INFLUENCE OF THE *CSI* EFFECT ON EDUCATION AND MASS MEDIA

by

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ABSTRACT

Forensic science television shows, especially *CSI: Crime Scene Investigation*, have been said to influence the public's perception of how forensic science is used and create interest in studying forensic science and pursuing jobs in the field. This study investigates this claim through a variety of methods. First, definitions of the *CSI* effect are discussed, including how it was first used and mentioned in the media. Second, survey data from students in a forensic anthropology course regarding interest in forensic science media and educational and career choices are analyzed. Third, the number and debut dates of forensic science non-fiction books, novels, non-fiction television shows, and television dramas are investigated. Finally, a content analysis of the television show *Bones* is undertaken in order to understand how the forensic anthropology presented in this show differs from the actual practice of forensic anthropology.

Results of this study indicate that, overall, students who wanted to pursue forensic science careers and graduate study did not watch more forensic science television shows and read more forensic science novels than those who did not want to pursue forensic science careers and graduate study. Also, based on the decreased interest in a number of forensic careers, it appears that respondents may have started the course with false perceptions regarding the actual job descriptions of these careers. Regarding the number and debut dates of forensic science media, this study found that the majority of non-fiction forensic anthropology books, non-fiction television shows, television dramas debuted after *CSI* appeared, corroborating the claim that *CSI* led to an increase in interest in forensic

anthropology. In addition, this study found that while much of *Bones* is fictionalized for entertainment purposes, many of the techniques and analyses presented on the show have a peripheral basis in scientific methods.

Dedicated to my parents and John

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CHAPTER 1: INTRODUCTION

The show *CSI: Crime Scene Investigation*, which focuses on the solving of crimes through the use forensic science, debuted on television on October 6, 2000. In the decade since its debut, many researchers have described an effect, termed the *CSI* effect, which has been said to have caused a number of different changes in the behavior of the general public, including how juries judge cases, the popularity of forensic science education and careers, and the popularity of forensic science media (Cole and Dioso-Villa, 2009). Originally, the *CSI* effect was used to refer to the impact watching *CSI* had on the behavior of juries. In the following years, though, it has come to refer to a multitude of different effects, such as increased interest in forensic science educational programs and attraction to forensic science careers (Cole and Dioso-Villa, 2007).

CSI is not the first show that has been said to have had an effect on the behavior of the general public. A number of previous shows, including *Perry Mason* and *The Oprah Winfrey Show*, have been said to influence what jurors expect in a trial (Mann, 2006). In addition, researchers have investigated whether consumption of various media influences crime, attitudes toward the penal system, and the perception of the efficacy of police with mixed results (Coyne, 2007; Dowler, 2007).

While *CSI* has many elements that link it to the police procedurals that have been aired on TV since 1950s, *CSI* was unique at its debut in that it focused on how various disciplines of forensic science were used to solve crimes. However, the portrayal of forensic science on *CSI* is not completely accurate. Many elements are stylized in order to make the

show entertaining at the expense of realistic portrayals of the jobs forensic scientists do and the methods they use (VanLaerhoven and Anderson, 2009). Additionally, the forensic science in the show is portrayed as much more accurate than seen in real life (Toobin, 2007).

Since *CSI*'s debut in 2000 until 2006 there were increasing mentions of the *CSI* effect in the media and many of these mentions referred to the supposed effect that watching *CSI* had on the conviction rates of juries and their interpretation of forensic evidence (Cole and Dioso-Villa, 2009). However, researchers who have analyzed whether or not the viewing of forensic science television shows has an effect on jury behavior have not seen results favorable to a belief in this type of *CSI* effect (Brickell, 2008; Ghoshray, 2007; Kim *et al*., 2009; Podlas, 2006; Shelton, 2006).

In addition to being said to have an effect on juries, the *CSI* effect has also been implicated in increasing the popularity of forensic science media (Houck, 2006). Many forensic science non-fiction books, novels, non-fiction television shows, and dramas have appeared in the past few decades, and a large number of these debuted after the premiere of *CSI*, perhaps showing *CSI*'s influence on the popularity of forensic science. Like *CSI*, much of the forensic science media available portrays a stylized version of actual forensic science meant to entertain rather than educate.

Forensic science education has also been named as one of the areas affected by the *CSI* effect. According to researchers, because of *CSI* and other forensic science media, forensic science has become a popular area of study for both high school and college students, and a number of classes and degree programs have been created by various

schools in order to capitalize on this interest (Bergslien, 2006; Harvey and Derksen, 2009; Smallwood, 2002). However, some researchers have stated that the consumption of forensic science media has caused students to have an unrealistic idea of the job descriptions of forensic science careers and the type of study involved in preparing for these careers (Lovgren, 2004; Smallwood, 2002).

While many researchers have discussed the *CSI* effect in general terms, few have investigated its effect using empirical studies. There has been no study of number and debut dates of forensic science books or television shows in order to understand whether there has been an increase in their number. Also, while other researchers have briefly discussed the fictionalization of the forensic science seen on *CSI*, no researcher has methodologically examined the use of forensic science in a television drama. Furthermore, although there have been examinations conducted on other disciplines, there has been no investigation of the availability of forensic science-related degree programs in the United States in order to understand possible effects of the popularity of *CSI*. Similarly, there has been no attempt to specifically investigate whether students who watch forensic science television shows and read forensic science novels are more likely to want pursue forensic science education and careers.

Research Objectives

In order to fill the void in research on the *CSI* effect mentioned in the previous paragraph, the primary research objective of this thesis is to investigate what the *CSI* effect is and its effect on various aspects of popular culture. First, in Chapter 2, the origins and

different definitions of the *CSI* effect are examined along with how the *CSI* effect is related to previous instances in which the media has been said to affect the public's behavior and perceptions. Also, the forensic realism of *CSI* is investigated along with the effect that *CSI* has been said to have on juries. Chapter 3 examines the number and debut dates of various types of forensic science media in order to determine any correlation with the premiere of *CSI*. Following this, the television show *Bones* is analyzed in order to look at the accuracy of the portrayal of forensic anthropology. In Chapter 4 the number and starting dates of forensic science-related degree programs are explored. In addition, a survey of students enrolled in a forensic anthropology course is analyzed in order to understand the relationship between consumption of forensic science media and interest in forensic science careers and education. Finally, Chapter 5 presents a discussion and conclusion regarding the entire thesis.

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CHAPTER 2: AN ANALYSIS OF THE *CSI* EFFECT AND ITS IMPACT ON THE CRIMINAL JUSTICE SYSTEM

Introduction

CSI: *Crime Scene Investigation* and other television shows with a focus on forensic science have been implicated as influencing the public, especially in the area of jury decisions, through what has been dubbed the *CSI* effect. But is this a new phenomenon? The *CSI* effect may only be the latest aspect of the broad influence of the media (including news reports and fiction and non-fiction television shows) on public perceptions and actions. In addition, there are various facets of the *CSI* effect that apply to different perceived impacts it has had. Furthermore, there is the question of whether or not the *CSI* effect is a real occurrence or just an imagined phenomenon, especially in the case of influence on juries.

This chapter will examine research on the media impact on public perceptions and crime in general, pre-*CSI* shows that have been said to have an effect on the public, what the *CSI* effect is, and *CSI*'s effect on the criminal justice system. First, this chapter will include a discussion on how the media has been examined by researchers as an influence on the general public long before *CSI*. Second, a description of the television show *CSI* will be provided along with a discussion of how the *CSI* effect has been used to describe a number of different effects pertaining to the criminal justice system, education, and other things. Also, the use of forensic science on *CSI* and how it differs from real life applications will be discussed. Finally, research related to the impact of the *CSI* effect on the criminal justice system will be analyzed.

Media Impact on Crime, Public Perception of Crime, and the Criminal Justice System

A number of researchers have examined whether media portrayals and discussions of crime and violence have had an impact on public perception of crime and violence as well as the propensity to commit crimes. Dowler (2003) investigated whether the consumption of media had an effect on individuals' attitudes regarding crime, punishment, and police effectiveness. He found that media consumption had a strong positive relationship to fear of crime, stating that "...regular viewers of crime drama are more likely to fear crime, [and] television portrayal of crime and justice is largely sensational, violent and fear producing" (Dowler, 2003:117). However, Dowler (2003) found that media consumption was not a good indicator of punitive attitudes or perceived police effectiveness. Dowler (2003) also speculates that the public forms the majority of its perceptions of crime via the viewing of media sources while noting that their results are weak and there are limitations to his study.

Several other authors have also researched how the media has affected public perception of various types of crime and violence. Pollak *et al*. (2007) examined reports of crimes in both newspapers and local television news shows and found stories involving juveniles were disproportionately portrayed in the news. They state that the crime portrayed as happening by the media is often in conflict with the levels and types of crime actually occurring (Pollak *et al*., 2007).

Looking at a different kind of crime, Spitzberg and Cadiz (2002) found a large number of discrepancies between media portrayals of stalking and actual cases of stalking, leading the authors to state that the media warp the public's perception of violence.

Killingbeck (2001) also found that the media distorted actual reports of violence, with the violence in this case being school shootings. She states that the presentation of school shootings in the media has created a "moral panic" and that media representations have led to an increase in the amount of fear of school shootings and other things such as ill-advised public policies and the growth of an entire industry based around school violence (Killingbeck, 2001). Based on these studies of public perception, it is clear that the media may have some influence on the thoughts and behavior of the public although it is unclear how much.

Origin of the *CSI* Effect

When discussing the effect of television and other media on the criminal justice system during the past decade, the effect is generally attributed to the television show *CSI: Crime Scene Investigation* and other programs such as *CSI*'s spinoffs and *Crossing Jordan*, and it is implied that this is a new type of influence due to the focus on forensic science in these shows (Bochenek, 2008). However, in the past other media have been said to have an effect on the public and the criminal justice system as well. Forensic science has been a part of literature since the time of Edgar Allan Poe and Sir Arthur Conan Doyle, and, according to Max Houck (2006), Doyle "...presaged many actual techniques for linking physical evidence to the perpetrator of the crime" (84). Beginning in the 1940s crime dramas began appearing on television and created conflict over whether their airing caused an increase in juvenile delinquency, leading to Senate hearings on the subject and promises from the networks to only air crime dramas after a certain time (Bochenek, 2008).

In 1957 the television series *Perry Mason* debuted. This series focused on the character of Perry Mason, who was a defense attorney known for intimidating the prosecution's witnesses into a confession or recantation (Bochenek, 2008). Because of the popularity of this show, the "*Perry Mason* Syndrome" and the "*Perry Mason* Effect" entered the criminal justice lexicon to refer to the jury's expectation that the defense attorney would "...coerce an admission from the prosecution's star witness upon cross-examination" (Mann, 2006:158). The "*Perry Mason* Effect" is also used by Jeffrey Frederick, Director of Jury Research Services at the National Legal Research Group, to refer to a propensity by jurors to "...expect someone to jump up in the back of the courtroom and suddenly confess" (Bochenek, 2008:32).

Various other shows primarily dealing with the criminal justice system (that is, involving police officers, attorneys, trials, and/or judges who attempt to solve crimes) appeared on television in the years between *Perry Mason* and *CSI*. In the 1950s, other series debuted such as *Dragnet*, *Highway Patrol*, *Manhunt*, and *Naked City*. In the 1960s came *Adam-12*, *Car 54, Where are you?*, and *Hawaii Five-O*, and in the 1970s several shows about law enforcement appeared, including *Barnaby Jones, Barney Miller*, *Baretta*, and *Rockford Files*. In addition, the show *Quincy, M.E.* premiered in 1976, which showed the pathologist main character finding fingerprint evidence in nearly every episode and using it to nab criminals. According to Harvey and Derksen (2009), this resulted in an increase in jury demands for fingerprint evidence in criminal trials.

In the 1980s and 1990s numerous other shows focusing on the criminal justice system debuted on television, such as *Magnum P.I.*, *Murder, She Wrote*, *Miami Vice*,

Moonlighting, *Cagney & Lacey*, *L.A. Law*, *NYPD Blue*, *The Practice*, and *Law & Order*. In addition, reality shows involving judges, such as *Judge Judy* and *Court TV*, became popular, leading juries to expect real-life judges to provide the interjections and moralizing of their TV counterparts and even complain if they did not (Harvey and Derksen, 2009). Television viewers were also introduced to shows urging them to participate in the catching of criminals, such as *America's Most Wanted*. In addition to scripted or reality television shows, actual criminal hearings and trials, such as Watergate, the Anita Hill investigation, and O.J. Simpson's arrest and trial, were also shown on television and given round-the-clock media coverage. Television shows not dealing primarily with criminal justice were also said to have an effect on jurors' perceptions in criminal cases. For example, the term "Oprahization" was created to refer to "when jurors failed to hold a defendant responsible for their crime because of their own victimization, such as abuse as a child" (Mann, 2006:158). These examples show that *CSI* was not the first show to have been said to influence public perceptions of the criminal justice system; media before *CSI*, such as Sherlock Holmes, have included aspects of forensic science.

CSI: Crime Scene Investigation

The television show *CSI: Crime Scene Investigation* debuted in 2000 on CBS and focuses on how a group of criminalists working for the Las Vegas police department solve crimes (typically one per episode) through the use of forensic science. Since its debut in 2000 *CSI* has consistently been one of the most popular shows on network television, ranking in the top 10 for number of viewers for non-reality shows each year it has been on

air (see Table 1). While *CSI* focuses more on the forensic science part of crime investigation than earlier programs, Cole and Dioso-Villa (2007) note that, "*CSI* is at bottom a police procedural, a genre that has been a staple of television programming for many decades now. The heavy use of crime and law in developing plotlines is certainly not novel to television; indeed, it is undoubtedly as old as theater itself" (437). In other words, *CSI* has the same basic building blocks as the crime dramas that came before it; the only difference between the two is the focus on forensic science.

Table 1. Rank (among non-reality shows) and number of viewers for *CSI* since its debut.

Season	**TV season**	**Rank**	**Viewers (in millions)**
1	2000-2001	#5	17.80
2	2001-2002	#1	23.69
3	2002-2003	#1	26.20
4	2003-2004	#1	25.27
5	2004-2005	#1	26.26
6	2005-2006	#1	24.86
7	2006-2007	#1	20.00
8	2007-2008	#3	19.53
9	2008-2009	#1	19.03
10	2009-2010	#4	15.96 (to date)

Sources: WNDU-TV (2001); IMDb (2002); Ryan (2003); ABC Television Network (2004;2005;2006;2008;2009); The Hollywood Reporter (2007); Zap2it (2010)

According to Cole and Dioso-Villa (2007) before *CSI* debuted, the general rule in the entertainment industry was that forensic science was not interesting enough to be the basis for a program. In order to circumvent this thinking, the creators of *CSI* "...adopted a number of tactics to make science sexy," including using attractive actors to portray the criminologists and creating an attractive, open forensic lab that was bathed in light (Cole

and Dioso-Villa, 2007:438). In addition, they tweaked the collection and analysis of forensic evidence in order to make it more entertaining and less tedious for the viewer.

However, while forensic science was portrayed as entertaining and fun by *CSI*, the show was still designed to display enough scientific realism for viewers to feel like the show was realistic (Deutsch and Cavender, 2008). Deutsch and Cavender (2008) discuss how *CSI* creates a "strategic web of forensic facticity" in order to make the show realistic and look like it is using valid scientific techniques in addition to providing entertainment (34). In order to do this, the characters on the show were first portrayed as looking the part of scientists. In addition, the lab portrayed on *CSI* was outfitted with all of the necessary equipment, including high-tech and expensive equipment. Scientific jargon was also used to further emphasize the forensic knowledge used on the show, and a technical consultant was used to instruct the actors on pronunciation and use of the equipment on the set (Deutsch and Cavender, 2008).

CSI's portrayal of forensic science

The differences between *CSI*'s portrayal of forensic science and the actual use of forensic science in real-life crime solving are fourfold. First, real-life forensic science suffers from a lack of adequate funding and time. According to Cooley (2007) there has been a severe funding crisis in forensic science for three decades, which affects the discipline in a variety of ways. Inadequate funding leads to an inability to provide competitive salaries to those in the forensic science discipline, leading to a high turnover rate and a decrease in the number of students seeking forensic science careers, which ultimately leads to a backlog of

evidence that needs to processed. Also contributing to a backlog of evidence, law enforcement is also collecting more and more evidence that needs to be analyzed while the number of forensic scientists working at laboratories has not increased to meet this demand (Houck, 2006; Roane, 2005). A lack of funding also leads to an inability to modernize crime labs through the purchase of new equipment (Cooley, 2007).

The second difference between *CSI*'s portrayal of forensic science and real life is that in *CSI*, forensic science is portrayed as infallible and without error while this is not the case in real life. In *CSI* forensic scientists are portrayed as "super sleuths whose scientific wizardry encompass every area of forensic science" (Cooley, 2007:476). Cooley (2007) argues that while criminalists would like forensic science to be viewed as absolutist and free of doubt science has always been filled with uncertainty and this uncertainty is necessary in order to maintain an objective approach to the analysis of evidence. Several other researchers also note the perceived infallibility of scientific evidence as an important aspect of the *CSI* effect (Podlas, 2006; Roane, 2005).

In addition, both Roane (2005) and Cooley (2007) describe how the analysis of forensic evidence can be affected by mistakes, intentional or not, made by investigators. There have been a number of highly publicized cases in which innocent people were wrongly convicted due to errors in fingerprint, bite mark, or DNA identification, including Stephen Cowan (convicted due to the misidentification of a fingerprint), Ray Krone (mistakenly identified as the source of a bite mark on a homicide victim), and Josiah Sutton (whose DNA was wrongly estimated to be present at a crime scene) (Cooley, 2007).

In addition to these three cases of misidentification, cases of DNA errors in criminal cases have been found in at least 10 states (Cooley, 2007). According to Judge Nancy Gertner, "...forensic testing errors were responsible for wrongful convictions in sixty-three percent of eighty-six DNA Exoneration cases reported by the Innocence Project at Cardozo Law School" (Cooley, 2007:481). For example, a Philadelphia lab inadvertently switched the DNA samples from a rape victim and a suspect in the rape in 1999, leading to the lab to issue a report stating that the victim was guilty of rape (Roane, 2005).

Cooley (2007) and Roane (2005) also discuss why miscalculations and misidentifications occur in forensic science. According to Roane (2005), many forensic labs were not accredited in 2005. However, in 2006 labs were required to be accredited in order to obtain federal funding. Although, Roane (2005), points out that certification and accreditation have not prevented other labs and forensic scientists from making mistakes:

> According to 2004 proficiency results [which accredited labs use to judge their proficiency] from one private testing service reviewed by U.S. News, a few labs failed to properly match samples on simple DNA tests, mysteriously came to the right result after making the wrong interpretation of the data, or accidentally transposed the information from one sample to another (Roane, 2005: 52).

Also, according to Cooley (2007), many people employed in the forensic sciences possess "inadequate training and education" (481). For example, many forensic science workers are not actual scientists but rather "specialized technicians" trained to conduct specific repetitive tasks. Most of these individuals possess only an undergraduate degree, and many do not have an undergraduate degree at all. Thus, these individuals lack the "five

to six years developing, implementing, and interpreting experimental data" that the typical scientist would receive "in graduate school in order to hone their critical and analytical thinking skills" (Cooley, 2007:482).

According to Cooley (2007), not only do many crime scene investigators lack graduate or undergraduate degrees in the field, those that do often do not have adequate training in the scientific method. A number of both graduate and undergraduate programs allow students to graduate with a forensic science degree without having any laboratory work or hard science classes at all. Because of this, many forensic science job positions are labeled "technician" rather than "scientist." Cooley (2007) believes that this is a detriment to the field:

> Unlike scientists, who are trained to think outside the box when confronted with a unique problem, technicians have limited problem solving skills because their primary task(s) merely involve(s) adhering to a prearranged routine to administer a certain technique or instrument. The technician "knows how, but not why." (483)

In addition to lack of training, Cooley (2007) also states that the observer effect, in which forensic science workers are biased toward a conclusion due to knowing the background of a piece of evidence, has played a part in causing misidentifications. In discussing the reasons for errors in forensic analysis, Cooley (2007) concludes that forensic science television shows do not address the fact that errors occur. Instead, they portray forensic examiners as computers limited only by the condition or presence of forensic evidence, and this portrayal can cause forensic examiners to have to live up to impossible expectations.

Miscalculations and misidentifications are not the only problems with forensic science not portrayed in forensic science crime dramas. Forensic fraud is also a real problem not mentioned in fictional portrayals. According to Cooley (2007), fraud has been involved in thirty-one percent of overturned convictions, and instances of fraud have been identified in at least four different major crime labs, including the FBI crime lab. Cooley (2007) attributes these incidents of fraud to several different reasons. Forensic examiners are under pressure both from a need to keep the large backlogs at many crime labs from increasing and from law enforcement agencies and prosecutors. In addition, the certainty of forensic evidence presented in crime dramas may cause prosecutors to demand irrefutable evidence from forensic examiners and also for forensic examiners to exaggerate their results of their own volition.

Roane (2005) also discusses instances of forensic fraud, noting that forensic professionals all across the country have been caught with fake credentials and/or been found to have lied in court or created bogus evidence. For example, Fred Zain, once a star forensic scientist in West Virginia, was found to have potentially fabricated results in over 100 cases. Also, in another highly publicized case, Sandra Anderson, a cadaver dog trainer, was found to have planted evidence for her dog to discover in several criminal cases. She was subsequently convicted of obstruction of justice and making false statements and sentenced to a 21-month jail term.

Also, the forensic evidence itself may not be as straightforward as it is portrayed on *CSI*. According to Toobin (2007) there is actually a great deal of disagreement on the accuracy of hair and fiber analysis, unlike the clear consensus in its scientific validity as

portrayed in forensic science crime dramas. In a recent study it was shown that more than ten percent of associations between hair samples taken from crime scenes and known samples from suspects were found not to be valid based on mitochondrial DNA evidence. As described by Toobin (2007), one hair analyst compares his work to that of an art expert who has to determine whether paintings are fakes or the work of a master. Other forensic scientists question this analogy, however, pointing out that there are real errors occurring that are resulting in convictions and jail time. There are also cases of hair and fiber analysts in at least three states providing fraudulent results to juries either due to incompetence or malice, and many of these incidents are only uncovered years later by groups such as the Innocence Project after the individuals are convicted and incarcerated.

CSI also differs from real life forensic investigations in the amount of forensic evidence found at crime scenes and available for analysis. According to Houck (2006), around 40% of the forensic science techniques shown on *CSI* do not exist, and in regard to the use of techniques that do exist, Cooley (2007) points out that actual crime scenes contain far less DNA evidence than do the fictional crime scenes in forensic science crime dramas. In the majority of criminal cases, DNA plays a negligible role. In addition, many murder cases involve an additional felony that the suspect is linked to, lessening the need for DNA evidence. In addition to portraying a false view of how DNA is used in criminal cases, forensic science crime dramas also portray techniques such as fingerprinting, impression evidence, and toolmarks as "legitimate 'sciences' that firmly supported by identifiable scientific principles and copious research" (Cooley, 2007:496). According to

Cooley (2007), these techniques are based on the idea of individuality, which is based on premises that have not been scientifically tested.

In addition to the differences described above, *CSI* also differs from real life in its portrayal of forensic scientists as being involved in every aspect of a criminal investigation. According to Nolan (2007),

> In *CSI* it is the civilian investigator who is the dominant and driving force in the criminal investigation. The police officers are depicted as bumbling, clueless functionaries who are barely tolerated by the dedicated, conscientious, and ultimately moral "scientists" who search for the truth amid the chaotic and gruesome remnants of the violent acts of those soon to be caught (all in under 45 minutes). (577)

The police are ordered around by the crime scene investigators and assigned menial tasks that require little critical thinking. In addition, the crime scene investigators are portrayed as interrogating suspects and determining when they can go. This portrayal results in a belief by the audience that the police are subservient to forensic scientists and a lack of knowledge on how crime scene investigation actually operates, with the police in charge of crime scenes and the forensic scientists chiefly relegated to work in labs.

VanLaerhoven and Anderson (2009) describe the differences between the forensic science seen in *CSI* and the techniques used in real life in eight different areas within the discipline (forensic identification, forensic chemistry, forensic biology, forensic toxicology, questioned documents, ballistics and tool marks, forensic pathology, and forensic entomology). See Table 2 for a summary of the differences. Concerning forensic

identification, the authors note that real life crime scene investigators are typically police officers whose primary job is to collect evidence at the scene; they do not interview or interrogate suspects or analyze collected evidence. In addition, investigators would typically wear head to toe suits at crime scenes in order to prevent contamination of evidence, unlike their television counterparts dressed in designer clothing.

Table 2. Summary of the differences between *CSI* and real life as noted by VanLaerhoven and Anderson (2009).

Subdiscipline	**Use in *CSI***	**Use in real life**
Forensic identification	Scientists who collect and analyze evidence and interview suspects	Police officers whose primary job is to collect evidence
Forensic chemistry	Exaggerated usefulness and accuracy of techniques	Many of the same techniques as CSI, but less accurate
Forensic biology	DNA is collected from everything at every crime scene	Analysis takes much more time and is used less often
Forensic toxicology	Able to identify substances with a single test	Can take a number of tests to narrow down to substance
Questioned documents	Can attribute personality traits to someone based on writing style	Deriving personality traits is not a part of QD analysis at all
Ballistics and tool marks	Able to determine if a toolmark came from a specific tool	The same except that it takes much more time
Forensic pathology	Forensic pathologist doesn't need specialists and CSI often doesn't need forensic pathologist	Forensic pathologist needs specialists and CSIs do not determine trauma or biological characteristics of victim
Forensic entomology	Theoretical techniques and time since death estimates from cursory visual examination of insects	Larvae must be reared into adulthood and dissected and temperature must be known before determination can be made

The forensic chemistry portrayed on *CSI* also differs from its real life counterpart according to VanLaerhoven and Anderson (2009). VanLaerhoven and Anderson (2009)

state that while many of the techniques shown on *CSI* are used in real life forensic labs, the accuracy and usefulness of some techniques is exaggerated for television. For instance, tests for gunshot residue are shown to definitively show who the shooter of a weapon is. However, a person can test positive for gunshot residue if they were merely in the vicinity of a gun being fired, and preliminary tests for the presence of gunshot residue only check to see if nitrates are present, meaning that the presence of things such as urine or tobacco could produce a positive in a gunshot residue test. Also, VanLaerhoven and Anderson (2009) note that the forensic biology portrayed on *CSI* consists chiefly of DNA evidence, which is shown to be collected and tested in far more instances than in real life. In yet another difference between *CSI* and real life, forensic toxicology is shown to identify specific substances in human body fluids quickly and with a single test, unlike in real life where it may take a number of tests to narrow down to a specific substance.

Regarding questioned documents, VanLaerhoven and Anderson (2009) note that *CSI* often confuses questioned document analysis (which involves analysis of ink, writing surface, and writing styles) with graphology (which is the unscientific derivation of personality traits from writing styles). Unlike the other types of forensic examination, the authors have little complaint about how ballistic and tool mark analyses are portrayed on *CSI*. The authors state that on both *CSI* and in real life the minute striations that a tool leaves on what it was used on or a firearm leaves on a bullet are analyzed to determine the specific tool or firearm used in a crime. However, VanLaerhoven and Anderson (2009) do note that this is a very time consuming task, something that is not conveyed on *CSI*.

With forensic pathology, VanLaerhoven and Anderson (2009) state that in *CSI*, the forensic pathologist is able to determine things that a real life forensic pathologist would need to call in a specialist for. In addition, the authors describe how the CSIs on *CSI* often determine a biological profile or trauma on a body or skeleton when in real life only a forensic pathologist or anthropologist would do this. Another type of forensic specialty used in the show is forensic entomology. With forensic entomology, CSIs on the show are shown using techniques that are only theoretical and also making determinations about time since death from cursory visual examination of insects found at a crime scene, which greatly differs from real life forensic entomology in which temperature at scene must be known and larvae must be reared to adulthood and dissected before time since death can be estimated.

While VanLaerhoven and Anderson (2009) show that *CSI* exaggerates the accuracy or greatly compresses the time needed for many forensic techniques as well as confusing the roles of CSIs and other forensic professionals, they point out that many television shows make equally large fictional leaps regarding the subject matter that they deal with. Rather, the authors are most concerned with the knowledge of the television viewing audience and whether the audience understands what is fictional about the portrayal of crime scene investigation.

What is the CSI effect?

According to Cole and Dioso-Villa (2007), "the *CSI* effect refers to the idea that this shift in the content of typical Americans' police procedural viewing fare [to an emphasis on

circumstantial evidence and laboratory analysis] might affect jury decision making" (441), agreeing with a number of other researchers who have used this definition when discussing the *CSI* effect (Brickell, 2008; Catalani, 2006; Tyler, 2006). Jurors have an expectation that the cases they participate in will be similar to those they have seen on television, focusing on forensic evidence to solve the crime. Cole and Dioso-Villa (2007) believe that the idea of the *CSI* effect was likely created by prosecutors, who viewed it as potentially having a "beneficial effect on prosecutions by facilitating jurors' uptake of forensic evidence" (442).

At the time that *CSI* began broadcasting the general assumption in the legal community was that shows that portrayed prosecutors and police officers positively, such as *CSI* and *Law & Order*, would enhance their image in the public's mind and that the same would go for shows that portrayed defense attorneys positively, such as *The Practice* and *Perry Mason* (Cole and Dioso-Villa, 2007). However, shortly after *CSI* premiered on television, many prosecutors had different opinions. They felt that *CSI* was actually detrimental to what they tried to do in court, making the jurors want the case to be proven by definitive forensic evidence. As Cole and Dioso-Villa (2007) state, "in other words, the hypothesized *CSI* effect was a counterintuitive effect in which a show favorably depicting the police harmed the prosecution. Thereafter, this trope dominated the media treatment of the *CSI* effect" (443).

In order to examine the how the media has treated the *CSI* effect, Cole and Dioso-Villa (2007; 2009) examined the number and type of mentions the *CSI* effect has received in the media. The term first appeared in 2002 on both the CBS *Early Show* and an article in

Time magazine. The number of mentions increased in both 2003 and 2004, and the authors state that "by 2005, there was a veritable explosion in such stories" (Cole and Dioso-Villa, 2007:444). Cole and Dioso-Villa (2007) note that they were able to find 416 different news items containing a mention of the *CSI* effect and that these articles are primarily from local news agencies. The authors attribute this to the idea that the *CSI* effect "lends itself well to what journalists call 'localization,' in which a story from a neighboring media outlet is essentially duplicated using the duplicator's local cast of characters" (Cole and Dioso-Villa, 2007;444). They note that almost all areas of the country have forensic scientists, lawyers, or judges they can turn to for sound bites about the *CSI* effect.

Cole and Dioso-Villa (2009) looked more in depth at how the number of mentions of the *CSI* effect varied in different years (see Table 3). Coverage of the *CSI* effect increased at a rapid pace until 2007, when mentions decreased for the first time in at least five years. Mentions decreased again in 2008. In addition to examining the number of mentions of the *CSI* effect, Cole and Dioso-Villa (2009) also noted that almost all media coverage stated the *CSI* effect as fact and described it as being a detriment to the job of prosecutors.

Table 3. Media mentions of CSI effect according to Cole and Dioso-Villa (2009).

Year	**Mentions**
2002	2
2003	2
2004	12
2005	56
2006	78
2007	65
2008	43

Harvey and Derksen (2009) also examined media mentions of the *CSI* effect, focusing on 2002 to 2005. They found that there an increase in the number of mentions of the *CSI* effect in media content each year through 2005 (see Table 4). Interestingly, the number of media mentions counted differs between Harvey and Derksen (2009) and Cole and Dioso-Villa (2009) for 2003-2005. This is likely due to the different methods used to search for mentions, with Harvey and Derksen (2009) using Google and Cole and Dioso-Villa (2009) using LexisNexis. In an analysis of the themes present in media mentions of the *CSI* effect, Harvey and Derksen (2009) found that the most common theme was that of unrealistic jury expectations, and within this theme, negative impacts were reported more often than positive impacts. They also observed that prosecutors were the group second most commonly reported as being affected by the *CSI* effect after juries, with negative impacts being more commonly reported for them as well. In addition, Harvey and Derksen (2009) report that the *CSI* effect is also frequently mentioned as causing enrollment at forensic science programs to increase. However, the authors note that many of these articles cite the same professor at a single university.

Table 4. Media mentions of *CSI* effect according to Harvey and Derksen (2009).

Year	**Mentions**
2002	2
2003	9
2004	13
2005	46

Different definitions of CSI effect

While they state that originally the *CSI* effect referred to the influence of *CSI* and other forensic science television shows on jurors, according to Cole and Dioso-Villa (2007), the media and researchers now use the term *CSI* effect to refer to several different phenomena. They propose the division of the *CSI* effect into eight different effects (see Table 5): the strong prosecutor's effect, weak prosecutor's effect, defendant's effect, producer's effect, educator's effect, police chief's effect, tech effect, and victim's effect. The authors refer to the strong prosecutor's effect as the "purest version" of the *CSI* effect, and define it as saying "that actual jurors in actual cases are 'wrongly acquitting' defendants whom they would have convicted had the television show *CSI* never existed" (Cole and Dioso-Villa, 2007:447). This is the effect that the media has focused on the most, and Cole and Dioso-Villa (2007) state that "prosecutors often provide anecdotes of jurors acquitting defendants because of a lack of forensic evidence cases that they believed had sufficient non-forensic evidence for a conviction" (447).

Cole and Dioso-Villa (2007) provide five different examples of the strong prosecutor's effect. The first comes from a case in Kansas City. In this case a jury acquitted a man from a charge of breaking and entering due to the lack of fingerprints from a wallet that had been left in the rain. In the second example, prosecutors in Prince George County, Maryland, believe that a man was acquitted of murdering his girlfriend because forensic testing had not been done on a hamburger left at the scene. The third example of the strong prosecutor's effect that the authors provide is the trial of Robert Blake for the murder of his wife. The prosecuting attorney in this case believed that the jury acquitted Blake due to the

CSI effect, giving the example of the lack of gunshot residue on Blake making the jury think they could not link the gun to him. In the fourth example a lack of fingerprint evidence is blamed for the acquittal of Richard Scrushy on charges of securities fraud, and for the fifth example, the authors state that the *CSI* effect has been blamed for the acquittal of Michael Jackson on child molestation charges.

Table 5. Types of *CSI* effects described in the media. Taken from Cole and Dioso-Villa (2009).

Effect name	**Effect on**	**Description**
Strong prosecutor's effect	Jurors	Acquit in cases in which they would have convicted had *CSI* never existed
Weak prosecutor's effect	Prosecutors	Compensate for absence/weakness of forensic evidence
Defendant's effect	Jurors	Afford greater credibility to forensic expert witnesses
Producer's effect	Jurors	Know more science
Educator's effect	Students	Attraction to careers in forensic science
Police chief's effect	Criminals	Adopt countermeasures to prevent detection through forensic evidence
Tech effect	Jurors	Hold higher expectation for forensic evidence because of actual developments in forensic technology
Victim's effect	Crime victims	Expect forensic testing for all crimes

The second type of *CSI* effect Cole and Dioso-Villa (2007) describe is the weak prosecutor's effect, which they describe as, "...an effect on prosecutor, rather than juror, behavior" (448). They note that in the media the strong and weak prosecutor's effects are often mentioned together, and this effect involves actions prosecutors take in response to the influence of *CSI* on juries. Cole and Dioso-Villa (2007) describe these actions as "remedial measures" and include such things as "questioning jurors about the show during voir dire, explaining the absence of forensic evidence in opening and closing arguments,

and calling on experts to explain why evidence was not found or why results may have been found inconclusive" (448).

In the weak prosecutor's effect, forensic science shows do not result in more acquittals. Rather, they simply require prosecutors to change how they present cases to the jury in an attempt to counteract the perceived effects of forensic science television shows. The strong and weak prosecutor's effects are also some of the most commonly provided definitions of the *CSI* effect by others researchers (Brickell, 2008; Catalani, 2006; Deutsch and Cavender, 2008; Difonzo and Stern, 2007; Ghoshray, 2007; Houck, 2006; Hughes and Magers, 2007; Kim *et al*., 2009; Shelton *et al.*, 2006; Tyler, 2006). However, other researchers do not use the specific terms Cole and Dioso-Villa (2007) use, instead portraying it as a single effect regardless of whether it actually has an impact on conviction rates.

The third type of *CSI* effect is the defendant's effect. According to Cole and Dioso-Villa (2007), defense attorneys are interviewed about the *CSI* effect in the media much less often than prosecutors. However, when interviewed, they typically state that *CSI* has had the effect of making a conviction more likely due to the trust the show generates in forensic scientists and forensic evidence. This effect is described as being the opposite of the strong prosecutor's effect, in which it is believed that the *CSI* effect leads to a decrease in convictions. Cole and Dioso-Villa (2007) state that the defendant's effect is mentioned much less than either the strong or weak prosecutor's effect. However, it is mentioned by a number of different researchers, and is the second most commonly used definition of the *CSI* effect behind the prosecutor's effect, and it is often mentioned in tandem with the

prosecutor's effect (Brickell, 2008; Difonzo and Stern, 2007; Hughes and Magers, 2007). Other researchers, rather than referring to prosecutors or defense attorneys in particular being affected, instead describe a general effect on how juries view forensic evidence (Mann, 2006; Nolan, 2007; Podlas, 2006).

The producer's effect is the fourth type of *CSI* effect mentioned by Cole and Dioso-Villa (2007). This effect refers to the belief that because of forensic science television shows, "...there is greater public awareness about forensic science and jurors are better at assessing testimony of expert witnesses and evaluating evidence" (Cole and Dioso-Villa, 2007;451). This effect is viewed as beneficial. Ghoshray (2007) also mentions this effect as being a beneficial result of the *CSI* effect. The fifth type of *CSI* effect the authors mention, the educator's effect, can be both positive and negative. This effect is concerned with the interest that forensic science television shows have generated among students in forensic science programs at universities. According to Cole and Dioso-Villa (2007), more and more students are enrolling in these programs and professors in related disciplines are receiving numerous inquiries from students on how to obtain careers in forensic science. However, there is also a negative aspect of this effect in which students are dropping out of forensic science programs because they are "disappointed by the degree of science involved and the tedious and unglamorous nature of the profession compared to its television depiction" (Cole and Dioso-Villa, 2007:451). This educator's effect has also been reported in the media (Bergslien, 2006; Cavanagh, 2009; Sappenfield, 2003).

The final three different types of *CSI* effects, the police chief's effect, tech effect, and victim's effect, are only briefly mentioned by Cole and Dioso-Villa (2007). According to the

police chief's effect, *CSI* and other similar television shows have caused a change in the behavior of criminals based on information gained from forensic science shows on how to avoid detection. The authors state that, "...criminalists report more sophistication on the part of criminals in avoiding detection with the greater use of bleach to clean up blood, the use of plastic gloves, not licking envelopes, and the removal of cigarette butts at crime scenes" (Cole and Dioso-Villa, 2007:452). The next effect is called the tech effect and refers to the belief that juries will hold a higher expectation of the level of forensic evidence presented at trials due to the various forensic techniques portrayed on forensic science television shows. Other researchers have also mentioned this affect but group it with the prosecutor's or defendant's effect (Brickell, 2008; Houck, 2006; Hughes and Magers, 2007). The final effect, the victim's effect, is based on the belief that victims and their families will demand and expect more forensic testing of evidence in their cases based on the testing done on forensic science programs.

Harvey and Derksen (2009) also refer to different "major themes" related to how the *CSI* effect is mentioned in the media, similar to how Cole and Dioso-Villa (2007) divide the *CSI* effect into different types. However, unlike Cole and Dioso-Villa (2007), they do not specifically differentiate each type of effect, instead referring to themed groups of subjects that are often mentioned in the media. For example, they discuss changes to juror expectations, both positive and negative and including things such as a change in conviction rates and knowledge of forensic evidence, as one theme. Cole and Dioso-Villa (2007), on the other hand, divided the *CSI* effect's impact on jurors into four different types. Like Cole and Dioso-Villa (2007), Harvey and Derksen (2009) do mention the impact of the

CSI effect on the defense and students. However, unlike Cole and Dioso-Villa (2007), they do not mention any effect on criminals or crime victims.

Influence of *CSI* on the Criminal Justice System

Various researchers have studied whether *CSI* and other forensic science programs have had a tangible effect on the criminal justice system and jury conviction rates in particular. Podlas (2006) examined whether the expectations generated by the forensic techniques shown on *CSI* would result in a not guilty verdict due to the jury's belief that these techniques were necessary for conviction. The author provided 306 undergraduate and graduate students with surveys in which they were asked whether they watched *CSI* and to evaluate whether a defendant was guilty in a case of "he said/she said" alleged rape. The author designed the hypothetical case so that the only correct answer would be a vote of not guilty in order to study the reasons why the participants voted not guilty (especially reasons related to a lack of forensic evidence) and to correlate these with viewing of *CSI*. Podlas (2006) found that frequent viewers of *CSI* were no more likely than non-frequent viewers to give a lack of forensic evidence as a reason for declaring the defendant not guilty, and states that this provides evidence that the *CSI* effect reported in the media does not exist.

Shelton *et al*. (2006) also investigated whether forensic science television programs have had an effect on jurors. They surveyed individuals called for jury duty in the county around Ann Arbor, Michigan and asked them various questions about whether they watched forensic science shows, whether they were likely to find a defendant guilty

depending on the presence of specific types of evidence, and what types of evidence the individuals expected to be shown to them in a criminal case. Shelton *et al*. (2006) found that individuals who watched forensic science shows had a higher expectation for forensic evidence to be present than individuals who did not watch those shows did. In addition, *CSI* viewers also appeared to understand what type of evidence would be most important in different types of cases, demonstrated by *CSI* viewers having a very high expectation of being shown fingerprint evidence in a breaking and entering case and ballistic evidence in crimes involving guns. However the author did not find that *CSI* viewers felt they had to be shown forensic evidence in order to produce a guilty verdict. Rather, they showed similar conviction rates to non-*CSI* viewers in hypothetical cases not involving forensic evidence.

Other researchers have also failed to find evidence that the *CSI* effect has had an impact on jury conviction rates. Brickell (2008) observed that the *CSI* effect was believed by prosecutors to exist, but there was no evidence of noticeable change in jury habits. Ghoshray (2007) argues that while the *CSI* effect has not had an impact on conviction rates, it has had a positive impact on juries' ability to understand and analyze circumstantial and forensic evidence. Kim *et al*. (2009) analyzed survey data from jurors and found that watching *CSI* and other forensic dramas had no effect on verdicts. However, they did find that it raised expectations about the level of forensic evidence presented. Shelton *et al*. (2006) also found that watching *CSI* increased jurors' expectations of the amount of forensic evidence presented at trial.

Both Harvey and Derksen (2009) and Hughes and Magers (2007) conducted surveys of individuals employed in criminal justice professions in order to understand their

perceptions of the *CSI* effect. Hughes and Magers (2007) surveyed judges and found that the majority felt that the *CSI* effect had a negative impact on courtroom proceedings and caused changes in both attorney and jury behavior. However, they did not indicate that they felt it had a significant impact on conviction rates. Harvey and Derksen (2009) surveyed "...criminal justice experts and real-life crime scene investigators how had been identified in media reports" (9). The authors found a difference in the perceptions of attorneys and crime scene investigators. Generally, the attorneys surveyed felt that the *CSI* effect had an impact on how juries interpreted forensic evidence and how jury members were selected. Crime scene investigators, however, viewed the *CSI* effect as having an impact on the expectations of juries in regard to the amount and depth of forensic evidence.

Discussion and Conclusions

The *CSI* effect is not the first instance of media being said to have an impact on the public. In the past, research has been conducted on the effect of violence in the media on public perception and behavior and differences between actual crime rates and crime as depicted by the media (Dowler, 2003; Pollak *et al*., 2007; Spitzberg and Cadiz, 2002; Killingbeck, 2001; Coyne, 2007). While some of these studies provide evidence that media violence does have an impact on the public (Dowler, 2003), other studies have shown there is little to no effect (Coyne, 2007). In addition to media in general, pre-*CSI* television shows have also been implicated in shaping the behavior of the general public, with the media referring to such things as the "*Perry Mason* effect" (referring to an expectation of dramatic courtroom confessions) and "Oprahization" (referring to a willingness to acquit based on

childhood victimization of the accused) (Bochenek, 2008; Mann, 2006). However, with the debut of *CSI* on television and an increase in the popularity of forensic science, there has been increased media attention given to the effect of the media on the criminal justice system and education (Harvey and Derksen, 2009).

Since it debuted, *CSI* has consistently been one of the top shows on primetime television, and according to many media reports, it has influenced viewers' views of forensic science. While *CSI* does use many real forensic techniques, the science depicted on the show is enhanced and stylized in order to be entertaining and attractive to viewers (Deutsch and Cavender, 2008). This can potentially cause viewers to misunderstand how forensic science is actually practiced. This potential problem has been termed the "*CSI* effect" by the media. Originally, the *CSI* effect referred to how this knowledge of forensics gained from *CSI* led to a change in jury conviction rates. However, the term has been expanded by both researchers and the media to refer to a number of different effects, such as increased knowledge of forensics, increased enrollment in forensic programs, increased desire for forensic evidence to be presented at trial, and juries giving greater credibility to forensic experts (Cole and Dioso-Villa, 2007).

A number of researchers have examined whether *CSI* has had an actual effect on jury conviction rates, jury perceptions, and the perceptions of judges, forensic professionals, and attorneys (Podlas, 2006; Shelton *et al*., 2006; Brickell, 2008; Ghoshray, 2007; Kim *et al*., 2009; Harvey and Derksen, 2009; Hughes and Magers, 2007). Currently, contrary to what many media reports say, there is no evidence that the *CSI* effect has had an impact on jury conviction rates. However, there is evidence that the *CSI* effect has caused a change in both

juries' feelings toward forensic evidence and criminal justice professionals' perceptions of juries' attitudes about and desire for forensic evidence. Thus, *CSI* is only the last in a long series of shows and other types of media that have been said to influence the public, and it appears to only have a superficial influence on the criminal justice system, rather than conviction-changing effect it is said to have by many media sources.

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CHAPTER 3: FORENSIC REALISM IN THE TELEVISION SHOW *BONES* AND THE *CSI* EFFECT'S IMPACT ON POPULARITY OF FORENSIC SCIENCE MEDIA

Introduction

The *CSI* effect refers to the popularity of forensic science media, and the television show *CSI* specifically, among the general public and the resulting influence these shows have on shaping the public's perception of forensic science (Houck, 2006). In the past few decades, a number of other forensic science television shows, non-fiction books, and fictional book series have also appeared, many coinciding with the debut of *CSI*. Many of these television shows and books have appeared in lists of the top-rated programs and best-selling books. Because of the popularity of forensic science media, it has been said to influence the public's understanding of forensic science (Smallwood, 2002). Therefore, if the media presents a fictionalized view of forensic science, it may cause the public to have a misunderstanding of how forensic science works in real life (Robbers, 2008).

In order to investigate the popularity and realism of forensic science media, this chapter will first examine the number and popularity of forensic science books and television shows. Books are divided into non-fiction books and fictional book series, and television shows are divided into non-fiction and dramas. Following this, a content analysis of the television show *Bones* will be presented in order to investigate the realism of a specific forensic science television show.

Non-fiction Books

In order to examine the number of forensic science non-fiction books published in the past several decades, it was decided to focus on books concerned with forensic anthropology so as to provide a more manageable list. In addition, only books that were geared toward non-professional audiences (i.e., not textbooks) were included so as to more accurately gauge the increased interest in forensic science among the general public. Based on these criteria, a list was generated of forensic anthropology non-fiction books geared toward non-professionals that have been published in English via internet searches, including searches of online bookstores such as Amazon.com (see Table 6).

The listed books, 18 in total, were all published between 1994 and 2009. Thirteen of the 18 (72.2%) were published after *CSI* debuted on television (*CSI* debuted on October 6, 2000). The year 2005 shows the largest number of forensic anthropology books published, with four. Eleven out of the 18 books (61.1%) were written by professional forensic anthropologists, either active or retired. William M. Bass was Professor Emeritus of Anthropology at the University of Tennessee at the time Death's Acre was published, and is the only forensic anthropologist on this list to have been retired at the time of publication of his books. William M. Bass and Jon Jefferson are also the only authors on this list who have published fictional forensic science books as well.

Of the 18 books, ten are autobiographies that discuss case studies (Maples and Browning, 1994; Rhine, 1998; Manhein, 1999; Manhein, 2005; Ubelaker, 2000; Bass and Jefferson, 2003; Bass and Jefferson, 2007; Craig, 2004; Mann, 2005; Koff, 2005), two are biographies (Jackson, 2001; Benedict, 2004), and six are geared toward young adults

(Jackson, 1996; Thomas, 2003; Libel, 2005; Adams, 2006; Shone, 2008; Yancey, 2009). The ten autobiographies were written by forensic anthropologists who worked in a variety of different job settings and generally include both personal thoughts and experiences of the authors as well as details of cases they were involved in during their careers. Many of these forensic anthropologists, such as William Maples, Stanley Rhine, William Bass, and Douglas Ubelaker, are very prominent in the field.

Table 6. List of forensic anthropology non-fiction books.

Title	**Author**	**Is author FA?**	**Published**
Dead Men Do Tell Tales: The Strange and Fascinating Cases of a Forensic Anthropologist	William R. Maples and Michael Browning	Yes	1994
The Bone Detectives: How Forensic Anthropologists Solve Crimes and Uncover Mysteries of the Dead	Donna M. Jackson	No	1996
Bone Voyage: A Journey in Forensic Anthropology	Stanley Rhine	Yes	1998
The Bone Lady: Life as a Forensic Anthropologist	Mary H. Manhein	Yes	1999
Bones: A Forensic Detective's Casebook	Douglas H. Ubelaker	Yes	2000
No Stone Unturned: The True Story of the World's Premier Forensic Investigators	Steve Jackson	No	2001
Death's Acre: Inside the Legendary Forensic Lab the Body Farm Where the Dead Do Tell Tales	William M. Bass and Jon Jefferson	Yes	2003
Forensic Anthropology: The Growing Science of Talking Bones (Science and Technology in Focus)	Peggy Thomas	No	2003
No Bone Unturned: Inside the World of a Top Forensic Scientist and His Work on America's Most Notorious Crimes and Disasters	Jeff Benedict	No	2004
Teasing Secrets from the Dead: My Investigations at America's Most Infamous Crime Scenes	Emily Craig	Yes	2004
Forensic Detective: How I Cracked the World's Toughest Cases	Robert Mann and Miryam Williamson	Yes	2005
The Bone Woman: A Forensic Anthropologist's Search for Truth in the Mass Graves of Rwanda, Bosnia, Croatia, and Kosovo	Clea Koff	Yes	2005
Forensic Anthropology	Angela Libal	No	2005
Trail of Bones: More Cases from the Files of a Forensic Anthropologist	Mary H. Manhein	Yes	2005
Forensic Anthropology	Bradley Adams	Yes	2006
Beyond the Body Farm: A Legendary Bone Detective Explores Murders, Mysteries, and the Revolution in Forensic Science.	William M. Bass and Jon Jefferson	Yes	2007
Corpses and Skeletons: The Science of Forensic Anthropology	Rob Shone	No	2008
Body Farms	Diane Yancey	No	2009

Maples was the founder of the University of Florida's C.A. Pound Human Identification Laboratory and served as a professor in the anthropology department while also consulting on forensic anthropology cases. Stanley Rhine was a professor of anthropology, now retired, at the University of New Mexico, Albuquerque, and Mary Manhein is a faculty member in the geography and anthropology department at Louisiana State University and is also the director of the LSU Forensic Anthropology and Computer Enhancement Services (FACES) Laboratory. Like Rhine, Bass is also retired, having served as the chair of the anthropology department at the University of Tennessee and the founder and director of the Forensic Anthropology Center there.

The other four forensic anthropologists who wrote autobiographies, Ubelaker, Craig, Mann, and Koff, are all employed in non-teaching positions. Ubelaker is a physical anthropology curator in the Department of Anthropology at the National Museum of Natural History in Washington, DC. Craig is the state forensic anthropologist for Kentucky, while Mann is the director of the Forensic Science Academy at the Central Identification Laboratory in Hawaii. Koff, who was a forensic anthropologist working for the UN during the events described in her autobiography, is currently involved with the Missing Persons Identification Research Center (MPID), which she founded, whose goal is to help families find and identify missing relatives (Missing Persons Identification Research Center, 2010).

Of the two biographies, one concerns a forensic organization while the other concerns a specific forensic anthropologist. In his book, Jackson discusses the organization NecroSearch, an investigative team founded in 1991 that specializes in conducting searches

for bodies. Benedict's biography discusses Douglas Owsley, who works alongside Ubelaker as a curator at the Smithsonian Museum of Natural History.

Unlike the ten autobiographies and two biographies, the six books geared toward young adults are not in a narrative form. Instead, they are set up as introductions to the field of forensic anthropology with each chapter devoted to a specific subject. Only one of the young adult books, Forensic Anthropology (Inside Forensic Science) by Bradley Adams, is written by a forensic anthropologist. Adams is the forensic anthropologist for the New York City Medical Examiner's Office. This analysis of forensic anthropology non-fiction books shows that the majority were written by practicing forensic anthropologists and were published after *CSI* debuted on television, pointing to a possible increase in public interest in forensic science in the past decade.

Fiction Book Series

In addition to non-fiction books, fictional books concerning forensic science were also examined through the use of internet searches and searches of online bookstores such as Amazon.com. Since 1980 29 different book series (two or more books with the same character or characters by the same author) have been published in which forensic scientists were the main characters (see Table 7). Fourteen of the 29 (48%) were published after the debut of *CSI* on television. The earliest of these series debuted in 1982, and the latest was published in 2009. Forensic pathologist is the most common profession of the main characters of these series, with seven out 29 (24%) featuring a forensic pathologist

character (authors Cornwell, Walker, La Plante, Slaughter, May, McCarthy, and Baden and Kenney).

Table 7. List of forensic science fictional book series.

Series	Author	Debut	Profession
Gideon Oliver	Aaron Elkins	1982	Forensic anthropologist
Andy Broussard	D.J. Donaldson	1988	Forensic psychologist
Kay Scarpetta	Patricia Cornwell	1990	Forensic pathologist
Jessica Coran	Robert W. Walker	1992	Forensic pathologist
Josef Tanaka	Richard La Plante	1993	Forensic pathologist
Sylvia Strange	Sarah Lovett	1995	Forensic psychiatrist
Lindsay Chamberlain	Beverly Connor	1996	Forensic anthropologist
Temperance Brennan	Kathy Reichs	1997	Forensic anthropologist
Michael Stone	Anna Salter	1997	Forensic psychologist
Simon Shaw	Sarah Shaber	1997	Forensic historian
Frank Clevenger	Keith Ablow	1998	Forensic psychiatrist
Eve Duncan	Iris Johansen	1998	Forensic sculptor
Colin Cellars	Ken Goddard	1999	Forensic scientist
Phil D'Amato	Paul Levinson	1999	Forensic scientist
Peter Zak	G.H. Ephron	2000	Forensic psychologist
Grant County	Karin Slaughter	2001	Forensic pathologist
Diane Fallon	Beverly Connor	2003	Forensic anthropologist
China Thrillers	Peter May	2003	Forensic pathologist
Eisenmenger-Flemming	Keith McCarthy	2003	Forensic pathologist
Billy Nightingale	Shelley Reuben	2005	Fire Investigator
Jake Rosen	Michael Baden and Linda Kenney	2006	Forensic pathologist
Body Farm	William M. Bass and Jon Jefferson	2006	Forensic anthropologist
Kel McKelvey	Thomas Holland	2006	Forensic scientist (CILHI)
Evelyn James	Elizabeth Becka	2007	Forensic scientist
David Hunter	Simon Beckett	2007	Forensic anthropologist
Claudia Rose	Sheila Lowe	2007	Forensic handwriting expert
Barrett Conyors	Charles Atkins	2008	Forensic psychiatrist
Grace Descanso	Susan Arnout Smith	2008	Crime scene technician
Theresa MacLean	Lisa Black	2009	Forensic scientist

Forensic anthropology and forensic psychology/psychiatry are the next most common professions, with six series featuring a forensic anthropologist (Elkins, two series by Connor, Reichs, Bass and Jefferson, and Beckett) and another six series featuring either a forensic psychologist or forensic psychiatrist (Donaldson, Lovett, Salter, Ablow, Ephron, and Atkins). Five of the series feature a main character described as a general forensic scientist (Goddard, Levinson, Holland, Becka, and Black), while the remaining five series contain unique main characters with Shaber featuring a forensic historian, Johansen a forensic sculptor, Reuben a fire investigator, Lowe a forensic handwriting expert, and Smith a crime scene technician.

Only four of the 29 book series have appeared on the New York Times Bestseller List (see Table 8). Patricia Cornwell was the first author to appear on the Bestseller List with the third book of her Kay Scarpetta series, *All That Remains*, in 1992. Twelve subsequent books from that series have all appeared on the Bestseller List, making Cornwell the most common author of the ones listed in this chapter to appear on the list. Out of the four series to appear on the list, Cornwell's remained on the list the longest and reached higher positions than the other three on average. Ten of her novels reached number one, and all stayed on the list for six weeks or longer.

Table 8. Forensic science novels on New York Times Bestseller List.

Title	Author	Highest Position	Weeks on List	Year
All That Remains	Patricia Cornwell	5	9	1992
The Body Farm	Patricia Cornwell	2	10	1994
From Potter's Field	Patricia Cornwell	1	10	1995
Cause of Death	Patricia Cornwell	1	12	1996
Unnatural Exposure	Patricia Cornwell	1	13	1997
Deja Dead	Kathy Reichs	8	7	1997
Point of Origin	Patricia Cornwell	1	11	1998
Black Notice	Patricia Cornwell	1	10	1999
The Killing Game	Iris Johansen	9	2	1999
Deadly Decisions	Kathy Reichs	12	4	2000
The Last Precinct	Patricia Cornwell	1	14	2000-01
Fatal Voyage	Kathy Reichs	10	5	2001
Body of Lies	Iris Johansen	5	4	2002
Grave Secrets	Kathy Reichs	11	3	2002
Bare Bones	Kathy Reichs	8	4	2003
Blow Fly	Patricia Cornwell	1	13	2003-04
Monday Mourning	Kathy Reichs	10	4	2004
Blind Alley	Iris Johansen	11	3	2004
Countdown	Iris Johansen	6	3	2005
Cross Bones	Kathy Reichs	9	3	2005
Predator	Patricia Cornwell	1	12	2005-06
Break No Bones	Kathy Reichs	5	4	2006
Stalemate	Iris Johansen	8	4	2007
Beyond Reach	Karin Slaughter	6	2	2007
Bones to Ashes	Kathy Reichs	3	4	2007
Book of the Dead	Patricia Cornwell	1	10	2007-08
Quicksand	Iris Johansen	7	2	2008
Devil Bones	Kathy Reichs	1	4	2008
Scarpetta	Patricia Cornwell	1	11	2008-09
Undone	Karin Slaughter	14	1	2009
206 Bones	Kathy Reichs	4	4	2009
The Scarpetta Factor	Patricia Cornwell	2	6	2009
Blood Game	Iris Johansen	11	1	2009

Source: Hawes Publications (2010).

Kathy Reichs had the second highest number of novels appear on the list, starting with *Deja Dead*, the first novel in the Temperance Brennan series, in 1997 and continuing through *206 Bones*, which was released in 2009. Only one of her novels, *Devil Bones*,

reached number one on the list. All of her novels stayed on the list for between three to seven weeks. Iris Johansen had the third largest number of books on the Bestseller List with seven and is also the third author to appear on the list chronologically with *The Killing Game* in 1999. Her books did not reach positions as high as Cornwell's and Reichs' nor did they stay on the list as long. Finally, Karin Slaughter appeared once on the Bestseller List with *Beyond Reach* in 2007, reaching #6 and staying on the list for two weeks.

Non-fiction Television Series

In order to investigate the popularity of forensic science on television, the number and scope of non-fiction television series dealing with forensic science as a main subject were investigated through the use of internet searches. Thirteen American nonfiction shows were found that dealt specifically with forensic science (see Table 9). Five of the shows are known to be currently still running (*The First 48*, *Dr. G: Medical Examiner*, *Skeleton Stories*, *Forensic Files*, and *Solved: Extreme Forensics*) and the status with one show is unknown (*The Investigators*). Two of the shows, *Mummy Autopsy* and *Skeleton Stories*, deal with forensic anthropology specifically, while one of the shows, *Dr. G: Medical Examiner*, focuses on forensic pathology. The other nine shows are concerned with a mix of forensic disciplines related to how their techniques are used to solve cases. Nine of the twelve shows (75.0%) debuted after *CSI* appeared on television in October 2000.

Table 9. List of non-fiction forensic science television shows.

TV Show	Debut Date	End Date
New Detectives	1996	2005
FBI Files	1998	2006
Cold Case Files	1999	2006
Forensic Files	2000	Still running
I, Detective!	2001	2004
Body of Evidence	2002	2008
Extreme Evidence	2003	2005
Mummy Autopsy	2004	2005
The First 48	2004	Still running
Dr. G: Medical Examiner	2004	Still running
The Investigators	2004	Unknown
Skeleton Stories	2005	Still running
Solved: Extreme Forensics	2008	Still running

Forensic Science Television Dramas

Like with nonfiction television shows, the scope and number of forensic science television dramas was also investigated through internet searches in order to better understand the presence of forensic science in primetime television (see Table 10). Ten television dramas on American television have had plots and premises dealing specifically with forensic science. Nine of these shows are currently still running; only *Crossing Jordan* is no longer in production. *CSI* was the first of these shows to premiere followed by *Crossing Jordan* the next year and *CSI: Miami* in 2003. Two of the shows have produced spin-offs: *CSI* begat *CSI: Miami* and *CSI: NY* while *NCIS: Los Angeles* followed *NCIS*. One of the shows, *Bones*, deals specifically with forensic anthropology while another, *Crossing Jordan*, deals specifically with forensic pathology. In *Dexter* the main character is a forensic blood spatter analyst while the other seven shows deal with a variety of forensic science techniques used to solve crimes in a law enforcement or crime lab environment.

Table 10. List of forensic science television dramas.

TV Show	Debut Date	End Date
CSI: Crime Scene Investigation	October 6, 2000	Still running
Crossing Jordan	September 24, 2001	May 16, 2007
CSI: Miami	May 9, 2002	Still running
NCIS	September 23, 2003	Still running
Cold Case	September 28, 2003	Still running
CSI: NY	September 22, 2004	Still running
Bones	September 13, 2005	Still running
Criminal Minds	September 22, 2005	Still running
Dexter	October 1, 2006	Still running
NCIS: Los Angeles	September 22, 2009	Still running

Note: All except for Dexter, which aired on Showtime, aired on broadcast channels.

Seven of the ten shows have appeared on the Nielsen ratings lists for primetime series for entire seasons (see Table 11). First run episodes of *Dexter* aired on Showtime, a premium television channel while first run episodes of all the other listed series aired on broadcast channels, potentially explaining why *Dexter* does not appear in the Nielsen ratings lists. *CSI* has appeared on the list for each year that data is available (2003-2010), and it has also ranked consistently higher than any other show. *CSI: Miami* and *NCIS* appeared on the list for six out of seven seasons for which data is available while *CSI: NY* appeared on the list for five out of seven seasons. After *CSI*, *CSI: Miami* has the most consistently high rankings. However, *NCIS* surpassed both *CSI* and *CSI: Miami* in the 2009-2010 season to date. *NCIS*'s spin-off, *NCIS: Los Angeles*, also surpassed all other shows except for *NCIS* in the 2009-2010 season to date. Together, these rankings show that forensic science television dramas are a very popular part of primetime television and watched by millions of people each week.

Table 11. Nielsen rankings for forensic science television dramas per season 2003-2010.

TV Show	'03-'04	'04-'05	'05-'06	'06-'07	'07-'08	'08-'09	'09-'10
CSI	1	1	3	6	8	4	8
CSI: Miami	10	5	8	11	12	12	N/A
NCIS	N/A	25	12	17	13	5	5
Cold Case	22	17	18	18	N/A	20	N/A
CSI: NY	---	23	20	19	25	15	N/A
Criminal Minds	---	---	N/A	20	19	11	16
NCIS: Los Angeles	---	---	---	---	---	---	9

Note: 2009-2010 season data is through April 25, 2010. N/A means that a series was not in the top 100 primetime programs for the year.
Source: Television Bureau of Advertising (2010); Zap2it (2010).

Content Analysis of *Bones*

Bones is a primetime television drama on the Fox Network. It premiered September 13, 2005, and, as of spring 2010, is currently in its fifth season. According to the Fox Broadcasting Company (2009), *Bones* is "a darkly amusing procedural with humor, heart and character, inspired by real-life forensic anthropologist and novelist Kathy Reichs." The show concerns the work of Dr. Temperance Brennan, played by Emily Deschanel, who is a forensic anthropologist working at the fictional Jeffersonian Institute (modeled after the Smithsonian Institute), and her partner, Special Agent Seeley Booth, played by David Boreanaz, who is a member of the FBI's Homicide Investigations Unit. Supporting characters include various lab workers, such as a forensic artist, forensic entomologist, coroner, and a forensic psychologist, who help Brennan and Booth solve crimes. Brennan and the premise of the show are adapted from the novels of Kathy Reichs, a professional forensic anthropologist. Reichs serves as a producer of *Bones*, and before every episode it is stated that the show is "based on the life of forensic anthropologist Kathy Reichs."

In *Bones*, Brennan and Booth are teamed together to investigate one case per episode. These cases typically involve the use of Brennan's forensic anthropology expertise in addition to lab work done by the assistants and interviewing of suspects and persons of interest usually done by Brennan and Booth together. As a television drama series, *Bones* presents a stylized version of forensic anthropology to the public which does not necessarily conform to actual forensic anthropology methods as performed by experts in the field.

While other researchers have discussed how the forensic science presented on *CSI* differs from that used by real forensic scientists (Cooley, 2007; Houck, 2006; Nolan, 2007; VanLaerhoven and Anderson, 2009), no one has conducted an analysis of the forensic anthropology content of *Bones*. However, other researchers have examined the content of other television crime dramas, including *CSI.* Escholtz, *et al.* (2004) examined episodes of *Law & Order* and *NYPD Blue* to investigate the race and gender of offenders and law enforcement professionals and interactions between the offenders and law enforcement, including the number of civil rights violations and to compare these incidents to the numbers seen in real life. Soulliere (2003) also examined both *Law & Order* and *NYPD Blue* as well as *The Practice* in order to analyze the types of crimes, weapons, context surrounding crimes, and motives presented in each show and then compared these findings to official statistics and analyses done by other researchers. Other researchers (Gans-Boriskin and Wardle, 2005; Rhineberger-Dunn *et al.*, 2008) have also used content analyses of *Law & Order* to examine the portrayal of juvenile delinquency and mental illness.

Most related to the current research, Deutsch and Cavender (2008) examined *CSI* in order to investigate the types of offenses and weapons and the gender and race of offenders as well as the level of forensic realism portrayed in the show. The authors conclude that *CSI* developed and maintained a "web of forensic facticity" through the use of scientific jargon and specialized equipment, thereby appearing to reflect actual scientific practices (44). While Deutsch and Cavender (2008) provide some discussion of how *CSI* is different from the reality of forensic science, they point out that more research needs to be conducted on *CSI* and other forensic science television shows and the *CSI* effect. Therefore, to add to the knowledge of how forensic science is adapted by television dramas, a content analysis of *Bones* was completed in order to observe differences between the forensic anthropology used by real life forensic anthropologists and that used in the show for entertainment. Specifically, this content analysis of *Bones* sought to answer several questions:

1. What role does the forensic anthropologist play in the death investigation?
2. Are the techniques used to determine the biological profile and analyze trauma and pathologies consistent with those used by real-life forensic anthropologists?
3. What identification methods are used, and do these differ from the methods typically used by actual forensic anthropologists?
4. How is time since death determined, and are the methods used to determine it on the show different from those used in real life?

Methods

For this content analysis, seasons one and two of *Bones* were viewed by the author. These seasons were chosen in order to start at the beginning of the series. The sample consisted of 22 episodes from season one and 21 episodes from season two, making a total of 43 one-hour episodes. In order to conduct analysis, a coding sheet was constructed for each episode in order to measure nine different subjects: death investigation activity, construction of the biological profile, identification methods, trauma analysis, analysis of postmortem damage, injuries matched to specific activities, analysis of pathology, determination of time since death, and uses of entomology. See Appendix A for a sample coding sheet. For both death investigation activity and specific analyses, occurrences were counted when involving either Temperance Brennan or one of her assistants. Cases involving living subjects were excluded.

Results

In regard to death investigation activity (see Table 12), in the majority of times Brennan or one of her assistants went to a scene in order to recover remains, it was for either skeletal or decomposed remains (26 incidents and 60.5% of episodes). However, they also went to scenes for burnt (8 incidents and 18.6% of episodes) and fresh remains (2 incidents and 4.7% of episodes). Brennan and her assistants also conducted searches for skeletal (15 incidents and 25.6% of episodes) and non-skeletal evidence (19 incidents and 25.6% of episodes) a number of times.

Looking at the investigation part of death investigation activity, out of all categories, talking to other people associated with the victim occurred the most frequently, with 129 incidents in 76.7% of episodes. Brennan and her assistants interviewed a suspect (49 incidents and 67.4% of episodes) and talked to the family of the victim (45 incidents and 60.5% of episodes) frequently. Another item of note is the frequency of Brennan being involved in a physical confrontation, with 20 incidents in 41.9% of episodes.

In regard to the analysis part of death investigation activity, a forensic anthropologist was involved with the analysis in 28 total incidents. The majority of these incidents involved decomposed remains (11 incidents and 25.6% of episodes), although a significant number involved fresh remains (8 incidents and 14.0% of episodes). In addition, Brennan or her assistants testified in court about their analysis of remains in three incidents in 4.7% of episodes.

Looking at the construction of a biological profile in *Bones*, six different categories were examined: sex, ancestry, age, stature, weight, and pregnancy (see Table 13). For sex, in the majority of analyses an unknown method was used (36 incidents and 67.4% of episodes). When a method was named, pelvic morphology was the most frequently used (6 incidents and 11.6% of episodes) followed by skull morphology (4 incidents and 9.3% of episodes). Regarding ancestry, unknown methods were again the most commonly used (8 incidents and 18.6% of episodes). Skull morphology was the most commonly named method, with 6 incidents in 14.0% of episodes.

Table 12. Death investigation activity.

Activity	N of incidents	% of episodes
Recovery		
Go to scene for skeletal/decomposed remains	26	60.5
Go to scene for fresh remains	2	4.7
Go to scene for burnt remains	8	18.6
Conduct search for skeletal evidence	15	25.6
Conduct search for non-skeletal evidence	19	37.2
Investigation		
Interview suspect	49	67.4
Serve search warrant	5	9.3
Search for suspect	13	20.9
Talk to family of victim	45	60.5
Talk to other people associated with victim	129	76.7
Talk to judge	2	2.3
Talk to doctor	2	4.7
Talk to other professional	6	9.3
Involved in physical confrontation	20	41.9
Analysis		
Forensic pathologist involved with skeletal	5	11.6
Forensic pathologist involved with burnt	4	9.3
Forensic pathologist involved with decomposed	11	25.6
Forensic pathologist involved with fresh	8	14.0
Testify in court	3	4.7

For age and stature, unknown methods were also the most commonly used (25 incidents and 46.5% of episodes for age and 5 incidents and 11.6% of episodes for stature). Development and epiphyseal fusion were the most commonly used named method for age, with 9 incidents in 20.9% of episodes. This was followed by x-ray analysis and bone histology, which were each used in 5 incidents and 9.3% of episodes. For stature, a named method was only used three times, with length of the femur used in two incidents in 4.7% of episodes and length of the tibia used in one incident in 2.3% of episodes. Whether or not a victim had gone through pregnancy was analyzed once in 2.3% of episodes, and the

analysis was done using the preauricular sulcus with Brennan able to tell how long ago the pregnancy occurred.

Table 13. Biological profile.

Trait	N of incidents	% of episodes
Sex		
Size of hand	1	2.3
DNA	2	4.7
Bone histology	1	2.3
Skull morphology	4	9.3
Pelvic morphology	6	11.6
Unknown method	36	67.4
Ancestry		
Skull morphology	6	14.0
Bone histology	1	2.3
Anthropometrics	2	2.3
DNA	1	2.3
Hair	1	2.3
Unknown method	8	18.6
Age		
Development and epiphyseal fusion	9	20.9
Pubic symphysis or pelvis	2	4.7
Skull morphology	1	2.3
X-ray analysis	5	9.3
Bone histology	5	9.3
DNA	1	2.3
Sternal rib end morphology	1	2.3
Osteoarthritic lipping	2	4.7
Osteoporosis	1	2.3
Cranial suture fusion	2	4.7
Measuring fetal bone size	2	4.7
Tooth wear	1	2.3
Tooth eruption	1	2.3
Unknown method	25	46.5
Stature		
Length of femur	2	4.7
Length of tibia	1	2.3
Unknown method	5	11.6
Weight		
Unknown method	2	4.7
Pregnancy		
Using preauricular sulcus	1	2.3
Able to tell how long ago	1	2.3

Regarding methods used to identify unknown victims (see Table 14), facial reconstruction, using either two-dimensional drawings or computer imaging, was the most commonly used method (25 incidents). Of these 25 incidents, a facial reconstruction from skeletal remains occurred the most often (19 incidents in 44.2% of episodes). However, facial reconstructions were also completed using remains with tissue still adhered (3 incidents and 7.0% of episodes), remains of unknown condition (2 incidents and 4.7% of episodes), and skin without a skeleton (1 incident and 2.3% of episodes). Aside from facial reconstruction, the most commonly used identification method was dental x-ray, with 7 incidents in 16.3% of episodes. Identification through comparison with antemortem medical records and using a serial number on a medical device also occurred a significant number of times (4 incidents and 9.3% of episodes for each).

Concerning trauma analysis conducted in *Bones* (see Table 15), perimortem trauma was divided into four categories: blunt force, sharp force, gunshot, and other. Blunt force trauma was matched to a specific weapon in 15 incidents in 25.6% of episodes. Sharp force trauma was matched to a specific weapon in 20 incidents in 41.9% of episodes, and gunshot trauma was matched to a specific weapon in four incidents in 9.3% of episodes. Trauma was determined to have come from physical force in eight incidents in 16.3% of episodes. Antemortem injuries were analyzed in nine incidents, with a broken bone being the most commonly occurring injury with four incidents in 9.3% of episodes. Holographic reconstruction was used to analyze trauma in 15 incidents in 30.2% of episodes, and bone staining from blood was used to determine whether an injury was perimortem in six incidents in 14.0% of episodes.

Table 14. Identification methods.

Method	N of incidents	% of episodes
DNA	3	7.0
Dental x-ray	7	16.3
Fingerprints	2	4.7
Facial reconstruction		
Using skeletal remains	19	44.2
Using remains with tissue still adhered	3	7.0
Using remains of unknown condition	2	4.7
Using skin without skeleton	1	2.3
Photo superimposition	1	2.3
Comparison with antemortem medical records	4	9.3
Medical device		
Using serial number	4	9.3
Other method	1	2.3
Artifact found with body		
Bracelet with name	1	2.3
Paper with name	1	2.3
Tattoo	2	4.7
Skeletal disease/condition	1	2.3
Sternal foramen	2	2.3
Carbon dating	1	2.3
Bone histology	1	2.3
Unknown method	1	2.3

Table 15. Trauma analysis.

Type of trauma	N of incidents	% of episodes
Type of perimortem trauma		
Blunt force		
Matched to specific weapon	15	25.6
Not matched to specific weapon	8	18.6
Physical force	8	16.3
Sharp force		
Matched to specific weapon	20	41.9
Not matched to specific weapon	4	9.3
Gunshot		
Matched to specific weapon	4	9.3
Not matched to specific weapon	8	11.6
Other		
Matched to specific weapon	1	2.3
Not matched to specific weapon	2	4.7
Antemortem injury		
Broken bone	4	9.3
Gunshot	2	4.7
Stab wound	1	2.3
Evidence of surgery	2	4.7
Use of holographic reconstruction	15	30.2
Bone staining from blood	6	14.0

With analysis of postmortem damage (see Table 16), specific types of damage tended to occur only once in the sample of episodes. Animal damage was the only type of damage to be mentioned more than once, with 4 incidents in 9.3% of episodes. Analysis of injuries matched to a specific activity also followed the same pattern (see Table 17). Of the 18 types of injuries mentioned in the show, only one, fractures from a fall, was mentioned more than once, with 4 incidents in 9.3% of episodes. Nine of the incidents relate to activities that the victim participated in while six incidents relate to the victim being subjected to something and six relate to the victim being involved in a traumatic event.

Table 16. Postmortem damage.

Type of damage	N of incidents	% of episodes
Animal	4	9.3
Marine life	1	2.3
Forced into container	1	2.3
Bone weakened due to chemical exposure	1	2.3
Freezing	1	2.3
Dismemberment	1	2.3
Fed into wood chipper	1	2.3
Holes for wires	1	2.3
Forced into clothing	1	2.3
Debris in water	1	2.3
Fracturing due to being dragged	1	2.3
Fracturing due to grave robbing	1	2.3

Table 17. Injuries matched to specific activity.

Type of injury	N of incidents	% of episodes
Tibia stress fractures from dance/running	1	2.3
Stress fractures from bound wrists	1	2.3
Erosion from bound legs rubbing together	1	2.3
Bone abnormalities from lying in one position	1	2.3
Fractures from fall	4	9.3
Trauma from aircraft impact	1	2.3
Markers on cuboid and medial malleolus from high heels	1	2.3
Repetitive motion injury to shoulder from basketball	1	2.3
Repetitive motion injuries from golf	1	2.3
Hip displacement and spine elongation from being hung upside down	1	2.3
Ankylosis of joints from carrying tray	1	2.3
Hairline fractures on knuckles and stress markers on sternum from boxing	1	2.3
Trephination	1	2.3
Frontal spurring on patella indicating squatting	1	2.3
Greenstick fracturing due to being dragged	1	2.3
Bone demineralization due to spending time in space	1	2.3
Whiplash from car crash	1	2.3
Arthritic lipping on dens due to looking up a lot	1	2.3

In regard to analysis of pathologies in *Bones*, 21 different pathologies were mentioned in the sample. In order to understand how the analysis of pathologies on *Bones* relates to the analysis conducted by actual forensic anthropologists, a sample of forensic anthropology (Burns, 2007; Byers, 2005) and paleopathology texts (Aufderheide and Rodriguez-Martin, 2005; Mann and Hunt, 2005; Ortner, 2003; Waldron, 2009) was consulted in order to determine whether the pathologies mentioned in *Bones* were mentioned in these texts (see Table 18). This sample was chosen to represent common forensic anthropology and paleopathology texts that a forensic anthropologist would likely use to help with analysis of remains. Two common forensic anthropology texts (Klepinger,

2006; Komar and Buikstra, 2008) were excluded due to the extreme brevity of their pathology sections.

Table 18. Pathologies mentioned in *Bones* and whether or not they are mentioned in common forensic anthropology and paleopathology texts.

Type of pathology	Ortner (2003)	Burns (2007)	Mann and Hunt (2005)	Byers (2005)	Waldron (2009)	Aufderheide and Rodriguez-Martin (2005)
Deformity of ribs due to corset	N	N	N	N	N	N
Cribra orbitalia	Y	Y	Y	N	Y	Y
Uneven growth of vertebrae due to diet	N	N	N	N	N	N
Trabecular pattern of bone affected by toxin	Y*	N	N	N	N	Y*
Hyperparathyroidism	Y	N	Y	N	Y	Y
Leukemia	Y	N	N	N	Y	Y
Dental enamel hypoplasia	Y	Y	Y	N	Y	Y
Metastatic carcinoma	Y	N	Y	N	Y	Y
Nonmalignant bone tumor	Y	N	Y	N	Y	Y
Tertiary syphilis	Y	Y	Y	N	Y	Y
Rickets	Y	Y	Y	N	Y	Y
Scurvy	Y	N	Y	N	Y	Y
Spina bifida	Y	N	Y	Y	Y	Y
Premature aging due to heroin addiction	N	N	N	N	N	N
Osteogenesis imperfecta	Y	N	N	N	Y	Y
Nail-patella syndrome	N	N	N	N	N	Y
Bone cancer originating in testes or prostate	Y	N	Y	N	Y	Y
Osteonecrosis	Y	N	N	Y	Y	Y
Werner syndrome	N	N	N	N	N	N
Hypophosphatemia	N	N	N	N	N	N
Coffin-Lowry syndrome	N	N	N	N	N	N

*Discusses the affects of specific toxins
**Discusses cancerous tumors in general

A deformity of the ribs due to wearing a corset, uneven growth of the vertebrae due to diet, premature aging due to heroin addiction, Werner syndrome, hypophosphatemia, and Coffin-Lowry syndrome were not mentioned in any of the texts. No pathology was mentioned in all books. Cribra orbitalia, dental enamel hypoplasia, tertiary

syphilis, rickets, and spina bifida were mentioned in the largest number of texts, with all mentioned in five out of the six texts. Regarding the trabecular pattern of bone being affected by a toxin, two of the texts (Ortner, 2003; Aufderheide and Rodriguez-Martin, 2005) did mention bone being microscopically affected by specific toxins, showing that it is possible for a toxin to affect bone in the way described on the show.

With respect to the use of entomology in the show (see Table 19), entomology was used to determine time since death in 15 incidents with the green bottle fly being the most commonly used insect (5 incidents and 9.3% of episodes). Other specific types of insects were used in six incidents. Unknown insects and unknown pupa casings were each used in two incidents in 4.7% of episodes. Entomology was used to determine the location where a victim had been located in 4 incidents in 9.3% of episodes and was used to determine the chemicals in a body in five incidents in 9.3% of episodes. Of non-entomology methods used to determine time since death (see Table 20), visual assessment was the used the most often with four incidents in 9.3% of episodes. Volatile fatty acids, adipocere formation, and weathering/degeneration were also used multiple times (each was used in two incidents and 2.3% of episodes). An unknown method was used to determine time since death in five incidents in 11.6% of episodes.

Table 19. Entomology.

Use	N of incidents	% of episodes
Used for time since death		
Moth pupa casings	1	2.3
European hornet queen	1	2.3
Blue bottle fly	1	2.3
Green bottle fly	5	9.3
Unknown bottle fly	1	2.3
Eastern tent caterpillar casings	1	2.3
Mites	1	2.3
Unknown pupa casings	2	4.7
Unknown insect	2	4.7
Used for location	4	9.3
Used to determine chemicals in body	5	9.3

Table 20. Non-entomology methods used for time since death.

Method	N of incidents	% of episodes
Chemicals body found in	1	2.3
Visual assessment	4	9.3
Volatile fatty acids	2	4.7
Carbon-14 dating	1	2.3
Adipocere formation	2	4.7
Weathering/degeneration	2	4.7
Putrescene smell	1	2.3
Barnacle and small mussel incrustation	1	2.3
Clothing matched to time period	1	2.3
Decomposition of clothing	1	2.3
Unknown method	5	11.6

Discussion and Conclusions

Forensic science media has become very popular in the past decade. Since *CSI*'s debut, 12 non-fiction forensic anthropology books geared toward a general audience have been published. Only five were published before *CSI* debuted on television. Almost half of the total fictional book series focusing on forensic science were published after *CSI* as well.

Both forensic science non-fiction and fictional television shows also saw an increase after *CSI* premiered. In addition, the books of Kathy Reichs and Patricia Cornwell are consistently on the New York Times Best Sellers List, and numerous forensic television dramas have been among the top rated prime time television series since 2003. These findings lend credence to the idea that *CSI* created an increased interest in forensic science, and they conform to what other researchers have said about the popularity of forensic science media. However, previous researchers have focused on the increased popularity of forensic science television dramas (Cole and Dioso-Villa, 2007; Robbers, 2008) whereas the current research shows that there has been an increase in the number of fiction and non-fiction forensic science books and non-fiction television shows as well.

Regarding the content analysis of *Bones*, the show presents a portrayal of a forensic anthropologist with both accurate and inaccurate aspects. *Bones* shows Temperance Brennan and her assistants going to scenes in order to recover skeletal, decomposed, and burnt remains, conducting searches for skeletal remains, and testifying in court, which are common activities conducted by actual forensic anthropologists (Byers, 2005). However, Brennan and her assistants were also shown going to scenes to conduct searches for non-skeletal evidence, which would typically fall under the jurisdiction of law enforcement. Brennan is also shown going to scenes for fresh remains whereas in actual forensic cases the medical examiner would be in charge of examining fresh remains. Also, Brennan is shown interviewing suspects, talking to the family of victims, talking to other people associated with the victim, serving search warrants, and searching for suspects, things which are the generally the domain of law enforcement. In addition to this, Brennan is

frequently involved in physical confrontations, an uncommon occurrence among actual forensic anthropologists.

Looking at the forensic anthropological analysis shown on *Bones*, the actual methods used to determine the biological profile are often not provided. When they are provided, they involve a mixture of actual and questionable techniques. Skull and pelvis morphology are the most cited methods used for sexing in *Bones.* This corresponds to actual forensic anthropology research that shows that the skull and pelvis possess specific morphological traits that can reliably be used to determine sex (Acsadi and Nemeskeri, 1970; Buikstra and Ubelaker, 1994; Phenice, 1969). However, Brennan and her assistants also use the size of a hand, bone histology, and DNA to estimate sex on *Bones*. There is a lack of support for estimation of sex based on hand size or bone histology in forensic anthropological literature, and DNA is not commonly used due to the expense and time requirements for DNA analysis and the availability of other methods.

For ancestry determination, the most commonly used methods on *Bones* are skull morphology and anthropometry. Both methods have received attention in forensic anthropological literature and are considered to be accurate methods for estimating ancestry (Krogman, 1962; Brues, 1977; Rhine, 1990). The other methods used in *Bones* to estimate ancestry (bone histology, DNA, and hair) do not have the support of forensic anthropological literature. In addition, actual forensic anthropologists often employ the computer program FORDISC 3.0 (Ousley and Jantz, 2005) in the analysis of metric measurements for determining sex and ancestry, something that is never mentioned on *Bones*.

Regarding determination of age at death, all of the methods used in *Bones* aside from DNA have been mentioned in forensic anthropological literature. Development, epiphyseal fusion, the measurement of fetal bone size, and tooth eruption are all common methods for aging children and young adults (Baker *et al*., 2005; Scheuer and Black, 2000). Also, cranial suture fusion, the pubic symphysis, and sternal rib end morphology are common methods used in the aging of adults (Brooks and Suchey, 1990; Loth and Iscan, 1989; McKern and Stewart, 1958; Meindl and Lovejoy, 1985). While not a common method, bone histology has also been studied as a method of determining age (Stout, 1998; Thompson, 1978, 1979).

Several other methods for age estimation with less support in the forensic anthropological literature have also been used on *Bones* (osteoarthritic lipping, osteoporosis, skull morphology, DNA, and tooth wear). While research has been conducted on the association of medullary cavity size and age (Acsadi and Nemeskeri, 1970), no research has been conducted that specifically mentions a relationship between the presence of osteoporosis and age-at-death, and there is no research that supports the use of skull morphology and DNA in estimating age-at-death. In addition, degenerative changes such as osteoarthritic lipping can only be used as very general criteria in determining age-at-death (Ubelaker, 1989). While tooth wear has been mentioned by some researchers as a tool for estimating age at death (Lamendin *et al*., 1992), it is generally not used due the variability in tooth wear due to diet.

For stature, the measurements of multiple long bones are generally used (Klepinger and Giles, 1998; Trotter, 1970). However, the two methods mentioned in *Bones* consist of only one bone (one using the tibia and the other using the femur), although these bones are

both commonly used for stature estimation. In addition, as with the estimation of sex and ancestry, FORDISC 3.0 (Ousley and Jantz, 2005) is often employed by actual forensic anthropologists when estimating stature, something that is not shown on *Bones.* While estimation of the weight of the living victim using skeletal remains has been researched (Baker and Newman, 1957), Byers (2005) recommends against doing this due to problems with the accuracy of these methods. In addition, in *Bones* the preauricular sulcus is used to determine whether a woman went through a pregnancy and how long ago this pregnancy occurred. While some early researchers noted that a specific form of the preauricular sulcus was associated with prior pregnancy (Houghton, 1974), later researchers have found no association between the presence or type of preauricular sulcus and pregnancy (Cox and Scott, 1992; Spring *et al*., 1989). Thus, this is not currently a recognized method in the forensic anthropological literature.

While many of the identification methods used in *Bones* are mentioned in forensic anthropology texts as viable methods (Byers, 2005; Komar and Buikstra, 2008; Wilkinson, 2008), there appears to be confusion between positive and presumptive identifications in the show. Facial reconstruction, which only provides a presumptive identification (Burns, 2007), is commonly used on the show to identify victims without using any other method in order to obtain a positive identification. According to Komar and Buikstra (2008), facial reconstruction "fails to meet the standard of scientific acceptance and validity required for admissibility in court" and facial reconstruction artists have exaggerated the accuracy and identification abilities of facial reconstructions (237). Other methods that provide only a presumptive identification are also used on the show, such as photo superimposition,

artifacts found with the body, and tattoos. However, a number of positive identification methods are used in the show, including DNA, dental x-rays, comparison of antemortem and postmortem x-rays, and serial numbers from medical devices.

In *Bones* the weapon used to create blunt force, sharp force, and gunshot trauma is often specifically identified through skeletal analysis. With blunt force trauma, the size, shape, and weight of the weapon can usually only be generally estimated (Byers, 2005). However, patterned injuries which point to a specific weapon can occur, although they are only rarely found in skeletal remains (Spitz, 1980). With sharp force trauma, the type and size of the instrument may be determined based on the characteristics of the injuries, but the specific weapon is not typically able to be determined (Maples, 1986; Reichs, 1988). Also, Symes *et al.* (1998) have determined specific characteristics of saw marks that allow the weapon to be narrowed down to a specific class but still not a specific weapon. Similarly, with gunshot trauma the caliber of the bullet can only be generally estimated and there has been no research on estimating the bullet construction (Berryman *et al*., 1995; Ross, 1996). Also, highly advanced holographic reconstruction is often used in the show to analyze trauma. In actual forensic anthropology labs, although facial reconstructions are being done using computer-generated graphics (Clement and Marks, 2005), the level of technology shown in *Bones* is not available for simulations of victims' appearances or traumatic events.

Regarding postmortem damage and injuries matched to a specific activity, while some of the specific types of damage and injuries mentioned in the show could be determined (animal damage, dismemberment, holes for wires, fractures from a fall, and

trephination), many of the types mentioned in the show are too specific to be able to be determined based on skeletal analysis alone. Many of the pathologies shown in the show, however, are discussed in paleopathology and forensic anthropology literature as having specific characteristics that can be analyzed on bone.

Time since death on *Bones* was most commonly determined through the use of insects, which is also a common method used by actual forensic entomologists (Byrd and Castner, 2009). Most of the other methods used in the show are not typically employed by real life forensic anthropologists aside from visual assessment of soft tissue. However, on *Bones*, when visual assessment is used to determine time since death, it is typically done quickly in the field after only a cursory examination of the remains, which does not allow for an accurate assessment of time since death since factors such as temperature and humidity during the decomposition period should be taken into account (Mann *et al*, 1990; Marx *et al*., 2009).

The content analysis of the television show *Bones* illustrates that while much of the show is fictionalized, some of the methods and analysis shown are based on actual methods employed by forensic anthropologists. This is to be expected, though, as *Bones* is stylized in order to appeal to the general public, which lacks the forensic anthropology knowledge of a professional. When the victim can be easily identified through simple methods, the weapon can be pinpointed specifically, and the lead female character is involved in the entire episode, it makes for a much more entertaining show than if she is only able to speak in generalities and confined to a lab. This fictionalization of forensic science content corresponds to what other researchers have said about the forensic science content in *CSI*

(Deutsch and Cavender, 2008; VanLaerhoven and Anderson, 2009). In addition, the increase in forensic science books and television since the debut of *CSI* in 2000 corresponds to previous researchers' discussion of the increased popularity of forensic science media (Cole and Dioso-Villa, 2009).

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CHAPTER 4: THE *CSI* EFFECT: IMPACT ON FORENSIC SCIENCE EDUCATION AND INTEREST IN FORENSIC SCIENCE CAREERS

Introduction

In recent years forensic science has become popular among high school and college students (Bergslien, 2006). Because of this increased interest, many new forensic science classes, lessons, and degrees have been created by various schools, both secondary and post-secondary. Researchers have generally attributed this increase in interest to the *CSI* effect (Harvey and Derksen, 2009; VanLaerhoven and Anderson, 2009; Smallwood, 2002; Bergslien, 2006; Cavanagh, 2009). That is, the viewing of forensic science television shows and reading of forensic science novels leads students to become interested in pursuing forensic science courses and degree programs in school. However, it is unclear whether the *CSI* effect is the actual cause of increased scholastic interest in forensics or if the increased interest was caused by other elements that coincided with the development of the *CSI* effect, such as increased use of forensic science in trials.

This chapter will investigate the impact of the *CSI* effect through a variety of different methods. First, previous research on how education has been affected by the *CSI* effect will be discussed. Following this the number and types of forensic-related university degree programs in the United States will be examined. Finally, the results of a survey of forensic students will be presented in order to examine the popularity of forensic careers, graduate study, and forensic media, the effect of forensic media consumption on the desire to pursue forensic careers and graduate study, and the influence of forensic education on how realistic forensic media is seen to be.

Forensic Science and Education

Forensic science has become a very popular area of study in the past decade in universities, high schools, and middle schools, and is the fastest growing college major according to Sallie Mae, the nation's leading company for student loans (Sappenfield, 2003). According to Smallwood (2002), this is due to interest generated by the media through high-profile criminal cases, non-fiction shows, and television dramas. Interest in forensics has been growing since the O.J. Simpson murder trial (occurring in 1995), which was the first well-known trial to use DNA and other forensic evidence, and forensic science degree programs have seen applicants and enrollment greatly increase (Smallwood, 2002). In addition, there has been an increase in the number of programs in existence as well as the number of teaching jobs at universities and colleges that already had programs (Sappenfield, 2003; Smallwood, 2002).

Forensic science programs at the college level

Smallwood (2002) describes how specific programs have been affected by the increased interest in forensics. George Washington University's forensic science graduate program, for example, has doubled in the number of students enrolled in three years, and faculty positions have increased from three to eight. Michigan State University's forensic science graduate program also more than doubled in applicants, going from 60 applicants in its inaugural year (1994) to 147 less than ten years later. Michigan State's undergraduate introduction to forensic science course has also become increasingly popular, with 400 students enrolled in 2002 compared to 80 22 years before. This increase

in applications and enrollment is seen throughout the country, including in New York, NY, where in 2000 200 applicants vied for only 30 slots in the forensic science master's program at City University of New York.

However, while the number of students pursuing forensic science degrees has increased, the respect conveyed to these programs and the amount of money available for research has perhaps not (Smallwood, 2002). According to one professor, James Starrs of George Washington University, some lab directors "have strong feelings that the universities don't train people who are ready to do lab work and testify in court [and] that they have to be retrained" (Smallwood, 2002:A8). In addition, some laboratories are worried that the programs that have been created due to the increased interest in forensics are just criminal justice programs with an added internship (Smallwood, 2002).

Organizations such the National Science Foundation and the Justice Department are also wary of forensic science programs and consequently provide little research support (Smallwood, 2002). As a result, much of the funding for forensic science research comes from companies hoping that their sponsorship will create future sales. Peter DeForest, a professor at the City University of New York, attributes some of the lack of research support to the media. He says that while the forensic science portrayed on television is black and white with every technique completely figured out, "there's a need for more scientific research, and there's very little money spent on research; it falls between the cracks" (Smallwood, 2002:A8).

In addition to not realistically portraying the need for research, media portrayals of forensic science have also caused potential forensic science students to have an unrealistic

view of the profession (Lovgren, 2004; Smallwood, 2002). While some students entered into forensic science programs expecting to solve crimes like the people on *CSI*, forensic science professors are quick to point out that though the science is fairly accurate, actual forensic science jobs are very different from those seen on TV. As Anthony Falsetti, forensic anthropologist at the University of Florida says, "You would never use all that science on a single case. And we never finish our cases in 45 minutes" (Smallwood, 2002:A8). According to Clair Shepard, the director of the forensic science program at Griffin Technical College in Georgia, her program "lose[s] two out of 10 [students] because they come in with these crazy views of what it's really like" due to the unrealistic portrayals seen in television dramas (Recruitment & Retention, 2005:7).

Influence of forensic science in primary and secondary education

Universities are not the only schools that have been affected by increased interest in forensic science. One school in Missoula, Montana, has created an after school program called Biomedical Research After School Scholars that features hands-on lessons on forensic science related topics such as genetics and infectious diseases (Curriculum Review, 2004). Another high school in Troy, Michigan, has created an entire forensic science class in which students examine such things as blood spatter analysis (NEA Today, 2008). The teacher notes that the class can be used to teach variety of subjects like physics and geometry and that an important part of the class is understanding the difference between the reality of forensic science and that portrayed on television.

Other researchers have also discussed using forensic science as a way to convey concepts of biology, chemistry, and other related to disciplines to students. Duncan and Daly-Engel (2006) state that the number of forensic-related courses and units within courses has rapidly increased in the past few years. Specifically they mention two biology classes at the University of Hawaii Laboratory School that incorporated *CSI* episodes and forensic-related experiments into biology lessons. Duncan and Daly-Engel (2006) say that these lessons allowed the students to understand the importance of science in criminal justice and to also understand how *CSI*'s use of science differed from how it is used in real life.

While NEA Today (2008) and Duncan and Daly-Engel (2006) portray the incorporation of forensic science into science classes as a good thing, Mardis (2006) states that "the *CSI* effect on science education is as inconclusive as a smudged fingerprint; mixed results are apparent for both teaching and learning of science" (12). According to Mardis (2006) investigating *CSI* and forensic science in the classroom can attract students to not only forensic science-related careers but science-related careers in general, which is a good thing considering "the grim predictions of a slow-growing and aging science workforce," and this investigation is not complete without the involvement of the school library (13).

Colgan (2002) also notes that forensic science classes can help with shortages in individuals seeking forensic science jobs, pointing out that there is a nationwide shortage in forensic pathologists. Through the resources of the school library, students can investigate specific research questions they have about forensic science, look at crime statistics and whether forensic science media portray them accurately, or seek information

about forensic science in general. Through the inclusion of the school library, Mardis (2006) believes that forensic science instruction can ignite students' interest in science and allow them to be better informed regarding the differences between television dramas and reality.

Bergslien (2006), like Mardis (2006), has reservations about the inclusion of forensic science and *CSI* in science classes without time to completely investigate concepts or making sure that the students fully understand the differences between *CSI* and real world forensic science. Bergslien (2006) believes that, "...the manner in which forensic science is sometimes presented in the classroom has the potential of reinforcing the *CSI* effect," and causes students to think that forensic science is like the experiments they conduct in the classroom in which a clear answer is found from ample samples that can be precisely identified (690). Colgan (2002), however, points out that the hands-on nature of forensic sciences classes and lessons can keep students engaged in learning and that forensic sciences classes can be rigorous, citing one class in Vermont in which two of the 50 high school students failed.

Forensic science has become a common part of science instruction throughout the country as both an individual class and as a lesson incorporated into other science classes. While this instruction may not be especially thorough or delve deep enough into the differences between reality and *CSI*, it appears that it is at least attempting to make students understand how real-life forensic science works. It is adapting something that many students are already interested in and combining it with science such as biology and

chemistry, subjects students may have not been interested in before, perhaps causing some students to consider a career in science or forensic science.

Forensic Science University Programs

According to VanLaerhoven and Anderson (2009), one of the most fictional parts of *CSI* is the portrayal of the main characters' education and careers. While the characters on *CSI* are portrayed as generalists who dabble in many different areas of forensic science, the authors point out that real-life forensic scientists typically concentrate in one area after years of specialized training. Thus, beginning students often come in with a belief that they can have a career like they have seen on TV, but advisors and mentors within forensic science programs can help dispel this myth and redirect a student's focus onto achievable career paths.

While studies have been conducted on the characteristics of criminal justice (Southerland, 1991; Flanagan, 1990; Kuykendall, 1977) and computer forensics university programs (Gottschalk *et al*., 2005) in the U.S., examining the subject areas focused on and course content, no similar studies have been on U.S. forensic science programs. However, VanLaerhoven and Anderson (2009) did investigate the availability of forensic science post-secondary programs in Canada. They found that pre-*CSI* (before 2000) there were not many formalized programs specializing in forensic disciplines, but that since the debut of *CSI*, many programs have developed, and the majority of forensic-related degree programs currently available in Canada were formed after the debut of *CSI*. In addition, VanLaerhoven and Anderson (2009) point out that because of the increased interest in

studying forensic-related areas, the demand for forensic jobs has outpaced the supply, leading students with forensic degrees to seek employment in other fields. The authors note that this can have the positive effect of increasing the scientific knowledge of the workforce in general.

In order to investigate the popularity of forensic science at universities in relation to the *CSI* effect, the number and year of creation of forensic science-related degree programs around the US were investigated. Lists were generated for US universities with forensic science, forensic chemistry, forensic psychology, and other forensic degrees, both undergraduate and graduate. Online degree programs, certificates, associates degrees, and concentrations or specializations were excluded in order to create manageable lists of the typical degrees that people seriously pursuing a career in forensic science would pursue. Using these criteria, 26 forensic science BS programs, 21 forensic science MS programs, nine forensic chemistry BS programs, one forensic psychology BA program, one forensic psychology BS program, one forensic psychology MA program, one forensic psychology PhD program, and 17 other forensic-related degree programs were found.

Of the 25 forensic science BS programs (see Table 21), the starting year was available for 21 of the programs. Of these 21, 6 (or 28.6%) were created before *CSI* debuted on television (October 6, 2000). Of the 21 forensic science MS programs (see Table 22), all had available starting years. Ten of the MS programs (47.6%) began before *CSI* premiered.

Of the nine forensic chemistry programs (see Table 23), six had known starting years. Of these six programs, four (66.7%) began before the premiere of *CSI*. Of the four forensic psychology degree programs (see Table 24), the starting year of only one, the BS

degree, was known, and this program began in 2003, after the premiere of *CSI*. Regarding the other forensic degree programs, consisting of degree programs with specialties or names other than those in the previous four groups (see Table 25), 12 of the 18 degree programs had known starting years. Of these 12, all but one (91.7%) began after *CSI* premiered on television.

Table 21. List of forensic science BS degree programs.

Degree	Type	University	City	Date began
Forensic Science	BS	Defiance College	Defiance, OH	N/A
Forensic Science	BS	Eastern Kentucky University	Richmond, KY	N/A
Forensic Science	BS	John Jay College of Criminal Justice	New York, NY	N/A
Forensic Science	BS	Alvernia College	Reading, PA	N/A
Forensic Science	BS	University of Central Florida	Orlando, FL	1968
Forensic Science	BS	University of New Haven	West Haven, CT	1981
Forensic Science	BS	Chaminade University	Honolulu, HI	1996
Forensic Science	BS	Albany State University	Albany, GA	1998
Forensic Science	BS	University of North Dakota	Grand Forks, ND	1999
Forensic Science	BS	Waynesburg College	Waynesburg, PA	1999
Forensic Science	BS	Columbia College	Columbia, MO	2001
Forensic Science	BS	Russell Sage College	Troy, NY	2001
Forensic Science	BS	Virginia Commonwealth University	Richmond, VA	2001
Forensic Science	BS	Pace University	New York, NY	2002
Forensic Science	BS	Baylor University	Waco, TX	2002
Forensic Science	BS	San Jose State University	San Jose, CA	2003
Forensic Science	BS	Seattle University	Seattle, WA	2003
Forensic Science	BS	Loyola University Chicago	Chicago, IL	2004
Forensic Science	BS	Madonna University	Livonia, MI	2004
Forensic Science	BS	Simpson College	Indianola, IA	2005
Forensic Science	BS	University of Southern Mississippi	Hattiesburg, MS	2005
Forensic Science	BS	University of Findlay	Findlay, OH	2005
Forensic Science	BS	Pennsylvania State University	State College, PA	2005
Forensic Science	BS	St. Edward's University	Austin, TX	2005
Forensic Science	BS	University of Nebraska, Lincoln	Lincoln, NE	2007

Table 22. List of forensic science MS degree programs.

Degree	Type	University	City	Date began
Forensic Science	MS	Syracuse University	Syracuse, NY	N/A
Forensic Science	MS	University of Central Florida	Orlando, FL	1968
Forensic Sciences	MS	George Washington University	Washington, DC	1968
Forensic Science	MS	John Jay College of Criminal Justice	New York, NY	1968
Forensic Science	MS	University of Illinois at Chicago	Chicago, IL	1974
Forensic Science	MS	University of New Haven	West Haven, CT	1981
Forensic Science	MS	Michigan State University	Ann Arbor, MI	1994
Forensic Science	MS	Marshall University	Huntington, WV	1995
Forensic Science	MS	Florida International University	Miami, FL	1998
Forensic Science	MS	Cedar Crest College	Allentown, PA	1999
Forensic Science	MS	Nebraska Wesleyan University	Lincoln, NE	2000
Forensic Science and Law	MS	Duquesne University	Pittsburgh, PA	2001
Forensic Science	MS	Sam Houston State University	Huntsville, TX	2001
Forensic Science	MS	University of California, Davis	Davis, CA	2002
Forensic Science	MS	Pace University	New York, NY	2002
Forensic Science	MS	Arcadia University	Glenside, PA	2003
Forensic Science	MS	Virginia Commonwealth University	Richmond, VA	2003
Forensic Science	MS	University of Southern Mississippi	Hattiesburg, MS	2005
Forensic Science	MS	Pennsylvania State University	State College, PA	2006
Forensic Science	MS	Chaminade University	Honolulu, HI	2008
Forensic Science	MS	Buffalo State College	Buffalo, NY	2008
Forensic Science	MS	University of Central Oklahoma	Edmond, OK	2009

Table 23. List of forensic chemistry degree programs.

Degree	Type	University	City	Date began
Forensic Chemistry	BS	West Chester University	West Chester, PA	N/A
Forensic Chemistry	BS	York College	York, PA	N/A
Forensic Chemistry	BS	Sam Houston State University	Huntsville, TX	N/A
Forensic Chemistry	BS	University of Mississippi	Oxford, MS	1974
Forensic Chemistry	BS	Ohio University	Athens, OH	1974
Forensic Chemistry	BS	Buffalo State College	Buffalo, NY	1997
Forensic Chemistry	BS	Loyola University, New Orleans	New Orleans, LA	1998
Forensic Chemistry	BS	Eastern Washington University	Cheney, WA	2003
Forensic Chemistry	BS	St. Edward's University	Austin, TX	2005

Table 24. List of forensic psychology degree programs.

Degree	Type	University	City	Date began
Forensic Psychology	BA	John Jay College of Criminal Justice	New York, NY	N/A
Forensic Psychology	MA	John Jay College of Criminal Justice	New York, NY	N/A
Forensic Psychology	PhD	John Jay College of Criminal Justice	New York, NY	N/A
Forensic Psychology	BS	Seattle University	Seattle, WA	2003

Table 25. List of other forensic degree programs.

Degree	Type	University	City	Date began
Forensic Mental Health Counseling	MA	John Jay College of Criminal Justice	New York, NY	N/A
Forensic Biology	BS	Guilford College	Greensboro, NC	N/A
Forensic Investigation	BS	Mountain State University	Beckley, WV	N/A
Forensic and Investigative Science	BS	West Virginia University	Morgantown, WV	N/A
Anthropology	MS	Mercyhurst College	Erie, PA	N/A
Computer Forensics	BS	International Academy of Design & Technology	Chicago, IL	N/A
Scientific Forensic Technology	BS	Dakota State University	Madison, SD	N/A
Forensic Studies	BS	University of Baltimore	Baltimore, MD	2000
Criminal Investigation	BT*	State University of New York, Canton	Canton, NY	2001
Forensic Genetics	MS	University of North Texas	Forth Worth, TX	2001
Applied Forensic Sciences	BS	Mercyhurst College	Erie, PA	2002
Criminal Forensic Studies	BS	Florida Gulf Coast University	Fort Myers, FL	2003
Forensic Biology	BS	Ferris State University	Big Rapids, MI	2003
Forensic Computing	MS	John Jay College of Criminal Justice	New York, NY	2004
Criminal Forensic Studies	MS	Florida Gulf Coast University	Fort Myers, FL	2006
Biomedical Forensic Science	MS	Boston University School of Medicine	Boston, MA	2006
Forensic Biochemistry	BS	Northern Michigan University	Marquette, MI	2007
Forensic and Investigative Science	MS	West Virginia University	Morgantown, WV	2008
Forensic Anthropology	MS	Boston University School of Medicine	Boston, MA	2009

*Bachelor of Technology

Survey of Forensic Anthropology Students

In order to investigate whether interest in forensic science television programs and novels has an effect on students' career and educational choices, a survey was designed and distributed to students enrolled in a forensic anthropology course at a Southeastern university. This research sought to answer three specific questions:

1. Did taking a forensic science course influence students' viewing habits and desire to pursue forensic science graduate study and careers?
2. Is there a relationship between forensic science media consumed and desire to pursue forensic science graduate study and careers?

3. Did taking a forensic science course have an effect on how realistic students felt forensic dramas were?

Methods

The surveys used in this study were distributed to undergraduate students at a Southeastern university enrolled in an introductory forensic anthropology course. See Appendix B for IRB approval forms. IRB approval was obtained on August 10, 2005, and renewed on July 7, 2006, and June 7, 2007. Surveys were administered over a three-year period. Students were given an initial survey on the second day of class and a follow-up survey on the last day of class before the final examination. See Table 26 for a breakdown of the number of complete surveys (consisting of both a beginning and follow-up survey) by semester. Beginning and end of the semester surveys from the same respondents were matched together. Each survey asked a number of different questions related to the following categories: sex, major, minor, class standing, and full-time or part-time status; extracurricular activities and jobs; interest in pursuing education at the graduate level; interest in forensic science media; how realistic the respondent felt forensic entertainment was; and interest in pursuing a career in forensic science. See Appendix C for a sample survey form.

Table 26. Number of students surveyed.

Semester	Percent	N
Fall 2005	12.0	33
Summer 2006	11.2	31
Fall 2006	18.5	51
Summer 2007	12.7	35
Fall 2007	22.8	63
Fall 2008	22.8	63
Total	100.0	276

Students were first asked their sex ["What is your sex? (please circle)"] and asked to circle either male or female. Next students were asked their major ["Check your major (if you have a double major check both majors)"] and instructed to check their major from a list of five different majors, undeclared, and an "other" category. For their minor, students were given a line to list any minors ("List your minor(s)"). For analysis, the number of students who wrote in forensic-related minors, such as forensic science, anthropology, and chemistry, was tabulated, while other minors were counted together in a category labeled "other." Students were next asked for their class standing ("What is your class standing?"), followed by five options, freshman, sophomore, junior, senior, and 5th year. The next question asked students whether had been attending UCF as a full-time or part-time student ["Have you been attending UCF as a part-time or full-time student? (please circle)"] and asked them to circle either part-time only, full-time only, or both full-time and part-time. Following this, students were asked if they participated in extracurricular activities ["In addition to your studies, do you participate in extracurricular activities? (please circle)"] and instructed to circle to either yes or no.

Two questions were asked about jobs. First, students were asked whether or not they had a job ["In addition to your studies, do you have a job? (please circle one)"] and were prompted to circle either yes or no. Next, students were asked whether they had a forensic or law enforcement job ("Are you working in a forensic or law enforcement job?") and were asked to circle yes or no. After this, students were asked if they had recently become interested in forensics because of the popularity of forensics in mass media ["Have you recently become interested in forensics because of the popularity of forensics in mass media (TV, movies, etc.) and books?"] and given space to circle either yes or no. Next, students were asked why they enrolled in the class ["Why did you enroll in this class (you may check more than one)?"] and given six different options they could check (counts toward my major, counts toward my minor, I want to complete the Crime Scene Certificate, I have a general interest in forensics and want to pursue a career in forensics and death investigation, I have a general interest in forensics but do not want to pursue a career in forensics, and other).

The next section of the survey consisted of questions regarding forensic science media, and students were asked to indicate whether they watched the television show listed or read books by the authors listed. These questions were divided into three sections consisting of authors ["Do you read novels from the following authors? (please circle all that apply)"], television dramas ["Do you watch any of the following forensic dramas: (please circle all that apply)"], and nonfiction shows ["Do you watch any of the following real-life forensic shows? (check all that apply)"].

For authors, Patricia Cornwell, Kathy Reichs, and Ann Rule were listed. For television dramas, *CSI*, *CSI: Miami*, *CSI: NY*, *Crossing Jordan*, and *Bones* were listed. For nonfiction shows, *Forensic Files*, *The Investigators*, *Dr. G: Medical Examiner*, *Cold Case Files*, *American Justice*, *Investigative Reports*, *New Detectives/FBI Files*, *Body of Evidence*, *I, Detective!*, and *Extreme Evidence* were included along with a space to write in other shows the student may watch. Regarding television dramas, students were also asked how realistic they thought these shows were ["On average, how realistic do you think these shows are (please circle one)"]. At the beginning of the semester students were given a choice of five answers (very realistic, realistic, somewhat realistic, somewhat unrealistic, and very unrealistic). However, at the end of the semester, only four answers were available (very realistic, somewhat realistic, somewhat unrealistic, and very unrealistic). Because of this, answers of "realistic" at the beginning of the semester were recoded into "somewhat realistic" in order to conduct analysis.

To examine interest in forensic science careers students were asked which careers they wanted to pursue ("Do you want to pursue a career in any of the following areas?") given a choice of 15 forensic science-related careers – crime scene investigator, law enforcement, lawyer, death investigator, autopsy technician, forensic pathologist, full-time forensic anthropologist, university professor that is a consulting forensic anthropologist, archaeologist, FBI, human rights, mass disaster, Disaster Mortuary Response Team (DMORT), Florida Emergency Response Mortuary Team (FEMORS), and the Central Identification Laboratory in Hawaii (CILHI). Similar questions were also asked regarding whether the students wanted to pursue a graduate degree ("Do you plan to pursue a

graduate degree?"), with students first asked to circle yes or no regarding whether they wanted to attend graduate school and then asked to circle what type of graduate degree they wished to pursue, medicine, law, master's, PhD, or other ("If yes, please select all that apply and in what subject areas").

Analysis of the survey data began with descriptive statistics. After this, percentages of students who watched or read specific forensic-related authors and television shows, wanted to pursue specific forensic science careers and wanted to pursue different types of graduate degrees were generated for both the beginning and end of the semester. Next, the number of forensic science media consumed was examined in relation to respondents' desire to pursue forensic science careers (yes/no) or graduate study (yes/no) by conducting t-tests on the data. Three new variables were created to measure different types of media consumption, one for the total number forensic science authors read, one for the total number of forensic science dramas watched, and one for the total number non-fiction forensic science shows watched.

Results

See Table 27 for demographic data. The majority of respondents (73.9%) were female, and most were anthropology, criminal justice, or forensic science majors, although some were sociology and psychology majors. Two respondents were undeclared while 40 had a variety of other majors. A large number of respondents also had minors, with chemistry being the most popular followed by anthropology. Thirteen percent of respondents had majors unrelated to forensic science (the "other" category). The majority

of respondents were either junior or seniors (78.7%). Freshman, sophomores, and 5th year students were all also represented, however.

Eight in ten respondents reported that they were full-time students, while 15.3% said they were both full-time and part-time, and 3.6% said they were part-time only. Half of the respondents reported that they participated in extracurricular activities, and 63.8% reported that they had a job. However, only 3.3% of respondents reported having a forensic science-related job.

Regarding interest in forensics and reasons for taking the Introduction to Forensic Anthropology class, only 17.7% of respondents indicated that they had recently become interested in forensic science because of the popularity of forensics in mass media. Nearly three-fourths of respondents (72.8%) said that they were taking the class because it counted for either their major or minor, while nearly half (48.9%) were taking the class to complete a Crime Scene Certificate. Just over three-fourths of respondents (78.3%) indicated they were taking the class because they were interested in forensics, with 55.1% of these saying they wanted to pursue a career in forensics.

Table 27. Demographic characteristics of survey respondents.

Characteristic	Percent	N
Sex		
Female	73.9	204
Major		
Criminal justice	34.5	96
Anthropology	31.5	87
Forensic science	23.2	64
Psychology	4.71	13
Sociology	0.70	2
Other	14.5	40
Undeclared	0.70	2
Minor		
Chemistry	15.2	42
Anthropology	9.06	25
Criminal justice	6.16	17
Psychology	5.43	15
Sociology	3.99	11
Legal studies	3.26	9
Behavioral science	2.54	7
Biology	2.17	6
Criminal profiling	1.09	3
Criminology	0.72	2
Behavioral profiling	0.36	1
Other	13.0	36
Class standing		
Freshman	1.1	3
Sophomore	8.8	24
Junior	36.6	100
Senior	42.1	115
5th year	11.4	31
Full-time or part-time status		
Part-time only	3.6	10
Full-time only	81.1	223
Both full-time and part-time	15.3	42
Extracurricular activity		
Participated in extracurricular activities	50.0	137
Job status		
Had a job	63.8	176
Had a forensic or law enforcement job	3.3	9
Interest in forensics		
Had recently become interested in forensics	17.7	48
Why respondent enrolled in class		
Counts toward major	63.0	174
Counts toward minor	9.8	27
Complete Crime Scene Certificate	48.9	135
Interest in forensics and want to pursue career in it	55.1	152
Interest in forensics but don't want to pursue career	23.2	64
Other	10.5	29

Note: Respondents could list multiple majors, minors, and reasons for taking the class. Three respondents did not provide a class standing and one respondent did not provide a status.

Most respondents reported that they were interested in pursuing at least one forensic science-related career at both the beginning and end of the semester (see Table 28). Crime scene investigator was the most popular career choice at both the beginning and end of semester, with 50.7% wishing to pursue this career choice at the beginning and 46.7% at the end. The second most popular career choice was the FBI, with 38.4% of respondents indicating they wanted to pursue this career at the beginning and 39.9% at the end. Significant percentages of respondents also indicated they were interested in pursuing careers as death investigators (21.7% at the beginning and 23.6% at the end) or as autopsy technicians (16.3% at the beginning and 17.4% at the end). For the majority of careers, the number of students reporting they wished to pursue them increased from the beginning to the end of the semester. Only crime scene investigator, forensic pathologist, full-time forensic anthropologist, and university professor that is consulting forensic anthropologist saw decreases while law enforcement stayed the same.

A large majority of respondents indicated that they wanted to pursue a graduate degree at both the beginning (80.4%) and end (79.2%) of the semester (see Table 29). The most popular type of graduate degree that respondents wanted to pursue was a Masters, with 57.6% indicating that they wished to pursue one at the beginning of the semester and 56.9% at the end. A PhD was the second most popular type, with 29.3% at the beginning and 30.1% at the end. Law and medicine were the third and fourth most popular, respectively, at the beginning of the semester, while at the end of the semester more respondents wished to pursue other types of graduate degrees (5.8%) than degrees in medicine (5.4%). Four out of five types of graduate degrees (law, medicine, PhD, and other)

saw an increase in the number of students who wanted to pursue them from the beginning to the end of the semester, while there was a decrease in the number of respondents who wanted to pursue a graduate degree in general.

Table 28. Survey respondents who want to pursue careers at beginning and end of semester (N=276).

Career	Beginning of semester % (N)	End of semester % (N)	Increase?
Crime scene investigator	50.7 (140)	46.7 (129)	N
FBI	38.4 (1.06)	39.9 (110)	Y
Law enforcement	26.4 (73)	26.4 (73)	N
Death investigator	21.7 (60)	23.6 (65)	Y
Autopsy technician	16.3 (45)	17.4 (48)	Y
Archaeologist	13.4 (37)	15.2 (42)	Y
University professor that is a consulting forensic anthropologist	12.3 (34)	12.0 (33)	N
Full-time forensic anthropologist	12.0 (33)	9.1 (25)	N
Mass disaster	11.2 (31)	12.0 (33)	Y
Forensic pathologist	8.3 (23)	8.0 (22)	N
Human rights	8.3 (23)	11.2 (31)	Y
Lawyer	8.3 (23)	10.1 (28)	Y
DMORT	6.2 (17)	6.9 (19)	Y
CILHI	6.2 (17)	7.6 (21)	Y
FEMORS	3.6 (10)	4.3 (12)	Y

Note: Respondents could select multiple careers.

Table 29. Survey respondents who want to pursue a graduate degree at beginning and end of semester (N=276).

Degree	Beginning of semester % (N)	End of semester % (N)	Increase?
Graduate degree in general	80.4 (213)	79.2 (210)	N
Masters	57.6 (159)	56.9 (157)	N
PhD	29.3 (81)	30.1 (83)	Y
Law	10.5 (29)	11.2 (31)	Y
Medicine	5.1 (14)	5.4 (15)	Y
Other	3.3 (9)	5.8 (16)	Y

Note: Respondents could select multiple graduate degrees.

Regarding consumption of forensic media, a majority of respondents watched at least one nonfiction show or television drama, while the majority of respondents did not read forensic science novels. Patricia Cornwell was the most read author, with 22.8% reporting that they read her books at the beginning of the semester and 31.9% reporting that they them at the end of the semester (see Table 30). Kathy Reichs was the second most commonly read author followed closely behind by Ann Rule. A greater proportion of respondents indicated they read novels by Kathy Reichs and Patricia Cornwell at the end of the semester than at the beginning, but the proportion of respondents who said that they read novels by Ann Rule decreased between the beginning and end of the semester.

Table 30. Survey respondents who read novels from specific authors at the beginning and end of the semester (N=276).

Author	Beginning of semester % (N)	End of semester % (N)	Increase?
Patricia Cornwell	22.8 (63)	31.9 (88)	Y
Kathy Reichs	7.6 (21)	9.1 (25)	Y
Ann Rule	7.6 (21)	6.5 (18)	N

Forensic Files was the most commonly watched nonfiction show (59.8% at the beginning of the semester and 57.6% at the end) followed by *Cold Case Files*, *Dr. G: Medical Examiner*, *New Detectives/FBI Files*, and *Body of Evidence*, respectively (see Table 31). Twelve percent of respondents at the beginning of the semester and 11.6% at the end of the semester reported watching nonfiction shows other than those listed. A greater proportion of respondents indicated they were viewers at the end of the semester than at the beginning for only three out of the ten nonfiction shows used in the survey (*Dr. G: Medical Examiner*, *Investigative Reports*, and *Body of Evidence*).

CSI was the most watched forensic drama at both the beginning (52.5%) and end (53.5%) of the semester (see Table 32). *CSI: Miami* was the second most watched show at the beginning of the semester (26.4%), while *Bones* was the second most watched at the end of the semester (30.2%). *CSI: NY* was the third most watched at the beginning (14.5%) and end of the semester (14.2%), and *Crossing Jordan* had the fewest number of respondents who reported watching it at the beginning (12.3%) and end of the semester (9.5%). Two of the forensic dramas, *CSI* and *Bones*, saw an increase in viewers between the beginning and end of the semester.

Table 31. Survey respondents who watched non-fiction forensic shows at the beginning and end of the semester (N=276).

Show	Beginning of semester % (N)	End of semester % (N)	Increase?
Forensic Files	59.8 (165)	57.6 (159)	N
Cold Case Files	51.8 (143)	44.6 (123)	N
Dr. G: Medical Examiner	30.1 (83)	37.7 (104)	Y
New Detectives/FBI Files	26.1 (72)	22.8 (63)	N
Body of Evidence	22.5 (62)	23.9 (66)	Y
The Investigators	21.0 (58)	16.7 (46)	N
American Justice	19.6 (54)	18.1 (50)	N
Investigative Reports	12.0 (33)	17.0 (47)	Y
I, Detective!	8.3 (23)	8.0 (22)	N
Extreme Evidence	6.5 (18)	5.8 (16)	N
Other	12.0 (33)	11.6 (32)	N

Table 32. Survey respondents who watched forensic dramas at the beginning and end of the semester (N=276).

Show	Beginning of semester % (N)	End of semester % (N)	Increase?
CSI	52.5 (145)	53.5 (147)	Y
CSI: Miami	26.4 (73)	21.8 (60)	N
Bones	25.7 (71)	30.2 (83)	Y
CSI: NY	14.5 (40)	14.2 (39)	N
Crossing Jordan	12.3 (34)	9.5 (26)	N

A plurality of respondents at the beginning of the semester (41.9%) indicated that they felt that forensic dramas were somewhat unrealistic while 29.4% felt that they were somewhat realistic and 28.3% felt that they were very realistic (see Table 33). Only one respondent felt that they were very realistic at both the beginning and end of the semester. At the end of the semester a plurality of respondents (46.5%) felt that forensic dramas were very unrealistic and 33.9% felt that they were somewhat unrealistic. Out of all four categories, there was only an increase in the number of students who felt that forensic dramas were very unrealistic between the beginning and end of the semester.

Table 33. How realistic survey respondents thought the forensic dramas were at the beginning and end of the semester.

Opinion	Beginning of semester % (N)	End of semester % (N)	Increase?
Very unrealistic	28.3 (75)	46.5 (126)	Y
Somewhat unrealistic	41.9 (111)	33.9 (92)	N
Somewhat realistic	29.4 (78)	19.2 (52)	N
Very realistic	0.4 (1)	0.4 (1)	N

Note: 11 survey respondents did not answer this question.

The change in respondents who indicated they viewed or read specific forensic media, wanted to pursue graduate degrees, or wanted to pursue specific forensic-related careers was analyzed using Pearson chi-square analysis. All types of forensic media saw statistically significant changes in the respondents who said that they watched or read them between the beginning and end of the semester (see Table 34). For two out of three authors (Kathy Reichs and Ann Rule), a higher percentage of people switched from reading at the beginning of the semester to not reading at the end than switched from not reading to reading. For Patricia Cornwell, however, more respondents switched from not reading at

the beginning of the semester to reading at the end. The majority of non-fiction shows also saw higher percentages of people stop watching than start watching at the end of the semester. Only two non-fiction shows, *Forensic Files* and *Dr. G: Medical Examiner*, saw a higher percentage of people switch to watching at the end of the semester than stop watching. For the forensic dramas, only *CSI* had a higher percentage of people begin watching than stop watching at the end of the semester. All others, *CSI: Miami*, *CSI: NY*, *Crossing Jordan*, and *Bones*, saw greater percentages stop watching.

Regarding change in respondents who wanted to pursue specific careers, all careers saw greater percentages of people switch from wanting to pursue a specific career at the beginning of the semester to not wanting to at the end of the semester than switch from not wanting to at the beginning to wanting to at the end (see Table 35). FEMORS saw the largest percentage change in this regard, with 70.0% of the people who said they wanted to pursue this career at the beginning of the semester switching to not wanting to at the end. Five other careers, forensic pathologist, full-time forensic anthropologist, mass disaster, DMORT, and CILHI, also had more than half of the people who said they wanted to pursue these careers at the beginning of the semester switch to not wanting to at the end. On the other end, lawyer was the career path that saw the least amount of change, with only 6.7% respondents changing their opinion regarding it. Like with forensic media, all careers saw statistically significant changes.

Table 34. Change in respondents who read authors or watched television shows from beginning to end of semester.

Media	No → Yes (N)	Yes → No (N)	Pearson chi-square value
Kathy Reichs	3.1 (8)	19.0 (4)	142.6***
Patricia Cornwell	15.5 (33)	12.7 (8)	115.4***
Ann Rule	2.0 (5)	38.1 (8)	114.4***
Forensic Files	18.9 (21)	16.4 (27)	113.8***
The Investigators	6.0 (13)	43.1 (25)	85.6***
Dr. G: Medical Examiner	18.7 (36)	18.1 (15)	99.0***
Cold Case Files	15.8 (21)	28.7 (41)	86.0***
Investigative Reports	11.5 (28)	42.4 (14)	43.6***
American Justice	5.0 (11)	27.8 (15)	132.5***
New Justice/ FBI Files	6.9 (14)	31.9 (23)	113.1***
Body of Evidence	9.8 (21)	27.4 (17)	104.1***
I, Detective!	2.4 (6)	30.4 (7)	129.8***
Extreme Evidence	3.1 (8)	55.6 (10)	52.7***
Other non-fiction	8.2 (20)	63.6 (21)	22.4***
CSI	10.7 (14)	7.6 (11)	183.9***
CSI: Miami	4.9 (10)	30.6 (22)	129.7***
CSI: NY	3.8 (9)	23.1 (9)	147.0***
Crossing Jordan	0.4 (1)	24.2 (8)	192.6***
Bones	12.7 (26)	19.7 (14)	114.0***

***P < .001

All types of graduate degrees also saw statistically significant changes in the number of respondents who switched from no to yes and from yes to no (see Table 36). The "other" category, in which respondents could write in what type of graduate degree they wished to pursue, saw the largest percentage of students switch from saying yes at the beginning to saying no at the end (77.8%), while the smallest percentage of respondents (5.2%) switched from not wanting to pursue medicine at the beginning to wanting to pursue it at the end. More respondents switched to wanting to pursue a graduate degree than switched to not wanting to pursue a graduate degree for both a graduate degree in general and

Masters degree. For law, medicine, and PhD degrees, a greater proportion of students switched to not wanting to pursue these degrees than switched to wanting to pursue them.

Table 35. Change in respondents who wanted to pursue specific careers from beginning to end of semester.

Career	No → Yes (N)	Yes → No (N)	Pearson chi-square value
Crime scene investigator	11.0 (15)	18.6 (26)	137.3***
Law enforcement	7.4 (15)	20.5 (15)	143.3***
Lawyer	2.4 (6)	4.3 (1)	201.2***
Death investigator	14.8 (32)	45.0 (27)	42.1***
Autopsy technician	10.8 (25)	48.9 (22)	42.6***
Forensic pathologist	4.3 (11)	52.2 (12)	54.3***
Full-time forensic anthropologist	4.5 (11)	57.6 (19)	50.7***
University professor that is consulting forensic anthropologist	5.0 (12)	38.2 (13)	91.4***
Archaeologist	6.3 (15)	27.0 (10)	110.5***
FBI	20.0 (34)	28.3 (30)	72.8***
Human rights	6.3 (16)	34.8 (8)	73.3***
Mass disaster	8.2 (20)	58.1 (18)	29.8***
DMORT	5.0 (13)	64.7 (11)	22.8***
FEMORS	3.4 (9)	70.0 (7)	16.4***
CILHI	5.0 (13)	52.9 (9)	40.1***

***P < .001

Table 36. Change in respondents who wanted to pursue a graduate degree from beginning to end of semester.

Type	No → Yes (N)	Yes → No (N)	Pearson chi-square value
Graduate degree in general	21.2 (11)	6.6 (14)	132.7***
Law	4.0 (10)	27.6 (8)	121.7***
Medicine	1.1 (3)	14.3 (2)	184.9***
Masters	23.9 (28)	18.9 (30)	88.9***
PhD	12.3 (24)	27.2 (22)	99.7***
Other	5.2 (14)	77.8 (7)	4.6*

*P < .05, ***P < .001

Independent samples t-tests were conducted in order to examine the mean number of television dramas a respondent watched and its relationship with the desire to pursue a

forensic science-related career (yes/no). Respondents who wanted pursue FBI and FEMORS careers at the beginning of the semester and DMORT and FEMORS careers at the end of the semester reported that they watched significantly more dramas than those who did not want to pursue those careers (see Table 37). In contrast, respondents who wanted to pursue archaeology reported that they watched significantly fewer dramas than those who did not want to pursue archaeology. Regarding pursuit of a graduate degree, the mean number of dramas watched was significantly different between those who did not wish to pursue a graduate degree and those that did for only the "other" category at the beginning of the semester (see Table 38). Individuals who wanted to pursue an "other" type of graduate degree watched fewer shows than those who did not want to pursue an "other" degree.

Table 37. Effect of number of forensic science television dramas watched on desire to pursue career at beginning and end of semester.

Career	Mean # of dramas at beginning	Mean # of dramas at end
Crime scene investigator		
No	1.15	1.24
Yes	1.47	1.35
Law enforcement		
No	1.32	1.32
Yes	1.30	1.21
Lawyer		
No	1.30	1.28
Yes	1.43	1.43
Death investigator		
No	1.25	1.24
Yes	1.51	1.45
Autopsy technician		
No	1.27	1.25
Yes	1.56	1.48
Forensic pathologist		
No	1.30	1.29
Yes	1.52	1.32
Full-time forensic anthropologist		
No	1.31	1.28
Yes	1.33	1.44
University professor that is consulting forensic anthropologist		
No	1.34	1.33
Yes	1.15	0.97
Archaeologist		
No	1.38*	1.32
Yes	0.86	1.12
FBI		
No	1.16*	1.19
Yes	1.56	1.45
Human rights		
No	1.34	1.33
Yes	1.00	0.97
Mass disaster		
No	1.27	1.26
Yes	1.65	1.53
DMORT		
No	1.29	1.25*
Yes	1.65	1.89
FEMORS		
No	1.28*	1.24***
Yes	2.20	2.42
CILHI		
No	1.29	1.27
Yes	1.65	1.57

*P < .05, ***P < .001

Table 38. Effect of number of forensic science television dramas watched on desire to pursue graduate degree at beginning and end of semester.

Type	Mean # of dramas at beginning	Mean # of dramas at end
Graduate degree in general		
No	1.18	1.29
Yes	1.37	1.30
Law		
No	1.28	1.28
Yes	1.62	1.35
Medicine		
No	1.28	1.28
Yes	1.93	1.47
Masters		
No	1.20	1.28
Yes	1.40	1.30
PhD		
No	1.31	1.29
Yes	1.33	1.30
Other		
No	1.35*	1.26
Yes	0.33	1.81

*P < .05

The relationship between viewing of forensic science television dramas and career and graduate study choices at the beginning and end of the semester was also examined separately for males and females. This analysis is not shown in a table. For the three careers where there were significant differences when looking at the group as a whole at the beginning of the semester, different patterns emerged when considering males and females separately. Women who wanted to pursue archaeology watched significantly fewer dramas (mean of 0.97) than those who did not want to (mean of 1.54) while the differences for males were not significant. Women who were interested in a career with the FBI (mean of 1.70) watched significantly more dramas than women who were not interested in this career (mean of 1.28), but the difference for males was not statistically significant. For

FEMORS, males who wanted to pursue this career watched significantly more dramas (mean of 0.84) than those who did not (mean of 3.00) while the differences for females were not statistically significant.

Looking at the end of the semester, while university professor that is a consulting anthropologist and FBI careers did not show significant differences for the group as a whole, both were significant for females. Women who wanted to be university professors that are consulting anthropologists watched fewer dramas (mean of 1.00) than those who did not want to pursue this career (mean of 1.53), and women who wanted to pursue a career with the FBI watched significantly more dramas (mean of 1.69) than women who were not interested in this career (mean of 1.32). In addition, while the "other" type of graduate degree did not show significant differences for the group as a whole, males who wanted to pursue an "other" graduate degree watched significantly more dramas (mean of 1.71) than those did not want to pursue this type of graduate degree (mean of 0.72).

The number of forensic science novels read was significantly different between the respondents who did and did not want to pursue specific careers for only crime scene investigator, human rights, DMORT, and CILHI (see Table 39). In all four cases, respondents who did want to pursue these careers read a higher mean number of authors than those who did not. This was also the case for the end of the semester, where of authors read was statistically different only between those that did and did not wish to pursue careers in crime scene investigation and DMORT. While the number of authors read was not significant for any type of graduate degree at the beginning of the semester, those that

wished to pursue a Masters or PhD at the end of the semester read significantly more authors than did those who did not (see Table 40).

Following analysis of the group as a whole, males and females were analyzed separately in order to evaluate differences in the relationship between the number of forensic science novels read and career and graduate study choices. This analysis is not shown in a table. At the beginning of the semester both human rights and CILHI careers produced significant results for the group as a whole. However, when males and females were examined separately it was found that the results were only significant for females. Women who wanted to pursue careers in human rights and CILHI read more novels (means of 0.80 and 0.87, respectively) than women who did not want to pursue these careers (means of 0.40 for human rights and 0.39 for CILHI). Autopsy technician and law enforcement, which were not significant for the group as a whole were found to be significant for females. Women who wanted to pursue careers in law enforcement and as autopsy technicians read significantly more novels (means of 0.64 and 0.67, respectively) than women who were not interested in these careers (means of 0.37 for law enforcement and 0.38 for autopsy technician). Two types of graduate study that were not significant for the group as a whole were found to be significant for males. Men who wanted to pursue graduate study in general and a PhD specifically read more novels (means of 0.61 and 1.00, respectively) than men who were not interested in pursuing these types of graduate study (means of 0.00 for general graduate study and 0.13 for PhD).

Table 39. Effect of number of forensic science novels read on desire to pursue career at beginning and end of semester.

Career	Mean # of authors at beginning	Mean # of authors at end
Crime scene investigator		
No	0.29*	0.37**
Yes	0.46	0.60
Law enforcement		
No	0.37	0.46
Yes	0.41	0.52
Lawyer		
No	0.39	0.50
Yes	0.26	0.25
Death investigator		
No	0.37	0.45
Yes	0.42	0.57
Autopsy technician		
No	0.35	0.48
Yes	0.53	0.44
Forensic pathologist		
No	0.37	0.49
Yes	0.52	0.32
Full-time forensic anthropologist		
No	0.39	0.48
Yes	0.33	0.40
University professor that is consulting forensic anthropologist		
No	0.38	0.49
Yes	0.41	0.39
Archaeologist		
No	0.39	0.48
Yes	0.32	0.45
FBI		
No	0.35	0.46
Yes	0.43	0.50
Human rights		
No	0.36*	0.47
Yes	0.65	0.48
Mass disaster		
No	0.36	0.45
Yes	0.55	0.64
DMORT		
No	0.36*	0.46
Yes	0.71	0.74
FEMORS		
No	0.37	0.45*
Yes	0.70	0.92
CILHI		
No	0.36*	0.48
Yes	0.76	0.43

*P < .05, **P < .01

Table 40. Effect of number of forensic science novels read on desire to pursue graduate degree at beginning and end of semester.

Type	Mean # of authors at beginning	Mean # of authors at end
Graduate degree in general		
No	0.25	0.42
Yes	0.42	0.50
Law		
No	0.39	0.50
Yes	0.31	0.26
Medicine		
No	0.37	0.48
Yes	0.64	0.40
Masters		
No	0.33	0.35**
Yes	0.42	0.57
PhD		
No	0.34	0.41*
Yes	0.48	0.63
Other		
No	0.38	0.48
Yes	0.33	0.38

*P < .05, **P < .01

At the end of the semester, one career that was significant for the group as a whole was found to only be significant for males when males and females were examined separately. Men who wanted to pursue careers as crime scene investigators (mean of 0.59) read significantly more novels than men who did not want to pursue this career (mean of 0.20). In regard to graduate study, two types of graduate study that were significant for the sample as a whole were found to only be significant for males when males and females were analyzed separately. Men who wanted to pursue Masters degrees (mean of 0.61) and PhDs (mean of 1.00) read significantly more novels than men who were not interested in these degrees (means of 0.18 for Masters and 0.27 for PhD). One type of graduate degree that was not significant for the sample as a whole was found to be significant for females.

Women who wanted to pursue law degrees (mean of 0.21) read significantly fewer novels than women who did not want to pursue a law degree (mean of 0.55).

For nonfiction shows, the mean number of shows watched was statistically significant between those who did and did not want to pursue a career at the beginning of the semester for crime scene investigator, law enforcement, death investigator, autopsy technician, archaeologist, and FEMORS (see Table 41). In all cases except archaeologist, respondents who wanted to pursue these careers watched more shows than those who did not. At the end of the semester, however, there were slightly different results. Respondents who wanted to pursue death investigator, autopsy technician, forensic pathologist, FBI, and FEMORS careers watched significantly more shows than those who did not want to pursue those careers. For graduate degrees (see Table 42), only the other category at the end of the semester showed a significant difference in the number of shows watched between those who said yes and those who said no.

Table 41. Effect of number of forensic science non-fiction television shows watched on desire to pursue career at beginning and end of semester.

Career	Mean # of shows at beginning	Mean # of shows at end
Crime scene investigator		
No	2.13**	2.24
Yes	2.81	2.58
Law enforcement		
No	2.28**	2.34
Yes	3.01	2.58
Lawyer		
No	2.44	2.38
Yes	2.83	2.57
Death investigator		
No	2.31*	2.17***
Yes	3.07	3.14
Autopsy technician		
No	2.34*	2.24**
Yes	3.16	3.17
Forensic pathologist		
No	2.43	2.31*
Yes	2.96	3.41
Full-time forensic anthropologist		
No	2.49	2.34
Yes	2.36	2.96
University professor that is consulting forensic anthropologist		
No	2.50	2.32
Yes	2.26	2.97
Archaeologist		
No	2.61**	2.43
Yes	1.59	2.24
FBI		
No	2.28	2.09**
Yes	2.77	2.86
Human rights		
No	2.44	2.42
Yes	2.83	2.26
Mass disaster		
No	2.43	2.32
Yes	2.77	3.00
DMORT		
No	2.42	2.37
Yes	3.24	2.84
FEMORS		
No	2.40**	2.31***
Yes	4.30	4.33
CILHI		
No	2.42	2.38
Yes	3.24	2.62

*P < .05, **P < .01, ***P < .001

Table 42. Effect of number of forensic science non-fiction television shows watched on desire to pursue graduate degree at beginning and end of semester.

Type	Mean # of shows at beginning	Mean # of shows at end
Graduate degree in general		
No	2.45	2.18
Yes	2.50	2.49
Law		
No	2.45	2.37
Yes	2.69	2.65
Medicine		
No	2.46	2.38
Yes	2.71	2.67
Masters		
No	2.28	2.37
Yes	2.61	2.42
PhD		
No	2.45	2.34
Yes	2.52	2.53
Other		
No	2.48	2.32*
Yes	2.11	3.63

*P < .05

As with television dramas and novels, the relationship between viewing forensic science non-fiction television shows and career and graduate study choices at the beginning and end of the semester was examined separately for males and females. This analysis is not presented in a table. While crime scene investigator, death investigator, autopsy technician, archaeologist, and CILHI were all found to be significant for the group as a whole, when males and females were examined separately different patterns emerged. Women who wanted to be crime scene investigators, death investigators, or autopsy technicians all watched significantly more non-fiction shows(means of 2.98, 3.12, and 3.44, respectively) than those who did not want to pursue these careers (mean of 2.21 for crime scene technician, 2.44 for death investigator, and 2.43 for autopsy technician) while differences between men who did and did not want to pursue these careers were not

statistically significant. For archaeology, women who wanted to pursue this career watched significantly fewer non-fiction shows (mean of 1.67) than those who were not interested in this career (mean of 2.79), but the results for men were not significant. For CILHI, men who were interested in this career watched significantly more non-fiction shows (mean of 5.00) than men who were not interested (mean of 2.00) while the results for women were not significant. FBI, which was not significant for the group as a whole, was significant for women. Women who wanted to pursue a career with the FBI watched significantly more non-fiction shows (mean of 2.98) than women who did not want to pursue this career (mean of 2.37).

At the end of the semester, four careers that were significant for the group as a whole were found to be only significant for females when looking at males and females separately. Women who were interested in pursuing careers as death investigators (mean of 3.22), autopsy technicians (mean of 3.37), forensic pathologists (mean of 3.78), members of the FBI (mean of 3.15) and FEMORS (mean of 4.60) watched significantly more non-fiction shows than women who were not interested in these careers (mean of 2.44 for death investigator, 2.47 for autopsy technician, 2.54 for forensic pathologist, 2.33 for FBI, and 2.55 for FEMORS). While law enforcement was not significant for the group as a whole, men who were interested in pursuing this career watched significantly more non-fiction shows (mean of 2.20) than men who were not interested in law enforcement (mean of 1.22). Also, while the "other" type of graduate degree was significant for the group as a whole, when males and females were examined separately it was only significant for males. Men who wanted to pursue an "other" type of graduate degree watched significantly more

non-fiction shows (mean of 4.57) than men who did not want to pursue this type of degree (mean of 1.38).

Paired samples t-tests were used to look at differences in the number of forensic science media consumed between the beginning and end of the semester, there was only a statistically significant difference in regard to novels, which saw an increase (see Table 43). Related to forensic science media, there was a statistically significant change in the opinion of respondents on the level of realism in forensic science television dramas, with the mean level of realism falling more toward the unrealistic side of the spectrum at the end of the semester (see Table 44).

Regarding the number of respondents who switched their opinion from one level of realism to another between the beginning and end of the semester, 44.0% of respondents who said somewhat unrealistic at the beginning of the semester and 26.7% of respondents who said somewhat realistic at the beginning switched to very unrealistic at the end (see Table 45). However, 10.7% of respondents who said very unrealistic at the beginning and 11.9% of respondents who said somewhat unrealistic at the beginning switched to saying somewhat realistic at the end of the semester.

Table 43. Change in number of forensic science novels and television shows consumed from beginning to end of semester.

Type	Mean
Nonfiction shows	
Beginning	2.47
End	2.39
Fiction shows	
Beginning	1.31
End	1.29
Novels	
Beginning	.038**
End	.048

**P < .01

Table 44. Change in opinion on realism of forensic science television dramas from beginning to end of semester.

Type	Mean
Level of realism	
Beginning	2.01***
End	1.73

***P < .001

Note: Level of realism was measured on a four-point scale with 1 being very unrealistic and 4 being very realistic.

Table 45. Change in opinion on realism of forensic science television dramas from beginning to end of semester.

Level of realism at end	Very unrealistic at beginning (N)	Somewhat unrealistic at beginning (N)	Somewhat realistic at beginning (N)	Very realistic at beginning (N)	Pearson chi-square value
Very unrealistic	72.0 (54)	44.0 (48)	26.7 (20)	0.0 (0)	50.6***
Somewhat unrealistic	17.3 (13)	44.0 (48)	34.7 (26)	0.0 (0)	
Somewhat realistic	10.7 (8)	11.9 (13)	38.7 (29)	100.0 (1)	

***P < .001

Discussion and Conclusions

In the past decade or so, interest in forensics has increased among students at both the secondary and post-secondary level (Smallwood, 2002; Duncan and Daly-Engel, 2006; Upfront, 2008; Bergslien, 2006). Enrollment and applications have both increased (Smallwood, 2002). More programs are being created, and more classes involving forensic science are being formulated (Bergslien, 2006; Smallwood, 2002). This increased interest does coincide with debut of *CSI* on television, and researchers examining the popularity of forensic science in schools explicitly mention *CSI* as a cause of students' interest (Smallwood, 2002; VanLaerhoven and Anderson, 2009).

In regard to forensic-related degree programs, the majority of the forensic science BS, forensic science MS, and other forensic-related degree programs were created after the debut of *CSI* on television in October of 2000. This is consistent with other researchers (Smallwood, 2002; Sappenfield, 2003) who have stated that there has been an increase in the number of forensic science students and programs. This also corresponds with VanLaerhoven and Anderson (2009), who found that the majority of forensic science programs in Canada were created after *CSI* premiered.

The results of the survey show that the majority of respondents were female and either anthropology, criminal justice, or forensic science majors. The fact that the majority of students surveyed are female corresponds with other researchers who have found that the majority of graduates from forensic science programs are female (Potter, 2008). In addition, many of the respondents had chemistry minors, likely due to the fact that at the university in the study the forensic science major is administered through the chemistry

department, meaning that forensic science students automatically receive a minor in chemistry due to the number of chemistry courses they are required to complete. Very few of the respondents had forensic-related jobs, which could be explained by the fact that many of these jobs would require at least an undergraduate degree. While only 17.7% of respondents said that they had *recently* become interested in forensics, over half of the respondents (55.1%) said that they had an interest in forensics and wanted to pursue a career in it, while another 23.2% said that they had an interest but did not want pursue a career. This shows that the vast majority of those surveyed were taking the class not just to fulfill a requirement but because they had an interest in the subject.

When looking at the number of respondents who indicated that they wanted to pursue a specific forensic-related career at the beginning and end of the semester, the number who wanted to become lawyers, death investigators, autopsy technicians, archaeologists, or work with the FBI, human rights, mass disasters, DMORT, FEMORS, or CILHI increased. However, the number interested in pursuing careers in crime scene investigation, law enforcement, forensic pathology, and forensic anthropology as either a full-time forensic anthropologist or a university professor decreased. In addition, at the end of the course, more respondents switched to not wanting to pursue a forensic science career than the reverse for all careers. Also, there was an increase from beginning to end in the number of respondents who wanted to pursue degrees in law and medicine, obtain a PhD, and pursue other types of graduate degrees. However, there was a decrease in the number who wanted to pursue graduate study and Masters degrees specifically.

These results for the number interested pursuing forensic-related careers and graduate degrees correspond to the findings of researchers such as VanLaerhoven and Anderson (2009) and Smallwood (2002), who said that forensic science students may have unrealistic views of forensic careers before they have studied those subjects. Both forensic anthropology careers, the careers most closely following the subject of the class, saw decreases in the number of respondents who wished to pursue them, possibly indicating that respondents changed their minds upon gaining a greater understanding of what forensic anthropology is. However, human rights, mass disaster, DMORT, FEMORS, and CILHI all saw increases (although not statistically significant increases) in the number of respondents who wished to pursue these careers. This could be the result of a lack of knowledge of these careers at the beginning of the semester and an increased knowledge at the end.

Regarding forensic science media, there was an increase in the number of respondents who reported watching or reading specific media from the beginning to end of the semester for three nonfiction shows (*Dr. G: Medical Examiner*, *Investigative Reports*, and *Body of Evidence*), two dramas (*CSI* and *Bones*), and two authors (Kathy Reichs and Patricia Cornwell). Also, for most media, more respondents switched from watching at the beginning of the semester to not watching at the end than did the opposite, with the exceptions being *Forensic Files*, *Dr. G: Medical Examiner*, *CSI*, and Patricia Cornwell. In addition, more respondents reported reading at least one author at the end of the semester than did at the beginning.

Based on the specific shows and authors that saw increases in viewers/readers, it appears that the forensic anthropology course the respondents were taking influenced their media consumption. *Bones* and the novels of Kathy Reichs both saw increased viewership/readership, and both focus on a forensic anthropologist. Patricia Cornwell has been associated with forensic anthropology due to her novel featuring the Forensic Anthropology Research Facility (commonly called the Body Farm) at the University of Tennessee, and *Dr. G: Medical Examiner* focuses on a forensic pathologist who works in the same city that the university studied is located in and who is frequently mentioned in the course, the university, and the local news.

In looking at the effect of the amount forensic media consumed on the desire to pursue forensic careers or graduate degrees, it was found that there were statistically significant differences in the number of forensic media sources watched/read between respondents who did and did not want to pursue a career for several different careers. With forensic dramas, those who wanted to pursue FBI careers at the beginning of the semester, DMORT careers at the end of the semester, and FEMORS careers at the beginning and end of the semester all watched significantly more dramas.

In regard to novels, those who wanted to pursue careers in crime scene investigation, human rights, DMORT, and CILHI all read significantly more novels at the beginning of the semester, and those wanted to pursue crime scene investigation and FEMORS careers also read significantly more at the end of the semester. Regarding nonfiction television shows, those who wanted to pursue careers as crime scene investigators, law enforcement, death investigators, autopsy technicians, and FEMORS

members at the beginning of the semester, and death investigators, autopsy technicians, forensic pathologists, FBI agents, and FEMORS members at the end of the semester all watched significantly more shows than those who did not want to pursue those specific careers. However, archaeology had a pattern that was the opposite of the other careers that had statistically significant differences. Unlike the other careers, those who wanted to pursue archaeology watched significantly less forensic dramas and nonfiction shows at the beginning of the semester. This could be explained by the fact that archaeologists are generally not involved in forensic work.

Looking at interest in pursuing graduate study, those who wished to pursue other degrees watched significantly less forensic dramas at the beginning of the semester but watched significantly more nonfiction shows at the end of the semester than those did not want to pursue other types of graduate degrees. Also, respondents who wanted pursue Masters and PhD degrees read significantly more novels at the end of the semester. In addition to this, the average level of realism that respondents assigned to forensic dramas was significantly lower at the end of the semester than at the beginning. In other words, after taking the forensic anthropology course, respondents thought that forensic dramas were less realistic.

Overall, researchers have indicated that students who view forensic science television shows and read forensic science novels will be more likely to want to pursue careers in forensic science and pursue academic study in the subject (Harvey and Derksen, 2009; VanLaerhoven and Anderson, 2009; Smallwood, 2002; Bergslien, 2006; Cavanagh, 2009). However, the results of this study contradict these expectations. The results of this

study indicate that, in the majority of instances, students who wanted to pursue forensic science careers and graduate study did not watch more forensic science television shows and read more forensic science novels than those who did not want to pursue forensic science careers and graduate study.

The general results of this survey and analysis of dates of creation of forensic science programs in the U.S. correspond to what other researchers have said about the influence of forensic media on forensic science education. The majority of forensic science degree programs were created after *CSI* premiered on television. The majority of respondents to the survey did report their interest in forensics as a reason for taking the class, and the amount of forensic media consumed appears to have influenced respondents' desire to pursue specific forensic careers. However, like Smallwood (2002) discussed, it appears that respondents may have started the course with an idea of what forensic careers are like that did not correspond with reality based on the decreased interest in a number of careers.

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CHAPTER 5: CONCLUSION

CSI: Crime Scene Investigation has consistently been one of the most popular shows on primetime television since its premiere. Because of this popularity, many researchers feel that *CSI* has had an impact on the public's perception of forensic science (Cole and Dioso-Villa, 2007; Deutsch and Cavender, 2008). While much of the forensic science techniques used in the show are based on actual forensic science research, *CSI* is designed to be entertaining and attractive to viewers, necessitating the fictionalization of some aspects of forensic science work (Deutsch and Cavender, 2008).

The impact that *CSI* has had on the public's behavior and perceptions has been termed the "*CSI* effect" by researchers and the media. In the beginning, this term was typically used to specifically refer to the impact that consumption of forensic science media, and *CSI* specifically, had on juries in regard to conviction rates and interpretation of forensic science evidence. However, since then the definition of the *CSI* effect has been expanded to refer to other impacts such as increased interest in forensic science educational programs and careers and increased knowledge of forensics among the general public (Cole and Dioso-Villa, 2007). In regard to the *CSI* effect's impact on juries, research has been conducted to examine whether there has been any perceivable effect on jury conviction rates and perceptions (Brickell, 2008; Ghoshray, 2007; Harvey and Derksen, 2009; Hughes and Magers, 2007; Kim *et al.*, 2009; Podlas, 2006; Shelton *et al.*, 2006). Results of this research indicate that there has been no actual effect on jury conviction

rates. However, juries' perceptions of forensic evidence and attorneys' and judges' perceptions of juries' attitudes toward forensic evidence have been affected.

While the *CSI* effect has not influenced jury conviction rates, it does appear to have influenced the popularity of forensic science media. Before the debut of *CSI*, a total of five non-fiction forensic anthropology books were published while 12 were published between *CSI*'s debut in 2000 and 2009. In addition, nearly half of the total number of fiction book series that focus on forensic science were published after *CSI* debuted, and a number of the series' authors have appeared on the New York Times Best Sellers List. Forensic science television series, both non-fiction and fiction, have also increased in number since the premiere of *CSI* and many have appeared among the top rated primetime programs.

Since *CSI* and other forensic science television dramas are fictionalized in order to appeal more to viewers, it is important to understand the differences between these shows and actual forensic work. The content analysis of the television show *Bones*, conducted to facilitate the understanding of these differences, determined that although much of the forensic anthropology content is fictionalized in order to make techniques more accurate, provide results more immediately, and involve the main character in more of the investigation, it has a basis in the methods and techniques used by actual forensic anthropologists.

In addition to an increase in the amount of forensic science media, there also been an increase in interest in forensic science secondary and post-secondary education programs in the form of more programs and classes, increased enrollment, and a larger number of applications, which has been has been called a direct result of the *CSI* effect by

both researchers and journalists (Bergslien, 2006; Duncan and Daly-Engel, 2006; NEA Today, 2008; Smallwood, 2002; VanLaerhoven and Anderson, 2009). To support this, an analysis of the starting dates of forensic science-related undergraduate and graduate degree programs shows that the majority of all types of programs aside from forensic chemistry programs were created after *CSI* debuted in the fall of 2000. In addition, results of the survey of students taking a forensic anthropology course indicate that students who wanted to pursue some specific forensic science careers did consume more forensic science media than students who did not want to pursue those careers. Also, the majority of students taking the course reported an interest in forensics as one of their reasons for taking it. However, overall, students who were interested in pursuing forensic science careers and graduate study did not consume more forensic science media than those who did not.

This thesis presents an analysis of what the *CSI* effect is, the popularity and realism of forensic science media, the popularity of forensic science in education, and the relationship between enrollment in a forensic anthropology class, interest in forensic science careers and graduate study, and consumption of forensic science media. These analyses show that the number of forensic science books, television programs, and university programs have all greatly increased since *CSI* debuted in October of 2000. In addition, interest in forensics was one of the common factors in choosing to take a forensic anthropology course cited by surveyed students. Students wishing to pursue specific forensic science-related careers also consumed more forensic science media than their peers who did not wish to pursue these careers. Overall, these results show that the

television show *CSI: Crime Scene Investigation* and the resulting *CSI* effect have played an important role in the recent popularity of forensic science media and educational programs.

This study has several limitations. First, the sample sizes of some specific categories used in the survey of forensic anthropology students (such as the number of students who wanted to pursue some careers) were small. Second, the survey question that asked about the respondent's perception of the level of realism in forensic science dramas had different available answer choices in the surveys used at the beginning and end of the semester, with the survey at the beginning of the semester having one more answer choice than the survey at the end. Third, starting dates were unavailable for all of the forensic science-related programs listed in the study.

Future research on this subject could include a larger sample of students from which to assess interest in forensic science careers and graduate study and consumption of forensic science media. In addition, the survey could be expanded to include non-fiction books and the additional fictional books and fiction and non-fiction television shows listed in this study. Future research could also examine the accuracy of the forensic science content of other television shows in addition to *Bones*. Furthermore, future researchers could examine the number and start dates of forensic science university programs that lead to certificates or associates degrees.

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APPENDIX A: SAMPLE CODING SHEET FOR CONTENT ANALYSIS

Coding sheet for *Bones* content analysis

Episode: _____

1. Death investigation activity — Count
    a. Recovery
        i. Go to scene for skeletal/decomposed remains _____
        ii. Go to scene for skeletal/decomposed remains _____
        iii. Go to scene for fresh remains _____
        iv. Go to scene for burnt remains _____
        v. Conduct search for skeletal evidence _____
        vi. Conduct search for non-skeletal evidence _____
    b. Investigation
        i. Interview suspect _____
        ii. Serve search warrant _____
        iii. Search for suspect _____
        iv. Talk to family of victim _____
        v. Talk to other people associated with victim _____
        vi. Talk to judge _____
        vii. Talk to doctor _____
        viii. Talk to other professional _____
        ix. Involved in physical confrontation _____
    c. Analysis
        i. Forensic pathologist involved with skeletal _____
        ii. Forensic pathologist involved with burnt _____
        iii. Forensic pathologist involved with decomposed _____
        iv. Forensic pathologist involved with fresh _____
    d. Testify in court _____

2. Biological profile
    a. Sex
        i. Method: _____ Count: _____
        ii. Method: _____ Count: _____
        iii. Method: _____ Count: _____
        iv. Method: _____ Count: _____
        v. Method: _____ Count: _____
    b. Ancestry
        i. Method: _____ Count: _____
        ii. Method: _____ Count: _____
        iii. Method: _____ Count: _____
        iv. Method: _____ Count: _____
        v. Method: _____ Count: _____
    c. Age

i. Method: _____ Count: _____
ii. Method: _____ Count: _____
iii. Method: _____ Count: _____
iv. Method: _____ Count: _____
v. Method: _____ Count: _____

d. Stature
i. Method: _____ Count: _____
ii. Method: _____ Count: _____
iii. Method: _____ Count: _____
iv. Method: _____ Count: _____
v. Method: _____ Count: _____

e. Weight
i. Method: _____ Count: _____
ii. Method: _____ Count: _____
iii. Method: _____ Count: _____
iv. Method: _____ Count: _____
v. Method: _____ Count: _____

f. Pregnancy
i. Method: _____ Count: _____
ii. Method: _____ Count: _____
iii. Method: _____ Count: _____
iv. Method: _____ Count: _____
v. Method: _____ Count: _____
vi. Able to tell how long ago _____

3. Identification methods
a. Method: _____ Count: _____
b. Method: _____ Count: _____
c. Method: _____ Count: _____
d. Method: _____ Count: _____
e. Method: _____ Count: _____

4. Trauma analysis Count
a. Type of perimortem trauma
i. Blunt force
1. Matched to specific weapon _____
2. Not matched to specific weapon _____
3. Physical force _____

ii. Sharp force
1. Matched to specific weapon _____
2. Not matched to specific weapon _____

iii. Gunshot
1. Matched to specific weapon _____

2. Not matched to specific weapon _____

iv. Other

1. Matched to specific weapon _____
2. Not matched to specific weapon _____

b. Antemortem injury

i. Type: _____ Count: _____
ii. Type: _____ Count: _____
iii. Type: _____ Count: _____
iv. Type: _____ Count: _____
v. Type: _____ Count: _____

c. Use of holographic reconstruction _____
d. Bone staining from blood _____

5. Postmortem damage
   a. Type: _____ Count: _____
   b. Type: _____ Count: _____
   c. Type: _____ Count: _____
   d. Type: _____ Count: _____
   e. Type: _____ Count: _____
6. Injuries matched to specific activity
   a. Injury: _____ Count: _____
   b. Injury: _____ Count: _____
   c. Injury: _____ Count: _____
   d. Injury: _____ Count: _____
   e. Injury: _____ Count: _____
7. Pathology
   a. _____
   b. _____
   c. _____
   d. _____
   e. _____
8. Entomology
   a. Used for time since death
      i. Type: _____ Count: _____
      ii. Type: _____ Count: _____
      iii. Type: _____ Count: _____
      iv. Type: _____ Count: _____
      v. Type: _____ Count: _____
   b. Used for location _____
   c. Used to determine chemicals in body _____
9. Non-entomology methods used for time since death
   a. Method: _____ Count: _____
   b. Method: _____ Count: _____
   c. Method: _____ Count: _____

d. Method: ________________________ Count: ___________
e. Method: ________________________ Count: ___________

APPENDIX B: IRB APPROVAL LETTERS

University of Central Florida

Office of Research & Commercialization

August 17, 2005

John J. Schultz, Ph.D.
Department of Sociology and Anthropology
College of Arts and Sciences
PH 403
University of Central Florida
Orlando, Fl 32816-1360

Dear Dr. Schultz:

With reference to your protocol #05-2762 entitled, **"Forensic Anthropology: Student Opinions and General Knowledge"** I am enclosing for your records the approved, expedited document of the UCFIRB Form you had submitted to our office. **This study was approved on 8/10/05 and the expiration date will be 8/9/06.** Should there be a need to extend this study, a Continuing Review form must be submitted to the IRB Office for review by the Chairman or full IRB at least one month prior to the expiration date. This is the responsibility of the investigator. **Please notify the IRB office when you have completed this research study.**

Please be advised that this approval is given for one year. Should there be any addendums or administrative changes to the already approved protocol, they must also be submitted to the Board through use of the Addendum/Modification Request form. Changes should not be initiated until written IRB approval is received. Adverse events should be reported to the IRB as they occur.

Should you have any questions, please do not hesitate to call me at 407-823-2901.

Please accept our best wishes for the success of your endeavors.

Cordially,

Barbara Ward

Barbara Ward, CIM
IRB Coordinator

Copies: IRB File

BW:jm

12443 Research Parkway • Suite 302 • Orlando, FL 32826-3252 • 407-823-3778 • Fax 407-823-3299

University of Central Florida

Office of Research & Commercialization

July 13, 2006

John J. Schultz, Ph.D.
University of Central Florida
Department of Sociology and Anthropology
College of Arts and Sciences
PH 403
Orlando, FL 32816-1360

Dear Dr. Schultz:

With reference to your protocol #06-3612 entitled, "Forensic Anthropology: Student Opinions and General Knowledge" I am enclosing for your records the approved, expedited document of the UCFIRB Form you had submitted to our office. **This study was approved on 7/7/2006. The expiration date for this study will be 7/6/2007.** Should there be a need to extend this study, a Continuing Review form must be submitted to the IRB Office for review by the Chairman or full IRB at least one month prior to the expiration date. This is the responsibility of the investigator.

Please be advised that this approval is given for one year. Should there be any addendums or administrative changes to the already approved protocol, they must also be submitted to the Board through use of the Addendum/Modification Request form. Changes should not be initiated until written IRB approval is received. Adverse events should be reported to the IRB as they occur.

Should you have any questions, please do not hesitate to call me at 407-823-2901.

Please accept our best wishes for the success of your endeavors.

Cordially,

Joanne Muratori
UCF IRB Coordinator
(FWA00000351 Exp. 5/13/07, IRB00001138)

Copies: IRB File

12201 Research Parkway • Suite 501 • Orlando, FL 32826-3246 • 407-823-3778 • Fax 407-823-3299

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

EXPEDITED CONTINUING REVIEW APPROVAL NOTICE

From : **UCF Institutional Review Board**
FWA00000351, Exp. 5/07/10, IRB00001138

To : **John J. Schultz**

Date : **June 07, 2007**

IRB Number: **SBE-06-03612**

Study Title: **Forensic Anthropology: Student Opinions and General Knowledge**

Dear Researcher,

This letter serves to notify you that the continuing review application for the above study was reviewed and approved by the IRB Chair on **6/7/2007** through the expedited review process according to 45 CFR 46 (and/or 21 CFR 50/56 if FDA-regulated).

Continuation of this study has been approved for a one-year period. The expiration date is 06/06/2008. This study was determined to be no more than minimal risk and the category for which this study qualified for expedited review is:

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Subjects or their representatives must receive a copy of the consent form(s).

All data must be retained in a locked file cabinet for a minimum of three years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained on a password-protected computer if electronic information is used. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

To continue this research beyond the expiration date, a Continuing Review Form must be submitted 2 – 4 weeks prior to the expiration date. Use the Unanticipated Problem Report Form or the Serious Adverse Event Form (within 5 working days of event or knowledge of event) to report problems or events to the IRB. Do not make changes to the study (i.e., protocol methodology, consent form, personnel, site, etc.) before obtaining IRB approval. Changes can be submitted for IRB review using the Addendum/Modification Request Form. An Addendum/Modification Request Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at https://iris.research.ucf.edu .

On behalf of Tracy Dietz, Ph.D., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 06/07/2007 01:00:29 PM EDT

Joanne Muratori

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

EXPEDITED CONTINUING REVIEW APPROVAL NOTICE

From : **UCF Institutional Review Board**
FWA00000351, Exp. 5/07/10, IRB00001138

To : **John J. Schultz**

Date : **June 04, 2008**

IRB Number: **SBE-06-03612**

Study Title: **Forensic Anthropology: Student Opinions and General Knowledge**

Dear Researcher,

This letter serves to notify you that the continuing review application for the above study was reviewed and approved by the IRB Vice-chair on **6/3/2008** through the expedited review process according to 45 CFR 46 (and/or 21 CFR 50/56 if FDA-regulated).

Continuation of this study has been approved for a one-year period. The expiration date is 06/02/2009. This study was determined to be no more than minimal risk and the category for which this study qualified for expedited review is:

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Subjects or their representatives must receive a copy of the consent form(s).

All data must be retained in a locked file cabinet for a minimum of three years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained on a password-protected computer if electronic information is used. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

To continue this research beyond the expiration date, a Continuing Review Form must be submitted 2 – 4 weeks prior to the expiration date. Use the Unanticipated Problem Report Form or the Serious Adverse Event Form (within 5 working days of event or knowledge of event) to report problems or events to the IRB. Do not make changes to the study (i.e., protocol methodology, consent form, personnel, site, etc.) before obtaining IRB approval. Changes can be submitted for IRB review using the Addendum/Modification Request Form. An Addendum/Modification Request Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at https://iris.research.ucf.edu .

On behalf of Tracy Dietz, Ph.D., UCF IRB Chair, this letter is signed by:

Signature applied by Janice Turchin on 06/04/2008 01:42:48 PM EDT

Janice M Turchin

IRB Coordinator

APPENDIX C: SAMPLE SURVEY FORM

Project Survey 1 – Beginning of Semester
"Forensic Anthropology: Student Opinions and General Knowledge"

Date: _____ Semester:_____ Pin#:_____

What is your sex? (please circle)
Male Female

What is your gender? (please circle)
Male Female Other _____

What is the difference between gender and sex?_____
_____
_____

How old are you? _____

Define ancestry: _____
_____

What is your ancestry? _____

Define race: _____
_____

What is your self-described racial classification? _____

Define ethnicity: _____
_____

What is your ethnicity? _____

How does your actual stature (height) differ from your self reported stature on your driver's license? Check one:
_____ Your actual stature is the same as your reported stature on your drivers license.
_____ Your actual stature is less than your reported stature on your drivers license.
_____ Your actual stature is more than your reported stature on your drivers license.
_____ You do not know.

Have you earned an associates degree (A.A. or A.S.) prior to attending UCF? (please circle)
Yes No

Check your major (If you have a double major check both majors):

Anthropology_____
Criminal Justice _____
Forensic Science _____
Sociology_____
Psychology _____
Undeclared_____
Other – please list: _____
Indicate if you already have a Bachelor's degree in another subject: please list:
_____

If you are currently an Anthropology or Criminal justice major, were you first a Forensic Science major at UCF and changed your major?

Yes No

List your minor(s): _____

Have you earned an associates degree (A.A. or A.S.) prior to attending UCF? (please circle)

Yes No

What is your class standing?

Freshman Sophomore Junior Senior 5th year

How many credits have you completed? _____

What is your overall GPA? _____ What is your major GPA? _____

Have you been attending UCF as a part-time or full-time student? (please circle)

Part-time only Full-time only Both full-time and part time

In addition to your studies, do you participate in extra curricular activities? (please circle)

No Yes If yes, how many hours per week? _____
Please list clubs or activities at UCF:_____
_____
Please list volunteer work outside UCF: _____
_____

In addition to your studies, do you have a job? (Please circle one)

Yes No

If yes, please circle one of the following:
Full time Part Time

How many hours a week do you work on average? _____

Are you working in a forensic or law enforcement job?
Yes No

If yes, please specify your job: _____

Have you recently become interested in forensics because of the popularity of forensics in mass media (tv, movies, etc) and books?
Yes No

How did you become interested in forensics?
_____
_____
_____

Why did you enroll in this class (you may check more than one)?
_____ Counts towards my major
_____ Counts towards my minor
_____ I want to complete the Crime Scene Certificate
_____ I have a general interest in forensics and want to pursue a career in forensics and death investigation
_____ I have a general interest in forensics but do not want to pursue a career in Forensics.
_____ Other, please specify:_____

Do you want to **pursue** a career in any of the following areas?
_____ Crime Scene Investigator (CSI) or Crime Scene Technician (CST)
_____ Law Enforcement
_____ Lawyer
_____ Death investigator at medical examiner
_____ Autopsy or forensic technician at a medical examiner
_____ Forensic pathologist
_____ Full time forensic anthropologist that does not teach at a university
_____ University professor that is a consulting forensic anthropologist
_____ Archaeologist
_____ Federal Bureau of Investigation
_____ Human Rights
_____ Mass Disaster
_____ Disaster Mortuary Operational Response Team (DMORT)
_____ Florida Emergency Mortuary Response Team (FEMORS)
_____ Central Identification Laboratory in Hawaii (CILHI)

Do you plan to **pursue** a graduate degree? (please circle one)
No Yes

If yes, please check all that apply and in what subject areas:
Law _____
Medicine_____
Masters _____
Ph.D. _____
Other _____

Indicate if you have taken the following courses include the grade you received.

	Completed (grade)	Currently taking	Plan to take
ANT3501: Intro. to Forensic Sciences	_____	_____	_____
ANT3101: Archaeological Sciences	_____	_____	_____
ANT4528: Advanced Forensic Anthro.	_____	_____	_____
ANT4525: Human Osteology	_____	_____	_____
ANT2511: Human Species	_____	_____	_____
ANT2410: Cultural Anthropology	_____	_____	_____
ANT2000: General Anthropology	_____	_____	_____
ANT3340: Caribbean Cultures	_____	_____	_____
CJE4101: Criminal Investigations	_____	_____	_____
ANT4516: Human Biological Diversity	_____	_____	_____
SYG 2000: Intro to Sociology	_____	_____	_____
SYD 3700: Race & Ethnicity			

Do you read novels from the following authors? (please circle all that apply)
Kathy Reichs Patricia Cornwell Anne Rule

Do you watch any of the following real-life forensic shows? (check all that apply)
_____ Forensic Files on Court TV
_____ The Investigators on Court TV
_____ Dr. G Medical Examiner on Discovery Health
_____ Cold Case Files on A & E
_____ Investigative Reports on A & E
_____ American Justice on A & E
_____ New Detectives/FBI Files on the Discovery Channel
_____ Body of Evidence on Court TV
_____ I, Detective! On Court TV
_____ Extreme Evidence on Court TV
_____ Other, please specify:_____

Do you watch any of the following forensic dramas: (please circle all that apply)

CSI CSI Miami CSI New York Crossing Jordan Bones

On average, how realistic do you think these shows are? (please circle one)
Very realistic – Realistic -- Somewhat realistic -- Somewhat unrealistic --Very unrealistic

Project Survey 2 – End of Semester
"Forensic Anthropology: Student Opinions and General Knowledge"

Date: _____ Semester:_____ Pin#:_____

What is the difference between gender and sex?_____
_____
_____

Define ancestry: _____
_____

What is your ancestry? _____

Define race: _____
_____

What is your self-described racial classification? _____

Define ethnicity: _____
_____

What is your ethnicity? _____

On a scale of 1 to 5, with 5 being the highest, rate each of the following based on what you liked about the course? (please circle one for each line)

Rate your opinion of the class		1	2	3	4	5
Guest lectures	1	2	3	4	5	
Class lectures		1	2	3	4	5
Movies	1	2	3	4	5	
Dr. Schultz's forensic case studies	1	2	3	4	5	
Textbook	1	2	3	4	5	
Class discussion	1	2	3	4	5	
Forensic anthropology book report	1	2	3	4	5	
Critical analysis paper		1	2	3	4	5
Looking at bones and casts	1	2	3	4	5	

Anything else; please specify and rate.

_____

Has this course directed you to take more **biological/forensic anthropology courses**? (please circle one)

Yes No

Has this course directed you to **minor** in anthropology? (please circle one)
Yes No Already a minor before taking course

Has this course directed you to **major** in anthropology? (please circle one)
Yes No Already a major

Has this course directed you to pursue the **Crime Scene Certificate** if you are already not pursuing it? (please circle one)
Yes No Already pursuing the CSC certificate

Has this course directed you to pursue a career in forensic anthropology if you are already not pursuing it? (please circle one)
Yes No Already planned to before taking course

Has this course directed you to pursue a career in **death investigation**?
Yes No
If yes, please specify the field: _____

Had you considered forensic anthropology as a career, but chose not to pursue it. If so, please indicate why?
_____ Limited jobs that are available
_____ Do not want to work with decomposing remains
_____ Do not want to obtain graduate degrees
_____ It is too late to change your major
_____ Other, please specify:_____

Provide a list of jobs that employ individuals with a background in forensic anthropology?
_____
_____
_____

Do you read novels from the following authors? (please circle all that apply)
Kathy Reichs Patricia Cornwell Anne Rule

Do you watch any of the following forensic dramas: (please circle all that apply)
CSI CSI Miami CSI New York Crossing Jordan Bones

On average, how realistic do you think these shows are? (please circle one)
Very realistic
Somewhat realistic

Somewhat unrealistic
Very unrealistic

Do you watch any of the following real-life forensic shows? (check all that apply)
_____ Forensic Files on Court TV
_____ The Investigators on Court TV
_____ Dr. G Medical Examiner on Discovery Health
_____ Cold Case Files on A & E
_____ Investigative Reports on A & E
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_____ New Detectives/FBI Files on the Discovery Channel
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_____ I, Detective! On Court TV
_____ Extreme Evidence on Court TV
_____ Other, please specify:_____
_____

Do you want to **pursue** a career in any of the following areas?
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_____ Lawyer
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_____ Human Rights
_____ Mass Disaster
_____ Disaster Mortuary Operational Response Team (DMORT)
_____ Florida Emergency Mortuary Response Team (FEMORS)
_____ Central Identification Laboratory in Hawaii (CILHI)

Do you plan to **pursue** a graduate degree? (please circle one)
Yes no

If yes, please check all that apply and in what subject areas:
Law _____
Medicine_____
Masters _____
Ph.D. _____

Other _____

Do you give permission to John J. Schultz to use data from your survey in a larger project that may be presented or published outside the classroom and department? (please circle one)

Yes No