and movies. *Law & Order*, for example, uses the following disclaimer:

“The following story is fictional and does not depict any actual person or event.”

Instead of detailing how what is being shown does not depict any actual person or event, the forensic science crime dramas disclaimer might be worded in this way:

“The scientific experiments, analyses, and timeline of events depicted in this episode do not necessarily reflect the actual scientific protocols, procedures and/or time restrictions required and applied in forensic science.”

Showing this disclaimer prior to an episode being aired might be enough to make a significant difference. By including a disclaimer the viewer is briefly made aware of the inaccuracies that are being presented and might encourage the viewer to question what they are seeing in the episode. Not every viewer will be able to see the entire episode from the very beginning, when the disclaimer appears, some may turn the television on right in the middle of an episode and others may stop on the channel within the last few minutes of the final scene. Hence why it may be necessary to have multiple disclaimers.

It is quite common for drug commercials to have disclaimers that appear at the bottom of the screen during their advertisement. Typically the font size and color do not distract the viewing audience from the commercial itself but what is written can be very informative. However, if a disclaimer of this nature was included in forensic science television shows each time a forensic science test was preformed or when a character is representing a member within forensic science they would appear so readily that it may as well never be taken off the screen. Instead of having a disclaimer frequently appear, it may be worth showing the disclaimer at various segments throughout the episode as a reminder to the
audience that what is being shown is inaccurate.

Another way to inform the crime show drama’s viewing audience of the inaccurate representation of the field of forensic science in television would be to launch a campaign that would raise awareness of the specific problems that result. A campaign titled “No More”, spearheaded by Law & Order actress Mariska Hargitay, has already served a similar function. This campaign focused on raising awareness of sexual assault and domestic violence and challenges bystanders to say “NO MORE excuses, NO MORE silence, NO MORE violence.” This campaign has its own “NO MORE” symbol (See Figure 7.1) and has its own Twitter hash-tag, #sayNOMORE. In addition to Mariska Hargitay, other well known celebrities, talk show hosts, and actors and actresses such as George Stephanopoulos, Katie Couric, Tim Gun, and Amy Poehler have gotten involved with this campaign (See Figure 7.2).35

In the same way that the NO MORE campaign has raised awareness against sexual violence, a campaign could be started to raise awareness of the problems associated with inaccurately representing the field of forensic science in crime dramas on television. Celebrities on these crime dramas, such as CSI: Miami, CSI: Las Vegas, CSI:
New York, and Bones could get involved; a campaign slogan could be created and used as a hash tag on Twitter to get those on social media networks involved and active in this effort as well.

**Forensic Science Television Shows Effects on the Educational System**

One way to avoid giving the wrong impression in the education system would be to provide an accurate description of the career to which a specialized degree in forensic science would lead individuals who are considering going into forensic science should be shown exactly what their career requires and the daily activities for that occupation. Eastern Kentucky University is already doing this. “The Forensic Science Program” webpage states:

“Forensic Science is NOT what you see on the famous CSI television series. If you become a Forensic Scientist you will

- Accept and log in evidence
- Decide how to analyze the evidence you receive
- Perform analyses the evidence using careful techniques and scientific methods
- Write reports detailing the results of your analyses
- Offer testimony in court about some cases.”

By stating clearly the type of responsibilities a forensic scientist has on a day to day basis, the program has informed those who have misperceptions about an occupation in forensic science about what their career really entails. Another link on EKU’s main page is titled “It’s not all CSI.” On this page there are two columns, one titled “CSI”, the other “Real Life Forensic Science.”

<table>
<thead>
<tr>
<th>CSI</th>
<th>Real Life Forensic Scientist</th>
</tr>
</thead>
<tbody>
<tr>
<td>• One person does a little of everything (investigate, interrogate, collect evidence, arrest people, analyze)</td>
<td>• Police officers do crime scene investigation, interrogations, arrests</td>
</tr>
<tr>
<td>• Forensic scientists are IN THE LAB analyzing</td>
<td></td>
</tr>
</tbody>
</table>

31
Two by two table:

<table>
<thead>
<tr>
<th>Evidence</th>
<th>The Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis of evidence is completed in minutes</td>
<td>Analysis may take hours, days, weeks, or months</td>
</tr>
<tr>
<td>Results are always clear and definite</td>
<td>Results need interpretation of a skilled scientist</td>
</tr>
<tr>
<td>No messy paperwork to fill out</td>
<td>LOTS of paperwork and report-writing required</td>
</tr>
<tr>
<td>Forensic scientists respond to all crime scenes</td>
<td>Rarely go to crime scenes</td>
</tr>
<tr>
<td>Cool Hummer vehicles and all the latest equipment is available</td>
<td>Most labs are state-funded, and budgets are often tight</td>
</tr>
<tr>
<td>All alternate lighting is blue</td>
<td>Need good full-spectrum lighting</td>
</tr>
<tr>
<td>Dress in stylish clothing</td>
<td>Conservative, professional dress and appearance required for court session</td>
</tr>
<tr>
<td>Workplace attire appropriate for a laboratory setting</td>
<td></td>
</tr>
<tr>
<td>Characters have degrees in chemistry, biology, or other sciences</td>
<td>Challenging college course work in chemistry, biology, physics and math are needed to get the degree that will let you work in a crime lab</td>
</tr>
</tbody>
</table>

Figure 8: Eastern Kentucky University “It's not all CSI” Chart.

Another way to potentially lessen the “CSI Effect” would be to start at the roots via the educational system. There are many ways that the education system could inform the public in order to better avoid the “CSI Effect”. In forensic science programs, students may get accustomed to being handed a cluster of “suspects” to choose the criminal from and end up going to great lengths to get their evidence to match the suspect to determine who is guilty. By encouraging the students to not only look for the “potentially guilty matches” but also to search for the “potentially innocent” ones the students will learn to refrain from focusing their investigations in only one direction. By doing this students will not get into the habit of always trying to pick out the bad guy.

When practicing their application techniques, it may also benefit forensic science students to work with evidence that is similar to the evidence they will encounter in real cases. By comparing and contrasting the quality of evidence and seeing the real-world decisions that were made based on the implications of the evidence students will be reminded that the work
they carry out is of the utmost importance. On many of the forensic science television dramas one will find that a significant majority of the evidence used in court is used to reveal someone’s guilt and not their innocence. It may therefore, be beneficial to provide students with a group of suspects that are all innocent to compare to the example evidence. By doing this the students will be reminded that not every piece of evidence may have a matching ‘suspect’, this would also be an excellent transition step to emphasize how important it is to present the evidence exactly as it appears and to maintain objectivity in all aspects of work. To further this discussion, it would be beneficial to mention recent cases in which the scientific evidence that was presented was falsified and examine the repercussions of falsifying scientific evidence.\textsuperscript{24} The importance of continually encouraging forensic science students to question what they are given and to avoid matching the evidence to the suspect would play a crucial role in avoiding biased and inaccurate scientific testing in the future. This would also prevent forensic scientists from getting into a habitual routine where they are merely going through the motions of their daily activities. They would be aware of the importance of their work and would know to treat their work with great importance.

It is clear that the multitude of forensic science crime dramas on television today do influence the general public. The effects of these television programs are significant and should not be pushed aside or disregarded. The ways in which the forensic science system is misrepresented has detrimental effects, particularly to our judicial system. It is important for audiences to be aware of the discrepancies between the television shows and the real world.
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