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The differential effects of American and British trial proceedings on juror decision-making

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THE DIFFERENTIAL EFFECTS OF AMERICAN AND BRITISH TRIAL PROCEEDINGS ON JUROR DECISION-MAKING

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To: Dean Arthur W. Herriott
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This dissertation, written by Marisa Evelyn Collett, and entitled The Differential Effects of American and British Trial Proceedings on Juror Decision-Making, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

Janat Fraser Parker

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DEDICATION

I dedicate this dissertation to my grandparents Lee Bowling Hines and Wilson Sears Hines. Their legacy to me was not just the wisdom of their words or the fortune of their possessions, but the treasure of their example as friends, parents, spouses, and grandparents.

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ABSTRACT OF THE DISSERTATION

THE DIFFERENTIAL EFFECTS OF AMERICAN AND BRITISH TRIAL PROCEEDINGS ON JUROR DECISION-MAKING

by

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Florida International University, 2001

Miami, Florida

Professor Margaret Bull Kovera, Major Professor

Seven basic elements differentiate British from American trial procedures: confining attorneys to their tables; dealing with objections outside the presence of the jury; resolving disagreements between attorneys prior to objections being made; presenting the defense opening statement at the close of the prosecution case; the judge directly questions witnesses and has a wider latitude in controlling the evidence; and the judge gives a summation of all the evidence presented to the jury (Fulero & Turner, 1997). The present experiment examined the influence of these different courtroom procedures, judges' non-verbal behavior, and evidence strength on juror decision-making. Using models of persuasion to understand how the varying elements may effect juror decision-making, it was predicted that trials following American courtroom procedures would be more distracting for jurors and as such, they would be more likely to rely on the peripheral cue of the judge's expectations for trial outcome as expressed in his nonverbal behavior. In trials following British procedures jurors should be less distracted and better able to scrutinize the strength of the evidence that in turn should minimize the influence

of the judge's nonverbal behavior. Two hundred forty-five participants viewed a mock civil trial in which courtroom procedure, judge's nonverbal behavior, and evidence strength were varied. Analyses suggest that courtroom procedure and evidence strength influenced the direction of participants' verdicts, but that judge's nonverbal behavior did not have a direct impact on verdict preference. Judge's nonverbal behavior appeared to influence other measures related to verdict. Participants were more confident in their verdicts when they agreed with judge's nonverbal behavior and when they viewed British courtroom procedures. Participants were more likely to return estimates of the defendant's liability that reflected judge's nonverbal behavior and a congruency with evidence strength. Participants also recalled more facts in the British conditions than in the American conditions. These findings are interpreted as indicating the importance of the impact of trial procedures and of nonverbal influence.

TABLE OF CONTENTS

LIST OF TABLES

TABLE PAGE

Chapter One: Introduction and Literature Review

Trial by jury is a unique system of justice that has origins dating back to the Norman invasion of Britain in 1066 AD (Hans & Vidmar, 1986; Kempin, 1990). No other nations, besides the United States and Britain, rely so heavily on ordinary citizens to make its most important decisions (Adler, 1994).

American and British[1] courts have been said to exemplify adversarial models of procedural justice (Lind, Erickson, Friedland, & Dickenberger, 1978). Yet, as Fulero and Turner (1997) noted, "[American] attorneys, judges, and legal scholars have become increasingly critical of the handling of cases in American courts" (pp. 439). Many of the recent and more eminent cases, such as the notorious O.J. Simpson case, have displayed the excessively combative nature of American trials. Those who have observed trials in both Britain and the United States note that British trials contain a more civil and cooperative atmosphere within the courtroom (Enoch, 1994).

This more civil and cooperative atmosphere is not merely due to the barristers' wigs and robes seen in British courts. Rather, British trial procedures seem much more somber in contrast to their American counterparts (Collett, 1995). British barristers remain behind their one long table and simply stand up behind that table when they are questioning a witness, addressing the judge, or addressing opposing council. They also rarely, if ever, object to a line of questioning. Most often in British courts it will be the judge who will object to or redirect a line of questioning. A British judge also gives a summation to the jury of all the evidence presented in the case. The judge presents this summary before instructing the jury on how to apply the relevant laws in the case.

Confining lawyers to their table, and limiting objections, sidebar conferences and other distractions common to American courts might enhance an individual juror's ability to process information systematically. Jurors would not be distracted by these other events and they could then concentrate on the vast amounts of evidence brought forth during a trial.

In American courts, there have been numerous court cases that were overturned because judges' biased nonverbal communication unduly influenced the jury and thus breached the defendants' right to a fair and impartial trial (Offutt v. US, 1954; US v. Beaty, 1983; US v. Frazier, 1978; US v. Nazzaro, 1973; Walker v. Lockhart, 1984). If, within American courts, judge's nonverbal behavior is so egregious as to impede a defendant's right to a fair trial, one can only presume that there are similar occurrences within British courts due to the basic similarities of the adversarial system. As discussed previously, there are several possible advantages to British trial procedures, but given the potential prejudicial effects of judge's nonverbal behavior, the imposing role of the British trial judge serves as a possible drawback to wholly using British trial procedures. In British trials, the judge plays a more imperious role than in American trials. This provides jurors with more exposure to the judge; therefore, the potential for the judge to influence the jury is greater. The major objectives of the current study include: (1) an exploration of the effects, if any, of British and American trial procedures; (2) an investigation of the effect of judicial behavior on the decision-making of jurors; (3) examining the extent to which trial procedures (British vs. American) interact with the apparent bent of judge's nonverbal behavior to influence juror decision-making; and (4)

[1] It is important to note that the British trials described in this research only include jury trials conducted in England and Wales.

trying to understand the conditions under which jurors may use judge's nonverbal behavior in making verdict decisions. Do British trials provide jurors with more exposure to the judge which in turn unduly influences their decision-making or is it not merely exposure to the judge, but rather other elements which inhibit the ability of the individual juror to attend and process to trial evidence?

Procedural Differences Between British and American Trial Procedures

Fulero and Turner (1997) noted that British trials are said to be more civil than American trials. They identified several procedural differences between British and American courts. Some of these procedural differences between British and American courts are: (1) confining attorneys to their tables rather than allowing them walk about the courtroom; (2) dealing with objections outside the presence of the jury; (3) resolving disagreements between opposing attorneys before objections are made; and (4) presenting the defense opening statement at the close of the prosecution case rather than at the beginning of the trial. In addition, judges have a more active role in controlling evidence in British than in American trials; they directly question witnesses and provide summaries of the evidence to the jury after the closing arguments and before instructions (Fulero & Turner, 1997; Baldwin & McConville, 1979; Darbyshire, 1992).

Fulero and Turner (1997) manipulated these seven procedural differences between British and American trials and measured their effect on the final verdict and perceptions of the trial. They examined whether the use of these British courtroom style procedures led to a trial that was perceived as more civil than the American courtroom style without affecting verdict. Participants viewed one of three versions of a videotaped

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Scotland and Northern Ireland have separate legal jurisdictions and trials within those countries are conducted in an entirely different fashion

trial: (1) a British version conducted by British legal professionals; (2) an American version (which lacked the British trial elements) conducted by American legal professionals; and (3) a British version conducted by American legal professionals.

Results of their study indicated that participants perceived the British trial procedures, conducted by either British or American legal professionals, as more civil and viewed the judge in the British trial more positively than the judge in the American version (Fulero & Turner, 1997). In terms of verdict, there was no significant affect between the trial conditions. Even though participants perceived the British trial as more civil and the British judge was viewed more positively than the American judge, participants preferred the American trial version.

The present research poses the question: Does the more civil atmosphere of the British courtroom, which is created by the seven elements noted previously, create an arena in which jurors are better able to process trial evidence systematically? The results of Fulero and Turner's research have indicated that civility may not be correlated with preferences for style of adjudication. Mock jurors may prefer the more churlish American version of the trial, but this extreme antagonism may create distractions for jurors that impede their scrutiny of the evidence.

Fulero and Turner's results of procedural preference substantiate results from research conducted by Walker, LaTour, Lind and Thibaut (1974) and Lind, Erickson, Friedland, and Dickenberger (1978) on procedural justice. Walker, et al., (1974) and Lind, et al., (1978) delineate two distinct procedural models in civil cases used throughout the world. Trial courts that derive their legal system from English common law follow what is known as an adversarial model (i.e., British, Canadian, and US courts

are examples of adversarial models.) In adversarial models there are two disputing parties represented by attorneys who are skilled in argument and persuasion. The choice of what evidence is presented to either an impartial jury or a judge is left to the discretion of the disputing parties. In essence, control over adjudication is left in the hands of the disputing parties. Legal systems that are based off of the Code-Napoleon, the inquisitorial model, are essentially the opposite of the previously described adversarial systems based off of Anglo-American law (French and German courts are among the many examples of the inquisitorial model.) In the inquisitorial model, an impartial representative of the court conducts an investigation of the dispute. In most cases the presiding judge or a panel of judges questions witnesses. In the inquisitorial model, the control of the trial rests in the hands of the judge or panel of judges (i.e., the inquisitor).

In research conducted by Walker, LaTour, Lind, and Thibaut (1974) participants served as defendants in a trial as the result of some controversy stemming from the initial experimental activity, which was a business simulation. Other participants served as observers of the trial. Observers had no prior knowledge of the defendant's guilt or innocence. The study evaluated participants' perception of the adjudication when they varied adversarial versus non-adversarial procedures, prior belief about guilt, and the favorableness of the final judgment. Results indicated that the defendant-participants viewed the adversarial procedure as most fair and were most satisfied with judgments resulting from this procedure. These results were all independent of pretrial belief or favorableness of verdict. There was also a preference on the part of defendant-participants for innocent verdicts, again, regardless of their pretrial belief. Observers rated the adversary procedure as most fair and preferred innocent over guilty verdicts.

As Walker, et al., pointed out the results of this study indicate that the adversarial model induces greater trust and satisfaction in participants. Observers see the adversarial model as more fair than the inquisitorial. The findings of their study suggest that if elements of the inquisitorial model were presented in the United States, parties to litigation and the observing public would find these procedures unfair and litigants would not have faith in verdicts that were derived from these procedures.

Walker, et al.'s study was conducted in the United States with participants that were most likely familiar with the American adversarial model of adjudication. A later study conducted by Lind, Erickson, Friedland, and Dickenberger (1978), looked at reactions to different models of adjudication from a cross-national perspective. Participants from the United States, Britain, France and West Germany[2] were randomly assigned to the roles of plaintiff or defendant. Participants then read descriptions of four different models of adjudication. The researchers chose the four different models because they appeared to represent different distinct points on a "conceptual continuum of systemic adversariness," (cited in Lind, et al., 1978, p. 320). The American and British trial procedures represented the adversarial model, which is at one end of the continuum and the French and West German trial procedures represented the inquisitorial model of adjudication, the other extreme of this continuum. Thibaut and Walker (1975) suggested that it is the perceived distribution control between the decision-maker (i.e., the judge) and the disputants which will determine the amount of satisfaction and preference with the adjudication procedure. The "continuum of systemic adversariness" could also be conceptualized as a continuum of distributed control, with the more adversarial

[2]This study was conducted prior to the reunification of West and East Germany in 1989.

models (American and British) at the end where over control litigation is in the hands of the disputing parties, and the inquisitorial models (French and West German) at the other end of the continuum with control mostly in the hands of the decision-maker.

Lind, et al., (1978) found that even in countries with legal systems based on the inquisitorial model, there was a general preference for the adversarial model. Defendant participants had a somewhat greater preference for the adversarial model than plaintiff participants did. Also, participants tended to indicate that they perceived greater control in their roles as disputing parties in the adversarial model than in the inquisitorial model. Some interesting findings regarding British participants was that they gave nearly equivalent ratings to the adversary model and the model that contained two investigators who were aligned with the decision-maker (they also had the same results with French participants). Also, with the model in which there was only one investigator aligned with the decision-maker, British participants, more so than others, perceived as leaving little control in the hands of disputing parties and the decision-maker: all the control was perceived to be in the hands of the investigator. One interpretation of these findings with British participants was that the double investigator model may be more analogous to their own legal system. The courtroom procedures used in the British legal system appear to engender a more cooperative environment between the attorneys for the disputing parties and the decision-maker, especially in comparison to their American counterparts. The results obtained by Lind, et al., from British participants may be due to the fact they do not perceive and change in control between the adversarial model and the double investigator model, based on their familiarity with their own legal system.

The focus of the current study is not on preference or satisfaction with a particular adjudicative model, rather the current study examines what influence the elements that differ between British and American trial procedures can have on verdict decisions by jurors. Fewer distractions (i.e., objections, outbursts, and sidebar conferences), the judge's summation of trial evidence, and the judges' greater control of the courtroom proceedings can conceivably create an atmosphere in which jurors can effectively attend, process, and scrutinize trial evidence. In essence, the same elements that Fulero and Turner noted as creating an atmosphere of civility within British courts may be the same elements that also create an atmosphere in which jurors are better able to reach the considered verdicts that the law requires.

Some of the elements that may influence jurors' decision-making are the procedural differences that can be distracting. Potentially distracting elements of a trial are the constant objections made by either of the disputing parties, side-bar conferences, and outbursts. These distracting elements are more common in American courts.

The British judge's greater control of the courtroom, which includes asking questions of witnesses directly and summation of the evidence, may also influence juror decision-making. British judges tend to exhibit a greater degree of control over courtroom proceedings. They manage proceedings in such a way that there is a more continual flow of information, because there are fewer objections and judges take it upon themselves to either redirect questioning or object to a line of questioning (Darbyshire, 1992). In contrast, American judges adopt a more reserved role during the course of the trial. They allow the attorneys more control over the trial proceedings and normally contribute when they must rule on an objection. These dynamics may elicit the elements

that produce an environment that is ultimately distracting to jurors, (e.g., frequent objections) and drawing jurors' attention away from their main task of scrutinizing trial evidence.

There is no research to suggest that the other elements confining attorneys to their tables, which is unique to British trials, influence juror decision-making. Yet, there is research demonstrating that presenting the defense opening statement at the close of the prosecution's case rather than at the beginning of the trial may have an effect on the way jurors go about processing the trial evidence. Research on the positioning of opening statements has shown that whichever party is allowed to present their opening statement first is the party that is most likely to set thematic framework for the trial (Pyszczynski, Greenberg, Mack, & Wrightsman, 1981; Pyszczynski & Wrightsman, 1981; Wells, Miene, & Wrightsman, 1985). As such, jurors will use that particular framework to guide their processing and interpretation of evidence (Wrightsman, Nietzel, & Fortune, 1994). Given these results, it seems that the defense statement would only affect the processing of trial evidence by jurors if it came before the prosecution or plaintiff's opening statement. Given that the aim of this research is to examine the differences between actual British and American trial procedures, it will not matter where the defense's opening statement is located; it will not have a large impact because it follows the prosecution's opening statement in both procedures. The procedural differences of confining attorneys to their tables and the variation between the locations of the defense opening statement are considered to be non-detrimental to juror decision-making in the present research. They were retained for the purpose of maintaining authenticity between

the two trial procedures and for achieving the overarching goals of this research, which is to analyze the impact of the two trial systems on juror decision-making.

Fewer distractions during the course of the trial, along with the greater control of the judge over the trial proceedings could potentially assist jurors by creating an atmosphere in which there are few disruptions in thought. In this environment, jurors can better process and retain information presented to them and later evaluate that information. This increased ability to process is especially important in more complex trials (i.e., those containing scientific evidence or otherwise complicated evidence) that require a greater amount of attention and more cognitive resources to process the information. If many distractions occur, such as objections and side-bar conferences, jurors may not be able to focus, accumulate, or evaluate this information. This inability to evaluate evidence effectively may cause jurors to be particularly susceptible to the influence of judges' nonverbal indications of bias for or against a particular litigant.

Judge's Nonverbal Behavior

Judges have access to a large amount of background information in a trial, including inadmissible evidence that will never appear before the jury. It is likely that this information will influence the opinions that judges form about the merits of a particular case. Resnik (1982) notes that judges may form opinions of litigants based on inadmissible evidence or pretrial testimony similar to any other person given this kind of information. Judges may communicate their beliefs about these key individuals through their nonverbal behavior. "Laughter, nods, expressions of anger, and the like can intentionally or unintentionally communicate what the judge thinks" (Levine, 1992, p.72). This nonverbal behavior may be an influential piece of information that jurors

bring with them to the jury room, especially in the face of a diminished ability to systematically process the evidence presented at the trial.

In re Murchinson (1955) the Supreme Court of the United states determined that due process of law requires that a trial judge conduct a fair, orderly, and impartial trial. In Offutt v. United States (1954) judges were required to "satisfy the appearance of justice." The Federal Rules of Criminal Procedure (1987) actually delineate permissible limits of judicial behavior. The courts recognize that not only is overt behavior on the part of the judge impermissible, but more subtle verbal and nonverbal behavior is unacceptable judicial behavior, as well, and can potentially violate a defendant's right to a fair trial (State v. Lamont, 1976). Currently, appellate courts recognize that there are more subtle forms of judicial influence but only the most egregious cases of undue judicial influence are reversed on these grounds alone.

As noted previously, there have been numerous court cases that have been overturned because a judges' biased nonverbal communication unduly influenced the jury (Offutt v. US, 1954; US v. Beaty, 1983; US v. Frazier, 1978; US v. Nazzaro, 1973; Walker v. Lockhart, 1984). Ekman and Friesen (1969) noted that it is easier for people to exert conscious control over verbal communication than over their nonverbal communication. Because it is difficult to control, people may inadvertently communicate their attitudes and biases through nonverbal behaviors. Ekman and Friesen called this process leakage.

Blanck, Rosenthal, and Cordell (1985) conducted an extensive examination of judges' beliefs about defendants, judges' behavior, and jurors' judgments of guilt in actual trials. They found that defendants' background characteristics, such as prior

criminal history, were related to the judges' expectations of guilt (Blanck et al., 1985). They also noted that judges' nonverbal communication while instructing juries differed depending on their belief about the defendant's guilt or innocence. Evaluators perceived the judges' delivery of the instructions as less warm, less competent, less wise, and raters also viewed the judges as more anxious when they had an expectation of guilt. Juries were more likely to bring back guilty verdicts when judges were perceived as less professional, less dogmatic, and not as wise.

There findings, however, indicated that when comparing jury verdicts and judges' perceptions of what the verdict should be the researchers found a negative relationship between the two. It seemed that even though the judge's behavior varied when their perceptions of the defendant's guilt or innocence differed, it did not appear to bias jurors' verdicts in the similar direction of the judge's verdict perception. In these situations jurors returned verdict that were contrary to the judge's perceptions of what the trial outcome should be. Possible explanations for this negative relationship could be that juror's perceptions of what the judge's nonverbal behavior indicated was divergent to the judge's expectations or they simply were not influenced by the judge's behavior.

Blanck et al.'s (1985) study was an observational study and not a study that systematically manipulated the courtroom setting. Blanck et al.'s study did not allow for causal inferences about the effect of judges' nonverbal communication on jurors and jury verdicts. Researchers have manipulated jurors' exposure to judges' expectations in a few studies (Halverson, Hallahan, Hart, & Rosenthal, 1997; Hart, 1991, 1995). One study specifically examined the effects of judges' expectation of defendants' guilt on jury verdicts (Hart, 1995). Jury eligible adults listened to audiotaped testimony and then

watched a videotape of actual trials in which one of three judges read jury instructions. Individual differences among judges were controlled by having each of the three judges read instructions for a case in which they thought the defendant was guilty and for a case in which they thought the defendant was not guilty. In one condition, participants watched a videotape in which the judge believed the defendant was guilty, and in the other condition participants viewed a judge who felt the defendant was not guilty. In each condition, subjects heard the same testimony and the judges' instructions were equal in terms of content across conditions, as well. Even when jurors were advised to disregard the judge's behavior and form their own opinions, participants tended to return verdicts concordant with the judges' view of the case. In another study, independent raters viewed the delivery of the jury instructions from the previously described study and evaluated the extent to which the judge's believed the defendant was guilty (Hart, 1991). Raters' assessments of the judge's nonverbal behavior were highly predictive of the judges' expectations in the case.

Most recently, researchers examined if simplified jury instructions would reduce the biasing effects of judges' nonverbal behavior (Halverson, Hallahan, Hart, & Rosenthal, 1997). In the study, participants were randomly assigned to conditions in which they were given either standard or simplified jury instructions. All the participants then heard the same audiotape of testimony from an actual trial and then proceeded to view a videotape of one of two judges: one judge who believed the defendant was guilty or another who believed the defendant was innocent. Participants who heard the standard jury instructions were more likely to return a verdict that was in concordance with the judges' expectations than were participants who heard the simplified instructions. Thus,

higher complexity instructions increased the influence of judges' nonverbal communication on participant verdicts.

As noted earlier, these series of experiments serve as the only empirical analysis that manipulated jurors' exposure to judges' expectations. These experiments focused primarily on judges' nonverbal behavior only during the delivery of jury instructions. The nature and extent of judicial influence may be a naturally occurring expectation effect that happens throughout the trial. Factors such as reduced ability to process information and an increased interaction with the judge may increase the likelihood that jurors use the judges' nonverbal behavior as a peripheral cue in decision-making.

Elaboration Likelihood Model and Heuristic Systematic Model

Research on persuasion may enable us to predict how the different trial procedures interact with judges' nonverbal behavior to influence juror verdicts. The "heuristic-systematic model" (HSM; Chaiken, Liberman, & Eagly, 1989) and the "elaboration likelihood model" (ELM; Petty & Cacioppo, 1986) describe two major processes that lead to persuasion. The central route, or systematic processing (Petty & Cacioppo, 1989; Chaiken, Liberman, & Eagly, 1989), is conceived as a comprehensive, analytic orientation in which people scrutinize and analyze all the information that is relevant and important to the judgment task at hand. Persuasion is then a function of the quality of the arguments that are presented in the message; greater argument quality leads to greater persuasion (Petty, Cacioppo, & Goldman, 1981).

Research has shown that people do not always engage in systematic processing of information. Rather, in situations where they lack motivation or domain-specific knowledge or are confronted by situations that impair the ability to process when the

ability is present (e.g. distraction, time-pressures, etc.) they may turn to a peripheral or heuristic processing (Petty & Cacioppo, 1986; Chaiken, Liberman, & Eagly, 1989). The peripheral route, or heuristic processing, demands less cognitive effort and capacity than the central route. People use heuristic decision rules (i.e., declarative and procedural knowledge structures) and peripheral cues (i.e., simple cues that affect attitudes in the absence of central processing) that do not involve attention to message quality as shortcuts for evaluating a persuasive message. Source credibility, source likeability, mood, mere number of arguments, and stereotypes have been shown to be the sole determinants of attitude change (Bodenhausen & Lichtenstein, 1987; Cacioppo & Petty, 1979b; Chaiken, Liberman, & Eagly, 1989; Cooper, Bennett & Sukel, 1996; Macrae, Milne, & Bodenhausen, 1994; Petty & Cacioppo, 1986; Petty, Schumann, Richman, & Strathman, 1993).

When individuals have high motivation, ability, and opportunity to process information, they engage in more effortful cognitive processing, called high elaboration, or systematic processing. In these situations, central cues such as existing beliefs, argument quality, and initial impression are important in determining persuasion effects (i.e., enduring positive attitude change or resistance to attitude change). In contrast, when motivation, ability, or opportunity is low, individuals are either not willing or unable to engage in a high level of processing. In this low elaboration situation, peripheral persuasion cues or heuristic rules of thumb such as communicator attractiveness, credibility or expertise, similarity, power, repetition of a simple message which increases the liking of a message, clarity, ordering and rewards within the message are all factors that determine persuasion effects. Persuasion effects range from a temporary attitude

shift to retaining the initial attitude. Individual difference variables, such as, a need to scrutinize all information (i.e. need-for-cognition), a need to monitor behavior in order to convey an appropriate image at all times (i.e. self-monitoring), or varying levels of personal involvement on different issues, are examples of variables that can affect motivation to process information systematically. Variables that can affect ability to process information centrally or systematically are such things as the complexity level of a message, comprehensibility, rate or speed of message delivery, and distraction.

According to these dual process models, the distractions caused by American courtroom proceedings should increase jurors' use of heuristic decision rules and peripheral cues. The constant objections, sidebar conferences, and open derisions made by opposing attorneys during an American trial may be highly distracting to jurors and as such may reduce systematic processing of trial evidence.

Empirical research supports the view that distraction inhibits systematic processing by disrupting the thoughts that would normally be elicited by the persuasive message (Petty & Cacioppo, 1986). Petty, Wells, and Brock (1976) found that distraction was especially consequential as a thought disrupter when motivation and/or ability to process a message was high. In their experiment, they systematically manipulated argument quality (high vs. low quality arguments) and distraction when motivation to process was high. Two discrepant messages concerning a 20% tuition increase at the participant's university were prepared for the experiment. Participants listened through headphones to a pre-recorded message that was either easy to counterargue and elicited more negative thoughts due to the negative content or one that was more difficult to counterargue, yet elicited more positive thoughts due to the content. The distraction task

required subjects to record on paper the quadrant in which each "X" flashed on a projector screen. The "X's" were flashed at varying intervals during the message. Results indicated that increased distraction was associated with a decrease in the number of counterarguments generated. There was also a significant message quality and distraction interaction. Participants who were not highly distracted were able to counterargue the low quality arguments more easily than participants in the highly distracted conditions were. There were also significantly more favorable thoughts were generated for the difficult to counterargue message when distraction was low than in any other condition. Distraction serves as a disruption to thoughts that would normally be elicited by a message and would be most disruptive when people are highly motivated and able to process information (Petty & Cacioppo, 1986).

As noted previously, many distractions exist within American courts and include constant objections, lawyers approaching the bench, and extensions during the trial that create a sort of "stop-start" atmosphere to the trial. These courtroom distractions can be likened to the task of counting the flashing "X's" used in Petty et al. (1976; they serve as a thought disruption and reduce a persons' ability to process information). Given the results of Petty et al., disruptions in the court could potentially lead to either a reliance on heuristic decision rules or peripheral cues because jurors are unable to fully process and cogitate over the information presented. Since jurors may feel they need to make a decision, in distracting situations they may turn to other cues or heuristic shortcuts to aid in their decision process.

Cacioppo and Petty (1979b) predicted that if a person were already motivated to think about a more complex message, repeating the message would give individuals a

greater opportunity to cogitate over the arguments presented. For example, if an argument contained slightly complex and compelling ideas, people would be likely to generate additional pro-attitudinal thoughts concerning the argument with each repetition (Cacioppo & Petty, 1979b). As noted previously, message repetition can also serve as a peripheral cue. The difference in the utility of message repetition as either a peripheral or central cue to processing lies in the complexity of the message. When a message is more complex, repetition provides the audience with another opportunity to ruminate over the information. When a message is simple, repetition breeds familiarity and it is then this familiarity that becomes a peripheral cue to processing. Commercials and ads, depicting simple phrases or messages are good examples of how message repetition breeds familiarity. A good example of this would be in terms of buying soda. When you think of soda, you think of Pepsi®, or Coke®, and not necessarily Fanta®; this is because Fanta® does not barrage the television viewing audience with commercials (which use other persuasion factors as well.)

Cacioppo and Petty (1979b) conducted an experiment in which participants, who were university students, were exposed to eight cogent arguments for increasing university expenditures. Half the participants were led to believe that the money would come from a tuition increase (this was considered a counter-attitudinal message) and the other half were led to believe the money would come from a tax on visitor services (a pro-attitudinal message). Participants were randomly exposed to one, three, or five repetitions of either of the previously described messages. Results of this experiment indicated that repeating the message three times led to more agreement with the advocacy of the message than a single presentation. Participants generated more favorable

thoughts and fewer unfavorable thoughts concerning the message when it was repeated three times. When the message was repeated five times, agreement with the message advocated declined. Cacioppo and Petty (1979b) suggest that this result was due to boredom which then led to the decrease in favorable thoughts.

The judge's summation can be viewed as repeated presentation of the trial evidence. As Cacioppo and Petty demonstrated, repeated exposure allows individuals to revisit and elaborate further on the information presented. Jurors are given another opportunity to revisit trial evidence via this summation. Many times, information presented at a trial, especially a civil trial can be very complex. The added opportunity to ruminate over evidence should enhance a juror's ability to elaborate further on the arguments presented during the trial. Because of this opportunity for further elaboration of the trial evidence, jurors would be less likely to demonstrate a reliance on peripheral cues or heuristics in order to make a decision (i.e., returning a verdict that is congruent with the judge's perception of the trial outcome.)

The ELM/HSM models have been used successfully in other research on juror decision-making. Cooper, Bennett, and Sukel (1996) examined the way in which mock jurors make decisions about complex scientific testimony. They predicted that testimony of scientists and engineers may become so complex as to render processing of the information difficult. In these situations, jurors may turn to shortcuts or heuristic rules as a way of informing their ultimate decision (Cooper et al., 1996). They hypothesized that highly complex testimony produces a situation in which jurors' ability to process the information systematically is diminished and as such they must turn to the peripheral or heuristic route and use peripheral cues or heuristic shortcuts. Research has shown that

limiting participants' ability to process induces perceivers to use peripheral cues and heuristic shortcuts (Petty & Cacioppo, 1986; Chaiken, Liberman, & Eagly, 1989). In their trial simulation, they systematically manipulated the strength of the expert's credentials and the complexity of the testimony given by the expert. As they predicted, when the testimony was complex, jurors were more persuaded by a highly credible expert witness than by a less credible expert witness. Witness credentials had little impact on the persuasiveness of the evidence when it was less complex, and thus more comprehensible to the perceiver. This study does not provide a complete test of the HSM/ELM models of persuasion because the authors did not manipulate evidence strength, so there is no indication as to whether jurors engaged in systematic processing (i.e., attended to argument quality) when the evidence was less complex. Without this manipulation, it is difficult to know for certain whether jurors, who are provided with the opportunity to elaborate on trial evidence, will disregard peripheral cues and base their decisions on the evidence.

How might jurors evaluate conflicting complex scientific evidence when it is presented using American versus British trial procedures? Might the constant objections from and meandering by attorneys in the American system prove distracting and prevent jurors from recognizing whether the trial evidence is weak or strong? If jurors are distracted from the quality of the evidence, might they be more likely to rely on judges' nonverbal behavior when deciding whether the plaintiff or the defendant has won their case? Will the judge's summation function as an added opportunity for jurors to revisit and elaborate upon trial evidence? Will trial components of the American system help or hinder a juror's ability to process trial evidence? Will trial components of the British

system help or hinder a juror's ability to process trial evidence? The present study was designed to address these questions.

Overview

The present study evaluates the impact of British or American trial procedures on juror decision-making. As noted earlier, such elements as allowing the attorneys to roam about the courtroom, objections, side-bar conferences and outbursts that occur in courtrooms in the United States, as well as the lack of a judge's summation may reduce an individual jurors' ability or likelihood systematically process information. In the alternate courtroom condition, the increased exposure jurors have to the British judge may increase the prejudicial effects of their nonverbal behavior. In addition to evaluating the consortium of varying elements between the two trial conditions, I was able to evaluate mock jurors' perceptions of the attorneys' civility, fairness, advocacy, and antagonism as well as the effectiveness of the judge. I hypothesized that participants viewing British courtroom procedures would: recall more facts in the case; exhibit a higher scrutiny of the evidence and, thus, be more likely return a verdict congruent with evidence strength than would participants who viewed American procedures. Moreover, participants who viewed British procedures would perceive the trial as more civil and fair than participants who viewed American procedures would.

Dual process models of persuasion suggest that when an individual is either not able or motivated to process information he or she will look to peripheral cues or heuristics as cues or shortcuts to processing. Halverson et al. demonstrated that a likely peripheral cue would be judges' nonverbal behavior. I predicted that judge's beliefs about defendant guilt would not be as influential in the British as in the American conditions.

Participants who viewed American courtroom procedures would have less ability and opportunity to systematically process information and would be more likely to utilize the judge's nonverbal behavior as a peripheral cue to processing rather than scrutinizing evidence strength.

Along with varying courtroom procedures between British and American trials and manipulating judge's nonverbal behavior, I manipulated evidence strength in order to fully evaluate the impact of these procedural differences on juror decision-making. I predicted that evidence strength, judges' nonverbal behavior, and trial procedures would interact to influence jurors' decisions. Using persuasion models to try and understand how the varying elements could influence jurors, I speculated that American trials created conditions in which mock jurors had a diminished ability and/ or opportunity to elaborate process information (i.e., they contained distracting elements and lacked the judge's summation). On the other hand, British trials would enhance a mock jurors ability and/ or opportunity to elaborate on trial evidence because they lack the distracting elements and contain the judge's summation. Given this main differentiation between the two trial systems, I predicted that when jurors viewed American trial procedures, their subsequent verdicts would be similar to the judges' perception of what the trial outcome should be, regardless of evidence strength. The ratings of individual trial players and the cases presented by participants who viewed American trial procedures will be rated in a manner consistent with the preference of the judge (as indicated by their nonverbal behavior.) In American trial conditions, the frequent distractions may cause multiple thought disruptions, which may hinder the individual juror's ability to focus attention on the evidence and also may limit their ability to form overall impressions of the case or

trial players without utilizing judge's nonverbal behavior as a peripheral cue. Participants in American trial conditions should recall less information than participants in British trial conditions because there were more distractions and there was no opportunity to revisit trial information (i.e., there was no judge's summation in American conditions.) Overall, participants in American trials should not exhibit a reliance on evidence strength in making their verdict decisions, rather they will return verdicts that are congruent with the judge's perception of trial outcome.

In British trials, evidence strength should prevail as the dominant influence on verdict preference by jurors (i.e., there should be an evidence strength x courtroom procedure interaction). As noted previously, this may be due to the fact that jurors are better able and have more opportunity to elaborate on trial evidence in British trials. Judges' perception of what the verdict should be would not influence decision-making in these conditions because jurors will be able to process information and will not rely on peripheral cues in order to make a decision. Also, participants' ratings of the trial players and the cases presented should not demonstrate an influence of judge's nonverbal behavior because they should have the opportunity in these conditions to form impressions of these aspects of the trial.

Chapter Two: Methodology

Participants

Two hundred forty-five participants (approximately 30 per cell) were drawn from different psychology classes taught at Florida International University. Participants' average age was 21 years (SD = 5; range = 18 – 56 years). A majority of the sample was female (71%). The racial and ethnic background of the sample varied with the largest portion of the sample being Hispanic white (60%). The remainder of the sample consisted of non-Hispanic white (14%), non-Hispanic black (14%), Asian (5%), Hispanic black (3%), and those who marked "other" (4%). Most of the sample (92%) had had some college experience but had not yet received their degree; the remaining had received their college degree and/or had post-graduate experience or degrees (8%). The sample consisted mostly of full-time students (77%). The remainder of the sample indicated that their current occupation fell under such categories as: professional or technical (5%), sales (5%), managerial (3%), clerical or secretarial (8%), and craftsperson or laborer (2%).

Participants received either extra credit in their psychology classes or they fulfilled a research experience requirement in return for their involvement in this study. Participants were tested in groups of one to five people.

Materials

Stimulus Trial. Participants viewed one of eight versions of a civil trial, adapted from the trial used in Cooper et al. (1996). This was a fictitious trial concerning exposure to toxic substances based on several product liability cases. The plaintiff in this case alleged that he had contracted colon cancer as a result of workplace exposure to

polychlorinated biphenyls or "PCB's." Before the trial the defense conceded that the plaintiff had been exposed to PCB's, the issue under contention was whether PCB's were a proximal cause of the plaintiff's cancer. The expert for the plaintiff was a biochemist who claimed that his experimental research demonstrated that PCB's cause cancer in animals. The expert for the defense was an epidemiologist, and he claimed that his observational research demonstrated that PCB's have adverse affects, but that colon cancer is not one of them (see Appendices A and B for representational samples of the trial transcripts). The experts were the only people to give testimony in the trial. People with acting or public speaking experience played the roles of the judge, expert witnesses, and attorneys.

The trial included: an opening statement of the facts of the case, the trial judge's initial instructions to the jury, opening statements by counsel, the examination of expert witnesses for the plaintiff and defense, closing statements by counsel, and the judge's final instructions to the jury. Participants in the British versions also viewed a summation of the facts of the case given by the judge before hearing instructions. Within the trial, I manipulated the use of British or American courtroom proceedings, the judges' nonverbal behavior, and the strength of the evidence presented by the plaintiff.

The complex version of the Cooper et al. stimulus trial was used so that the trial would be complex enough that participants would have to put forth effort to evaluate the testimony systematically. The complexity level of the testimony was previously pilot tested by Cooper et al. and the results of a between subjects design indicated that participants viewed the high complexity testimony as significantly more complex than the simple testimony. Participants also rated the complex testimony as more difficult to

understand than the simpler testimony. The mean trial time of the eight versions was 1:07:12 (SD = 0:01:12). The mean trial time for the British trials was 1:06:39 (SD = 0:01:29) and the mean time for American trials was 1:07:46 (SD = 0:00:33). For the strength manipulation, the mean time for the strong trials was 1:07:56 (SD = 0:01:16) and the mean time for the weak trials was 1:06:28 (SD = 0:00:33). The shortest trial was 1:04:39 (British procedures- strong evidence) and the longest trial was 1:08:23 (American procedures- weak evidence).

Courtroom Proceedings. Following Fulero and Turner's (1997) description of seven procedural differences between British and American trials, I built five courtroom variations into the stimulus trial (please see Table 1 for the specific variations). Not all the variations were used because not all would be apparent in the videotaped trial. The omitted procedural differences that are evident in British courts were having the differences between opposing attorneys dealt with outside and having the judge play a more active role in controlling evidence. The variations center on three main areas: the behavior of the attorneys; the behavior of the judge as dictated by the different courtroom cultures; and the order of events during the trial. In the American trial attorneys objected to questions posed by the opposing attorney, but in the British trial no such objections were made by opposing attorneys. The judge summarized the evidence in the British trial but did not in the American trial. The attorneys roamed all over the courtroom in the American trial but did not in the British trial, where they simply stood behind a single table when they asked questions of the witnesses. In the British trial, the defense opening statement was at the close of the plaintiff's case. In contrast, in the American trial both

the plaintiff and defense opening statements were at the beginning of the trial and the closing statements were at the end of the trial prior to instructing the jury.

Evidence Strength. I varied the strength of the evidence in the context of the expert witnesses' testimony. In the strong evidence condition, the plaintiff expert noted that his research demonstrates that PCB's cause cancer in rats and that PCB exposure is the only plausible cause of the plaintiff's cancer. The defense expert in this condition argued that one couldn't extrapolate findings from research conducted on rats to humans and that his epidemiological research indicates that there is no link between PCB exposure and the later development of cancer. In the weak evidence condition, the plaintiff's expert witness was unable to deny the existence of other plausible causes for the plaintiff's cancer. The other plausible causes for the plaintiff's colon cancer presented during the weak evidence conditions were: (a) that the plaintiff's family had *familial adenomatous polyposis* (FAP), a colorectal cancer syndrome that runs in families; (b) the plaintiff had adenomatous polyps, which have been associated with an increased risk of colon cancer; (c) the plaintiff had evidence of ulcers in his colon, which is associated with chronic inflammatory bowel disease which in turn is associated with an increase risk of colon cancer; (d) the plaintiff smoked, but quit three years prior to the trial; (e) and the plaintiff had a diet which was high in fat and low in fiber, which also has been associated with an increase risk of colon cancer (http://www.cancer.org/cancerinfo/, 2000). The defense expert restated all of these alternative causes for the plaintiff's colon cancer in his testimony.

The effectiveness of this manipulation of evidence strength was pilot tested in a two-group, between subjects design. Forty participants, recruited from various

psychology classes at Florida International University, viewed two versions of the stimulus trial that controlled for courtroom procedure and judge's beliefs about the defendant's negligence and legal responsibility for the plaintiff's colon cancer. The only variation between the two conditions was the strength of the evidence presented by both the plaintiff and defense. When the plaintiff's case was strong, the defense case was weakened because they simply stated that their research did not find a connection between PCB's and colon cancer. When the plaintiff's case was weakened the plaintiff's expert noted other possible alternatives for the plaintiff's cancer and the defense then reiterated these alternatives. Results of the pilot testing indicated that participants in the strong evidence conditions were more likely to find in favor of the plaintiff ($\underline{P} = .64$) than in the weak evidence conditions ($\underline{P} = .27$), $\chi^2 (1, \underline{N} = 40) = 5.23$, $\underline{p} < .05$. On a scale of 0 to 100%, participants in the strong evidence condition were more likely to indicate PCB's were most probably the cause of the plaintiff's colon cancer ($\underline{M} = 71.20$, $\underline{SD} = 21.19$) than were participants in the weak evidence condition. $\underline{M} = 44.95$, $\underline{SD} = 22.37$, $\underline{t}$ (38)= 3.809, $\underline{SE} = 6.89$, $\underline{p} < .01$. Also, participants in the strong evidence condition were more likely to indicate that the plaintiff's colon cancer was the legal responsibility of the defendant ($\underline{M} = 74.00$, $\underline{SD} = 23.78$) than were participants who were in the weak evidence condition, $\underline{M} = 40.85$, $\underline{SD} = 24.35$, $\underline{t}(38) = 4.356$, $\underline{SE} = 7.61$, $p < .01$. Participants' ratings of the experts, the judge, and the attorneys did not differ across conditions.

Judge's Nonverbal Behavior. I manipulated the judge's nonverbal behavior across conditions by varying both negative and positive non-verbal behaviors of the judge in each of the conditions. In the pro-plaintiff conditions, the judge displayed more positive

non-verbal behaviors toward the plaintiff's attorney and expert witness during the presentation of the plaintiff's case. For example, the judge was attentive and leaned toward the witness (for a listing of pro-plaintiff and pro-defense nonverbal behaviors exhibited by the judge please see Appendix C and D). In this same condition, the judge displayed negative non-verbal behaviors during the presentation of the defendant's case, such as leaning away from the expert and not paying attention to the evidence as it was presented. In the alternate condition in which the judge is pro-defense, the judge showed negative nonverbal behaviors during the presentation of the plaintiff's case and positive nonverbal behaviors during the presentation of the defendant's case.

Measures

After viewing the videotape, participants answered a number of questions concerning the trial, the testimony, and the major players in the trial (see Appendix F). First, participants rendered a verdict either in favor of the plaintiff or in favor of the defense. Participants also rated their confidence in their verdict decision on a 7-point Likert scale, with 1 = not at all confident and 7 = very confident. The crucial issue in the case was whether PCBs were the proximal cause of the plaintiff's cancer. Participants indicated, by writing in a number between 0% and 100%, the probability that PCBs were the proximal cause of the plaintiff's cancer and the probability that the plaintiff's cancer was the legal responsibility of the defendant. This is arguably a more sensitive measure than verdict for perceived liability in this case (Cooper et al., 1996). I created a new variable (defendant liability) by averaging participant ratings for two separate items: participants' probability estimates for whether PCB's were the proximal cause of the

plaintiff's colon cancer and whether the plaintiff's colon cancer was the legal responsibility of the defendant (Cronbach's $\alpha = .92$).

If participants rendered a verdict for the plaintiff they were asked how much money (if any) they would award him for compensatory damages. Similar to Cooper et al., participants were told to assume that he has been adequately compensated for medical bills, lost income, and legal costs, but that he is requesting an additional $500,000 compensation for pain and suffering.

The next series of questions assessed participants' reactions to the evidence, the experts, the attorneys, the judge, and the overall trial and procedure in separate sections. In the first section, participants evaluated the evidence presented during the trial (evidence perception). On the 7-point Likert scales ranging from 1 (strongly disagree) to 7 (strongly agree), participants rated their agreement with the following statements: the plaintiff's colon cancer was caused by his exposure to PCB's, the plaintiff's expert evidence was sufficient to demonstrate that PCB's cause colon cancer, other risk factors were the cause of the plaintiff's colon cancer, the defense expert sufficiently demonstrated that PCB exposure does not cause colon cancer, and it was improper to claim that a substance that causes cancer in animals would cause cancer in humans. I recoded the data so that higher numbers indicated a more favorable evaluation of the plaintiff's case. A principal component factor analysis of the data indicated that the scale was unidimensional and the solution yielded one interpretable factor, defendant responsibility for the plaintiff's injury, which accounted for 58.63% of the item variance (See Table 2 for defendant responsibility items and factor loadings). I constructed a defendant responsibility scale by averaging all the items in the evidence perception

section of the questionnaire (Cronbach's $\alpha = .81$). Reliability was increased if the scale concerning the level of impropriety when claiming that a substance that causes cancer in animals would cause cancer in humans was removed (Cronbach's $\alpha = .85$). Thus, the defendant responsibility scale was created by averaging the items: the plaintiff's colon cancer was caused by his exposure to PCB's, the plaintiff's expert evidence was sufficient to demonstrate that PCB's cause colon cancer, other risk factors were the cause of the plaintiff's colon cancer, and the defense expert sufficiently demonstrated that PCB exposure does not cause colon cancer.

Participants also rated their agreement with statements about their perceptions of the plaintiff's and defense expert witnesses on 7-point Likert scales ranging from 1 (strongly disagree) to 7 (strongly agree). These items included the extent to which he was: persuasive, his arguments were weak, likeable, convincing, knowledgeable, credible, incompetent, qualified, and understandable. Results from a principal component factor analysis of this data yielded one factor, plaintiff expert credibility, which accounted for 43% of the item variance (see Table 3 for plaintiff expert credibility items and factor loadings). A scale was constructed by averaging all the scores of these items based on this factor analysis (Cronbach's $\alpha = .83$). The factor analysis of participant ratings of the defense expert also yielded one factor, defense expert credibility, which accounted 50% of the item variance (see Table 4 for defense expert credibility items and factor loadings).

In the third section, participants rated their agreement with items concerning the opposing attorneys, using the same 7-point scales described above. Within the questionnaire, the statements were counterbalanced such that participants viewed an

equal number of positively and negatively worded statements. Participants viewed the following statements (all positively worded): her opening argument was compelling, she questioned her witness effectively, she had a compelling closing argument, she was an effective trial advocate, she was persuasive, she was likeable, she was knowledgeable, she used objections effectively, she was antagonistic. I conducted separate principal component analyses with varimax rotation for each of the attorneys. In each factor analysis, the rotated solution yielded two interpretable factors, perceptions of the attorneys' performance during trial and antagonism of attorneys (a single item). The plaintiff attorney performance factor accounted for 47% of the item variance and plaintiff's attorney antagonism factor accounted for 14% of the item variance (see Table 5 for perceptions of plaintiff's attorney performance and factor loadings). Defense attorney performance accounted for 38.0% of the item variance and defense attorney antagonism accounted for 18.8% of the item variance (see Table 6 for perceptions of defense attorney and factor loadings). I created scales of the perceptions of the plaintiff attorney's performance by averaging across scores obtained from each of the individual items. The scale had adequate reliability (Cronbach's $\alpha = .83$) as did the similar scale I created for perceptions of the defense attorney's performance (Cronbach's $\alpha = .87$).

Participants then evaluated the judge in the same fashion as the other major players in the case. Participants indicated the extent of their agreement with the following statements: the judge treated the lawyers and jurors with respect and concern, was authoritative, favored the plaintiff, favored the defense, was knowledgeable, was interested in the plaintiff's case, was interested in the defendant's case, was competent, was domineering, was effective, exhibited any prejudicial nonverbal behavior during the

trial, and exhibited prejudicial nonverbal behavior during the jury instructions. For the twelve items addressing participants' evaluations of the judge, a factor analysis with varimax rotation yielded four interpretable factors. The first factor was judge competency and included items such as fairness, authoritativeness, effectiveness, competency, and the extent of his knowledge. Judge competency accounted for 29% of the item variance. The second interpretable factor was judge bias, which included items such as: the extent to which the judge was in favor of the plaintiff, the extent to which the judge was in favor of the defense, the degree to which the judge seemed interested in the plaintiff's case, and the degree to which he was interested in the defense case. Judge bias accounted for 20% of the item variance. The third interpretable factor was judge nonverbal behavior and this included the scale items of the extent of the judge's nonverbal behavior during the trial and the extent of the judge's nonverbal behavior during the jury instruction phase. Judge's nonverbal behavior accounted for 14% of the item variance. The final factor was the single scale item that evaluated participants' perceptions of the judge's domineering behavior during the trial. This item accounted for 9% of the item variance. Based on the factor analyses of jurors' ratings of the judge, three separate scales of judge competency, judge bias, and judge's nonverbal behavior were created by averaging the items that loaded onto each of these factors (Cronbach's $\alpha = .78$, .78, and .83, respectively: see Tables 7 for scale items and factor loadings).

Participants also evaluated their overall impressions of the trial. They rated their agreement with the following statements: the trial was fair, the trial had too many interruptions and objections, the plaintiff's case was strong, the defense's case was weak, the trial was civil, the plaintiff's case was clear, the defense's case was understandable,

and the plaintiff's expert witnesses' testimony was complex, and the defense expert's testimony was not complex. A principal component factor analysis with varimax rotation yielded three interpretable factors. The first factor was impressions of the defense case and this included items such as: strength of the defense case, complexity of the defense expert's testimony, and the extent to which participants were able to understand his testimony. Impressions of the defense case accounted for 23% of the item variance. The second interpretable factor was perceptions of the trial procedure and plaintiff's case, which included items such as: the civility of the trial, fairness of the trial, strength of the plaintiff's case, and the extent to which participants were able to understand the plaintiff's expert's testimony. Perceptions of the trial procedure and plaintiff's case accounted for 22% of the item variance. A third interpretable factor included the items of whether the plaintiff's case was clear and whether the trial had too many interruptions and objections. This third factor accounted for 12% of the variance. Reliability analyses of these factors revealed that the only highly reliable scale created from the factor analyses was impressions of the defense case when the item evaluating participants' perceptions of the strength of the defense case was removed (Cronbach's $\alpha = .77$). Perceptions of the trial procedure and plaintiff's case and whether the plaintiff's case was clear and whether the trial had too many interruptions and objections were not highly reliable (Cronbach's $\alpha = .59$ and .07 respectively: see Table 8 for factor loadings of this section).

The next section of the questionnaire measured participants' overall comprehension and retention of trial evidence. Participants took a timed recall test like the one used in Petty, Wells, and Brock (1981). Participants had five minutes to recall all

the facts in the case that they could remember. A fact is any piece of information that conveys one factual idea, (i.e., "the plaintiff is 28 years old") as conveyed by the experts during the trial. Repetitions of the same fact and opinions were not counted as new pieces of information. Two judges independently scored this section of each questionnaire and inter-rater reliability was extremely high ($\underline{W} = .947$, $p < .01$). The number of correct facts scored for this section was then averaged across raters to create the dependent variable of recall. Comprehension of the testimony was determined by asking participants twenty true/false questions (Cooper et al, 1996). Comprehension was coded by calculating the proportion of correct answers to these true/false questions.

The remaining items that were not part of any of the newly created scales were analyzed separately. These items included: (1) whether it is improper to say that a substance that causes cancer in animals would do so in humans, (2) plaintiff and (3) defense attorney antagonism, (4) whether the judge was domineering, (5) civility, (6) fairness, and (7) distracting quality of the trial, (8) whether the plaintiff's expert witness was complex, (9) and whether the defense's case was strong.

Procedure

There were eight experimental conditions formed by the crossing of courtroom proceedings (British vs. American), with the strength of evidence (strong vs. weak), and with the verdict perception by the judge (plaintiff vs. defense). Participants were randomly assigned to conditions in groups ranging in size from 1 to 5 people. These groups then viewed one of the eight versions of the videotaped mock trial. At the conclusion of the videotaped mock trial, participants filled out a questionnaire that asked for basic demographic information, along with the questions described previously.

Questionnaires were filled out individually. Participants did not discuss or deliberate the trial while filling out the questionnaire. Once participants were completed with the questionnaire they were debriefed and thanked for their participation.

Chapter Three: Results

Manipulation Checks

Judge's Nonverbal Behavior. A 2 (courtroom procedure) X 2 (judge's nonverbal behavior) X 2 (evidence strength) ANOVA was conducted on the scale of judge's nonverbal behavior. There was only a main effect of courtroom procedure, F (1, 237) = 8.12, $p < .01$, $\eta^2 = .03$. Participants who viewed British courtroom procedures were more likely to notice the judge's nonverbal behaviors (M= 4.85) than were participants who viewed American courtroom procedures (M= 4.12: see Table 22 for means and standard deviations).

Evidence strength. A 2 (courtroom procedure) X 2 (judge's nonverbal behavior) X 2 (evidence strength) ANOVA was conducted on participants' overall evaluation of the strength of the plaintiff's case. As would be expected, participants in the strong evidence conditions found the plaintiff's case much stronger (M= 5.28) than did participants in the weak evidence condition (M= 4.57), F (1, 237) = 13.93, $p < .01$, $\eta^2 = .06$. There was also a significant main effect for judge's nonverbal behavior, F (1, 237) = 3.97, $p < .05$, $\eta^2 = .02$. Participants in the judge pro-plaintiff conditions judged the plaintiff's case to be stronger (M=5.11) than did participants in the judge pro-defense condition (M= 4.73).

Verdict

For the purpose of these analyses, participant verdicts were coded 0 if they found for the defense and 1 if they found for the plaintiff. I conducted a 2 (courtroom procedure) X 2 (judge's nonverbal behavior) X 2 (evidence strength) ANOVA on participants' verdicts (see Table 9 for means). Both courtroom procedure and evidence strength main effects were significant, F (1, 237) = 7.26, $p < .01$, $\eta^2 = .03$ for courtroom

procedure and $\underline{F}$ (1, 237) = 75.78, $\underline{p} < .01$, $\eta^2 = .24$ for evidence strength. Participants in the American courtroom procedure were more likely to vote for the plaintiff than were participants in the British courtroom procedure ($\underline{Ms}$ = .73 and .60, respectively). In addition, participants who saw the strong plaintiff's evidence were more likely to vote for the plaintiff than participants who saw the weak evidence were ($\underline{Ms}$ = .89 and .43, respectively). There was no significant main effect for judge's nonverbal behavior or any significant interactions for verdict as the dependent variable, all Fs < 2.75.

Following this ANOVA, I conducted a 2 (courtroom procedure) X 2 (judge's bent) X 2 (evidence strength) logistic regression using SPSS© LOGISTIC REGRESSION. I used the simple variable coding scheme for all the variables. Initially, I entered all of the main effects and interactions into the model I then used a backward stepwise selection procedure to determine which of the terms to include in the model. The final model included the three main variables and all interactions of those variables (i.e., courtroom procedure X judge's nonverbal behavior, courtroom procedure X evidence strength, evidence strength X judge's nonverbal behavior, and evidence strength X courtroom procedure X judge's nonverbal behavior, χ^2 (7, $\underline{N}$ = 245) = 73.38, $\underline{p} < .001$. These analyses revealed that the main effect of courtroom procedure was significant, such that participants in the American procedure were almost three times (i.e., 2.69) as likely as participants in the British conditions to find for the plaintiff than for the defendant. The analysis also revealed a significant main effect of evidence strength, such that participants in the strong plaintiff's evidence condition were almost 14 times (i.e., 13.87) more likely to find for the plaintiff than for the defendant than participants who viewed the weak evidence conditions. There were no other significant findings, $\chi^2 \leq -.015$.

Confidence

A 2 (courtroom procedure) X 2 (judge's nonverbal behavior) X 2 (evidence strength) ANOVA was conducted with confidence as the dependent variable. This analysis revealed a significant three-way interaction of courtroom procedure X judge's nonverbal behavior X evidence strength, $\underline{F}$ (1, 237) = 6.69, $\underline{p} < .01$, $\eta^2 = .04$ (see Table 10 for means). Simple effects analyses revealed a significant cross-over interaction within the British courtroom procedure condition for judge's nonverbal behavior and evidence strength $\underline{F}$ (1, 120) = 21.67, $\underline{p} < .001$, but there was no significant interaction within the American version. Participants in the British conditions with the judge displaying a pro-plaintiff bias were more confident in their verdicts when the plaintiff's case was strong than when the plaintiff's case was weak, $\underline{F}$ (1, 120) = 10.91, $\underline{p} = 001$. Conversely, participants in the British conditions with a judge displaying a pro-defendant bias were more confident in their verdicts when the evidence was weak, $\underline{F}$ (1, 120) = 10.76, $\underline{p} = 001$.

The ANOVA also revealed a significant two-way interaction of judge's nonverbal behavior and evidence strength, $\underline{F}$ (1, 237) = 14.64, $\underline{p} < .001$, $\eta^2 = .06$. Simple effect analyses revealed a significant effect of judges' nonverbal behavior in the strong evidence condition, $\underline{F}$ (1, 241) = 8.72, $\underline{p} = .003$. Participants in the strong evidence condition were more confident in their verdicts when the judge was pro-plaintiff than when the judge was pro-defense. Conversely, when the evidence was weak, participants were more confident in their verdicts when the judge's behavior was pro-defense than when the judge's behavior was pro-plaintiff, $\underline{F}$ (1, 241) = 6.02, $\underline{p} = .015$. There were no other significant interactions or main effects, all $\underline{Fs} \leq .13$.

Defendant Liability

I conducted a 2 (courtroom procedure) X 2 (judge's nonverbal behavior) X 2 (evidence strength) ANOVA on the continuous variable representing defendant liability. There were no significant interactions (all Fs $\leq$ 1.81), but there were significant main effects for each of the independent variables (see Table 11 for means). Participants rated the defendant to be more liable when American courtroom procedures were used (M = 64.37) than when British courtroom procedures were used (M = 56.22), F (1, 237) = 4.49, $p < .05$, $\eta^2 = .02$. Participants also rated the defendant to be more liable when the judge was pro-plaintiff (M = 64.22) than when the judge was pro-defense (M= 56.37), F (1, 237) = 4.17, $p < .05$, $\eta^2 = .02$. As would be predicted, strong evidence strength conditions elicited significantly higher ratings of defendant liability (M= 78.01) than did weak evidence conditions (M= 42.58), F (1, 237) = 84.98, $p < .01$, $\eta^2 = .26$.

Damage Awards

To normalize the distribution of damage awards, I took the natural log of each participant's response. I analyzed responses only from participants who had found for the plaintiff (as per the instructions to participants). I conducted a 2 (courtroom procedure) X 2 (judge's nonverbal behavior) X 2 (evidence strength) ANOVA with the natural log of each award response as the dependent variable. There were no significant interactions and no significant main effects, all Fs $\leq$ 1.48 (see Table 12 for means).

Defendant Responsibility for the Plaintiff's Injury

The defendant responsibility scale was subjected to a 2 (courtroom procedure) X 2 (judge's nonverbal behavior) X 2 (evidence strength ANOVA (see Table 13 for means). The main effect of courtroom procedure was significant, F (1, 237) = 8.39, $p < .01$, η^2 =

.03. Participants in the American condition rated the defendant to be more responsible (M= 4.54) than did participants in the British condition (M= 4.10). The main effect of judge's nonverbal behavior was also significant, F (1, 237) = 5.05, p < .05, η^2 = .02. Participants in the pro-plaintiff condition found the defendant to be more responsible for the plaintiff's injury (M= 4.51) than did participants in the pro-defense condition (M= 4.11). The last main effect of evidence strength was also significant, F (1, 237) = 110.88, p = .000, η^2 = .32. Participants in the strong evidence condition judged the defendant to be more responsible for the plaintiff's injury (M= 5.19) than did participants in the weak evidence condition (M= 3.42). This analysis revealed no significant interactions, all Fs ≤ .92.

Plaintiff Expert's Credibility

A 2 (courtroom procedure) X 2 (judge's nonverbal behavior) X 2 (evidence strength) ANOVA of participant ratings of the plaintiff expert's credibility revealed no significant interactions among the three independent variables, all Fs ≤ .94 (see Table 14 for means). There was a significant main effect of courtroom procedure, F (1, 237) = 4.53, p < .05, η^2 = .02. Participants viewing the American courtroom procedure were more likely to rate the plaintiff's expert to be more credible (M= 5.57) than were participants in the British condition (M= 5.33). There was also a significant main effect for evidence strength, F (1, 237) = 26.82, p = .000, η^2 = .10. Participants in the strong evidence condition were more likely to view the plaintiff's expert more positively (M= 5.73) than were participants in the weak evidence condition (M= 5.16). There was no significant main effect of judge's nonverbal behavior on the ratings of the plaintiff expert's credibility, F (1, 237) = 2.34, p = .13.

Defense Expert Credibility

A 2 (courtroom procedure) X 2 (judge's nonverbal behavior) X 2 (evidence strength) ANOVA of participants' ratings of the defense expert's credibility revealed no significant interactions on participants' perceptions of the defense expert, all Fs $\leq$ 2.91 (see Table 15 for means). Just as with the plaintiff's expert, there was a significant main effect of courtroom procedure, F (1, 237) = 16.11, p = .000, η^2 = .06. Participants in the British condition found the defense expert to be more credible (M= 5.17) than did participants in the American condition (M= 4.63). Again, similar to the ratings of the plaintiff's expert, there was a significant main effect of evidence strength, F (1, 237) = 12.73, p = .000, η^2 = .05. Participants in the weak evidence conditions were more likely to rate the defense expert more positively (M= 5.14) than were participants in the strong evidence condition (M= 4.66). There was no significant main effect of judge's nonverbal behavior on the ratings of the plaintiff expert's credibility, F (1, 237) = 1.35, p = .25.

Plaintiff's Attorney Performance

A 2 (courtroom procedure) X 2 (judge's nonverbal behavior) X 2 (evidence strength) ANOVA with plaintiff's attorney performance as the dependent measure indicated that there were no significant interactions among the independent variables, all Fs $\leq$ .98 (see Table 16 for means). There was a significant main effect of courtroom procedure, F (1, 237) = 14.55, p = .000, η^2 = .06. The plaintiff's attorney received more positive evaluations from participants in the American condition (M= 5.19) than from participants in the British condition (M= 4.71). There was also a significant main effect of evidence strength, F (1, 237) = 4.56, p < .05, η^2 = .02. Participants rated the plaintiff's attorney more favorably when the evidence for the plaintiff was strong (M=

5.08) than when the evidence was weak (M= 4.82). There was no significant main effect of judge's nonverbal behavior on the ratings of the plaintiff attorney's performance, F (1, 237) = .94, p = .33.

Defense Attorney Performance

I conducted a 2 (courtroom procedure) X 2 (judge's nonverbal behavior) X 2 (evidence strength) ANOVA with defense attorney performance as the dependent variable (see Table 17 for means). Similar to ratings of the plaintiff's attorney, there was a significant main effect of evidence strength on ratings of defense attorney performance, F (1, 237) = 16.28, p = .000, η^2 = .06. Participants rated the defense attorney more positively when the evidence presented by the plaintiff was weak (M= 4.32) than when the evidence presented by the plaintiff was strong (M= 3.78). Unlike ratings of the plaintiff's attorney, there was a significant main effect for judge's nonverbal behavior, F (1, 237) = 9.84, p < .01, η^2 = .04. Ratings of the defense attorney's performance were higher when the judge was pro-defense (M= 4.26) than when the judge was pro-plaintiff (M= 3.83). This main effect was qualified by a significant interaction of courtroom procedure and judge's nonverbal behavior, F (1, 237) = 4.91, p < .05, η^2 = .02. In the judge pro-defense condition, ratings of the defense attorney were higher when the trial was conducted using British courtroom procedures (M= 4.48) than when the trial was conducted using American courtroom procedures (M= 4.03), F (1, 241) = 5.15, p = .02. Within the judge pro-plaintiff condition, ratings for the defense attorney did not differ across courtroom procedures, F (1, 241) = .56, p = .45. There were no other significant interactions, all Fs ≤ 3.04.

Extent of Antagonism Exhibited by the Attorneys

For both the plaintiff and defense attorneys, there was a main effect of courtroom procedure on participants' ratings of attorney antagonism, F (1, 237) = 10.64, $p < .01$, η^2 = .04 for the plaintiff's attorney; F (1, 237) = 5.11, $p < .05$, η^2 = .02 for the defense attorney. Participants judged the plaintiff's attorney to be significantly more antagonistic in the American conditions (M= 3.74) than in the British conditions (M= 3.13). Similarly, participants viewed the defense attorney to be significantly more antagonistic in the American condition (M= 4.01) than in the British conditions (M= 3.60). There were no other main effects or interactions for the level of antagonism exhibited by the attorneys, all other $Fs \leq 3.29$ (see Tables 18 and 19 for means).

Judge Competency

A factorial ANOVA was conducted using the three independent variables of courtroom procedure, judge's nonverbal behavior, and evidence strength and the judge competency scale as the dependent variable (see Table 20 for means). The only significant effect for this scale was a main effect of judge's nonverbal behavior, F (1, 237) = 4.66, $p < .05$, η^2 = .02. Participants in the judge pro-plaintiff condition rated the judge to be more competent (M= 4.94) than did participants in the judge pro-defense condition (M= 4.60). There were no other significant main effects or interaction effects for judge competency, all $Fs \leq 1.22$.

Judge Bias

A 2 (courtroom procedures) X 2 (judge's nonverbal behavior) X 2 (evidence strength) ANOVA was used to analyze the dependent variable of judge bias. As would be expected, there was a significant main effect for judge's nonverbal behavior, F (1,

237) = 133.43, p = .000, η^2 = .36 (see Table 21 for means). Participants in the judge pro-plaintiff rated the judge as more biased toward the plaintiff (M= 5.03) than did participants in the judge pro-defense condition (M= 3.14). This main effect was qualified by a significant interaction of courtroom procedures and judge's nonverbal behavior, F (1, 237) = 11.47, $p < .01$, η^2 = .05. Participants who watched the pro-plaintiff judge rated the judge as more biased toward the plaintiff in the British conditions (M= 5.32) than in the American conditions (M= 4.73), F (1, 241) = 6.44, p = .012. Yet, the reverse occurred for participants who in the judge pro-defense condition. Participants rated the judge as more biased toward the plaintiff in the American conditions (M= 3.40) than in the British conditions (M= 2.88), F (1, 241) = 4.81, p = .029. There was also a significant main effect for evidence strength, F (1, 237) = 12.24, $p < .01$, η^2 = .05. Participants in the strong evidence condition rated the judge to be more biased towards the plaintiff (M= 5.26) than did participants in the weak evidence condition (M= 3.14). There were no other significant interactions or main effects, all Fs < 1.76.

The Extent of Judge's Domineering Behavior

This single item rating of the judge's domineering behavior was subjected to the same factorial ANOVA as those mentioned previously (see Table 23 for means). The only significant effect this factorial ANOVA revealed was an interaction between courtroom procedure, judge's nonverbal behavior, and evidence strength, F (1, 237) = 7.72, $p < .01$, η^2 = .03; all other $Fs \leq .73$. Within the judge pro-plaintiff conditions, there was a significant interaction of courtroom procedure and evidence strength, F (1, 119) = 6.08, p = .02. When the evidence was strong, participants found the judge to be more domineering in the American condition (M= 3.87) than in the British condition (M=

2.94), F (1, 119) = 5.25, p = .02. Courtroom procedure did not affect participants' perceptions of how domineering the judge was when the evidence was weak. Within the judge pro-defense condition, participants' perceptions of how domineering the judge appeared did not differ significantly as a function of the interaction of courtroom procedure and evidence strength.

Complexity of the Defense Case

A factorial ANOVA was conducted with complexity of the defense case scale as the dependent variable (see Table 24 for means). This analysis revealed no significant interactions and only one significant main effect of courtroom procedure, F (1, 237) = 11.60, $p < .01$, $\eta^2 = .05$, all other $Fs \leq 2.20$. Participants who viewed the trial that used British courtroom procedures were more likely to rate the defense's case as understandable and less complex (M= 4.40) than participants who viewed the trial using American courtroom procedures (M= 3.74).

Complexity and Understandability of the Plaintiff's Case

Participants did not see the plaintiff's case as differing significantly in terms of the items concerning the complexity and the understandability of the plaintiff's case across the different conditions and levels of the independent variables when a factorial ANOVA was conducted on this item, all $Fs \leq 3.08$ (see Tables 25 and 26 for means).

Trial Fairness

A 2 (courtroom procedure) X 2 (judge's nonverbal behavior) X 2 (evidence strength) ANOVA was conducted with participants' evaluations of the overall fairness of the trial as the dependent variable. The only significant effect was that participants who viewed the trial with strong evidence were significantly more likely to agree that the trial

was fair (M= 5.05) than were participants in the weak evidence conditions (M= 4.60), F (1, 237) = 4.73), $p < .05$, $\eta^2 = .02$ (see Table 27). There were no significant interactions across variables for this dependent measure, all Fs ≤ 1.70.

Trial Civility

As predicted, participant's who viewed British courtroom procedures were more likely to rate the trial as being civil (M= 5.79) than participants who viewed American courtroom procedures (M= 5.22), F (1, 237) = 11.44, $p < .01$, $\eta^2 = .05$ (see Table 28 for means). There were no other significant main effects or interactions for this variable, all Fs ≤ 1.24.

Perceived Amount of Distraction

Also, as predicted participant's rated the trials that used American courtroom procedures (M= 4.86) as significantly more distracting than trials that used British courtroom procedures (M= 2.36), F (1, 237) = 179.61, $p < .01$, $\eta^2 = .43$. There were no other main effects or significant interactions for this dependent variable, all other Fs ≤ 2.33 (see Table 29 for means).

Memory of Trial Evidence

A 2 (courtroom procedure) X 2 (judge's nonverbal behavior) X 2 (evidence strength) ANOVA was conducted with the total number of correctly recalled facts from each participant as the dependent variable (see Table 30 for means). As hypothesized, participants in the British conditions (M = 6.75) recalled significantly more facts than participants in the American conditions (M = 4.77), F (1, 237) = 18.36, $p < .01$, $\eta^2 = .07$. There were no other significant main effects or interactions for amount recalled, all Fs ≤ 3.57.

The same ANOVA was conducted with total number of items correct on the true-false memory test as the dependent variable. Results were similar to the free-recall section, in that the only effect of the factorial ANOVA was the main effect of courtroom procedure, $\underline{F}$ (1, 237) = 4.69, $\underline{p} < .05$, $\eta^2 = .2$ (see Table 31 for means). Participants in the British conditions provided more accurate responses to the true-false questions ($\underline{M}$= 15.88) than did participants in the American condition ($\underline{M}$= 15.15). There were no other significant main effects or interactions for amount recalled, all $\underline{Fs} \leq 1.29$.

Chapter Four: Discussion

British Versus American Courtroom Procedures

The present study examined the effects of British and American trial procedures and judges' nonverbal behavior on juror decision-making. British courtroom procedures lack distracting elements such as objections, side-bar conferences, outbursts, and recesses and contain other elements such as the judge's summation and direct questioning of witnesses that most likely enhance a jurors ability to systematically process evidence. It was hypothesized that the presence of the distracting elements and the absence of such elements as the judge's summation in American courtroom procedures would hinder participants' ability to process evidence systematically. As a result, participants should rely more heavily on judge's nonverbal behavior as a cue or heuristic to processing. Conversely, it was also hypothesized that in British courtroom conditions, which lacked these distracting elements and contained the judge's summation, participants would be more likely to scrutinize evidence and be influenced by variations in evidence strength.

The results of the current study indicated that participants who viewed British courtroom procedures were more likely than their American viewing counterparts to find the trial to be: more civil, less distracting, the judge to be less domineering, the attorneys to be less antagonistic, and the defense evidence to be less complex. Participants in the British conditions also recalled more trial evidence and scored higher on a test for their memory of the trial evidence presented. These results supported and extended the results of Fulero and Turner's (1997) study. The only significant difference Fulero and Turner found between British and American trials were perceived civility and the perceived performance of the judge. Their results indicated that participants found the British style

trial to be more civil. In addition, participants rated the British style judge higher than the American judge on the dimensions of fairness, authoritativeness, knowledgeability, likeability, and overall effectiveness. They also found that participants viewing American trials perceived that there were more interruptions and objections than participants viewing trials using the British style.

One of the most significant extensions of Fulero and Turner's (1997) study was that participants viewing the trial using British courtroom procedures had a higher number of total recalled facts and a higher number of correct answers to the memory test than did those who viewed the American trial procedures. No such assessment of this dimension was conducted in Fulero and Turner's study.

The results obtained between courtroom procedures on participants' perceptions of the lawyers and their cases stand in contrast to those obtained by Fulero and Turner. In the current study within the American conditions, participants were more likely to find for the plaintiff, assign higher probabilities of defendant liability, find the plaintiff's case stronger than the defense's, and give the plaintiff's attorney and expert higher ratings than did participants in the British conditions. It seemed the reverse results were obtained in the current study for the case presented by the defense. Within the British condition, participants rated the case presented by the defense as less complex and more understandable and rated the defense attorney and expert more positively than did participants in the American conditions. When Fulero and Turner compared American style trials and British style trials (using American judges and lawyers for both versions), they found that the conviction rate for both trials was similar and perceptions of the prosecution and defense attorneys were equal across conditions (though used a criminal

case rather than the civil case used for this study).

Another extension of Fulero and Turner's original study on British versus American trial procedures was to look at the effect of judge's nonverbal behavior between both courtroom styles. An interesting result of the current study between courtroom conditions was that participants demonstrated a better ability to notice the judge's bias and nonverbal behavior when viewing the trial using British courtroom procedures.

Influence of Judge's Nonverbal Behavior

There was no direct influence of judge's nonverbal behavior on verdict. However, there were interesting and important effects of judge's nonverbal behavior on participants' confidence in their verdicts and in their ratings of defendant liability. Participants were more confident in their verdicts when the judge's bent, as indicated by his nonverbal behavior, corresponded with evidence strength (i.e., when evidence was strong the judge was pro-plaintiff, and when evidence was weak the judge was pro-defense). Although participants' verdicts appeared to be chosen on the basis of the evidence, participants may have had some nagging doubt about their verdicts when the judge did not seem favorable to the side that presented the strongest case. Hart (1991) had the same results for judge's nonverbal behavior on confidence, although in his research, judge's nonverbal behavior did influence verdict.

Judge's nonverbal behavior also influenced participant ratings of defendant liability. Participants believed that the defendant was more likely to be liable when the judge was pro-plaintiff than when the judge was pro-defense. It also appeared that when the judge's bent, as indicated by their nonverbal behavior, corresponded with evidence

strength this not only inflated participant's confidence in their verdict choice but also their probability estimates of defendant liability.

Other researchers have found an effect of nonverbal behavior on the crucial measure of verdict, but such was not the case in this current study. Across British and American courtroom procedures, the strength of the evidence presented appeared to verdict choice. Visher (1987) found that extra-legal factors affect juror decision-making only when evidence is ambiguous. Even when participants felt distracted and exhibited an effect of that distraction in American conditions (i.e., lower recall and memory scores), the strength of the evidence was the biggest predictor of verdict decision.

Impact of Courtroom Procedure and Judge's Nonverbal Behavior

One important area in which the interaction of courtroom procedure and judge's nonverbal behavior did have a significant impact was on participants' confidence in their verdicts. Participants in the British conditions were more confident in their verdicts when judge's nonverbal behavior and evidence strength were congruent than in American conditions when judge's bent and evidence strength were congruent. It could be that participants viewed the judge's nonverbal behavior as a form of evidence. As noted in the introduction, judges have access to much of the background information in a trial that jurors may never hear, such as prior background or inadmissible evidence. Due to the wide influence of the media such as television court dramas and news coverage of notorious trials, it could be assumed that the participants knew that the judge might have been exposed to information about the case that they would not be. When the judge's behavior was congruent with the evidence strength, his behavior served to bolster their confidence in their verdict choices. When the judge's behavior was not congruent with

the evidence strength, it may have brought doubt to participants' verdict choices because the evidence strongly suggested that the defendant was legally responsible for the plaintiff's colon cancer but the judge's behavior did not. This congruency effect on confidence was exaggerated in British conditions because participants were better able to detect the nonverbal behavior in these conditions as indicated by their ratings on judge's nonverbal behavior. It should be noted that the judge is more salient in British conditions and as such may have more potential for influence. Future studies need to look at whether the judge's behavior was used as further evidence for rendering a verdict decision and whether it is the saliency of the judge in British conditions promotes the influence of the judge's behavior.

Interaction of Courtroom Procedure, Judge's Bent and Evidence Strength on Verdict

The hypothesis that there would be an interaction effect of courtroom procedure, judge's nonverbal behavior and evidence strength on verdict and other measures related to verdict was not supported. It seems each of the independent variables by themselves had an impact on verdict. The only measure related to verdict that did exhibit a three-way interaction for these variables was participant's confidence in their verdicts. Participants were the most confident in their verdicts in conditions where British courtroom procedures were used, and the judge's behavior and evidence strength were congruent. In looking at the rating scales pertaining to the judge, this result seems logical. Participants found the judge to be more competent when he was pro-plaintiff than when he was pro-defense. Also, they were better able to detect his nonverbal behavior in the British conditions, which in turn may have affirmed their verdict choice when his behavior was congruent and served as lingering doubt when his behavior was

incongruent. Also, research on the ELM/ HSM has demonstrated that when participants come to a decision after systematically processing the evidence, they are more resistant to persuasion and more confident in their decisions (Tesser, Martin & Mendolia, 1995). Though there was no courtroom procedure and evidence strength interaction, there are indications that participants in British conditions may have had a greater opportunity to systematically process information. Participants in the British conditions had higher memory and recall scores than participants in the American conditions and they were better able notice judge's nonverbal behavior to the point that it bolstered their confidence in their verdict choices when his behavior was congruent with the strength of the evidence. In trials where evidence may be more ambiguous this difference in court procedures could have a greater impact given these results.

Differences Between Current and Previous Studies on Judge's Nonverbal Behavior

Halverson, et al (1997), Hart (1991), and Blanck, et al (1987) all used an experimental paradigm in which participants listened to a brief *audiotaped* version of a drunk driving trial and then viewed a *videotape* of a judge reading pattern jury instructions. These researchers used real judges and predetermined their beliefs about defendant guilt before showing the videotape to participants. This paradigm seems to highlight the underlying hypothesis about the influence of the judge's behavior (i.e., increase the demand characteristics of the experiment [Orne, 1961]). Because participants listen to a very brief audiotaped version of an ambiguous case, they have very little information. This increases the likelihood that they will use a peripheral cue or heuristic. Within these studies, it appears that judges' nonverbal behavior is made obvious to jurors and in turn they use it to make decisions about the case. This could be

an explanation as to why they found an effect of judge's nonverbal behavior on verdict and I did not. We know that jurors are motivated to make good decisions (Kalven & Zeisel, 1966). So, in order to make good decisions jurors try and focus on the evidence in the case. When this is absent, jurors would be most likely to turn to secondary and in some cases, tertiary sources of information to make a decision, such as judge's nonverbal behavior.

Hart (1991) predicted that using actors to assess the influencing effects of judges' nonverbal behavior would produce much larger effects on verdict than the videotaped judges of his study would. This study did not support his prediction. Yet, there may be other conditions where using an actor as a judge could produce larger effects on verdict, i.e. trials with more ambiguous or circumstantial evidence. These other conditions should be explored in further studies.

Conclusions

The current study served as an extension to Fulero and Turner's (1997) study on perceptions of British and American courtroom procedures. Rather than simply being a study on perceptions of both procedures, the current study evaluated the impact these differences may have on juror decision-making. The current study also served as an extension to previous studies on judges' nonverbal behavior (Hart, 1991; and Halverson, et al, 1997). It provided a theoretical framework in which the biasing effects of judge's nonverbal behavior could be explored. Also, the current study used a mock trial and evaluated the effect of judges' behavior throughout the trial, rather than having participants listen to an abridged audiotaped trial and then view a judge read instructions to the jury.

Overall, it seemed that a participant's verdict was predicted by evidence strength. But the question remains whether if conditions were changed (e.g., the trial was much more ambiguous) would participants rely more on judge's nonverbal behavior as they did in the studies by Hart and Halverson, et al.? Or are participants only somewhat influenced by judge's nonverbal behavior, as indicated by the results of the current experiment. These are questions to be answered with further research?

What constitutes "leakage" on the part of the judge? In the current study, the judge was an actor who was instructed to be a bit more blatant with his nonverbal behaviors. In contrast, the judges' used by Blanck, Hart, and Halverson, et al. were real judges who more than likely were trying to control their behavior and appear neutral. The results of Hart's study indicated that when judges expected guilty verdicts, they were more somber and inserted more words into the text but their overall nonverbal behavior was not entirely obvious. In the current study the judge's behavior could be described as indicating interested or preference depending on what case he was instructed to be for or against. Though, the current study did not produce an effect of judge's nonverbal behavior on verdict using an actor, it nonetheless, produced an effect on other dependent variables. In other conditions this particular actor's behavior may produce an effect on verdict, but given the results of the current study and previous studies it is difficult to say what behavior specifically seems to influence jurors. It seems that not only do the small, less noticeable behaviors of the real judges used in previous research influence participants, the exaggerated behaviors of the current judge also influenced jurors, though not on their ultimate verdict choices. Is it that the less noticeable behaviors influence

verdict, while the exaggerated nonverbal behaviors do not? Further research should explore this issue.

The present research was an initial attempt to examine the potential influence of the aspects of courtroom procedures that vary between American and British trial systems on juror decision-making. This was applied research so all the varying aspects of these two procedures were included in this study. Further research should tease apart these varying components and assess their individual affects on juror decision-making.

Given the current findings about American versus British courtroom proceedings and judges' nonverbal behavior, it seems that there are advantages and disadvantages to using either court procedure. American trials have elements that can distract jurors from their primary task of processing evidence. British trial elements allow the juror to have considerable exposure to the judge and his or her behavior during trial, which can unduly influence a juror's processing of trial evidence under certain conditions. The current study demonstrates the potential biases of distraction and judges' nonverbal behavior on juror decision-making. The psycho-legal literature identifies a growing number of biases in courtroom proceedings, but it also identifies ways to minimize those biases. The results of the current study seem to suggest that taking on an American approach to the judicial role can minimize the potentially biasing effects of judge's nonverbal behavior. Yet, in terms of enhancing a juror's recall and memory for trial evidence, the British courtroom procedures are a better choice than American courtroom procedures. The most important finding of this study is that when jurors have the ability they will ultimately use evidence to reach their verdict decisions.

Table 1

Procedural variations between British and American trial conditions

	British	American
1.	Attorneys remained behind their tables while questioning witnesses.	Attorneys roamed about the court during questioning of witnesses.
2.	There were no objections during the course of testimony.	There were 26 objections during the presentation of evidence for each side.
3.	The presentation of the defense opening statement was at the close of the plaintiff's case.	Both the plaintiff and defense gave their opening statements at the beginning of the trial and their closing statements at the end of both examinations.
4.	The judge was seen asking questions and interjecting himself when a question was seemingly improper.	The judge did not ask questions nor interjected himself during the course of questioning by attorneys.
5.	The judge gave a summation of the trial evidence after the closing arguments and prior to instructions.	The judge did not give a summation

Table 2

Means for Defendant Responsibility Items and Factor Loadings from Principal Component Analysis

Item	M	Factor Loading
The primary cause of Mark Stevens' colon cancer was his exposure to PCB's.	4.50	.92
The plaintiff expert's research sufficiently demonstrated that PCBs cause colon cancer in humans.	4.43	.86
It is more likely that other risk factors such as a familial history of colon cancer, a diet high in fat and low in fiber, as well as adenomatous polyps and chronic inflammatory bowel disease were the primary cause of Mark Stevens colon cancer.	4.38	.78
The defense expert's research sufficiently demonstrated that PCB exposure might have harmful effects on humans, but that colon cancer is not one of them.	3.95	.76
It is improper to say that a substance that causes cancer in animals would cause cancer in humans.	4.47	.42

Table 3

Means for Plaintiff Expert Credibility Items and Factor Loadings from Principal Component Analysis

Item	M	Factor Loading
Dr. Fallon's testimony was persuasive	5.07	.77
His arguments were weak.	5.02	.77
He was likeable	4.54	.48
His arguments were not convincing	5.14	.83
He was knowledgeable.	5.91	.70
He was not credible	5.71	.68
He was incompetent	6.23	.44
He was qualified to be an expert witness in this case	5.78	.62
His testimony was understandable	5.65	.53

Table 4

Means for Defendant Expert Credibility Items and Factor Loadings from Principal Component Analysis

Item	M	Factor Loading
Dr. Campbell's testimony was persuasive	4.62	.77
His arguments were weak.	4.74	.66
He was likeable	3.89	.51
His arguments were not convincing	4.47	.80
He was knowledgeable.	5.56	.72
He was not credible	5.12	.75
He was incompetent	5.61	.69
He was qualified to be an expert witness in this case	5.14	.76
His testimony was understandable	4.93	.69

Table 5

Means for Plaintiff Attorney Competence Items and Factor Loadings from Principal Component Analysis with Varimax Rotation

Item	M	Factor Loadings (1)	(2)
Jean Howard's opening argument was compelling.	4.97	.77	.05
Her questioning of the expert witness was effective.	5.40	.75	.14
Her closing argument was not compelling.	4.64	.72	-.06
Overall, she was an effective trial advocate.	5.09	.89	-.05
Overall, she was not persuasive	4.97	.82	-.09
She was dislikable.	5.64	.61	-.48
She was knowledgeable.	5.00	.76	.17
Her use of objections during the trial was effective.	3.80	.51	.47
She was antagonistic.	3.43	-.10	.85

Table 6

Means for Defense Attorney Competence Items and Factor Loadings from Principal Component Analysis with Varimax Rotation

Item	M	Factor Loadings (1)	(2)
Diane Moore's opening argument was compelling.	3.78	.69	.17
Her questioning of the expert witness was effective.	4.30	.83	.08
Her closing argument was not compelling.	4.02	.37	.62
Overall, she was an effective trial advocate.	4.19	.86	.19
Overall, she was not persuasive	4.18	.40	.58
She was dislikable.	4.34	.40	.59
She was knowledgeable.	4.27	.80	.17
Her use of objections during the trial was effective.	3.23	.58	.14
She was antagonistic.	3.81	.27	-.17

Table 7

Means for Judge Perception Items and Factor Loadings from Principal Component Analysis with Varimax Rotation

Items	M	Factor Loadings (1)	(2)	(3)	(4)
The judge treated the lawyers and jurors with respect and concern.	4.70	.09	-.43	.34	.58
The judge was authoritative.	5.10	-.08	-.07	.17	.80
The judge was in favor of the plaintiff	3.34	.74	.43	-.10	-.02
The judge was knowledgeable.	4.80	.06	.01	.77	.25
The judge seemed interested in the plaintiff's case.	4.01	.69	.27	.21	.26
The judge was competent.	4.87	-.04	-.10	.82	.09
The judge was not in favor of the defense	4.81	.82	-.29	.11	.15
The judge was domineering.	3.48	-.27	.41	-.43	.51
The judge did not seem interested in the defense's case.	4.20	.82	-.20	-.07	-.17
Overall, the judge was effective	4.39	.06	-.03	.51	.61
During the trial, the judge's facial expressions, gestures, tone of voice, etc., gave me an idea as to which side the judge preferred.	4.68	-.06	.88	-.08	-.19
During jury instructions in particular, the judge's facial expressions, gestures, tone of voice, or any type of behavior other than his actual words let me know what he thought the verdict should be.	4.33	.02	.84	-.05	-.04

Table 8

Means for Trial Procedure Items and Factor Loadings from Principal Component Analysis with Varimax Rotation

Items	M	Factor Loadings (1)	(2)	(3)
The trial was tried fairly.	4.83	.06	.06	-.03
The trial had too many interruptions and objections.	3.59	-.43	-.48	.42
The case presented by the plaintiff was strong.	4.83	-.42	.52	.05
The trial was civil in tone and atmosphere.	5.51	.10	.72	.16
The case presented by the plaintiff was easily understandable.	5.44	-.17	.59	.51
The evidence presented by Dr. Fallon (the plaintiff's expert) was complex.	4.03	.14	.11	.82
The case presented by the defense was weak.	3.62	-.61	.02	.19
The case presented by the defense was difficult to understand.	4.36	.84	.08	.07
The evidence presented by Dr. Campbell (the defense's expert) was complex.	3.79	.73	-.02	.26

Table 9

Mean Verdicts by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	1.09	0.29	33	1.26	0.44	31
	Weak	1.63	0.49	30	1.67	0.48	30
American	Strong	1.03	0.18	30	1.07	0.25	30
	Weak	1.43	0.50	30	1.55	0.51	31

Table 10

Mean Confidence by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	1.09	0.29	33	1.26	0.44	31
	Weak	1.63	0.49	30	1.67	0.48	30
American	Strong	1.03	0.18	30	1.07	0.25	30
	Weak	1.43	0.50	30	1.55	0.51	31

Table 11

Mean Probabilities Defendant Liability Scale by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	83.10	23.01	33	69.95	34.80	31
	Weak	37.30	32.47	30	34.53	33.39	30
American	Strong	82.97	18.94	30	76.03	27.30	30
	Weak	53.50	31.72	30	44.97	35.09	31

Table 12

Mean Damage Award by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Pro-Plaintiff			Pro-Defense		
Courtroom Procedure	Evidence Strength	M	SD	n	M	SD	n
British							
	Strong	$872,424	$1,851,993	33	$32,787,903	$17,9510,575	31
	Weak	$348,333	$950,814	30	$105,000	$192,242	30
American							
	Strong	$726,667	$850,125	30	$471,167	$682,965	30
	Weak	$230,000	$258,844	30	$284,347	$494,315	31

Table 13

Mean Ratings for Defendant Responsibility Scale by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	5.36	1.05	33	4.67	1.09	31
	Weak	3.21	1.41	30	2.99	1.63	30
American	Strong	5.47	0.85	30	5.25	1.08	30
	Weak	3.93	1.43	30	3.54	1.73	31

Table 14

Mean Ratings for Plaintiff Expert Credibility Scale by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	5.77	0.59	33	5.49	0.84	31
	Weak	5.05	0.97	30	5.02	0.98	30
American	Strong	5.97	0.76	30	5.70	0.86	30
	Weak	5.34	0.97	30	5.24	0.87	31

Table 15

Mean Ratings for Defense Expert Credibility Scale Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British							
	Strong	4.75	1.08	33	5.18	0.97	31
	Weak	5.21	0.84	30	5.55	1.00	30
American							
	Strong	4.45	1.03	30	4.26	1.09	30
	Weak	4.89	1.15	30	4.92	1.26	31

Table 16

Mean Ratings for Plaintiff Attorney Competence Scale by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	4.95	0.95	33	4.76	1.13	31
	Weak	4.58	1.06	30	4.57	0.89	30
American	Strong	5.46	0.80	30	5.17	0.88	30
	Weak	5.06	0.94	30	5.07	1.10	31

Table 17

Mean Ratings for Defense Attorney Competence Scale by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	3.50	1.02	33	4.42	1.12	31
	Weak	4.05	0.97	30	4.55	1.21	30
American	Strong	3.67	0.99	30	3.54	1.05	30
	Weak	4.15	1.08	30	4.52	0.85	31

Table 18

Mean Ratings for Plaintiff Attorney Antagonism Item by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	3.21	1.32	33	3.03	1.45	31
	Weak	3.40	1.40	30	2.87	1.46	30
American	Strong	3.63	1.69	30	3.67	1.45	30
	Weak	3.90	1.40	30	3.74	1.48	31

Table 19

Mean Ratings for Defense Attorney Antagonism Item by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	3.94	1.00	33	3.81	1.64	31
	Weak	3.31	1.17	29	3.33	1.75	30
American	Strong	3.93	1.26	30	4.20	1.52	30
	Weak	4.17	1.58	30	3.74	1.37	31

Table 20

Mean Ratings for Judge Competence Scale by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	5.17	1.27	33	4.98	1.29	31
	Weak	5.20	1.29	30	4.70	1.42	30
American	Strong	4.70	1.53	30	4.60	1.53	30
	Weak	4.67	1.35	30	4.68	1.24	31

Table 21

Mean Ratings for Judge Bias Scale by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	5.60	1.32	33	3.36	1.19	31
	Weak	5.01	1.26	30	2.38	1.37	30
American	Strong	4.88	1.40	30	3.60	1.29	30
	Weak	4.58	1.09	30	3.20	1.24	31

Table 22

Mean Ratings for Judge's Nonverbal Behavior Scale by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	5.42	1.74	33	4.47	2.23	31
	Weak	4.38	1.90	30	5.12	2.26	30
American	Strong	4.20	2.07	30	3.72	1.81	30
	Weak	4.43	1.64	30	4.15	2.15	31

Table 23

Mean Ratings for Judge Domineering Behavior Item by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	2.94	1.58	33	3.71	1.70	31
	Weak	3.67	1.69	30	3.43	1.87	30
American	Strong	3.87	1.33	30	3.30	1.60	30
	Weak	3.17	1.78	30	3.90	1.37	31

Table 24

Mean Ratings for Complexity of Defense Case Scale by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	4.35	1.36	33	4.39	1.54	31
	Weak	4.22	1.57	30	4.63	1.71	30
American	Strong	3.32	1.47	30	3.75	1.62	30
	Weak	4.12	1.48	30	3.79	1.23	31

Table 25

Item Mean Rating for Plaintiff Case Clarity Item by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	5.18	1.79	33	5.55	1.31	31
	Weak	5.23	1.59	30	5.37	1.38	30
American	Strong	5.70	0.99	30	5.47	1.25	30
	Weak	5.47	1.43	30	5.55	1.03	31

Table 26

Mean Ratings for Plaintiff Case Complexity Item by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	3.91	1.72	33	3.97	1.62	31
	Weak	3.50	1.70	30	4.53	1.78	30
American	Strong	4.23	1.72	30	3.87	1.96	30
	Weak	4.03	1.59	30	4.23	1.59	31

Table 27

Mean Ratings of Trial Fairness Item by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	5.21	1.43	33	5.10	1.89	31
	Weak	4.90	1.60	30	4.33	1.73	30
American	Strong	4.83	1.60	30	5.03	1.47	30
	Weak	4.50	1.76	30	4.68	1.11	31

Table 28

Mean Ratings of Trial Civility Item by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	5.85	1.28	33	6.06	1.31	31
	Weak	5.60	1.40	30	5.63	1.59	30
American	Strong	5.03	1.16	30	5.43	1.22	30
	Weak	5.17	1.26	30	5.26	1.15	31

Table 29

Mean Ratings of Perceived Distraction Level Item by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	2.27	1.42	33	2.13	1.20	31
	Weak	2.67	1.35	30	2.37	1.22	30
American	Strong	5.30	1.39	30	4.53	1.72	30
	Weak	4.77	1.65	30	4.84	1.63	31

Table 30

Mean Free Recall of Trial Facts by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	5.48	3.15	33	6.84	3.39	31
	Weak	7.67	4.79	30	7.13	4.51	30
American	Strong	3.90	2.16	30	5.70	3.71	30
	Weak	4.67	4.17	30	4.81	2.85	31

Table 31

Mean Correct for Memory Test by Courtroom Procedure, Judge's Bent, and Evidence Strength

		Judge's Bent					
		Pro-plaintiff			Pro-defense		
Courtroom Procedure	Evidence Strength	M	SD	N	M	SD	N
British	Strong	16.30	1.93	33	16.03	1.99	31
	Weak	15.10	4.03	30	16.10	2.14	30
American	Strong	15.13	2.18	30	15.17	3.46	30
	Weak	15.27	2.66	30	15.03	2.11	31

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APPENDIX A

Mark A. Stevens v. Keen Co., 1999

Judge: Good morning ladies and gentlemen. Thank you for coming. Today you will be participating in a summary jury trial in the case of Stevens vs. Keen Co. Now, although a summary jury trial is considerably shorter than a jury trial, this does not make the case any less important or deserving of any less consideration. I will ask you to give the evidence your complete attention and come to a reasonable decision, as is your duty.

Now, before we begin today, let me give you very brief background information. This information has been stipulated to by both plaintiff and defense counsel. Mark A. Stevens, who claims that Keen Co. negligence resulted in his illness, filed this suit in 1999 against Keen Co. Mark Stevens was diagnosed as suffering from metastatic colon cancer at the age of 28, slightly less than ten years after beginning his employment at Keen Co. Although his cancer is in remission, he claims the danger of recurrence, in addition to permanent decrease in his quality of his life, is present.

The cancer is alleged to have been caused by work place exposure to polychlorinated biphenyls (PCBs) in heat transfer fluids and through soil contamination at the Keen Company Plant. It is uncontested that the plaintiff was indeed exposed to PCBs at Keen and that his exposure was significantly higher than normal. What is contested is whether exposure to PCBs was the cause of Mr. Stevens' cancer. Thomas Fallon, Ph.D., a biochemist, will be offered as plaintiff's expert on causation. William R. Campbell, Ph.D., an epidemiologist, will testify for the defense. Ready to proceed, counsel?

Plaintiff's attorney (Jean Howard): Thank you, your honor. Counsel, ladies and gentlemen, good morning. My name is Jean Howard. I am the attorney representing Mark Stevens. I'm here today to present scientific evidence about how chemicals called PCBs, which were used at Keen Company, caused Mark Stevens to contract colon cancer that metastasized; colon cancer that nearly ended his life. The scientist who is going to present this evidence, Dr. Thomas Fallon, will explain to you that PCBs are chemicals that are used in several industrial processes, and he'll tell you about the qualities that make them useful in industry.

But what Dr. Fallon will also explain to you is that although PCBs have these qualities that make them useful in industry, they also have qualities that can make them terribly dangerous to human health. When human beings are exposed to PCBs it can place them at risk for a wide variety of diseases including cancer of the colon; the kind of cancer Mark Stevens has.

The reason we are here today, as the evidence will show, is that the Keen Company violated its duty to protect Mark Stevens against these hazardous chemicals. It did not warn him of the dangers. It did not take the proper precautions to protect him from the dangers. We can show this to you quite clearly because we know that Mark's exposure was much, much higher than that of the average American. Too high. And even the defendant will agree to this. This is not in dispute.

Now, Mark's body was full of PCBs and as the scientific proofs will show, PCBs cause different forms of cancer. One of the cancers that PCBs have been associated with is cancer of the colon, and Mark has that disease. It is a disease he was diagnosed with, had surgery for, and has suffered from for years. He is now in remission and it looks good, but it took a long time and a lot of suffering, and Mark will never really be the same.

Unfortunately, Mark won't be here to testify today to tell you the story himself because he is still in the hospital undergoing treatment for an infection caused by the colostomy he had to get at age 29, when his doctors removed his colon in order to save his life. A 29 year old with a colostomy. You don't see that very often, do you? That's because 29 year olds don't get colon cancer. That is, they don't get it unless

they've been exposed to something. Like a substance that causes it. And this is only one of the many reasons why we believe that PCBs caused Mark Stevens' colon cancer.

We're here today because we're going to argue and we're going to prove that this should never have happened. We're going to prove to you that if the defendant had protected Mark Stevens against the PCB exposure, as they should have done, Mark never would have contracted this terrible disease.

What are the tools of our trade? The tools of our trade are evidence and testimony. Dr. Thomas Fallon, who will describe for you the basic scientific information, will offer these. He will also explain to you how he came to the conclusion that PCBs caused Mark Stevens' cancer and the research he has used to support this conclusion. After you have heard all the evidence, I think you will have to agree that Mark Stevens' cancer was caused by Keen Company negligence in exposing him to PCBs. PCBs they knew were there. PCBs they knew were dangerous.

Now, when all is said and done, what is the point of it? The academics and the issues are interesting, if tough to understand. I think you'll find them interesting and also very difficult, but in the legal system, we're not here merely for academic argument. My client has brought this case to be compensated and is here seeking, as our law permits, reasonable compensation, adequate compensation from those who are responsible for the decision that caused all of his pain and all his suffering. It is our contention and we're going to argue and to present evidence to support the claim that he is entitled to compensatory, monetary damages for the pain and suffering caused by his disease.

When we present our evidence I promise you, you will see he is entitled to this compensation. You will hear the term burden of proof - and the plaintiff does have the burden of proof. We must persuade you that what I have said here today is true and I am going to make that commitment to you. It is an important case. It is important to Mr. Stevens. It is important to the defendant and that's why you're here. Because in disputes of this magnitude, that concern our citizens this much, it is only you who can make a decision. This is Mark's case. I will do the best I can to prove it. And then I think you'll agree. We are not Hollywood showmen. It doesn't always go smoothly as we'd like it to, but we'll do our best and we're happy to have this opportunity to present this case to the jury system. Thank you.

Judge: Thank you, Ms. Howard. Are you ready to examine the witness?

Plaintiff's attorney (Jean Howard): Ready to proceed, your honor.

Judge: O.K. Dr. Fallon, please approach the witness stand. Dr. Fallon you have already been sworn in. I remind you that you are still under oath.

Dr. Fallon: Yes, your honor.

Judge: Please be seated.

Plaintiff's attorney(Jean Howard): Doctor would you state your name and address for the record?

Dr. Fallon: My name is Dr. Thomas Fallon and I reside at 1400 Longwood Ave., Brookline, Massachusetts.

Plaintiff's attorney (Jean Howard): And what is you profession?

Dr. Fallon: I run a research laboratory at Princeton University Medical School. My laboratory undertakes investigations on studies of carcinogens on animals. That is to say, I do cancer research.

Plaintiff's attorney (Jean Howard): Doctor can you tell us about your educational background?

Dr. Fallon: I graduated from Stanford University in 1980 with a dual major in biology and chemistry. In 1984 I received my Ph.D. in biochemistry from Johns Hopkins University.

Plaintiff's attorney (Jean Howard): And what positions have you held in your field?

Dr. Fallon: From 1984 to 1986 I was an associate professor at Princeton University Medical School. During this time I headed a laboratory in which we studied the effects of PCBs and other carcinogens on animals. In addition, I taught introductory toxicology, which is the study of adverse effects of chemicals on living organisms to students in the medical school. Periodically, I also taught a course in cancer cell biology to graduate students. From 1986 to 1988 I was an associate professor at Princeton and served on committees at the National Cancer Institute and the Food and Drug Administration. In 1988 I became a full tenure professor and was elected to the board of directors of the American Association of Cancer Research. I continue to teach toxicology and cancer cell biology courses and gave seminars at different universities around the country.

Plaintiff's attorney(Jean Howard): And Dr. Fallon, can you tell us what the focus of your research activities is?

Dr. Fallon: Laboratories interested in the mechanisms of how chemicals cause cancer. We do this by maintaining a large stock of the experimental animals and carefully standardizing the conditions and feeding them certain chemicals. After a period of observation we can tell what effects the chemicals have had on the animals.

Plaintiff's attorney (Jean Howard): And what have you published during this time?

Dr. Fallon: In the nine years I have been a professor, my laboratories published 45 articles on cancer in peer review journals.

Plaintiff's attorney (Jean Howard): Do you hold any other scientific related positions?

Dr. Fallon: Yes I do. In addition to my other duties I am editor-in-chief of the Journal of Biochemistry Review.

Plaintiff's attorney (Jean Howard): At this time your honor, the plaintiff wishes to qualify Dr. Thomas Fallon as an expert in the field of biochemistry.

Judge: I hear no objections. You may proceed Ms. Howard

Plaintiff's attorney (Jean Howard): So, Dr. Fallon, you do research on substances that cause cancer?

Dr. Fallon: Yes. These substances are called carcinogens. My laboratory studies several carcinogens including PCBs.

Plaintiff's attorney (Jean Howard): So, PCBs are carcinogens?

Dr. Fallon: Yes, I do believe that PCBs cause cancer.

Plaintiff's attorney (Jean Howard): In your opinion, did Mark Stevens contract his cancer from exposure to PCBs?

Plaintiff's attorney (Jean Howard): Please continue, Dr. Fallon.

Dr. Fallon: I believe for several reasons that there is a very high possibility that Mark Stevens contracted cancer as a result of his exposure to PCBs.

Plaintiff's attorney (Jean Howard): Dr. Fallon, you've done a lot of research on PCBs. Are you familiar with their uses outside of the laboratory?

Dr. Fallon: Yes, I am. Because PCBs are fluids that are non-flammable and dielectric, they're used as heat exchange fluids. The extent of the heating does not cause these fluids to explode or to catch fire. They can increase gas transmission in pipelines, capacitors and transformers. So, because of the unique physical properties of these compounds, they've found extensive use in a variety of products in electrical industry and a number of other industries.

Plaintiff's attorney (Jean Howard): So PCBs are used in capacitors and transformers and various electrical industries?

Dr. Fallon: Yes that's right.

Plaintiff's attorney (Jean Howard): Just like the capacitors and transformers that Mark Stevens worked with at the Keen Company?

Dr. Fallon: Yes, but even if Mr. Stevens had not touched those capacitors and transformers he still would have been exposed to high levels of PCBs. I have here reports from the Environmental Protection Office, Department of Cancer and Toxic Substances Research and from the National Institute of Occupational Safety and Health dated 1994.

Judge: Please excuse me, Dr. Fallon Ms. Howard, have these reports been received as an exhibit?

Plaintiff's attorney (Jean Howard): No, your honor, but they are public documents.

Judge: Very well, I will allow Dr. Fallon to continue, but just so there can be no objections, I will have my clerk make a copy of these reports and make them available to the defense. Please, Dr. Fallon, continue.

Dr. Fallon: As I was saying, these reports state that the analytical data show extremely high amounts of PCB contamination on the site. According to the reports, PCBs were used in heat exchangers, capacitors and transformers as the heat transfer medium in polyester resin production from 1972 to 1991. Although the PCBs were removed from these devices in 1991, soil containing PCB level above 50 PPMwas not removed until early 1994. Both reports concluded that substantial health hazards existed at the Keen Corporation.

Plaintiff's attorney(Jean Howard): Were there any differences between the PCBs used in the machinery and PCBs found as contamination in the soil?

Dr. Fallon: Well, by the time Mark Stevens had begun working at the Keen plant in 1988, pressure from the government and the public had already forced them to switch from heavily chlorinated PCBs to the lesser-chlorinated PCBs. However, nothing was done to clean up the contaminated soil, which still contained the old mixtures of heavily chlorinated PCBs.

Judge: I must apologize for interrupting you Dr. Fallon, but I must ask if this is testimony based on first hand reports?

Dr. Fallon: No, your honor, I was not on Keen Co. property at that time.

Judge: Then I must ask that you please refrain from making statements about the activities of the Keen Co. The jury will need to disregard that last statement from Dr. Fallon. Please, Dr. Fallon continue.

Plaintiff's attorney (Jean Howard): Dr., can you explain to me in the most basic terms you can, what the significance is of the different levels of chlorine in different PCBs?

Dr. Fallon: Sure. As the chlorination increases so does the apparent toxicity of the PCB congeners. For example, aerochlores that have increased chlorination, like aerochlores 1254 and 1260; that is to say 6020 chlorinated aerochlores have caused hepatocarcinoma in rats, neoplastic changes in the liver and other severe effects like necrosis and other degeneration. The effects of the lesser-chlorinated aerochlores like 1242 and 1248 appear to be less severe, although these less chlorinated PCBs have been less extensively studied than their more heavily chlorinated counterparts. Thus, we attribute the increased carcinogenic and toxic potential effects to the increased chlorination.

Plaintiff's attorney (Jean Howard): O.K. So, if I understand you correctly, the more heavily chlorinated PCBs, although they might have been easier for Keen to use, were still more toxic than the lesser-chlorinated PCBs.

Dr. Fallon: Yes. That's correct.

Plaintiff's attorney (Jean Howard): All right then, why did Keen switch to the lesser-chlorinated PCBs?

Judge: Excuse me Ms. Howard, but I must interject. I am sorry Dr. Fallon but your answer could be considered speculative. Ms. Howard, could you please rephrase the question? Again, I am sorry for interrupting.

Plaintiff's attorney (Jean Howard): Of course your honor. Dr. Fallon, why would a company switch to the lesser chlorinated PCBs?

Dr. Fallon: Well, the first indications that PCBs might pose an environmental and health hazard began emerging in the mid 1950's. By the 1970's evidence was strong enough that the federal government passed regulations prohibiting the use of the more heavily chlorinated PCBs. Of course, by then they became nearly ubiquitous pollutants.

Plaintiff's attorney (Jean Howard): All right, and why was it that the government forbade the use of PCBs?

Dr. Fallon: Well, most of the studies of the effects of PCBs on living organisms that the government used were conducted on animals. These studies showed that PCBs were causing cancer in animals, and when you see a substance causing cancer in animals you immediately begin to worry that the same substance may cause cancer in humans.

Plaintiff's attorney (Jean Howard): Can you explain to us the value of animal studies? Why did you use animals?

Dr. Fallon: Because for this type of research you can't use people due to the toxicity of the substance under consideration. Laboratory animals are inexpensive to grow and maintain, and they grow up quickly which makes them ideal subjects. We can keep the conditions controlled very closely when you use animals: altering only a single variable between the experimental group and the control group. In addition, with animal research you can control the dosage very carefully- so you can make sure an exact dose has an exact effect.

Plaintiff's attorney (Jean Howard): Can you please describe for us some of the animal studies you did?

Dr. Fallon: Of course. In general we would dose the animals with a certain amount of PCBs for 2 weeks, wait an appropriate latency period and then observe the effects. At the same time we would have a control group of animals that was treated in exactly the same way except that they would receive no such exposure to PCBs. We would then compare any differences between the two groups and feel confident that any differences were the result of the PCB exposure. For example, a specific test we did was as follows: 100 rats were allowed to ingest 100 mgs. per kg. per diem of the aerochlore 1254 congener of PCBs. The

control rats were fed saline. After two weeks of exposure we observed the rats for a follow up period of one year; noting especially hepatic neoplasia in the experimental group.

Plaintiff's attorney (Jean Howard): And what else did you observe?

Dr. Fallon: After one year, 58% of the experimental animals had liver tumors and another 10% of the experimental animals had tumors of another type. Compare this to a control percentage of only 4% of the animals receiving tumors of any type during that year.

Plaintiff's attorney (Jean Howard): Dr. Fallon, so far all of the research we have discussed about the effects of PCBs has been on animals. What can you tell us about the effects of PCBs on humans?

Dr. Fallon: Well, I don't think that there is any scientist out there who could seriously pose a challenge to the idea that animal studies could tell a lot about the effects of chemicals on humans. The FDA, for example, relies exclusively on animal studies for the purpose of determining which foods and drugs are appropriate for dispensation to humans. In fact, just about every substance that has been shown to be carcinogenic in human beings was first shown to be carcinogenic in animals. Of course, animals aren't humans, but since we don't want to use humans to test potentially toxic substances; animals are an appropriate substitute.

Plaintiff's attorney (Jean Howard): So we can use animal studies to help us understand and to predict the effects of PCBs in humans, as for instance in Mr. Stevens?

Dr. Fallon: Absolutely.

Plaintiff's attorney(Jean Howard): Dr. Fallon, do you recall my discussing with you and my giving you information about Mr. Stevens family medical history?

Dr. Fallon: Yes, I do.

Plaintiff's attorney (Jean Howard): And specifically do you recall asking me to find out all information concerning any incidences of cancer in Mr. Stevens's family? Is that correct?

Dr. Fallon: That's correct.

Plaintiff's attorney (Jean Howard): Why would this be an important factor for you to know?

Dr. Fallon: Mark Stevens was diagnosed with colon cancer at age 28. You usually don't see colon cancer till at least age 45. You only see colon cancer in people much younger than that, in 20 year olds, when they belong to a cancer family.

Plaintiff's attorney (Jean Howard): Can you tell the court exactly what a cancer family is?

Dr. Fallon: Yes. Members of a cancer family have a genetic predisposition to certain forms of cancer. For example, families with Lymphedema syndrome inherit a gene, which makes it more likely they'll get many kinds of tumors. What turns out to happen is that their inherited mutant P53 gene is functionally haploid insufficient. This means that the lymphedema syndrome families get tumors of all forms at a much greater rate than that of the general populace. In fact, in cancer families such as these 75 to 80 percent of inflicted individuals eventually get cancer.

Plaintiff's attorney (Jean Howard): Are their cancer families explicitly for colon cancer?

Dr. Fallon: Yes, there are. In familial adenomatous polyposis or FAP, for short, virtually every member of the family gets colon cancer. Another notable trait of FAP is that it causes colon cancer to strike young

people. People as young as in their twenties. As a matter of fact, one theory posits that all men who have colon cancer at a young age, say in their 30's or early 40's, are related in some way to these cancer families.

Plaintiff's attorney (Jean Howard): All right, now, when are most colon cancer victims diagnosed?

Dr. Fallon: Colon cancer is usually diagnosed around 65 years of age. As you look at younger and younger populations, colon cancer becomes progressively, relatively more rare; until by the time you look at people in their 20's you never see colon cancer. Except of course in cancer families.

Plaintiff's attorney (Jean Howard): So it was important for you to know whether Mark Stevens' family was a cancer family. Is that right?

Dr. Fallon: Oh that's correct.

Plaintiff's attorney (Jean Howard): Dr. Fallon, based upon the medical evidence and research and conversations with the family were you able to reach any conclusions about the Stevens being a cancer family?

The defense attorney leans toward the plaintiff's attorney. They quietly discuss things to one another for 30-45seconds. Then they face the judge and the plaintiff's attorney nods to the judge.

Plaintiff's attorney(Jean Howard): Dr. Fallon, please continue.

Dr. Fallon: The Stevens definitely are not a cancer family. No one in Mr. Stevens' family has ever contracted any form of cancer.

Plaintiff's attorney(Jean Howard): Dr. Fallon do you recall inquiring whether Mr. Stevens had a personal history of intestinal polyps or chronic inflammatory bowel disease?

Dr. Fallon: Yes.

Plaintiff's attorney (Jean Howard): And why might that be important?

Dr. Fallon: Well, both can increase the risk of colon cancer. In terms of the intestinal polyps they increase the risk of colon cancer when they are adenomatous polyps and those polyps are large and there are several of them. Other types of polyps, hyperplastic and inflammatory do not increase the risk of colon cancer. As for the chronic bowel disease, well this is a condition in which the colon is inflamed over a long period of time and may have ulcers in its lining. This increases the risk of colon cancer.

Plaintiff's attorney (Jean Howard): Based on Mr. Stevens' medical history, would you say that Mr. Stevens had a personal history of intestinal polyps or chronic inflammatory bowel disease?

Dr. Fallon: Mr. Stevens does not have and never has had any polyps whatsoever in his colorectal area. As for the chronic inflammatory bowel disease, Mr. Stevens has never had this disease nor is there evidence of ulcers in his colon.

Plaintiff's attorney (Jean Howard): Dr. Fallon, do you recall inquiring whether Mr. Stevens is a smoker or non-smoker?

Dr. Fallon: Yes, he is a non-smoker.

Plaintiff's attorney (Jean Howard): And why might that be important?

Dr. Fallon: There are several lines of evidence indicating that smokers face an increased incidence of certain types of cancer -that includes colon cancer.

Plaintiff's attorney (Jean Howard): That fact that Mr. Stevens is a non-smoker helpful to you in formulating your opinion?

Dr. Fallon: It was a minor factor, but it was still a factor.

Plaintiff's attorney (Jean Howard): Do you recall asking for information about Mark Stevens eating habits and lifestyle?

Dr. Fallon: Yes, I do. Mr. Stevens lived quite a healthy lifestyle outside of his work. He engaged in both aerobic and anaerobic exercise at least four times a week. He also ate foods that were high in fiber and low in fat and cholesterol. He never ate fast foods, which are high in fat and cholesterol and low in fiber. Recent research has uncovered that diets which consist mainly of fast foods and foods that are low in fiber and high in fat and cholesterol have been associated with colon cancer. I would consider Mr. Stevens a bit of a health fanatic.

Plaintiff's attorney (Jean Howard): So, was the fact that Mr. Stevens had a healthy lifestyle also important in formulating your opinion?

Dr. Fallon: Yes, very much so, because it eliminated yet another factor as to the source of Mr. Stevens colon cancer.

Plaintiff's attorney (Jean Howard): Dr. Fallon, did you ask for a report on the recent medical histories of the individuals who worked with Mark Stevens at Keen Company?

Dr. Fallon: Yes I did.

Plaintiff's attorney (Jean Howard): Why did you ask for this?

Dr. Fallon: I requested information on those individuals who could reasonably be expected to have been exposed to high levels of PCBs as was Mr. Stevens. According to the report, Mr. Stevens was employed at the Keen Corporation Plant from 1988 to 1998, at which time he was diagnosed with this colon cancer. Keen had stopped using PCBs in its capacitors in 1992 and did some significant cleanup on the site later in 1995. Therefore, I was primarily interested in those individuals who worked with Mr. Stevens prior to 1995. I was able to locate 46 other such individuals.

Plaintiff's attorney (Jean Howard): All right. Dr. Fallon, have you read the report written by the Keen Company physician?

Dr. Fallon: Yes I have.

Plaintiff's attorney (Jean Howard): And what does it say? Could you summarize the contents for the court please?

Dr. Fallon: The report said that 47 people, including Mark Stevens, had been exposed to high levels of PCBs at the Keen Company Plant. In this small group of 47 people, 20 people over a five-year period contracted cancer.

Plaintiff's attorney (Jean Howard): And what is so unusual about this?

Dr. Fallon: In a normal group of American males you would expect only one, or at most two cancers over a five-year period. To get 20 is really statistically rare and unusual. It really shocked me to see that number. Nearly half the men we found had contracted cancer of some form! In fact, a statistical chi square test of the difference of finding two cancers in this group to finding 20 cancers is enormous. The probability is only 1 in 1800 that this is due to chance alone.

Plaintiff's attorney (Jean Howard): So, Dr., if it's not chance alone, what do you think the cause of their cancer is?

Dr. Fallon: Well, when we see numbers like this, we immediately start looking for where the common cause may lie. In a case such as this, the most immediate and possible explanation is that they were all exposed to a carcinogen. In this case all the men were exposed to PCBs.

Plaintiff's attorney (Jean Howard): And if PCBs are the real cause why didn't all 47 of these men get cancer? Wouldn't you expect that?

Dr. Fallon: Oh no, not at all. As I said, to find 20 cancers in this group, at this time was really remarkable: a 1 in 1800 chance. There are also other reasons why you would see 20 cancers and not more. First, there is latency. It takes time for these tumors to develop to the point where they can be physically diagnosed. Second, there is a difference between being exposed to and getting a disease. For example, even if you were exposed to a proven causative agent like chicken pox that doesn't mean you automatically come down with the disease. And it's the same with carcinogens. Cigarette smoke is a known carcinogen. It's known that not everybody who smokes cigarettes gets lung cancer.

Plaintiff's attorney (Jean Howard): And Dr., what was the dosage level on Mark Stevens?

Dr. Fallon: Well, the average background level in American males of PCBs is 4.2 to 6.4 parts per billion in the blood. When we measured Mark Stevens blood levels of PCBs he came out to 300 parts per billion. That's over 60 times the normal level.

Plaintiff's attorney (Jean Howard): Of these 20 men at the Keen plant who did get cancer, what kinds of cancer did they get?

Dr. Fallon: There were: six cases of colon cancer, three young and three old; four cases of lung cancer, non-Hodgkin's lymphoma; three each of liposarcoma, epithelioma, hepatocarcinoma.

Plaintiff's attorney (Jean Howard): And is there any reason to suspect that more cancers might come out of the Keen plant even if it were closed down for business today?

Dr. Fallon: Yes, because of the latency of most tumors.

Judge: Dr. Fallon, could you explain latency to the jury?

Dr. Fallon: Latency is the period of time between the exposure to the disease and the onset of the disease. For instance, in colon cancer the period of latency is usually quite long, up to 10 years. Ten years between the first pre-malignant defense and the expression of frank diagnosable disease.

Plaintiff's attorney (Jean Howard): All right, so, what you're saying is that given more time the incidence of PCB induced cancer in Mark Stevens' co-workers could actually increase?

Dr. Fallon: That is a strong possibility, yes.

Plaintiff's attorney (Jean Howard): And if this were to come to pass, this would make Mark's case even stronger wouldn't it?

Dr. Fallon: Well yes, of course it would. But we would have to wait at least 10 years after the cessation of exposure in order to insure that we would be able to observe all the PCB induced tumors.

Plaintiff's attorney (Jean Howard): I see. Dr. Fallon, everything you told us here today suggests very strongly that colon cancer can result from exposure to PCBs.

Dr. Fallon: Yes, I would agree with that.

Plaintiff's attorney (Jean Howard): So, there's no reason to believe that Mark would have contracted cancer had he not been exposed to PCBs. Is that correct?

Dr. Fallon: That is correct, especially since I could eliminate such factors as: Mr. Stevens being from a cancer family; having had adenomatous polyps or chronic inflammatory bowel disease; having any sort of smoking habit; and also, the fact that Mr. Stevens was a bit of a health fanatic and ate foods high in fiber and low in fat and cholesterol.

Plaintiff's attorney (Jean Howard): Dr. Fallon can you give us your expert opinion as to the cause of Mark's colon cancer?

Dr. Fallon: In my expert opinion there can be no other cause for Mr. Stevens's early onset of colon cancer except for his exposure to high levels of PCBs at the Keen Company plant.

Plaintiff's attorney (Jean Howard): Thank you, Dr. Fallon.

Judge: Yes, thank you Dr. Fallon. You may step down. Ms. Howard, are you ready to proceed with your closing statement at this time?

Plaintiff's attorney (Jean Howard): Yes, your honor we are ready to proceed with the plaintiff's closing arguments.

Judge: Ladies and gentlemen of the jury, before Ms. Howard proceeds with her closing statement, I have one caution for you: what the attorneys say to you is not evidence. The evidence came from the witness stand in the form of testimony.

Plaintiff's attorney (Jean Howard): Thank you, your honor. Now is my opportunity to come before you and examine in a comprehensive way the evidence that's been presented in this case. And the theme that I want to set for you is responsibility. Responsibility. Lets talk about my client and realize you can't examine what's happened to Mark Stevens without looking at the evidence hard from beginning to end.

As you heard in this case PCBs are dangerous chemicals and when they get into your body they can cause serious diseases. And there's no dispute about this in this particular case and there's no doubt that for many years Mr. Stevens was exposed to PCBs. We know that Mr. Stevens was exposed and he had PCBs in his liver. You know that he got sick, very sick and one of the best scientists in the world showed you that his sickness was quite probably caused by PCBs in his body. There was no other reason for him to get colon cancer. People argue that people like Mark Stevens don't get this disease. But Mr. Stevens was full of PCBs and he got it.

Now, not all chemicals are the same, not all of them cause disease or symptoms. But some do and there's really only one way to determine that. You've got to look at this the way Dr. Fallon did. You've got to do an experiment on them and study them. Dr. Fallon was able to experimentally control his variables, thus enabling him to eliminate alternative explanations and confounding variables. This is very important in understanding the effects of different chemicals on humans.

When you resolve some of these issues you will come to conclusions. What can you now do? Well, the only thing we can do in a civil justice system is award damages. You can't take away Mark Stevens cancer, you can't take away his years of pain and suffering. That's not in your power. All you can do is make it right by awarding Mr. Stevens with a settlement, by returning your verdict sheet with an amount. That power is yours and that choice is your, ladies and gentlemen, to decide if Mr. Stevens deserves a settlement.

Now, how do you make that decision? Well, you have to use your own judgment as to what adequately will compensate him. You're going to have a few tools but not many. You can measure his pain and suffering. But I won't dwell on that because this trial is not about sympathy, it's about causation and it's about responsibility.

This trial has not been easy. We all understand and appreciate it. But the fact of the matter is that in the wisdom of all this concern, the decision is left up to you. It's not left up to Judge Montgomery, it's not left up to the lawyers, it's left up to you and that's because the intrinsic value of this system is that when someone has a dispute or has been harmed in your community they can come to the courthouse and get relief. That's what Mr. Stevens has done. His judgment is in your hands and we have no doubt that when it is over, justice will be done. Thank you.

Judge: Thank you, Ms. Howard. We will now proceed with the defendant's case. Ms. Moore, are you ready to proceed?

Defense attorney (Diane Moore): Ladies and gentlemen, my name is Diane Moore and I represent the Keen Company. This case like any other case started with a complaint and like any other case the complaint has an allegation. The allegation in this case is that the plaintiff has PCB caused injuries and that my client the Keen Company provided the exposure that resulted in those injuries. These are the allegations against my client, the Keen Company.

Now, we're all here today because this trial is a search for the facts. Fortunately, in this country it is not enough to simply make allegations. We have to carefully examine the facts and weigh the evidence before we decide the truth of any allegation. Now I know that a lot of you have heard stuff about PCBs. I'm going to ask you to try, if it is in any way possible, to set that aside and listen to what happens in court. Listen to the testimony and see if the plaintiff has proven to you that his injuries were proven by PCBs. I'm going to ask you to listen closely.

Now, the judge asked you during voir dire if you could treat a corporation the same as you could treat any individual in this case. All of you said that you could and I hope you can, but I also think that will be difficult to do. I think that's going to be difficult because pure and simple; a corporation is not flesh and blood. It is not flesh and blood unless, of course, you think of the people who make up the corporation. It is many people who make up a corporation, the various jobs that they do. And that's what the Keen Company is; a corporation made up of people. The people who make up the Keen Company are just one of the issues that I'll ask you to keep in mind throughout this case.

And in this case there is one issue that stands out as being most important. This is the issue of whether or not Mr. Stevens's colon cancer was caused by PCBs. Every witness who speaks from this witness stand and every piece of evidence that comes into this trial will have some bearing on this issue. The attorney for the plaintiff is going to tell you that his client's cancer was caused by the PCBs he was exposed to while working at Keen Corporation. He and his expert are going to tell you that if Mark Stevens hadn't been exposed to PCBs he would not have gotten cancer. I don't think the testimony you will hear will support that. Instead, the evidence will show that he doesn't have any PCB caused cancer in his body.

But this is neither for me to decide nor for the experts to decide. This most important issue is for you to decide. You're the jury and it is your job to decide the case. My job, on the other hand, is to present the evidence to you; bring in an expert witness who can explain the evidence to you better than I ever could.

Now, don't get me wrong, I'm not here to defend PCBs. It's very clear that PCBs cause some serious health problems. They do, and we're not trying to try and hide from the truth. But neither are we going to sit still for exaggerations and distortions of the scientific evidence about PCBs. PCBs do cause some serious health problems. They cause some kinds of liver disease and also skin ailments, but they do not cause colon cancer.

Today, I'm going to invite Dr. William Campbell, and eminent epidemiologist to speak with you about the plaintiff's cancer and explain to you why it was not caused by PCBs. Dr. Campbell will tell you how he looked at all of the relevant epidemiological studies. Studies that have taken place in Japan, in China and in America. All of these studies, people were exposed to PCBs. In each of these countries people got liver damage and they also got skin cancer but they did not, in any of these studies, get colon cancer. Indeed, it will be undisputed in this case that the majority, the majority of the studies showed no statistically significant increase in colon cancer and there will be no question about that issue. These studies do not show any connection between colon cancer and PCBs. But, what they did show was that colon cancer, an extremely rare form of cancer, occurs more frequently in some groups than in others. For instance, in New York and New Jersey we have some of the highest colon cancer rates in this country and this has absolutely nothing to do with PCBs. These studies also show there are different risk factors such as diets high in fat-low in fiber; and these are associated with high rates of colon cancer. And when you look at all the studies and you take into account the inherent variability in people and that people are not numbers, not statistics - you will conclude, ladies and gentlemen, on the evidence in this case, that PCBs simply do not cause colon cancer.

Now, as Ms. Howard said earlier, "A trial is nothing less than a search for the truth." - "A search for the facts, " I think she said, and I believe Ms. Howard would join me in saying that we want you to do justice in this case. And justice in this case, ladies and gentlemen, on all the evidence, all the scientific evidence of the relevant epidemiological studies. All the most credible interpretations of the evidence will show the defendants are entitled to your verdict at the end of this case. And I will have a chance to speak to you again at the end of this case and I just want to ask you for a few things before I go. I'm going to ask you to pay close attention to the case. I'm going to ask you for your common sense. I'm going to ask you for your oath, your sense of fairness even though we are a corporation. I'm going to ask you for a reasonable, intelligent verdict at the end of this case. Thank you.

Judge: Thank you. Are you ready with your witness?

Defense attorney (Diane Moore): Yes, your honor.

Judge: Dr. Campbell, please approach the bench. Dr. Campbell you've already been sworn in. I remind you, you're still under oath. You may be seated. Ms. Moore, you may proceed.

Defense attorney (Diane Moore): Thank you, your honor. Dr., will you please state your name and address for the record.

Dr. Campbell: My name is Dr. William Campbell and I live at 2230 Huntington Court, New Haven, Connecticut.

Defense attorney (Diane Moore): And Dr. Campbell, what is your current occupation?

Dr. Campbell: I'm a professor of epidemiology at Yale University.

Defense attorney (Diane Moore): And what exactly is epidemiology?

Dr. Campbell: Epidemiology is the study of the distribution and effects of disease on human populations. An epidemiologist is someone who like myself gathers information about a large population and then uses statistics to process this information and reach conclusions about effects of disease. We can gather this information from a variety of sources including medical records, clinical examinations, surveys and even death certificates.

Defense attorney (Diane Moore): Thank you. And where did you receive your training in this science?

Dr. Campbell: I received my bachelor's degree from Dartmouth University in 1977 with concentrations in mathematics and biology. And then I proceeded to earn a Ph.D. in epidemiology from Columbia University in New York.

Defense attorney (Diane Moore): What professional appointments have you held?

Dr. Campbell: In 1982 when I finished my Ph.D., I proceeded to work for the Center of Disease Control in Atlanta, Georgia; studying the effects of diet on heart attacks. After three years, in 1985 I was appointed associate professor at Yale University and in 1989 appointed full professor.

Defense attorney (Diane Moore): Well, what do you do at Yale, Dr. Campbell?

Dr. Campbell: I teach a seminar in epidemiology to graduate students in public health and also a class on environmental disease to medical students. Most importantly, I do research. I study gastrointestinal cancer; how the diet and environment affect gastrointestinal cancer. And this is epidemiology of gastrointestinal cancer.

Defense attorney (Diane More): And where does you work take you besides Yale, Doctor?

Dr. Campbell: I'm on the committee for population studies in the National Institute of Health in Washington, D.C. and I still maintain my contacts at the Center for Disease Control and fly to Atlanta at least once a month.

Defense attorney (Diane Moore): With what professional journals are you involved?

Dr. Campbell: I've published over 30 articles in such journals as Cancer Research, Environmental Health and Public Safety and the European Journal of Cancer Research. In addition, I sit on the board of review for several journals. I'm most proud, however, of my recent book The Environment and Cancer Danger ; What Governments Can Do About It.

Defense attorney (Diane Moore): Dr., have any of your articles or chapters covered epidemiological studies of PCBs?

Dr. Campbell: Yes, several of my articles have covered epidemiology of PCB exposure.

Defense attorney (Diane Moore): So would you consider PCB epidemiology to be one of the major thrusts of your research?

Dr. Campbell: Yes, I would.

Defense attorney (Diane Moore): Would you consider yourself to be an expert on that subject, the epidemiology of PCBs?

Dr. Campbell: Yes, I would consider myself to be an expert in that area.

Defense attorney (Diane Moore): At this time, your honor, the defense wishes to qualify Dr. William Campbell as an expert in the field of epidemiology.

Judge: I hear no objections. Ms. Moore, you may proceed.

Defense attorney (Diane Moore): Thank you, your honor. Dr., you've conducted and reviewed many studies on the effects of PCBs on populations. What have these studies indicated with respect to the association between PCBs and colon cancer?

Dr. Campbell: Well, there are no studies that specifically address the question of PCBs and colon cancer. In none of these studies was there a linkage shown between PCB exposure and colon cancer.

Defense attorney (Diane Moore): So people who were exposed to PCBs were no more likely to contract colon cancer than anybody else.

Dr. Campbell: That's right. Populations exposed to PCBs did not have a different rate of colon cancer than populations that are unexposed.

Defense attorney (Diane Moore): What does that mean for the plaintiff?

Dr. Campbell: That means it is unlikely the plaintiff's colon cancer was caused by PCB exposure.

Defense attorney (Diane Moore): So in your expert opinion PCBs did not cause Mark Stevens colon cancer.

The plaintiff's attorney leans toward the defense attorney and the defense attorney notices and leans down and they begin whispering to one another. Then the plaintiff's attorney crouches down and they continue whispering to one another. Allow thirty seconds to go by, then the defense attorney stands up.

Defense attorney (Diane Moore): Dr. Campbell, please answer the question.

Dr. Campbell: I see no evidence that the plaintiff's colon cancer was caused by PCB exposure.

Defense attorney (Diane Moore): Do you believe that epidemiology is an appropriate way to answer such a question?

Dr. Campbell: There is really no better way to answer that question. Epidemiology is the study of people in real life. It measures how various environmental effects influence a large population of people. It has direct implications for making causal interpretations and even for designing preventive strategies. There is one limitation, however, in that since you're working with real people it's not possible to randomize. But in a properly conducted study, with a large population, this is a minor limitation that can be worked around to lead to very conclusive results.

Defense attorney (Diane Moore): O.K. Dr. Campbell, are you aware of any medical text or literature that identify PCBs as being causally related to colon cancer?

Dr. Campbell: No, I'm not.

Defense attorney (Diane Moore): If there were an epidemiological association with colon cancer and PCBs, would you know about it?

Dr. Campbell: Yes I would. I'm actively involved in epidemiology of cancer and PCBs. I'm on the boards of a variety of journals. If there were such evidence, such information out there, I would certainly hear of it.

Defense attorney (Diane Moore): So PCBs have not been shown to cause colon cancer but they have not been ruled out.

Dr. Campbell: Well, I think it's actually stronger than that. There's just no evidence that PCBs are involved in the cancer problem. High doses of PCBs have serious toxic effects, but their risk of causing cancer is minimal.

Defense attorney (Diane Moore): I see. I'd like to talk about your research for a minute. Am I correct in my belief that an epidemiologist has both the research or data collecting function and then an analytical function?

Dr. Campbell: Yes. First we must identify a population, collect data on it and then we use statistics, work with the data to a coherent whole and interpret it.

Defense attorney (Diane Moore): So you yourself perform the experiment?

Dr. Campbell: Not in the same way that a laboratory scientist would perform an in vivo or in vitro experiment. No, we have less ability to control since we are working with real people, especially in the case of epidemiology with PCBs. We're talking about toxic substances. We can't control for exposure, we can only look for exposed populations and look for its effects on them.

Defense attorney (Diane Moore): So you must be extremely knowledgeable about the other research in the field?

Dr. Campbell: Well definitely, in order to reach legitimate conclusions you must be even more conversant in the literature than scientists in other fields.

Defense attorney (Diane Moore): The scientific literature that is associated with epidemiology of PCBs and humans sufficient for you to draw any scientific conclusions either from an individual piece of literature or looking at the body of literature as a whole?

Dr. Campbell: You're asking whether I can draw a conclusion from literature in aggregate?

Defense attorney (Diane Moore): Yes.

Dr. Campbell: Well, very few of these individual studies are persuasive on their own. They may have some flaws, they may not be a large enough sample, and they may not follow the population long enough. But, as an aggregate, you can take all of these studies and look at all of the conclusions and reach a fairly strong conclusion that PCBs are not linked to cancer problems.

Defense attorney (Diane Moore): So I take it you would agree that there is no substantial minority of epidemiologists who find that the literature supports a causal connection between exposure to PCBs and colon cancer?

Dr. Campbell: Well, obviously, I can't know that. I haven't asked every epidemiologist his or her opinion on this question. But, I'm not aware of any epidemiologist who thinks there is a strong causal between PCB exposure and cancer.

Defense attorney (Diane Moore): What about the animal studies that say that PCBs are carcinogens? Are they wrong or is it scientifically improper to extrapolate from animals to humans?

Dr. Campbell: It's scientifically improper to extrapolate from one kind of tumor type in animals to another kind of tumor type in humans.

Defense attorney (Diane Moore): Why is that, Doctor?

Dr. Campbell: Well, there are many reasons you can't say that one tumor type in an animal can be directly related to another tumor type in humans. Animals and humans interact with their environments differently. Different chemicals can have different effects on different animals for a variety of reasons.

Judge: Excuse me, Dr. Campbell, but I just wanted to make one thing clear. You are an epidemiologist and your research does not involve experiments with animals. Is that correct?

Dr. Campbell: Yes.

Judge: Thank you Dr. Campbell. I just wanted to get that clear for the jury and myself. Please continue.

Dr. Campbell: As I was saying, most experimental animals are quite small. Just looking at humans a thousand times larger than a rat or a mouse. You have to be very careful about dosages. Likewise, the human life expectancy is much longer than that of a rat or a mouse. A human can live for 80 years. Cancer can take ten years to develop. A rat lives two years. Cancers happen in a matter of months. It's hard to extrapolate between organisms in that way, especially with the different types of tumors, is the question.

Defense attorney (Diane Moore): I see. Is it possible to extrapolate at all from any animal tumors to human tumors?

Dr. Campbell: Well, as I said it is perfectly legitimate to extrapolate from hepatocarcinoma elicited by a chemical in a mouse to a hepatocarcinoma being perhaps elicited by the same chemical in humans. But, it would not be legitimate to extrapolate to a different type of tumor.

Defense attorney (Diane Moore): Can you tell us more about the specificity of carcinogens and tumors?

Dr. Campbell: Well, I would if I could. This is an on going area of research. Site specificity is a very important question in science today. Toxins and carcinogens affect very specific organs and it's not all that very well understood. As a non-obvious example, take Aflo-Toxin B, which is a biological toxin found on contaminated beans and rice in Africa. Now, Aflo-Toxin B causes liver cancer. This kind of toxin is found throughout the body of an affected person but only the liver develops tumors. It's not understood why. A more obvious example is cigarette smoking. Cigarette smoke is known to cause lung cancer and cancers of the esophagus and larynx, and that's about it. It does not cause colon cancer even though smokers are ingesting the same toxins that cause lung cancer into the gastrointestinal tracts. The colon is exposed to the same toxins,- nicotine, tar, etc.,- but no colon cancer arises. The same thing is true of PCBs. They have very specific targets in the skin and the liver, not affecting the colon.

Defense attorney (Diane Moore): O.K. Since cancer-causing substances are tissue specific, can you extrapolate from animal studies to humans?

Dr. Campbell: You can extrapolate if the dosages are comparable and organs are identical. If you saw a rodent that was exposed to PCBs and developed a hepatocarcinoma, a liver tumor, you could extrapolate that PCBs could be linked to hepatocarcinoma, or liver cancer in humans, but not to a different type of cancer.

Defense attorney (Diane Moore): I see. But if the tumor type is different then an extrapolation is not appropriate.

Dr. Campbell: Exactly.

Defense attorney (Diane Moore): O.K. So if for example we found that PCBs cause liver cancer in rats it would be improper based only that evidence to say that PCBs cause colon cancer in humans.

Judge: Ms. Moore, please rephrase that last question.

Defense attorney (Diane Moore): If, for example we found that PCBs cause liver cancer in rats would it be improper based only that evidence to say that PCBs cause colon cancer in humans?

Dr. Campbell: Of course.

Defense attorney (Diane Moore): How would epidemiological evidence be brought to bear on such an extrapolation?

Dr. Campbell: Well, if epidemiological evidence failed to show a correlation between exposure and a tumor type then the assumptions that the same chemicals causing cancer in humans just like the animals would be inappropriate. Only if the epidemiological evidence led to the same conclusions, this chemical leads to this type of cancer would extrapolations from animals to humans be considered appropriate.

Defense attorney (Diane Moore): Could you please tell us more about, the sort of conclusions that have arisen in those 50 years of experience? Maybe you can start by telling us something about your own research.

Dr. Campbell: I'd be happy to. My most recent study concerned 30 railroad workers that were exposed to PCBs on the job. Either through PCB as dielectric fluid in railroad transformers, PCBs that leaked out onto the tracks or were breathed in as dust through respirative function. Now these workers had been exposed for an average of 5 years, over a range of 1 to 15 years. We follow them for 4 years after they have been identified. At the beginning of the work their blood PCB *rs* levels range from 17 to 200 parts per billion. That has since dropped.

Defense attorney (Diane Moore): And so far what have you found?

Dr. Campbell: Well, we found some normal liver functions, elevated numbers for SGOT, SGBT and OCT and serum cholinesterase, but no cancer.

Defense attorney (Diane Moore): I see. Dr. Campbell, have you done other similar studies?

Dr. Campbell: Yes, until this most recent one, my 1985 study of electrical workers was the critical study.

Defense attorney (Diane Moore): And what did you find there?

Dr. Campbell: We found that PCBs induced hepatic drug metabolism, and high levels induced frank toxicity.

Defense attorney (Diane Moore): Anything else?

Dr. Campbell: Well, yes, dermal conditions such as digital and ocular keratinitis, edema of the skin and eyes and some core acne.

Defense attorney (Diane Moore): How interesting. What about other studies?

Dr. Campbell: Well, there have been about 17 epidemiological studies related to PCB exposure and cancer. One of the most important was a morbidity and mortality study in 1985 by Brown and Jones from the National Institute of Health. They had evaluated the incidence of cancer individuals who were exposed occupationally to PCBs.

Defense attorney (Diane Moore): Did they concentrate on groups believed to have increased risks of exposure to PCBs?

Dr. Campbell: The actual PCB exposure levels were known.

Defense attorney (Diane Moore): What is the most reliable way to measure PCB levels?

Dr. Campbell: The most reliable way to measure PCB levels in the blood is through mastocapony. Certainly, with maspec, as we call it, you take a sample you want to study- like a drop of someone's blood, in this case and you burn it. The burning separates and ionizes it in the samples into its individual

components. And the machine exposes the separated components into an electrical field. They separate from each other in direct relation to their mass, their size in this electrical field. The mass to charge ratio of each compound is unique, like a fingerprint, and this allows you to identify every compound found in the sample in question.

Defense attorney (Diane Moore): O.K. Dr. Campbell, in the Brown and Jones study they were able to measure very accurately the blood levels of PCBs.

Judge: Ms. Moore, please ask your witness a question.

Defense attorney (Diane Moore): Could you tell us what the study showed?

Dr. Campbell: Well, one health defect that they found was liver damage. Forty percent of heavily exposed workers had a normal liver function test. There were anomalous readings and GGT and OCT and again cholinesterase and in addition, instances of hepatomegaly and hypetosplenomegaly and venal hypertrophy.

Defense attorney (Diane Moore): But no cancer?

Dr. Campbell: But no cancer.

Defense attorney (Diane Moore): Is there a substantial body of scientific opinion that claims that human exposure to PCBs will give rise to any form of human cancer?

Dr. Campbell: Not substantial, epidemiological literature on PCBs and cancer risk is scant.

Defense attorney (Diane Moore): Is it fair to say that there is a small minority position of qualified investigators who will adopt that position?

Dr. Campbell: Well, there are a very limited number of published studies, which do suggest some relationship between PCB and cancer. But again, these studies each have their own individual flaw, maybe not large enough, not long enough follow-up time or flaws like that. There are some studies that suggest PCBs are related to cancer in animals but not in humans.

Defense attorney (Diane Moore): Doctor, do you have other studies, which support your claim?

Dr. Campbell: Yes, one of the most conclusive and powerful studies was just published in 1993 by Harvinsons group from the University of Florida. They summarized the major chemical findings about exposure to PCBs. Those people that had the greatest exposure were involved in the manufacture and maintenance of electrical transformers and capacitors. The potential target areas they looked at include the skin, lungs, liver, circulatory system, endocrine system, some aspects of the immune system as well as the colon and gastrointestinal and urinary tracts, in general. After careful analysis the weight of the evidence suggests that the effects of PCBs are limited to the skin and the liver.

Defense attorney (Diane Moore): There was no evidence linking PCBs to cancer of any type at all?

Dr. Campbell: Well, this is only one study, but no it did not show linkage between PCB exposure and cancer. I would consider this to be a very well done study.

Defense attorney (Diane Moore): O.K. So, that's only one study. But let me get this clear, what you've told us here today was that if you look at all the studies that have been done and you put all the studies and all the data together; all you can really say is, the evidence to date suggests although PCBs may have some adverse effects, colon cancer is not among them.

Dr. Campbell: That is what the epidemiological data would suggest, yes.

Defense attorney (Diane Moore): Meaning that, there is no evidence linking colon cancer to PCB exposure.

The plaintiff's attorney leans toward the defense attorney and the defense attorney notices and leans down and they begin whispering to one another. Then the plaintiff's attorney crouches down and they continue whispering to one another. Allow thirty seconds to go by, then the defense attorney stands up.

Defense attorney (Diane Moore): Please, continue Dr. Cambell.

Dr. Campbell: There is no epidemiological evidence that links PCB exposure to cancer, yes.

Defense attorney (Diane Moore): Then in you expert opinion, would you day that PCBs were not the cause of the plaintiff's illness?

Dr. Campbell: I would say that it is highly improbable the plaintiff's colon cancer was the result of exposure to PCBs.

Defense attorney (Diane Moore): Thank you very much Dr. Campbell.

Judge: Good afternoon members of the jury. As I cautioned before, what the attorneys say to you is not evidence. The evidence came from the witness stand in the form of testimony. All right, Ms. Moore, are you ready to proceed?

Defense attorney (Diane Moore): Yes, thank you your honor. Counsel, Ms. Plaintiff and members of the jury, this is my last chance to talk to you before you go and deliberate. You've been asked to sit as a juror in a case and decide a dispute between parties in an impartial manner. An impartial manner means that you decide this matter fairly to all parties concerned.

Ladies and gentlemen, when you look at the deficiencies in Dr. Fallon's opinion, his failure to interpret the evidence correctly, his failure to consider all the relevant information when formulating his opinion, you will realize he did not have all the evidence to make a considered medical opinion. For that reason you should disregard his opinion. It is your right to disregard his opinion.

I told you in my opening statement that just because a scientist hired by a lawyer comes to a conclusion that doesn't mean we are going to sit still and accept that conclusion. Not all the truth comes from opinions. Some of the studies he used are a little old. Some have even been disproved. We don't have to accept them.

Now on the other hand our scientist, Dr. Campbell, has carefully considered all the important facts. He is familiar with all the medical literature and all the latest scientific literature and he has based his opinion on this information. He says that his opinion reflects the opinion of the majority of the scientific community. He has seen the deficiencies in the other point of view and he has chosen a view that he believes to be right and to be supported by the majority of scientists who study colon cancer.

Ladies and gentlemen, if you think that Keen has caused Mr. Stevens' pain and suffering you should give him money. There is nothing wrong with compensating people with money. That's the only way our system has for addressing a wrong. But remember you're not here to throw money into the wind. That's not going to help the situation. All the plaintiff is entitled to is plain and fair compensation and if his injury was not caused by Keen, then making Keen pay for this unfortunate accident would be grossly unfair, wouldn't it?

I've made my position clear, I hope. I don't go into the jury room with you. I have no place there. I know some other things, which have no place there. One is sympathy. We've heard some sympathetic

testimony in this case, things that have nothing to do with this case, anymore. I ask you to try to put that aside. I hope you can. I ask you for your common sense especially in regards to the testimony of Dr. Fallon. He might be a scientist, he might have all those degrees, but you have your common sense. I ask you for a fair and reasonable and intelligent verdict. I'm confident we will get one. Thank you.

Judge: Thank you Ms. Moore.

Judge: Members of the jury, we have reached the final phase of this case. I will first summarize the facts of the case and instruct you, as is my duty, to the principles of law that apply to this case.

The plaintiff, Mark A. Stevens, alleges that his metastatic colon cancer is the result of negligence on the part of the Keen Co., and as such has filed this suit against the Keen Co. because of this alleged negligence. The plaintiff claims that he was exposed during his employment at the Keen Co. from 1988 to 1998, to PCBs, or Polychlorinated Biphenyls. The Keen Co. does not contest that Mr. Stevens was exposed to higher than normal levels of PCBs. The Keen Co. is contesting whether Mr. Steven's exposure to PCBs was the proximal cause of his cancer.

The plaintiff had called Dr. Thomas Fallon, an expert in biochemistry and biochemistry research, to testify as to the effects of PCBs on animals. His research focus is on how chemicals cause cancer in animals. It is Dr. Fallon's opinion that PCBs are carcinogens, i.e. they cause cancer. Dr. Fallon noted in his testimony that the Keen Co. used PCBs in their heat exchangers, capacitors and transformers as the heat transfer medium in polyester resin production from 1972 to 1991. PCBs were removed from these devices in 1992, but soil containing high levels of PCBs was not removed until early 1995. Dr. Fallon also pointed out that by the time Mark Stevens started at the Keen Co. in 1988, they had already switched to lesser chlorinated PCBs, however nothing was done to clean up the soil which contained a mixture of both the heavily and lesser chlorinated PCBs. The more heavily chlorinated PCBs are more toxic than the lesser chlorinated PCBs.

Dr. Fallon's research and research by his colleagues in biochemistry has demonstrated that PCBs can cause cancer in animals. He believes that these animal studies can help us to understand and to predict the effects of PCBs in humans.

Dr. Fallon went on to note that Mark Stevens did not come from a cancer family, which means there are no incidences of cancer in his family, Mark Stevens did not have adenomatous polyps or chronic inflammatory bowel disease, Mark Stevens did not smoke, and he also maintained a diet which was high in fiber and low in fat. As Dr. Fallon noted, all of these things have been associated with an increase risk in colon cancer. He said that diagnosing colon cancer at age 28 is rare because symptoms are not usually diagnosed until around age 65. Dr. Fallon also found that another 20 out of 47 other people, who were exposed to the same levels of PCBs as Mr. Stevens, had contracted cancer as well.

The defense called Dr. William Campbell, an epidemiologist, which, to refresh your memory, is the study of the distribution and effects of disease on human populations. Dr. Campbell noted that several of his articles covered the epidemiology of PCB exposure. Dr. Campbell notes that his research, along with that of his colleagues, found that populations exposed to PCBs did not have a different rate of colon cancer than populations that are unexposed. Dr. Campbell's research and research by his colleagues in epidemiology has intimated that PCBs may have serious toxic effects, but their risk in causing cancer has not been found. It is his opinion that PCBs were not the proximal cause of the plaintiff's colon cancer.

Dr. Campbell feels it is scientifically improper to extrapolate from one type of tumor in animals to another type of tumor in humans. Since life expectancy and body size of animals is different than that of humans it is very difficult just on this basis to compare the two. Dr. Campbell believes that toxins and carcinogens affect very specific organs and that PCBs have not been shown to affect the colon. Dr. Campbell described his research and that of other colleagues in epidemiology and noted that the research has demonstrated that PCBs have been found to affect the skin and the liver. Based on both of these findings in epidemiology, Dr. Campbell concludes that it is improper to say that a substance that causes cancer in a specific organ site in animals would cause cancer in a different organ site in humans.

Your first duty is to determine whether or not the defendant is legally liable and whether the defendant proximally caused the injuries complained of. If you find the defendant is legally liable and that this liability was the proximate cause of these injuries, then it becomes you duty to determine the total amount

of damages the plaintiff is entitled to. To compensate him reasonably for his injuries in this case, you the jury, have to weigh and sift contradictory testimony.

You have to determine the credibility of the witnesses who took the stand. You have to determine the extent to which each witness is to be believed or disbelieved. You're required to give the witnesses such weight; such worth such credibility as you believe they are entitled to. Now if you believe any testimony to be inherently improbable or impossible you may reject such testimony. You may believe only that part of the witness testimony that you think is accurate and true and disregard that part you think is false or inaccurate.

Now you must divide you decision into two parts. First, was the defendant legally liable, that is to say legally responsible. Second if the defendant is responsible, what damages is the plaintiff entitled to. That is to say, how much money should be awarded. Note that many useful products are dangerous but since they come with warnings the companies that manufacture them are not negligent.

There is conflicting testimony here as to whether or not PCBs cause injury. To be fair, take a preponderance of the credible evidence that PCBs are or are not a proximate cause of Mr. Stevens. In order to be a proximate cause, PCBs need not be the only cause but just one of the causes. You may find that PCBs are not a substantial contributing factor.

Next, you should consider damages. Well, how will you determine the damages, if any? A plaintiff who sustains an injury or illness or a disease as the result of the legal responsibility of another is entitled to recover reasonable monetary damages for the full extent of the harm caused. The law recognizes as proper items of recovery: pain, suffering, discomfort, distress and disability, which apparently may endure as a natural consequence of such injury. The measure of damages is what a reasonable person would consider to be fair and just under all the circumstances of the case, to compensate the plaintiff, no more and no less. Now, with all that said, I want to thank you ladies and gentlemen, for your presence in this courtroom here today. You will now retire to deliberate the facts and return a decision. Bailiff, please escort the jury into the deliberation room. Court is adjourned.

APPENDIX B

American Courtroom Procedures
Plaintiff's Evidence Weak

Mark A. Stevens v. Keen Co., 1999

Judge: Good morning ladies and gentlemen. Thank you for coming. Today you will be participating in a summary jury trial in a case of Stevens vs. Keen Co. Now, although a summary jury trial is considerably shorter than a jury trial this does not make the case any less important or deserving of any less consideration. I will ask you to give the evidence your complete attention and come to a reasonable decision, as is your duty.

Now, before we begin today, let me give you very brief background information. This information has been stipulated to by both plaintiff and defense counsel. Mark A. Stevens, who claimed that Keen Co. negligence resulted in his illness, filed this suit in 1991 against Keen Co. Mark Stevens was diagnosed as suffering from metastatic colon cancer at the age of 28, slightly less than 10 years after beginning his employment at Keen Co. Although his cancer is remission, he claims the danger of recurrence, in addition to a permanent decrease in his quality of his life, are present.

The cancer is alleged to have been caused by work place exposure to polychlorinated biphenyls (PCBs) in heat transfer fluids and through soil contamination at the Keen Company Plant. It is uncontested that the plaintiff was indeed exposed to PCBs at Keen and that his exposure was significantly higher than normal. What is contested is whether exposure to PCBs was the cause of Mr. Stevens's cancer. Thomas Fallon, Ph.D., a biochemist, will be offered as plaintiff's expert on causation. William R. Campbell, Ph.D., an epidemiologist, will testify for the defense. Ready to proceed counsel?

Plaintiff's atty. (Jean Howard): Thank you, your honor. Counsel, ladies and gentlemen, good morning. My name is Jean Howard. I am the attorney representing Mark Stevens. I'm here today to present scientific evidence about how chemicals called PCBs, which are used at Keen Company, caused Mark Stevens to contract colon cancer, which had metastasized; colon cancer that nearly ended his life. The scientist who is going to present this evidence, Dr. Thomas Fallon, will explain to you that PCBs are chemicals that are used in several industrial processes, and he'll tell you about the qualities that make them useful in industry.

But what Dr. Fallon will also explain to you is that although PCBs have these qualities that make them useful in industry, they also have qualities that can make them terribly dangerous to human health. When human beings are exposed to PCBs it can place them at risk for a wide variety of diseases including cancer of the colon; the kind of cancer Mark Stevens has.

The reason we are here today, as the evidence will show, is that the Keen Company violated its duty to protect Mark Stevens against these hazardous chemicals. It did not warn him of the dangers. It did not take the proper precautions to protect him from the dangers. We can show this to you quite clearly because we know that Mark's exposure was much, much higher than that of the average American. Too high. And even the defendant will agree to this. This is not in dispute.

Now, Mark's body was full of PCBs and as the scientific proofs will show, PCBs cause different forms of cancer. One of the cancers they have been associated with is cancer of the colon, and Mark has that disease. It is a disease he was diagnosed with; had surgery for; and has suffered from for years. He is now in remission and it looks good, but it took a long time and a lot of suffering, and Mark will never really be the same.

Unfortunately, Mark won't be here to testify today to tell you the story himself because he is still in the hospital undergoing treatment for an infection caused by the colostomy he had to get at age 29, when his doctors removed his colon in order to save his life. A 29 year old with a colostomy. You don't see that very often, do you? That's because 29 year olds don't get colon cancer. That is, they don't get it unless

they've been exposed to something. Like a substance that causes it. And this is only one of the many reasons why we believe that PCBs caused Mark Stevens' colon cancer.

We're here today because we're going to argue and we're going to prove that this should never have happened. We're going to prove to you that if the defendant had protected Mark Stevens against the PCB exposure, as they should have done, Mark never would have contracted this terrible disease.

What are the tools of our trade? The tools of our trade are evidence and testimony. Dr. Thomas Fallon, who will describe for you the basic scientific information, will offer these. He will also explain to you how he came to the conclusion that PCBs caused Mark Stevens' cancer and the research he has used to support this conclusion. After you have heard all the evidence, I think you will have to agree that Mark Stevens' cancer was caused by Keen Company negligence in exposing him to PCBs. PCBs they knew were there. PCBs they knew were dangerous.

Now, when all is said and done, what is the point of it? The academics and the issues are interesting, if tough to understand. I think you'll find them interesting and also very difficult, but in the legal system, we're not here merely for academic argument. My client has brought this case to be compensated and is here seeking, as our law permits, reasonable compensation, adequate compensation from those who are responsible for the decision that caused all of his pain and all his suffering. It is our contention and we're going to argue and to present evidence to support the claim that he is entitled to compensatory, monitory damages for the pain and suffering caused by his disease.

When we present our evidence I promise you, you will see he is entitled to this compensation. You will hear the term burden of proof - and the plaintiff does have the burden of proof. We must persuade you that what I have said here today is true and I am going to make that commitment to you. It is an important case. It is important to Mr. Stevens. It is important to the defendants and that's why you're here. Because in disputes of this magnitude, that concerns our citizens this much, it is only you who can make a decision. This is Mark's case. I will do the best I can to prove it. And then I think you'll agree. We are not Hollywood showmen. It doesn't always go smoothly as we'd like it to, but we'll do our best and we're happy to have this opportunity to present this case to the jury system. Thank you.

Judge: Thank you, Ms. Howard. Ms. Moore you may proceed.

Defense atty. (Diane Moore): Ladies and gentlemen, my name is Diane Moore and I represent the Keen Company. This case like any other case started with a complaint and like any other case the complaint is an allegation. The allegation in this case is that the plaintiff has PCB caused injuries and that my client the Keen Company provided the exposure that resulted in those injuries. These are the allegations against my client, the Keen Company.

Now, we're all here today because this trial is a search for the facts. Fortunately, in this country it is not enough to simply make allegations. We have to carefully examine the facts and weigh the evidence before we decide the truth of any allegation. Now I know that a lot of you have heard stuff about PCBs. I'm going to ask you to try, if it is in any way possible, to set that aside listen to what happens in court. Listen to the testimony and see if the plaintiff has proven to you that his injuries were proven by PCBs. I'm going to ask you to listen closely.

Now, the judge asked you during voir dire if you could treat a corporation the same as you could treat any individual in this case. All of you said that you could and I hope you can, but I also think that will be difficult to do. I think that's going to be difficult because pure and simple; a corporation is not flesh and blood. It is not flesh and blood unless, of course, you think of the people who make up the corporation. It is many people who make up a corporation, the various jobs that they do. And that's what the Keen Company is; a corporation made up of people. The people who make up the Keen Company are just one of the issues that I'll ask you to keep in mind throughout this case.

And in this case there is one issue that stands out as being most important. This is the issue of whether or not Mr. Stevens's colon cancer was caused by PCBs. Every witness who speaks from this witness stand and every piece of evidence that comes into this trial will have some bearing on this issue. The attorney for the plaintiff is going to tell you that his client's cancer was caused by the PCBs he was exposed to while working at Keen Corporation. He and his expert are going to tell you that if Mark Stevens hadn't been exposed to PCBs he would not have gotten cancer. I don't think the testimony you will hear will support that. Instead, the evidence will show that he doesn't have PCB caused cancer in his body.

But this is neither for me nor for the experts to decide. This most important issue is for you to decide. You're the jury and it is your job to decide the case. My job, on the other hand, is to present the evidence to you; bring in an expert witness who can explain the evidence to you better than I ever could.

Now, don't get me wrong, I'm not here to defend PCBs. It's very clear that PCBs cause some serious health problems. They do, and we're not trying to hide from the truth. But neither are we going to sit still for exaggerations and distortions of the scientific evidence about PCBs. PCBs do cause some serious health problems. They cause some kinds of liver disease and also skin ailments, but they do not cause colon cancer.

Today, I'm going to invite Dr. William Campbell, and eminent epidemiologist to speak with you about the plaintiff's cancer and explain to you why it was not caused by PCBs. Dr. Campbell will tell you how he looked at all of the relevant epidemiological studies. Studies that have taken place in Japan, in China and in America. All of these studies, people were exposed to PCBs. In each of these countries people got liver damage and they also got skin cancer but they did not, in any of these studies, get colon cancer. Indeed, it will be undisputed in this case that the majority, the majority of the studies showed no statistically significant increase in colon cancer and there will be no question about that issue. These studies do not show any connection between colon cancer and PCBs. But, what they did show was that colon cancer, an extremely rare form of cancer, occurs more frequently in some groups than in others. For instance, in New York and New Jersey we have some of the highest colon cancer rates in this country and this has absolutely nothing to do with PCBs. These studies also show there are different risk factors such as diets high in fat-low in fiber; and these are associated with high rates of colon cancer. And when you look at all the studies and you take into account the inherent variability in people and that people are not numbers, not statistics - you will conclude, ladies and gentlemen, on the evidence in this case, that PCBs simply do not cause colon cancer.

Now, as Ms. Howard said earlier, "A trial is nothing less than a search for the truth" - "A search for the facts, " I think he said, and I believe Ms. Howard would join me in saying that we want you to do justice in this case. And justice in this case, ladies and gentlemen, on all the evidence, all the scientific evidence of the relevant epidemiological studies. All the most credible interpretations of the evidence will show the defendants are entitled to your verdict at the end of this case. And I will have a chance to speak to you again at the end of this case and I just want to ask you for a few things before I go. I'm going to ask you to pay close attention to the case. I'm going to ask you for your common sense. I'm going to ask you for your oath, your sense of fairness even though we are a corporation. I'm going to ask you for a reasonable, intelligent verdict at the end of this case. Thank you.

Judge: Thank you.

Judge: Plaintiff's counsel ready to examine the witness?

Plaintiff's atty. (Jean Howard): Ready to proceed, your honor.

Judge: O.K. Dr. Fallon please approach the witness stand. Dr. Fallon you have already been sworn in. I remind you that you are still under oath.

Dr. Fallon: Yes, your honor.

Judge: Please be seated.

Plaintiff's atty. (Jean Howard): Dr., would you state your name and address for the record?

Dr. Fallon: My name is Dr. Thomas Fallon and I reside at 1400 Longwood Ave., Brookline, Massachusetts.

Plaintiff's atty. (Jean Howard): And what is you profession?

Dr. Fallon: I run a research laboratory at Princeton University Medical School. My laboratory undertakes investigations on studies of carcinogens on animals. That is to say, I do cancer research.

Plaintiff's atty. (Jean Howard): Doctor can you tell us about your educational background?

Dr. Fallon: I graduated summa cum laude from Stanford University in 1980 with a dual major in biology and chemistry. In 1984 I received my Ph.D. in biochemistry from Johns Hopkins University.

Plaintiff's atty. (Jean Howard): And what positions have you held in your field?

Dr. Fallon: From 1984 to 1986 I was an associate professor at Princeton University Medical School. During this time I headed a laboratory in which we studied the effects of PCBs and other carcinogens on animals. In addition, I taught an introductory toxicology, which is the study of adverse effects of chemicals on living organisms to students in the medical school. Periodically I also taught a course in cancer cell biology to graduate students. From 1986 to 1988 I was an associate professor at Princeton and served on committees at the National Cancer Institute and the Food and Drug Administration. In 1988 I became a full tenure professor and I continued to teach the toxicology and cancer cell biology courses and give seminars at different universities around the country.

Plaintiff's atty. (Jean Howard): And Dr. Fallon, can you tell us what the focus of your research activities is?

Dr. Fallon: Laboratories interested in the mechanisms of how chemicals cause cancer. We do this by maintaining a large stock of the experimental animals and carefully standardizing the conditions and feeding them certain chemicals. After a period of observation we can tell what effects the chemicals had on the animals.

Plaintiff's atty. (Jean Howard): And what have you published during this time?

Dr. Fallon: In the nine years I have been a professor, my laboratories published 45 articles on cancer in peer review journals.

Plaintiff's atty. (Jean Howard): Do you hold any other scientific related positions?

Dr. Fallon: Yes I do. In addition to my other duties I am editor-in-chief of the Journal of Biochemistry Review.

Plaintiff's atty. (Jean Howard): At this time your honor, the plaintiff wishes to qualify Dr. Thomas Fallon as an expert in the field of biochemistry.

Judge: I hear no objections. You may proceed Ms. Howard.

Plaintiff's atty. (Jean Howard): So, Dr. Fallon, you do research on substances that cause cancer?

Dr. Fallon: Yes. These substances are called carcinogens. My laboratory studies several carcinogens including PCBs.

Plaintiff's atty. (Jean Howard): So, PCBs are carcinogens?

Defense atty. (Diane Moore): Objection your honor; leading!

Plaintiff's atty. (Jean Howard): Your honor this man has been qualified as an expert.

Judge: Overruled. You may answer the question Dr. Fallon.

Dr. Fallon: Yes, I do believe that PCBs cause cancer.

Plaintiff's atty. (Jean Howard): And in your opinion, did Mark Stevens contract his cancer form exposure to PCBs?

Defense atty. (Diane Moore): Objection your honor; this is what the jury has to decide!

Plaintiff's atty. (Jean Howard): Your honor, as I said before, this man has been qualified as an expert.

Judge: Overruled. Please answer the question Dr. Fallon.

Dr. Fallon: I believe for several reasons that there is a very high possibility that Mark Stevens contracted cancer as a result of his exposure to PCBs.

Plaintiff's atty. (Jean Howard): Dr. Fallon, you've done a lot of research on PCBs. Are you familiar with their uses outside of the laboratory?

Dr. Fallon: Yes, I am. Because PCBs are fluids that are non-flammable and dielectric, they're used as heat exchange fluids. The extent of the heating does not cause these fluids to explode of to catch fire. They can increase gas transmission in pipelines, capacitors and transformers. So, because of the unique physical properties of these compounds, they've found extensive use in a variety of products in electrical industry and a number of other industries.

Plaintiff's atty. (Jean Howard): So PCBs are used in capacitors and transformers and various electrical industries.

Dr. Fallon: Yes, that's right.

Plaintiff's atty. (Jean Howard): Just like the capacitors and transformers that Mark Stevens worked with at the Keen Company?

Dr. Fallon: Yes, but even if Mr. Stevens had not touched those capacitors and transformers he still would have been exposed to high levels of PCBs. I have here reports from the department of Environmental Protection Office, of Cancer and Toxic Substances Research and from the National Institute of Occupational Safety and Health dated 1994.

Defense atty. (Diane Moore): Objection your honor. These reports have not been received as an exhibit. This is hearsay your honor based on Rules 703 and 801 of the Federal Rules of Evidence!

Plaintiff's atty. (Jean Howard): Your honor, these are reports that can be accessed by the public!

Judge: I will allow Dr. Fallon to continue, but I will have my clerk make a copy of these reports and make them available to you Ms. Moore. Please continue Dr. Fallon.

Dr. Fallon: As I was saying, these reports state that the analytical data show extremely high amounts of PCB contamination on the site. According to the reports, PCBs were used in heat exchangers, capacitors

and transformers as the heat transfer medium in polyester resin production from 1972 to 1991. Although the PCBs were removed from these devices in 1991, soil containing PCB level above 50 PPM was not removed until early 1994. Both reports concluded that substantial health hazards existed at the Keen Corporation.

Plaintiff's atty. (Jean Howard): Were there any differences between the PCBs used in the machinery and PCBs found as contamination in the soil?

Dr. Fallon: Well, by the time Mark Stevens had begun working at the Keen plant in 1990, pressure from the government and the public had already forced them to switch from heavily chlorinated PCBs to the lesser-chlorinated PCBs. However, nothing was done to clean up the contaminated soil, which still contained the old mixtures of heavily chlorinated PCBs.

Defense atty. (Diane Moore): Objection your honor, hearsay. Dr. Fallon was not present at the Keen Co. during that time.

Judge: Sustained. The jury will disregard that last sentence from the record.

Plaintiff's atty. (Jean Howard): Dr., can you explain to me in the most basic terms you can, what the significance is of the different levels of chlorine in different PCBs?

Dr. Fallon: Sure. As the chlorination increases so does the apparent toxicity of the PCB congeners. For example, aerochlores that have increased chlorination, like aerochlores 1254 and 1260; that is to say 6020 chlorinated aerochlores have caused hepatocarcinoma in rats, neoplastic changes in the liver and other sever effects like necrosis and other degeneration.

Defense atty. (Diane Moore): Objection your honor. Ms. Howard has not established the relevance of this question, Rules 401 and 402 of the Federal Rules of Evidence.

Plaintiff's atty. (Jean Howard): Your honor, I am simply addressing the issue of PCBs.

Judge: Overruled. Please continue Dr. Fallon.

Dr. Fallon: The effects of the lesser-chlorinated aerochlores like 1242 and 1248 appear to be less severe. Although these less chlorinated PCBs have been less extensively studied than their more heavily chlorinated counterparts. Thus, we attribute the increased carcinogenic and toxic potential effects to the increased chlorination.

Plaintiff's atty. (Jean Howard): O.K. So, if I understand you correctly, the more heavily chlorinated PCBs, although they might have been easier for Keen to use, were still more toxic than the lesser-chlorinated PCBs?

Defense atty. (Diane Moore): Objection your honor; leading!

Judge: Overruled. Dr. Fallon you may answer.

Dr. Fallon: Yes. That's correct.

Plaintiff's atty. (Jean Howard): All right then, why did Keen switch to the lesser-chlorinated PCBs?

Defense atty. (Diane Moore): Objection your honor. Hearsay, your honor. Unless Dr. Fallon was on the board of directors he has no idea why they switched!

Judge: Sustained. Ms. Howard, please refrain the question.

Plaintiff's atty. (Jean Howard): Dr. Fallon, why would a company switch to the lesser-chlorinated PCB's?

Dr. Fallon: Well, the first indications that PCBs might pose an environmental and health hazard began emerging in the mid 1950's. By the 1970's evidence was strong enough that the federal government passed regulations prohibiting the use of the more heavily chlorinated PCBs. Of course, by then they became nearly ubiquitous pollutants.

Plaintiff's atty. (Jean Howard): All right, and why was it that the government forbids the use of PCBs?

Defense atty. (Diane Moore): Objection your honor; sufficient qualifications have not been established for the witness to give opinion testimony on this subject, Rule 702 in the Federal Rules of Evidence.

Judge: Overruled.

Dr. Fallon: Well, most of the studies of the effects of PCBs on living organisms that the government used were conducted on animals. These studies showed that PCBs were causing cancer in animals, and when you see a substance causing cancer in animals you immediately begin to worry that the same substance may cause cancer in humans.

Plaintiff's atty. (Jean Howard): Can you explain to us the value of animal studies? Why did you use animals?

Dr. Fallon: Because for this type of research you can't use people due to the toxicity of the substance under consideration. Laboratory animals are inexpensive to grow and maintain, and they grow up quickly which makes them ideal subjects. We can keep the conditions controlled very closely when you use animals: altering only a single variable between the experimental group and the control group. In addition, with animal research you can control the dosage very carefully- so you can make sure an exact dose has an exact effect.

Plaintiff's atty. (Jean Howard): Can you please describe for us some of the animal studies you did?

Defense atty. (Diane Moore): Objection your honor; overly narrative under Rule 611(a)!

Judge: Overruled. Please continue Dr. Fallon.

Dr. Fallon: Of course. In general we would dose the animals with a certain amount of PCBs for 2 weeks, wait an appropriate latency period and then observe the effects. At the same time we would have a control group of animals that was treated in exactly the same way except that they would receive no such exposure to PCBs. We would then compare any differences between the two groups and feel confident that any differences were the result of the PCB exposure.

Defense atty. (Diane Moore): Objection your honor; relevance!

Judge: Overruled. Please continue Dr. Fallon.

Dr. Fallon: For example, a specific test we did was as follows: 100 rats were allowed to ingest 100 mgs. per kg. per diem of the aerochlore 1254 congener of PCBs. The control rats were fed saline. After two weeks of exposure we observed the rats for a follow up period of one year; noting especially hepatic neoplasia in the experimental group.

Plaintiff's atty. (Jean Howard): And what else did you observe?

Dr. Fallon: After one year, 58% of the experimental animals had liver tumors and another 10% of the experimental animals had tumors of another type. Compare this to a control percentage of only 4% of the animals receiving tumors of any type during that year.

Plaintiff's atty. (Jean Howard): Dr. Fallon, so far all of the research we have discussed about the effects of PCBs has been on animals. What can you tell us about the effects of PCBs on humans?

Dr. Fallon: Well, I don't think that there is any scientist out there who could seriously pose a challenge to the idea that animal studies could tell a lot about the effects of chemicals on humans. The FDA, for example, relies exclusively on animal studies for the purpose of determining which foods and drugs are appropriate for dispensation to humans. In fact, just about every substance that has been shown to be carcinogenic in human beings was first shown to be carcinogenic in animals.

Defense atty. (Diane Moore): Objection your honor; inflammatory!

Judge: Overruled, Ms. Moore. Please continue Dr. Fallon.

Dr. Fallon: Of course, animals aren't humans, but since we don't want to use humans to test potentially toxic substances; animals are an appropriate substitute.

Plaintiff's atty. (Jean Howard): So we can use animal studies to help us understand and to predict the effects of PCBs in humans, as for instance in Mr. Stevens?

Defense atty. (Diane Moore): Objection, leading!

Judge: Sustained. Please rephrase the question Ms. Howard.

Plaintiff's atty. (Jean Howard): Then, in essence, animal studies can help us to understand and maybe to predict the effects of PCBs in humans. Is that correct Dr. Fallon?

Dr. Fallon: Absolutely.

Plaintiff's atty. (Jean Howard): Dr. Fallon, do you recall my discussing with you and my giving you information about Mr. Stevens family medical history?

Dr. Fallon: Yes, I do.

Plaintiff's atty. (Jean Howard): And specifically do you recall asking me to find out all information concerning any incidences of cancer in Mr. Stevens's family? This is correct?

Defense atty. (Diane Moore): Objection, leading!

Judge: Sustained. Please rephrase the question Ms. Howard.

Plaintiff's atty. (Jean Howard): Do you recall asking me to find out all information concerning any incidences of cancer in Mr. Stevens's family?

Dr. Fallon: Yes.

Plaintiff's atty. (Jean Howard): Why would this be an important factor for you to know?

Dr. Fallon: Mark Stevens was diagnosed with colon cancer at age 28. You usually don't see colon cancer till at least age 45. You only see colon cancer in people much younger than that, in 20 year olds, when they belong to a cancer family.

Plaintiff's atty. (Jean Howard): Can you tell the court exactly what a cancer family is?

Dr. Fallon: Yes. Members of a cancer family have a genetic predisposition to certain forms of cancer. For example, families with Lymphedema syndrome inherit a gene, which makes it more likely they'll get many kinds of tumors. What turns out to happen is that their inherited mutant P53 gene is functionally haploid insufficient. Which means that the lymphedema syndrome families get tumors of all forms at a much greater rate that the general populace. In fact, cancer families such as these 75 to 80 percent of inflicted individuals eventually get cancer.

Plaintiff's atty. (Jean Howard): Are there cancer families explicitly for colon cancer?

Dr. Fallon: Yes, there are. In familial adenomatous polyposis or FAP, for short, virtually every member of the family gets colon cancer. Another notable trait of FAP is that it causes colon cancer to strike young people. People as young as in their twenties. As a matter of fact, one theory posits that all men who have colon cancer at a young age, say in their 30's or early 40's are related in some way to these cancer families.

Plaintiff's atty. (Jean Howard): All right, now, when are most colon cancer victims diagnosed?

Defense atty. (Diane Moore): Objection, calls for speculation!

Judge: Overruled.

Dr. Fallon: Colon cancer is usually diagnosed around 65 years of age. As you look at younger and younger populations, colon cancer becomes progressively, relatively more rare; until by the time you look at people in their 20's you never see colon cancer. Except of course in cancer families.

Plaintiff's atty. (Jean Howard): So it was important for you to know whether Mark Stevens's family was a cancer family. Is that right?

Defense atty. (Diane Moore): Objection. Ms. Howard is leading the witness your honor!

Judge: Overruled. Please answer the question Dr. Fallon.

Dr. Fallon: Oh, that's correct.

Plaintiff's atty. (Jean Howard): Dr. Fallon, based upon the medical evidence and research and conversations with the family were you able to reach any conclusions about the Stevens being a cancer family?

Defense atty. (Diane Moore): Objection, leading! Your honor may I request a side-bar?

Judge: Ms. Moore, Ms. Howard, please approach the bench.

(Simply show the judge and lawyers conversing for approximately 45 seconds to a minute)

Judge: Dr. Fallon, please continue.

Dr. Fallon: Where were we? Only Mr. Stevens' great uncle, uncle and two male first cousins have contracted colon cancer.

Plaintiff's attorney (Jean Howard): Dr. Fallon do you recall inquiring whether Mr. Stevens had a personal history of intestinal polyps or chronic inflammatory bowel disease?

Dr. Fallon: Yes.

Plaintiff's attorney (Jean Howard): And why might that be important?

Dr. Fallon: Well, both can increase the risk of colon cancer. In terms of the intestinal polyps they increase the risk of colon cancer when they are adenomatous polyps and those polyps are large and there are several of them. Other types of polyps, hyperplastic and inflammatory do not increase the risk of colon cancer. As for the chronic bowel disease, well this is a condition in which the colon is inflamed over a long period of time and may have ulcers in its lining. This increases the risk of colon cancer.

Plaintiff's attorney (Jean Howard): Based on Mr. Stevens' medical history, would you say that Mr. Stevens had a personal history of intestinal polyps or chronic inflammatory bowel disease?

Dr. Fallon: Mr. Stevens had a few adenomatous polyps but again, they were not large and there were only a few of them. As for the chronic inflammatory bowel disease, Mr. Stevens was never tested for it, but there is evidence of ulcers in his colon.

Plaintiff's atty. (Jean Howard): Dr. Fallon, you concluded that Mr. Stevens is a non-smoker…..

Defense atty. (Diane Moore): Objection, leading!

Judge: Ms. Howard, please rephrase the question.

Plaintiff's atty. (Jean Howard): Dr. Fallon, do you recall inquiring whether Mr. Stevens is a smoker or non-smoker?

Dr. Fallon: Yes, and Mr. Stevens only smoked for seven years of his life and quit when he was 25.

Defense atty. (Diane Moore): Objection. Habit must be established over time, your honor. Rule 406!

Judge: Overruled.

Plaintiff's atty. (Jean Howard): And why might that be important?

Dr. Fallon: There are several lines of evidence indicating that smokers face an increased incidence of certain types of cancer -that includes colon cancer. Mr. Stevens (*pause slightly*) didn't smoke for that long so he probably wasn't as affected as other smokers.

Plaintiff's atty. (Jean Howard): That fact that Mr. Stevens is not really a smoker helpful to you in formulating your opinion?

Dr. Fallon: It was a minor factor, but it was still a factor.

Plaintiff's attorney (Jean Howard): Do recall asking for information about Mark Stevens eating habits and lifestyle?

Dr. Fallon: Yes, I do. Mr. Stevens lived a relatively average lifestyle in terms of health outside of his work. He didn't really exercise much. He also had a pretty typical diet for an American, which consisted mostly of fast foods and maybe little bit of healthier high fiber/low fat and cholesterol foods. Recent research has uncovered that diets consisting mainly of fast foods and foods that are low in fiber and high in fat and cholesterol have been associated with colon cancer. But Mr. Stevens' diet wasn't out of the ordinary for the typical American.

Plaintiff's attorney (Jean Howard): So, was the fact that Mr. Stevens had a typical lifestyle also important in formulating your opinion?

Dr. Fallon: Well, his diet wasn't that good but it also wasn't atypical of the average American. So, like the smoking it was a minor factor that I used in formulating my opinion.

Plaintiff's atty. (Jean Howard): Dr. Fallon, did you ask for a report on the recent medical histories of the individuals who worked with Mark Stevens at Keen Company?

Dr. Fallon: Yes, I did.

Plaintiff's atty. (Jean Howard): Why did you ask for this?

Dr. Fallon: I requested information on those individuals who could reasonably be expected to have been exposed to high levels of PCBs as was Mr. Stevens. According to the report, Mr. Stevens was employed at the Keen Corporation Plant from 1988 to 1998, at which time he was diagnosed with this colon cancer. Keen had stopped using PCBs in its capacitors in 1992 and did some significant cleanup on the site later in 1995.

Defense atty. (Diane Moore): Objection. This is repetitive your honor. Dr. Fallon has already brought all this into evidence!

Plaintiff's atty. (Jean Howard): Your honor, the doctor is merely trying to make a point.

Judge: Overruled Ms. Moore. Please continue doctor.

Dr. Fallon: Well, therefore, I was primarily interested in those individuals who worked with Mr. Stevens prior to 1995. I was able to locate 46 other such individuals.

Plaintiff's atty. (Jean Howard): All right. Dr. Fallon, have you read the report written by the Keen Company physician?

Dr. Fallon: Yes I have.

Plaintiff's atty. (Jean Howard): And what does it say? Could you summarize the contents for the court, please?

Dr. Fallon: The report said that 47 people, including Mark Stevens, had been exposed to high levels of PCBs at the Keen Company Plant. In this small group of 47 people, 3 people over a five-year period contracted cancer.

Plaintiff's atty. (Jean Howard): Is there anything unusual about this?

Dr. Fallon: In a normal group of American males you would expect only one, or at most two cancers over a five-year period. So, to get 3 is somewhat unusual.

Defense atty. (Diane Moore): Objection, your honor, sufficient qualifications have not been established for the witness !

Judge: Sustained, the jury will ignore last statement. Dr. Fallon, please continue.

Plaintiff's atty. (Jean Howard): So, Dr., if it's not chance alone, what do you think the cause of their cancer is?

Dr. Fallon: Well, when we see numbers like this, we begin to wonder if there is a common cause. In a case such as this, the most immediate and possible explanation is that they were all exposed to PCBs. Well, I may need to add that these men are considerably older than Mr. Stevens, but well that's not a big deal.

Defense atty. (Diane Moore): Objection, your honor, prejudicial!

Judge: Overruled.

Plaintiff's atty. (Jean Howard): And if PCBs are the real cause why didn't all 47 of these men get cancer? Wouldn't you expect that?

Dr. Fallon: Oh no, not at all. As I said, to find 3 cancers in this group, at this time was sort of unusual. There are also other reasons why you would see 3 cancers and not more. First, there is latency. It takes time for these tumors to develop to the point where they can be physically diagnosed. Second, there is a difference between being exposed to and getting a disease. For example, even if you were exposed to a proven causative agent like chicken pox that doesn't mean you automatically come down with the disease. And it's the same with carcinogens. Cigarette smoke is a known carcinogen. It's known that not everybody who smokes cigarettes gets lung cancer.

Plaintiff's atty. (Jean Howard): And Dr., what was the dosage level on Mark Stevens?

Dr. Fallon: Well, the average background level in American males of PCBs is 4.2 to 6.4 parts per billion in the blood. When we measured Mark Stevens blood levels of PCBs he came out to 300 parts per billion. That's over 60 times the normal level.

Plaintiff's atty. (Jean Howard): Of these 3 men at the Keen plant who did get cancer, what kinds of cancer did they get?

Dr. Fallon: There was one case of lung cancer, non-Hodgkin's lymphoma, one liposarcoma, and one case of hepatocarcinoma.

Plaintiff's atty. (Jean Howard): And is there any reason to suspect that more cancers might come out of the Keen plant even if it were closed down for business today?

Defense atty. (Diane Moore): Objection, your honor, calls for speculation!

Judge: Overruled.

Defense atty. (Diane Moore): Your honor this is beyond the scope of Dr. Fallon's testimony.

Judge: Overruled. Please answer the question Dr. Fallon.

Dr. Fallon: Yes, because of the latency of most tumors.

Plaintiff's atty. (Jean Howard): And what is latency, exactly?

Dr. Fallon: Latency is the period of time between the exposure to the disease and the onset of the disease. For instance, in colon cancer the period of latency is usually quite long, up to 10 years: ten years between the first pre-malignant defense and the expression of frank diagnosable disease.

Plaintiff's atty. (Jean Howard): All right, so, what you're saying is that given more time the incidence of PCB induced cancer in Mark Stevens' co-workers could actually increase?

Defense atty. (Diane Moore): Objection, your honor, repetitive! Dr. Fallon just stated that.

Judge: Overruled.

Dr. Fallon: That is a strong possibility, yes.

Plaintiff's atty. (Jean Howard): And if this were to come to pass, this would make Mark's case even stronger wouldn't it?

Defense atty. (Diane Moore): Objection, your honor, inflammatory!

Judge: Overruled.

Dr. Fallon: Well, yes, of course it would. But we would have to wait at least 10 years after the cessation of exposure in order to insure that we would be able to observe all the PCB induced tumors.

Plaintiff's atty. (Jean Howard): I see. Dr. Fallon, everything you told us here today suggests very strongly that colon cancer can result from exposure to PCBs.

Defense atty. (Diane Moore): Objection, your honor, leading!

Judge: Sustained, please rephrase the question Ms. Howard.

Plaintiff's atty. (Jean Howard): In your expert opinion, Dr. Fallon, would you very strongly suggest that colon cancer could result from exposure to PCB's?

Dr. Fallon: Yes, I would agree with that.

Plaintiff's attorney (Jean Howard): So, it is most probable that Mark Stevens' colon cancer is a result of his exposure to PCBs. Is that correct?

Dr. Fallon: Well, yes, I would agree with that given that I feel that Mr. Stevens' lifestyle really wasn't atypical of the average American lifestyle, and the other factors that I mentioned previously aren't as likely as the PCBs to have caused Mark Stevens' colon cancer.

Plaintiff's atty. (Jean Howard): Dr. Fallon can you give us your expert opinion as to the cause of Mark's colon cancer?

Defense atty. (Diane Moore): Objection, your honor, repetitive!

Judge: Overruled.

Dr. Fallon: In my expert opinion the colon cancer in Mark Stevens was more than likely caused by his exposure to PCBs at the Keen Company plant.

Plaintiff's atty. (Jean Howard): Thank you. That's all, your honor.

Judge: Thank you, Dr. Fallon. Ms. Moore are you ready with your witness?

Defense atty. (Diane Moore): Yes, your honor.

Judge: Dr. Campbell, please approach the bench. Dr. Campbell you've already been sworn in. I remind you, you're still under oath. You may be seated. Ms. Moore, you may proceed.

Defense atty. (Diane Moore): Thank you, your honor. Dr., will you please state your name and address for the record?

Dr. Campbell: My name is Dr. William Campbell and I live at 2230 Huntington Court, New Haven, Connecticut.

Defense atty. (Diane Moore): And Dr. Campbell, what is your current occupation?

Dr. Campbell: I'm a professor of epidemiology at Yale University.

Defense atty. (Diane Moore): And what exactly is epidemiology?

Dr. Campbell: Epidemiology is the study of the distribution and effects of disease on human populations. An epidemiologist is someone who like myself gathers information about a large population and then uses statistics to process this information and reach conclusions about effects of disease. We can gather this information from a variety of sources including medical records, clinical examinations, surveys and even death certificates.

Defense atty. (Diane Moore): Thank you. And where did you receive your training in this science?

Dr. Campbell: I received my bachelor's degree from Dartmouth University in 1977 with concentrations in mathematics and biology. And then I proceed to earn a Ph.D. in epidemiology from Columbia University in New York.

Defense atty. (Diane Moore): What professional appointments have you held?

Dr. Campbell: In 1982 when I finished my Ph.D., I proceeded to work for the Center of Disease Control in Atlanta, Georgia; studying the effects of diet on heart attacks. After three years, in 1985 I was appointed associate professor at Yale University and in 1989 appointed full professor.

Defense atty. (Diane Moore): Well, what do you do at Yale, Dr. Campbell?

Dr. Campbell: I teach a seminar in epidemiology to graduate students in public health and also a class in environmental disease to medical students. Most importantly I do research. I study gastrointestinal cancer; how the diet and environment affect gastrointestinal cancer. And this is epidemiology of gastrointestinal cancer.

Defense atty. (Diane More): And where does your work take you besides Yale, Doctor?

Dr. Campbell: I'm on the committee for population studies in the National Institute of Health in Washington, D.C. and I still maintain my contacts at the Center for Disease and fly to Atlanta at least once a month.

Defense atty. (Diane Moore): With what professional journals are you involved?

Dr. Campbell: I've published over 30 articles in such journals as Cancer Research, Environmental Health and Public Safety and the European Journal of Cancer Research. In addition, I sit on the board of review for several journals. I'm most proud, however, of my recent book The Environment and Cancer Danger; What Governments Can Do About It.

Defense atty. (Diane Moore): Dr., have any of your articles or chapters covered epidemiological studies of PCBs?

Dr. Campbell: Yes, several of my articles have covered epidemiology of PCB exposure.

Defense atty. (Diane Moore): So, would you consider PCB epidemiology to be one of the major thrusts of your research?

Dr. Campbell: Yes, I would.

Defense atty. (Diane Moore): Would you consider yourself to be an expert on that subject, the epidemiology of PCBs?

Dr. Campbell: Yes, I would consider myself to an expert in that area.

Defense atty. (Diane Moore): At this time, your honor, the defense wishes to qualify Dr. William Campbell as an expert in the field of epidemiology.

Judge: I hear no objections. Ms. Moore you may proceed.

Defense atty. (Diane Moore): Thank you, your honor. Dr., you've conducted and reviewed many studies on the effects of PCBs on populations. What have these studies indicated with respect to the association between PCBs and colon cancer?

Dr. Campbell: Well, there are no studies that specifically address the question of PCBs and colon cancer. But in none of the general studies on PCB exposure and cancer was there a linkage shown between PCB exposure and colon cancer.

Defense atty. (Diane Moore): So, people who were exposed to PCBs were no more likely to contract colon cancer than anybody else was?

Plaintiff's atty. (Jean Howard): Objection your honor, speculative.

Judge: Overruled. Please answer the question Dr. Campbell.

Dr. Campbell: That's right. Populations exposed to PCBs did not have a different rate of colon cancer than populations that are unexposed.

Defense atty. (Diane Moore): What does that mean for the plaintiff?

Plaintiff's atty. (Jean Howard): Objection your honor, prejudicial.

Judge: Sustained, please rephrase the question Ms. Moore.

Defense atty. (Diane Moore): What does that mean in terms of the probability that the plaintiff's colon cancer was caused by PCB's?

Dr. Campbell: That means it is unlikely the plaintiff's colon cancer was caused by PCB exposure.

Defense atty. (Diane Moore): So, in your expert opinion PCB's did not cause Mark Stevens' colon cancer

Plaintiff's atty. (Jean Howard): Objection, your honor, that's the purpose of the jury.

Defense atty. (Diane Moore): Your honor this man's an expert in this area. He is merely giving his expert opinion.

Judge: Ms. Howard and Ms. Moore will you please approach the bench?

Side bar- cut out for 45 seconds.

Judge: Dr. Campbell, please answer the question.

Dr. Campbell: I see no evidence that the plaintiff's colon cancer was caused by PCB exposure.

Defense atty. (Diane Moore): Do you believe that epidemiology is an appropriate way to answer such a question?

Dr. Campbell: There is really no better way to answer that question. Epidemiology is the study of people in real life. It measures how various environmental effects influence a large population of people. It has directive implications for making causal interpretations and even for designing preventive strategies. There is one limitation, however, in that since you're working with real people it's not possible to randomize. But in a properly conducted study, with a large population, this is a minor limitation that can be worked around to lead to very conclusive results.

Defense atty. (Diane Moore): O.K. Dr. Campbell, are you aware of any medical text or literature that identify PCBs as being causally related to colon cancer?

Dr. Campbell: No, I'm not.

Defense atty. (Diane Moore): If there were an epidemiological association with colon cancer and PCBs, would you know about it?

Dr. Campbell: Yes I would. I'm actively involved in epidemiology of cancer and PCBs. I'm on the boards of a variety of journals. If there were such evidence, such information out there, I would certainly hear of it.

Defense atty. (Diane Moore): So PCBs have not been shown to cause colon cancer but they have not been ruled out.

Plaintiff's atty. (Jean Howard): Objection, your honor that is not even a question.

Judge: Sustained. Ms. Moore, please rephrase that last statement so that it is a question.

Defense atty. (Diane Moore): So, according to what you know, would you agree that PCBs have not been shown to cause colon cancer but they have not been ruled out?

Dr. Campbell: Well, I think it's actually stronger than that. There's just no evidence that PCBs are involved in the cancer problem. So, high doses of PCBs have serious toxic effects, but their risk of causing cancer is minimal.

Defense atty. (Diane Moore): I see. I'd like to talk about your research for a minute. Am I correct in my belief that an epidemiologist has either the research or data collecting function and then an analytical function?

Dr. Campbell: Yes. First we must identify a population, collect data on it and then we use statistics, work with the data to a coherent whole and interpret it.

Defense atty. (Diane Moore): So, you yourself perform the experiment?

Dr. Campbell: Not in the same way that a laboratory scientist would perform an in vivo or in vitro experiment. No, we have less ability to control since we are working with real people, especially in the case of epidemiology with PCBs. We're talking about toxic substances. We can't control for exposure, we can only look for exposed populations and look for its effects on them.

Defense atty. (Diane Moore): So, you must be extremely knowledgeable about the other research in the field?

Dr. Campbell: Well, definitely, in order to reach legitimate conclusions you must be even more conversant in the literature than scientists in other fields.

Defense atty. (Diane Moore): The scientific literature that is associated with epidemiology of PCBs and humans sufficient for you to draw any scientific conclusions either from an individual piece of literature or looking at the body of literature as a whole?

Plaintiff's atty. (Jean Howard): Objection, your honor is there a point to this?

Judge: Overruled. Ms. Moore, please continue.

Dr. Campbell: You're asking whether I can draw a conclusion from literature in aggregate?

Defense atty. (Diane Moore): Yes.

Plaintiff's atty. (Jean Howard): Objection, your honor, again Ms. Howard has not posed a question.

Judge: Overruled. Dr. Campbell is simply trying to understand her question. Please continue, Dr. Campbell.

Dr. Campbell: Well, very few of these individual studies are persuasive on their own. They may have some flaws, they may not be large enough, they may not follow the population long enough. But, as an aggregate, as a group you can take all of these studies and look at all of the conclusions and reach a fairly strong conclusion PCBs are linked to cancer problems.

Defense atty. (Diane Moore): So, I take it you would agree that there is no substantial minority of epidemiologists who find that the literature supported a causal connection between exposure (of) PCBs and colon cancer?

Plaintiff's atty. (Jean Howard): Objection that's a leading question.

Judge: (Hesitate before answering) Overruled. Please answer the question Dr. Campbell.

Dr. Campbell: Well, obviously, I can't know that. I haven't asked every epidemiologist his or her opinion on this question. But, I'm not aware of any epidemiologist who thinks there is a strong causal link between PCB exposure and cancer.

Defense atty. (Diane Moore): What about the animal studies that say that PCBs are carcinogens? Are they wrong or is it scientifically improper to extrapolate from animals to humans?

Plaintiff's atty. (Jean Howard): Objection that's a leading question.

Judge: Overruled. Please answer the question Dr. Campbell.

Dr. Campbell: It's scientifically improper to extrapolate from one kind of tumor type in animals to another kind of tumor type in humans.

Plaintiff's atty. (Jean Howard): Objection, Dr. Campbell has stated that he does not do that type of research.

Judge: I will have to overrule that Ms. Howard, as he is the expert in this area.

Defense atty. (Diane Moore): Why is that, Doctor?

Dr. Campbell: Well, there are many reasons you can't say that one tumor type in an animal can be directly related to another tumor type in humans. Animals and humans interact with their environments differently. Different chemicals can have different effects on different animals for a variety of reasons.

Plaintiff's atty. (Jean Howard): Objection. Again, your honor Dr. Campbell is not an experimental researcher.

Judge: Ms. Howard and Ms. Moore please approach the bench.

Side bar: Cut out for 20 seconds.

Judge: Please, continue Dr. Campbell.

Dr. Campbell: As I was saying, most experimental animals are quite small. Just looking at humans that are a thousand times larger than a rat or a mouse. You have to be very careful about dosages. Likewise, the human life expectancy is much longer than that of a rat or a mouse. A human can live for 80 years. Cancer can take 10 years to develop. A rat lives two years. Cancers happen in a matter of months. It's hard to extrapolate between organisms in that way, especially with the different types of tumors, is the question.

Defense atty. (Diane Moore): I see. Is it possible to extrapolate at all from any animal tumors to human tumors?

Plaintiff's atty. (Jean Howard): Objection, again Dr. Campbell has stated that he does not do that type of research.

Judge: I am sorry Ms. Howard, but I will have to overrule that. Please answer the question Dr. Campbell.

Dr. Campbell: Well, as I said it is perfectly legitimate to extrapolate from hepatocarcinoma elicited by a chemical in a mouse to a hepatocarcinoma being perhaps elicited by the same chemical in humans. But, it would not be legitimate to extrapolate to a different type of tumor.

Defense atty. (Diane Moore): Can you tell us more about the specificity of carcinogens and tumors?

Dr. Campbell: Well, I would if I could. This is an ongoing area of research. Site specificity is a very important question in science today. Toxins and carcinogens affect very specific organs and it's not all that very well understood. As a non-obvious example take Aflo-Toxin B, which is a biological toxin found on contaminated beans and rice in Africa. Now, Aflo-Toxin B causes liver cancer.

Plaintiff's atty. (Jean Howard): Objection, what is the purpose of this testimony?

Defense atty. (Diane Moore): Your honor, Dr. Campbell is trying to elucidate the concept of site specificity.

Judge: Overruled, please continue Dr. Campbell.

Dr. Campbell: This kind of toxin is found throughout the body of an affected person but only the liver develops tumors. It's not understood why. A more obvious example is cigarette smoking. Cigarette smoke is known to cause lung cancer and cancers of the esophagus and larynx, and that's about it. It does not cause colon cancer even though smokers are ingesting the same toxins that cause lung cancer into the gastrointestinal tracts.

Plaintiff's atty. (Jean Howard): Objection, again, what is the purpose of this testimony?

Judge: Ms. Howard, he is the expert. Overruled, please continue Dr. Campbell.

Dr. Campbell: The colon is exposed to the same toxins, nicotine, tar, etc., but no colon cancer arises. The same thing is true of PCBs. They have very specific targets in the skin and the liver, not affecting the colon.

Defense atty. (Diane Moore): O.K. Since cancer-causing substances are tissue specific, can you extrapolate from animal studies to humans?

Plaintiff's atty. (Jean Howard): Objection, again Dr. Campbell has stated that he does not do that type of research.

Judge: Overruled. Please answer the question Dr. Campbell.

Dr. Campbell: You can extrapolate if the dosages are comparable and organs are identical. If you saw a rodent that was exposed to PCBs and developed a hepatocarcinoma, a liver tumor, you could extrapolate that PCBs could be linked to hepatocarcinoma, or liver cancer in humans, but not to a different type of cancer.

Defense atty. (Diane Moore): I see. But if the tumor type is different then an extrapolation is not appropriate.

Plaintiff's atty. (Jean Howard): Objection that is not a question, your honor.

Judge: Sustained. Please rephrase the last statement Ms. Moore.

Defense atty. (Diane Moore): Dr. Campbell, would you agree that if the tumor type is different then an extrapolation is not appropriate?

Dr. Campbell: Exactly.

Defense atty. (Diane Moore): O.K. So, if for example, we found that PCBs cause liver cancer in rats it would be improper based only that evidence to say that PCBs cause colon cancer in humans.

Plaintiff's atty. (Jean Howard): Objection that is not a question, your honor

Judge: Sustained. Please rephrase the last statement Ms. Moore.

Defense atty. (Diane Moore): If, for example, we found that PCBs cause liver cancer in rats, would it be improper based *only* that evidence to say that PCBs cause colon cancer in humans?

Dr. Campbell: Of course.

Defense atty. (Diane Moore): How would epidemiological evidence be brought to bear on such an extrapolation?

Dr. Campbell: Well, if epidemiological evidence failed to show a correlation between exposure and a tumor type then the assumptions that the same chemicals causing cancer in humans just like the animals would be inappropriate. Only if the epidemiological evidence led to the same conclusions, this chemical leads to this type of cancer would extrapolations from animals to humans be considered appropriate.

Defense atty. (Diane Moore): Could you please tell us more about the sort of conclusions that have arisen in the past 50 years of experience?

Plaintiff's atty. (Jean Howard): Objection, irrelevant your honor.

Judge: Overruled.

Defense atty. (Diane Moore): Maybe you can start by telling us something about your own research?

Dr. Campbell: I'd be happy to. My most recent study concerned 30 railroad workers that were exposed to PCBs on the job. Either through PCB as dielectric fluid in railroad transformers, PCBs that leaked out onto the tracks or were breathed in as dust through respirative function. Now these workers had been exposed for an average of 5 years, over a range of 1 to 15 years. We follow them for 4 years after they have been identified. At the beginning of the work their blood PCB levels range from 17 to 200 parts per billion. That has since dropped.

Defense atty. (Diane Moore): And so far what have you found?

Dr. Campbell: Well, we found some normal liver functions, elevated numbers for SGOT, SGBT and OCT and serum cholinesterase, but no cancer.

Plaintiff's atty. (Jean Howard): Objection, inflammatory your honor.

Judge: Overruled.

Defense atty. (Diane Moore): I see. Dr. Campbell, have you done other similar studies?

Dr. Campbell: Yes, until this most recent one, my 1985 study of electrical workers was the critical study.

Defense atty. (Diane Moore): And what did you find there?

Dr. Campbell: We found that PCBs induced hepatic drug metabolism, and high levels induced frank toxicity.

Defense atty. (Diane Moore): Anything else?

Plaintiff's atty. (Jean Howard): Objection, that is not a question your honor.

Judge: Overruled.

Dr. Campbell: Well, yes, dermal conditions such as digital and ocular keratinitis, edema of the skin and eyes and some core acne.

Defense atty. (Diane Moore): How interesting. What about other studies?

Dr. Campbell: Well, there have been about 17 epidemiological studies related to PCB exposure and cancer. One of the most important was a morbidity and mortality study in 1985 at Brown and Jones from the National Institute of Health.

Plaintiff's atty. (Jean Howard): Objection, irrelevant your honor.

Judge: Overruled. Let's see where Dr. Campbell is taking this. Please continue Dr. Campbell.

Dr. Campbell: They had evaluated the incidence of cancer individuals who were exposed occupationally to PCBs.

Defense atty. (Diane Moore): Did they concentrate on groups believed to have increased risks of exposure to PCBs?

Dr. Campbell: The actual PCB exposure levels were known.

Defense atty. (Diane Moore): What is the most reliable way to measure PCB levels?

Dr. Campbell: The most reliable way to measure PCB levels in the blood is through mastocapony. Certainly, with maspec, as we call it, you take a sample you want to study- like a drop of someone's blood, in this case and you burn it. The burning separates and ionizes it in the samples into its individual components. And the machine exposes the separated components into an electrical field.

Plaintiff's atty. (Jean Howard): Objection your honor, again, irrelevant.

Judge: Overruled. Please continue Dr. Campbell.

Dr. Campbell: They separate from each other in direct relation to their mass, their size in this electrical field. The mass to charge ratio of each compound is unique, like a fingerprint, and this allows you to identify every compound found in the sample in question.

Defense atty. (Diane Moore): O.K. Dr. Campbell, in the Brown and Jones study they were able to measure very accurately the blood levels of PCBs.

Plaintiff's atty. (Jean Howard): Objection, that's not a question your honor.

Judge: Sustained. Ms. Moore, please ask your witness a question.

Defense atty. (Diane Moore): Could you tell us what the study showed?

Dr. Campbell: Well, one health defect that they found was liver damage. Forty percent of heavily exposed workers had a normal liver function test. There were anomalous readings and GGT and OCT and again cholinesterase. In addition, instances of hepatomegaly and hypetocetomegaly and venal hypertrophy.

Defense atty. (Diane Moore): But no cancer.

Plaintiff's atty. (Jean Howard): Objection, leading .

Judge: Overruled.

Dr. Campbell: Yes, no cancer.

Defense atty. (Diane Moore): Is there a substantial body of scientific opinion that claims that human exposure to PCBs will give rise to any form of human cancer?

Dr. Campbell: Not substantial, epidemiological literature on PCBs and cancer risk is scant.

Defense atty. (Diane Moore): Is it fair to say that there is a small minority position of qualified investigators who will adopt that position?

Dr. Campbell: Well, there are some published studies, which do suggest some relationship between PCB and cancer. But again, these studies each have their own individual flaw, maybe not large enough, not long enough follow-up time or flaws like that. There are some studies that suggest PCBs are related to cancer in animals but not in humans.

Defense atty. (Diane Moore): Doctor, do you have other studies, which support this claim?

Dr. Campbell: Yes, one of the most conclusive and powerful studies was just published in 1993 by Harvinsons group from the University of Florida. They summarized the major chemical findings about exposure to PCBs. Those people that had the greatest exposure were involved in the manufacture and maintenance of electrical transformers and capacitors. The potential target areas they looked at include the

skin, lungs, liver, circulatory system, endocrine system, some aspects of the immune system as well as the colon, gastrointestinal and urinary tracts, in general. After careful analysis the weight of the evidence suggests that the effects of PCBs are limited to the skin and the liver.

Defense atty. (Diane Moore): There was no evidence linking PCBs to cancer of any type at all?

Dr. Campbell: Well, this is only one study, but no it did not show linkage between PCB exposure and cancer. I would consider this to be a very well done study.

Defense atty. (Diane Moore): O.K. So, that's only one study, but let me get this clear. What you've told us here today was that if you look at all the studies that have been done and you put all the studies and all the data together; all you can really say is, the evidence to date suggests although PCBs may have some adverse effects, colon cancer is not among them.

Plaintiff's atty. (Jean Howard): Objection. Leading your honor. The witnesses are supposed to give evidence.

Judge: Sustained. Ms. Moore, please ask your witness a question.

Defense atty. (Diane Moore): What you've told us here today was that if you look at all the studies that have been done and you put all the studies and all the data together; would you agree that the evidence to date suggests, that although PCBs may have some adverse effects, colon cancer is not among them?

Dr. Campbell: That is what the epidemiological data would suggest, yes.

Defense atty. (Diane Moore): Meaning that, there is no evidence linking colon cancer to PCB exposure.

Plaintiff's atty. (Jean Howard): Objection, that's not a question your honor.

Judge: Sustained. Ms. Moore, please ask your witness a question.

Defense atty. (Diane Moore): Would you agree then that there is no evidence linking colon cancer to PCB exposure?

Dr. Campbell: There is no epidemiological evidence that links PCB exposure to cancer, yes.

Defense attorney (Diane Moore): Dr. Campbell did you have a chance to review the documents containing Mark Stevens' medical history?

Dr. Campbell: Yes.

Defense attorney (Diane Moore): Dr. Campbell, were *you* able to reach any conclusions about the Stevens being a cancer family based upon the medical evidence, research and conversations with the family?

Dr. Campbell: Yes, familial adenotamous polyposis does run in Mr. Stevens' family.

Plaintiff's atty. (Jean Howard): Objection, inflammatory your honor.

Judge: Overruled.

Dr. Campbell: As Dr. Fallon noted, in familial adenomatous polyposis or FAP, for short, virtually every member of the family gets colon cancer. Another notable trait of FAP is that it causes colon cancer to strike young people. People as young as in their twenties. As a matter of fact, one theory posits that all men who have colon cancer at a young age, say in their 30's or early 40's are related in some way to these cancer families.

Defense attorney (Diane Moore): Dr. Campbell did you have an opportunity to review documents about other aspects of Mr. Stevens' medical history?

Dr. Campbell: Yes.

Defense attorney (Diane Moore): Based on Mr. Stevens' medical history, would you say that Mr. Stevens had a personal history of intestinal polyps or chronic inflammatory bowel disease?

Dr. Campbell: Mr. Stevens did have a number of adenomatous polyps. And these intestinal polyps were adenomatous polyps, which as Dr. Fallon noted, increase the risk of colon cancer. As for the chronic inflammatory bowel disease there was evidence of ulcers in his colon. This increases the risk of colon cancer as well.

Defense attorney (Diane Moore): Dr. Campbell did these medical records make note of whether Mr. Stevens is a smoker or a non-smoker?

Dr. Campbell: Yes, and Mr. Stevens was a smoker who only quit four years ago and again, as Dr. Fallon pointed out, there are several lines of evidence indicating that smokers face an increased incidence of certain types of cancer -that includes colon cancer.

Defense attorney (Diane Moore): What about Mark Stevens eating habits and lifestyle?

Dr. Campbell: Mr. Stevens diet consisted mostly of fast foods. Recent research has uncovered that diets consisting mainly of fast foods and foods that are low in fiber and high in fat and cholesterol have been associated with colon cancer.

Defense attorney (Diane Moore): Dr. Campbell, did you ask for a report on the recent medical histories of the individuals who worked with Mark Stevens at Keen Company?

Dr. Campbell: Yes I did.

Defense attorney (Diane Moore): And what does it say? Could you summarize the contents for the court please?

Dr. Campbell: The report said that 47 out of the 800 people that worked at the Keen Co., including Mark Stevens, had been exposed to high levels of PCBs at the Plant. In this small group of 47 people, only 3 people, including Mr. Stevens, over a five-year period contracted cancer. As Dr. Fallon stated, these men are considerably older than Mr. Stevens. And like Mr. Stevens, these other two men had other risk factors that were most probably the reason for their cancer. None of these men had colon cancer.

Defense attorney (Diane Moore): Dr. Campbell, in your expert opinion, were PCBs the most likely cause of Mr. Stevens colon cancer?

Plaintiff's atty. (Jean Howard): Objection, inflammatory your honor.

Judge: Overruled.

Dr. Campbell: No, I would say that it is highly improbable the plaintiff's colon cancer was the result of exposure to PCBs. Given that familial adenomatous polyposis raises the risk of colon cancer three to five times that of the average population. Also Mr. Stevens had so many other risk factors: smoking, diet, adenomatous polyps, and chronic inflammatory bowel disease. Also, he was one of three people to get cancer at the Keen Co. Plant. He was the only one to get colon cancer. Given this and my research, there is no way PCBs in any way cause Mark Stevens colon cancer.

Defense attorney (Diane Moore): Thank you very much Dr. Campbell.

Judge: Yes, thank you Dr. Campbell. You may step down.

Judge: Good afternoon members of the jury. The plaintiff, Mark A. Stevens, as represented by Ms. Howard will speak to you first, but there is just one caution. What the attorneys say to you is not evidence. The evidence came from the witness stand in the form of testimony. All right, Ms. Howard, you may proceed.

Plaintiff's atty. (Jean Howard): Yes, thank you, your honor. Now is my opportunity to come before you and examine in a comprehensive way the evidence that's been presented in this case. And the theme that I want to set for you is responsibility. Responsibility. Lets talk about my client and realize you can't examine what's happened to Mark Stevens without looking at the evidence hard from beginning to end.

As you heard in this case PCBs are dangerous chemicals and when they get into your body they can cause serious diseases. And there's no dispute about this in this particular case and there's no doubt that for many years Mr. Stevens was exposed to PCBs. We know that Mr. Stevens was exposed and he had PCBs in his liver. You know that he got sick, very sick and one of the best scientists in the world showed you that his sickness was quite probably caused by PCBs in his body and that there was no other reason for him to get colon cancer. People argue that people like Mark Stevens almost never get this disease. But Mr. Stevens was full of PCBs and he got it.

Now, let's look at Dr. Campbell. He is a professional epidemiologist, a scientist, absolutely, but what kind of testimony did he give us? Now, not all chemicals are the same, not all of them cause disease or symptoms. But some do and there's really only one way to determine that. You've got to look at this the way Dr. Fallon did. You've got to do an experiment on them and study them. Dr. Campbell never did that; he just collected data that were already there, he couldn't control his research at all. How could he know what really happened?

When you resolve some of these issues you will come to conclusions. What can you now do? Well, the only thing we can do in a civil justice system is award damages. You can't take away Mark Stevens cancer, you can't take away his years of pain and suffering. That's not in your power. All you can do is make it right by awarding Mr. Stevens with a settlement, by returning your verdict sheet with an amount. That power is yours and that choice is yours, ladies and gentlemen, to decide if Mr. Stevens deserves a settlement.

Now, how do you make that decision? Well, you have to us your own judgment as to what adequately will compensate him. You're going to have a few tools but not many. You can measure his pain and suffering. But I won't dwell on that because this trial is not about sympathy, it's about causation and it's about responsibility.

This trial has not been easy. We all understand and appreciate it. But the fact of the matter is that in the wisdom of all this concern, the decision is left up to you. It's not left up to Judge Montgomery, it's not left up to the lawyers, it's left up to you and that's because the intrinsic value of this system is that when someone has a dispute or has been harmed in your community they can come to the courthouse and get relief. That's what Mr. Stevens has done. His judgment is in your hands and we have no doubt that when it is over, justice will be done. Thank you.

Judge: Thank you Ms. Howard

Judge: Ms. Moore, are you ready to proceed?

Defense atty. (Diane Moore): Thank you your honor. Counsel, Ms. Howard and members of the jury, this is my last chance to talk to you before you go and deliberate. You've been asked to sit as a juror in a

case and decide a dispute between parties in an impartial manner. An impartial manner means that you decide this matter fairly to all parties concerned.

Ladies and gentlemen, when you look at the deficiencies in Dr. Fallon's opinion, his failure to interpret the evidence correctly, his failure to consider all the relevant information when formulating his opinion, you will realize he did not have all the evidence to make a considered medical opinion. For that reason you should disregard his opinion. It is your right to disregard his opinion.

I told you in my opening statement that just because a scientist hired by a lawyer comes to a conclusion, that doesn't mean we are going to sit still and accept that conclusion. Not all the truth comes from opinions. Some of the studies he used are a little old. Some have even been disproved. We don't have to accept them.

Now on the other hand our scientist, Dr. Campbell, has carefully considered all the important facts. He is familiar with all the medical literature and all the latest scientific literature and he has based his opinion on this information. He says that his opinion reflects the opinion of the majority of the scientific community. He has the deficiencies in the other point of view and he has chosen a view that he believes to be right and to be supported by the majority of scientists who study colon cancer.

Ladies and gentlemen, if you think that Keen has caused Mr. Stevens pain and suffering you should give him money. There is nothing wrong with compensating people with money. That's the only way our system has for addressing a wrong. But remember, you're here to throw money into the wind. That's not going to help the situation. Yes, the Keen Co. is big company that makes profits and yes, we have seen many cases like this where big companies have disregarded their employee's safety in the pursuit of profits. But we have also seen cases where individuals sue corporations simply for their own personal gain. It is unfortunate that Mr. Stevens has colon cancer. But making the Keen Co. pay for a condition that is most likely caused by genes and a bad medical history would be grossly unfair, wouldn't it?

I've made my position clear, I hope. I don't go into the jury room with you. I have no place there. I know some other things, which have no place there. One is sympathy. We've heard some sympathetic testimony in this case, things that have nothing to do with this case, anymore. I ask you to try to put that aside. I hope you can. I ask you for your common sense especially in regards to the testimony of Dr. Fallon. He might be a scientist, he might have all those degrees, but you have your common sense. I ask you for a fair and reasonable and intelligent verdict. I'm confident we will get one. Thank you.

Judge: Thank you, Ms. Moore.

Judge: Members of the jury, we have reached the final phase of this case. The time has come when you're about to deliberate and reach a verdict. But, before you do it's my duty to instruct you as to the principles of law that apply. And it's you duty to be guided by those principles in the discharge of your obligation.

Your first duty is to determine whether or not the defendant is legally liable and whether the defendant proximally caused the injuries complained of. If you find the defendant is legally liable and that this liability was the proximate cause of these injuries, then it becomes you duty to determine the total amount of damages the plaintiff is entitled to. To compensate him reasonably for his injuries in this case, you the jury, have to weigh and sift contradictory testimony.

You have to determine the credibility of the witnesses who took the stand. You have to determine the extent to which each witness is to be believed or disbelieved. You're required to give the witnesses such weight; such worth such credibility as you believe they are entitled to. Now if you believe any testimony to be inherently improbable or impossible you may reject such testimony. You may believe only that part of the witness testimony that you think is accurate and true and disregard that part you think is false or inaccurate.

Now you must divide you decision into two parts. First, was the defendant legally liable, that is to say legally responsible. Second, if the defendant is responsible, what damages is the plaintiff entitled to. That is to say, how much money should be awarded. Note that many useful products are dangerous but since they come with warnings the companies that manufacture them are not negligent.

There is conflicting testimony here as to whether or not PCBs cause injury. To be fair, take a preponderance of the credible evidence that PCBs are or are not a proximate cause of Mr. Stevens. In order to be a proximate cause, PCBs need not be the only cause but just one of the causes. You may find that PCBs are not a substantial contributing factor.

Next, you should consider damages. Well, how will you determine the damages, if any? A plaintiff who sustains an injury or illness or a disease as the result of the legal responsibility of another is entitled to recover reasonable monetary damages for the full extent of the harm caused. The law recognizes as proper items of recovery: pain, suffering, discomfort, distress and disability, which apparently may endure as a natural consequence of such injury. The measure of damages is what a reasonable person would consider to be fair and just under all the circumstances of the case, to compensate the plaintiff, no more and no less. Now, with all that said, I want to thank you ladies and gentlemen, for your presence in this courtroom here today. You will now retire to deliberate the facts and return a decision. Bailiff, please escort the jury into the deliberation room. Court is adjourned.

APPENDIX C: Judge Pro-Plaintiff Nonverbal Behaviors

During the Plaintiff's case:

1. Smiles
2. Affirmative head nods
3. Appears thoughtful, concerned, attentive
4. Body positioned forward and facing plaintiff's attorney
5. Eyes on plaintiff's attorney during plaintiff opening and closing
6. No excessive body movements or appearing distracted during the plaintiff's case
7. He is very warm when asking Dr. Fallon to continue his testimony
8. Judge looks directly at Dr. Fallon while speaking
9. Judge smiles, makes eye contact and nods
10. No distracting body position changes, remains relatively still, nods and smiles throughout expert's qualifying process and testimony
11. Look toward the camera as if sizing up the jury
12. Looks briefly toward the "jury"
13. Allow time for Dr. Fallon to step down from the bench
14. When the defense attorney makes an objection
    a. Hesitate, take a breath and without looking toward Ms. Moore, say, "Overruled."
    b. When the judge overrules the objections by Ms. Moore he does so in an indifferent, annoyed manner
    c. He emphasizes the word, "Overruled."

During the Defense's case

a. Leans back in chair
b. Starts shuffling papers
c. Crosses legs
d. Looks down at the floor
e. Crosses arms
f. Rests chin on hand
g. Drums fingers briefly
h. Shifts in chair
i. Fidgets in seat
j. Taps cheek
k. Rubs back of neck
l. Scratches nose
m. Crosses his arms
n. Look at watch
o. Looks at pen
p. Takes off glasses and rubs bridge of nose
q. Has minimal eye contact with Ms. Moore

r. Moves body periodically with posture changes, i.e. crossing legs, touching face, hair, studies hands, etc.
s. Judge speaks to defense attorney with eyes down, shuffling paper
t. When the plaintiff's attorney makes an objection

a. He will appear more warm and thoughtful about overruling those objections
b. He takes a second longer than with defense attorney to say, "Overruled."

<u>During jury instructions (and in British conditions the judge's summation of the trial):</u>

1. Emphasize the words negligence and liability
2. Speak slowly and more distinctly through sections concerning instructions about: evaluating the defendants liability in this case, evaluating whether the plaintiff is entitled to monetary compensation and how much, and discussing that PCB need not be the only cause just one of the causes.
3. Speak quickly through sections about how products are dangerous but since they come with warnings the companies that manufacture them are not negligent and how the jurors may not find that PCBs are substantial contributing factor.
4. During the summation speak slowly and look at the jury during the sections about the plaintiff's case.
5. Speak quickly, lean back in your seat, and use more hand gestures during sections about the defense's case.

APPENDIX D: Judge Pro-Defense Nonverbal Behaviors

During the Plaintiff's case

1. Leans back in chair
2. Starts shuffling papers
3. Crosses legs
4. Looks down at the floor
5. Crosses arms
6. Rests chin on hand
7. Drums fingers briefly
8. Shifts in chair
9. Fidgets in seat
10. Taps cheek
11. Rubs back of neck
12. Scratches nose
13. Crosses his arms
14. Look at watch
15. Looks at pen
16. Takes off glasses and rubs bridge of nose
17. Has minimal eye contact with Ms. Howard
18. Moves body periodically with posture changes, i.e. crossing legs, touching face, hair, studies hands, etc.
19. Judge speaks to plaintiff's attorney with eyes down, shuffling paper
20. When the defense attorney makes an objection
    a. He will appear more warm and thoughtful about overruling those objections
    b. He takes a second longer than with defense attorney to say, "Overruled."

During the Defense's case:

1. Smiles
2. Affirmative head nods
3. Appears thoughtful, concerned, attentive
4. Body positioned forward and facing plaintiff's attorney
5. Eyes on defense attorney during defense opening and closing
6. No excessive body movements or appearing distracted during the defense's case
7. He is very warm when asking Dr. Campbell to continue his testimony
8. Judge looks directly at Dr. Campbell while speaking
9. Judge smiles, makes eye contact and nods
10. No distracting body position changes, remains relatively still, nods and smiles throughout expert's qualifying process and testimony
11. Look toward the camera as if sizing up the jury
12. Looks briefly toward the "jury" (camera)
13. Allow time for Dr. Campbell to step down from the bench

14. When the plaintiff attorney makes an objection
    a. Hesitate, take a breath and without looking toward Ms. Howard, say, "Overruled."
    b. When the judge overrules the objections by Ms. Howard he does so in an indifferent, annoyed manner
    c. He emphasizes the word, "Overruled."

<u>During jury instructions (and in British conditions the judge's summation of the trial):</u>

1. Do not emphasize the words negligence and liability
2. Speak quickly through sections concerning instructions about: evaluating the defendants liability in this case, evaluating whether the plaintiff is entitled to monetary compensation and how much, and discussing that PCB need not be the only cause just one of the causes.
3. Speak slowly through sections about how products are dangerous but since they come with warnings the companies that manufacture them are not negligent and how the jurors may not find that PCBs are substantial contributing factor.
4. During the summation speak quickly, lean back in your seat, and use more hand gestures during sections about the plaintiff's case.
5. Speak slowly and look at the jury during the sections about the defense's case.

APPENDIX E

Informed Consent
Perceptions of Courtroom Procedures

I freely and voluntarily consent to be a participant in the research project entitled Perceptions of Courtroom Procedures to be conducted at Florida International University during the Spring 2001 semester, with Marisa Collett, M.S. as the Principal Investigator. I have been told that this experiment will last approximately one and a half hours.

I understand that the purpose of this research is to gain an insight into how jurors may perceive courtroom procedures.

I understand that the research procedures will be that I will view a simulated trial of a civil case and then I will be asked a series of questions pertaining to that trial.

I understand that there will be approximately 200 participants in this research study.

I understand that the only possible risk involved in my participation in this experiment is that I will be viewing a civil trying which deals with the litigants' exposure to a cancerous substance. I have been told that my responses will be kept strictly anonymous. Only a code number will identify all scores, and my individual performance will not be revealed to anyone.

I understand that I may withdraw my consent and discontinue participation in this research project at any time with no negative consequences to myself. I have been given the right to ask questions concerning this procedure, and any questions have been answered to my satisfaction.

I understand that if I desire further information about this research, I should contact Marisa Collett at (305) 919-5975 or Dr. Margaret Bull Kovera (305) 919-5959. I have been offered a copy of this informed consent form.

I have read and understand the above.

Participant's Signature Date

I have explained and defined in detail the research in which the participant has agreed to participate, and have offered him/her a copy of this informed consent form.

Principal Investigator's Signature Date

APPENDIX F

Participant Questionnaire

1. For the following question please indicate your verdict by circling one of the options below.

   Find for the:

PLAINTIFF	DEFENDANT
(Mark A. Stevens)	(Keen Co.)

2. On a scale of 1 through 7 (**1** indicates **not at all confident** and **7** indicates **extremely confident**), please indicate your confidence in your verdict choice by circling the number that best reflects this.

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all confident						Extremely confident

3. On a scale of 0-100%, please indicate the size of the role that you felt PCB exposure played in Mark Stevens' subsequent development of colon cancer. For example, if you felt that PCB exposure *did not play a role* (i.e. was not one of the causes of Mark Stevens' colon cancer) you would put *0%* or if you felt PCB exposure *was the sole cause* you would put *100%*.

   _____%

4. On a scale of 0-100%, please indicate the probability that Mark Stevens' cancer was the legal responsibility of the defendant, the Keen Co.

   _____%

Please answer this question only if you found for the plaintiff.

(If you found for the defendant, please go to question #6.)

5. If you found for the plaintiff, assume he is adequately compensated for medical bills and lost income. In addition to this, Mr. Stevens has requested an additional $500,000 in compensation for pain and suffering. Please indicate in dollars, the amount you would award for pain and suffering.

   $_____

In the following sections you will be evaluating the evidence presented during the trial. Please read each statement carefully. Please indicate your agreement with each statement about the evidence presented during the trial by circling the number that best reflects your impression on the 7-point scale provided (**1** indicates **strongly disagree** and **7** indicates **strongly agree**).

6. The primary cause of Mark Stevens' colon cancer was his exposure to PCB's.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

7. Dr. Fallon's (the plaintiff's expert) research sufficiently demonstrated that PCBs cause colon cancer in humans.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

8. It is more likely that other risk factors such as a familial history of colon cancer, a diet high in fat and low in fiber, as well as adenomatous polyps and chronic inflammatory bowel disease were the primary cause of Mark Stevens colon cancer.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

9. Dr. Campbell's (the defense expert) research sufficiently demonstrated that PCB exposure might have harmful effects on humans, but that colon cancer is not one of them.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

10. It is improper to say that a substance that causes cancer in animals would cause cancer in humans.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

In the following sections you will be evaluating your impressions of the major players in the trial. Please read each statement carefully. Please indicate your agreement with each statement about each of the major players in the trial by circling the number that best reflects your impression on the 7-point scale provided (**1** indicates **strongly disagree** and **7** indicates **strongly agree**).

In terms of Dr. Thomas Fallon, the expert witness for the plaintiff:

11. Dr. Fallon's testimony was persuasive.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

12. His arguments were weak.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

13. He was likeable.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

14. His arguments were not convincing.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

15. He was knowledgeable.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

16. He was not credible.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

17. He was incompetent.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

18. He was qualified to be an expert witness in this case.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

19. His testimony was understandable.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

In terms of Dr. William Campbell, expert witness for the defense:

20. Dr. Campbell's testimony was persuasive.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

21. His arguments were weak.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

22. He was likeable.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

23. His arguments were not convincing.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

24. He was knowledgeable.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

25. He was not credible.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

26. He was incompetent.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

27. He was qualified to be an expert witness in this case.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

28. His testimony was understandable.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

In terms of Jean Howard, the plaintiff's attorney:

29. Her opening argument was compelling.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

30. Her questioning of the expert witness was effective.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

31. Her closing argument was not compelling.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

32. Overall, she was an effective trial advocate.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

33. Overall, she was not persuasive.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

34. She was dislikable.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

35. She was knowledgeable.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

36. Her use of objections during the trial was effective.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

37. She was antagonistic.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

In terms of, Diane Moore, the defendant's attorney:

38. Her opening argument was compelling.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

39. Her questioning of the expert witness was effective.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

40. Her closing argument was <u>not</u> compelling.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

41. Overall, she was an effective trial advocate.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

42. Overall, she was <u>not</u> persuasive.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

43. She was dislikable.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

44. She was knowledgeable.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

45. Her use of objections during the trial was effective.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

46. She was antagonistic.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

In terms of Judge Montgomery:

47. The judge treated the lawyers and jurors with respect and concern.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

48. The judge was authoritative.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

49. The judge was in favor of the plaintiff.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

50. The judge was not knowledgeable.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

51. The judge seemed interested in the plaintiff's case.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

52. The judge was not competent.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

53. The judge was in favor of the defense.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

54. The judge was domineering.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

55. The judge seemed interested in the defense's case.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

56. Overall, the judge was effective.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

57. During the trial, the judge's facial expressions, gestures, tone of voice, etc., gave me an idea as to which side the judge preferred.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

58. During jury instructions in particular, the judge's facial expressions, gestures, tone of voice, or any type of behavior other than his actual words let me know what he thought the verdict should be.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

In the following section you will be evaluating your overall impressions of the trial. Please read each statement carefully. Please indicate your agreement with each statement by circling the number that best reflects your impression on the 7-point scale provided (**1** indicates **strongly disagree** and **7** indicates **strongly agree**).

59. The trial was tried fairly.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

60. The trial had too many interruptions and objections.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

61. The case presented by the plaintiff was strong.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

62. The trial was civil in tone and atmosphere.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

63. The case presented by the plaintiff was easily understandable.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

64. The evidence presented by Dr. Fallon (the plaintiff's expert) was complex.

1	**2**	**3**	**4**	**5**	**6**	**7**
Strongly disagree						**Strongly agree**

65. The case presented by the defense was weak.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

66. The case presented by the defense was difficult to understand.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

67. The evidence presented by Dr. Campbell (the defense's expert) was complex.

1	2	3	4	5	6	7
Strongly disagree						**Strongly agree**

If you have any further comments about your verdict, the evidence presented, the major players in the trial, and/or the trial itself, please provide them in the space below.

In this section you will recall as much of **the facts presented by the experts** that you can. You will have three minutes to recall all the facts presented by the experts that you are able to remember. Please put one fact per numbered space provided. An example of a fact is, "The car was blue," which essentially states one idea or concept. Please follow this example.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____

14. _____
_____

15. _____
_____

16. _____
_____

17. _____
_____

18. _____
_____

19. _____
_____

20. _____
_____

In this section you will read a statement and then evaluate whether it is true or false based on the trial you just viewed. Please read each statement carefully. Please circle your answer.

True	False	1. Dr. Fallon is a biochemist
True	False	2. PCBs are used as heat exchange fluids.
True	False	3. **Lesser**-chlorinated PCBs are **more** toxic than the more **heavily** chlorinated PCBs.
True	False	4. Studies of the effects of PCBs on animals showed that PCBs were causing cancer in animals.
True	False	5. The Keen Co. does not contest that Mr. Stevens was exposed to higher than normal levels of PCBs.
True	False	6. Recent research has uncovered that diets consisting mainly of fast foods and foods that are low in fiber and high in fat and cholesterol have **not** been associated with colon cancer.
True	False	7. There were PCBs in the soil at the Keen Co.
True	False	8. Mark Stevens worked with capacitors and transformers at the Keen Co.
True	False	9. The government never restricted the use of the more heavily chlorinated PCBs.
True	False	10. Epidemiology is the study of the distribution and effects of disease on human populations.
True	False	11. According to Dr. Campbell there is a strong minority of epidemiologist who see a causal link between PCBs and cancer.
True	False	12. Dr. Campbell has done extensive research on human populations exposed to toxic substances.
True	False	13. Cancers in rats develop slower than cancer in humans.
True	False	14. Dr. Campbell notes that site specificity is the concept that toxins and carcinogens affect specific organ sites **in the same way**.
True	False	15. Epidemiological evidence has not found a high correlation between exposure to PCBs and colon cancer.

True False 16. Dr. Fallon believes that assuming that the same chemicals that cause cancer in animals are the same chemicals that cause cancer in humans is inappropriate.

True False 17. A reliable way to measure PCB levels in the blood is to essentially burn the blood and separate and ionize the individual components.

True False 18. According to the judges' instructions, you must divide your decision into two parts. First was the defendant legally liable and second was the defendant responsible.

True False 19. The judge noted that many useful products are dangerous but since they come with warnings the companies that manufacture them **are** negligent.

True False 20. The measure of damages is what a reasonable person would consider to be fair and just under all the circumstances of the case, to compensate the plaintiff, no more and no less.

DEMOGRAPHIC INFORMATION

1. Gender:

   ☐ Female
   ☐ Male

2. Age: _____

3. Race/Ethnic background:

   ☐ White/Non-Hispanic
   ☐ White/Hispanic
   ☐ Black/Non-Hispanic
   ☐ Black/Hispanic
   ☐ Asian
   ☐ Other: (please specify)_____

4. Please indicate how much formal education you have received:

   ☐ Less than High School
   ☐ Some High School
   ☐ Received High School Diploma
   ☐ Some College
   ☐ Received College Degree
   ☐ Some Post-Graduate
   ☐ Received Post-Graduate Degree

5. Please indicate your current occupation:

   ☐ Student
   ☐ Homemaker
   ☐ Professional/Technical
   ☐ Salesperson
   ☐ Manager
   ☐ Clerical/Secretarial
   ☐ Craftsperson/Laborer
   ☐ Service worker
   ☐ Teacher
   ☐ Self-employed/ small business
   ☐ Not working now/Unemployed/Retired
   ☐ Other (please specify):
   _____

6. Have you ever served on a criminal or civil jury before?

- ☐ Yes
- ☐ No

7. If you answered "yes" to question #6, please indicate the type of trial in which you served as a juror:

- ☐ Criminal
- ☐ Civil

8. Independent of your party affiliation, how would you describe your current political views? (Please indicate ONLY ONE category)

- ☐ Conservative
- ☐ Slightly conservative
- ☐ Slightly liberal
- ☐ Liberal

9. Please indicate your annual family income:

- ☐ Less than $20,000
- ☐ $20,000 to $30,000
- ☐ $30,000 to $45,000
- ☐ $45,000 to $60,000
- ☐ $60,000 to $75,000
- ☐ $75,000 +

Thank you for your participation in this study.
Please hand this questionnaire to the experimenter now.

VITA

MARISA EVELYN COLLETT

October 31, 1973	Born Bogotá, Colombia
1994 – 1997	Research Assistant Claremont Memory and Aging Project Pitzer College Claremont, CA
1996	Bachelor of Arts in Psychology and Sociology Pitzer College Claremont, CA
1997 – 1998	Teaching Assistant Department of Psychology Florida International University Miami, FL
1998	Awarded $500 Research Grant-In-Aid American Psychology and Law Society
1998 – 1999	Research Assistant Southeast Florida Center on Aging North Miami, FL
1999 – 2001	Instructor Department of Psychology Florida International University Miami, FL
1999 – 2001	Investments Assistant Salomon Smith Barney Miami, FL
2000	Master of Science in Psychology Florida International University Miami, FL

2001 – current

Research Associate
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PUBLICATIONS AND PRESENTATIONS

Collett, M.E. & Fisher, R.P. (submitted). Criminal appearance and legal decision-making. Criminal Justice and Behavior.

Prull, M. W., Light, L. L., Collett, M. E. & Kennison, R. F. (1998). Age- related differences in memory illusions: The revelation effect. Aging, Neuropsychology and Cognition, 5, p. 147-165.

Collett, M.E. & Fisher, R.P. (2001, March). Criminal appearance and legal decision-making. Poster presented at the 14th Florida Conference on Cognition, Language, Action, Sensation and Perception, Gainesville, Florida.

Dunlop, B. L., & Collett, M. E. (1999, April). Jury Service Accessibility for older adults and persons with disabilities. Report presented to the Supreme Court of Florida.

LaVoie, D.J., Light, L.L., & Collett, M.E. (1996, April). The effect of definitions on nonword repetition priming in young and older adults. Poster presented at the 1996 Cognitive Aging Conference, Atlanta, Georgia.