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Extra-Legal Factors and Product Liability: The Influence of Mock Jurors' Demographic Characteristics and Intuitions about the Cause of an Injury

Brian H. Bornstein, Ph.D., and Michelle Rajki

Two experiments were performed to investigate the role of extra-legal factors in a simulated product liability trial. In cases where the factual evidence was identical, subjects' liability judgments varied as a function of the case-specific factor of the alleged source of the plaintiff's injury. In deciding cases differently depending on the alleged cause, subjects relied on intuitions about what injury sources are more or less likely to cause a certain kind of injury. Juror-specific factors also influenced subjects' verdicts. There was no difference between students and non-students, but race and SES—factors that are often correlated with student status—did affect subjects' verdicts. Low-SES and minority subjects were more likely to find the defendant liable than high-SES and white subjects. The results are considered in terms of general decision-making processes, and the implications for jury selection and mock jury research are discussed.

The current “litigation explosion” (Olson, 1991), accompanied by changing definitions of liability (Landes & Posner, 1987; White, 1980), has driven up insurance rates (Abelson, 1988; Abraham, 1987) and prices for drugs and other potentially injurious products, resulting in calls for product liability reform (Litan & Winston, 1988; Schwartz, 1988; Viscusi, 1991). A frequently noted characteristic of many product liability cases is that the trial outcome is often very unpredictable, in terms of both who wins (Huber, 1988) and the size of damage awards (Greene, 1989; Harris *et al.*, 1984; Peterson, 1986). Although jurors are instructed to consider only the formally presented evidence in reaching a verdict (Devitt, Blackmar, Wolff, & O'Malley, 1992), they sometimes fail to do so; rather, they may be influenced by a variety of “extra-legal” characteristics.

Extra-legal characteristics may be divided into two broad classes: “case-specific”

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factors that pertain to the litigants or to the case itself (for a general review, see Davis, 1989), and “juror-specific” factors that derive from individual characteristics of the jurors. Jurors, as a group, are not evaluating legal evidence objectively and consistently if the decisions of sub-groups (*e.g.*, men vs. women) in similar cases are systematically different. Likewise, they are considered biased if sub-groups of litigants (*e.g.*, black vs. white defendants) in similar cases are treated differently.

Most research on the relationship between juror verdicts and extra-legal factors has been done on criminal trials. There is considerable similarity between civil and criminal trials, especially in terms of the jury’s task: to estimate the relative probability of competing hypotheses and compare their judgment to a standard of proof in reaching a verdict (Kaye, 1988). Jurors themselves appear to make little distinction between civil and criminal processes (Hans, 1992). However, there are also some very important differences, such as the standard of proof, the separation in criminal trials of the roles of victim and prosecutor (combined in the civil plaintiff), and the goals served by the process. Since less research has been done within the civil paradigm, it is generally unknown whether fundamental processes will hold true for both kinds of trial. For example, the fact that the victim in a civil trial stands to profit materially by the outcome—unlike the criminal victim, whose sole benefit is usually the satisfaction of seeing justice done—might alter the effect of victim characteristics found in criminal trials (Dane & Wrightsman, 1982).

Both criminal and civil law are ultimately concerned with assigning responsibility; yet they differ in that criminal verdicts carry greater moral connotations, while civil law can be viewed more as a tool for resolving conflicts that individuals cannot settle privately (Lempert & Sanders, 1986). In civil torts, jurors’ task is to attribute responsibility (or in legal terms, liability) for an injury. The primary factor in attributing liability is usually attribution of causality (Hart & Honore, 1985)—that is, showing beyond a preponderance of the evidence that the defendant caused the plaintiff’s injury.¹

Causation is an important feature of torts for two reasons. First, causation in the law is treated as an objective matter that can be factually determined by adherence to intuitive, common-sense notions (Hart & Honore, 1985), with reference to scientific evidence. The facts that bear on whether or not the defendant caused the plaintiff’s injury are less subjective than questions about whether the defendant foresaw or intended the harm, which would require insight into the defendant’s mental state.

Second, although causation is not always necessary, and often not sufficient, for assigning liability (Hamilton, 1978; Hart & Honore, 1985), it is sometimes both, as in strict product liability law. In most cases, causation is a necessary minimal component of liability and is frequently the major fact-in-issue. An increasing number of product liability cases has focused on causation. For example, can Agent Orange or electromagnetic radiation cause cancer? Does anti-depressant medication produce aggressive behavior? The combination of more cases being filed (Kakalik & Pace, 1986) and scientific technological advances means that scientific evidence is being used to resolve an increasing number of such disputes (Braun, 1982; Imwinkelreid,

¹ Although attributions of causality and responsibility are highly correlated, they are partially separable. One may be legally liable for an injury without actually causing it, and vice versa (Fincham & Jaspers, 1980; Hamilton, 1978; Lloyd-Bostock, 1983). Although we recognize this important distinction, the relationship between causality and responsibility is beyond the scope of this paper.

1983). Where causation is the only fact-in-issue, an attribution of liability is a simple reflection of the causal attribution.

The purpose of the present research is to investigate the effect of extra-legal factors on jurors' judgments in a simulated product liability trial. The relative influence, and possible interaction, of both case-specific and juror-specific factors will be assessed.

CASE-SPECIFIC EXTRA-LEGAL FACTORS

Most experimental demonstrations of the case-related factors that influence jurors'² verdicts have focused on criminal trials (Dane & Wrightsman, 1982; Kalven & Zeisel, 1966; Kerr, 1982; Reskin & Visher, 1986; Shaffer, 1985). For example, mock jurors are influenced by criminal defendants' race (Bodenhausen & Lichtenstein, 1987; Ugwuegbu, 1979), physical attractiveness (Landy & Aronson, 1969; Efran, 1974; Sigall & Ostrove, 1975), and sex (Cruse & Leigh, 1987), as well as by evidence that has been ruled inadmissible (Sue, Smith, & Caldwell, 1973; Thompson, Fong, & Rosenhan, 1981).

Some research has been done on civil trials as well. Civil outcomes are influenced by the status of both real (Chin & Peterson, 1985) and mock defendants (Bornstein, in press; Greene, 1989; Hans & Ermann, 1989); the severity of the plaintiff's injury (Walster, 1966) and the opportunity to provide compensation (Bornstein, 1993); the number of plaintiffs involved (Horowitz & Bordens, 1988); the way in which expert testimony is presented (Diamond & Casper, 1992); how the standard of proof is expressed (Kagehiro & Stanton, 1985); and whether an individual appears as the plaintiff or the defendant (Lupfer, Cohen, Bernard, & Schippman, 1985). In each instance, jurors are influenced by information other than the formal evidence admitted at trial.

Thus, jurors are often unable to limit their judgments to the formal evidence, relying on their prior beliefs and expectations. In product liability cases, one factor that might influence jurors' verdicts is their intuition about what types of substances or events (collectively referred to as "sources") are likely to cause certain kinds of injury. For example, people might naively assume, in the absence of scientific evidence, that cancer is less likely to be caused by an ingested substance, like medication, than by an environmental contaminant, like toxic waste. Kraus and Slovic (1988) and Kraus, Malmfors, & Slovic (1992) have found that people tend to share intuitions about what types of sources pose the greatest risk of causing various diseases. Given those naive assumptions and the general effect of prior expectations on jurors' judg-

² Most research on jury decision-making has used "mock" jurors, performing simulated tasks, rather than real jurors. Comparisons of mock jurors to real ones are few, and they offer conflicting results (MacCoun, 1989). What little research has been done using actual jurors (*e.g.*, Kalven & Zeisel, 1966; Reskin & Visher, 1986) indicates that making decisions with real consequences does not guarantee impartial, bias-free performance; rather, the same general processes appear to be operating in both actual and mock jurors. Also, the effect of extra-legal factors will not necessarily be reduced in more realistic simulations (Bray & Kerr, 1982; Kramer & Kerr, 1989). Nonetheless, it is indisputable that more realistic simulations and, if possible, real jurors need to be used to establish the broader applicability of experimental findings. Research on individual differences in juror decision-making (discussed below) supports the frequently made arguments challenging the ecological validity of much psycholegal experimentation (*e.g.*, Bray & Kerr, 1982; Weiten & Diamond, 1979).

ments, it follows that jurors will rely on their intuitions where the cause of an injury is the principal fact-in-issue.

In product liability cases, jurors' attributions should be based on the evidence presented in court as to whether or not something is capable of causing a certain type of injury (cf. Devitt et al., 1992). The variability and unpredictability found in such cases (Huber, 1988) suggest that extra-legal factors are at work. The present experiments specifically test the hypothesis that subjects' attributions of liability will be influenced by their intuitions about what types of sources cause a certain kind of injury.

JUROR-SPECIFIC EXTRA-LEGAL FACTORS

Nearly all of the extant research on the effect of jurors' characteristics on their verdicts has used criminal cases (cf. Penrod, 1990). On the whole, attitudinal or personality variables are stronger predictors than demographic variables like sex, age, or race. The most consistent relationships that have been discovered are for attitudes towards authority and capital punishment. Authoritarianism is positively correlated with guilt judgments and sentence length for both actual (Moran & Comfort, 1982) and mock jurors (Bray & Noble, 1978). An abundance of research (reviewed by Ellsworth, 1988) has shown that "death-qualified" jurors are pro-prosecution and more likely to convict, compared to those that contain individuals who would normally be excluded from serving in capital cases (Cowan, Thomson, & Ellsworth 1984).

Fulero and Penrod (1990), in a recent review of the efficacy of scientific jury selection, find a modest relationship between demographic variables and juror verdicts. This somewhat tentative conclusion reflects the fact that some studies have found no relationship (e.g., Baldwin & McConville, 1979 and 1980, reporting on actual jurors), while others have found a relationship for some variables but not others. This inconsistency is due at least in part to the mediating effect of the type of case (Horowitz, 1980; Patterson, 1986). For example, in a rape case, female mock jurors are more likely than males to find a rape defendant guilty (Thornton, 1977; Ugwuegbu, 1979); when the crime is murder, however, there is no sex difference (Bray & Noble, 1978).

The importance of jurors' sex in combination with other personality and demographic factors has been addressed by three studies of actual jurors in trials for a variety of felonies (regrettably, type of crime was not a factor in any of the analyses). Bridgeman and Marlowe (1979) found no sex effect at all, while the other two studies found interactions between sex and a number of other factors. Specifically, Mills and Bohannon (1980) found that socialization scores were positively correlated with guilty verdicts for males, but negatively for females; empathetic males were more likely to acquit, but not empathetic females; and autonomous jurors were more likely to acquit, regardless of sex. Moran and Comfort (1982), looking at a slightly different constellation of variables, found that males who convicted had more children and higher socialization and social desirability scores, while females who convicted had higher just-world scores, higher empathy, and less anomie.

In civil cases, there is a tendency for jurors to favor plaintiffs of their own sex, but the effect is somewhat ambiguous and inconsistent for the separate dependent variables of verdict and monetary damages (Stephan, 1975). Overall, although jurors' sex

appears to have a definite effect on their verdicts, the precise nature of the relationship is far from clear. Sex serves as a moderating variable for a number of other factors, and its influence varies across different types of case—both civil versus criminal and for different crimes.

The relationship of socioeconomic status to jurors' verdicts is not much clearer. Simon (1967) found that high-status jurors were less likely to acquit a defendant by reason of insanity; this result is supported by other studies showing that jurors with high SES are, across a variety of offenses, more likely to convict and to give harsher sentences (Adler, 1973; Reed, 1965). However, other studies investigating the effect of SES components like education and income level have yielded opposite results (Feild, 1978; Moran & Comfort, 1982). Although little research has been done on SES and civil verdicts, there appears to be little systematic relationship (Stephan, 1975).

Two of the more prominent ways in which simulated juries often differ from actual juries is in their racial composition and the overabundance on simulated juries of college subjects (Bray & Kerr, 1982). It is somewhat surprising, then, that few studies have directly compared subjects' verdicts as a function of race or student status. Such comparisons are crucial, in light of other individual differences that have been found and the constitutional mandate to have representative juries.

What little research has been conducted on these variables suggests that there are potentially important differences. Two studies of actual criminal trials have found a main effect of race, such that whites were more likely to convict than blacks (Broeder, 1959; Simon, 1967). Using a simulated rape case, Ugwuegbu (1979) found a more subtle effect of race: white subjects judged a black defendant more culpable than a white defendant, but black defendants displayed the opposite pattern.

With regard to student status, some studies indicate greater leniency among students than in a sample drawn from the community (Kassin & Wrightsman, 1983), Simon & Mahan, 1971), though at least one study has failed to replicate this finding (MacCoun & Kerr, 1988). Again, one possible mediator is the type of trial: students were more likely to acquit in trials for murder (Simon & Mahan, 1971) and conspiracy (Kassin & Wrightsman, 1983), but not when the charge was armed robbery (MacCoun & Kerr, 1988). Research is needed that explicitly compares the effect of various demographic factors for different types of trial (cf. Patterson, 1986; Penrod, 1990).

Neither jurors' race nor their student status has been examined in civil trials. Thus, a secondary aim of the present experiments is to assess the relationship between these and selected other demographic variables and subjects' verdicts in a simulated product liability trial.

EXPERIMENT 1

Experiment 1 compares subjects' liability judgments in a product liability trial, as a function of the source of the plaintiff's injury. The effects of Injury Source on subjects' evaluation of the evidence, compensation awards, and feelings toward the defendant and plaintiff are assessed separately. Since both compensatory and punitive damages are paid by the plaintiff to the defendant, there is little practical distinction between the two, and either type may serve as a deterrent (Landes & Posner, 1987). In order to mini-

mize potential confusion on the part of subjects between the different types of damages, punitive damages were not investigated in the present experiment. The case is simplified so that the sole fact-in-issue is causation; that is, whether the defendant's product is capable of causing the plaintiff's injury. Subjects' task, as it would be for actual jurors, is to estimate the probability that the defendant caused the plaintiff's injury, and from that judgment to reach a decision about liability and damages.

In order to explore the relationship between subject demographic factors and verdicts, as well as possible interactions between those factors and Injury Source, a large and diverse sample was used.

METHOD

Subjects

Subjects were 239 persons recruited in front of a busy Baton Rouge department store that serves a diverse clientele. The only criteria for inclusion were American citizenship and age over 18, meaning that all subjects were potentially eligible jurors. Subjects received \$5 for their participation.

Materials and Design

Subjects read about a hypothetical lawsuit, modified from actual cases (Huber, 1988; Weinstein, Mansfield, Abrams, & Berger, 1988), involving a plaintiff who had developed ovarian cancer. This particular disease was chosen because little is known about its etiology. There were three different versions of the case, depending on what the plaintiff alleged caused her illness: a special ink used in her hobby of calligraphy, her birth control pills, or a chemical from a nearby dump that had leaked into the neighborhood's water supply. The injury sources were selected to represent three different types of commonly perceived sources of health risks—chemical waste, other environmental contaminants, and medication (Kraus & Slovic, 1988; Kraus *et al.*, 1992)—while being plausible within the experimental scenario. In each condition, the plaintiff had been exposed to the defendant's product for approximately ten years with no previous problems.

The case was one single-spaced page long and contained the following elements: a description of the plaintiff and her injury; a description of the defendant and alleged cause; the major issue—whether or not the defendant's product causes ovarian cancer—and amount requested in damages; and expert scientific testimony on both sides, as to whether or not the defendant's product is capable of causing ovarian cancer. Except for the alleged cause of the plaintiff's injury, the case materials were identical for all conditions. The identity of the defendant was varied to be consistent with the alleged injury source but was a large company in all conditions (*i.e.*, a large ink manufacturer, drug company, or chemical company).

Procedure

A table was set up near the store entrance, with a sign requesting participants for a paid survey. As subjects approached to volunteer, they were randomly assigned to one of the three experimental conditions and given a questionnaire, clipboard, and brief

oral description of the task. They were then shown to a quiet spot away from pedestrian traffic to complete the questionnaire individually.³

The first two pages of the questionnaire contained instructions informing the subjects that the experiment's purpose was to address how people make decisions about legal liability, in a case with opposing scientific evidence about whether or not something is capable of causing a certain type of injury. Subjects were told that "Your job is to decide whether or not the defendant is liable for the plaintiff's injury and how much money (if any) the plaintiff should receive from the defendant in damages." The instructions contained definitions of important legal terms, such as "liable," "plaintiff," "defendant," and "compensatory damages." Subjects were also instructed on the preponderance of the evidence standard and "to determine the facts solely from the evidence presented in the case."

After reading the case summary, subjects made a number of responses, described below. Subjects completed the questionnaire in 15–20 minutes. They were then paid, thanked, and given the opportunity to ask any questions about the study.

Dependent Variables

Subjects answered five questions concerning the case: 1. Verdict. 2. Causation estimate: On a scale from 0–100, "How likely is it that the defendant caused the plaintiff's injury?" The 100-point scale allowed subjects to make finer assessments of the evidence than a dichotomous verdict, and hence allows more precise statistical comparisons. A preponderance of the evidence was defined as any score above 50. 3. Compensation. 4. and 5. Sympathy for the plaintiff and defendant, rated on a scale from –100 to +100, where negative numbers indicate negative feelings, positive numbers show positive feelings, and 0 means indifference. These questions were included to see if the subjects' feelings toward the litigants varied depending on the source of the plaintiff's injury or subject variables.

In addition, subjects were asked to provide demographic information on race, age, sex, education level, income level, and student status.

RESULTS AND DISCUSSION

The results are presented for each of the dependent variables separately. Sex of subject had no main effect on any measure and was involved in only one marginally significant interaction, so the data are collapsed across sex. Primary analyses include the factors of Injury Source, Student Status, and Race. A subset of the demographic variables (Education, Income, and Age) varied substantially only within the non-student sample, so their effect is considered separately.

³ In focusing on individual judgments in the absence of deliberation, the procedure is not a wholly accurate representation of actual jury behavior; however, a number of researchers have found that the jury's verdict almost always reflects the majority of individual members' predeliberation judgments (e.g., Hastie, Penrod, & Pennington, 1983; Kalven & Zeisel, 1966).

⁴ A tendency for females to feel more sympathy for the plaintiff than males was greater among student subjects than among non-students ($F(1, 209) = 3.3, p < .08$). This effect is likely due to college females' identifying more with the plaintiff, who is portrayed as being 32 years old. However, since there is no main effect of Sex, and the interaction between Sex and Student Status is only marginally significant and is not reflected in subjects' liability judgments as well, the remaining analyses are collapsed across Sex.

Sample Characteristics

Characteristics of the sample are displayed in Table 1. Subjects were classified as either students, if they indicated that they attended a college or university full-time (mean age = 23.2), or non-students (mean age = 32.2). Since there were very few subjects whose race was neither white nor black, Race was analyzed by comparing white to minority subjects (analyses including separate categories for blacks and “others”—*e.g.*, Hispanic, Asian-American—yielded the same pattern of results). A small number of subjects declined to provide all or some of the requested demographic information, so the number of subjects used in each analysis varies slightly.

Table 1. Sample characteristics, Experiments 1 and 2

Variable ^a	Expt. 1	Expt. 2
Female	55	52
White	57	65
Student	45	44
Education ^b	—	—
low	24	11
medium	52	48
high	24	41

^a Figures are percentages. For the binary variables of Sex, Race, and Student Status, the percentage of females, white, and students, respectively, is given.

^b Educational level is relevant only to the non-student subsample.

Liability Judgments

Subjects made two judgments relevant to liability: a dichotomous verdict and an estimate of the probability that the defendant caused the plaintiff's injury.

Verdicts

Although the evidence was the same across conditions, subjects evaluated it differently depending on whom the plaintiff was suing. They were more likely to find for the plaintiff when she alleged that her injury was caused by a toxic chemical (61% found the defendant liable) than by birth control pills (37% liable) or calligraphy ink (40% liable $\chi^2(2) = 11.42, p < .005$; see Table 2). Student subjects were neither more nor less likely to find for the plaintiff than subjects drawn from the community; however, race did affect subjects' verdicts. Minority subjects were significantly more likely to decide in favor of the plaintiff than white subjects ($\chi^2(1) = 5.69, p < .02$; see Table 3). Since some research indicates that jurors tend to favor litigants to whom they are similar (Stephan, 1975), it should be pointed out here that the race of the plaintiff herself was not specified.

Causation Estimates

Subjects' estimates of the probability that the defendant caused the plaintiff's injury were analyzed in a three-way ANOVA with the between-subject factors of Injury Source, Student Status, and Race. Seven subjects failed to provide an estimate and

Table 2. Effect of injury source on liability judgments

Injury source	N	% liable ^a	Causation estimate ^b
Birth control pill	82	37	39.0 (28.8)
Calligraphy ink	75	40	41.5 (32.2)
Chemical waste	82	61	56.1 (26.0)

^aPercentage of subjects who found the defendant liable.

^bMean probability that the defendant caused the plaintiff’s injury, on a scale of 0–100 (standard deviations in parentheses).

Table 3 Effect of race on liability judgments

Race	N	% liable ^a	Causation estimate ^b
White	134	39	40.5 (28.6)
Minority	103	54	51.8 (30.3)

^aPercentage of subjects who found the defendant liable.

^bMean probability that the defendant caused the plaintiff’s injury, on a scale of 0–100 (standard deviations in parentheses).

were dropped from the analysis. Consistent with the Verdict data, only Injury Source ($F(2, 216) = 5.42, p < .005$) and Race ($F(1, 216) = 5.15, p < .025$) exerted main effects. The chemical company was judged more likely to have caused her injury than either of the other two defendants (Tukey HSD, p 's $< .01$; see Table 2), while minorities gave higher probability estimates than whites (see Table 3).

As with subjects’ verdicts, there was no main effect of Student Status ($F(1, 216) = 1.5, ns$); however, it interacted with both Injury Source ($F(2, 216) = 3.38, p < .05$) and Race ($F(1, 216) = 8.65, p < .005$). As can be seen in Figure 1, white and minority students did not differ, while minority community subjects rated the probability that the defendant caused the plaintiff’s injury much higher than did white community subjects (means: 57.2 vs. 36.6). Students and non-students both perceived the chemical company’s waste product as most likely to have caused the injury, but non-students’ causation estimates were higher for the calligraphy ink than for the birth-control pill (though not significantly), while students viewed the latter two sources as equally likely (see Figure 2).

Thus, the verdict results were corroborated by subjects’ estimates of the probability that the defendant had caused the plaintiff’s injury. Although the scientific evidence about whether or not the defendant’s product could have caused the injury was the same in each condition, subjects’ evaluation of that evidence was not; rather, they were significantly influenced by both the case-specific factor of what product had allegedly caused the injury, and the subject-specific factor of race. Both of these factors also interacted with Student Status, though whether or not subjects were students did not have a main effect.

Compensation

Compensation awards were analyzed for only those subjects who found the defendant liable ($n = 106$). Since the plaintiff’s injury was the same in all conditions, her com-

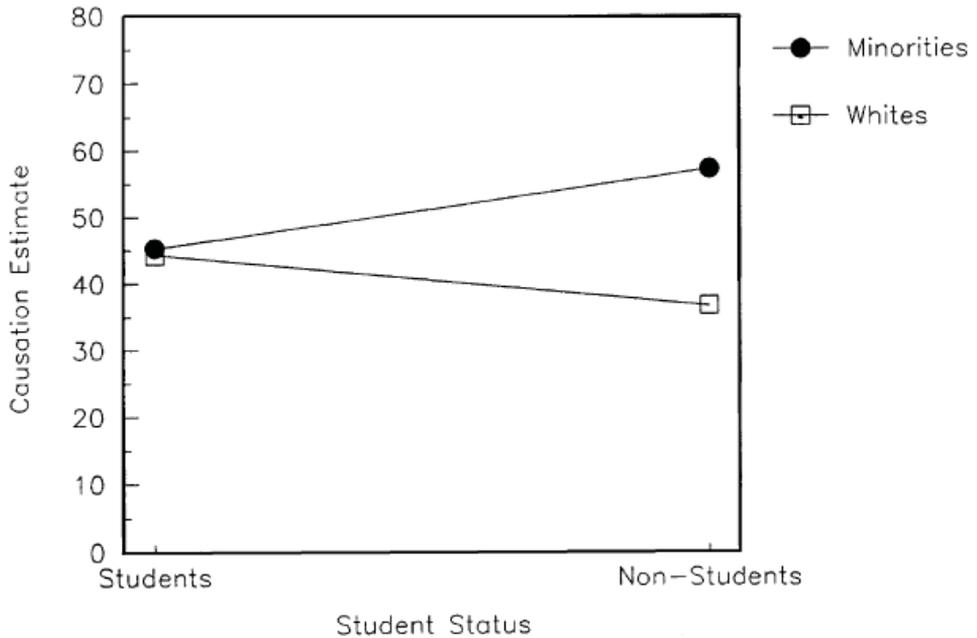


Figure 1. Effect of Race and Student Status on causation judgments in Experiment 1. Probability of causation was estimated on a scale from 0 (injury not in any way caused by the defendant) to 100 (defendant definitely caused the injury).

pensatory damages should not vary as a function of either the alleged source of the injury or subject demographic characteristics. Although compensation awards were higher, on average, for the chemical Injury Source, for students, and for minority subjects, none of the effects (nor interactions) was significant.

Sympathy

Subjects rated their sympathy for the litigants on a scale that ranged from -100 (strong negative feelings) to +100 (strong positive feelings). The alleged Source of the plaintiff's injury, subjects' Race, and subjects' Student Status had no effect on how favorable an impression the plaintiff made (F 's < 1.5). On the other hand, Injury Source did affect subjects' feelings toward the defendant ($F(2, 222) = 3.57, p < .03$). They viewed the ink manufacturer (mean sympathy rating = 15.3, $SD = 43.5$) as more sympathetic than either the chemical manufacturer (mean sympathy = 0.5, $SD = 54.7$) or drug company (mean sympathy = 1.1, $SD = 44.6$; all pairwise comparisons *n.s.*). Thus, there is a close relationship between subjects' feelings toward the defendant and their liability judgments; defendants judged less likely to have caused the plaintiff's injury are viewed more favorably (cf. Bornstein, 1993; *in press*).

In addition, there were main effects of both Race ($F(1, 222) = 5.40, p < .025$) and Student Status ($F(1, 222) = 6.11, p < .02$). Minorities were more sympathetic toward the defendant than white subjects (means: 14.0 vs. -1.3), and community subjects were

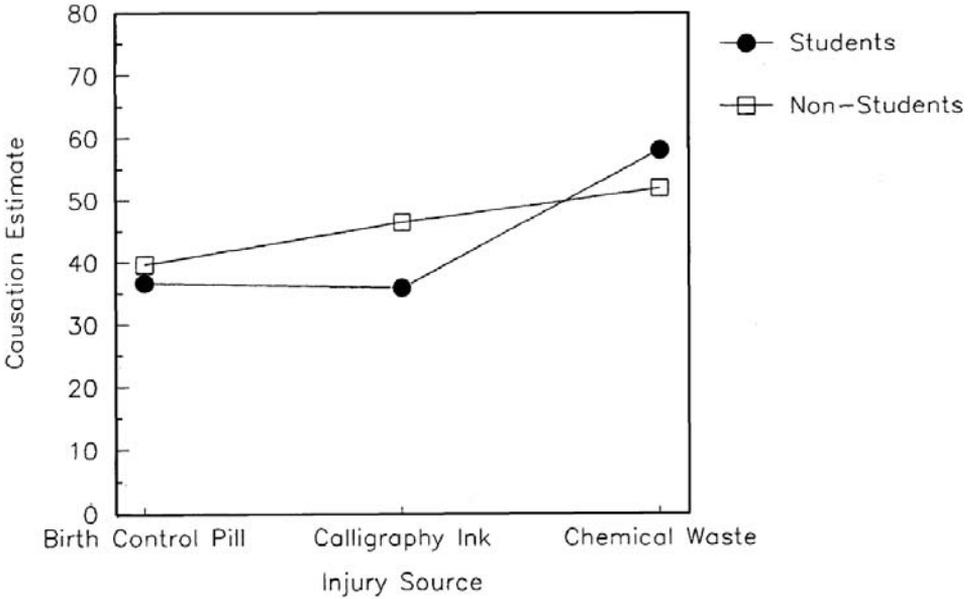


Figure 2. Effect of Student Status and Injury Source on causation judgments in Experiment 1. Probability of causation was estimated on a scale from 0 (injury not in any way caused by me defendant) to 100 (defendant definitely caused me injury).

more sympathetic than students (means: 12.4 vs. -2.8). There were no significant interactions among Injury Source, Race, and Student Status on sympathy for either litigant.

The effect of subjects' race and student status on defendant sympathy is inconsistent with their liability judgments. Community subjects were more favorably disposed toward the defendant, yet no more likely to reach a verdict in his favor, than student subjects; while minority subjects were more favorably disposed toward the defendant, yet paradoxically more likely to find against him, than white subjects. The source of the plaintiff's injury, on the other hand, elicited the same pattern of findings for both defendant sympathy and liability judgments. These results suggest that subjects' prior beliefs about the type of source most likely to cause a certain injury are a more reliable predictor of their liability judgments than are their feelings towards the litigants.

Demographic Variables within the Non-Student Sample

Sample Characteristics

Community subjects varied in terms of their education, income, and age. The effect of these variables on subjects' judgments is analyzed for the non-student subsample ($n = 130$). Educational background was analyzed by splitting subjects into three groups: those with only a high school education or less ($n = 31$); those who had attended college ($n = 68$); and those who had done post-graduate work ($n = 31$). The four annual income categories used were: < \$20,000, \$20,000-\$50,000, \$50,000-\$ 100, 000, and

> \$ 100,000. Twelve subjects did not provide their income level; of those who did, very few reported earning more than \$50,000/year ($n = 17$). Thus, for the purpose of analysis, subjects were split into two roughly equal-sized groups: those earning less than \$20,000/year ($n = 54$), and those earning more than \$20,000 ($n = 64$). Interactions between Injury Source and the variables of Education and Income could not be tested because of unequal frequency distribution across some of the cells.

Liability Judgments

Both education and income had a significant effect on non-student subjects' verdicts. Subjects whose formal education did not go beyond high school were twice as likely to find for the plaintiff as for the defendant, while those who had done post-graduate work were twice as likely to find for the defendant; subjects who had attended college but not beyond were about equally likely to find the defendant liable as not ($\chi^2(2) = 8.29, p < .02$; see Table 4). A similar relationship was found between income and verdicts: subjects in the low-income group found in favor of the plaintiff 57% of the time, while those in the high-income group found for the plaintiff only 36% of the time ($\chi^2(1) = 5.44, p < .02$).

Table 4. Effect of education on liability judgments

Education	N	% Liable ^a	Causation estimate ^b
High School	31	68	65.8 (28.9)
College	68	44	42.1 (29.8)
Post-Grad	31	32	33.9 (27.3)

^aPercentage of subjects who found the defendant liable.

^bMean probability that the defendant caused the plaintiff's injury, on a scale of 0-100 (standard deviations in parentheses).

Causation estimates were analyzed in a two-way analysis of covariance, with education and income as the between-subject factors and age as a covariate. The only significant effect was for education ($F(2, 106) = 2.79, p < .07$), with subjects' estimates of the probability that the defendant caused the plaintiff's injury decreasing as level of education increased (see Table 4). Taking education and income together as indicators of SES, higher-status subjects were more likely to find for the civil defendant than relatively low-status subjects. This result is incongruent with studies that have shown a tendency for high-SES jurors to judge criminal defendants more harshly (Adler, 1973; Reed, 1965; Simon, 1967).

Compensation

Including both Income and Education in the same model resulted in too few subjects in some of the cells, since only subjects who first found the defendant liable could be included in the analysis of compensation; hence, the two factors are analyzed separately. Neither education nor income affected community subjects' compensation awards, though age was found to be a significant covariate for education ($F(1, 47) = 4.2, p < .05$).

Sympathy

Subjects' ratings of how sympathetic they felt toward the litigants were also analyzed by two-way ANCOVAs. There were no significant effects on sympathy for the plaintiff ($F_s < 1$). Sympathy for the defendant, however, was affected by education level ($F(2, 190) = 4.01$; $p < .025$). Even though they were more likely to find for the plaintiff, subjects in the lowest educational category felt the most favorably toward the defendant (means: high school education: 39.1 ($SD = 58.8$); college education: 1.6 ($SD = 45.5$); post-graduate education: 10.0 ($SD = 45.3$); high school > college, $p < .05$, other pairwise comparisons n.s.).

The effect of education on sympathy for the defendant supports the finding, reported above, that Race influences sympathy for the defendant. Race and Education were significantly correlated ($\chi^2(2) = 6.0$, $p < .05$), with whites disproportionately more likely to have attained higher levels of educational achievement. Education and Income were also positively associated ($\chi^2(2) = 29.9$, $p < .001$). Thus, as has been widely established, there is an association between Race and SES. Nonetheless, each factor exerts an independent effect on mock jurors' liability judgments. The effect of SES—particularly Education—on subjects' feelings toward the defendant, as well as their liability judgments, parallels the effect of Race. Minority subjects are both more likely to find for the plaintiff and more sympathetic towards the defendant, as are poorly educated subjects.

EXPERIMENT 2

Across all demographic variables, subjects' attributions of liability varied depending on the alleged source of the plaintiff's injury. The assumption that jurors can make their judgments on the basis of the evidence alone conflicts with widely accepted normative standards for reasoning under uncertainty, such as Bayes' Theorem (see Edwards, 1968; Slovic & Lichtenstein, 1971). Bayesian theory prescribes the inclusion of the decision maker's prior expectations in assessing the probability of a hypothesis—for example, in estimating the probability that a civil defendant caused a plaintiff's injury. According to Bayesian theory, if a juror has a non-evidentiary, extra-legal belief that is relevant to a fact-in-issue, she ought to use it (Bornstein & Baron, 1993). Many extra-legal characteristics might exert their effect by drawing on subjects' prior beliefs. For example, Bornstein (in press) found that mock jurors' tendency to find against corporate defendants more often than individual defendants was associated with different attitudes toward the two types of defendant (see also Hans & Ermann, 1989); for instance, corporate defendants were perceived as more likely to cause harm. In deciding cases with corporate and individual defendants differently, subjects relied on their expectations about the defendant's status as an additional piece of evidence.

In addition to being unavoidable, the incorporation of such beliefs is rational from a Bayesian perspective. In estimating the posterior probability that a defendant's product caused the plaintiff's injury, one should include both the new evidence presented at trial (scientific testimony) and one's prior probability, in the form of intuitions about "what causes what." If subjects rely on their expectations in making liability attributions, they are violating legal guidelines; but if they pos-

sess a relevant prior belief regarding Injury Source, they are behaving like competent and thorough decision-makers. The present experiment was designed to explore the nature of subjects' intuitions about what causes ovarian cancer. In order to measure subjects' naive intuitions, the plaintiff from Experiment 1 was presented as a medical case history, with no scientific evidence or any information indicating a lawsuit had been filed. The results of Experiment 1 lead to the prediction that subjects will perceive chemical waste as more likely to cause ovarian cancer than either birth control medication or calligraphy ink.

METHOD

Subjects

Subjects were 48 adults recruited at the same location as subjects in Experiment 1. Subjects received \$1 for their participation.

Materials and Design

Subjects read a case history describing a woman who suffers from ovarian cancer. The case was identical to Experiment 1, except the woman was referred to as "the patient" instead of "the plaintiff." Under "possible illness factors," the history mentioned the patient's exposure to the three levels of Injury Source used in Experiment 1. The presentation order of the Injury Sources was counterbalanced within subjects, so that each causal factor was presented in the first, second, or third position for one-third of the subjects. No scientific evidence about causality was included, in order to assess subjects' naive intuitions.

Procedure

The general procedure was the same as in Experiment 1. The written instructions informed subjects that the experiment addressed what types of events people think cause certain kinds of injury or disease. Subjects were told "Based on what you will be told about the patient's personal history . . . your job is to estimate how much each factor is responsible for the disease." After reading the patient's case history, subjects rated the contribution to her illness of all three factors on a seven-point Likert scale (where 1 = extremely unlikely to cause ovarian cancer, and 7 = extremely likely to cause ovarian cancer). Subjects were also asked to provide demographic information and if they had ever personally experienced any of the three factors. The experiment too approximately five minutes to complete.

RESULTS

Sample Characteristics

Overall, there was a very high degree of similarity between the Experiment 1 and Experiment 2 subject samples, although the present sample was somewhat better-educated and contained slightly fewer non-white subjects (see Table 1).

Causation Estimates

The primary dependent measure was subjects' estimate of the likelihood of different Injury Sources causing ovarian cancer. Based on the results of Experiment 1, it was predicted that subjects would judge exposure to a chemical from a nearby dump as more likely to cause ovarian cancer than exposure to either birth control pills or calligraphy ink. Subjects' estimates were significantly different across the types of Injury Source ($F(2, 94) = 58.84, p < .001$). As predicted, exposure to the chemical (mean = 5.4, $SD = 1.5$) was rated more likely to cause cancer than either birth control pills (mean = 4.0, $SD = 1.8$; $t(47) = 4.17, p < .001$) or calligraphy ink (mean = 2.1, $SD = 1.2$; $t(47) = 12.29, p < .001$). The difference between birth control pills and calligraphy ink was tested and was also found to be significant ($t(47) = 6.26, p < .001$); subjects perceived the pills as more likely to cause ovarian cancer than the ink.

Thus, people have strong intuitions about what factors are more or less likely to cause ovarian cancer. These intuitions underlie the main result of Experiment 1, that a plaintiff's chance of winning depends on what she alleges to have caused her injury. Simulated jurors incorporate their expectations with the evidence presented at trial in making attributions of causality and, ultimately, responsibility.

Effect of Demographic Variables

There was no effect of subjects' Sex or Student Status on their ratings of the different Injury Sources. This finding is consistent with the results of Experiment 1, which showed no main effect of either Sex or Student Status on subjects' liability judgments. On the other hand, subjects' Race did affect their judgments in Experiment 1. In the present experiment, however, minorities did not perceive any of the factors as more likely to cause ovarian cancer than white subjects (t 's < 1.8). Although there is a clear effect of Race on liability judgments, it appears to derive from a source other than differential intuitions about the likelihood of specific factors causing ovarian cancer (though this conclusion should be considered tentative, given the relatively small number of minority subjects in the present experiment). One explanation might be that individuals of different races have different intuitions about the global probability of developing ovarian cancer. Such a belief could serve as a more general intuitive base-rate in attributing liability; it would not be reflected in the present experiment, which addresses beliefs about specific causes. Alternatively, whites and minorities might process scientific evidence of the sort presented in Experiment 1 differently, or have divergent opinions about its credibility. Further research is needed to explore the reasons for racial differences in making liability judgments.

Prior Experience

Very few subjects had lived near a chemical dump ($n = 5$) or used special calligraphy ink ($n = 8$), but 73% of female subjects had used birth control pills. However, they rated them as likely to cause ovarian cancer as females who had not ($t < 1$). Thus, there was no discernible relationship between subjects' personal experiences and their intuitions about disease causation.

GENERAL DISCUSSION

The present research has sought to identify extra-legal factors that influence judgments in a simulated product liability trial. Subjects' liability judgments were affected by both case-specific and subject-specific factors.

Case-Specific Extra-Legal Factors

Subjects' verdicts differed for cases that were identical except for the alleged cause of the plaintiff's injury. Even though the scientific evidence presented as to whether or not the defendant's product was capable of causing the injury was the same—regardless of the source of the injury—subjects were more likely to find the defendant liable if it was a chemical company than if it was a birth control pill or ink manufacturer. Thus, they did not base their decisions solely on the evidence presented at trial, as legal instructions prescribe (Devitt *et al.*, 1992), but relied also on the extra-legal characteristic of the source of the injury.

Cognitive processes that govern people's everyday thinking should appear in jurors' reasoning as well (Arkes, 1989; Saks & Kidd, 1980). One such process is a reliance on prior knowledge and expectations. The effect of Injury Source on subjects' verdicts was found to reflect varying intuitions people have about "what causes what." The more likely they believe a product is to cause a particular disease, the more likely they are to find a civil defendant who makes that product liable, in cases where the plaintiff suffers from the disease; they also feel less favorably toward the defendant.

The finding that subjects were most likely to find the chemical company liable is almost certainly specific to the particular disease that was used. The same three sources might be evaluated completely differently if the plaintiff suffered from another disease. In addition to varying across different types of injury, perceptions of causality and risk often vary across cultures as well (Englander *et al.*, 1986; Goszczyńska, Tyszka, & Slovic, 1991; Teigen, Brun, & Slovic, 1988). Within cultures, there is considerable agreement in people's perceptions of what is most likely to cause certain kinds of injury (Kraus & Slovic, 1988; Kraus *et al.*, 1992), but further research is needed to specify more precisely people's perception of the relationship between various diseases, disease sub-types (*e.g.*, types of cancer), and different types of injury source (*e.g.*, prescription medication, environmental contaminants, etc.).

Subjects in the present experiments used Injury Source as diagnostic information in making their decisions. In doing so, they violated legal guidelines, but they behaved as optimal decision-makers by relying on their prior expectations, as well as the newly presented evidence, in making a decision under conditions of uncertainty. One problem that arises from jurors' reliance on their prior beliefs is that those beliefs might be erroneous. The accuracy of such beliefs is an empirical question; research could show, for example, whether exposure to birth control pills, high-grade ink, or certain chemicals is more likely to cause ovarian cancer. Unfortunately, the beliefs' accuracy is generally not known, especially by the individuals making the decision. Thus, jurors' assumptions are put in the class of evidence that, though relevant to the decision in terms of making a fact-in-issue more or less probable—is not used

because of potential misuse (Koehler & Shaviro, 1990). However, the accuracy of jurors' intuitions is separate from the issue of whether or not they have a normative basis in the decision-making process itself (Bornstein & Baron, 1993). Research demonstrating the influence of case-specific extra-legal factors has traditionally ignored the relationship between those factors and jurors' belief systems.

Juror-Specific Extra-Legal Factors

In addition to the effect of Injury Source, the impact on subjects' liability judgments of a number of demographic variables was assessed. The characteristic that had the greatest effect on subjects' behavior was Race. Minority subjects felt more sympathy toward the defendant than white subjects, yet they were more likely to find in favor of the plaintiff. Level of Education and Income, which were correlated with Race, operated in the same fashion. The greater tendency of minorities and low-SES individuals to find for the plaintiff is inconsistent with the effect of those variables in criminal trials. In general, black (Broeder, 1959; Simon, 1967) and low-SES (Alder, 1973; Reed, 1965) jurors have been found to be more lenient toward criminal defendants. Although civil and criminal trials are similar in many respects (Hans, 1992), they are sufficiently different that the effect of demographic variables on how jurors treat the two kinds of defendant is not constant. Compared to white and high-SES jurors, black and low-SES jurors are more likely to reach a verdict that favors criminal defendants, who are opposed by the state, but less likely to reach a verdict that favors a civil defendant, who is opposed by a plaintiff. This finding may be due to a greater tendency on the part of minority jurors to perceive both civil plaintiffs and criminal defendants as the "victim" parties in their respective litigation. The differential treatment of civil and criminal defendants suggests caution in generalizing from criminal jury selection research to the predicted outcome of civil trials (cf. Penrod, 1990).

Minority subjects were more likely to find in favor of the plaintiff even though they did not perceive the various Injury Sources as more likely to cause ovarian cancer than whites. According to a normative model of decision-making like Bayesian theory, one's final decision, or posterior probability, should incorporate both previous knowledge (*i.e.*, one's prior probability) and new evidence (Slovic & Lichtenstein, 1971). Since Race did not affect subjects' prior intuitions about "what causes what," its effect on their liability judgments—that is, their posterior probability estimates of causation—is likely due to the weight they gave to the new evidence. Additional research is needed before any firm conclusions can be drawn about possible differences in evidence usage as a function of race, but minorities might have been more likely than whites to interpret the scientific evidence presented at trial as favoring the plaintiff. In light of the educational disparity between whites and minorities, an explanation linked to their interpretation of expert, scientific testimony seems plausible.

Although the plaintiff was female, there was no effect of Sex on subjects' verdicts. Jurors' sex has been found to make a difference in some cases but not others (Fulero & Penrod, 1990; Stephan, 1975); product liability falls into the class of cases where it does not. There was also no effect of Student Status on subjects' liability judgments, though the effect of both Injury Source and Race varied depending on whether or not

subjects were college students. For example, the effect of Race was greater for community than student subjects, which can be explained by the fact that student subjects, as a group, would not also have the contributing factor of low SES.

The absence of any systematic effects of Student Status suggests that the predominance of student subjects in psycholegal research is not, in and of itself, cause for concern. Two caveats are in order, however. First the present research used a single kind of case. Although previous research has not addressed the impact of Student Status on civil trial outcomes, students have been found to be more lenient in some criminal cases (*e.g.*, Simon & Mahan, 1971) but not others (MacCoun & Kerr, 1988). Similarly, the effect of Student Status might fluctuate across civil case type. It is not hard to imagine a personal injury case in which Student Status might make a difference, such as an underage plaintiff suing a university because he was allowed to drink too much at a party on campus and consequently injured himself.

Second, whether or not one is a student might not be important by itself, but factors that covary with Student Status could matter a great deal. For example, many studies using student subjects also contain a disproportionate number of white subjects. In light of the present findings regarding Race, future researchers, especially those investigating jury decisions in product liability cases, should be sensitive to the racial makeup of their samples.

In conclusion, the results of these experiments indicate that subjects' student status did not have a significant effect on their performance as jurors in a simulated product liability trial. However, demographic factors that are correlated with student status did affect subjects' liability judgments: minority and relatively poorly educated subjects were more likely to find for the plaintiff. Across all demographic categories, subjects were influenced by the case-specific extra-legal factor of the alleged source of the plaintiff's injury. They were more likely to reach a verdict in the plaintiff's favor when the alleged source corresponded to their intuitions about what causes a particular disease than when it did not.

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