FAKE FORENSICS. REAL EFFECTS?:
TESTING THE CULTIVATING POWER OF CRIME DRAMA

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Central to cultivation theory is the premise that television's recurrent narrative, visual, and ideological patterns cultivate viewers' (mis)constructions of the real world in a manner positively correlated with the amount and types of exposure. This study tested that premise by examining the relationships between and among crime drama viewing, perceptions of the effectiveness of the U.S. criminal justice system, and scientific literacy via an analytical web-based survey of 1,365 undergraduate students. Contrary to the cultivation thesis, few significant and no strong associations emerged between or among any of the study’s main variables; in other words, little evidence of cultivation effects or processes was manifest in the data.
To the many who’ve made my journey worthwhile—
Thank you.
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<tr>
<td>ASL</td>
<td>Actual Scientific Literacy</td>
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<td>ECJS</td>
<td>Experience with the Criminal Justice System</td>
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<td>PECJS</td>
<td>Perceived Effectiveness of the Criminal Justice System</td>
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<td>PSL</td>
<td>Perceived Scientific Literacy</td>
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CHAPTER 1
INTRODUCTION AND LITERATURE REVIEW

Introduction

Every time we turn on our televisions, we are bombarded with information. Some of this information is fact, some is fiction, and much is to be found along the great continuum between. What audiences perceive to be true and what actually is true, of course, do not always (or perhaps even often) coincide; and it is the aim of cultivation research to describe, explain, and predict the cumulative effects of television exposure on viewers' (mis)conceptions of social reality.

Central to cultivation theory is the premise that television's recurrent narrative, visual, and ideological patterns cultivate viewers' constructions of the real world in a manner positively correlated with the amount and types of exposure. This study tested that premise by examining the influence of forensics-focused police procedural programs on audience perceptions about the effectiveness of the U.S. criminal justice system as moderated by audience members’ understanding of and attitudes toward science—or, more succinctly, by their scientific literacy.

Setting the stage for this investigation are both the explosive popularity of the crime drama genre\(^1\) (Nielsen, 2007, 2008, 2009, 2010) and the importance of and need for scientific

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\(^1\)For each of the past four years, two of Nielsen’s top ten most-viewed regularly scheduled primetime television programs have been police procedurals: *CSI* and *CSI: Miami* in 2007, *CSI* and *NCIS* in 2008, and *NCIS* and
literacy in an age of rapid scientific and technological advancement. As debates rage on about stem cell research, genetically modified organisms, and the teaching of evolution in schools (among countless other issues), it becomes clear that “meaningful citizen participation [in a democratic society] requires a level of civic scientific literacy sufficient to understand the essential points of competing arguments and to evaluate or assess these arguments” (Miller, 2000, p. 24). But is the forensic fiction of CSI and other widely viewed police procedural programs affecting audiences’ interest in and understanding of science? Furthermore, is viewer scientific literacy moderating the cultivating effects of the crime drama genre?

The following literature review examines cultivation theory, relevant genre-specific cultivation research, and the concept of scientific literacy, providing context for the present study and giving rise to its hypotheses.

_Cultivation Theory and Research_

**Historical Context**

The rise of television in America took place against the tumultuous backdrop of the 1940s, 50s, and 60s. Burgeoning in a time of warfare and social unrest, the new medium ascended to ubiquity in the wake of World War II and the second Red Scare and amidst profound changes in American society. WWII transformed the country “from a primarily rural society boasting an agriculturally based economy into a largely urban nation dependent on an industrially based economy” (Baran & Davis, 2008, p. 178) and ushered the United

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2The terms “police procedural” and “crime drama” are used interchangeably throughout this paper to denote *CSI*-type programs (i.e., those depicting the work of police detectives and forensic scientists as they investigate and solve crimes).
States into position as “the undisputed economic, social, and technological leader of the world” (Baran & Davis, 2008, p. 165). By 1960, 90% of U.S. homes had at least one television set (Baran & Davis, 2008), and “the U.S. economy roared, homes and suburbs were built, college enrollment soared, and new television networks and interstate highways linked America in nationwide optimism” (Baran & Davis, 2008, p. 165). Theories of mass communication shifted from direct-effects, “hypodermic needle” models birthed from fear of communism, fascism, propaganda, and pervasive new technologies (such as and indeed especially the broadcast media) to more reasonable, indirect-effects models allowing that the mass media represent only a part of our social system and that media effects, therefore, are counterbalanced—limited—by the influence of society's other institutions, such as the family, school, and church (Baran & Davis, 2008).

Nevertheless, the 1960s brought a dichotomy of sanguine advancement and tremulous apprehension as rapid change supplanted social order. The African-American Civil Rights Movement, Women's Liberation, and protests of U.S. involvement in the Vietnam War—all of which were made well and widely known to the American public via television, with an immediacy possible only through the new medium's real-time, audiovisual delivery—threatened the long-established status quo; and the violence that accompanied these movements—particularly the assassinations of President John F. Kennedy in 1963 and the Reverend Dr. Martin Luther King, Jr. in 1968—left many looking for the proverbial root of society's evils. “Again and again critics arose who blamed many of the problems on media. Media fomented racial unrest, they said; media encouraged young people to challenge adult authority” (Baran & Davis, 2008, p. 165). Politicians, citizens, and media researchers debated the role of television in inciting social instability and violence, and the federal
government established the National Commission on the Causes and Prevention of Violence in 1968 and the Surgeon General's Scientific Advisory Committee on Television and Social Behavior in 1969 to ascertain whether the media were harmful to society, granting funding to a wide variety of research efforts on the individual- and societal-level effects of television violence (Baran & Davis, 2008).

One such effort was The Violence Index, an annual content analysis of a sample week of prime time network programming conducted to determine how much violence was actually present on television. The Index was carried out by a group of researchers at the University of Pennsylvania led by George Gerbner, a Hungarian native who had immigrated to the United States in the late 1930s and who worked as a journalist and fought for the U.S. in WWII before earning his doctorate and becoming a professor of communications. The Violence Index generated considerable controversy as debates raged about the definition of violence, the rationale behind analyzing only television violence and not, say, racism and sexism, and the point of undertaking such analysis when the link between television violence and audience behavior remained conspicuously absent (Baran & Davis, 2008). Gerbner and his colleagues addressed these challenges in 1973, redefining their work as the Cultural Indicators Project, a three-part research framework for investigating the structure, contours, and consequences of pervasive systems of symbols, premised on three global, interrelated questions:

1. What are the processes, pressures, and constraints that influence and underlie the production of mass media content?

2. What are the dominant, aggregate patterns of images, messages, facts, values, and lessons expressed in media messages? and

3. What is the relationship between attention to these messages and audiences' conceptions of social reality? (Shanahan, Gerbner, & Morgan, 1999, pp. 6-7)
The now-defunct first prong, “institutional process analysis” (Gerbner, 1973), examined how media messages are selected, produced, and distributed. The second prong, “message system analysis” (Gerbner, 1973), quantifies and tracks recurrent images in television content. The final prong, “cultivation analysis” (Gerbner, 1973), studies how exposure to the television world contributes to viewers' conceptions of the real world and is the basis for cultivation theory. The Cultural Indicators Project continues (sans the first prong) into the present, making it the longest-running continuous media research project in the world. George Gerbner died in 2005.

Cultivation Theory

Cultivation theory was developed to “help us understand the consequences of growing up and living in a cultural environment dominated by television” (Morgan, Shanahan, & Signorielli, 2009, p. 34), and cultivation research seeks to explain how television, which “has become the common symbolic environment” (Gerbner, 1998, p. 192), shapes audience views of reality. The central hypothesis guiding such research is that, after controlling for demographic characteristics, those who watch more television are “more likely to perceive the real world in ways that reflect the most common and recurrent messages of the television world” (Shanahan et al., 1999, p. 4). The premises upon which this cultivation hypothesis is based are as follows:

1. “[T]elevision is the central cultural arm of American society” (Gerbner & Gross, 1976, p. 126).

Gerbner, Gross, Jackson-Beeck, Jeffries-Fox, and Signorielli (1978) argued that television is “the chief creator of synthetic cultural patterns (entertainment and information) for the most heterogeneous mass publics in history, including large groups that have never
shared in any common public message systems” (p. 178), largely due to the fact that it differs so fundamentally from other media:

Unlike print, television does not require literacy. Unlike the movies, television is “free” (supported by a privately imposed tax on all goods), and it is always running. Unlike radio, television can show as well as tell. Unlike the theater, concerts, movies, and even churches, television does not require mobility. It comes into the home and reaches individuals directly. With its virtually unlimited access from cradle to grave, television both precedes reading and, increasingly, preempts it. (Gerbner & Gross, 1976, p. 127)

Because television has traditionally been more accessible (and indeed more pervasive) than other media, it arguably possesses both relatively greater potential and wider scope as an agent of socialization. This socialization occurs incrementally over time as viewers are continually exposed to television's uniform system of relatively generic, formulaic, cyclical, and repetitive messages, as indicated in the second premise of cultivation theory:


Most of what we know comes not from our own experiences but from the stories we hear—stories that tell us how things work, what things are, and what we should do; stories that socialize us into and accustom us to roles of gender, class, or vocation (among countless others); stories that “weave the seamless web of the cultural environment that cultivates most of what we think, what we do, and how we conduct our affairs” (Shanahan et al., 1999, p. ix).

Indeed, as Gerbner and Gross (1976) pointed out,

[how many of us have ever been in an operating room, a criminal courtroom, a police station or jail, a corporate board room, or a movie studio? How much of what we know about such diverse spheres of activity, about how various kinds of people work and what they do—how much of our real world has been learned from fictional worlds? (p. 130)
Humans have always used storytelling as a method and medium of entertainment, education, and socialization; this is hardly a new phenomenon. What is comparatively novel is, in essence, the institutionalization of storytelling. Television presents a centralized system of storytelling in which the stories have become byproducts of marketing; Gerbner (1998) asserted that broadcast television is “the most concentrated, homogenized, and globalized medium,” as two thirds of all network television programming is paid for by the top 100 U.S. advertisers (p. 176). “Four networks,” he contended, “allied to giant transnational corporations—our private ‘Ministry of Culture’—control the bulk of production and distribution and shape the cultural mainstream” (1998, p. 176). For this reason, some choose to classify cultivation as a critical theory, a theory of social control (Shanahan et al., 1999). Because the institutions of mass media are owned and controlled by economic and social elites—defined by Shanahan et al. (1999) as both dominant organizations and, to a lesser extent, the individuals who play a part in those organizations’ institutional rule structures (p. 16)—the viewpoints disseminated by the media systemically favor the viewpoints of the elite, indoctrinating—cultivating—audiences accordingly. After all, cultivation occurs independently of the source(s), motive(s), and even the veracity of individual messages and of the system of messages as a whole. Institutional process analysis, the discontinued first prong of the Cultural Indicators Project, explored this facet of cultivation.

Most cultivation theorists, however, would assert that more than a theory of social control, cultivation is a theory of media influence (Shanahan et al., 1999). The term influence is used in contrast to effects, as traditional media effects research is concerned with and indeed defined as a matter of short-term change:
Traditional effects research is based on evaluating specific informational, educational, political, or marketing efforts in terms of selective exposure and measurable before/after differences between those exposed to some messages and others not exposed. Scholars steeped in those traditions find it difficult to accept the emphasis of cultivation on total immersion rather than selective viewing. (Morgan et al., 2009, p. 37)

Cultivation is not a unidirectional, monolithic process (e.g., Gerbner, 1998; Morgan et al., 2009). Instead, cultivation—which occurs as the triumvirate of television reality, viewers’ personal realities (both subjective and objective), and factual reality coincide in a complex web of multivariate effects—is “a continual, dynamic ongoing process of interaction among messages, audiences, and contexts” (Morgan et al., 2009, p. 38). Cultivation patterns are not static, and cultivation analysis does not discount the socializing effects of institutions other than television. Direct experience plays a significant role in shaping individuals' worldviews; those who live in high-crime areas, for example, exhibit greater fear of crime, regardless of how much television they watch. Heavy television viewers living in such areas, however, demonstrate the highest levels of fear: “this is a phenomenon… called 'resonance,' in which everyday reality and television provide a 'double dose' of messages that 'resonate' and amplify cultivation” (Gerbner, 1998, p. 182).

In addition to personal experience, families, friends, colleagues, schools, churches, and countless other people, organizations, and circumstances also exert varying degrees of influence on individuals, limiting the direct influence of television. Heavy television viewing, however, “may absorb or override differences in perspectives and behavior which ordinarily stem from other factors and influences” (Gerbner, 1998, p. 183) via a process called “mainstreaming.”

The notions of resonance and mainstreaming represent variations in cultivation theory designed to accommodate the world outside of and beyond the symbolic environment of
television. They can occur individually or in tandem, and both processes are apparent in viewer development of “mean world syndrome,” perhaps the most well-documented cultivation effect. In collecting responses to the now-iconic Mean World Index,³ Gerbner, Gross, Morgan, and Signorielli (1980) found that overall, heavy television viewers were more likely to see the world as a mean place than were light viewers. Moreover, less-educated, less-affluent viewers tended to see the world as meaner than did their better-educated, wealthier counterparts (resonance). Heavy viewers in the educated and affluent group, however, rated the world as being just as mean as did low-education, low-income individuals (mainstreaming).

Cultivation analysis primarily utilizes data gathered from surveys (as well as the occasional field experiment) to investigate the relationship between media messages and viewers’ social reality judgments, commonly called the “cultivation differential;” it does not involve laboratory experiments and causal attributions. In fact, cultivation analysis was developed specifically to address the shortcomings of more traditional effects research such as Albert Bandura's famous Bobo doll studies (1965), in which young children were exposed to videos of adult models committing a series of aggressive acts against a Bobo doll and either being rewarded, punished, or experiencing no consequences. The children were then given opportunity to imitate this aggressive behavior, and many of the children who had watched the model be rewarded or go unpunished did. This led Bandura to develop social cognitive (also known as social learning) theory, which, in short, predicts that behavior can be and is often learned socially, by observing others’ behaviors and the accompanying outcomes and either imitating (modeling) or avoiding those behaviors accordingly.

³(1) Do you believe that most people are just looking out for themselves? (2) Do you think that you can’t be too careful in dealing with people? (3) Do you think that most people would take advantage of you if they got the chance?
Like Gerbner's Violence Index, Bandura's work was funded by government grants and sought to ascertain the impact of television violence on audiences (and, by extension, whether or not television posed a public health hazard). Gerbner and his colleagues, however, viewed Bandura's and similar research as overly simplistic, largely unrealistic, strictly short-term, and having “more to do with theories of observational learning than with violence” (Shanahan et al., 1999, p. 9). “Indeed,” Shanahan et al. (1999) argued, “in most such studies, there is no need to know anything about the institution of television, or its status as a cultural object, or how people typically use it, to be able to interpret the results” (p. 9). Truly a theory of television, cultivation was designed to complement and supplement traditional effects research in order to help paint a better and more accurate picture of television's role in society.

**Criticisms and Shortcomings**

Cultivation analysis was—and certainly is—not without its critics, however. The first public criticism of the Cultural Indicators was voiced by television industry researchers, who accused the project's definition of “violence” of being too general or vague (Shanahan et al., 1999). The first academic criticism followed in 1978 with Newcomb's “humanistic critique,” in which the author argued that because symbols are complex and subject to interpretation and because individual contexts, viewers, and programs differ, in-depth examination and analysis of these symbols and differences would be more meaningful than the Cultural Indicators' broad focus on television messages and audiences as aggregates. Gerbner and Gross (1979) responded, claiming that if our concepts of communication and culture are to have any meaning, television's messages must eventually be understood by viewers in common ways. They asserted that the value of studying singular messages and their effects
on individuals (a “micro” approach) does not cancel out the value of studying the system of messages and its impact on society at large (a “macro” approach); in essence, Gerbner and Gross (1979) declared, “Newcomb's big question, 'what does violence mean to the respondents' is not only irrelevant but distracting” (p. 227) to cultivation analysis.

Cultivation theory has also periodically been accused of being “spurious;” the first such imputation is attributed to Doob and Macdonald (1979), who concluded from survey data that the relationship between fear of crime and heavy television viewing was simply an artifact of actual neighborhood crime levels. After all, people who live in high-crime areas would not only be more afraid of crime but would also be more likely to spend time indoors, engaged in safe activities—watching television, for example. As mentioned previously, Gerbner et al. (1980) also found stronger correlation between fear of crime and heavy viewing for individuals living in dangerous neighborhoods; they interpreted the data, however, as an example of resonance.

Indeed, Gerbner and his colleagues had a rebuttal for every criticism; and when Hughes (1980) and Hirsch (1980, 1981) reanalyzed some of the data reported in Violence Profiles 8 and 9 (Gerbner et al., 1977, 1978), academic discourse gave way to “fierce, prolonged battles, occasionally acrimonious and vituperative. The controversies consumed literally hundreds of pages of scholarly journals; the repercussions were felt at academic conferences and even spilled over into such popular media as Time magazine” (Shanahan et al., 1999, p. 70). Most of the fighting was centered on methodological issues, most notably the proper use of statistical controls in cultivation analysis. Some of these criticisms were legitimate and led to methodological improvements in cultivation research. Others merely spiraled into an embarrassing display of name-calling and finger-pointing and remain, to this
day, unresolved; it is still unclear, for example, whether mainstreaming is in fact a function of cultivation or, as Hirsch (1981) posited, simply a statistical artifact (regression to the mean).

More recent challenges to cultivation (e.g., Bryant, 1986; Potter, 1993) often impeach its applicability in a changing media landscape, as the advent of “cable and satellite networks, VCRs, DVDs, DVRs, and the Internet have brought a significant erosion in audience share (and revenue) for the old “Big Three” broadcasting networks and have altered the marketing and distribution of programming” (Morgan et al., 2009, p. 45). Skeptics of cultivation theory argue that television is no longer the common symbolic environment nor indeed the “cultural arm” of American society; proponents counter that

[d]espite the never-ending proliferation of channels and alternative media ‘delivery systems,’... most programs are by commercial necessity designed to be watched by large and heterogeneous audiences in a relatively non-selective fashion. Network shares decline as ‘new’ technologies promise (and allow) an expansion in diversity and choice, but this has been accompanied by decreased diversity in ownership and greater concentration of production and control, with little diversification evident in programming. (Shanahan et al., 1999, p. 30)

Still, the contention that “if cultivation research is to remain current, it will have to accommodate, rather than subordinate, notions of program diversity and audience selectivity” (Bryant, 1986) has not gone unheard in the academic community, and the current trend in cultivation research is to investigate the impact—i.e., the cultivating power—of genre-specific television viewing (e.g., Bilandzic & Rössler, 2004).

Many critics have also charged cultivation analysis with neglecting to consider the cognitive processes that mediate the relations between input variables, such as media messages, and output variables, such as global reality judgments (e.g., Hawkins & Pingree, 1990); to remedy this shortcoming, Shrum (2009) developed a heuristic processing model of
television effects incorporating both the wealth of research that has found evidence of at least small-scale cultivation effects (for a summary, see Morgan & Shanahan, 1996) and current research on information processing in social cognition. Shrum's model also accommodates source confusion, which has been found to strengthen cultivation effects (Mares, 1996), as well as artifacts such as persuasion theory’s “sleeper effect” that have the potential to produce or to increase cultivation differentials (e.g., Appel & Richter, 2007). Most importantly, Shrum's (2009) model is testable at every stage, finally resolving the greatest claim against cultivation theory—that it is non- (or at least not sufficiently) falsifiable.

*Cultivation Research*

In describing the cultivation process, Morgan et al. (2009) assert that “most of what we know, or think we know, is a mixture of all the stories and images we have absorbed” (p. 36) and that the labels, therefore, “of ‘factual,’ which may be highly selective, and ‘fictional,’ which may be highly realistic, are more questions of style than function” (p. 36). In short, audiences are susceptible to cultivation not only by factual but also by fictional messages; in many cases, it can be difficult for viewers even to distinguish between the two. This difficulty is further compounded by source confusion, a phenomenon in which individuals recall information but forget—and subsequently misattribute—the source of that information. In an oft-cited experiment, Mares (1996) found strong support for her hypotheses that fiction-to-news confusion strengthens the cultivation effect (p. 295) and that visually similar stimuli cause more source confusions than do visually distinct stimuli (p. 293). Indeed, as modern fictional television programs become increasingly more realistic through the use of computer-generated graphics and other high-tech special effects, audiences are likely to face
greater quandaries in evaluating media messages and, in turn, greater impact of those messages on their global reality judgments.

Deutsch and Cavender (2008) specifically addressed this issue with respect to CSI, adapting the term “strategic web of forensic facticity” to describe the show's use of authentic-seeming “wardrobe, sets, and [jargon-laden] dialogue” (p. 45) to depict fictitious science in the context of dramatic realism. The researchers conducted a small-scale content analysis of CSI's debut season (2000-2001), citing the rationale that said season “established CSI as a dominant force in television crime drama” (p. 37) for the selection. Deutsch herself served as the sole coder, utilizing her background in chemistry to code—among other variables—assorted markers of forensic realism (e.g., scientific equipment and jargon); the second author reviewed a sample of her coding observations as a “methodological safeguard” (p. 38). In a qualitative analysis of their data, the authors concluded that police procedurals and related media presentations “provide a kind of ideological closure that cloaks the infallibility of the police with the mantle of science” (p. 48) and that “such closure tends to forestall critical questions about policing in the United States” (p. 48), hinting at the cultivating power of crime drama.

Also relevant to the proposed research are both the previously mentioned “mean world” syndrome and a possible corollary—the “just world” effect. Many studies have demonstrated that exposure to nonfictional television content (e.g., news, “reality” crime programs) can cultivate belief in a “mean and dangerous world” (e.g., Signorielli, 1990). Recently, however, Appel (2008) found evidence in two questionnaire-based studies (one in Germany and another in Austria) of an equal and opposite phenomenon: exposure to fictional television content can cultivate belief in a just world. “Fictional narratives,” he
claims, “depict a world that is guided more by the principle of justice than [is] the real world” (p. 64); these depictions, over time, shape audience perceptions of social reality.

Consider the “CSI Effect,” a modern media buzzword coined to refer to the numerous alleged effects of the popular series on society. The most frequently (if anecdotally) cited of these effects causes jurors who have been exposed to CSI and similar programs to demand “scientific evidence” in every trial—and to refuse to convict when no or “insufficient” evidence is presented. Today’s juries “expect forensic evidence in every case, and they expect it to be conclusive” (Roane, 2005, p. 2), and both police and prosecutors are feeling pressured to cater to these expectations (Roane, 2005).

Sadly, the average American appears to lack sufficient scientific understanding to discern valid techniques and true experts from hokey pseudoscience and charlatans: take, for example, the case of the late Fred Zain, a lab chemist who in the 1990s was discovered to have falsified enough forensic evidence over the course of his 13-year career to bring the convictions of more than one hundred people into doubt. And the list goes on: forensic “experts” have pushed ear prints, lip prints, and handwriting analysis, among other questionable techniques, “with degrees of certainty that just don’t exist” (Roane, 2005, p. 6)—a fact that individuals under the influence of the “CSI Effect” are apparently unable or unwilling to accept. “It is comforting to be lulled into a false sense of security about the infallibility of science,” asserts Lee (2007, p. 22).

Only a small number of empirical tests of the “CSI Effect” have been carried out; but unlike the evidence ever presented in the popular show, the evidence for the existence of any such effect remains inconclusive. In the “first empirical study of jurors designed to investigate the existence and extent of the 'CSI Effect,'” Shelton, Kim, and Barak (2006)
surveyed 1,027 individuals summoned for jury duty in a Michigan state court over a nine-week period (p. 332). The survey questioned subjects about their television viewing habits, expectations that scientific evidence would be produced in a trial, and whether they would demand such evidence as a condition of a guilty verdict (p. 332). The results of the study suggest that juror expectations of being presented with forensic evidence are generally high and that “watching CSI and related programs may marginally increase the expectation of scientific evidence in certain types of cases” (p. 358); they do not, however, affirm the existence of any direct or causative “CSI Effect.”

Schweitzer and Saks (2007) tested the “CSI Effect” in a similar but smaller-scale study in which a “simulated transcript of a criminal trial in which the principal item of inculpatory evidence was hair recovered from a ski mask… left at the crime scene by the perpetrator” (p. 361) was presented to a pool of 48 jury-eligible university students. Subjects were asked to read the transcript and complete a questionnaire assessing “their perceptions of both the trial as a whole and the forensic… evidence specifically” (p. 362); they were then asked about the frequency with which they viewed police procedurals and other crime-themed programs. While a number of differences did emerge between forensics program viewers and non-viewers (viewers rated themselves as better informed about forensic science and reported greater confidence in their verdicts, for example), some of the differences were not statistically significant; and the most important conclusion drawn from the study was that further testing of the “CSI Effect” would be necessary to determine if and how crime drama programs are affecting audiences.

While the “CSI Effect” remains unsubstantiated, it has been shown that the media play an integral role in shaping viewers’ (and, by extension, public) perceptions of science
and technology (S&T), due largely to the fact that when formal science education ends, mass media become the primary—and sometimes the only—source of scientific information for the general public (e.g., Brossard & Shanahan, 2006; Gerbner, Gross, Morgan, & Signorielli, 1981; Miller, Augenbraun, Schulhof, & Kimmel, 2006; Nisbet, Scheufele, Shanahan, Moy, Brossard, & Lewenstein, 2009). Current research on the relationships between and among science, the media, and society comprises two primary domains of inquiry: “(a) images of science, technology, and scientists in the media and (b) media effects on public perceptions of science and technology” (Nisbet et al., 2009, p. 586). Extant measures of American civic scientific literacy and attitudes toward S&T such as the National Science Board's Science and Engineering Indicators (NSB, 2008) have identified the two ends of the public opinion spectrum with regard to science and technology: reservation (apprehension about the dangers of S&T) and promise (expectations about the benefits of S&T). Perhaps incidentally (or indeed perhaps not), these poles correspond nicely with the two dominant media depictions of S&T—terrifying (e.g., Dr. Frankenstein and his monster) and nigh omnipotent (e.g., the forensic heroes of CSI and other police procedurals).

Introducing a media effects-specific model for public perceptions of science and technology, Nisbet et al. (2009) analyzed cross-sectional survey data from the 1999 Science and Engineering Indicators, employing structural equation modeling techniques to test relationships between variables. The researchers concluded that nonfiction science-specific programming (e.g., National Science Foundation-funded Bill Nye the Science Guy) can play a positive role in public understanding of science and technology, but that such educational programming efforts are overwhelmed by the massive popularity of science fiction, science fantasy, paranormal mystery shows, and other general television content that caters to
a ready-made audience for storytelling that often distorts science as either scary or omnipotent, while apparently inhibiting public understanding. (p. 604)

The results of Nisbet et al.’s study assert the media’s role in influencing audience understanding of S&T. Given the premises of cultivation theory, it seems reasonable to infer that this understanding—whether complete or incomplete, accurate or inaccurate—would necessarily and in turn influence viewers’ reception and interpretation of relevant media messages by determining or affecting their abilities and motivation to process information (for a summary of the heuristic processing model of television effects, see Shrum, 2009). This same, cultivated understanding (i.e., scientific literacy) would then serve to moderate other cultivation effects, such as—for example—those on viewers’ perceptions of the effectiveness of the criminal justice system. But what, precisely, is scientific literacy?

Scientific Literacy

Conceptual Overview

Scientific literacy—also referred to as science literacy, scientific and technological literacy, and public understanding of science, usually interchangeably—is a programmatic concept, “a good that educators, scientists, and politicians want for citizens and society” (Norris & Phillips, 2009, p. 271). As such, its meaning has been the subject of perpetual debate, and countless educators, scientists, social scientists, politicians, and public opinion researchers have proposed as many interpretations since the term’s inception in the late 1950s (Hurd, 1958; McCurdy, 1958). None of these attempts, however, “has yielded anything that even approaches universal acceptance” (DeBoer, 2000, p. 582), and some have even confessed that “scientific literacy” may in fact be no more than a mere slogan to rally public
support for more and better science education (Bybee, 1997). The only true consensus surfacing throughout the literature seems to be that some degree of scientific literacy is necessary for citizens of modern, industrial, and—especially—democratic societies (e.g., Miller 2004).

Perhaps the best place to begin an overview of scientific literacy (SL), then, is by defining literacy in a general sense; for it is here that the first divergence in conceptualizations emerges. The word literate has two applicable but very different meanings: 1) possessing the ability to read and write, and 2) demonstrating knowledge or competence (Merriam-Webster online, n.d.). While terminology comprising literacy (the state of being literate) and an antecedent modifier (e.g., scientific, financial) does by and in its very construction indicate the latter denotation, there are some who have chosen to work from the former, defining scientific literacy as the ability to read and write about science (e.g., Norris & Phillips, 2003, 2009; Resnick & Resnick, 1977). Norris and Phillips (2009) have dubbed this notion “the fundamental sense of scientific literacy” (emphasis original; p. 271); and they contrast it with other conceptions, which they accuse of being “wedded solely to the derived sense of scientific literacy—that is, to knowledge of the substantive content of science and to knowledge about science” (emphasis original; p. 271).

The two senses are not necessarily considered to be mutually exclusive, however, and there are some who have attempted to integrate fundamental into otherwise derived notions of scientific literacy (to borrow Norris and Phillips' terms): Miller (2000), for example, set the bar for SL at a level of understanding adequate to read the science section of The New York Times. Shen (1975) suggested that the public understanding of science could be usefully divided into three categories—practical, cultural, and civic scientific literacy—and
defined the latter as comprehension of scientific terms and constructs sufficient to read a daily newspaper or magazine; and Brossard and Shanahan (2006) pitched “the understanding of scientific and technical terms, or the mastery of scientific and technical vocabulary” (p. 48) as a “completely different approach to… conceptualization” (p. 48) upon which to base a new scientific literacy scale. Still, those willing to divorce scientific literacy from its implications of knowledge pertaining to and competency with science are comparatively few, and critics of fundamental SL contend that

while communication skill is a crucial component of literacy… it is difficult to see how any approach to STL is bound simply by language, or by a dominance of the written text. Language ability, as a component of communication skill, is… common to learning in all subject areas, not just science… Scientific and technological literacy is much more than language proficiency. (Holbrook and Rannikmae, 2007, p. 1356)

Substantially larger and more prevalent than the ideological realm of “fundamental” scientific literacy is that of “derived” scientific literacy, in which the plenitude of oft-intersecting SL conceptualizations are based in the second definition of literacy—demonstrating knowledge or competency. The remaining two components of Shen's (1975) aforementioned tripartite notion of scientific literacy—practical and cultural SL—fall into this category: Shen defined practical (also called consumer) scientific literacy as the “possession of the kind of scientific knowledge that can be used to help solve practical problems” (p. 46) and cultural scientific literacy as scientific inquiry “motivated by a desire to know something about science as a major human achievement” (p. 49). The American Association for the Advancement of Science's (AAAS, 1993) and the National Research Council's (NRC, 1996) definitions both emphasize the ability to utilize scientific knowledge and principles in problem solving. The NRC's (1996) inclusive conceptualization also stresses the capacity “to evaluate the quality of scientific information on the basis of its
source and the methods used to generate it” (p. 22), which, in turn, is closely related to the notion of scientific literacy as an understanding of what counts as science (DeBoer, 2000; Hurd, 1998; Lee, 1997) and the ability to distinguish science from non-science and pseudoscience, such as astrology (Mayer, 1997; Miller, 2000; Shortland, 1988).

Many conceptual definitions of scientific literacy (including most of those discussed above) are specifically directed at describing and indeed prescribing the requisite knowledge for what is known as civic (or adult) scientific literacy, most frequently defined as the ability—or at least the potentiality—to function as a member of society and to participate in science-based social issues (e.g., Kolsto, 2000; Miller, 1983, 1998, 2000, 2004; NRC, 1996; Roth & Lee, 2004). Miller (2000) elaborates, asserting that because

it is primarily at the point of controversy that the public becomes involved in the resolution of scientific and technological disputes, it is clear that meaningful citizen participation requires a level of civic scientific literacy sufficient to understand the essential points of competing arguments and to evaluate or assess these arguments. (p. 24)

While accepting in general the idea of civic scientific literacy, physicist Shamos (1995) argued that true scientific literacy is not achievable for most individuals and that, for this reason, an acceptable conceptualization of scientific literacy for non-scientists must necessarily include the awareness of and the ability to deal with scientific experts and expertise; he even went so far as to suggest that science policy should be removed from the democratic process and placed in the more capable hands of a science court. Miller (2000), however, criticized Shamos for being “unable to step outside his own scientific training” and failing to recognize “that the general political institutions of society are extremely reluctant to exclude areas of decision-making from democratic influence, as shown in the uneasy experiment with independent regulatory commissions for securities, trade practices, and
communications over the last four decades” (p. 25). While Shamos is not infrequently cited, his “radical” (DeBoer, 2000) views and proposals seem to attract more controversy than support.

Civic scientific literacy represents an ideal for adults (i.e., those of voting age), but its foundations are laid in adolescence, and most of the remainder of extant conceptions of scientific literacy can be found in compilations of educational standards (e.g., Council of Ministers of Education, Canada (CMEC), 1997; NRC, 1996) and assessments of student scientific knowledge and reasoning (e.g., Organisation for Economic Co-Operation and Development (OECD), 2007a, 2007b, 2009). There is, unsurprisingly, a great deal of overlap among the constructs constituting SL for adolescents and SL for adults; in the case of student scientific literacy, however, greater emphasis is placed on rote knowledge of scientific facts. For this reason, the divergence between civic (adult) scientific literacy and educational (adolescent) scientific literacy is most apparent not in the conceptualizations but in the operationalizations of SL.

**Measuring Scientific Literacy**

Scientific literacy is widely regarded as ill-defined, diffuse, and difficult to measure (e.g., Champagne & Lovitts, 1989); DeBoer (2000) even went so far as to suggest that it is impossible to quantify:

>[S]cientific literacy is about the public's understanding of science. That understanding is open-ended and ever-changing. It is organic, not static. Because its parameters are so broad, there is no way to say when it has been achieved. There can be no test of scientific literacy because there is no body of knowledge that can legitimately define it. To create one is to create an illusion. (p. 597)

Still, there is no shortage of available SL scales, and movements to assess civic and educational scientific literacy can be traced back to before the 1957 launch of the Sputnik I
and subsequent “Space Race” (for historical context, see, e.g., DeBoer, 2000; Miller, 1983). In the interest of relevance and parsimony, only presently active instruments specifically designed to gauge scientific literacy in the United States (without excluding comparative international assessments, provided that they are administered in the U.S. and in English) will be discussed below.

**Civic Scientific Literacy**

In 1978, the National Science Foundation (NSF) selected Jon Miller and Kenneth Prewitt to devise a test of public understanding of and attitudes toward science and technology for use in the National Science Board’s (NSB) Science and Engineering Indicators (SEI) series (Miller, 2004). In the resulting 1979 study, respondents were asked to report whether they had a clear understanding, a general sense, or no understanding at all of what it means to study something scientifically (Miller, 2004); those selecting the first option were then asked in an open-ended question to explain the nature of scientific inquiry. From an analysis of the responses conducted by a set of independent coders, Miller (1983, 2004) estimated that only 14 percent of U.S. adults would be able to provide an acceptable answer to the question.

Miller is now the Director of the International Center for the Advancement of Scientific Literacy at Northwestern University, and his work has been particularly influential in the domain of empirical research on civic scientific literacy. He continues to be involved in the design of the Science and Engineering Indicators (the surveys are still carried out approximately every other year); and since 1979, the size and scope of the SEI instruments have been expanded to include more knowledge and attitudinal items as well as a greater
number of open-ended inquiries (Miller, 2000). Table 1 (below) depicts a sample set of items from the 2008 Indicators.

**TABLE 1: SAMPLE SEI ITEMS, 2008**

<table>
<thead>
<tr>
<th>Item (Response/Options)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All radioactivity is man-made. (\textit{false})</td>
</tr>
<tr>
<td>Lasers work by focusing sound waves. (\textit{false})</td>
</tr>
<tr>
<td>Electrons are smaller than atoms. (\textit{true})</td>
</tr>
<tr>
<td>Antibiotics kill viruses as well as bacteria. (\textit{false})</td>
</tr>
<tr>
<td>How long does it take for the earth to go around the sun? (\textit{one year})</td>
</tr>
<tr>
<td>It is not important for me to know about science in my daily life. (\textit{strongly disagree to strongly agree})</td>
</tr>
</tbody>
</table>

*Note: adapted from NSB (2008)*

Working from the SEI database, Miller (1998, 2000) identified two operationalizable dimensions of scientific literacy: a construct (i.e., vocabulary) dimension reflecting a knowledge of terms such as one might need to read the science section of a newspaper, and a nature dimension reflecting an understanding of the essence of scientific inquiry. “Although it is not reasonable to expect a scientifically literate citizen to be able to design or conduct an experiment,” Miller (2000) contends, “it is increasingly necessary for citizens and consumers to be able to recognize a scientific approach from a nonscientific or pseudoscientific approach” (p. 27).

Unfortunately, the results of the 2008 survey indicate that “many Americans do not give correct answers to basic factual questions about science and questions about the scientific inquiry process” and that “Americans' factual knowledge of science has not changed much over time” despite continual and significant advancements in science and technology (NSB, 2008). On a more positive note, attitudinal findings over the years have demonstrated that while many Americans have some (usually moral) reservations about
science and technology, U.S. citizens as a whole demonstrate a positive attitude about the power (sometimes misconstrued as omnipotence) of science (NSB, 2008).

Critics of the Science and Engineering Indicators and comparable measures of civic scientific literacy are as numerous at least as the scales themselves (e.g., Allum, Sturgis, Tabourazi, & Smith, 2008; Vaccarezza, 2007; Wynne, 1991; Ziman, 1991). Vaccarezza (2007) contends that such measures “constitute a field of not stable knowledge types, with important theoretical gaps and inaccuracies, and with widely recognized methodological weaknesses” (p. 143). Nevertheless, the SEI is generally considered to be the best available national and international assessment of public understanding of and attitudes toward science and technology, and it is widely cited throughout the literature on adult scientific literacy (e.g., Nisbet et al., 2009).

Student Scientific Literacy

In the institutional standard-ruled domain of education, tests of student proficiency in science (and indeed in every other academic subject) are never in short supply. Many of these tests, such as New York's Regents Exams and Georgia's High School Graduation Test, endeavor to measure not any sense of subject literacy per se but rather a general mastery of explicitly and most often narrowly delineated programs of study; other, nationally standardized tests such as the Scholastic Aptitude Test (SAT) Subject Tests are almost as limited in scope, testing nationally as opposed to regionally imposed curricula. The Longitudinal Study of American Youth (LSAY), implemented in 1986 and funded by the National Science Foundation, was designed to study student interest and competence in science and mathematics; the study parallels the Science and Engineering Indicators in many
respects but aims only to measure students' achievement in science, not their scientific literacy (Miller, 2000).

According to most experts, the best available evaluation of educational scientific literacy is the Organisation for Economic Co-operation and Development's (OECD)\(^4\) *Programme for International Student Assessment* (PISA) (e.g., Sadler & Zeidler, 2009). Unlike examinations born of institutional accountability systems,

PISA is not limited to measuring students' mastery of specific science content. Instead, it measures the capacity of students to identify scientific issues, explain phenomena scientifically and use scientific evidence as they encounter, interpret, solve and make decisions in life situations involving science and technology… In order to participate fully in today's global economy, students need to be able to solve problems for which there are no clear rule-based solutions and also to communicate complex scientific ideas clearly and persuasively. PISA has responded to this by designing tasks that go beyond the simple recall of scientific knowledge. (OECD, 2007a, p. 33)

By one measure of the 2006 PISA, American students ranked behind those of twenty other industrialized nations, falling noticeably short of average (OECD, 2007b). These results stand in contrast to those of recent international tests of adult scientific literacy, in which American citizens performed well relative to citizens of other industrialized nations (Miller, 2004). They do, however, seem fairly consistent with the U.S.'s nonetheless dismal civic scientific literacy rate: “no pride can be taken,” Miller (2004) asserts, “in a finding that four out of five Americans cannot read and understand the science section of the *New York Times*” (p. 290). Table 2 (below) displays a selection of items from the 2006 PISA.

\(^4\)The OECD is an international organization headquartered in Paris, France and of which 34 countries (including the United States) are members. For more information, see http://www.oecd.org.
The History of Vaccination

Mary Montagu was a beautiful woman. She survived an attack of smallpox in 1715 but she was left covered with scars. While living in Turkey in 1717, she observed a method called inoculation that was commonly used there. This treatment involved scratching a weak type of smallpox virus into the skin of healthy young people who then became sick, but in most cases only with a mild form of the disease.

Mary Montagu was so convinced of the safety of these inoculations that she allowed her son and daughter to be inoculated.

In 1796, Edward Jenner used inoculations of a related disease, cowpox, to produce antibodies against smallpox. Compared with the inoculation of smallpox, this treatment had less [sic] side effects and the treated person could not infect others. The treatment became known as vaccination.

<table>
<thead>
<tr>
<th>Item</th>
<th>Response/Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>What kinds of diseases can people be vaccinated against?</td>
<td>A. Inherited diseases like haemophilia.</td>
</tr>
<tr>
<td></td>
<td>B. Diseases that are caused by viruses, like polio.</td>
</tr>
<tr>
<td></td>
<td>C. Diseases from the malfunctioning of the body, like diabetes.</td>
</tr>
<tr>
<td></td>
<td>D. Any sort of disease that has no cure.</td>
</tr>
<tr>
<td>Give one reason why it is recommended that young children and old people, in particular, should be vaccinated against influenza (flu).</td>
<td>(response referring to the young and/or old having weaker immune systems than other people)</td>
</tr>
<tr>
<td>The effectiveness of unconventional treatments for diseases should be subject to scientific investigation.</td>
<td>(strongly disagree to strongly agree)</td>
</tr>
</tbody>
</table>

Note: adapted from OECD (2007a)

Some scholars, such as Sadler and Zeidler (2009), “applaud the efforts of the PISA team to create an assessment program that moves beyond more traditional, and typical, approaches to science testing” (p. 919); others criticize the PISA as a methodological failure, arguing that it does not and indeed cannot measure what it claims to measure: “PISA assesses, with some degree of reliability, knowledge and skills for PISA. No more, no less” (Dohn, 2007, p. 10).
Scientific Literacy and Media Effects Research

Scientific literacy is, again, a programmatic concept, and the ultimate goal of every definition (conceptual or operational) discussed hitherto is to advance an inherently prescribed meaning or measure of SL. The applicability of such definitions in mass communication research, therefore, is problematic: because media scholars presumably aim only to understand scientific literacy in the context of media effects paradigms (i.e., as an independent, dependent, or moderating variable) and not—at least in any immediate sense—to effect a scientifically literate populace, a non-normative definition of SL is both necessary and proper for communication research. But from which of the many and varied conceptions of scientific literacy, then, should an appropriate measure be drawn?

The notion of “fundamental” SL provides an inadequate framework for media effects studies, as viewers’ abilities to read and write about science are hardly universally consequential in such research and are, in many cases, entirely inconsequential: for example, audiences do not have to be able to read or write about science to be able to engage with or even to understand, say, a television news report about an influenza epidemic or a documentary on extinct birds.

In addition to the issue of relevance and in agreement with Holbrook and Rannikmae’s (2007) criticism, it is prudent to point out that by the fundamental definition of SL, a Polish professor of physics would no longer be considered scientifically literate were he to travel to Rome, assuming he or she were unable to read and write Italian. This example illustrates what is perhaps the greatest weakness in those conceptualizations of SL rooted only in the most rudimentary meaning of literacy.
The notion of “derived” scientific literacy encompasses two distinct conceptual and operational divisions—civic and educational SL. The latter, devised to test adolescents’ rote knowledge of scientific facts and principles, is insufficient for general communication research, which demands a measure of scientific literacy applicable across demographics. The former, however, designed to evaluate individuals’ potential to take part in science-related social discourse, falls more closely in line with the needs and goals of media research—especially in light of the fact that civic SL assessments typically include attitudinal items. Still, the greater part of extant derived scientific literacy measures stem from subjects’ scores on what are, in effect, science exams.

The creation and administration of appropriate, generalized science tests to participants in media effects studies would be, at best, impractical; at worst, it would be impossible. As is plain from the literature, there is very little consensus as to how to define, prescribe, effect, or calculate SL; the greater difficulty for communication researchers thus lies not in the selection or synthesis of an acceptable conceptualization of SL but in the development of a valid measure. Scientific literacy is, however, a knowledge-based construct, and knowledge is far too complex an abstraction to be treated merely as a running tally of correct answers to factual questions.

**Subjective Knowledge**

“Research in metacognition has found that knowledge about one’s own knowledge plays an important role in a wide variety of processing tasks” (Park, Gardner, & Thukral, 1988, p. 401). This *subjective knowledge*—also called *(self-)* perceived knowledge and feeling of knowing—is the knowledge one believes oneself to have, and it results from the
human capacity for metacognition (e.g., Park, 2001). Of course, a subjective impression of knowledgeability “does not necessarily imply [the possession of] any concrete knowledge” (Park, 2001, p. 419), and it is not at all uncommon for perceived and objective knowledge to be discrepant; indeed, many studies have demonstrated a tendency for the two to be “miscalibrated” (Alba & Hutchinson, 2000). Perhaps unsurprisingly, people’s subjective knowledge tends to exceed their actual knowledge, a phenomenon referred to as the illusion of knowing. This phenomenon is so well-documented that, in a comprehensive review of empirical research on knowledge calibration, Alba and Hutchinson (2000) go so far as to pronounce that “overconfidence [in one’s knowledge]… can be adopted by researchers as a stylized fact about human cognition” (p. 123).

Perceptions of knowledgeability about a given topic most likely arise from familiarity with that topic (e.g., Park, 2001), as “information made recently familiar may be [mistakenly] attributed to long-term knowledge” (Alba & Hutchinson, 2000, p. 143). With respect to mass communication, Park (2001) explains that “as exposure increases, media audiences may increasingly recognize frequently portrayed events as familiar, without necessarily gaining knowledge” (p. 419). In a sense, then, perceived knowledge is cultivated (quite possibly at a higher rate than is actual knowledge) by exposure to relevant information, factual or fictional (e.g., Park, 2001). Researchers have thus come to posit that “the sheer ubiquity of the mass media might contribute to a public that feels sufficiently informed” (Salwen & Driscoll, 1995, p. 270)—a public “assured” by the messages pouring ceaselessly forth from the Information Era’s nigh-omnipresent media (e.g., Salwen & Driscoll, 1995). Heavier users of media, therefore, “can develop an illusion of knowing more about the issues covered in the media, as compared to those who use the media less frequently” (Park, 2001, p. 419).
In addition to the all-but-inevitable quantitative disparities between people’s subjective and objective knowledge, the two knowledge types appear to have somewhat different effects on cognitive processing (e.g., Alba & Hutchinson, 1987, 2000; Park & Lessig, 1981; Raju, Lonial, & Mangold, 1995). The results of an experiment by Nabi, Roskos-Ewoldsen, and Dillman Carpentier (2008), for example, suggest that perceived knowledge promotes deeper information processing than does actual knowledge: “in other words, it doesn’t matter what you know so much as what you think you know” (p. 193).

In their analysis, Nabi et al. (2008) stress the importance of understanding “the potential negative consequences of those who believe themselves to be knowledgeable but who in fact are not, or worse, have misinformation on which they might potentially act (or not act)” (p. 198), a concern reminiscent of those voiced in both popular and academic literature on the alleged “CSI Effect.” After all, what jurors think they know about forensic evidence could, at least in theory, tip the scale between exculpation and a guilty verdict in a criminal trial. Likewise, what crime drama viewers think they know about forensic science could make the difference between positive and negative assessments of the criminal justice system.

Of course, the importance of subjective knowledge neither overrules nor cancels out that of its objective counterpart, which undisputedly plays a role in cognitive processing and is undeniably relevant to any research involving knowledge-based constructs. And while it is not always practical nor even possible to quantify an individual’s topical knowledge, it is certainly feasible to look for established indicators of such knowledge: one might classify an individual as scientifically literate, for example, based upon his or her job title (e.g., brain surgeon, rocket scientist)—no multiple-choice exam necessary.
CHAPTER 2
RESEARCH QUESTIONS, HYPOTHESES, AND RATIONALE

Review of the literature on cultivation and scientific literacy renders apparent the fact that there is yet a shortage of empirical studies on how forensics-focused police procedural programs influence audience perceptions of the effectiveness of the criminal justice system and especially on the manner in which viewer scientific literacy moderates the cultivation process. This study examined both of the above and was guided by the following research questions and hypotheses:

**RQ1**: Is there a relationship between crime drama viewing and perceptions of the effectiveness of the U.S. criminal justice system?

As Zillmann (1980) notes, the television world is often distorted not toward danger but toward safety: after all, on television, the “good guys” almost always triumph over the “bad guys,” restoring law and order to the land and bringing justice to its people. Indeed, it follows from the literature that exposure to the “just world” and infallible science of programs such as *CSI* should cultivate positive perceptions (*i.e.*, belief in the effectiveness) of the criminal justice system, advancing the first hypothesis:

**H1**: Regular crime drama viewers will exhibit greater belief in the effectiveness of the criminal justice system than will non-viewers.

If such phenomena as the “*CSI* Effect” hold true, however, there may arise a polarization of effects in which heavy viewers who have been involuntarily exposed to the
reality of the criminal justice system (e.g., through jury duty or personal experience with crime) exhibit more negative views of law enforcement stemming from the disparity between their real-life experience(s) and their inflated (cultivated) expectations. Those who have been exposed to the criminal justice system for other, generally voluntary reasons (e.g., those who work within the system and their close associates), however, would not be anticipated to show the same tendency; in fact, it is reasonable to assume that such individuals’ perceptions would be predicated more on their personal experiences than on any cultivated expectations.

**RQ2**: Is there a relationship between crime drama viewing and actual (ASL) and/or perceived (PSL) scientific literacy?

Individuals with higher levels of actual scientific literacy (*i.e.*, objective knowledge of science) might be “turned off” to police procedurals by the unintentionally comical preposterousness of the phony techniques and technology showcased rampantly throughout the genre. On the other hand, such individuals might also choose to view crime dramas precisely to take pleasure in the farce. For this reason, it is difficult to predict whether and how crime drama viewing and ASL will covary; it is reasonable to assume, however, that any link between the two is unlikely to be causal—that is, exposure to police procedurals does not necessarily make one knowledgeable about science, and knowledgeability about science does not necessarily compel one to watch police procedurals.

Crime drama viewing and perceived scientific literacy (*i.e.*, subjective knowledgeability about science), in contrast, are likely to exhibit a positive relationship. Television exposure has been demonstrated to be significantly related to the illusion of knowing (*e.g.*, Park, 2001; Salwen & Driscoll, 1995), and Schweitzer and Saks (2007), for example, found that crime drama viewers rated themselves as having a better understanding of forensic science than did non-viewers. Because regular crime drama viewers will be
familiar with the scientific (or perhaps more accurately, the “scientific”) content of such programs, they will potentially—albeit unconsciously—misconstrue that familiarity as knowledgeability:

**H2:** Regular crime drama viewers will evince higher PSL than will non-viewers.

In addition to the probable accrual of perceived scientific literacy to police procedural viewers, it is worth speculating that individuals already high in PSL might also, due to an inherent interest in or sense of facility with science, be more likely to enjoy—and hence to elect to watch—science-themed programs. In a paper exploring the role of uses-and-gratifications models in genre-specific cultivation research, Bilandzic and Rössler (2004) explain that “people regularly turn to television to satisfy their needs, and, in turn, get some of their needs actually satisfied, and, in addition, unintended effects (like knowledge or beliefs they have not sought after)” (p. 313). In short, viewers drawn to crime drama as a result of PSL are no less subject to the influence of the genre’s recurrent messages; indeed, said messages may well reinforce or even further augment such individuals’ pre-established sense of scientific literacy.

**RQ3:** What is the relationship, if any, between viewer scientific literacy (both actual and perceived) and the cultivating effects of television crime drama?

Because individuals higher in actual scientific literacy will presumably have greater awareness and understanding of the fictitiousness of science-related content in police procedural programs as well as greater motivation and ability to process such content (see Shrum, 2009), they are likely to demonstrate a decreased propensity toward source confusions and comparatively diminished cultivation effects. Scientifically literate viewers should be less easily “lulled into a false sense of security about the infallibility of [forensic]
science” (Lee, 2007, p. 22) and thus less likely to base attributions toward the criminal justice system upon the “just world” of crime drama (maintained largely, of course, through scientific heroism). In the words of Bilandzic and Rössler (2004), “people with higher cognitive abilities may just disregard television information as not being appropriate for reality judgments—exactly because they have better mental resources” (p. 311).

Individuals low in ASL, however, would assumably be less able to differentiate forensic fact from fiction and more likely to fall victim to source confusions, causing them to show comparatively heightened cultivation effects—regardless of their PSL levels. Moreover, if subjective knowledge does, as suggested by the results of Nabi et al. (2008), promote message processing, viewers with a combination of high PSL and low ASL might be most subject to television influence, as they would be predisposed both to absorbing more information and to misattributing that information to long-term [objective] knowledge. Thus, it is hypothesized that:

**H3**: ASL and PSL will, according to the combination in which they occur, moderate the relationship between crime drama viewing and perceived effectiveness of the criminal justice system.
Cultivation is a long-term process of influence, not a short-term process of effects; for this reason, cultivation research is frequently conducted via survey. In keeping with this convention, the researcher conducted an analytical web-based survey designed and administered using Qualtrics Survey Software. The questionnaire comprised three primary blocks of items assessing television viewing habits, beliefs about and experience with the criminal justice system, and scientific literacy; blocks were presented in a random order so as to reduce the likelihood of ordering effects. Questions soliciting demographic and other potentially sensitive information (i.e., students’ grades) were placed at the end of the instrument. Finally, no forced-response scheme was implemented anywhere in the survey; respondent ns, therefore, vary from item to item.

Participants

E-mail invitations to participate in the study were sent to the university e-mail addresses of all undergraduate students at a large Southeastern university ($N = 18,184$).¹ Response rate was approximately 7.5% ($N = 1,365$). Table 3 (below) displays the demographic breakdown of respondents.

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¹A list was obtained from the university registrar.
TABLE 3: PARTICIPANT DEMOGRAPHICS

<table>
<thead>
<tr>
<th>Age(^a)</th>
<th>Gender(^b)</th>
<th>Race/Ethnicity(^c)</th>
<th>Year(^d)</th>
<th>GPA(^e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(M = 20.10)</td>
<td>Female</td>
<td>White</td>
<td>First</td>
<td>3.5 – 4.0</td>
</tr>
<tr>
<td>(SD = 3.48)</td>
<td>Male</td>
<td>Black</td>
<td>Second</td>
<td>3.0 – 3.49</td>
</tr>
<tr>
<td>Range: 16–58</td>
<td></td>
<td>Asian</td>
<td>Third</td>
<td>2.5 – 2.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hispanic</td>
<td>Fourth</td>
<td>2.0 – 2.49</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>Fifth+</td>
<td>Below 2.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No GPA</td>
</tr>
</tbody>
</table>

Notes: \(^a\)\(n = 1161\), \(^b\)\(n = 1363\), \(^c\)\(n = 1359\), \(^d\)\(n = 1363\), \(^e\)\(n = 1358\)

It is worth noting that the prevalence of female subjects in the present study (70.7%) is greater than the prevalence of female students at the university (58.9%), as is the proportion of white subjects (78.7%) to white students (66.3%).

In addition to the information above, participants were asked to provide their majors, which were then categorized as science (e.g., chemistry, biology), social science (e.g., political science, linguistics), math/logic (e.g., mathematics, computer science), or other (e.g., humanities, undeclared). Of the responding students \((n = 1,361)\), 27.3\% \((n = 371)\) had a science major, 53.9\% \((n = 734)\) had a social science major, and 3.5\% \((n = 48)\) had a math/logic major. In total, 81.7\% of respondents \((n = 1,112)\) had at least one science-related major.

Variables and Measures

Television Viewing

Subjects were asked to report the amount of time they spend watching television
programming\(^2\) both on a typical weekday and on a typical weekend day. The two figures were fairly highly correlated (\(r = .63, p < .01\)), and a weekly viewing variable was computed. Weekly television viewing (\(n = 1,354\)) ranged from 0 to 110 hours (\(M = 10.92, SD = 10.94\)) and was non-normally distributed, with skewness of 2.51 (\(SE = 0.07\)) and kurtosis of 11.33 (\(SE = 0.13\)). In an effort to normalize the distribution, weekly viewing was split into nine approximately equal groups, a division determined based upon the fact that almost exactly 11\% of respondents (\(n = 151\)) were television non-viewers (\(i.e.,\) had a weekly viewing time of 0). Table 4 (below) presents the resultant distribution (\(M = 3.91, SD = 2.56\)), which has skewness of 0.05 (\(SE = 0.07\)) and kurtosis of -1.23 (\(SE = 0.13\)).

**Table 4: Weekly Television Viewing**

<table>
<thead>
<tr>
<th>Group</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td>0</td>
<td>0–3</td>
<td>3–5</td>
<td>5–7</td>
<td>7–9</td>
<td>9–12</td>
<td>12–16.5</td>
<td>16.5–23</td>
<td>&gt; 23</td>
</tr>
<tr>
<td>n</td>
<td>151</td>
<td>152</td>
<td>170</td>
<td>152</td>
<td>153</td>
<td>148</td>
<td>130</td>
<td>165</td>
<td>133</td>
</tr>
<tr>
<td>%</td>
<td>11.2%</td>
<td>11.2%</td>
<td>12.6%</td>
<td>11.2%</td>
<td>11.3%</td>
<td>10.9%</td>
<td>9.6%</td>
<td>12.2%</td>
<td>9.8%</td>
</tr>
</tbody>
</table>

*Note: Ranges are non-inclusive.*

**Crime Drama Viewing**

Regular crime drama viewing was measured nominally and discreetly, so as to avoid cuing respondents in to the study’s true purpose.\(^3\) Participants were given a set of ten television program genres\(^4\) (ordered randomly) and asked to select any they watch regularly,

---

\(^2\)The questionnaire instructed participants to “consider television programming viewed on the Internet or played back on a DVR device (\(e.g.,\) TiVo), as well.”

\(^3\)Subjects were told that the aim of the research was “to explore the relationship between young people’s media use and their opinions of certain core societal institutions” and that they would be asked to answer questions about one of the media, the health care system, the criminal justice system, or the education system (assigned randomly). Of course, all participants received the criminal justice questions.

\(^4\)news/informational; comedy; sports; medical drama; reality; children’s programming; crime drama; educational/documentary; general drama/romance; science fiction/fantasy
explicitly defined as at least once per week; 32.9% \((n = 449)\) identified themselves as regular crime drama viewers.

Participants were also invited to input the names of up to three television shows they watch regularly (again, at least once per week) as well as those of up to three of their favorite shows. For regularly watched programs \((n = 1,056)\), 20 different crime drama titles \((e.g., \textit{CSI})\) and 3 relevant “true crime” titles \((e.g., \textit{Forensic Files})\) were named a total of 295 times by 236 respondents \((22.35\%)\). For favorite programs \((n = 1,200)\), 20 police procedurals and 4 reality-type crime shows were mentioned 381 times by 308 subjects \((25.67\%)\) (see Appendix A for a complete list of these programs).

\textit{Perceived Effectiveness of the Criminal Justice System (PECJS)}

Eight Likert-type items pertaining to the efficacy of the U.S. criminal justice system \((\alpha = .85)\) were averaged to create a perceived effectiveness scale \((n = 1,335)\) with a possible range of 1 to 5 \((M = 3.17, SD = 0.63)\) and with higher scores indicating greater perceived effectiveness. The scale’s components are summarized in Table 5 (below).

\begin{table}[h]
\centering
\caption{PECJS Scale Items}
\begin{tabular}{|l|c|c|c|}
\hline
\textit{Strongly Disagree} – \textit{Strongly Agree} & \textit{M} & \textit{SD} & \textit{n} \\
\hline
The criminal justice system in the United States is effective.  & 3.14 & 0.94 & 1361 \\
Local law enforcement in my area is effective.  & 3.57 & 0.82 & 1360 \\
Judges are fair and impartial.  & 3.15 & 0.89 & 1362 \\
Juries are fair and impartial.  & 2.86 & 0.91 & 1358 \\
Police officers are fair and impartial.  & 2.63 & 0.95 & 1358 \\
Police officers do their jobs as best they can.  & 3.50 & 0.88 & 1358 \\
Most criminal convictions in the United States are correct.  & 3.40 & 0.79 & 1359 \\
\hline
\textit{Very Negative} – \textit{Very Positive} & \\
My overall impression of the U.S. criminal justice system is…  & 3.13 & 0.99 & 1359 \\
\hline
\end{tabular}
\textit{Note:} \(\alpha = .85\)
\end{table}
As a secondary measure of perceived effectiveness, subjects were asked to estimate the percentage of violent and non-violent crimes\(^5\) solved (i.e., cases closed) by law enforcement in the previous year (2009). Estimations for violent crime \((n = 1,304)\) ranged from 5\% to 95\% \((M = 51.64, SD = 20.17)\), while those for non-violent crime \((n = 1,302)\) ranged from 0\% to 99\% \((M = 52.78, SD = 22.28)\). The actual figures are 47.1\% and 18.6\%, respectively (FBI, 2010).

Respondents’ estimates for violent and non-violent crime were moderately correlated with each other \((r = .45, p < .01)\); they were also correlated—albeit surprisingly weakly—with PECJS (violent crime: \(r = .21, p < .01\); non-violent crime: \(r = .14, p < .01\)).

*Experience with the Criminal Justice System (ECJS)*

Participants were asked whether they or anyone close to them had ever had any of eleven different types of exposures to the U.S. criminal justice system; affirmative responses were then summed to create an experience scale \((n = 1,345)\) with a possible range of 0 to 11 \((M = 3.33, SD = 2.70)\) and with higher scores indicating broader experience. Table 6 (below) displays a summary of respondent ECJS.

---

\(^5\)Respondents were provided with the FBI’s Uniform Crime Reporting (UCR) program’s definitions of violent and non-violent crimes.
Subjects were also asked about the frequency of their personal interaction (business or social) with police officers, forensic scientists, and lawyers and/or judges; the results are presented in Table 7 (below).

### Table 7: Interaction with Criminal Justice Officials

<table>
<thead>
<tr>
<th>Frequency of Interaction</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Very Often</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Police Officers</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td>16.7%</td>
<td>61.6%</td>
<td>17.5%</td>
<td>2.9%</td>
<td>1.2%</td>
</tr>
<tr>
<td><strong>Lawyers/Judges</strong>&lt;sup&gt;b&lt;/sup&gt;</td>
<td>47.6%</td>
<td>35.4%</td>
<td>10.3%</td>
<td>4.1%</td>
<td>2.6%</td>
</tr>
<tr>
<td><strong>Forensic Scientists</strong>&lt;sup&gt;c&lt;/sup&gt;</td>
<td>85.3%</td>
<td>12.9%</td>
<td>1.2%</td>
<td>0.4%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

Notes: <sup>a</sup>n = 1363, <sup>b</sup>n = 1362, <sup>c</sup>n = 1363

As is apparent from the table, respondents on the whole reported very little personal interaction with police officers (78.3% never or rarely), lawyers and/or judges (83% never or rarely), and especially with forensic scientists (98.2% never or rarely); there is thus little cause to believe that personal connections to or relations with criminal justice officials, a
factor not reflected in the ECJS measure, would confound or skew the study’s results. Furthermore, subjects’ relatively limited interaction with agents of the criminal justice system suggests a greater potential role for television in the formation of PECJS.

Actual Scientific Literacy (ASL)

In order to construct a measure of actual scientific literacy from a questionnaire that did not include a science test, students were asked to report their average letter grades (A, B, C, D, or F) across courses in each of five science-related fields (mathematics, life science, physical science, social science, and logic); “not applicable” was provided as an option for students who had never taken courses in a given area. Grades were coded from 0 (N/A; no courses) to 6 (A; an ‘A’ average across courses) and then summed across sciences to create an ASL measure (n = 1,365) ranging from a possible 0 to 30 (M = 14.48, SD = 6.98).

The rationale for using grades in science courses (or the lack thereof) as indicators of ASL stems primarily from the work of Miller (2007), who tested eight variables thought to influence adult SL (age, gender, highest level of education, number of college science courses completed, presence of minor children in the household, level of use of informal science education resources, employment in a science-related job, and personal religious beliefs) in a path analysis and found that the strongest predictor of civic scientific literacy was the number of undergraduate science courses taken, with a total effect of .75. Because the present study examined a sample of undergraduate students, however, relying on the number of science courses completed as the sole indicator of ASL would result in a measure partially dependent upon class standing and heavily biased in favor of upperclassmen; the above measure, which incorporates exposure to and performance in science classes and is therefore less directly age-dependant, was thus devised.
Perceived Scientific Literacy (PSL)

Participants were asked to respond to 15 Likert-type items assessing their (1) interest in, (2) knowledgeability about, and (3) skill at understanding each of the science-related subjects enumerated above; a summary is displayed in Table 8 (below).

**Table 8: PSL Scale Items**

<table>
<thead>
<tr>
<th>Item</th>
<th>M</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I am generally interested in or enjoy learning about…</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics (calculus, geometry, etc.)</td>
<td>2.83</td>
<td>1.34</td>
<td>1363</td>
</tr>
<tr>
<td>Life Science (biology, ecology, etc.)</td>
<td>3.40</td>
<td>1.26</td>
<td>1363</td>
</tr>
<tr>
<td>Physical Science (chemistry, physics, etc.)</td>
<td>2.78</td>
<td>1.31</td>
<td>1363</td>
</tr>
<tr>
<td>Social Science (economics, psychology, etc.)</td>
<td>4.10</td>
<td>0.94</td>
<td>1361</td>
</tr>
<tr>
<td>Logic (computer science, symbolic logic, etc.)</td>
<td>2.81</td>
<td>1.13</td>
<td>1359</td>
</tr>
<tr>
<td><strong>I generally consider myself to be knowledgeable about…</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics (calculus, geometry, etc.)</td>
<td>3.16</td>
<td>1.23</td>
<td>1360</td>
</tr>
<tr>
<td>Life Science (biology, ecology, etc.)</td>
<td>3.31</td>
<td>1.14</td>
<td>1360</td>
</tr>
<tr>
<td>Physical Science (chemistry, physics, etc.)</td>
<td>2.85</td>
<td>1.20</td>
<td>1359</td>
</tr>
<tr>
<td>Social Science (economics, psychology, etc.)</td>
<td>3.83</td>
<td>0.99</td>
<td>1359</td>
</tr>
<tr>
<td>Logic (computer science, symbolic logic, etc.)</td>
<td>2.61</td>
<td>1.08</td>
<td>1359</td>
</tr>
<tr>
<td><strong>I generally consider myself to be skilled at understanding…</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics (calculus, geometry, etc.)</td>
<td>3.31</td>
<td>1.27</td>
<td>1362</td>
</tr>
<tr>
<td>Life Science (biology, ecology, etc.)</td>
<td>3.56</td>
<td>1.12</td>
<td>1360</td>
</tr>
<tr>
<td>Physical Science (chemistry, physics, etc.)</td>
<td>3.05</td>
<td>1.22</td>
<td>1359</td>
</tr>
<tr>
<td>Social Science (economics, psychology, etc.)</td>
<td>4.04</td>
<td>0.91</td>
<td>1360</td>
</tr>
<tr>
<td>Logic (computer science, symbolic logic, etc.)</td>
<td>2.95</td>
<td>1.10</td>
<td>1360</td>
</tr>
</tbody>
</table>

**Notes:** $^a \alpha = .91$, $^b \alpha = .88$, $^c \alpha = .89$, $^d \alpha = .86$, $^e \alpha = .85$

As is clear from the table, the three PSL dimensions proved to be reliable within all five fields (alphas ranged from .85 to .91) and were thus averaged for each. The resulting scores were then summed to create a perceived scientific literacy scale ($n = 1,334$) with a possible
range of 0 to 25 \( (M = 16.20, SD = 3.25) \) and with higher scores indicating greater PSL. As might be surmised based upon the subjective knowledge literature, PSL was only weakly correlated with ASL \( (r = .20, p < .01) \).

Additional Data for Supplementary Analysis

In order tentatively to examine students’ impressions about forensic science specifically, respondents were asked to indicate their levels of agreement (strongly disagree to strongly agree) with three statements reflecting common misperceptions about forensic evidence—misperceptions that are most likely perpetuated, at least in part, by crime drama programs:

1. Most convictions of violent criminals are based on forensic evidence.
2. DNA evidence is absolute proof of a person’s guilt.
3. The absence of DNA evidence is absolute proof of a person’s innocence.

Finally, as an exploratory measure of the perceived relative value/status of forensic scientists as justice operatives, students were invited to rank police officers, lawyers, judges, forensic scientists, and witnesses (presented in a random order) according to the relative importance of their roles in solving crimes.
CHAPTER 4
RESULTS AND ANALYSIS

Research Questions and Hypothesis Testing

RQs 1 and 2 were examined using bivariate correlations with two-tailed tests of significance. Table 9 (below) displays the correlation matrix for the study’s key variables.

<table>
<thead>
<tr>
<th></th>
<th>TV Viewing(a)</th>
<th>CD Viewing(b)</th>
<th>PECJS</th>
<th>ECJS</th>
<th>ASL</th>
<th>PSL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV Viewing(a)</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CD Viewing(b)</td>
<td>.236(*)</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PECJS</td>
<td>.054(*)</td>
<td>.031</td>
<td>1</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ECJS</td>
<td>-.026</td>
<td>.014</td>
<td>-.116(**)</td>
<td>1</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>ASL</td>
<td>-.013</td>
<td>.012</td>
<td>-.010</td>
<td>.041</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>PSL</td>
<td>-.063(*)</td>
<td>.014</td>
<td>.133(**)</td>
<td>.050</td>
<td>.204(**)</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes: *p < .05; **p < .01; \(a\)weekly TV viewing, grouped 0-8 (0 = non-viewers, 8 = heaviest viewers); \(b\)regular crime drama viewing, dummy coded (0 = non-regular viewers, 1 = regular viewers)

RQ1 asked about the relationship between crime drama viewing and perceptions of the effectiveness of the criminal justice system, and H1 predicted that PECJS would be higher among those who regularly watch police procedurals. As is apparent from the table above, however, correlation between regular crime drama viewing and PECJS was not significant, and association between total television viewing and PECJS was, to say the least,
minimal. Additionally, no significant relationship emerged when correlation between total television viewing and PECJS was tested separately for regular \( (r = .02, p = .63, n = 437) \) and non-regular crime drama viewers \( (r = .06, p = .07, n = 888) \).

Moreover, an independent samples \( t \)-test found no significant difference in PECJS between regular \( (M = 3.20, SD = 0.63) \) and non-regular \( (M = 3.16, SD = 0.63) \) police procedural viewers, \( t(1333) = -1.13, p = .26 \). The same held true for participants’ estimates of the percent of violent and non-violent crimes solved by law enforcement: estimations for violent crime did not differ significantly between regular \( (M = 52.85, SD = 19.60) \) and non-regular \( (M = 51.03, SD = 20.43) \) crime drama viewers, \( t(1302) = -1.54, p = .13 \), nor did estimations for non-violent crime \( (M = 54.33, SD = 2.42, \text{ for regular viewers}; M = 52.01, SD = 22.18, \text{ for non-viewers}), t(1300) = -1.77, p = .08 \). H1, therefore, was not supported.

RQ2 regarded the relationship between crime drama viewing and scientific literacy, and H2 predicted that regular crime drama viewers would perceive themselves to be more scientifically literate than would non-regular viewers. While PSL scores were indeed slightly higher among regular viewers \( (M = 16.26, SD = 3.10, n = 445) \) than among non-viewers \( (M = 16.16, SD = 3.32, n = 889) \), the difference was not significant, \( t(1332) = -0.53, p = .60 \); H2, therefore, was not supported. The difference in ASL scores between regular crime drama viewers \( (M = 14.60, SD = 6.57, n = 449) \) and non-viewers \( (M = 14.42, SD = 7.18, n = 916) \) was also non-significant, \( t(963.31) = -0.45, p = .65 \).

In order to assess whether crime drama viewership varied by scientific literacy level, respondents were grouped according to their combinations of high (median and above) or low (below median) perceived and actual scientific literacy,\(^1\) as summarized in Table 10

\(^1\)median ASL = 15.00 \( (M = 14.48) \); median PSL = 16.33 \( (M = 16.20) \)
A chi-square analysis did not reveal a significant difference in the distribution of regular crime drama viewers among the four groups, \( \chi^2 = 1.75, df = 3, p = .63 \).

**Table 10: Distribution of Regular Crime Drama Viewers by Scientific Literacy Level**

<table>
<thead>
<tr>
<th></th>
<th>High ASL</th>
<th>Low ASL</th>
</tr>
</thead>
<tbody>
<tr>
<td>High PSL</td>
<td>( n = 431 )</td>
<td>( n = 285 )</td>
</tr>
<tr>
<td>% Crime Drama Viewers</td>
<td>33.2%</td>
<td>36.5%</td>
</tr>
<tr>
<td>Low PSL</td>
<td>( n = 293 )</td>
<td>( n = 325 )</td>
</tr>
<tr>
<td>% Crime Drama Viewers</td>
<td>32.1%</td>
<td>32%</td>
</tr>
</tbody>
</table>

*Note: \( \chi^2 = 1.75, df = 3, p = .63 \)*

Moreover, much as was the case with perceived effectiveness, there appeared to be no meaningful association between total television viewing and either PSL (\( r = -.06, p = .02 \)) or ASL (\( r = -.01, p = .63 \)).

Finally, RQ3 addressed the relationship between viewer scientific literacy and the cultivating effects of television crime drama, and H3 predicted that ASL and PSL would interact to moderate the cultivation process. To evaluate the predictive power of television viewing (both general and genre-specific), scientific literacy (both actual and perceived), and experience for perceived effectiveness, a hierarchical multiple linear regression analysis was performed in which PECJS was regressed onto four blocks of variables: demographics (gender and race),

\(^2\) television viewing (crime drama and total weekly), scientific literacy (ASL and PSL), and experience (ECJS). A summary of the resultant models is presented in Table 11 (below).

---

\(^2\) Age was not included in the regression model as it did not vary much within the sample (87.9% of participants were between 18 and 22) and as correlation between age and perceived effectiveness was both infinitesimal and non-significant (\( r = .01, p = .87 \). See Appendix B for a table of correlations among demographic and key variables.
Table 11: Summary of Hierarchical Regression Analysis Predicting PECJS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
<th>Model 3</th>
<th></th>
<th></th>
<th>Model 4</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>$SE$</td>
<td>$\beta$</td>
<td>$B$</td>
<td>$SE$</td>
<td>$\beta$</td>
<td>$B$</td>
<td>$SE$</td>
<td>$\beta$</td>
<td>$B$</td>
<td>$SE$</td>
<td>$\beta$</td>
</tr>
<tr>
<td>Gender$^{a}$</td>
<td>.01</td>
<td>.04</td>
<td>.01</td>
<td>.00</td>
<td>.04</td>
<td>.01</td>
<td>.05</td>
<td>.04</td>
<td>.04</td>
<td>.04</td>
<td>.04</td>
<td>.03</td>
</tr>
<tr>
<td>Race$^{b}$</td>
<td>.24</td>
<td>.04</td>
<td>.16***</td>
<td>.25</td>
<td>.05</td>
<td>.16***</td>
<td>.25</td>
<td>.04</td>
<td>.16***</td>
<td>.25</td>
<td>.04</td>
<td>.16***</td>
</tr>
<tr>
<td>Crime Drama Viewing$^{c}$</td>
<td>.02</td>
<td>.04</td>
<td>.02</td>
<td>.02</td>
<td>.04</td>
<td>.02</td>
<td>.02</td>
<td>.04</td>
<td>.02</td>
<td>.02</td>
<td>.04</td>
<td>.01</td>
</tr>
<tr>
<td>Weekly TV Viewing$^{d}$</td>
<td>.02</td>
<td>.01</td>
<td>.07*</td>
<td>.02</td>
<td>.01</td>
<td>.08***</td>
<td>.02</td>
<td>.01</td>
<td>.08***</td>
<td>.02</td>
<td>.01</td>
<td>.08***</td>
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<tr>
<td>Actual SL</td>
<td></td>
<td></td>
<td>.00</td>
<td>.00</td>
<td>.04</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Perceived SL</td>
<td>.03</td>
<td>.01</td>
<td>.14***</td>
<td>.03</td>
<td>.01</td>
<td>.14***</td>
<td>.03</td>
<td>.01</td>
<td>.14***</td>
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<tr>
<td>Experience</td>
<td></td>
<td></td>
<td>-.03</td>
<td>.01</td>
<td>-.13**</td>
<td></td>
<td>-.03</td>
<td>.01</td>
<td>-.13**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>.024</td>
<td></td>
<td></td>
<td>.029</td>
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<td></td>
<td>.047</td>
<td></td>
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<td>.064</td>
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</tr>
<tr>
<td>$F$ for $\Delta R^2$</td>
<td>15.59**</td>
<td></td>
<td></td>
<td>3.58*</td>
<td></td>
<td></td>
<td>12.08***</td>
<td></td>
<td></td>
<td>21.94***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: $^a$p < .05, $^b$p < .01; $^c$dummy coded (0 = male, 1 = female) $^d$dummy coded (0 = nonwhite, 1 = white);
$^e$dummy coded (0 = non-regular viewers, 1 = regular viewers); $^f$grouped 0-8 (0 = non-viewers, 8 = heaviest viewers); $B$ = unstandardized coefficients, $\beta$ = standardized coefficients

All four models significantly predicted perceived effectiveness,$^3$ with each model explaining a significantly greater amount of variance than the last. Race was a significant contributor across the board, with white respondents evaluating the criminal justice system more favorably than did nonwhite respondents. It is possible that this discrepancy is at least partly a function of the fact that nearly 80% of the study’s subjects were white; an independent samples $t$-test, however, confirms that it is not due to nonwhite participants ($M = 3.19, SD = 2.85, n = 284$) having any more experience than white participants ($M = 3.36, SD = 2.66, n = 1,061$) with the criminal justice system, $t(1343) = -0.98$, $p = .33$. ECJS was, unsurprisingly, a significant predictor of PECJS, with respondents who reported having more experience with the system judging it more harshly.

---

$^3$Model 1: $F(2, 1275) = 15.59, p < .01$; Model 2: $F(4, 1273) = 9.62, p < .01$; Model 3: $F(6, 1271) = 10.55, p < .01$; Model 4: $F(7, 1270) = 12.33, p < .01$
Weekly television viewing was also a significant predictor of PECJS, with heavier viewers evincing more positive views of the justice system; crime drama viewing specifically, however, did not appear to be of any consequence. Participants’ PSL levels, on the other hand, did make a difference: subjects higher in perceived scientific literacy tended to rate the justice system as more effective. ASL did not make a significant contribution.

Indeed, ASL appears to play a subordinate role to PSL with respect to respondents’ assessments of the criminal justice system, and as a secondary test of H3, a 2 x 4 univariate ANOVA was performed with crime drama viewing (regular viewer, non-viewer) and SL grouping (high ASL/high PSL; high ASL/low PSL; low ASL/high PSL; low ASL/low PSL) as independent variables and PECJS as the dependent variable. While the interaction between crime drama viewing and SL grouping was non-significant, $F(3, 1298) = 0.78, p = .50$, a significant main effect did emerge for the latter, $F(3, 1298) = 3.32, p < .05$. Scheffé post-hoc comparisons for SL grouping indicated that individuals with low ASL but high PSL ($M = 3.27, SD = 0.60$) rated the criminal justice system as significantly more effective than did those with low ASL and low PSL ($M = 3.11, SD = 0.63$) or high ASL but low PSL ($M = 3.10, SD = 0.58$). H3 was not directly supported, as no relationship between police procedural viewing and PECJS materialized for SL to moderate; it is clear, however, from the relationships among total television viewing, PSL, and ASL revealed in the analyses above that scientific literacy (or, at very least, perceived SL) is most likely influential in the processing of relevant media messages and the formation of related attitudes and beliefs.

Supplementary Analysis

While participants’ crime drama viewing habits did not appear to have any bearing on their evaluations of the criminal justice system as a whole, it seems reasonable to speculate
that exposure to crime drama might impact their impressions of forensic science and scientists specifically. Subjects’ responses to the three forensic evidence items are summarized in Table 12 (below).

**Table 12: Forensic Evidence Items**

<table>
<thead>
<tr>
<th>Item</th>
<th>$M$</th>
<th>$SD$</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree – Strongly Agree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most convictions of violent criminals are based on forensic evidence.</td>
<td>3.20</td>
<td>0.85</td>
<td>1353</td>
</tr>
<tr>
<td>DNA evidence is absolute proof of a person’s guilt.</td>
<td>2.72</td>
<td>0.97</td>
<td>1361</td>
</tr>
<tr>
<td>The absence of DNA evidence is absolute proof of a person’s innocence.</td>
<td>1.81</td>
<td>0.67</td>
<td>1361</td>
</tr>
</tbody>
</table>

In total, 41.9% of participants agreed and only 21.6% disagreed that most convictions of violent criminals are based on forensic evidence; in reality, however, “most” is almost certainly a considerable overestimation. While the impact of physical evidence at the level of adjudication is notoriously understudied, a recent project funded by the U.S. Department of Justice’s National Institute of Justice (NIJ) and examining a stratified random sample of 4,205 criminal incidents taking place across five jurisdictions in the year 2003 found that none of the study’s measures of forensic evidence were significant predictors of criminal conviction for any type of offense (Peterson, Sommers, Baskin, & Johnson, 2010). The same study’s results also indicated that physical evidence is collected in well under half of reported incidents for most types of crime and that not all collected evidence is ever submitted to or analyzed by a crime laboratory, a point that will be addressed in greater detail shortly (Peterson et al., 2010).

A smaller proportion of subjects—25.1%—agreed that DNA evidence is irrefutable proof of an individual’s guilt (it is not; see, e.g., The Innocence Project, 2011), while 50%
correctly disagreed. Only 1.5% agreed that a lack of DNA evidence is irrefutable proof of a suspect’s innocence; 88.2% correctly disagreed.

Surprisingly, independent samples t-tests again revealed no significant difference between police procedural viewers and non-viewers for any of the forensic evidence items. Regular viewers ($M = 3.24, SD = 0.87, n = 449$) were not significantly more likely than non-regular viewers ($M = 3.18, SD = 0.84, n = 904$) to agree that most convictions for violent crimes are based on forensic evidence, $t(865.28) = -1.10, p = .27$; that DNA evidence is absolute proof of guilt (viewers: $M = 2.69, SD = 0.95, n = 448$; non-viewers: $M = 2.74, SD = 0.98, n = 913$), $t(1359) = 0.86, p = .40$; or that a lack of DNA evidence is absolute proof of innocence (viewers: $M = 1.81, SD = 0.67, n = 449$; non-viewers: $M = 1.81, SD = 0.67, n = 912$), $t(1359) = 0.10, p = .92$.

Moreover and indeed even more surprisingly, respondents’ dispositions on the three forensics items do not appear to a function of—nor even related to—their scientific literacy, as indicated by the nearly nonexistent and mostly non-significant correlations displayed in Table 13 (below).

<table>
<thead>
<tr>
<th>Item</th>
<th>ASL</th>
<th>PSL</th>
<th>Science Major$^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Convictions Based on Forensic Evidence</td>
<td>.012</td>
<td>.058$^*$</td>
<td>.059$^*$</td>
</tr>
<tr>
<td>2: DNA as Proof of Guilt</td>
<td>.006</td>
<td>.017</td>
<td>.046</td>
</tr>
<tr>
<td>3: Lack of DNA as Proof of Innocence</td>
<td>-.008</td>
<td>-.087$^{**}$</td>
<td>-.054$^*$</td>
</tr>
</tbody>
</table>

Notes: *$p < .05$; **$p < .01$; $^a$dummy coded (0 = student has no science major, 1 = student has a science major)
In addition, two univariate ANOVAs comparing responses to the first and second items, respectively, by SL grouping did not reveal significant main effects. An ANOVA for item three, however, did, $F(3, 1328) = 3.77, p < .05,$ and Scheffé post-hoc comparisons revealed that individuals with high ASL and high PSL ($M = 1.74, SD = 0.66$) were significantly less likely than those with high ASL but low PSL ($M = 1.90, SD = 0.64$) to erroneously agree that the absence of DNA evidence is absolute proof of a person’s innocence.

Finally, as an exploratory measure, subjects were asked to rank the importance of various individuals—including forensic scientists—in solving crimes; the results are reproduced in Table 14 (below).

**Table 14: Perceived Instrumentality in Crime Solving**

<table>
<thead>
<tr>
<th>Ranking</th>
<th>First</th>
<th>Second</th>
<th>Third</th>
<th>Fourth</th>
<th>Fifth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forensic Scientists</td>
<td>43.6%*</td>
<td>29.3%</td>
<td>17.6%</td>
<td>5.8%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Police Officers</td>
<td>26.0%</td>
<td>24.4%</td>
<td>26.8%*</td>
<td>12.4%</td>
<td>10.3%</td>
</tr>
<tr>
<td>Witnesses</td>
<td>20.9%</td>
<td>30.7%*</td>
<td>23.5%</td>
<td>12.3%</td>
<td>12.7%</td>
</tr>
<tr>
<td>Lawyers</td>
<td>4.8%</td>
<td>8.3%</td>
<td>16.4%</td>
<td>35.3%*</td>
<td>35.2%</td>
</tr>
<tr>
<td>Judges</td>
<td>4.8%</td>
<td>7.2%</td>
<td>15.8%</td>
<td>34.2%</td>
<td>38.0%*</td>
</tr>
</tbody>
</table>

*Notes: $n = 1338$; *most common ranking

Interestingly, the majority of participants (72.9%) ranked forensic scientists as being most or second most instrumental in solving crimes; in contrast, only about half of respondents (50.4%) placed police officers in one of the top two spots. In actuality, however, forensic scientists don’t become involved in what is most likely the majority of criminal cases: Peterson *et al.* (2010), for example, found that physical evidence was collected in no

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*Item 1 (Convictions): $F(3, 1321) = 2.41, p = .07$; Item 2 (DNA/Guilt): $F(3, 1328) = 0.83, p = .48$
more than 30% of incidents for all crime types but rape (64%) and homicide (97%);
mOREOVER, not all collected evidence ever made it as far as the lab:

  With the exception of homicides (89%), few of the reported crime incidents
  had forensic evidence that was submitted to crime laboratories. While the rate
  of submission of evidence for rape was 32%, submission rates in assaults,
  burglaries, and robberies were under 15% of reported offenses. (p. 8)

  Bivariate correlations revealed no meaningful association between respondents’
ratings of forensic scientists and their total weekly television viewing ($r = .01, p = .68$); the
same held true for both crime drama viewers ($r = .07, p = .12, n = 442$) and non-viewers ($r
= .00, p = .89, n = 886$) when examined separately. Finally, an independent samples $t$-test
found no significant difference in rankings between regular ($M = 1.92, SD = 1.09, n = 445$)
and non-regular ($M = 1.99, SD = 1.09, n = 893$) police procedural viewers, $t(1336) = 1.07, p
= .29$. But where, then, did subjects’ inflated notions of forensic scientists’ involvement in
crime-busting originate, if not television?
CHAPTER 5
DISCUSSION, LIMITATIONS, AND CONCLUSION

Discussion

The present study examined relationships between and among undergraduate students’ general and genre-specific (i.e., crime drama) television viewing, perceptions of the effectiveness of the U.S. criminal justice system, and perceived and actual scientific literacy. The results suggest a positive relationship (albeit rather a modest one) between total television viewing and PECJS, a finding consistent with the cultivation hypothesis and reflective of the “just world” effect (e.g., Appel, 2008; Zillmann, 1980). No evidence, however, of covariance between crime drama viewing in particular and perceived effectiveness of the justice system was manifest in the data.

Additionally, no association was apparent between police procedural viewing and either perceived or actual scientific literacy, and the prevalence of regular crime drama viewers was invariant across SL categories (high/low ASL x high/low PSL). Perceived scientific literacy was, however, positively associated with PECJS; actual scientific literacy, on the other hand, was ostensibly unrelated.

Finally, both total television viewing and PSL— as well as experience with the criminal justice system and participant race—were shown to be significant predictors of perceived effectiveness. Even so, the strength of this finding was minimal, as all four
variables together were able to explain only about 6% of the variance in PECJS. In summary, evidence of global cultivation effects was limited, and evidence of any genre-specific effects was—in a perplexing but not unprecedented turn of events—conspicuously absent.

Prior research on the cultivating power of crime drama has also consistently stopped (or, as in the case of this study, fallen) short of corroborating the likes of the “CSI effect” (e.g., Dowler, 2003; Schweitzer & Saks, 2007; Shelton et al., 2006). Dowler (2003), for example, upon analyzing a sample from the 1995 National Opinion Survey on Crime and Justice (NOSCJ)\(^1\) to assess relationships between media consumption and various crime- and justice-related attitudes, was forced to conclude that “perception of police effectiveness is not related to media consumption” (p. 120).

Nonetheless, it is plain from the present as well as a host of related studies that public valuation of forensic science and scientists is generally high, often to the point of being inflated. After finding only tenuous associations between police procedural viewing and jurors’ expectations regarding scientific evidence (which, incidentally, were both widespread and not infrequently unreasonable), Shelton et al. (2006) speculated that such expectations may be unrelated to exposure to any specific types of television programming and instead be “the result of broader changes in popular culture related to advancements in both technology and information distribution” (p. 368). They go on to argue that as both information exchange within the scientific community and the flow of new findings into the public sphere from the scientific community are increasingly facilitated by new and better technology, not only is more science accomplished, it is also assimilated into popular culture at previously unimaginable rates. “Ordinary people [now] know, or at least think they know,” the

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\(^1\)The NOSCJ is a random (CATI) telephone survey of adults living in the continental United States. The survey is cross-sectional and addresses a broad range of crime-related issues.
researchers contend, “more about science and technology from what they have learned in the media than they ever learned in school” (Shelton et al., 2006, p. 363)—a view consistent with the literature on public perceptions of science and technology (e.g., Brossard & Shanahan, 2006; Miller et al., 2006; Nisbet et al., 2009).

While the lack of a relationship between crime drama viewing and perceived effectiveness was unexpected, the association between experience and PECJS was wholly unsurprising, as was its inverse nature. In the television world, “forensic laboratories are fully staffed with highly trained personnel, stocked with a full complement of state-of-the-art instrumentation and rolling in the resources to close every case in a timely fashion” (Houck, 2006, p. 1). In TV land, where there’s a will—or a partial fingerprint lifted from a corpse and scanned into a remote computer with a scientist-cum-detective’s mobile phone—there’s a way, and justice officials, the gatekeepers of good, are efficient and infallible. In the real world, however, loose ends often remain untied, and more than half of crimes are never solved (FBI, 2010); not everyone is brought to justice or to closure, as the case may be. But if one is accustomed to prime time crime—if one possesses, consciously or not, a cultivated notion of what the criminal justice system is or should be—it stands to reason that exposure to the imperfect truth would result in disappointment. Indeed, an interesting direction for future research would be to investigate the possibility of a “disillusionment differential;” that is, whether those with heavier television diets exhibit a greater decrease in PECJS upon initial acquisition of personal experience with the system.

**Limitations**

Survey research—like any method—is bound by various limitations, the greatest perhaps being the fact that directionality and causation cannot be ascertained from
correlational data; it is unclear, for example, whether individuals with higher PSL evaluated the justice system more favorably because of their sense of relevant knowledge or whether PSL and PECJS were merely cultivated concurrently as a consequence of television viewing.

The present study was also limited in terms of sampling: while a census scheme was employed to invite students to take part in the study, respondents ultimately self-selected and may very well differ from those who declined to participate. Furthermore, the study’s sample was largely homogeneous, with both whites and females overrepresented relative to the university’s (already predominantly white and female) undergraduate population. And while undergraduate students do, of course, make for convenient, accessible subjects, data collected from them are not generalizable—especially in a study examining such characteristics as scientific literacy, which very likely exists at higher levels among university students than among the populace at large.

Finally, this study was limited—potentially quite severely—by two of its measures: crime drama viewing and actual scientific literacy. A continuous measure of crime drama viewing would perhaps have revealed effects undetectable with the dichotomous measure herein employed, though it is worth noting that several of the studies cited above that failed to find evidence of any “CSI effect” measured crime drama viewing continuously (e.g., Shelton et al., 2006).

More precarious is the study’s ASL measure. Actual scientific literacy—a fiercely debated and somewhat inchoate collection of objective knowledge—is notoriously difficult to measure; some have even called it unquantifiable (e.g., DeBoer, 2000). While the scale devised for and utilized in this research is based on an established predictor of civic scientific literacy (i.e., the number of college science courses completed; see Miller, 2007), the
modifications incorporated in order to accommodate a sample composed entirely of undergraduate students (i.e., performance in science-related courses) are potentially problematic—for example, by the study’s ASL measurement scheme, an ‘F’ average across classes in six academic subjects² would equate to an ‘A’ average across courses in one. As 81.6% of participants reporting a grade point average (n = 974), however, had GPAs of at least 3.0, it is unlikely that many poor science students ended up with high ASL scores. Still, the ASL measure implemented in this study is very much experimental and can—at best—claim only face validity.

Conclusion

In conclusion, this study—like so much cultivation research before it—offers no more than hints at the possibility of television’s influence and indeed raises more questions than it answers: while the fake forensics of popular crime drama programs are plain to see, whether they are accompanied by real effects continues to be shrouded in uncertainty. But unlike the tidy investigations of CSI, which almost always end with a mystery solved and a clever one-liner, this case must remain open long past the final remark—until at last the conundrum of cultivation is resolved by future research.

²Only five subjects—mathematics, life science, physical science, social science, and logic—were considered in this research.
Appendix A:

PARTICIPANTS’ REGULARLY VIEWED AND FAVORITE CRIME PROGRAMS

<table>
<thead>
<tr>
<th>Program Title</th>
<th>Regular</th>
<th>Favorite</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Crime Drama</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bones</td>
<td>53</td>
<td>53</td>
<td>106</td>
</tr>
<tr>
<td>Castle</td>
<td>27</td>
<td>22</td>
<td>49</td>
</tr>
<tr>
<td>Criminal Minds</td>
<td>20</td>
<td>32</td>
<td>52</td>
</tr>
<tr>
<td>CSI</td>
<td>5</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>CSI: Miami</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>CSI: New York</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Detroit 187</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Dexter</td>
<td>26</td>
<td>41</td>
<td>67</td>
</tr>
<tr>
<td>Fringe</td>
<td>13</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>Hawaii Five-O</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Law &amp; Order</td>
<td>15</td>
<td>28</td>
<td>43</td>
</tr>
<tr>
<td>Law &amp; Order: SVU</td>
<td>30</td>
<td>37</td>
<td>67</td>
</tr>
<tr>
<td>Lie to Me</td>
<td>21</td>
<td>16</td>
<td>37</td>
</tr>
<tr>
<td>Monk</td>
<td>1</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>NCIS</td>
<td>30</td>
<td>48</td>
<td>78</td>
</tr>
<tr>
<td>NCIS: Los Angeles</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Psych</td>
<td>31</td>
<td>38</td>
<td>69</td>
</tr>
<tr>
<td>Saving Grace</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>The Closer</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>The Mentalist</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>White Collar</td>
<td>2</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>286</td>
<td>374</td>
<td>660</td>
</tr>
<tr>
<td><strong>True Crime</strong></td>
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<td></td>
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<tr>
<td>48 Hours</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Forensic Files</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Lock Up</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>The First 48</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>9</td>
<td>7</td>
<td>16</td>
</tr>
</tbody>
</table>
# Appendix B: Correlations among Demographic and Key Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>TV Viewing(^a)</th>
<th>CD Viewing(^b)</th>
<th>PECJS</th>
<th>ECJS</th>
<th>ASL</th>
<th>PSL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.099</td>
<td>.024</td>
<td>.005</td>
<td>.090(^<em>)</em></td>
<td>.099(^<em>)</em></td>
<td>-.005</td>
</tr>
<tr>
<td>Year(^c)</td>
<td>.135(^<em>)</em></td>
<td>.046</td>
<td>-.036</td>
<td>.059(^<em>)</em></td>
<td>.215(^<em>)</em></td>
<td>-.047</td>
</tr>
<tr>
<td>Gender(^d)</td>
<td>-.050</td>
<td>.103(^<em>)</em></td>
<td>-.016</td>
<td>-.065(^<em>)</em></td>
<td>-.023</td>
<td>-.211(^<em>)</em></td>
</tr>
<tr>
<td>Race(^e)</td>
<td>-.121(^<em>)</em></td>
<td>-.058</td>
<td>.158(^<em>)</em></td>
<td>-.027</td>
<td>.008</td>
<td>.048</td>
</tr>
<tr>
<td>GPA(^f)</td>
<td>-.200(^<em>)</em></td>
<td>-.095(^<em>)</em></td>
<td>.038</td>
<td>-.052</td>
<td>.198(^<em>)</em></td>
<td>.123(^<em>)</em></td>
</tr>
<tr>
<td>Sci. Major(^g)</td>
<td>-.044</td>
<td>-.028</td>
<td>.063(^\dagger)</td>
<td>-.027</td>
<td>.143(^<em>)</em></td>
<td>.316(^<em>)</em></td>
</tr>
</tbody>
</table>

Notes: \(^*\) p < .05; \(^*\)* p < .01; \(^a\)weekly TV viewing, grouped 0-8 (0 = non-viewers, 8 = heaviest viewers); \(^b\)regular crime drama viewing, dummy coded (0 = non-regular viewers, 1 = regular viewers); \(^c\) year in university (1 = first, 6 = sixth and above); \(^d\)dummy coded (0 = male, 1 = female); \(^e\)dummy coded (0 = nonwhite, 1 = white); \(^f\)excludes students who reported having no GPA (1 = < 2.0, 5 = 3.5 - 4.0); \(^g\)dummy coded (0 = student does not have a science major, 1 = student has a science major)
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Miller, J. D. (2007, February). *The impact of college science courses for non-science majors on adult scientific literacy*. Paper presented to a symposium at the annual meeting of the American Association for the Advancement of Science, San Francisco, CA.


