
AFFIRMING AND WORKING WITH SUBJECTIVE PROBABILITIES

Lawyers analyze case law, statutes, and regulations, reach conclusions about legal and factual strengths and weaknesses, and advise their clients regarding certainties and uncertainties. Few lawyers' predictions come with absolute certainty; ambiguities and their consequences must be acknowledged and explained. Law school begins the process of acculturating lawyers to ambiguity and uncertainty as embedded in the legal system. If all laws, rules, and facts were clear and predictions about legal process outcome uncontroversial, legal analysis and its communication would be far less difficult.

Given that advising clients as to legal and factual uncertainties is an essential component of legal advice, it is not surprising that experienced lawyers become comfortable with that process. In face-to-face meetings, over the phone, on email or in a more formal opinion letter, lawyers walk clients through their analysis, explaining where the uncertainties lie, and how they assess the chances of success at each juncture. Phrases such as "highly likely," "quite possible," "just about a slam dunk," and "pretty good chance" roll off lawyers' tongues or keypads, with the reasoning supporting the phrase. Yet, if you ask them to assign a percentage, many lawyers resist, protesting: "I couldn't assign a probability percentage; it's too precise. No one can really do that: nothing is exactly this percent or that percent. If I just throw out a percentage, it's garbage in, garbage out. No client or lawyer should rely on a percentage number."

The entire enterprise of decision tree analysis for legal problems respectfully disagrees and invokes two sources of wisdom in support of that disagreement. The first one, referenced earlier, is:

*"Let not the perfect be the enemy of the good."*¹

Although probability percentages used in a decision tree are inevitably subjective and may not be perfect, they can be good approximations of the lawyer's judgment—the same judgment traditionally relied upon. In fact, there's no such thing as a knowably "perfect" probability in our legal context, given that its accuracy will never be tested through large numbers of identical trials in the same case.

¹ Other legitimate translations might be that the best or the better is the enemy of the good. Though this quote is generally attributed to Voltaire: *Le mieux est l'ennemi du bien*, Google answer informs us: That there are two citations for Voltaire's use of this phrase. Both citations are appropriate, since Voltaire wrote this phrase once in Italian and another time in French. The Oxford Dictionary of Quotations, Elizabeth Knowles ed. (5th ed. 1999), page 797, quotation number 11, provides this entry: 'Le mieux est l'ennemi du bien The best is the enemy of the good' Contes (1772) 'La Begueule' l. 2; though often attributed to Voltaire, the notion in fact derives from an Italian proverb quoted in his Dictionnaire philosophique (1770 ed.) 'Art Dramatique': 'Il meglio è l'inimico del bene'. See www.answers.google.com/answers/threadview?id=262796

Loftier philosophical and epistemological foundations aside, subjective probability percentages can and should be used for the following reasons:

1) *Clarity has greater virtue than covert operations.*

As discussed earlier, if lawyers express likelihood in verbal rather than numerical terms, they nevertheless inevitably and covertly use percentages to formulate their advice or case evaluation. Surfacing and articulating those percentages enables greater clarity of analysis, for the lawyer and the client.

2) *Acknowledged imprecision reflects professional judgment, given uncertainties.*

It is essential to know and acknowledge that named numerical percentages on a decision tree do not signify precision or certainty (nor do named damages figures). In fact, percentages chosen should be understood as approximations of the lawyer's gut sense. Moreover, the percentages inserted on a decision tree can easily be shifted up or down to account for high degrees of uncertainty, to test the impact of a shifting "gut sense" at any or all junctures.

3) *Informed process yields sound judgments as to percentage likelihood.*

While a percentage "just thrown out there" may have no value, decision tree analysis benefits from using percentages arrived at through a deliberative process structured to avoid common biases.

While expressed as rejoinders, these points are central to the case for using decision tree analysis in legal practice, and thus merit elaboration here.

On the Virtues of Clarity Over Covert Operations

Imagine that a group of lawyers are shown three different descriptions of the chances of success in a case, and asked to name a reasonable settlement (in view of that description) as follows:

- *This case is unassailable on liability. Damages will unquestionably be at \$500,000. What is a reasonable settlement?*
- *I have a very strong case on liability and the damages proof is equally strong in support of a \$500,000 award. What is a reasonable settlement?*
- *I have quite a good case on liability and my damages are likely to come in as high as \$500,000. What is a reasonable settlement?*

I have administered this "test" countless times, to countless lawyers' groups as well as law students. Every time, I ask the group, by show of hands, "How many of you had settlement numbers that were highest for the first case, in the middle for the second case, and lowest for the second case?" All of them. It never fails. Thus, we see that lawyers do routinely discount case valuation based upon an internally generated percentage that corresponds to their meaning for "unassailable" or "very strong," "quite good" or "likely" and so on. The calculation is hidden, but it happens, using numerical percentages to adjust from valuation of the best to the worst-case scenario in dollar terms.

Clarity is a virtue in lawyer-client communication. If nothing else—even if no EMV or roll back calculation is performed—placing percentages on the decision tree provides clarity to the client about the lawyer’s assessment. I remember a construction case mediated in a courthouse program, in which I had begun to sketch a decision tree mapping the structure of the case. I turned to the plaintiff’s lawyer and said: “You said your client has a very strong case. Okay, then, what do you think the chances are that your client will prevail on liability?” The lawyer responded: “I do think this is a very strong case, I’d say 60%.” The client was shocked, unhappy, and frankly, angry: “What do you mean? You’ve got to be kidding! When you’ve been saying I have a very strong case, I thought that meant 90%, maybe more. I never would have invested this much if I thought there was only a 60% chance of winning! I certainly would have offered to settle a long, long time ago, before spending all of this money.” Lack of clarity led the client to make entirely different choices than he would have otherwise made.

One person’s “highly likely” is another’s “good chance.” For some, “a good possibility” is merely “possible,” worse than an even chance – 50%. For others, the “good possibility” is indeed good, significantly better than 50%. When making an introductory presentation on decision analysis, I always read a list of eight probability assertions to the group, so that everyone sees the words on screen and hears the same voice, volume, and inflection. It includes assertions such as: “You have an excellent case on liability!” “This case is shaky on liability” ... “You should win this case”... and so on². The listeners are asked to record what liability percentage they would mean, as the lawyer, if they made each assertion in the way I voiced it. I then survey the class responses for each assertion, to find the range between the highest and lowest assigned percentages. Here is a set of typical results:

Prose Probability Description Stated	Participants’ Translations High % - Low%
It is very likely that X will win this suit.	90%-50%
X is likely to win this suit.	80%-50%
X should win this suit.	83%-35%
There is a good possibility that X will win this suit.	90%-50%
It is extremely likely that X will win this suit.	90%-75%
You have a very good case on liability.	80%-50%
You have an excellent case on liability.	98%-65%
Your case is shaky on liability.	55%-20%

As you can see, most often, the ranges are 25–30 percentage points wide. 20 points is relatively narrow; it is very rare to have ranges as low as 10 or 15 points. Ranges of 40 points or more are not at all uncommon. The obvious lesson is that although a lawyer intends to accurately communicate with his descriptive phrasing, the client’s interpretation may be far from the lawyer’s intended meaning.

From a legal practice perspective, wide discrepancy between probabilities intended and probabilities interpreted means the client is not fully informed. And it may unintentionally threaten client autonomy and self-determination around questions of risk. The owner of the small construction company de-

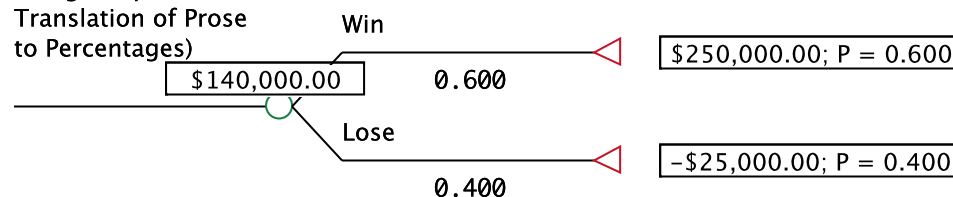
² Full credit to Jonathan Marks and Eric Green of Endispute, Inc., circa 1988 or so, who introduced me to this exercise; it works every time. The results in the table that follows was generated in a recent class or workshop I taught and are completely typical.

scribed earlier offers a client persona for elaboration. Let's assume that this client is risk averse by nature, has avoided large mortgages and other debt in his personal life, lives well within his means, and saves for retirement in his personal life. His modest 401K is invested in bonds and low risk mutual funds in blue chip stocks. He prefers to keep the bird in the hand, instead of looking to uncertain bushes. He runs his business in a similar way. He decided to file suit against a developer because his company had incurred extraordinary losses (and received only meager payment) on a large job. He strongly believed he and his employees were in the right and, in the initial consultation, the lawyer assured him of an extremely high likelihood of winning and recovering damages in the \$250,000 to \$300,000 range. Let's say the client invested \$25,000 from the company's limited cash reserves in the initial filing and early discovery. Let's also assume that the lawyer is not terribly risk averse by nature. He allocates a substantial portion of his 401K to riskier stocks for their greater upside. He enjoys rolling the dice.

What if, after the document exchange and a few key depositions, defense counsel approached our construction company owner's counsel about the possibility of settlement? While explaining that he doesn't have complete authority, he indicated that he believed his client might be willing to offer \$80,000 to \$100,000 to settle the case. As is always true, the document exchange and a few key depositions raised a few concerns, but the plaintiff's lawyer still sees the case as "very strong" (60% in his mind). He communicates the settlement overtures to his client, as well as his assessment that they have a "very strong" chance of winning and recovering damages in the \$250,000 to \$300,000 range. The lawyer acknowledges that it will take another \$25,000 in fees and costs through trial. If this were the lawyer's decision to make (even without any interest in the fees), he would go forward. After all, the midpoint damages range is \$275,000—the net would be \$250,000. If you discount that with a 60% chance of winning, the EMV would be \$140,000 (when the cost of fees are factored in).

Given his personal risk preferences, he would not take a settlement at \$80,000 or even \$100,000. Thus, he will no doubt signal to the client that it's not worth pursuing settlement negotiations. Here's what the tree might look like in the lawyer's mind.

Tree Model 74
Lawyer's Assessment,
Using Lawyer's
Translation of Prose
to Percentages)



Let's say the client understands "very strong" chance to mean 90%. Discounting the \$250,000 net using 90%, the EMV would be \$222,500. Even if this client were quite risk averse and would accept a hefty additional settlement discount to avoid the risk of losing, and the need to deplete cash reserves by \$25,000, he may nevertheless reject the \$80,000—\$100,000 as just too low.

Yet, if the same client had understood "very strong" to mean only 60%, his settlement point would no doubt be different from his lawyer's. With an EMV of \$140,000, a 40% chance of getting nothing, and the requirement to spend precious cash, that client might well take 1/3 less to avoid risk and accept

a settlement at \$100,000 or lower. At the very least, he would think it worthwhile to pursue settlement discussions. Here's what the tree might look like in the client's mind.

Tree Model 75

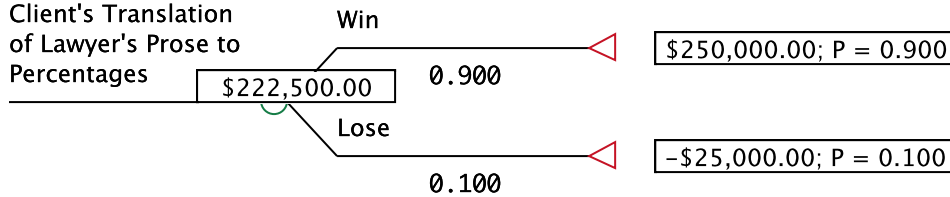
Client's

Interpretation –

Client's Translation

of Lawyer's Prose to

Percentages



Accurately communicating legal analysis, offering legal advice, and wise counsel are all within the lawyer's role, and are entirely consistent with client autonomy and self-determination. The client must be well informed and free to reject the lawyer's advice (subject to legal constraints), and act in his or his company's best interest, as he sees it. However, lacking awareness of his lawyer's real assessment of risks, the client cannot be well informed. And by failing to articulate that risk assessment clearly, the lawyer may unwittingly impose his own risk preferences and risk tolerances upon his client. That would indeed be inconsistent with the proper separation between legal advice and client self-determination.

Disclaiming Precision, Owning Gut Uncertainty

The logic, method, and purpose of decision analysis strongly caution against claims to precision in its numerical inputs or calculated numerical outcomes—dollars or compounded probabilities. Even decision analysis aficionados readily and properly concede that its goal is to model a decision and its consequential uncertainties and possible outcomes, but perfect precision should neither be sought nor expected.

This is particularly true for decision analysis applied in legal contexts, where the analysis will not be subjected to proof and refinement after hundreds of trials. After all, when decision analysis is used to formulate public health policy, or to evaluate pharmaceutical treatment protocols or stock market strategies, we anticipate that the results will be recorded and the outcomes reviewed. In a decision analysis regarding whether to prescribe a cold medicine, we would ask: "If 100 people took this cold medicine, what percentage of them would see dramatically improved symptoms?" Presumably, a sample of 100 people or more would take the medicine, with various positive and negative results. Even if 55% of the sample saw positive results, we know that a second sample is unlikely to yield *exactly* a 55% success rate. A reliably precise success rate can't be predicted with certainty until a large number of samples have been taken from the target population. And still, the percentage recorded from any single small number sample is likely to vary from the overall "true" average rate.³

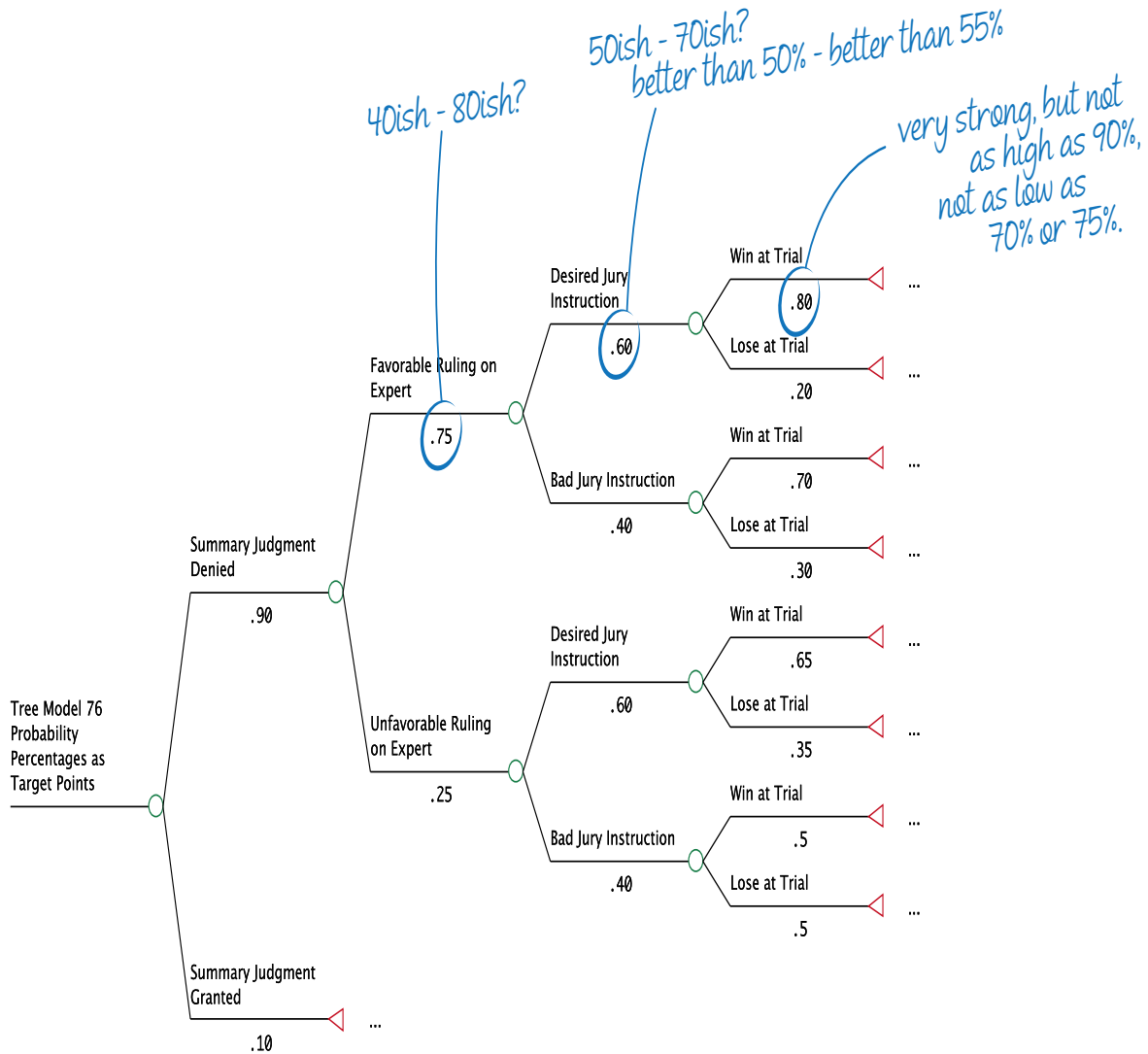
For decision analysis in a legal case, to assign a probability percentage for liability, we similarly ask: "If this case were tried a hundred times, what percentage of the time would there be a plaintiff's verdict?" In the simplest of cases, with damages set at \$100,000, no costs to subtract, and liability probability of

³ This is a basic fundamental truth in statistics and probability theory, available from any reputable text on the topic

70%, the EMV would be \$70,000. We are positing that the plaintiff would win 70 out of 100 times. Just as \$70,000 is the average of all of the trial outcomes, 70% is understood as the predicted win-loss percentage over time. As acknowledged at the outset, this question is premised on a fiction for the purpose of prompting the analysis. *That same case will not be tried 100 times.* Our sample size is one. Among the few certainties is that the case outcome will not be its hypothetical, fictional weighted average.

If the numerical percentages are not intended to be precise, then what are they intended to be? They are target points used to express the lawyer's gut sense. Imagine that the lawyer states that surviving summary judgment is "nearly certain"—"a slam dunk", defeating the defense motion to exclude expert testimony is "highly likely", "chances are quite good" of a favorable jury instruction on a key point, and the other side's star witness "might possibly" crack on cross-examination. As demonstrated by the phrases to percentages exercise described earlier, we don't know what he means by these phrases. More importantly, we don't know (and perhaps neither does he) what impact it will have on case assessment if he later reassesses "nearly certain" summary judgment survival to "very strong chances" after reading their brief. How should the client play his hand if the other side's witness proves to be wonderfully disastrous at deposition? When percentages are assigned, we see how the lawyer's gut sense of how the risks are ordered, and how they change as the facts, legal theories, and other realities unfold.

Thus, when a lawyer assigns 90% to the chance of surviving summary judgment, 75% to the chance of favorable ruling on his expert, and 60% to the desired jury instruction, we understand that these are markers—subjectively placed along a range of strength—not precise or provable assessments. It is a way of communicating: "I am not 100% certain, but I am surer of this than of that, and even less so on this question." A helpful way to think about these markers is as target points placed along a continuum, as reflected on the next tree, with fuzzy circles reflecting degrees of uncertainty. Yet, as lawyers know, acknowledging uncertainty and ambiguity does not reflect lack of careful thought and analysis: quite the opposite.



The obvious is also true: decision tree analysis requires us to use numbers—damages estimates in dollar numbers, and probabilities in percentage numbers. As a practical matter, without numbers, there can be no roll back calculation to an EMV and no calculation of the probability distribution of outcomes. Math and decision tree calculations are built on numbers.

Given that a numerical percentage is just a target point for expressing a lawyer’s (or client’s or mediator’s) sense of relative confidence, it would be entirely foolish to argue that 88% is correct and 90% is not, or that only a 92% probability will do. One important benefit of percentages is that they are easily shifted to account for the reality of their subjectivity and imprecision. Decision analysis software, Excel, or even an arithmetic calculator makes it easy to play with any percentage.⁴ Suppose the tree builder has named 80% as his estimated probability of success at a particular case juncture. It is easy and often wise

⁴ Of course, there is nothing magic about software and calculators. Since the functions are plain arithmetic, anyone with patience, pencil, and paper can try the math using different probabilities.

to see what happens when the probability ranges between 78% and 82%, or 75% and 85%, as if drawing circles around that target point. Where the facts or legal standards are squishy, and the gut sense is unclear, a wider circle can be drawn. Of course, as the case develops over time, the method enables us to analyze the impact of shifts in our “gut sense” at any or all junctures.

Showing What If? Sensitivity Analysis Maps the Impact of Uncertainty Ranges

“Sensitivity analysis” is the technical term for the process of testing the impact of variance in a probability percentage or damages estimate. Essentially, it examines the “sensitivity” of the tree’s results to this variance. The TreeAge software enables the user to easily graph this—to see what happens along a range of estimates. It can also be used to help decide whether actions intended to increase the probability of a favorable outcome—e.g. retaining a costly expert—are worthwhile, at least in terms of possible payoffs or EMV.⁵

To see the way sensitivity analysis can assist discussion of uncertainty and subjective probability, consider the case circumstances described in this paragraph, and then take a look at the next two trees and their graphed sensitivity analysis, from the plaintiff’s perspective. Let’s assume that the plaintiff’s counsel wishes to retain a “fancy expert” on the theory that his report and testimony would improve the chances of a liability finding. Even though he hasn’t yet formally retained the expert, much less seen his report, plaintiff’s counsel has informally consulted with him—as prelude to retention—and explained the circumstances in the case. Though the expert was careful to say that he couldn’t really provide an opinion without examining the evidence, he suggested a possible theory that would put liability squarely on the defendant. Plaintiff’s counsel anticipates a defense motion to block this expert from testifying based on the argument that his original PhD and faculty appointment were not related to the issue in the case. Plaintiff’s counsel is confident that the expert’s experience and research publications are more than relevant. Thus he estimates a small but significant (10%) chance that the defense will succeed in disqualifying the expert. Of course, retaining the expert will be costly.

Let’s assume that, right now, the plaintiff’s counsel is quite optimistic about the expert’s opinion and testimony and its impact on the case. Thus, the plaintiff’s counsel estimates the chance of liability with the expert testimony at 70%. Without the expert, he estimates the chance of a liability finding at 55%.

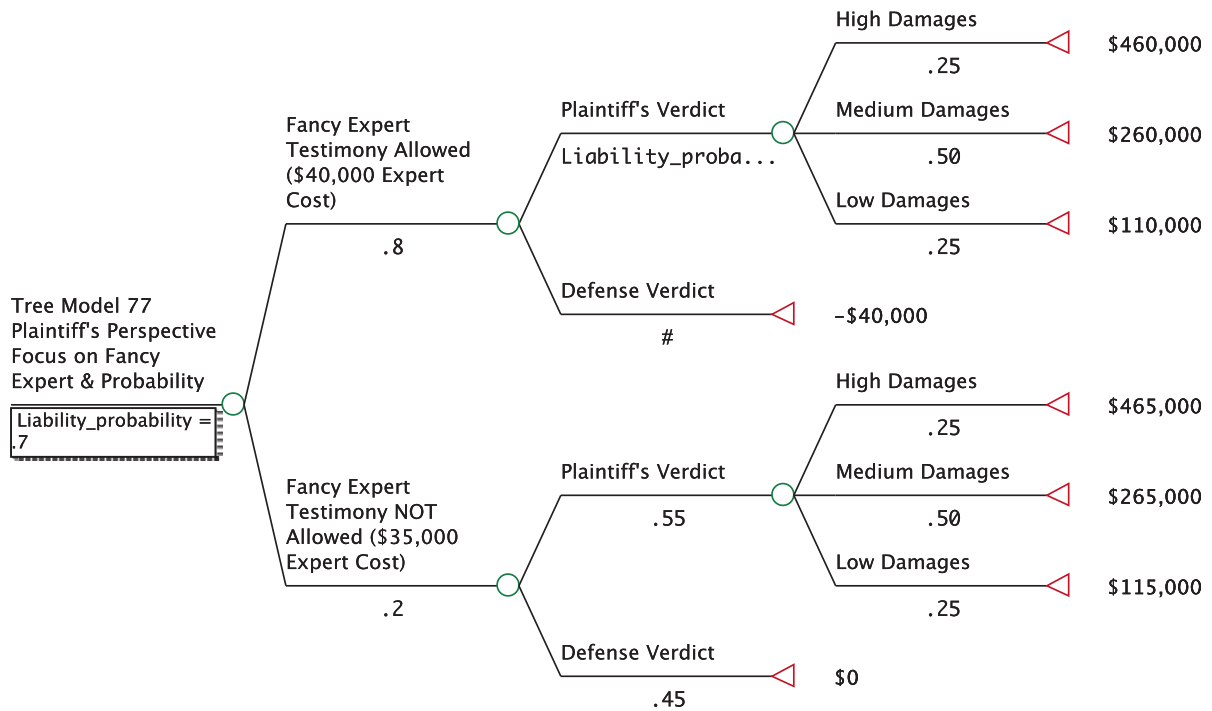
A mediator or the lawyer as tree-builder should acknowledge a great deal of uncertainty about the probability of liability if the fancy expert is retained and permitted to testify—given that he hasn’t yet produced a report or testified on deposition. The lawyer and client might recognize that the fancy expert *could* enhance the liability argument or diminish it (depending on what comes out of his fancy lab at MIT and his skills as a witness).

Of course, one easy way to ask “What if this probability estimate is off?” is to substitute other probability estimates, and see what impact that has on the EMV or the end chances of each outcome. The probability under the “liability” branch that started as .7 (70%) can be changed to .6 (60%), or to .5 (50%) and the probability under its opposite branch changed to the inverse, .4 (40%) or .5 (50%). Then the tree can be rolled back again to compare the difference in results.

⁵ Victor, Marc, “Interpreting a Decision Tree Analysis of a Lawsuit” (1988, revised 2001). This article, as is true for all of the others by Marc Victor, is available in pdf on his website, litigationrisk.com.

To capture and test that uncertainty—by asking the consequences of “What if that 70% probability is way off?”—the tree below involves some up front work with the software to set up a formal sensitivity analysis. A variable has been inserted into the tree for the probability of a liability finding with the expert’s testimony.

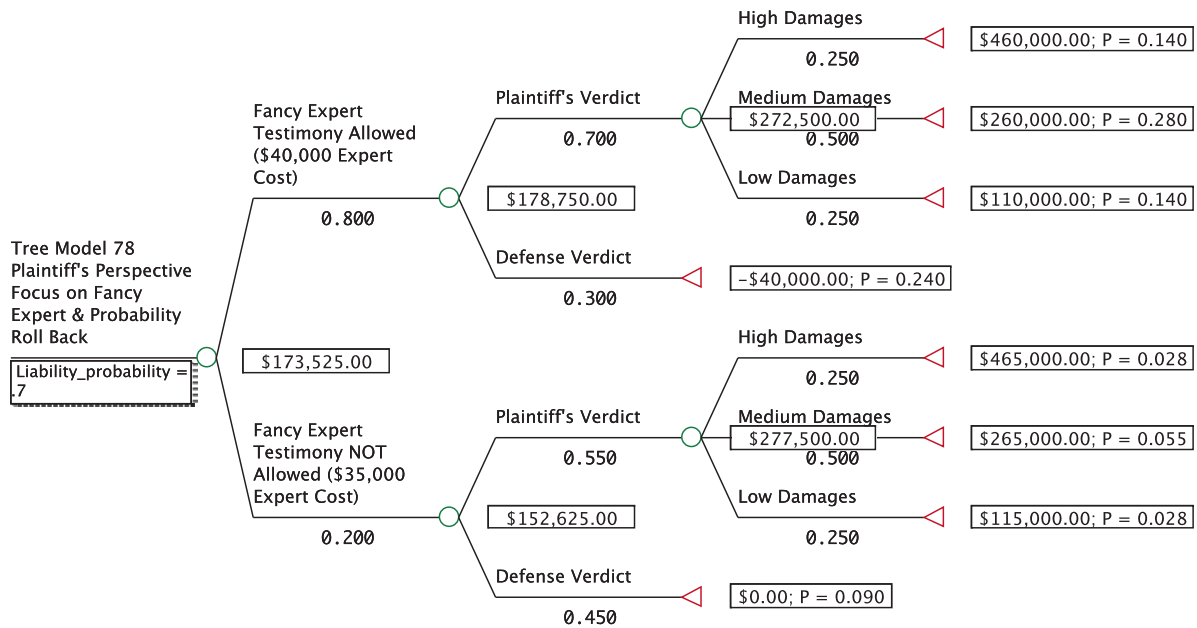
The starting point for the probability estimate is plaintiff’s counsel’s original and optimistic .7 or 70%. Note that the “no liability” branch below it shows probability in the form of a #. In the TreeAge software, that’s the way to tell the program to use the inverse of whatever probability is used for the branch above. Thus, when the roll back is performed on this tree, where the variable is set at .7 or 70% for the likelihood of liability, the chance of no liability becomes .3 or 30%.



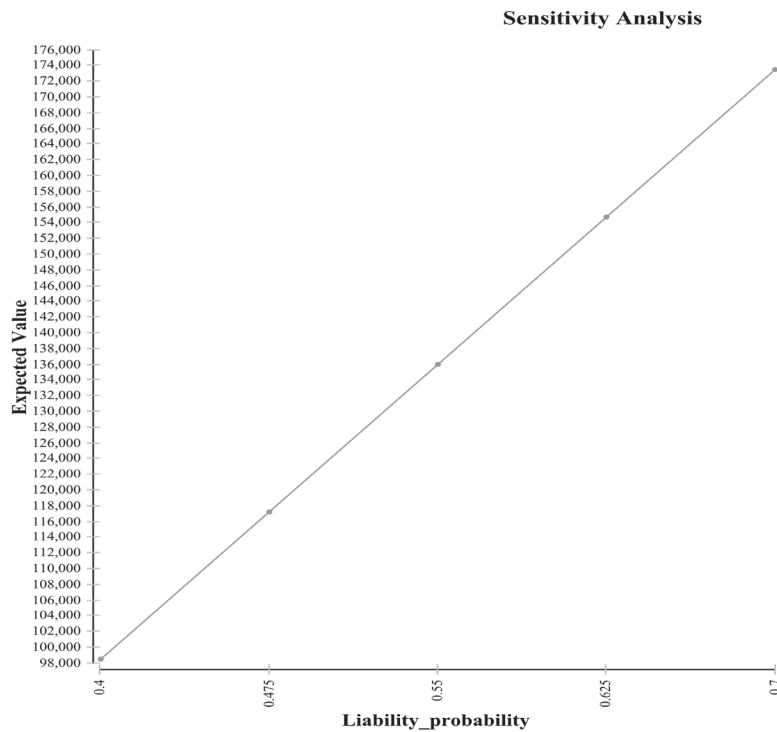
This tree reflects a prediction that expert testimony would raise the chances of a plaintiff’s verdict.

The tree uses a damages range with a high of \$500,000, a mid-level of \$300,000 and a low of \$150,000. While it assumes the plaintiff has a contingency fee arrangement with her lawyer, the contingency fee has not been deducted from the outcomes. The plaintiff will be responsible for paying the cost of the expert no matter what the trial outcome and has been deducted. The expert cost through trial has been set at \$40,000. If the defense motion to disallow the expert’s testimony succeeds, the expert cost would be \$35,000 (assuming \$5,000 as the cost for his testifying at trial).

Next is the same tree, rolled back to display an EMV.



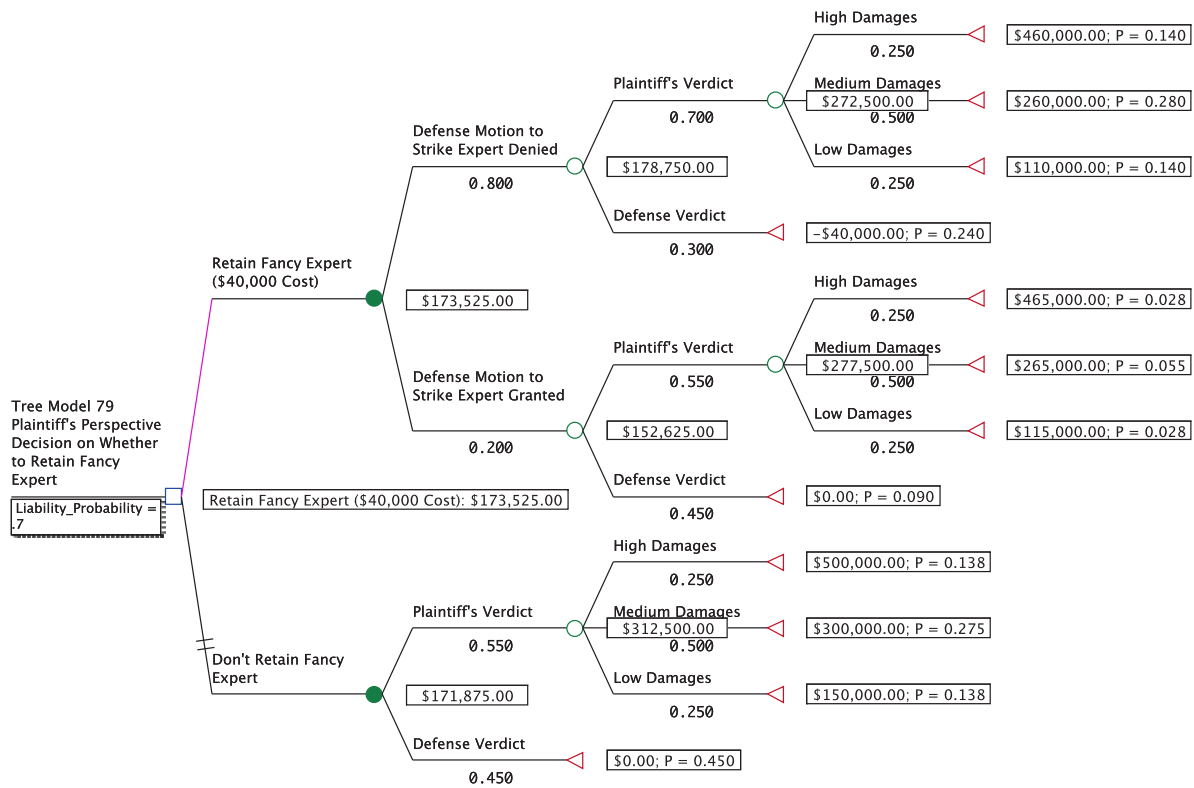
As you can see on the next page, it then becomes easy to do a sensitivity analysis, as a way of answering the question: “What if the probability is not 70%?” For the sensitivity analysis reflected in the graph below, we’ve tested a range of probabilities between .4 and .8, or 40% and 80%. In other words, we’ve asked, “What if, after the fancy expert would be retained and would testify, the probability of the liability might range between 40% and 80%. How would the EMV or the discounted value of the case be impacted, assuming various probabilities along that range?”



This graph reflects that sensitivity analysis. It shows the degree to which the case's EMV changes with changes in the probability of liability, after retaining the expert and assuming his testimony will be permitted.

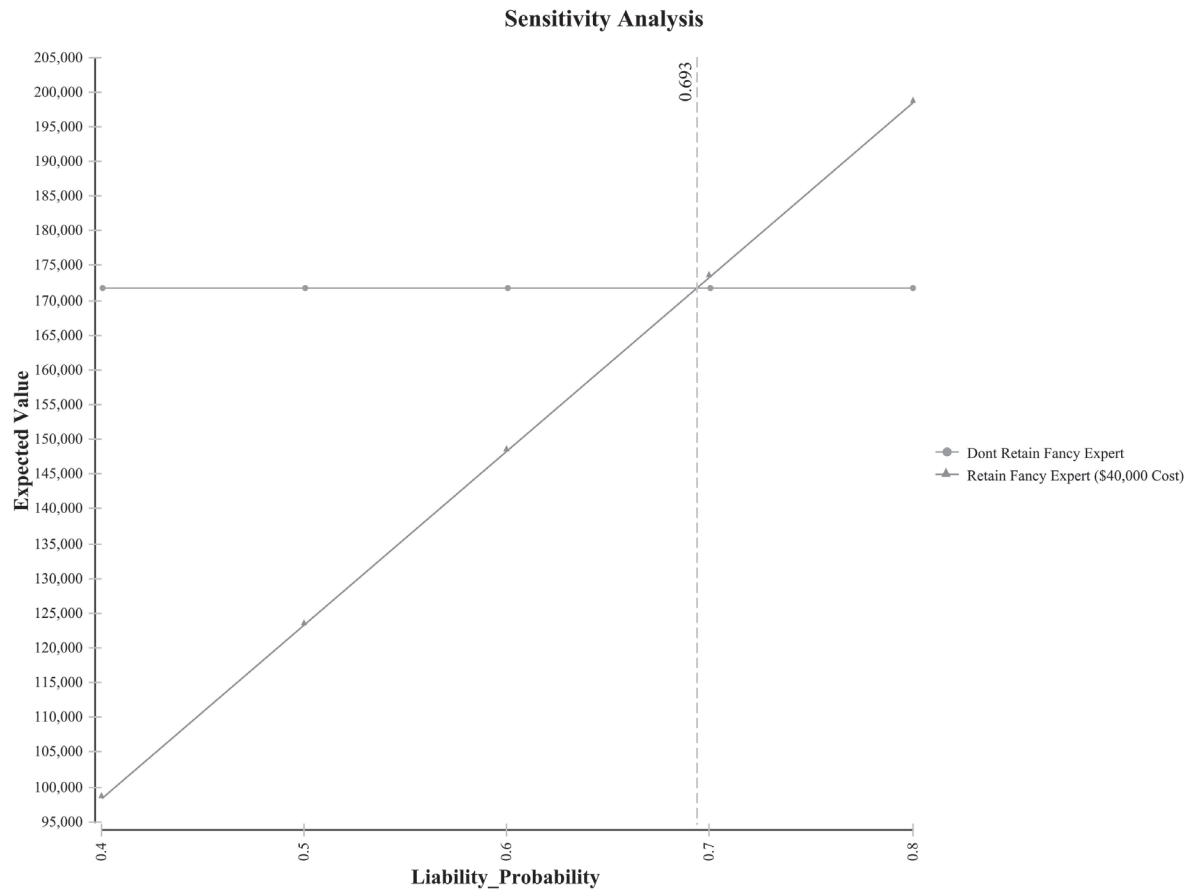
A Plug for Comparing Uncertain Choices to Make Decisions in the Trees

I hope the attentive reader will see that this analysis could also be used to inform a *decision* about whether it's worthwhile to retain the expert at all or, after a briefing on his conclusions, whether to pay for him to produce a report and testify. One could formally construct the tree such as the one below with a square decision node and two branches—retain expert or not—before the evidentiary motion. The roll back will suggest the optimal decision path, at least from an EMV perspective.



As you can see, our method recommends that we decide to retain the fancy expert, assuming that expert will increase the chances of a liability finding from 55% to 70%.

Without running a formal sensitivity analysis, it's easy to see that this is a close question. Once again, I offer a sensitivity analysis, asking the question, "What is the impact or likelihood of a liability finding (with the expert) along a range from 40% to 80%?"



As you can see, if retaining the expert leads to an estimated probability of liability that is lower than 65%, it doesn't appear to be worth the cost.

Of course, you can test that decision without a formal graph, just using different probabilities for the likelihood of liability, with and without the expert.

A perfectly reasonable short cut would be to skip the creation of a separate tree with a decision node. You can just take a look at the risk tree already created and notice the EMV of the case if the expert is not permitted to testify vs. the EMV if his testimony is permitted. How much difference is there? How much does that change if we adjust his involvement's likely impact on the chances of liability? Is it worth the cost?

One last important observation about decision-making, cost, and risk: It's important to remember that we've been using decision analysis in a way that does not pretend to consider risk tolerance, or feelings about risk and cost. Yet, these factors will and no doubt should influence decisions. For example, what if, after some more thought, the lawyer estimates that the expert's involvement will only result in a 60-65% chance of a liability finding? And what if he comes to believe there's really closer to a 30% chance that the judge won't allow the expert's testimony at all? If we make those changes, the roll back will no doubt recommend against retaining the expert.

Nevertheless, the lawyer and client may legitimately make a different decision. The client may not feel comfortable going forward with only a 55% chance of success—the estimated probability without

any expert involvement. The economic and emotional consequences of losing at trial—recovering \$0 for his losses—may be too great. Even if the investment in an expert increases his chances of winning only to 60% or 65%, it may be reasonable for him to decide to make that investment.

At the outset, this chapter asserted three sets of reasons that lawyers can and should use and discuss numerical probabilities to describe the uncertainties of possible twists in a litigation's path. The first was clarity and transparency. The second—premised on disclaiming precision—highlighted the numbers' agility in reflecting ranges of professional judgment and adapting to different views or changes in facts and circumstances.

By now, I hope the reader recognizes the values of communication, transparency, and flexibility afforded by using numerical probabilities in making decisions about litigation and settlement.

The third reason stated was that an informed process for estimating probability yields sound judgment. In other words, when care is taken, even subjective numerical probability estimates may be better than prose descriptors such as “very likely” or “great chance.” The next chapter constitutes an elaboration on what is an “informed process” and offers best practices for estimating numerical probabilities.