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PSYCHOLOGICAL MEDIATORS OF THE EFFECTS OF OPPOSING EXPERT TESTIMONY ON JUROR DECISIONS

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This study examined the effectiveness of the opposing expert safeguard against unreliable expert testimony and whether beliefs about experts as hired guns and general acceptance mediate the effect of opposing expert testimony on juror decisions. We found strong evidence that the presence, but not the content, of opposing expert testimony affected jurors' trial judgments and that these effects were mediated by mock jurors' beliefs about general acceptance. The presence of an opposing expert affected jurors' ratings of the general acceptance of research investigating sexual harassment in the workplace. Jurors' beliefs about general acceptance then affected jurors' ratings of plaintiff expert competence and research, which affected juror ratings of the probability that the plaintiff experienced a hostile work environment.

Keywords: juries, expert testimony, scientific evidence, sexual harassment

U.S. Supreme Court rulings have placed the responsibility of admitting sound scientific evidence into court in the hands of judges (*Daubert v. Merrell Dow Pharmaceuticals, Inc.,* 1993; *General Electric Co. v. Joiner,* 1997; *Kumho Tire Co. v. Carmichael,* 1999); however, research suggests that judges may not be good evidentiary gatekeepers because they lack the knowledge to evaluate expert evidence (Gatowski et al., 2001) and consequentially may admit testimony based on flawed research into evidence (Kovera & McAuliff, 2000). Thus, the jury may confront the task of evaluating and weighing unreliable expert evidence proffered at trial. However, jurors have difficulty differentiating between flawed and valid expert testimony (Groscup & Penrod, 2002; Kovera, McAuliff, & Hebert, 1999; Levett & Kovera, 2008; McAuliff & Kovera, 2008; McAuliff, Kovera, & Nunez, 2009). The *Daubert* court noted three safeguards that could help jurors evaluate scientific evidence: cross-examination, presentation of contrary evidence (including opposing expert testimony), and instruction on the burden of proof. Research has demonstrated the limited ability of the proposed safeguards to help jurors

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make good decisions in those cases in which flawed science is admitted (Groscup & Penrod, 2002; Kovera et al, 1999; Kovera, Russano, & McAuliff, 2002; Levett & Kovera, 2008). The present study was designed to evaluate the psychological mechanisms behind the inefficacy of one of these safeguards: the opposing expert. Specifically, we examined variables hypothesized to mediate the influence of opposing experts on jurors' decisions.

The Opposing Expert Testimony Safeguard

For opposing expert testimony to be an effective safeguard, several assumptions must be met. First, when attorneys are presented with expert evidence from the opposing side that is of questionable quality, they need to recognize the questionable research and consult with their own expert (Kovera et al., 2002). Some research suggests that attorneys have trouble recognizing flawed research (Kovera et al., 2002); however, the overall likelihood of consulting an opposing expert was high (regardless of whether attorneys could correctly identify flawed research), indicating that opposing expert testimony is likely to be proffered in many cases involving expert testimony. A second assumption must be met for opposing expert testimony to be an effective safeguard: The opposing expert hired must be able to recognize methodological flaws in the initial testimony. One study suggests that experts successfully recognize methodological flaws, regardless of the party requesting assistance; however, potential experts might be unwilling or reluctant to testify (Russano & Kovera, 2001).

These studies suggest that attorneys call experts to help educate the jury about the methods used by other experts and that these experts will be able to spot flaws in those methods. However, will opposing expert testimony assist jurors in making better decisions? Generally, research investigating opposing expert testimony has focused on comparing conditions with opposing experts to conditions with one expert or no experts. Findings collectively suggest that an opposing expert may not counter an initial expert's testimony but rather decrease the favorability of participants' ratings of the initial expert (Devenport & Cutler, 2004; Diamond, Casper, Heiert, & Marshall, 1996; Greene, Downey, & Goodman-Delahunty, 1999). To date, only one study has directly tested whether an opposing expert is an effective safeguard against junk science (Levett & Kovera, 2008). In this study, researchers manipulated the presence and type of opposing expert testimony (absent, present without addressing the original expert's methodology, or present and addressing the original expert's methodology) and the validity of the original expert's testimony (valid, missing control group, confound). Jurors rendered more guilty verdicts (i.e., their verdicts were moved away from the position supported by the original expert) in conditions with an opposing expert than in conditions without an opposing expert, regardless of the content of the initial or opposing expert testimony. The presentation of an opposing expert did not sensitize jurors to validity issues; instead, it caused jurors to be skeptical of all expert testimony, regardless of the validity of the testimony (Levett & Kovera, 2008).

It is unclear why an opposing expert was unsuccessful in educating the jury about junk science. That is, did jurors view the expert as a hired gun, testifying to whatever the hiring attorney desired? Or was the opposing expert unsuccessful

because jurors became skeptical of the research presented because of the disagreement between the two experts? That is, did jurors view two experts, similar in credibility, disagreeing on a topic and then conclude that the research must not have been generally accepted, regardless of scientific validity? Social–psychological theories of persuasion might shed light on these research questions.

Heuristics and Evaluation of Expert Testimony

The Heuristic–Systematic and the Elaboration Likelihood Models of persuasion suggest that individuals may use two paths to evaluate the persuasiveness of new information (Chaiken, Liberman, & Eagly, 1989; Petty & Cacioppo, 1986). If people use the first route, they process the information by evaluating the merits and quality of the message, termed *systematic processing* or the central route to persuasion. If people lack the ability or motivation to evaluate the message, they may use heuristics or environmental cues to evaluate the message, termed *heuristic processing* or using the peripheral route to persuasion. Ideally, when evaluating expert testimony, jurors should process expert testimony using systematic processing or the central route to persuasion, ensuring that they attend to the variations in evidentiary quality. However, given that scientific testimony is often complex, jurors' abilities to process centrally may be impaired. That is, whether jurors process information systematically or heuristically depends on their motivation and ability to do so. Jurors are presumably highly motivated; however, their ability to understand the testimony may be limited. Thus, jurors may engage in heuristic processing or may use the peripheral route to persuasion. In previous research, jurors demonstrated heuristic processing in that they relied on the ecological validity of a study when evaluating an expert's testimony. Specifically, jurors relied on testimony high in ecological validity versus low in ecological validity, regardless of the internal validity of the testimony (Kovera et al., 1999).

It is possible that jurors in the previous study examining the effectiveness of the opposing expert (Levett & Kovera, 2008) used the mere presence of opposing expert testimony as a heuristic. If they lacked the motivation or ability to comprehend the expert testimony proffered, they may have perceived the opposing viewpoints presented by the experts as evidence that the research was disputed and not generally accepted in the field. That is, the jurors may have noted that two experts from the same field with similar degrees were disagreeing on a set of findings and concluded that the findings must not be agreed upon in the field. Thus, without evidence of the testimony's general acceptance, jurors did not use it to make a decision.

In Levett and Kovera's (2008) study, the experts testified about children's suggestibility. One expert concluded that children are susceptible to suggestibility, and the other expert concluded that children are not susceptible to suggestibility. Both of these experts were psychologists who were university professors, published in professional journals, and were viewed overall as equally credible by the jury. However, their opinions on the effects of suggestive questioning on children differed. Given their conflicting opinions, jurors may have concluded that this issue is generally unresolved in the field (i.e., there is no generally accepted conclusion about children's suggestibility). Jurors may have used that lack of

general acceptance as a heuristic, choosing to discount any testimony about suggestibility. In previous research, jurors have used a general acceptance heuristic when making decisions about expert testimony (Groscup & Penrod, 2002; Kovera et al., 1999). In these studies, researchers manipulated the general acceptance of expert testimony in a trial. In both studies, jurors were more likely to rely on expert testimony when it was generally accepted in the field from which it came than when it was not. It is possible that jurors may infer a lack of general acceptance from two opposing experts and, in turn, use this heuristic in their decision making rather than evaluating the quality of the scientific evidence. In those conditions in which only one expert testified, jurors may have inferred that the research was generally accepted in the field because there was no opposing opinion presented.

It is also possible that jurors view opposing experts as "hired guns" or experts paid specifically to give a particular opinion. A previous study found that jurors disliked and did not believe experts who were highly paid or who frequently testified (Cooper & Neuhaus, 2000). This "hired gun effect" occurred more often when testimony was difficult for the jurors to understand. Because they perceive the experts to be hired guns, when presented with two opposing experts, jurors may be skeptical of all expert testimony, regardless of research quality. It is possible that jurors may have used the opposing expert as a heuristic to conclude that the research presented was inconsequential because the experts were *hired* to give their opinions.

Jurors may have used the general acceptance or hired gun heuristics both when the opposing prosecution expert attempted to educate the jury about the methods used by the defense expert and when the opposing prosecution expert did not. Even in those conditions in which an opposing prosecution expert tried to increase the ability of the jurors to evaluate the methods used in the defense expert's research, jurors did not use the validity of the research when making a final verdict decision (Levett & Kovera, 2008). However, jurors did use the information when evaluating certain characteristics of the expert. That is, jurors judged the defense expert (who offered the initial research) as more credible and trustworthy in those conditions in which she offered valid research versus invalid research, but only in those conditions in which the opposing expert evaluated the methods used by the defense expert. Thus, jurors showed evidence of both heuristic processing (in their verdict choices) and systematic processing (in their evaluations of the defense expert). Heuristic and systematic processing can occur simultaneously (Petty & Wegener, 1998). This study was designed to test the heuristics that jurors used in evaluating opposing expert testimony.

Do Heuristics Mediate the Effects of Opposing Expert Testimony About Scientific Validity?

In this study, we assessed whether jurors' attitudes about the science presented or the experts mediate the relationship between the type of opposing expert testimony presented and verdict. To answer our research question, we measured whether presenting two opposing experts caused jurors' attitudes about the general acceptance of the science presented or the nature of the experts (i.e., as hired guns) to become

more accessible, compared with when jurors only heard one expert. We then assessed whether this attitude affected jurors' verdicts and trial decisions.

Previous research has demonstrated that attitude accessibility mediates the effects of situations on behavior (Fazio, Powell, & Herr, 1983). Likewise, if jurors' beliefs about experts as hired guns or the general acceptance of the research proffered are activated through the presentation of opposing experts, then these beliefs will be more accessible when there is an opposing expert than when only one expert is presented. If accessible, these beliefs will influence the jurors' perceptions of the evidence (i.e., they may conclude that the research is not generally accepted or the experts are hired guns). These perceptions then influence the juror's behavioral response (i.e., the choice to discount either expert's testimony when rendering a verdict).

In this study, we varied the quality of the testimony given by the original expert (internally valid vs. invalid) and the testimony given by the opposing expert (absent; present without addressing the methods used by the original expert; and present, addressing the methods used by the original expert) in the context of a sexual harassment trial. After the trial, we measured two attitudes and the accessibility of those attitudes using reaction time (RT) software: attitudes about experts as hired guns and attitudes about general acceptance. We then tested whether the direction and accessibility of these attitudes mediate the relationship between opposing expert testimony presence and juror decisions.

Hypotheses

We expected to replicate findings in previous research. First, we expected to find some evidence of a sensitivity effect as a replication of previous research. That is, we expected that educational expert testimony would sensitize jurors to variations in scientific evidence on at least some of our dependent measures. Second, we expected to find the strongest evidence for a skepticism effect; that is, we expected that jurors would be less likely to find the defendant liable in those conditions in which there was an opposing expert, regardless of the content of that expert's testimony and regardless of the validity of the plaintiff expert's research. This effect was expected as a replication of the skepticism effect in Levett and Kovera (2008) and would be indicated by a significant contrast between conditions containing an opposing expert and the conditions in which no opposing expert was presented. Levett and Kovera (2008) found little evidence for a sensitivity effect; jurors' ratings of the first expert's trustworthiness significantly differed as a function of evidence validity when the opposing expert's testimony addressed the initial expert's methodology only when planned contrasts were conducted (i.e., the omnibus interaction test was not significant); therefore, we did not expect a sensitivity effect for the major trial decisions (i.e., verdict).

After testing whether we replicated previous findings, we tested possible mediators of the effects of opposing expert testimony on jurors' decisions. We hypothesized that jurors' attitudes would mediate the relationship between opposing expert presence and liability decisions. In conditions in which there was an opposing expert, we expected jurors' beliefs about general acceptance and psychologists as hired guns to be more accessible than in those conditions with no opposing expert. Jurors also should be less likely to find the defendant liable in

those conditions with an opposing expert compared to those without an opposing expert. Finally, we predicted that these beliefs would mediate the relationship between the opposing expert condition and liability decisions.

Method

Participants

Participants were 240 jury-eligible community members. Participants were recruited through three sources (advertisements posted in a free local newspaper and on www.craigslist.org, and flyers were distributed at busy intersections) and were paid $30 in exchange for participation. The majority of participants were female (64%) and had been called for jury duty previously (64%). Twenty-four percent of participants had served on a jury. Participants ranged in age from 18 years to 81 years ($M = 37$, $SD = 14$) and were from a variety of ethnic backgrounds (45% White, 27% Black, 8% Asian, 13% Hispanic, and 7% other) and education levels (1% had some high school, 4% had a high school degree, 2% had a trade school degree, 32% had some college, 38% had a college degree, 9% had some graduate school, and 14% had a graduate degree).

Design and Materials

The study had a 2 (validity of plaintiff expert testimony: valid vs. invalid) $\times$ 3 (opposing expert: absent vs. present/addresses plaintiff expert's testimony vs. present/does not address plaintiff expert's testimony) between-participants factorial design.

Trial stimulus. The voir dire and the trial stimulus were filmed in a mock courtroom using professional actors. The trial was a sexual harassment trial loosely based on *Robinson v. Jacksonville Shipyards, Inc.* (1991) and adapted from a trial transcript used in previous research (Kovera et al., 1999). Six versions of the trial stimulus were developed to manipulate the validity of the plaintiff expert testimony and the presence and content of the opposing expert testimony.

In all conditions, the plaintiff sued for damages resulting from hostile work environment sexual harassment. The plaintiff testified that she was the direct target of crude comments, that photographs of naked women were displayed in the workplace, and that she was the target of inappropriate sexual touching. She also testified that the harassing behavior happened continuously over time and that the company only made minimal attempts to curb the harassing behavior. The plaintiff called an expert to testify about research conducted to determine whether exposure to sexualized material increases the likelihood that men will engage in sexually harassing behavior. A representative for the company testified on behalf of the defense. This witness discussed his personal observation of the plaintiff in the working environment, the company's sexual harassment policy, and the measures he took to try and address the plaintiff's complaints. Some participants also heard testimony from an opposing expert hired by the defense.

Validity of plaintiff expert testimony manipulation. The plaintiff's expert testimony was based on a study (Rudman & Borgida, 1995) that examined the influence of sexual material on men's behavior toward women. In the valid version of the research (e.g., which described the actual methods of this study that

won an award from the Society for the Psychological Study of Social Issues, Division 9 of the American Psychological Association for the best paper on intergroup relations that year), male participants watched either commercials that focused on the scantily clad women selling the products or commercials that focused on the attributes of the products that were advertised. After viewing the commercials, the participants interviewed a female research assistant (RA) who was unaware of condition (i.e., she did not know which set of commercials the men viewed). The RA rated the men who viewed sexual commercials as more sexually motivated than those who viewed neutral commercials. In addition, the men who viewed sexual commercials were more likely to ask inappropriate questions, sit physically closer to the RA, and rate the RA's capabilities negatively than men who viewed neutral commercials. In the invalid version of the research, there was no comparison group (i.e., all participants viewed sexualized commercials), and all the results were stated without reference to a comparison group (e.g., men asked inappropriate questions).

Opposing expert manipulation. In both conditions in which opposing expert testimony was present, the opposing expert made arguments that were drawn from a published critique of the application of stereotyping research to gender discrimination cases (Barrett & Morris, 1993). The opposing expert argued that the findings in the stereotyping literature were inconsistent with the conclusions drawn by the plaintiff's expert about the role of the plaintiff's work environment in promoting sexual harassment. In addition, the opposing expert argued that the materials used in the study (i.e., sexualized commercials) were fundamentally different than materials found in the workplace of the plaintiff (i.e., sexualized calendars). This information was included in each opposing expert testimony condition because it was a published criticism of the research proffered by the plaintiff expert. Therefore, it is unlikely that opposing expert testimony would be proffered in a case such as the one used in this study without including these criticisms (even if the opposing expert testimony is not going to critique the methods used by the initial expert).

Either the defense attorney (through direct examination in the conditions in which the study is invalid) or the plaintiff's attorney (through cross-examination in which the study is valid) asked the opposing expert to evaluate the study of the original expert. The expert responded by explaining the methods used by the plaintiff's expert and describing why the methods were valid or invalid (depending on the validity of the plaintiff expert's study). However, the opposing expert always maintained the position that the study was inapplicable to the case.

Pilot Study

In the pilot study, to ensure that participants noticed our manipulations and perceived the credibility of the two experts similarly, we showed participants ($N = 65$ students at a northeastern, urban, public university) the trial stimulus that varied the validity of the research (valid vs. invalid) and the nature of the opposing expert testimony (addressed the validity of the initial experts study vs. did not address the validity). Then we asked the participants several questions to ensure that they noticed the manipulated content. Participants successfully distinguished between research that contained a control group and research that did not contain

a control group. Participants in the valid condition were more likely than participants in the invalid condition to answer "true" to the following true–false statements: (a) Half of the men viewed sexualized commercials, and the other half of the men viewed neutral commercials (88% vs. 42%), $\chi^2(1) = 14.96$, $p < .01$, $\phi = 0.48$; (b) participants were randomly assigned to one of two groups (85% vs. 19%), $\chi^2(1) = 27.53$, $p < .01$, $\phi = 0.66$; (c) men in the study viewed two sets of television commercials (73% vs. 26%), $\chi^2(1) = 14.08$, $p < .01$, $\phi = 0.47$.

Dependent Measures

Liability judgments. Participants rendered a liability judgment and rated the probabilities that the plaintiff experienced a hostile work environment and that the defendant contributed to the work environment on 100-point scales.

Ratings of plaintiff expert witness, strength of evidence, judgments about scientific validity, and general ratings. Participants rated the competence and trustworthiness of the plaintiff expert using 7-point bipolar adjective pairs. Participants rated expert competence using the following adjective pairs ($\alpha = 0.89$): competent–incompetent, convincing–unconvincing, not believable–believable, accurate–inaccurate, likable–unlikable, and certain–uncertain. They rated the expert's trustworthiness using the following adjective pairs ($\alpha = 0.92$): honest–dishonest, sincere–insincere, immoral–moral, intelligent–unintelligent, respectable–not respectable, trustworthy–untrustworthy, and good–bad.

For all remaining scalar ratings, participants rated their agreement with a series of statements on Likert-type scales ranging from 1 (*strong disagreement*) to 6 (*strong agreement*). Items in each scale were averaged to obtain a score for each scale. Scales and items are shown in Table 1, and some items were adapted from previous research (Cooper & Neuhaus, 2000; Levett & Kovera, 2008). If necessary, items were recoded so that higher numbers reflected a more positive evaluation (indicated by an R following the item).

Attitude accessibility. We measured the accessibility of two constructs: general acceptance and hired guns using RT software. To measure the accessibility of the hired guns construct, we had participants indicate the favorability of the following phrases by pressing a key marked "good" or a key marked "bad": (a) hired guns, (b) sellout, and (c) objective. To test the accessibility of general acceptance, we had participants indicate the favorability of the following phrases by pressing a key marked "good" or a key marked "bad": (a) agreement, (b) see eye to eye, (c) generally accepted, (d) disagreement, and (e) concurrence.

We also measured the accessibility of participants' beliefs about hired guns and general acceptance of psychological research. We factor analyzed the RTs for participants' ratings of these beliefs using principal axis factoring with varimax rotation, revealing two underlying factors. RTs for the following items were averaged to obtain an overall score for the accessibility of participants' beliefs toward general acceptance ($\alpha = 0.84$): (a) Psychologists disagree; (b) psychologists disagree about research; (c) there is no generally accepted opinion; (d) experts agree about research findings; and (e) psychologists see eye to eye. RTs for the following items were averaged to obtain an overall score for the accessibility of participants' beliefs about experts as hired guns ($\alpha = 0.84$): (a) Experts are hired guns; (b) experts are objective; (c) experts have integrity; (d) experts are

Table 1
Scale Items and Alpha Internal Consistency Scores

Scale	Items	α
Evidence strength	[The plaintiff] was the victim of hostile work environment sexual harassment.	0.93
	[The plaintiff] should be compensated for her injuries.	
	Sunshine Trucking Co. should be punished for its conduct.	
	The evidence presented by the plaintiff was strong.	
	In my opinion, the evidence presented by the defense was very convincing (R).	
	In my opinion, the evidence presented by the plaintiff was very convincing.	
	The evidence presented by the defense was strong (R).	
Plaintiff expert relevance	[The expert's] testimony was very helpful in reaching a liability judgment.	0.93
	[The expert's] testimony was irrelevant for deciding whether Sunshine Trucking Co. was a hostile work environment (R).	
	[The expert's] testimony was very persuasive.	
	[The expert's] testimony was relevant to the case.	
	[The expert's] testimony was relevant in describing the plaintiff's allegations.	
	[The expert's] testimony was relevant to what could happen in a sexual harassment scenario.	
	In my opinion, the testimony of [the expert] was applicable in this trial.	
	The testimony of the plaintiff expert was applicable to sexual harassment cases in general.	
	I think [the expert] provided valuable information.	
Plaintiff expert qualifications	[The expert's] testimony lacked scientific rigor (R).	0.86
	[The expert] was well qualified to provide expert testimony.	
	[The expert's] testimony was an accurate representation of scientific opinion.	
	[The expert] gave her testimony because she is knowledgeable about the effects of sexual material on workplace behavior.	
	[The expert] gave her testimony because she is a well-qualified researcher studying the effects of sexual material on workplace behavior.	
	In my opinion, the testimony of the plaintiff expert was "junk science" (R).	
Plaintiff expert motivation	[The expert] gave her testimony because she was paid to give her testimony (R).	0.86
	[The expert] gave her testimony because she makes money by giving such testimony (R).	
	[The plaintiff expert] was likely paid for her opinion (R).	
The plaintiff expert as a hired gun	[The expert] could likely be paid to give the opposite opinion (R).	0.72
	[The expert] would always give the same opinion.	
	No amount of money would cause [the expert] to offer a different opinion about this case.	

(*table continues*)

Table 1 (*continued*)

Scale	Items	α
The plaintiff expert's research	In my opinion, the research techniques used by the plaintiff expert were valid.	0.88
	In my opinion, the research presented by the plaintiff expert was not reliable (R).	
	The dependent measures used by the plaintiff expert were very appropriate.	
	The procedure used by the plaintiff expert was inappropriate (R).	
	I think [the expert] provided valuable information.	
Experts as hired guns	Experts are "hired guns," meaning that they will give any opinion if the price is right (R).	0.84
	Experts usually testify because that is how they make money (R).	
	Experts, generally, can be paid to give any opinion (R).	
	Experts are likely paid for their opinions (R).	
	Experts could likely be paid to give the opposite opinion (R).	
	Experts will always give the same opinion, no matter the cost.	
	No amount of money would cause experts to offer a different opinion because their opinions are based on research.	
The general acceptance of the research presented	Research on the effects of sexual material on sexual harassment in the workplace is not generally accepted in the field (R).	0.64
	Hearing the expert opinion made me believe that the research is inaccurate (R).	
	The research in this case is generally accepted in the field of psychology.	
	There are no commonly accepted opinions about the effects of sexual material on sexual harassment in the workplace (R).	
Psychology generally	Psychology is generally a reliable science.	0.74
	Having a psychological expert damages a case (R).	
	Psychological science generally provides good information about human behavior.	
	Psychologists are generally competent.	
Disagreement of opposing experts	When two psychologists disagree, the entire field of psychology loses credibility (R).	0.85
	Battling psychological experts causes confusion (R).	
	If two experts disagree, it does not help either case (R).	
	If two experts in a field disagree, the phenomenon they are discussing must not be reliable (R).	
	It is irritating to be presented with two "experts" who disagree (R).	

Note. A parenthetical R indicates that items were recoded so that higher numbers reflected a more positive evaluation.

sellouts; (e) experts cave to the highest bidder; (f) experts are honest; (g) experts are noble; and (h) experts give balanced opinions.

Demographic information. Participants reported demographic information such as gender, age, educational background, and ethnicity in a voir dire questionnaire.

Procedure

On responding to our advertisements, participants were screened to ensure they were jury eligible. Participants reported to a mock courtroom at a northeastern urban university. They gave informed consent, completed the voir dire questionnaire, and watched the trial video. Participants then completed the posttrial questionnaire and the RT task. We counterbalanced the collection of the RT data with the verdict and posttrial questionnaire to control for order effects.

During the RT task, participants were seated at a computer with a 16-in. (40.64-cm) monitor. The experimenter then showed each participant where the appropriate keys were located on the keyboard and instructed them to start. Instructions on the computer screen explained each task to participants. Before each task, participants completed a practice trial rating items and were presented with the task upon successful completion of the trial. In the first task, participants responded to single words or phrases by indicating whether the word or phrase was good or bad. In the second task, participants indicated whether the phrases on the computer were true or false. Participants first saw a series of xxxxxx's on the computer screen to draw their attention to the place where the word or phrase would appear. Then, the word or phrase would appear, and they were to evaluate the word or phrase as quickly and as accurately as they could. Words and phrases in each task were presented in random order to control for order effects, and filler items were included to adjust for individual differences in response speed.

For the questionnaire portion of the experiment, participants were given the questionnaire and instructed that they were to complete the questionnaire as a real juror who just saw the evidence in the case. Then, participants were debriefed, thanked, and paid for their participation.

Results

Questionnaire and Reaction Time Data

Data cleaning. RT outliers were identified and then set equal to the cutoff points established at 2 standard deviations below or 4 standard deviations above the mean (Fazio, 1990). Outliers accounted for $<1\%$ of all RTs. To correct for skewness and kurtosis, RTs were transformed using the square root, cube root, natural log, and inverse (Fazio, 1990). Overall, the natural log transformation provided the best normalization of RTs and was used for subsequent analyses. In addition, we computed a ratio index to adjust target RTs for individual differences in response speed (Fazio, 1990). Filler trials (RTs that were ambiguous in meaning) were averaged to give each participant's baseline for speed of response. RTs were adjusted on the basis of the ratio of the target RT to the sum of the filler and the target RT (ratio = target RT/[filler RT + target RT]). This ratio ranged from 0 to 1, with 0 indicating that participants' responses for the target RT were slower relative to their responses for the filler RTs (Fazio, 1990). Further analyses were computed with this ratio. For ease of interpretation, all means are reported in their untransformed state.

Hypothesis 1: Does opposing expert testimony increase juror sensitivity to variations in scientific validity? To test whether opposing expert testimony increased juror sensitivity, we conducted separate 2 (plaintiff expert validity: valid

vs. invalid because of missing control) × 3 (opposing expert: none vs. standard vs. address methodology) multivariate analyses of variance (MANOVAs) for each set of continuous dependent measures (i.e., plaintiff expert ratings and general ratings), analyses of variance (ANOVAs) for evidence strength and participants' ratings of the plaintiff expert's research, and a logistic regression for the dichotomous verdict measure.

We saw no evidence for a sensitivity effect in the tests of the interaction (which would indicate a sensitivity effect) on our measures of the trial outcome. We first regressed verdict on to our independent variables and their interactions; using a backward step procedure, we found that no predictors remained in the model. We also did not see evidence of a sensitivity effect in participants' ratings of the probability that the plaintiff experienced a hostile work environment, $\lambda = 0.98$, $F(4, 472) = 1.41$, $p = .23$, $\eta^2 = .01$. We did see evidence of a sensitivity effect in participants' ratings of evidence strength; the interaction between opposing expert testimony type and validity was significant, $F(2, 228) = 3.73$, $p < .03$, $\eta^2 = .03$. In conditions in which the opposing expert addressed the plaintiff expert's research, participants who heard invalid research rated the evidence to be weaker than those who heard valid research, $F(1, 228) = 7.46$, $p < .01$, $\eta^2 = .03$. The other simple main effects were not significant; all means are reported in Table 2.

We also observed a multivariate main effect of validity on participants' ratings of the plaintiff expert, $\lambda = 0.91$, $F(6, 217) = 3.44$, $p < .01$, $\eta^2 = .09$. At the univariate level, participants rated the plaintiff expert as more trustworthy ($M = 5.95$, $SD = 0.10$ vs. $M = 5.66$, $SD = 0.11$; $F[1, 222] = 3.83$, $p < .05$, $\eta^2 = .02$), competent ($M = 5.72$, $SD = 0.11$ vs. $M = 5.17$, $SD = 0.11$, $F[1, 222] = 13.21$, $p < .01$, $\eta^2 = .06$), relevant ($M = 4.19$, $SD = 0.09$ vs. $M = 3.78$, $SD = 0.09$, $F[1, 222] = 10.32$, $p < .01$, $\eta^2 = .04$), and qualified ($M = 4.04$, $SD = 0.08$ vs. $M = 4.04$, $SD = 0.08$, $F[1, 222] = 18.45$, $p < .01$, $\eta^2 = .08$) in those conditions in which the plaintiff expert presented valid research than in those conditions in which the plaintiff expert presented invalid research. All other univariate effects of validity were not significant; all Fs < 1.73, all ps $> .18$, all η^2s $< .01$.

This main effect of validity on participants' ratings of the plaintiff expert was qualified by a significant overall interaction between opposing expert testimony type and validity on plaintiff expert ratings, $\lambda = 0.90$, $F(12, 434) = 1.98$, $p < .03$, $\eta^2 = .05$. At the univariate level, we found that participant ratings of the plaintiff expert's relevance, $F(2, 222) = 5.77$, $p < .01$, $\eta^2 = .05$; and qualifications, $F(2, 222) = 6.69$, $p < .01$, $\eta^2 = .06$, significantly differed as a function of the validity

Table 2
Means (and Standard Deviations) for Evidence Strength Ratings as a Function of Study Validity and Opposing Expert Type

Opposing expert type	*M* (*SD*) for: Invalid study	Valid study
Opposing expert absent	4.44 (0.19)	4.15 (0.19)
Opposing expert Present: No address	3.76 (0.18)	4.07 (0.18)
Opposing expert Present: Address	3.49 (0.19)$_a$	4.19 (0.18)$_a$

[a] Means sharing subscripts are significantly different, $p < .01$.

and opposing expert testimony type interaction. All other univariate interactions were not significant, all Fs < 1.86, all ps $> .16$, all ns $< .02$. When the opposing expert addressed the methodology of the study, participants rated the plaintiff expert's testimony to be more relevant and the expert to be more qualified when the study was valid than when it was invalid. All means are reported in Table 3.

We also found that the interaction between validity and opposing expert testimony type had a significant effect on participants' ratings of the plaintiff expert's research, $F(2, 235) = 8.75$, $p < .01$, $\eta^2 = .07$. Regardless of whether jurors heard an opposing expert who addressed the validity of the plaintiff expert's research or who did not address the validity of the other expert's testimony, they rated flawed research less favorably than valid research: For the present, address condition, $F(1, 235) = 33.38$, $p < .01$, $\eta^2 = .12$; $M = 3.22$, $SD = 0.14$ versus $M = 4.38$, $SD = 0.14$. For the present, no address condition, $F(1, 235) = 5.78$, $p < .02$, $\eta^2 = .02$; $M = 3.72$, $SD = 0.14$ versus $M = 4.20$, $SD = 0.14$. However, the effect of the validity manipulation was larger when the opposing expert addressed the validity of the plaintiff expert's research than when the opposing expert did not.

Hypothesis 2: Does opposing expert testimony cause jurors to be skeptical of scientific testimony? To test for a skepticism effect on verdict, we conducted a

Table 3
Means (and Standard Deviations) for Plaintiff Expert Ratings as a Function of Study Validity and Opposing Expert Type

Measure	*M* (*SD*)		Univariate effect of study validity		
	Invalid	Valid	$F(1, 222)$	p	η^2
No opposing expert					
Trustworthiness	5.76 (0.18)	5.15 (0.18)	3.25	.12	.01
Competency	5.46 (0.19)	5.96 (0.19)	3.64	.07	.02
Relevance	4.14 (0.16)	4.03 (0.16)	0.24	.63	.01
Qualifications	4.43 (0.14)	4.64 (0.14)	1.21	.27	.01
Motive	3.11 (0.21)	3.14 (0.21)	0.01	.91	.01
Hired gun	4.08 (0.19)	4.00 (0.19)	0.09	.77	.01
Opposing expert does not address methodology					
Trustworthiness	5.74 (0.18)	5.70 (0.18)	0.05	.82	.01
Competency	5.33 (0.19)	5.55 (0.19)	0.71	.40	.01
Relevance	3.80 (0.16)	4.19 (0.16)	3.02	.08	.01
Qualifications	4.16 (0.14)	4.33 (0.13)	0.77	.38	.01
Motive	3.13 (0.21)	3.33 (0.21)	0.49	.48	.01
Hired gun	3.78 (0.19)	3.97 (0.18)	0.48	.49	.01
Opposing expert addresses methodology					
Trustworthiness	5.49 (0.18)	5.90 (0.18)	2.58	.01	.11
Competency	4.72 (0.19)	5.65 (0.19)	12.59	.01	.05
Relevance	3.39 (0.16)	4.35 (0.16)	18.60	.01	.08
Qualifications	3.54 (0.14)	4.59 (0.14)	20.85	.01	.12
Motive	3.11 (0.21)	3.54 (0.21)	2.13	.15	.01
Hired gun	3.63 (0.19)	4.15 (0.18)	3.86	.05	.02

logistic regression with opposing expert (present vs. absent), study validity, and the interaction of these variables as predictors. Only the main effect of presence of an opposing expert approached significance in the model, $B = -0.73$, $SE = 0.43$, Wald's $\chi^2(1, N = 242) = 2.86$, $p < .09$, exp(B) = 4.84. Participants were moderately more likely to render a verdict for the plaintiff in those conditions with no opposing expert testimony (73%) than in those conditions with opposing testimony (66%).

There was a significant multivariate effect of opposing expert testimony on participants' ratings of the probability of a hostile work environment, $\lambda = 0.96$, $F(2, 236) = 4.85$, $p < .01$, $\eta^2 = .04$. Participants indicated that the probability that the plaintiff experienced a sexually hostile work environment was greater in conditions without an opposing expert ($M = 74\%$) than in conditions with an opposing expert ($M = 65\%$), $F(2, 237) = 5.99$, $p < .02$, $\eta^2 = .03$. Furthermore, jurors rated the probability that the defendant contributed to the work environment higher in conditions without an opposing expert ($M = 85\%$) than in conditions with an opposing expert ($M = 62\%$), $F(1, 239) = 6.60$, $p < .01$, $\eta^2 = .03$. The presence of an opposing expert also affected juror ratings of evidence strength, $F(1, 228) = 6.92$, $p < .01$, $\eta^2 = .03$. Jurors found stronger evidence of liability in conditions without an opposing expert, $M = 4.30$, $SD = 0.13$, than in conditions with an opposing expert, $M = 3.88$, $SD = 0.09$.

In two MANOVAs, we tested whether the presence or absence of an opposing expert affected jurors' ratings of the plaintiff expert and participants' beliefs about opposing experts generally (as opposed to the specific opposing expert who appeared in the trial). Opposing expert presence had a significant effect on jurors' perceptions of the plaintiff expert and her research, $\lambda = 0.93$, $F(6, 217) = 2.86$, $p < .01$, $\eta^2 = .07$; and on jurors' ratings of opposing experts generally, $\lambda = 0.94$, $F(2, 225) = 3.86$, $p < .01$, $\eta^2 = .06$. Participants who heard an opposing expert rated the plaintiff expert to be less qualified and less competent than those who did not hear an opposing expert. In addition, participants were more likely to believe that the research presented at trial was generally accepted in conditions without an opposing expert than in conditions with an opposing expert. See Table 4 for all means.

Last, we found that opposing expert presence had a significant effect on participants' ratings of the plaintiff expert's research, $F(1, 235) = 5.68$, $p < .02$, $\eta^2 = .02$. If jurors heard an opposing expert, they rated the plaintiff expert's research lower than jurors who did not hear an opposing expert ($M = 3.88$, $SD = 0.07$ vs. $M = 4.17$, $SD = 0.10$).

Hypothesis 3: Are attitudes about hired guns and general acceptance more accessible in those conditions with opposing experts than those without? To test our main hypotheses, we first conducted analyses to test whether the semantic categories of beliefs about hired guns or general acceptance were more or less accessible in conditions with an opposing expert than conditions without, we conducted 2 (plaintiff expert research validity: valid vs. invalid) $\times$ 3 (opposing expert testimony type: absent vs. does not address the validity of the plaintiff expert's research vs. does addresses the validity of the plaintiff expert's research) ANOVAs on the RT data and tested the contrast between conditions in which the opposing expert was present and conditions in which the opposing expert was absent. Neither the planned contrast nor the main effects for the scales were

Table 4
Means (and Standard Deviations) of Participants' Plaintiff Expert Ratings and Ratings of Opposing Experts Generally as a Function of Opposing Expert (OE) Presence

Measure	*M* (*SD*)		Univariate effect of study validity		
	OE absent	OE present	*F*	*p*	η^2
Plaintiff expert ratings					
Trustworthiness	5.96 (0.13)	5.73 (0.09)	2.07	.15	.01
Competency	5.71 (0.13)	5.31 (0.09)	5.98	.02	.03
Relevance	4.09 (0.11)	3.93 (0.08)	1.31	.25	.01
Qualifications	4.53 (0.10)	4.15 (0.07)	10.39	.01	.05
Motive	3.12 (0.15)	3.27 (0.10)	0.71	.40	.01
Hired gun	4.04 (0.13)	3.88 (0.09)	0.95	.33	.01
Ratings of OEs generally					
Experts as hired guns	3.15 (0.09)	3.10 (0.06)	0.28	.60	.01
General acceptance of the research presented	4.39 (0.07)	4.12 (0.05)	9.29	.01	.04
Psychology generally	4.55 (0.08)	4.48 (0.06)	0.47	.50	.01
The disagreement of OEs	4.01 (0.11)	4.25 (0.08)	3.54	.06	.02

Note. For plaintiff expert ratings, degrees of freedom were 1 and 222; for ratings of OEs generally, degrees of freedom were 1 and 228.

significant, all Fs < 1.08, all ps $> .33$, all η^2s $< .01$. However, we did find a significant effect of the interaction between validity and opposing expert testimony type on the accessibility of participants' beliefs about experts as hired guns, $F(2, 235) = 4.15$, $p < .02$, $\eta^2 = .03$. Examining the simple main effects, we found that participants in the conditions with invalid testimony rated their beliefs about hired guns more slowly if the opposing expert addressed the plaintiff expert's research ($M = 2{,}148$ ms, $p < .01$) than if there was no opposing expert ($M = 2{,}098$ ms, $p < .01$).

We also found a significant effect of the interaction between validity and opposing expert testimony type on the accessibility of participants' beliefs about general acceptance, $F(2, 235) = 4.58$, $p < .01$, $\eta^2 = .04$. There was a simple main effect of opposing expert testimony type within the invalid research conditions. Participants responded more quickly when rating their beliefs toward general acceptance when there was no opposing expert ($M = 2{,}367$ ms) than when they heard an opposing expert who did not address the validity of the plaintiff expert's research ($M = 2{,}414$ ms, $p < .02$) and when they heard an opposing expert who addressed the validity of the plaintiff expert's research ($M = 2{,}414$ ms, $p < .04$).

In addition to measuring RT, we measured participants' evaluations of the beliefs about experts as hired guns and general acceptance during the RT task. To test whether participants' evaluations of experts as hired guns and general acceptance differed as a function of the presence or absence of opposing expert testimony, we conducted a series of chi-square analyses. Participants were more likely to answer "true" to the statements that "there is no generally accepted opinion" (64%) and "experts give balanced opinions" (64%) in those conditions with an opposing expert (46%), $\chi^2(1) = 5.75$, $p < .01$, $\phi = 0.17$; compared with

those conditions without an opposing expert (51%), $\chi^2(1) = 3.71$, $p < .05$, $\phi = 0.12$. All other effects were not significant.

Path Analysis

To paint the most complete picture of the effects of the mediating variables on the relationship between opposing expert testimony and juror decisions, we conducted two separate path analyses. The first path analysis was designed to test whether the potential mediators did in fact mediate the relationship between the independent variables (coded for a sensitivity effect) and participants' ratings of the probability that the plaintiff experienced a hostile work environment. The second path analysis was designed to test whether there were significant mediators of the relationship between opposing expert presence or absence and the probability that the plaintiff experienced a hostile work environment. We used the probability that the plaintiff experienced a hostile work environment as the dependent measure because it is a more sensitive measure than verdict, and participants' ratings of the probability that the plaintiff experienced a hostile work environment are presumably the underlying measure of verdict (i.e., several models of jury decision making posit that jurors make verdict decisions in trial on the basis of a cutoff point in the probability that the defendant is liable or guilty; Hastie, 1995). All path analyses were conducted using Mplus version 3.0 software (Muthén & Muthén, 2004), and models and coefficients were estimated using maximum likelihood procedures. In both models, two sets of mediators were included in the model. The first set of mediators included the reaction time scales (accessibility of the hired gun construct, beliefs about hired guns, the construct of general acceptance, and beliefs about general acceptance) and the evaluative rating scales assessing the favorability of attitudes toward hired guns, general acceptance of sexual harassment research generally, psychology and psychologists, and opposing experts generally). The second set of mediators included the scales measuring participants' attitudes toward the plaintiff expert in this case (the plaintiff expert as a hired gun, the plaintiff expert's trustworthiness, competence, relevance, qualifications, motive, and research). Opposing expert ratings were not included because they could not be obtained for those participants who heard no opposing expert. All correlation matrices for the path analyses are available upon request.

Sensitivity effect. In this path analysis, we dummy coded the opposing expert conditions to compare the conditions with an opposing expert who addressed the research presented by the plaintiff expert and the conditions with an opposing expert who did not address the research presented by the plaintiff expert to the conditions without an opposing expert. Figure 1 illustrates all significant paths in the fully saturated model; standard path coefficients are provided. We then tested for the indirect effect of the interaction between the condition in which the opposing expert addressed the validity of the plaintiff expert's research and validity (which would indicate a sensitivity effect). A significant total and indirect effect of this interaction was significant ($p < .05$). Among those participants who heard the opposing expert addressed the validity of the plaintiff expert, those who viewed valid research rated the plaintiff's expert to be more competent and the research presented by the plaintiff's expert to be of higher quality than did those

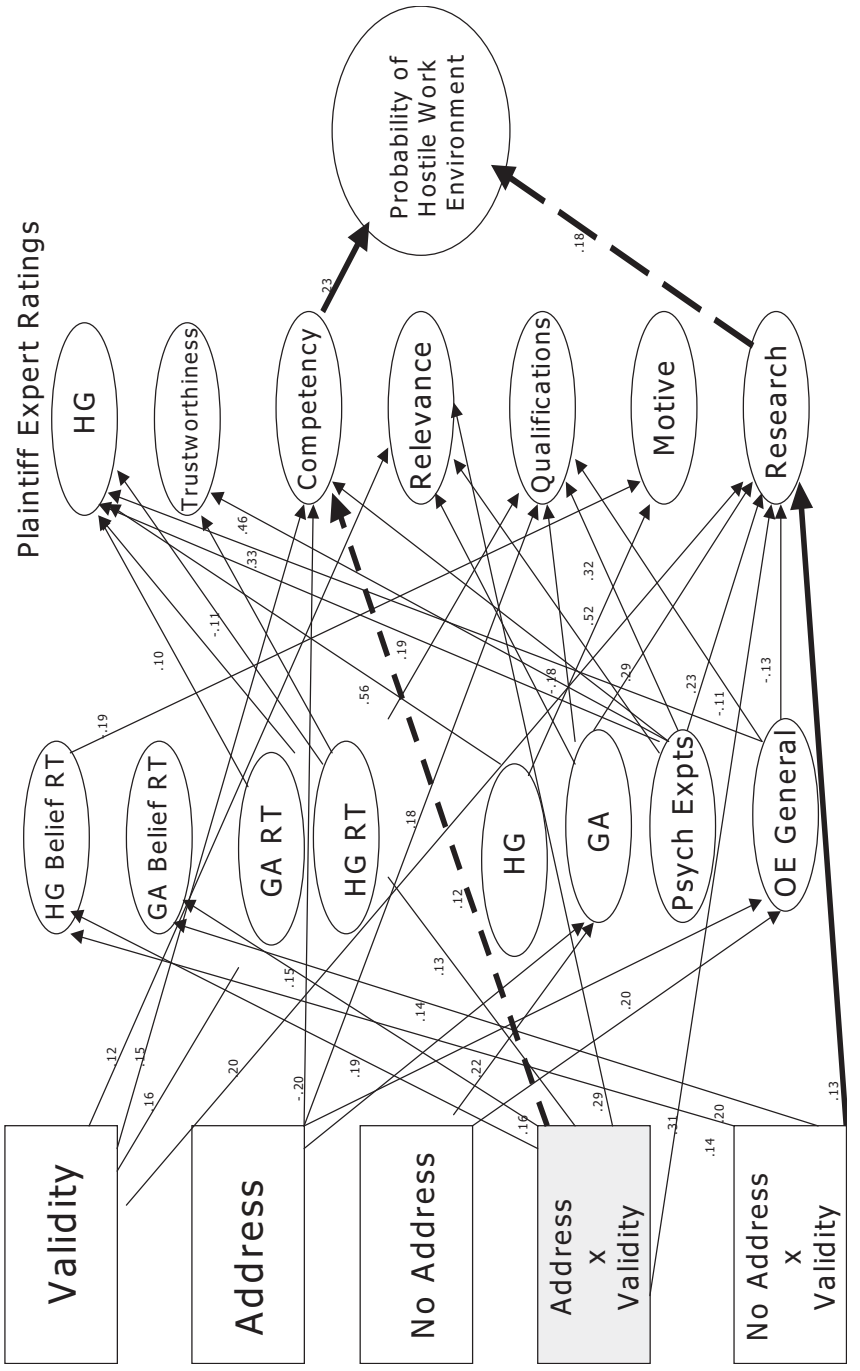

Figure 1. Path model of sensitivity effect. Solid lines indicate a significant relationship between two constructs. Bold lines indicate significant indirect effects of the independent variables on jurors' ratings of the probability that the plaintiff experienced a hostile work environment. HG = hired gun; RT = reaction time; GA = general acceptance; Expts = experts; OE = opposing expert.

who viewed invalid research. Moreover, participants who rated the competence of the plaintiff expert and the research presented by the plaintiff expert more favorably were more likely to believe that the plaintiff experienced a hostile work environment. These paths are represented by bold lines in Figure 1, and the dotted lines indicate effects that were not significant in the direct tests but contributed to significant indirect paths.

Skepticism effect. In the path analysis testing the skepticism effect on juror decisions, we dummy coded the opposing expert conditions to compare those conditions with an opposing expert to the condition without an opposing expert. Figure 2 illustrates all significant paths in the fully saturated model; standard path coefficients are provided. We then tested for the indirect effect of the main effect of opposing expert presence on juror decisions (which would indicate a skepticism effect). We found that the presence of an opposing expert significantly affected participants' ratings of the probability that the plaintiff experienced a hostile work environment, but this relationship was mediated by several variables ($p < .05$). First, if there was an opposing expert, participants rated the competence of the plaintiff expert less favorably than did participants who did not view an opposing expert; more favorable ratings of plaintiff expert competence led to ratings that there was a greater probability that the plaintiff experienced a hostile work environment. Second, if there was an opposing expert, participants rated sexual harassment research to be less generally accepted than if there was no opposing expert. Participants' ratings of the general acceptance of the research in the field positively influenced participants' ratings of the plaintiff expert's competence and research, which then positively influenced the participants' ratings of the probability that the plaintiff experienced a hostile work environment. Third, participants rated opposing experts generally higher in those conditions with an opposing expert compared to those conditions without. Participants' ratings of opposing experts generally were negatively related to participants' ratings of the plaintiff expert's research. Participants' ratings of the plaintiff expert's research were positively related to the probability that the plaintiff experienced a hostile work environment. The bold lines in Figure 2 indicate these significant indirect skepticism effects.

Discussion

This study clearly demonstrated the need for a safeguard against junk science in the courtroom. We found very little evidence that differences between valid and invalid scientific evidence influence jurors' trial judgments, although the manipulation checks indicated that jurors noticed the methodological difference between these studies. We found strong evidence for a skepticism effect; the presence of an opposing expert affected jurors' trial judgments. We also found less reliable evidence for a sensitivity effect; jurors rated the plaintiff expert differently in the valid and invalid conditions only when an opposing expert addressed the validity of the plaintiff expert's research. The path models illustrate the direct and indirect effects of sensitivity and skepticism and the various mediators of these effects. Sensitivity and skepticism can occur simultaneously, as evidenced by the results of this study. We first discuss the overall effect of opposing experts on jurors' decisions and then examine the role of attitudes in

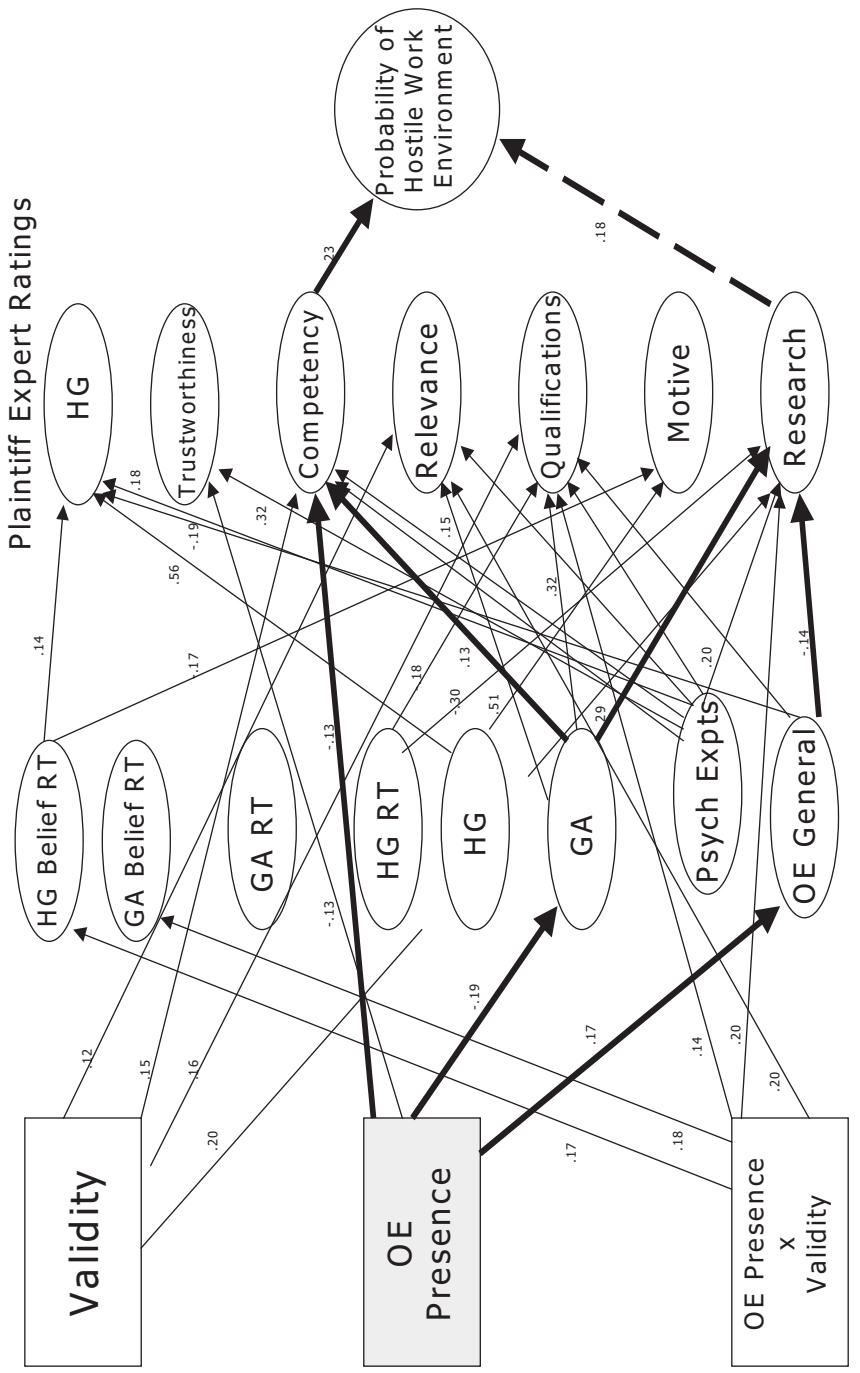

Figure 2. Path model of skepticism effect. Solid lines indicate a significant relationship between two constructs. Bold lines indicate significant indirect effects of the independent variables on jurors' ratings of the probability that the plaintiff experienced a hostile work environment. HG = hired gun; RT = reaction time; GA = general acceptance; Expts = experiments; OE = opposing expert.

mediating the relationship between opposing expert testimony presence and juror decisions.

Does the Opposing Expert Safeguard Sensitize Jurors to Scientific Validity?

Like past research, we found limited evidence for a sensitivity effect and strong evidence for a skepticism effect of opposing expert testimony (Levett & Kovera, 2008). When the opposing expert addressed the original expert's methodology, jurors rated the evidence as stronger and the plaintiff expert as more qualified and relevant if the plaintiff's research was valid rather than invalid, providing evidence of a sensitivity effect. These simple main effects of study validity on perceptions of evidence strength were not significant when there was no opposing expert or when the opposing expert did not address the original expert's methods. Thus, only the opposing expert who addressed the methods used by the plaintiff expert successfully sensitized jurors to variations in scientific validity.

However, this study provides more reliable support for a skepticism effect of opposing expert testimony in that participants rated the evidence as providing stronger evidence of liability in those conditions with no opposing expert than in those with an opposing expert, regardless of the validity of the plaintiff expert's research and the content of the opposing expert testimony. Furthermore, participants rated the plaintiff expert as more qualified and competent in those conditions without an opposing expert compared with those conditions with an opposing expert.

These results suggest a robust skepticism effect of opposing expert testimony on juror decisions. Jurors were more likely to believe that the work environment was hostile, rate the evidence in the case as stronger, and rate the plaintiff expert as more qualified in those conditions with an opposing expert compared with those conditions without an opposing expert, regardless of whether the opposing expert addressed the validity of the plaintiff expert's research and regardless of the validity of the plaintiff expert's research.

Overall, the results of this study indicate that an opposing expert who addresses the validity of the initial expert's research somewhat sensitizes jurors to the validity of the initial expert's research, although it does not sensitize jurors enough to directly affect major decisions in the case (e.g., verdict or probability of harassment). Participants rated the plaintiff expert differently and the strength of the evidence in the case differently on the basis of the validity of the research only in those cases in which the opposing expert addressed the methods used by the plaintiff expert. Thus, there is evidence that the opposing expert safeguard may influence some intermediate judgments; however, we find little evidence that opposing experts will directly affect case outcomes; the safeguard seems to make jurors more skeptical of all expert testimony.

Mediators of Sensitivity and Skepticism Effects

We explored whether opposing expert testimony influenced attitudes about experts as hired guns and general acceptance of the research presented and whether the accessibility of those attitudes mediated the sensitivity and skepticism

effects produced by opposing expert testimony. The effect of the presence of opposing expert testimony significantly affected jurors' ratings of the general acceptance of the research presented. Specifically, jurors rated the plaintiff expert's research to be less generally accepted when they heard an opposing expert than when they did not. This relationship provides some evidence that juror attitudes toward general acceptance may mediate the relationship between opposing expert testimony type and juror decisions. Future research could address whether giving jurors information about general acceptance of proffered research (e.g., through a survey of experts) can successfully educate jurors about general acceptance to counteract the effect of this heuristic.

The other main attitude of interest, jurors' ratings of experts as hired guns, did not differ on the basis of opposing expert presence. Future research could address whether this is because participants' attitudes toward experts as hired guns may be activated through the presentation of a single expert. That is, a possible reason that general acceptance attitudes changed and attitudes about the experts as hired guns did not change on the basis of the presence of the opposing expert may be because the attitudes about experts as hired guns are activated through the presence of a single expert and attitudes about general acceptance are activated by the addition of a second expert.

We found a significant simple main effect of opposing expert testimony type within the invalid conditions; participants' evaluations of experts as hired guns were less accessible when the methodology of invalid plaintiff expert testimony was addressed by the opposing expert compared with when there was no opposing expert. We also found a significant simple main effect of opposing expert testimony type on the accessibility of participants' evaluations of general acceptance. When the plaintiff expert presented invalid research, participants' beliefs toward general acceptance were less accessible when there was no opposing expert than when the opposing expert addressed the plaintiff expert's research or when there was an opposing expert who did not address the plaintiff expert's research. These results suggest that participants may be likely to be skeptical of all invalid research when they hear an opposing expert, regardless of the content of the opposing expert's testimony. That is, when jurors heard invalid research, the presence of an opposing expert made them more likely to believe that the research under contention is not generally accepted and less likely to believe that an expert will present an objective opinion.

The path models provide a clear picture of which variables mediated the effects of opposing expert testimony juror decisions. Specifically, jurors' ratings of the general acceptance of sexual harassment research mediated the relationship between opposing expert presence and probability ratings (a skepticism effect) but did not mediate the relationship between the interaction of validity and whether the jurors heard an opposing expert who addressed the validity of the plaintiff expert's research. In addition, jurors were somewhat sensitized by an opposing expert who addressed the research presented by the initial expert. Jurors who heard an opposing expert who addressed valid plaintiff research rated the plaintiff expert as more competent and rated the research presented by the plaintiff expert more favorably than did jurors who heard invalid research and an opposing expert who addressed the research presented by the plaintiff expert. Jurors' perceptions of the plaintiff expert's competence then positively affected jurors' ratings of the

probability that the plaintiff experienced a hostile work environment. However, the path analysis for the skepticism effect shows that an opposing expert also causes jurors to be skeptical and to use heuristics (the general acceptance of research) in their decision making. The presence of an opposing expert affected jurors' ratings of the general acceptance of research investigating sexual harassment in the workplace. Jurors' beliefs about general acceptance then affected jurors' ratings of plaintiff expert competence and research, which affected juror ratings of the probability that the plaintiff experienced a hostile work environment.

These results provide evidence for both sensitivity and skepticism effects. The skepticism effect occurred, in part, because jurors made conclusions about general acceptance that were based on the presence an opposing expert. The sensitivity effect demonstrated that jurors are using the right information somewhat in making a decision when presented with an opposing expert who addresses the validity of the plaintiff expert's research; they used the validity of the research in question, which affected their ratings of the expert, which in turn affected their ratings of the probability that the plaintiff experienced a hostile work environment. However, the skepticism effect showed that the relationship between opposing expert presence and participants' ratings of the probability that the plaintiff experienced a hostile work environment was mediated by the jurors' perceptions of the general acceptance of the research generally, regardless of the validity of the research presented by the plaintiff expert and regardless of whether the opposing expert addressed that validity.

Limitations

In our study, the opposing expert always offered the opinion that the testimony proffered by the plaintiff expert was inapplicable to the case. This occurred in each condition containing opposing expert testimony, regardless of whether the opposing expert concluded that the plaintiff expert's study was competently conducted. We included this information because it is a published critique of studies such as those proffered by the plaintiff expert in our case, and it is unlikely that opposing expert testimony such as that included in our trial would omit this critique. It is possible that our skepticism effect may be due to the opposing expert's critique of the literature rather than the presence of opposing expert testimony. However, this is not the first study to find that the presence of opposing expert testimony creates juror skepticism (Levett & Kovera, 2008). Thus, any critique of the initial expert given by an opposing expert may cause skepticism. To further test exactly what causes the skepticism effect, future research could vary the presence of a critique such as the one proffered in our study and measure jurors' perceptions of the applicability of each expert's testimony to the case as a whole.

Conclusions

We replicated previous research demonstrating that an opposing expert may have limited capacity as a safeguard against junk science in that it mostly causes jurors to be skeptical of all expert testimony (Levett & Kovera, 2008). Previous research examined these issues in the context of a criminal child sexual abuse

trial, with expert testimony presented on child witness suggestibility, using an on-line methodology and a written trial stimulus. In the present study, we examined the effects of opposing experts in a civil sexual harassment case, with expert testimony on gender stereotyping, using an elaborate trial simulation methodology with community-member participants coming to a mock courtroom to watch a videotaped trial reenactment. The results of these studies suggest that the ineffectiveness of the opposing expert safeguard is not limited to one type of trial (civil or criminal), one type of crime, or one level of ecological validity.

This study also provides some evidence that juror beliefs about the general acceptance of research may mediate the effect of opposing expert presence on juror decisions. That is, participants were more likely to believe that the research presented was not generally accepted, and they also believed that there was no generally accepted opinion in those conditions with an opposing expert compared with those conditions without an opposing expert, regardless of the validity of the plaintiff expert's research and the content of the opposing expert's testimony. Those beliefs then affected jurors' ratings of the probability that the plaintiff experienced a hostile work environment.

Research has demonstrated that the other proposed safeguards (judicial instruction on the burden of proof and cross-examination) may have limited capacity to educate jurors about junk science. However, research has also demonstrated that modifying judicial instruction to include instruction about the *Daubert* criteria may be a more effective safeguard (Groscup & Penrod, 2002). It is possible that opposing expert testimony may not be effective in its current form, but perhaps modifications to the opposing expert safeguard may increase its efficacy. The present study provides evidence that could inform efforts to create a more effective safeguard. For example, one possible method of eliminating jurors' reliance on general acceptance heuristics may be the use of a court-appointed expert rather than an adversarial expert to evaluate an initial expert's research. If jurors are more likely to believe that the science presented by an expert lacks general acceptance on the basis of the presence or absence of an adversarial opposing expert, it may be the mere fact that the opposing expert is adversarial that is causing jurors to become skeptical of the expert testimony. That is, if jurors are not listening to the content of the expert testimony because of beliefs that the research is not generally accepted, which are highlighted by the adversarial controversy over the research, then a nonadversarial expert may reduce jurors' reliance on general acceptance heuristics. If nonadversarial experts are less likely to activate general acceptance heuristics, opposing expert testimony from nonadversarial experts may be a more effective safeguard against junk science.

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