



## Jury decision-making biases and methods to counter them

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**Purpose.** The objective of this review was to give a broad overview of various biases associated with jury decision making. Specifically we review research on the impact of pretrial publicity, jury instructions, inadmissible evidence, and scientific evidence. This article elucidates various challenges jurors may face across systems around the world and remedies to counter these challenges.

**Results.** After 50 years of scientific research on juries and juror decision making, there are still many gaps in understanding how factors such as pretrial publicity, inadmissible evidence, scientific evidence, and jury instructions influence juries. At the same time the field has developed a level of appreciation for these problems and is making strides toward understanding them.

**Conclusion.** Based on this review some conclusions can be drawn regarding the areas of decision making reviewed. Jury instructions: Research shows that jurors have difficulties in understanding pattern instructions, at the same time we have developed some insights into ways instructions can be rewritten to increase comprehensibility. Inadmissible evidence: We are aware of the cognitive effort involved in attempting to disregard evidence but are at this point unclear on how to eliminate the associated problems. Scientific evidence: Research has illuminated the difficulties jurors have with comprehending scientific evidence. Better education of jurors and judges can help to address this issue. Pretrial publicity: The threats posed by pretrial publicity to the defendant's right to a fair trial are clear. At the same time (save change of venue) there is a need to develop cost-effective remedies to help overcome media-induced biases.

Jury trials are a complicated amalgamation of a number of players working toward a common goal. This includes the judge, the prosecution, the defence, witnesses, and, of course, the jury. The jury plays an integral role in the administration of justice – it is faced with the daunting task of deciding the ultimate fate of the defendant. Over the course of a trial jurors are given a significant amount of information to help them – including evidence of varying types and jury instructions. At the same time jurors may be exposed

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to extra-legal information via the media, friends or relatives, or other jurors. The legal system operates under the assumption that jurors can take in all this information, process it in a rational manner, disregard what is irrelevant to the case in point, and come to an informed decision. Unfortunately, this assumption is not always justified.

This article reviews several bodies of research that focus on threats to rational jury decision making. Specifically, we will examine research on the impact of jury instructions, inadmissible evidence, scientific evidence, and pre-trial publicity (PTP) on juries. For each section, we discuss the decision-making issues that are of concern to researchers, review empirical research on those issues, consider judicial attempts to deal with associated issues, evaluate whether these attempts have been successful or not, and identify, where appropriate, alternative remedies and areas for future research.

### **Jury instructions**

The complexity of judicial decision making is intensified by the complexity of instructions given to the jury on the law and how to apply the law to their decisions (Heuer & Penrod, 1994). For laws to be comprehended and justice achieved it is essential that jurors comprehend the instructions they are given by the judge. However, the complex nature of the law, jurors' unfamiliarity with the law, and the large quantity of information jurors may confront can combine to make this task extremely difficult (Lieberman & Sales, 1997). A number of researchers have concluded that juror comprehension of judicial instructions is alarmingly low (Elwork, Sales, & Alfini, 1982; Hastie, Penrod, & Pennington, 1983). In a review of the literature, Elwork and Sales (1985) found that comprehension levels for pattern jury instructions stand at about 50% or less. If jurors do not correctly understand the instructions given to them, they may rely on their own conceptions of what is fair and just. 'Commonsense justice' has been examined by Finkel (1995) and refers to 'intuitive notions jurors bring with them to the jury box when judging both a defendant and the law. It is what ordinary people think the law ought to be' (Finkel, 1995, p. 2).

In the USA, pattern jury instructions, typically developed by the courts to comport with appellate case law, are the standard means for instructing juries. Similarly, in England and Wales jurists use a book of standard instructions approved by Judicial Studies Board. Pattern or standard jury instructions are used in a number of countries in Europe, as well as in Australia and New Zealand. However, in the inquisitorial system, jurors do not reach verdicts independently but do so in conjunction with a panel of judges (e.g. France uses a three judge panel along with lay jurors). Thus, it is possible that jurors in these circumstance have a better understanding of instructions, but at the same time their understanding might be influenced, perhaps even unduly, by the experiences and opinions of the judges. Nevertheless, critics of legal instruction have long lamented the fact that they include legal jargon, unfamiliar vocabulary, and long, complex sentences (Strawn & Buchanan, 1976). These factors contribute to low levels of comprehension and confusion. Low levels of comprehension have been reported across the USA in jurisdictions including Florida, California, Arizona, and Michigan (Elwork, Sales *et al.*, 1982). High rates of confusion have been reported for both mock and actual jurors (Kramer & Koenig, 1990). Juror miscomprehension, and sometimes non-comprehension, has been shown to lead to a number of outcomes that are not desirable by the courts. These include reliance on more confident jurors during the deliberation process, even though they may not be more knowledgeable (Elwork & Sales, 1985), jury nullification (Wiener, Habert, Shkodriani, & Straebler, 1991), and

reliance on extra-legal evidence as opposed to trial evidence and testimony while making decisions (Halverson, Hallahan & Hart, 1997).

### **Empirical evidence**

Instruction comprehension research has focused on various types of jury instructions including reasonable doubt, limiting instructions, instructions regarding the joinder of charges against defendants, and death penalty instructions - to mention a few. Across these domains, findings indicate that the average juror has a low level of understanding (Rose & Ogloff, 2001). We briefly review some of the research on varying types of instructions and their comprehensibility. It must be noted that most of the research reviewed below was conducted in the USA, but given that a number of countries use pattern instructions that are similar in nature, verbiage, and use of legalese to those in the USA, there is reason to believe that the results would translate to other jurisdictions as well.

Reasonable doubt instructions are the cornerstone of decision making in criminal cases and possibly the most important instruction provided to jurors. Despite the importance of this construct, courts rarely attempt a very precise definition for jurors and in some instances judges have avoided defining the concept out of fear that their definition will lead to a reversal on appeal. Ellsworth (1989) found that jurors were very clear on the notion that they had to be convinced 'beyond a reasonable doubt' but at the same time, none of the jurors were able to define what reasonable doubt meant. Even when reasonable doubt is defined, confusion seems to occur. Kramer and Koenig (1990) compared reasonable doubt standards for jurors who had served jury duty and those who had been called but had never served. They found that only 25% of jurors in both groups thought they should return a not guilty verdict if they had any reasonable doubt. Additionally, defining the concept of reasonable doubt actually led to greater confusion for participants as opposed to clarification: 52% of uninstructed jurors thought that reasonable doubt could only be based on the evidence, and not the conclusions drawn from the evidence, but 68% of the instructed jurors made this mistake.

Though it may seem that providing a quantitative definition of reasonable doubt would be a good idea, courts have been resistant to that notion (Horowitz, 1997; Stoffelmayr & Diamond, 2000). Nonetheless, researchers have attempted such quantifications. A typical finding is that the probability of guilt associated with a reasonable doubt is around .90 (i.e. McCauliff, 1982 reported an average of .90 in a survey of federal judges and Hastie *et al.*, 1983 reported a mean of .92 among jury-eligible adults), but these numbers conceal wide variability (the range in McCauliff's study was .5-1) and in some samples with alternative forms of measurement the mean value is much lower than .9 (Dhami, 2008). These variations in subjective understandings of reasonable doubt are associated with varying conviction rates (Horowitz, 1997). Rather than measuring inferences about the probabilities of guilt associated with reasonable doubt, an alternative path of inquiry poses the question of what happens when a quantified definition is provided to jurors. In one programme of research Kagehiro (1986) examined the effect of combining legal and quantified (probability based) instructions on the three standard of proof instructions - preponderance of evidence, clear and convincing evidence, and beyond a reasonable doubt. She found that when quantified definitions were presented first, followed by the legal definition, instructions influenced verdicts in the intended

manner. That is, there was a greater proportion of verdicts favouring the defence as the standard of proof became stricter. This finding was replicated in a number of follow-up studies using similar methodologies (Kagehiro, 1990; Kagehiro & Rosen, 1986).

Research has shown that limiting instructions are also quite difficult to comprehend. These instructions are given when evidence introduced can be used for certain purposes, but not others (Lieberman & Sales, 1997). Research is mixed when it comes to the effectiveness of limiting instructions. Some researchers have found that limiting instructions add to juror confusion and those who understand these instructions do not perform any better than those who do not receive any instructions (Kramer & Koenig, 1990). For example, Wissler and Saks (1985) presented mock jurors with information about a defendant's prior history (either conviction for a crime similar to the one the defendant was currently accused of, a dissimilar crime, perjury, or no prior conviction). Jurors presented with a prior record were instructed to use the prior record only to assess the credibility of the defendant's testimony and not as evidence of criminal disposition or character. The defendant's credibility ratings were not affected by the prior record evidence, but verdicts were. The percentage of jurors voting to convict were: similar crime (75%), dissimilar crime (53%), perjury (60%), and no prior (43%). Jurors were clearly influenced by the type of prior crime. On the other hand, other researchers have found that limiting instructions can be helpful in limiting the impact of certain types of limited-use evidence. For instance, Thompson, Fong, and Rosenhan (1981) found that limiting instructions had an influence on the interpretation of evidence when it favoured the defence. This was not apparent when the evidence favoured the prosecution.

Joinder instructions - instructions given to jurors in cases where multiple charges against a defendant are joined together in a single trial - are another type of instruction that has received attention from researchers. Courts are concerned that joinder may unfairly bias the jury in favour of the prosecution when they hear evidence relating to more than one offence, as they may infer that the defendant has a criminal disposition and this can increase the likelihood of the defendant being convicted of a charge - as compared to the situation in which a charged is tried alone. A number of studies have produced results which underscore this concern. Tanford and Penrod (1982) and Tanford, Penrod, and Collins (1985) found that a defendant is more likely to be convicted of a particular charge when it is tried in a joined trial than by itself. Greene and Loftus (1985) presented mock jurors with limiting instructions regarding joinder of rape and homicide trial, and found higher guilt ratings for both the rape and murder when they were presented together in a joined trial as opposed to being tried separately.

### **Remedies**

Although recent research has shown that there are limits to instruction comprehensibility in the form of ceiling effects (English & Sales, 1997), significant improvements in juror comprehension have been shown through rewriting of jury instructions according to psycholinguistic principles (Diamond, 1993; Elwork, Alfini, & Sales, 1982; Wiener, Pritchard, & Weston, 1995). In one early demonstration, Elwork, Alfini, *et al.* (1982) attempted to rewrite standard jury instructions by replacing infrequently used words with common ones, replacing abstract words with concrete ones, removing negations, reducing legal jargon, shortening sentences, and creating a more logical order of legal concepts. They found that mock jurors' comprehension improved from 51 to 80% after the rewrite. Other methods that have been suggested and that have led to similar

improvements include pre-trial instructions (Smith, 1990), providing written copies of the instructions and providing taped instructions pre- and post-trial (Sand & Reiss, 1985), and allowing jurors to take notes with written copies of the instructions (Heuer & Penrod, 1989).

However, many of these remedies, although effective, call for a significant change in court procedures. One of the most commonly proposed remedies - re-writing of instructions has been a cause of concern for some judges due to the intrusive and possibly biasing nature of the re-writing (Lieberman & Sales, 1997). One alternate procedure that has been suggested is the use of providing flowcharts or decision trees to aid jurors in the decision-making process (Ogloff, 1995; Otto, Penrod, & Dexter, 1994). Graesser (1981) in a study of text comprehension showed that material is better recalled if people have an understanding of the underlying structure. Highlighting this structure can lead to a better understanding of the relationship between concepts and the rationality behind the concepts. This can be applied to help improve the learning and recall of legal concepts. Flowcharts may hold jurors' attention and aid in the comprehension of legal concepts (Dattu, 1998). Semmler and Brewer (2002) provided mock jurors with a flowchart to aid understanding of the law of self-defence during deliberations. They found that having a flowchart facilitated discussions about the criteria for self-defence and discussions were more accurate as compared with those who got verbal instructions only. Although flowcharts are uncommon in most jurisdictions, judges in New Zealand regularly employ flowcharts when instructing the jury. A recent study found that over two-thirds of judges provided juries with flowcharts or decision trees of instructions (Young, 2003). Given these findings and those in the broader literature it would follow that jurisdictions should look into alternative methods of presenting jury instructions including graphic displays, decision trees, and flowcharts. As suggested by Semmler and Brewer (2002) judges could qualify their verbal instructions with flowcharts pointing out the key elements - a strategy which may prove more effective than simple verbal instructions.

### ***Inadmissible/stricken evidence***

Jurors are expected to base their decisions only on information and evidence that is deemed acceptable for courtroom presentation (Stebly, Hosch, Culhane, & McWethy, 2006). The scope of evidence is governed by a strict set of rules which dictate what information or evidence is acceptable in court. As a general proposition, according to the Federal Rules of Evidence (and similar evidence rules used in the USA), information is admissible if it has probative value, unless it was illegally obtained, is inflammatory or redundant. At the same time, jurors are often exposed to extra-legal information which could alter their perceptions of the proceedings (Kassin & Sommers, 1997). These types of information could include, but are not limited to PTP, hearsay, defendant prior record, presumptive questioning by attorneys, or evidence deemed inadmissible by the court. Inadmissible evidence refers to evidence presented in the courts that is considered to be unrelated to the substantive nature of the case and could lead the jurors in reaching an incorrect verdict (London & Nunez, 2000). If information is deemed inadmissible the judge has the option of declaring a mistrial or striking the information from the record with an instruction to disregard. This is an admonition where the judge instructs the jury to disregard the improper information. This instruction may be given at the time the testimony or exhibit is presented or at the end of the trial, or both. As noted above, the judge may also issue a limiting instruction in some cases. This is done when the evidence

is admissible for one purpose but inadmissible for another. Once such an instruction is given, the courts proceed as though the information is just as easily forgotten by the jurors as it is erased from the court record.

Whether jurors are able and willing to comply with such admonitions is an important question. There is a lively debate in the field with judges falling on both sides of the question – some believe that jurors are able to process these instructions and follow them as directed whereas others believe that they are ‘mere legal fiction promoting expediency’ (Demaine, 2008, p. 9). The Supreme Court has adopted the optimistic view, assuming that instructions to disregard are generally effective but that some exceptions exist:

‘It is not unreasonable to conclude that . . . the jury can and will follow the trial judge’s instructions to disregard . . . Nevertheless . . . there are some contexts in which the risk that the jury will not, or cannot, follow instructions is so great, and the consequences of failure so vital to the defendant, that the practical and human limitations of the jury system cannot be ignored’ (United States v. Burton, 1968).

A related concern with the instruction to disregard is that judges often do not restate the inadmissible evidence in their instruction to disregard as they feel that this will draw additional attention to the evidence. At the same time, this may reduce the likelihood that jurors will understand what information they are required to disregard and may unwittingly use the inadmissible evidence in their decision making. A third problem is the traditional concept of ‘forgetting’ that is encouraged by the courts. Jurors are admonished to forget and ‘wipe from their minds’ the inadmissible or stricken evidence. This ability rests in cognitive and motivational process of jurors. Corrective action as required by judicial admonitions can only occur when jurors are motivated and able to do so. Evidence indicates the human mind cannot simply forget information on command. This inability has been acknowledged by the courts as well. Judges also conclude that sometimes it is more effective and in the better interest of the proceedings to give no instruction at all. This approach is reflected in an appellate decision in *Sowell v. Walker* (2000) where the court concluded that, ‘(the judge) could reasonably have believed that an instruction to the jurors to disregard what they had just heard . . . would have been just about as effective as a directive not to think about a pink elephant’ (p. 448).

### **Empirical evidence**

Psychology’s study of the influence of inadmissible evidence and admonitions to disregard has spanned more than 30 years (Lieberman & Arndt, 2000) and the findings are well explained with some core social psychological principles. Jurors are tasked with processing a huge amount of information that is both psychological and legal in nature. At the same time they experience a substantial amount of pressure during the process. This poses serious cognitive challenges and jurors can only take the corrective actions required by the courts if willing and able to do so (Fein, McCloskey, & Tomlinson, 1997).

Empirical research on stricken evidence has yielded mixed findings. Perhaps, the most succinct overview of this research is provided in a meta-analysis by Steblay *et al.* (2006) of 175 tests of the effects of instructions to disregard inadmissible evidence, reported in 48 studies. The authors examined the impact of exposure to inadmissible evidence, judicial instructions to disregard, admit or limit the use of contested evidence, and the timing of judicial instructions of juror decision making. They examined a number of hypotheses related to this phenomenon. They found that participants

exposed to critical evidence were more likely to convict a defendant (48%) as compared with those exposed to no information and instruction (40%). They also found that inadmissible evidence led to an increase in guilty verdicts even when there was a judicial admonition to disregard the evidence at that time (46% vs. 52%). Additionally, they found that there was a significant difference in conviction rates between those who were exposed to inadmissible evidence and an admonition (46%) versus those who did not hear the inadmissible information and received no instruction (37%). Thus, the judicial instruction to disregard did not return verdicts to the level of those jurors who were never exposed to inadmissible evidence.

Stebly *et al.* (2006) also examined the difference in verdicts of those who were exposed to inadmissible evidence and received an admonition versus those who were exposed to the information and did not get an admonition. They found that the instruction heightened the inadmissible evidence effect resulting in more guilty verdicts in the admonition condition (no means reported). When the inadmissible plus admonition condition (46%) was compared to those for whom the evidence was contested and ruled admissible (74%), there was a significant increase in conviction rates for the evidence ruled admissible condition. At the same time, they found that this effect of admonitions on the influence of inadmissible evidence was moderated by number of study variables. Specifically, the effect was greater when the reason for inadmissibility was not explained and when there were multiple points of inadmissible evidence. The effect was attenuated when the instructions provided a reason as to why the evidence was not admissible, when there was a general charge at the end of the trial and when the inadmissible evidence was hearsay evidence (Stebly *et al.*, 2006).

Research on the timing of instructions produced mixed results. Stebly *et al.* (2006) found no difference in studies that had a pre-trial instruction regarding inadmissible evidence as compared to those which did not. There were lower conviction rates for those who heard inadmissible evidence plus an end of trial instruction to disregard that evidence (25%) as compared to those who received no inadmissible evidence and no instruction (41%). In this one instance, the judge's instruction brought the experimental group's conviction rates below the rate of the control group.

Overall, Stebly *et al.* (2006) conclude that that jurors are reluctant to disregard evidence they consider probative and judicial instructions do not completely eliminate jurors' use of stricken evidence. Jurors are particularly susceptible to influence when a reason for rejecting evidence is not provided or the evidence is rejected due to an unexplained technicality, or the rejected evidence was obtained illegally. Rejected evidence has a smaller effect when instructions include an explanation such as a characterization of the evidence as unreliable or irrelevant to the case.

### **Remedies**

Courts have stood by the belief that people, once they enter a jury box, will be able to overcome basic cognitive limitations and will be willing and able to disregard information on command. Given Stebly *et al.*'s (2006) findings regarding jurors' regard of admonitions, if courts would like to limit jurors use of inadmissible evidence then they should consider developing methods to help explain to jurors why the evidence is irrelevant to the case and is deemed unfair to the parties involved. It would be prudent for the court to develop language as a part of their instructions that provide a clear rationale as to why the evidence is to be considered inadmissible. This admonition should be delivered at the time the evidence is revealed and again during the end of trial

instructions. Another possible strategy for attorneys is to carefully weigh the consequences of objecting to certain evidence. Research shows that when evidence is ruled admissible there is a significant increase in guilty verdicts as compared to when the evidence is presented uncontested. Thus attorneys should take this into consideration when objecting under certain circumstances.

Traditionally courts have conceptualized disregarding information as forgetting, as reflected in instructions (United States v. Kallin, 1995). At the same time by drawing attention to the information there is a possibility that it becomes more salient in the jurors minds (Wenzlaff & Wegner, 2000). An alternate to this form of instruction would be one in which judges acknowledge the biasing nature of the information and instruct jurors to take this into consideration and adjust their verdicts accordingly (Demaine, 2008). This strategy is supported by psychological research on correcting for bias which concludes that individuals who have the awareness, willingness, and ability to correct will do so (Wilson & Brekke, 1994). Studies show that individuals have the ability to correct for the amount of bias they perceive exists (Petty & Wegner, 1993). Thus jurors, based on their own perceptions of bias, and the judge's instructions may be able to correct for biases introduced via inadmissible evidence if motivated to do so. Reformulating instructions with this effect in mind may be helpful to the courts and to jurors.

### **Scientific evidence**

Another feature of trials that can add to the complexity of jury decision making is the technical nature of the evidence (Heuer & Penrod, 1994). Experts are often proffered in a variety of fields including, but not limited to, forensic psychology, product liability, financial management, health, and risk assessment. In addition, police investigations now use scientific methods as DNA, fingerprint, or wound analyses, adding to the difficult task of comprehension on the part of the jurors. Because judges play a gatekeeping role (guided by the rules of evidence) in which they determine which evidence a jury will hear, the admissibility of scientific evidence has been a longstanding concern for the courts (dating back to at least the eighteenth century). Recently, there have been substantial changes in the gatekeeping role for American judges due to a series of Supreme Court cases in the 1990 (Daubert v. Merrell Dow Pharmaceuticals, 1993; General Electric v. Joiner, 1996; Kumho Tire v. Carmichael, 1999), in which the Supreme Court has provided more detailed guidance to trial judges concerning the criteria they are to use when assessing the admissibility of scientific evidence. These changes in admissibility standards are important with regard to the admissibility of forensic scientific evidence in the court. Judges are now required to base decisions on the scientific validity of the testimony as opposed to relying entirely its general acceptance in the professional community. This opens the door to admissibility for a number of areas of scientific research that are innovative and may not have otherwise been admissible under the previous Frye<sup>1</sup> general acceptance standard. Additionally, the Daubert standard applies across all types of expert testimony including scientific, technical, and other specialized knowledge. Rules of evidence are followed in courts around the world – both in the adversarial and inquisitorial systems. Given that in the adversarial system evidence is presented to the lay person as opposed to a trained judge

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<sup>1</sup> The Frye test which governed the admissibility of expert testimony on scientific evidence before the Daubert ruling was based on whether the evidence 'was sufficiently established to have gained general acceptance in the pertinent field in which it belongs' (Frye v. United States, 1923, p. 1014).

the rules of evidence are somewhat stricter and much more extensive (DeBarba, 2002). Additionally, in the inquisitorial systems, experts are not called in by disputants, but are court referred. In France for instance, each court has a list of experts for each needed area. To be on the list, professionals have to fill several requirements defined by the law. Then, when needed, the judge in charge of the preliminary investigation approaches an expert of the list and this expert can be called to make a statement during the trial.

What about the influence of scientific evidence on jurors? Heightened reliance on scientific evidence has been dubbed the 'CSI effect'. The basic notion is that forensic science television shows have produced expectations among laypeople concerning forensic evidence standards - which leads to an increase in expectations by jurors with regard to evidence presented by the prosecution, especially crime scene investigations and DNA evidence. When such evidence is not present, jurors' expectations are violated leading to an increase in 'not guilty' verdicts.

### **Empirical evidence**

There is a possibility that scientific techniques that are not validated are being presented in the courtroom (or that valid science is being excluded). Judges for the most part are not scientifically trained and may not be the most effective gatekeepers when it comes to assessing the merit of scientific evidence. Gatowski *et al.* (2001) conducted a national survey of trial court judges to assess their understanding of the Daubert factors. Overall, between 4 and 6% of the judges were able to clearly define the various factors and provide appropriate examples of how they would use them in evaluating scientific evidence. Kovera and McAuliff (2000) asked trial court judges in Florida to evaluate the admissibility of expert testimony in a sexual harassment case. They varied the vignette so as to manipulate the internal validity of the study as either being sound or flawed in three ways - the presence of a confound, a missing control group, and experimenter bias. They found that the presence of flaws did not significantly influence admissibility decisions. This lack of scientific training for judges, and the over-reliance placed on scientific evidence by jurors may then lead to fatal flaws in the courtroom. A series of studies reviewed by Kovera, Russano, and McAuliff (2002) extended these findings to include attorneys and jurors.

Recently, research has examined the impact of various types of scientific evidence on juror decision making. Introduction of scientific evidence has become a powerful tool in the courtroom. At the same time, the presumed infallible nature of this evidence could lead to a discrepancy between people's perceptions and the accuracy of the evidence, thereby distorting legal decisions. Physical evidence (e.g. videotape surveillance pictures, DNA analysis, alcohol, and drug test) is perceived as more accurate and persuasive as compared to other types of evidence such as eyewitness statements and confession evidence (Lieberman, Carrell, Miethe, & Krauss, 2008). Studies show that physical evidence has a strong impact on juror verdicts, even stronger than other forms of testimony already known to have a powerful impact on verdicts such as eyewitness testimony (Skolnick & Shaw, 2001). Expectations regarding scientific evidence are extremely high. A survey of a potential jury pool (Shelton, 2008) found that scientific evidence of some kind is expected in every case by 46% of jurors, by 74% in murder cases, 43% in rape cases, 73% in breaking and entering cases, and 55% in crimes involving a gun.

Of the various types of scientific evidence that is proffered, DNA evidence is seen as the most authoritative by mock jurors (Connors, Lundregan, Miller, & McEwen,

1996). DNA evidence overshadows evidence that traditionally has significantly influenced decisions. For instance, Golding, Stewart, Yozwiak, and Sanchez (2000) found that DNA evidence led to more guilty verdicts as compared to when a child testified in sexual abuse trial. This evidence holds up even in face of testimony by eyewitnesses and alibi witnesses (Skolnick & Shaw, 2001). DNA evidence may also function as a heuristic cue (Lieberman *et al.*, 2008). Given the amount of attention DNA evidence has been given in recent years – from television shows, to high profile news stories, and DNA exonerations it is possible that jurors take the existence of DNA evidence as an indicator of guilt. Research has shown that this type of evidence is often seen as definitive as compared to other types of evidence (Schklar & Diamond, 1999). A recent study of 200 sexual assault cases in Australia revealed that jurors were 33 times more likely to convict when DNA evidence was presented, as compared to similar cases in which no DNA evidence was introduced. Based on this research and other findings, the Australian Law Reform Commission (2003) recommended that the judiciary develop model jury instructions to help judges and juries evaluate complex DNA evidence.

Research on the 'CSI effect' is arguably still in its infancy. Tyler (2006) offers a balanced overview of arguments (and limited evidence) concerning possible CSI effects on viewers' attitudes and jury decision making. Tyler notes that the CSI effect could plausibly reduce or increase conviction rates. Early research yields conflicting evidence on CSI effects (Podlus, 2006; Reardon, O'Neil, & Lawson, 2007). Podlus measured television viewing patterns of mock jurors, and had them render verdicts on a one-page trial transcript. Participants were then asked to indicate factors that had influenced their decisions. Frequent and non-frequent CSI viewers did not differ in their verdict choices or the reasons for their verdicts. Similarly, Shelton (2008) surveyed more than 1,000 summoned jurors and asked for their verdicts in response to short scenarios. Frequent CSI viewers were not more or less likely to convict in the absence of scientific evidence. Schweitzer and Saks (2007) presented mock jurors with a short trial transcript including testimony from a forensic scientist. CSI viewers rated the forensic evidence as less believable and were more confident about their verdicts. Although fewer CSI viewers convicted, the difference was not a statistically significant. Schweitzer and Saks surmise that scepticism about forensic science evidence may be limited to heavy consumers of forensic science programmes.

Other studies have found that the level of crime drama viewership is related to assessment of some types of evidence. Patry, Stinson, and Smith (2006) found that viewing crime dramas had a significant, positive correlation with high expectations of forensic science. Smith, Patry, and Stinson (2007) reported that CSI viewing was associated with higher accuracy, reliability, and fairness ratings for DNA and fingerprint evidence. Reardon *et al.* (2007) manipulated several aspects of a simulated trial and reported some support for a CSI effect. When frequent viewers were presented with weak forensic evidence and strong non-forensic evidence, they were less likely to convict than non-frequent viewers. A CSI 'warning' (emphasizing that real forensic science is not on a par with fictional forensic science) influenced jurors' assessment of the probative value of fingerprint evidence. When the warning was not presented, participants with high exposure to crime dramas overestimated the probative value of forensic evidence. A general belief in the diagnosticity of forensic evidence was significantly related to an increased probability of voting guilty.

One factor that may cause this over-reliance on various types of scientific evidence is the processing mechanisms used by jurors. DNA evidence is often accompanied by

complicated statistical tests, which require the trier of the fact to make a number of probabilistic determinations. Given the complexity of the information presented, it is possible that jurors process the information peripherally using heuristic shortcuts (Tversky & Kahneman, 1974), basing their decisions on what they know about the strength and reliability of DNA evidence from news stories and television programmes. At the same time, some evidence exists to support the notion that jurors are sensitive to variations in the weight of statistical evidence (Levett, Danielsen, Kovera, & Cutler, 2005). Smith, Penrod, Otto, and Park (1996) found that jurors made use of eyewitness confidence information (more guilty verdicts when eyewitness confidence was high as compared to low) even when exculpatory DNA evidence was presented.

### **Remedies**

It is clearly desirable to provide continuing education and training for judges in the scientific method to help them become better evaluators on scientific evidence (e.g. The Judging Science Course offered at Duke Law School). If faulty evidence can be censored at the admissibility stage this can lead to a better evaluation of the entire body of evidence presented at trial and sounder decision making on the part of jurors. As evidenced by the research, jurors tend to put great emphasize on scientific evidence and rate it as more credible and influential when compared to other types of powerful evidence such as eyewitness testimony and the testimony of a child in a sexual abuse case. Given this finding, it is crucial that evidence that makes its way to the jury is based on well-researched and validated methods. Similarly providing training for jurors would enhance their understanding of the limits of certain types of evidence.

A recent report released by the National Academy of Sciences (2009), found that with the exception of DNA analysis, 'no forensic method has been rigorously shown to be able to consistently, and with a high degree of certainty, demonstrate a connection between evidence and a specific individual or source.' Given this finding, it becomes imperative for judges to apply their training in an appropriate manner and avoid the inclusion of 'junk science' in the courtroom.

With respect to possible CSI effects, we are probably too early in the research enterprise to specify the exact nature of any media-induced effects and it may be premature to speculate about possible remedies - though the Reardon *et al.* (2007) 'warning' effects signal a possible avenue for further research.

### **Pre-trial publicity**

As news coverage has become increasingly accessible via newspapers, television, and the internet, the influence of PTP on jurors has become an increasing concern - particularly in the USA - where the press is relatively uninhibited in its coverage of legal matters - both criminal and civil. PTP refers to any information disseminated via the media about a case that is making its way towards trial (Greene & Wade, 1988; Studebaker & Penrod, 1997). This information can pose a number of challenges, particularly in highly publicized cases. For instance, PTP highlights the constant struggle between the right to a free press and the right to an impartial jury (Newcomb v. State, 1990). While the media and public have a right to disseminate and receive information about crimes in their community under the First Amendment of the USA constitution, the information that is circulated may contain emotion-provoking, inflammatory, biased, or erroneous details about the crime or the parties

involved (Kovera, 2002; Vidmar, 2002). Essentially, PTP may bias potential jurors and impair a defendant's right to be tried by an impartial jury. The potential biasing effect of PTP has been recognized both in the research literature (Imrich, Mullins, & Linz, 1995; Minnow & Cate, 2001; Moran & Cutler, 1991; Otto *et al.*, 1994; Simon & Eimermann, 1971; Studebaker, Robbennolt, Pathak-Sharma, & Penrod, 2000) as well as by legal institutions such as the American Bar Association.

Numerous aspects of PTP could influence potential jurors and their decision making. These include the amount of PTP, the type of PTP, the timing of the presentation of PTP in relation to trial evidence, the lack of appropriate screening measures of exposure for potential jurors, and the nature of the PTP itself (Stebly, Besirevic, Fulero, & Jimenez-Lorente, 1999). In general, research has demonstrated that prejudicial PTP in criminal cases influences perceptions of defendant likeability, credibility, sympathy towards the defendant, perceptions of defendant criminality, judgments of pre-trial guilt, and final verdicts (Studebaker & Penrod, 1997). According to Ruva, McEvoy, and Bryant (2007) exposure to PTP can significantly influence guilt verdicts, and sentence length. Perhaps most significantly, in a test of source memory they found that participants tended to misattribute PTP as having being presented as evidence during trial.

In the USA, in recent years, legal and policy arguments about the negative effects of PTP on a party's right to a fair trial as guaranteed under the Sixth Amendment have increased. Minnow and Cate (2001) estimated that in the 1980s at least 3,100 defendants claimed they could not be tried in a fair manner in the jurisdiction in which the alleged crime took place, due to the significant amounts of negative PTP surrounding their case. Replicating their methods, a more recent LexisNexis<sup>2</sup> search conducted by us revealed that the number of defendants who claimed a fair trial was jeopardized as a result of PTP between 1998 and 2008 is over 7,000. The 7,000 figure may substantially underestimate the actual number of cases as it is reasonable to anticipate that far more claims would be reported by local media – most of which are not included in the databases which we searched.

The courts' evaluations and understanding of the effects of PTP on jurors' judgments against a defendant, and their assessment of the likelihood that potential jurors' initial perceptions will persist throughout the trial is based on their common sense thinking as opposed to an evaluation of empirical findings from the psycho-legal literature. As a result, the courts' assumptions often overestimate the capabilities and underestimate the weaknesses of human inference, information processing mechanisms, and decision-making processes when faced with challenging cases involving PTP (Studebaker & Penrod, 1997; Tans & Chaffee, 1966). Due to the fact that PTP of a biased nature (e.g. information about a defendant or 'evidence' that would not be admissible at trial) is highly pervasive (Imrich, Mullins, & Linz, 1995), it is important to determine whether an empanelled jury can base its decision solely on the evidence presented before them – even if exposed to biasing information during the course of the trial.

The US Supreme Court uses a 'totality of circumstances' standard to assess the influence of PTP (*Murphy v. Florida*, 1975). According to this test, the court examines juror responses to questions posed to prospective jurors during jury selection as well as the media and community atmosphere surrounding the trial. The court also relies on jurors' statements of impartiality. If prospective jurors claim that they can ignore reports

<sup>2</sup> LexisNexis is a searchable archive of content from newspapers, television news archives, legal documents such as federal and state cases, and other printed sources.

of the case in the media and act as impartial judges these statements may be taken at face value, and the persons are selected as jurors. This belief that jurors can set aside any information they have received pre-trial and base their decisions solely on the trial evidence is counter to much basic research in social cognitive psychology (Fiske & Taylor, 1991; Pennington & Hastie, 1992). As noted in our earlier discussion of stricken evidence, research shows that it is extremely difficult for people to set aside previously acquired information. People tend to make decisions in an integrative manner and use prior information to guide the interpretation of new information presented to them. To 'set aside' information, a person must become consciously aware of the prejudicial information, gain mental control over this information, and reverse its biasing effects (Lieberman & Arndt, 2000). This requires substantial cognitive motivation and an ability to do so, and even with motivation and ability it would be difficult to do so. This is especially true when people are inundated with new information at a fast pace in an unfamiliar environment such as the courtroom (Jones & Brehm, 1970).

### **Empirical evidence**

Over the past 35 years a substantial body of research has developed, examining the effects of PTP on juror decision making. While some experimental studies suggest that jurors are insensitive to PTP when making judgments about a defendant (Carroll, 1986), the majority of past studies indicate that PTP can bias jurors' perceptions of defendant guilt, criminality, and juror sympathy for the defendant both pre-trial and after evidentiary presentations (Studebaker & Penrod, 2005). The most common methodology used to assess the effects of PTP on verdict judgments takes the form of experimental studies. These are designed so that participants receive various levels and types of PTP before making decisions about the case and about the defendant. Jurors are typically exposed to the PTP, followed by case facts, and asked to render judgments.

A meta-analysis on PTP effects was conducted by Steblay *et al.* (1999). Their analysis included 44 empirical tests of the effect obtained from articles published between the dates of 1966 and 1997. Steblay *et al.* found that participants who had been exposed to biasing accounts of PTP were significantly more likely to prejudge the defendant as guilty when compared to those not exposed to this type of information (average  $r = .16$ , though the effect size increased to .39 when researchers used non-experimental survey samples). They also discovered that PTP effects were the strongest when participants were potential jurors as opposed to students, when PTP had multiple accounts of information about the case, when PTP was real as opposed to artificial, and when judgments about the defendant were made more than 1 week after the initial PTP was disseminated to participants, and finally, results demonstrated that although the strongest effects of PTP occur before the trial takes place, effects are still seen post-trial. The strongest PTP effects were found in cases pertaining to drugs, sexual abuse, and murder.

The second PTP research methodology employed is case study methods where community members in a jurisdiction in which a high profile case is set to take place are surveyed regarding their opinions. Nietzel and Dillehay (1983) reported five separate community attitude surveys for five murder cases which were used to support a change of venue. In all five surveys, they found that more respondents in the trial venue had heard about that case when compared to respondents in different counties. Further, the respondents in the trial venue were more likely to perceive the defendant as guilty when

compared to respondents in other counties (these numbers ranged anywhere from 16 to 40%). Moran and Cutler (1991) surveyed potential jurors on two separate cases regarding their knowledge of the case, attitudes towards the case, and general attitudes towards the crime. Greater knowledge of the case was correlated with defendant culpability but this did not influence participants' self-reported ability to be fair and impartial. Arbuthnot, Myers, and Leach (2002) conducted a change of venue survey for a murder case and produced similar findings. Case knowledge emerged as a better predictor of defendant pre-judgment than case awareness.

Overall, results gleaned from case study research supports the results found in experimental studies, namely, that jurors exposed to PTP are more likely to hold biased opinions about a defendant pre-trial, and tend to hold more pro-prosecution attitudes.

### **Remedial efforts by the judicial system**

Although the actors in the adversarial system, including the courts and trial attorneys have placed much faith in jurors' ability to be impartial, they have taken several steps to try to ensure that a defendant receives a fair and impartial trial. Following a number of high profile cases in which PTP was raised as a concern on appeal (*Irvin v. Dowd*, 1961; *Rideau v. Louisiana*, 1953; *Sheppard v. Maxwell*, 1966), the American Bar Association instituted the Project on Standards for Criminal Justice in 1968 (Travis & Linz, 2002). This worked to establish guidelines for lawyers and court officials with regard to the type of statements, made in public, that could pose a threat to a fair trial.

The courts have also devised and implemented a number of remedies to help eliminate these biases. Research has shown most of these safeguards to be ineffective. The research is reviewed here briefly.

#### *Continuance*

One option that has been suggested to reduce the prejudicial impact of PTP is for the courts to grant a continuance to delay the trial long enough for the publicity to subside and its effects to dissipate (Lieberman & Arndt, 2000). When reviewing appeals on the grounds that the PTP was prejudicial in a case, courts review the time between the PTP exposure and the trial to determine whether this may have biased jurors and impeded the defendant's right to a fair trial. Unfortunately, the Steblay *et al.* (1999) meta-analysis found effect sizes to be larger when the time interval was lengthened as opposed to shortened. At the same time, this was for periods of time that were shorter than would be true with respect to actual trials. It is possible that a longer continuance period could produce significant reductions in the effects of PTP. Kramer, Kerr, and Carroll (1990) examined the effects of continuance for both factual and emotional PTP with a 12- or 1-day continuance period. They found that the 12-day delay period was effective for factual publicity but not for emotional publicity. Of course, there is also a concern that even though the bulk of PTP has appeared well before a trial begins, the start of the trial may provoke new media coverage which reinstates any biases which may have otherwise been attenuated by the passage of time.

#### *Voir dire*

*Voir dire* refers to the process of questioning potential jurors in an attempt to uncover biases and prejudices against the parties in the case, so as to ensure the impanelling of an impartial jury (Studebaker & Penrod, 2005). The inclusion of jurors with strong,

negative pre-existing attitudes and beliefs has the potential to create a biased jury and impede the defendant's right to a fair and impartial trial. The use of extended *voir dire* as a legal remedy has been suggested as a potential safeguard for educating and identifying jurors with particularly strong beliefs (i.e. authoritarianism; Narby, Cutler, & Moran, 1993). However, the empirical literature examining the effectiveness of extended *voir dire* in identifying potentially biased jurors indicates that *voir dire* is of limited value. Dexter, Cutler, and Moran (1992) found that extended *voir dire* was more effective than minimal *voir dire* in reducing jurors' perceptions of defendant culpability, but extended *voir dire* failed to significantly reduce the impact of PTP. Extended *voir dire* has been shown to elicit richer data thus explaining greater variation (78%) in juror verdicts than data gathered from minimal *voir dire* procedures (50%; Moran, Cutler, & Loftus, 1990). However, Dexter *et al.* (1992) found that mock jurors continued to be more punitive to the defendant after exposure to PTP, in spite of an extended *voir dire* focused on educating jurors and raising awareness of their possible biases. Freedman, Martin, and Mota (1998) found that the negative effects of PTP were actually increased, as opposed to decreased when jurors were questioned about their pre-trial exposure. Additionally, they found differences in post-trial guilt verdicts across conditions only when jurors were asked to render pre-trial verdicts. They interpreted this as participants being reluctant to change their opinions once they had committed to a position. Steblay *et al.*'s (1999) meta-analysis found stronger PTP effects when participants were asked to render pre-trial judgments. Thus, *voir dire* is a questionable tool to control the effects of PTP and may have a backfire effect. Ultimately, it is a self-report measure of attitudes and biases and is thus at risk of intentional as well as unintentional deception.

#### *Judicial admonitions*

Cautionary instructions are often given to jurors with regard to PTP. The judge will instruct jurors to ignore what they have learned about a case prior to trial and to avoid contact with media information about the case after they have been seated. The majority of research on instructions to disregard PTP has shown them to be ineffective. As noted earlier in this article, instructions to ignore inadmissible evidence or prior record have not been shown to reduce levels of bias. For example, Sue, Smith, and Gilbert (1974) presented participants with an article about a case followed by trial evidence and judicial admonitions. The articles contained PTP damaging to the defendant or neutral PTP. Judicial admonitions were ineffective in countering PTP effects, and the damaging PTP created a pro-prosecution bias. Fein *et al.* (1997) also found that admonitions were ineffective in reducing the effects of PTP and hearsay testimony.

#### *Presentation of trial evidence*

A majority of the studies that have found PTP effects have included little or no presentation of trial evidence. The studies that have included presentation of extensive evidence have revealed mixed results (Dexter *et al.*, 1992; Kramer *et al.*, 1990). Most studies have not focused on whether the influence of PTP is attenuated by the presentation of trial evidence. A recent study conducted by Daftary-Kapur, Wallace, and Penrod (2009) found that PTP effects remained intact 8 weeks after the presentation of PTP and were not attenuated by the presentation of trial evidence.

### Deliberations

Deliberations are seen as a safeguard for reducing bias under the assumption that although jurors may hold prejudicial beliefs privately, these may not permeate the deliberation room if they are unjustifiable and unsubstantiated (Lieberman & Arndt, 2000). Kramer *et al.* (1990) through a content analysis of jury deliberations found that the mention of PTP was rare and when it was mentioned brief. In addition, when inadmissible publicity was mentioned jurors reminded one another not to consider it. However, the effects on verdict decisions of emotional PTP were substantial, and were actually increased via deliberations. The Steblay *et al.* (1999) meta-analysis also found that the effects of PTP in the form of anti-defendant verdicts were accentuated after group deliberations ( $r = .15$ ) as compared to before deliberations ( $r = .09$ ). It is possible that this is a result of group polarization effects whereby the initial opinions of a majority of the jurors gets validated and stronger as the deliberations progress.

### Change of venue

Change of venue requests are made usually by defence attorneys in situations in which the publicity surrounding the case is perceived to be highly prejudicial. In many cases, a change of venue is likely to yield substantially less prejudice against a defendant. The Nietzel and Dillehay (1983) community surveys noted earlier document substantial differences in knowledge and prejudice between the communities in which trials have been scheduled and alternative venues.

PTP is not a concern exclusive to the courts in the USA. Recognizing that prejudicial PTP is a potential problem courts have implemented restrictions on discussion of a case by the media subjudice (Australia; Chesterman, Chan, & Hampton, 2001; England; Lloyd-Bostock, 2000; Canada, Vidmar, 2002). According to these restrictions, when a case is under judgment, public commentary regarding the parties at trial, the evidence, or suspects is not allowed. Other nations prevent reporting of the police investigation once a suspect has been identified. Thus, once a suspect has been named in an investigation the person is free from news media conjecture (Lieberman, Arndt, & Vess, 2009). In Scotland, the Contempt of Court Act (1981) 'makes it an offense of strict liability to publish, including broadcast, anything which creates a "substantial risk" that the court of justice in an active proceedings will be seriously impeded or prejudiced' (Duff, 1999, p.186). However, this act does not limit publication of information prior to the actual proceedings. At the same time, this threat is not adequately controlled as illustrated by the case of *Stuurman v. H. M. Advocate* (1983) in which, despite the Act being invoked and heavy fines being imposed on the press as an acknowledgement of the biased nature of the PTP, the court decided that a fair trial was possible and the case proceeded.

Despite these official controls over the dissemination of publicity, jurors may still be exposed to information regarding the case through outlets such as the community, friends, family, and media sources outside of their country. For example, in the 1993 rape trial of Paul Bernardo in Canada, where the Canadian press were barred from reporting on the case, 26% of people living in Ontario reported gaining information about the case from the *New York Times* and *The Washington Post*. Given the proliferation of news on the Internet, restricting juror access to information has become increasingly difficult. In response to some of these violations, countries have started to introduce legislation. For example, in Australia, a 2-year jail sentence can be imposed on

jurors who use the Internet to try and gain information about the trials on which they are sitting (Goodman-Delahunty & Tait, 2006).

### **Remedies**

In this age of information technology, it may be difficult to find a juror who has not been exposed to some extent to publicity regarding a trial – especially, a high profile one. Courts need to discern whether this exposure was in fact damaging and find methods for reducing that damage. Of all the above-mentioned remedies, a change of venue stands out as the most promising for cases that are primarily publicized locally. Despite the likely efficacy of changes of venue, courts are reluctant to grant a change of venue motion due to the potentially high costs of transporting and housing court personnel, attorneys, and witnesses and the increased burden on those individuals. In some highly publicized cases even a change of venue may not offer a solution to PTP-induced biases. As has been recognized by the courts, it is not merely exposure to information that is the problem, it is exposure to certain types of information. In those instances where a change of venue is not viable – and as a general matter – courts may need to give attention to the specific content of the PTP. It is possible that certain types of information are more inflammatory than others. For example, Steblay *et al.* (1999) report in their meta-analysis that cases involving murder and sexual abuse consistently generated larger effects than did other types of crimes.

Clearly, more research is needed before it is possible to differentiate types of cases and PTP which create the largest risks. Future research might also more plainly identify the mechanisms through which PTP exerts its effects and thereby suggest strategies for mitigating PTP effects. With more research in hand, it may be possible to identify cases in which a change of venue is clearly the preferred remedy and other cases in which *voir dire* or specialized instructions or warnings might effectively focus on those elements of the publicity that are thought to be most damaging.

### **Conclusions**

Despite more than 50 years of scientific research on juries and jury decision making, we are far from a complete understanding of factors that can have an untoward influence on juries. As we have highlighted above, we certainly have an appreciation of some of the problems that confront jurors and juries.

- (1) We know that jurors have difficulty in understanding traditional legal instructions and legal constructs, but have some insights into ways in which those instructions can be rewritten and made more comprehensible.
- (2) We know that jurors have difficulty with the mental gymnastics they are called upon to perform when evidence is offered for limited purposes or is ruled inadmissible but do not, as yet, have effective strategies that will eliminate those problems.
- (3) Recent changes in evidence standards governing the admissibility of scientific evidence have yielded research which underscores the difficulties jurors (and judges) have in evaluating the soundness of scientific evidence. These problems can likely be addressed with better education of jurors and judges.
- (4) The recent advent of fictional forensic science television programmes has prompted concerns about their influence on jurors' assessment of forensic

evidence. Initial studies of the so-called 'CSI effect' yield a mixed picture about the impact of such programmes on juries but some studies suggest reasons for concern. Of course, methods for addressing any problems flowing from CSI effects will have to await better understanding of those effects.

- (5) Finally, we have a growing appreciation of the threats that PTP poses to trial fairness and reasons to be concerned about the viability of most of the safeguards (save changes of venue) which the courts have devised to address media-induced biases. Further research is clearly needed if we are going to find alternative remedies.

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