

## A lawyer's view of the statistical expert

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Statisticians have expertise that can be very valuable in a wide variety of litigation. But the practices and culture of litigation are much different from science and, indeed, much different from most normal life. When statisticians enter this culture, they may be surprised and confused; at first, they are almost certain to be uncomfortable. In this article, I will provide a brief orientation to this complex and interesting, but quite foreign culture. My comments will focus on civil litigation in the United States.

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### 1. Litigation and the roles of expert witnesses

Litigation is a formal system for resolving disputes. The hoary image of lawyers appearing before a judge in robes is certainly one part of this process, but it is only one part. The system also involves a structured process through which the parties exchange information; a set of procedures prior to trial which may resolve the case or narrow the issues and a set of procedures after trial that are available to review decisions at earlier stages of a case. In recent years, people with disputes have increasingly begun to use a number of alternatives to formal litigation, such as arbitration and mediation. These alternative dispute resolution options may also call on the expertise of statisticians or other expert witnesses.

In general, statisticians and other experts play two somewhat distinct roles in these processes. First, they may play an important advisory role. Even before a lawsuit is filed, lawyers may need the expertise of statisticians to help them investigate, evaluate and prepare their case. If this is all the expert does, she is generally known as a consulting expert. Second, lawyers may want a statistician to testify in court. When statisticians do this, they are generally known as testifying experts. As we will see, some important consequences flow from this difference in duties.

Several aspects of the statistician's place and role in the legal system deserve comment. First, in almost all cases, expert witnesses are associated with one of the parties in the case. Although courts have the authority to appoint their own experts to advise them,<sup>2</sup> they seldom do so.<sup>3</sup> This association with a party has several consequences, which I will discuss later.

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<sup>2</sup> Federal Rule of Evidence 706.

<sup>3</sup> Surveys of federal judges indicate that a substantial majority have never appointed an expert. PIZZI, W. T. (1995) Expert Testimony in the United States. *New L. J.*, **145**, 82–83 (81% of federal judges have never appointed an expert); KRAFKA C. ET AL. (2002) Judge and attorney experiences, practices, and concerns regarding expert testimony in federal civil trials. *Psychol. Pub. Pol. L.*, **8**, 309–327 (74% have never appointed an expert).

Second, as a general matter, any information provided to a testifying expert has to be disclosed to the other side in the litigation.<sup>4</sup> Lawyers may be reluctant to disclose some of this information to their adversaries because it may disclose their legal strategies, types of analysis that are harmful to their case, doubts about the expert analysis or for other reasons. This broad disclosure rule, however, does not apply to consulting experts. Information provided to consulting experts is generally treated as confidential information that need not be disclosed to the other side. Because of this important difference, lawyers will sometimes hire two experts. One will be a consulting expert who can serve as a sounding board for ideas, try out a variety of approaches and provide general expert advice. The other would be a testifying expert who would be provided only with information necessary to permit the expert to reach conclusions favourable to the case. Because of the advice received from the consulting expert, the lawyer will have a firm grasp of what this information is.

Third, experts need not and probably should not make attempts on their own to gather the basic factual information in a case. It is standard and perfectly acceptable for the expert to accept the basic information provided by a party, and to perform analyses upon it. The lawyer has strong incentives to make this information accurate and reliable. If it is not, the other side will challenge it at trial, which would undermine the value of the expert's opinion. Thus, as a general matter, the expert's job is to provide an opinion, *assuming that the information provided is true and accurate*. It is the lawyer's job to make sure that she has provided the expert with the right information and to make sure that she can prove to the judge and jury that the information is true and accurate.<sup>5</sup>

Fourth, the dialogue permitted in legal proceedings tends to be artificial and awkward. Witnesses are generally not permitted to provide long, expansive explanations. Generally, they are only permitted to respond to questions. When responding to questions from the other side, standard advice given to experts, and all witnesses, is to provide very short answers. There are strong practical and historical reasons that trials proceed in this way, but these do not make the setting any less artificial and awkward.

Fifth, trials tend to have a finality that is unusual in most of science and life outside the law. Certainly, expert opinions can be changed and modified in response to new information or to correct mistakes prior to trial.<sup>6</sup> But once the trial concludes, a decision is rendered and any appeals have been completed, the opinion and any legal decision based on them are quite final. This is not like science or life, where one can go back and rethink the analysis or apply a newly discovered insight to it. Even if new discoveries indicate that the old testimony was quite wrong, this is likely to be an insufficient reason to re-open the case. One of the purposes of trials is to provide a final resolution to disputes. One consequence is that the result may not be open to review even when occasionally there are very good reasons for rethinking the issue.<sup>7</sup>

<sup>4</sup> Federal Rule of Civil Procedure 26(a)(2)(B).

<sup>5</sup> The point here is that the general incentive structure for lawyers is to provide good information to expert witnesses. However, as with any general statement, many possible qualifications and variations exist. On the one hand, lawyers may have incentives unrelated to the case to keep information away from experts (e.g. potential liability in other cases). In this situation, an expert would want to ask for the data and, if it is not provided, be prepared to decline an opinion or to explain how the undisclosed data might affect her analysis. On the other hand, part of the expert's function is to educate the lawyer in the area of her expertise. In this case, the conversation may cause the lawyer to realize that additional information should be provided.

<sup>6</sup> See Federal Rule of Civil Procedure 26(e)(1) (requiring experts to provide new information or analyses to the other side prior to trial).

<sup>7</sup> For a more extensive exploration of this idea, see GASTWIRTH, J. L. (1992) Statistical reasoning in the legal setting. *Am. Stat.*, **46**, 55.

## 2. The distinction between expert and lay witnesses

The rules of evidence in the United States attempt to create a clear distinction between expert and non-expert witnesses. The Federal Rules of Evidence say that a non-expert witness can testify about her opinions or inferences only in very limited circumstances. She can testify about opinions or inferences only if (a) they are rationally based on the actual perceptions of the witness, (b) are helpful to a clear understanding of the witness's testimony about a fact in issue and (c) are *not* based on scientific, technical or other specialized knowledge.<sup>8</sup> Expert witnesses are a distinct category. They can testify *only* if they possess scientific, technical or other specialized knowledge that is relevant to issues in the case.<sup>9</sup> The court is very much a gate-keeper in ensuring that only people who are truly qualified are permitted to testify as experts, that the opinions are based on reliable principles and methods and that the principles and methods are applied reliably to the facts in the case.<sup>10</sup>

As is often the case, this distinction is less than air-tight. In one case e.g. the plaintiffs' attorneys attempted to have an assistant medical examiner who had performed the autopsy in the case testify both about the facts of the autopsy (i.e. as a 'lay' witness about the facts) and as an expert on his opinions about the cause of death (to refute the opinion of an expert retained by the defence in the case). The defendants objected to this testimony because the medical examiner had not been identified as a testifying expert in the pre-trial proceedings as required. The court eventually held that the examiner could testify as an expert,<sup>11</sup> but this is not the point here. The point here is that the seemingly clear distinction in the Federal Rules of Evidence between lay and expert witnesses can become fuzzy in practice.

Despite this ambiguity, the general distinction between expert and lay witnesses hints at one of the reasons lawyers highly value expert witnesses. As a general matter, only experts can provide opinions about complex matters that may be central to a case. Lay witnesses are precluded from providing such opinions to the extent that they are based on scientific, technical or specialized knowledge. Lawyers also value expert witnesses because only experts can testify on the basis of data or information that is not otherwise admissible in a case, so long as the information is of a type reasonably relied on by experts in the field;<sup>12</sup> only experts can offer opinions based on second-hand information, such as medical records or personnel records; and only experts can provide a detailed explanation of the bases of their opinions.<sup>13</sup> Perhaps most importantly, however, lawyers value expert witnesses because '[t]heir qualifications and the pomp with which they are presented and received in court combine to create an extraordinary, if not undue, emphasis to their testimony in front of the jury'.<sup>14</sup>

## 3. Lawyers and their relationship with expert witnesses

As the preceding materials suggest, the relationship between lawyers and expert witnesses is a sensitive one. Lawyers, as a general matter, are not primarily interested in scientific integrity or 'truth'.

<sup>8</sup> Federal Rule of Civil Procedure 701.

<sup>9</sup> Federal Rule of Civil Procedure 702.

<sup>10</sup> Federal Rule of Civil Procedure 702. See *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993).

<sup>11</sup> *Dorsey v. Nold*, 765 A.2d 79 (Md. Ct. App. 2001).

<sup>12</sup> Federal Rule of Evidence 703.

<sup>13</sup> Indeed, they are required to do so by Federal Rule of Civil Procedure 26(a)(2)(B).

<sup>14</sup> MALONE, D. M. & HOFFMAN, P. T. (1996) *The Effective Deposition: Techniques and Strategies that Work*, 2nd edn, 259 pages. Although this view is common among lawyers, empirical studies on the influence of experts are mixed. See, e.g. COOPER, J. & NEUHAUS, I. M. (2000) The "Hired Gun" effect: assessing the effect of pay, frequency of testifying, and credentials on the perception of expert testimony. *L. Hum. Behav.*, **24**, 149.

Their primary obligation is to zealously protect the interests of their client. They have other obligations, of course, such as candor with courts and other tribunals and fairness to the opposing parties and counsel, but the lawyer's primary loyalties are to her client.<sup>15</sup> Thus, the lawyer's interest may not match perfectly with the expert's interest in preserving her reputation as a reliable neutral observer and her interest in scientific integrity. The system provides a number of incentives for lawyers to attend to the expert's interest in fair and reliable commentary, most pointedly because the expert's testimony will only be valuable if she is perceived as fair and reliable. Nevertheless, experts must be especially alert and sensitive to this potential mismatch of interests.

Lawyers are permitted to shop for expert witnesses who support their client's position. This can lead to delicate initial conversations in which the lawyer is attempting to determine (and perhaps shape) the expert's view. Lawyers are not under any ethical obligation to choose a particular expert with adverse views or disclose those views to the other side (unless the expert is listed as a testifying expert for that side, which would not be the case if the expert's views are adverse). As a result, the system as a whole exhibits considerable bias because of a selection effect. This is a principal reason why cases often turn into a 'battle of the experts'. Both sides of a case are subject to this selection effect, so the experts who testify tend not to come from the middle of the distribution, but to be skewed out at the ends which support one side or the other. Experts are also in a delicate position here. On the one hand, they want to maintain their reputation as reliable witnesses. At the same time, unless they tend to move to one end of the continuum or the other, their opportunities to serve as expert witnesses may be limited.

Lawyers are also very interested in protecting intellectual property relevant to the case. This would include both the lawyer's ideas about appropriate legal approaches and strategy, and the expert's opinions about how data should be viewed and analysed. I phrase the issue in this way because information about the case that is not intellectual property, i.e. the basic information and data, likely cannot be kept from the other side. In a statistically based employment discrimination case, the basic data about how many employees were hired, of what races and sexes, over what time period, for what jobs, etc., are all information that will be available to both parties. On the other hand, a competent lawyer should be able to protect his ideas about what legal theories apply to the case, and wants to be able to shield any adverse views his expert might have about the appropriate statistical approach to the data. If the lawyer hires a testifying expert who has access to these types of intellectual property, it will likely need to be made available to the other side. As mentioned above, one solution to this problem is to hire a consulting expert with whom everything is shared, but which does not trigger an obligation to disclose it to the other side, and then a testifying expert to whom only a more limited array of information is disclosed.<sup>16</sup>

Lawyers tend to be relatively insensitive to the costs of experts, except as these costs might reflect on the fact-finder's perception of the expert's reliability and trustworthiness. The first point is that lawyers tend not to worry that much about how much experts cost. In most cases in which an attorney might think about hiring an expert, the stakes of the case are so high that the costs of an expert will be small in comparison, even if they seem quite high to the neutral

<sup>15</sup> See American Bar Association, Model Rules of Professional Conduct 3.3, 3.4 (2002).

<sup>16</sup> This arrangement can pose issues for the testifying expert who may be shown only data favourable to one outcome. Once again, however, the general incentive structure tends to limit this problem. See *supra* note 5 and accompanying text. The opposing side in the dispute will have access to all the data and the value of the testifying expert's testimony will be undermined (and the money spent on the expert will be wasted) if it can be shown that the opinion was based on data that were incomplete in relevant ways.

observer.<sup>17</sup> The second point is that the expert's fees can reflect on the value of the expert's testimony if they are too high or too low. If they are too high, the impression would be that the expert was bribed to express a view he may not genuinely hold. If the fees are too low, the impression may be that the expert is not truly a neutral, but rather someone with ideological or other views that match his side's views. As a result, Goldilocks fees are the right approach—not too high or too low, but just right.

Finally, as I hinted above, there often is an improvised dance between lawyer and expert in these cases. The central issue in the dance is who leads and who follows. Certainly, the lawyer will need to lead on some aspects of the case: just what are the facts of the case, what is the legal theory that needs expert support, etc. On the other hand, the statistical expert has to ensure that she is the lead on other issues: what is the best statistical approach to the data, what are the appropriate conclusions based on that approach, etc.

#### 4. Some ethical considerations

A number of ethical issues can arise in connection with expert statistical advice. I do not intend to provide anything approaching a comprehensive listing of these issues here. However, I would like to provide a few examples.<sup>18</sup>

One type of ethical issue that can arise is related to my fee discussion above: An expert must make sure that her opinion is untainted, indeed unaffected, by financial promises made by the party employing her. This taint could occur, as indicated above, if the actual fee is unreasonably high; it could occur if the amount of the fee is made contingent on success in the case; or it could occur more subtly by promises of future work as an expert if the expert's opinion is especially favourable. On this issue, there is an alignment of the interests of lawyers and expert witnesses, but the aligned interests cut both ways on the issue. On the one hand, the lawyer would like a particular opinion and this aligns well with the expert's personal interest in a high fee. On the other hand, neither the lawyer nor the expert wants the opinion to be tainted by perceptions of self-interest. Experts must disclose their fee arrangements to the other side. As with many things, this type of disclosure makes it easier for lawyers and experts to resist any bad instincts.

Another ethical issue involves the use of potential evidence. As indicated above, testifying experts must generally disclose any information they have been provided and analyses they have conducted. This means that if an expert runs a number of different types of analyses and saves them, all those analyses must be disclosed to the other side. If the expert writes three or four different drafts of her expert report and saves them, they must all be turned over to the other side. If one of those drafts came back to the expert with comments on it from the lawyer, that draft must be disclosed and, almost certainly, the expert will be asked to explain what she thinks of the comments and how she responded to them. One common response to this is for experts not to save many things. Certainly, they will still be asked about what they have done and they will still be required to testify truthfully

<sup>17</sup> This is not always true, of course, but depends on the nature of the particular case. To the extent statisticians are asked to be experts in pension cases or cases involving corporate wrong-doing, it is likely that the stakes of the case will far outweigh any amount the expert might demand as a fee. The lawyer's principal interest in such cases is to get the best, most credible experts available. On the other hand, some employment discrimination cases may involve only relatively small numbers of plaintiffs. In such cases, the plaintiffs, in particular, might be quite sensitive to the cost of experts.

<sup>18</sup> For more extensive and excellent discussions of ethical issues regarding expert witnesses, see LONGAN, P. E. (2003) *Ethics & Expert Witnesses*. Mercer Center for Legal Ethics & Professionalism, 67 pages; LUBET, S. (1999) Expert witnesses: ethics and professionalism. *Geo. J. Legal Ethics*, 12, 465.

about it. But testimony tends to be less damaging to an expert's ultimate opinion than physical documents. The key ethical concern here is the word 'truthfully'. I do know of an ethical obligation in statistics or elsewhere that requires experts to keep physical copies of analyses or drafts. On the other hand, experts do have an ethical obligation to testify truthfully, even if there is no physical evidence of what has been done. Experts must resist the temptation to be less than truthful when asked about their activities.

Finally, on major issues it is not uncommon for one of the parties to try to keep experts from helping the other side. One variation of this is that one part of a settlement agreement may be that the expert witnesses agree not to testify for future plaintiffs with similar claims. Another variation is that a party may hire experts who have adverse views as consulting experts to prevent them from becoming testifying experts for the other side. Here the disclosure rules do not push people towards ethical conduct. Both settlement agreements and consulting arrangements need not be disclosed to the other side, so the worrisome alignment of interests between lawyers (preventing adverse testimony) and experts (extra-high payments for their expertise) is more likely. The safety factor here is that this sad alliance can only work if the supply of experts is limited.

## 5. Tensions between law and statistics

A number of tensions exist between law and statistics that arise because of differences between the disciplines in matters such as how they conceptualize their central tasks, how they view information and how they define words.

One insight into how the two disciplines view their tasks differently can be obtained by thinking about their quite different approaches to uncertainty. Statistics, by its nature, views uncertainty probabilistically. If an employer hires 15% female employees from an applicant pool containing 18% females for the relevant positions, statistics can control for other variables and tell us how often one would see that result by chance. The law does not, and cannot, operate in that way. It must decide, yes or no, whether the employer relied on sex in making the employment decisions. The likelihood that the hiring pattern could be explained by normal variation without reliance on sex is certainly relevant to the decision. But the decision itself will not be about the role of chance, but about the role of sex. And the ultimate decision about the role of sex in the decision will not be probabilistic—'we are 73% certain that the employer relied on sex in making these decisions'. Rather, the decision will be either entirely yes, sex discrimination occurred, or entirely no, sex discrimination did not occur.

The two disciplines also tend to view data differently. In statistics, analysis is generally used to produce inferences about a population based on information known about a sample. In law, by contrast, the 'sample' is often the entire population of interest; we want to make inferences about a set of hiring decisions made for a particular job during a particular time period. The task is not to make inferences about what that sample might tell us about employer decisions over a larger set of jobs or a larger time period, but rather to make inferences about the employer's practices or state of mind with respect precisely to that population.<sup>19</sup> Similarly, statistics and the law have different approaches to the types of data which must be dealt with in making such inferences. As a general matter, statistics thinks it very important to consider all relevant data and to account for discrepancies or problems in the data. On the other hand, the law carefully evaluates all data before determining

<sup>19</sup> See PAETZOLD, R. L. & WILLBORN, S. L. (2001) *The Statistics of Discrimination*, § 2.06.

that it is permissible to consider it in making a legal decision.<sup>20</sup> If data do not meet a number of legal indicators of reliability, it is excluded from the case and simply cannot be relied upon by the statistical expert in conducting her analysis. This may pose practical and ethical problems for statistical experts.<sup>21</sup>

Finally, statistics and law may use the same words quite differently, creating a significant possibility of miscommunication. A partial list of such words, as suggested by Ramona Paetzold, would include reliable, valid, unbiased, significant, power and causation.<sup>22</sup>

## 6. Conclusion

The cultures of statistics and the law are different in important ways. Inevitably, this is going to create certain tensions and miscommunications. My modest hope for this article is that it will help familiarize statisticians with the foreign culture of the law. I have no doubt that statisticians will continue to be puzzled and surprised by some aspects of our culture. As someone who has done some exploration in the other direction, I can assure you that this is not at all unusual.

At the same time, however, this intersection of cultures holds great promise for the law. Despite all the problems and concerns I have mentioned in this article, experts serve a very important role in legal proceedings, one that is often indispensable. Together, we need to address and resolve these problems so that experts can continue to serve the important role recognized well more than a century ago:

The [expert] witness should come into court with clean hands and a pure heart; with sincerity of purpose; with a tendency and desire to ascertain and recognize truth wherever it may be found; to conceal nothing; mindful of his oath, which requires him to speak not only the truth, but the whole truth.<sup>23</sup>

<sup>20</sup> An entire area of the law, the law of evidence, is devoted to this topic.

<sup>21</sup> PAETZOLD & WILLBORN, *supra* note 19.

<sup>22</sup> *Id.*

<sup>23</sup> FOSTER, W. L. (1897) Expert testimony—prevalent complaints and proposed remedies. *Harv. L. Rev.*, **11**, 169–186.