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Decision Analysis as a Method of Evaluating the Trial Alternative

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§11.0 INTRODUCTION

Decision analysis provides quantitative evaluation of decisions under conditions of uncertainty. Long used by business people to model business decisions, decision analysis has more recently gained recognition within the legal community as a tool for decision making in complex litigation.[2] The term "decision analysis" was originally used to refer specifically to the analysis of *decision trees* — tree-shaped models of the decision to be made and the uncertainties it encompasses. While sometimes used more broadly to describe any number

[2]Howard Raiffa, The Art and Science of Negotiation 20 (1982). Professor Raiffa is among the earliest and most important scholars in decision analysis and its use in business decision making.

The explanations and examples of decision analysis in this chapter are intended to be simple, to demonstrate the basic concepts for a lawyer-mediator without any expertise in mathematics or statistics. For a more complete background on decision analysis, see Howard Raiffa, Decision Analysis: Introductory Lectures on Choices Under Uncertainty (1968). For a discussion of using decision analysis software to model litigation risks, see Morris Raker, Software to Model the Uncertainties in Litigation *in* Winning with Computers: Trial Practice in the 21st Century (pt. 2) (1993).

of techniques for thinking systematically about decisions, *decision analysis* is used here to connote the traditional use of decision trees. Sections 11.2 and 11.3 of this chapter will introduce the simple terminology used (not surprisingly, decision trees have branches and so forth) and will walk the reader through the "how-to's" of decision analysis in a litigation/mediation context.[3] Section 11.4 examines the values of decision analysis in mediation, and section 11.5 concludes the chapter with some thoughts on the role of technology in using decision analysis.

§11.1 A SIMPLE LOGIC[1]

Before turning to the mechanics, it is important to understand the logic behind the method.

People commonly use the simple logic behind decision analysis to make decisions without even realizing it. (1) They sort out the possibilities — the various things that might occur. (2) They consider the costs or gains associated with each possibility. (3) They discount each possibility by its possibility — the estimated likelihood that it will in fact occur. (4) Finally, they weight the overall picture.

To understand how this process is an ordinary, intuitive part of the way people make everyday decisions, consider this simple example. You are faced with a decision: Should I bring an umbrella with me to work? Sort the possibilities: (1) it might rain and (2) it might not rain. If it rains, (1) there might be a relentless, torrential downpour; or (2) the rain might be light to moderate; or (3) it might just shower. Assume that you must do an errand at lunchtime, approximately a half-mile away, to which you must either walk or take a cab.

[3]Tremendous credit and full attribution is owed to Jonathan Marks and Eric Green who fashioned a seminar on decision analysis in litigation, and who regularly applied it in mediation. The author Aaron's work with them and with Morris Raker in the application of decision analysis to a mediated case was the original source of her understanding in this area.

§11.1 [1]Professor Raiffa wrote that in his professional life as a negotiator and director he found that "[t]he qualitative framework of [decision analytic] thought was repeatedly helpful — not in its detailed, esoteric, quantitative aspects. Simple, back-of-the-envelope analysis was all that seemed appropriate." The Art and Science of Negotiation 3 (1982).

Assume also that you normally walk to your office from the subway station in the morning, that you have numerous books and a heavy briefcase to carry, and that your umbrella is large and lacks a shoulder strap. (You have no rain hat and your raincoat is at the dry cleaners.) How do you decide what to do? You consider the cost of being caught in a torrential downpour, or a light-to-moderate rain, which may depend upon the burden of carrying the umbrella, particularly if it might consider the burden of carrying the umbrella, particularly if it is not to be used. You might seek more data, studiously listening to the weather report. If a 20 percent chance of rain is predicted and your shoes are inexpensive, you might "risk it" and opt not to take the umbrella. But, given a weather prediction of a 60 percent chance of rain throughout the day, "heavy at times," you might opt for the umbrella.

People "play the odds" in this way for the most mundane and the most consequential decisions. For example, when financing the purchase of a new home and choosing between a fixed 30-year mortgage and a variable rate, one must consider the possibility that the interest rates will rise or fall over the period of one's likely ownership, and by how much, and the difference in the upfront costs of the two mortgage products. Similarly, to choose between two job offers, one might try to anticipate future possibilities and their likelihood. Is the company stable, teetering on the edge of bankruptcy, or somewhere in between? What is the level of the current salary offer? What possibilities for advancement exist at each company? What might one's salary be after five years? What will one's personal "marketability" be after a few years in either position?

Personal decisions such as these, while illustrative of the process of weighing uncertain events and the costs and benefits associated with them, are usually not well suited to a rigorous decision analytic approach. Decision analysis adds the most value when costs, opportunities, and probabilities can be valued or estimated, and when the problem is sufficiently complex that the "right" answer may not be intuitive. It is difficult to quantify the "cost" of getting stuck in the rain without an umbrella, the likelihood of mortgage interest rates rising, or the value of enhanced marketability as a result of a new job.

Many legal (and business) decisions, on the other hand, can be materially improved through the design of even a relatively simple decision tree. To model a choice between litigation and settlement, a lawyer can estimate ranges of damage awards and legal fees with

some confidence, and she can approximate probabilities of different rulings or judgments based on previous experience with similar cases. Furthermore, most legal decisions are characterized by multiple uncertainties; decision analysis can be extremely helpful in disaggregating the various states of the litigation process as a means to assess the relative importance of different issues and stages in a case.

For example, a plaintiff in a complex environmental liability case may have to win several important discovery rulings, survive motions to dismiss and for summary judgment, and succeed in coaching its fact and expert witnesses to testify credibly—all before the case reaches a jury. In cases where victory is contingent on such multiple uncertainties, case value is very hard to assess analytically without the aid of decision analysis. While experienced lawyers can sometimes develop an intuitive sense of what a case is worth, their intuition is usually much less accurate in assessing the impact of a midstream change in strategy or particular ruling. Furthermore, intuitive "seat-of-the-pants" valuations are hard to support or explain to clients, and even more so when they are proved wrong. It is for these reasons—accuracy, flexibility, and transparency—that decision analysis can offer significant advantages over traditional "back-of-the-envelope" valuations of cases.

Many reading the description of how decision analysis works may be skeptical about using it for the evaluation of cases. Whether practicing primarily as mediator, trial counsel, or judge, most professionals in litigation have been making important evaluations of cases for many years without benefit of this method. Why might it be necessary or important?

As discussed above, decision analysis uses the same method that most human beings use in making decisions that require analysis of current options and future uncertainties. For a litigate-or-settle decision in a case of considerable complexity, any decision maker faces a large array of uncertainties on numerous factual and legal issues. If nothing else, the exercise of building the decision tree structure forces one to sort out all of the uncertainties. This is one of the raisons d'être of decision analysis.

The next section presents a simplified example of decision analysis as applied to a litigation decision. While the example presented may be too simple to warrant building a full-blown decision tree, it serves as a useful starting point from which to learn the principles of decision analysis.

§11.2 WORKING WITH DECISION TREES[1]

In order to construct a decision tree modeling the settlement decision in a typical litigation, it is helpful to understand the structure and terminology associated with decision trees.

§11.2.1 Structure and Terminology

Decision trees are organized chronologically, from left to right. Events are depicted in the tree in the order they are likely to occur. Decision trees contain three different types of branch points or "nodes": decision, chance, and terminal.

- A *decision node* denotes the point at which the decision maker has to choose between two or more options.
- A *chance node* denotes a point at which various possible outcomes may occur, which the decision maker does not control. Each possible outcome after the chance node is reflected on a *branch*, which is assigned a *probability* reflecting how likely it is to occur.
- A *terminal node* denotes a final outcome, after which no events are considered. Each terminal node is assigned a *payoff* value (negative or positive) which reflects the net dollar cost or gain associated with that outcome.

§11.2.2 A Litigation Example

For legal disputes, decision analysis is used to value the parties' litigation alternatives—what will happen in litigation if the case does not settle. A decision tree used in litigation typically has two branches: *litigate* and *settle*. The settle branch may reflect the other side's most recent offer, or it may reflect the lawyer's estimate of what the adverse party might accept in settlement. The litigate branch is

§11.2 [1]This explanation of decision tree structure and terminology can be found in David P. Hoffer, Decision Analysis as a Mediator's Tool, 1 Harv. Negotiation L. Rev. 113 (1996).

generally an extended chance tree, whose branches represent the different events that may transpire during litigation.

The following decision tree represents a situation in which a plaintiff must decide whether to accept a settlement offer of $30,000 or proceed to trial with a chance of recovering $100,000. Assume that you represent the plaintiff, with whom you have a contingent fee arrangement in this lawsuit.[2]
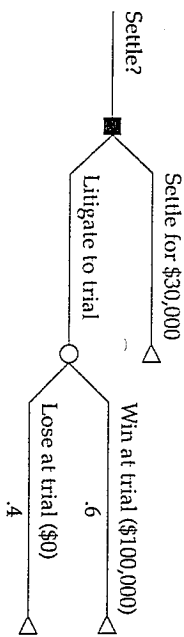
Settle?

Settle for $30,000

Litigate to trial

Win at trial ($100,000)

Lose at trial ($0)
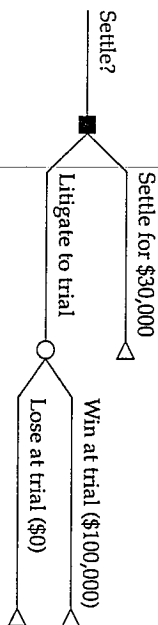
The plaintiff faces two choices — litigate or settle — which are represented by branches emanating from the decision node (solid box) at the left. If the plaintiff settles, the inquiry is complete: He will get $30,000 and the dispute will be over. If he chooses to litigate, there are two possible outcomes: win (a payoff of $100,000) and lose (a payoff of $0). For the purposes of this example, all other uncertainties associated with litigation have been ignored.

To make this decision intelligently, the plaintiff must assess how likely he is to win if litigation is pursued. The $30,000 settlement offer may be inadequate if the plaintiff has an excellent chance of winning $100,000. However, the offer may be attractive if the chance is low.

Assume that, in the attorney's professional judgment, the plaintiff has a 60 percent (.6) chance of winning at trial. This probability would be displayed beneath the chance node labeled "win." Accordingly, it follows that a probability of 40 percent (.4) would be displayed beneath the node labeled "lose."[3]

[2]All of the decision trees in this chapter were created using Decision Analysis by TreeAge (DATA), a software package by TreeAge Software, Inc., of Williamstown, Massachusetts. TreeAge Software was founded by Morris Raker and author David Hoffer. The discussion and examples of computer software applications are based upon the capabilities of and the authors' experience with that software.

[3]There is just one more rule, often overlooked by the novice when building his or her first decision tree of any complexity: *The sum of the probabilities assigned to the branches coming from each chance node must equal 100 percent.* This reads like an impenetrably technical formula, but it is not. If you describe a set of two possibilities—the case could end in a verdict of liability or no liability—but the sum of the probabilities assigned to these probabilities does not equal 100 percent, there must be some other unaccounted-for possibility.

II. Specific Issues and Strategies

Settle? — Settle for $30,000

Litigate to trial
- Win at trial ($100,000) .6
- Lose at trial ($0) .4

Litigation is apparently preferable to settlement (at least given the current settlement offer) in this case because the probability of winning is more than high enough to warrant gambling at trial. This evaluation is based on the concept of *expected value* or *expected monetary value*. The *expected value of a node* is defined as the sum of the products of the probabilities and the payoffs of its branches.

In simple terms, the expected value of a course of action is the average value of taking that course of action many times. If one were to try the identical case 100 times, and there is a 60 percent likelihood of a plaintiff's verdict, approximately 60 trials would result in a plaintiff's verdict while 40 would result in a defense verdict. The average recovery would be 60 victories multiplied by $100,000 per victory or $6,000,000, plus 40 losses multiplied by $0 per loss, divided by 100 cases for an average recovery of $60,000. Thus, the expected value associated with the litigate node is $60,000.

In this example, the plaintiff should not accept the settlement offer unless other issues such as the need for immediate cash make immediate settlement especially attractive, or unless the plaintiff simply cannot tolerate the risk of losing. However, the plaintiff should accept any settlement over $60,000. In reality, tolerance for risk and the value of current instead of future dollars would undoubtedly operate to make settlement a wise decision if the offer were "within range of" $60,000, albeit a bit lower.

§11.2.3 A Helpful Distinction: Decision Versus Chance Trees

For the purist, a distinction should be drawn between decision trees and chance trees. A *decision tree* is a tree whose first node is a decision node. In a litigation context, the decision is often "litigate or

settle." A *chance tree* is a tree that begins with a chance node.[4] It is used to model events over which the decision maker has no control, and its value represents the value of being faced with the modeled set of uncertainties.

Chance trees are often embedded in decision trees. For instance, in the example above, the "settle or litigate" decision tree contains the "chance tree" that represents the litigation alternative. The expected value of that chance tree is the expected value of the litigation alternative.

When decision analysis is used in mediation, it is often most helpful to model the "litigate" branch of a hypothetical "litigate or settle" decision tree. In other words, without reference to a particular settlement offer (whether anticipated or on the table), the mediator simply models the possibilities, probabilities, and payoffs predicted in litigation. Thus, in technical terms, the "litigate" branch is an extended "chance tree" whose calculation will represent the expected value or cost of litigation. However, for simplicity's sake and because few people ever speak of "chance tree analysis," the tree modeling the litigation alternative is referred to here as a decision tree.

§11.2.4 Walking Through a Slightly More Complex Tree

In more complex cases, there will be more than one layer (or *generation*) of chance nodes. Before the case goes to trial, for example, it may be heard on summary judgment. Thus, there would be a chance node for summary judgment (granted or denied). Assume a 10 percent chance that the summary judgment motion will be granted. On the branch of the tree that represents "summary judgment denied," one would find the chance node for liability at trial. The tree below illustrates how a motion for summary judgment would be interposed between the decision to litigate and the outcome of trial.

[4]Decision nodes are commonly represented as squares, and chance nodes as circles.

Litigate

- Summary judgment granted — .1 — Win at trial ($100,000) — .6 / Lose at trial ($0) — .4
- Summary judgment denied — .9
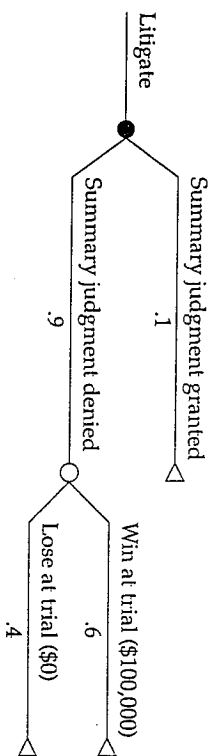
As in all decision trees, the calculations start at the right side. On the far right, the "payoff" is the value anticipated at the end of the process, or the terminal node of the decision tree, represented by a triangular marker. By multiplying the probability of defeat at trial by the payoff, and adding the two figures together, an expected value of $60,000 is calculated (or "rolled back") and displayed next to the branch "summary judgment denied." Thus, the expected value of the case upon denial of summary judgment is $60,000.

In this case, the plaintiff's expected value of litigation must also take into account the possibility of losing on summary judgment. Thus, the expected value of the litigation is calculated by multiplying the expected value after denial of the motion for summary judgment—$60,000—by the probability that summary judgment will be denied, 90 percent. As reflected in the tree below, the expected value of litigation is thus $54,000. The $6,000 difference between this expected value and the expected value in the previous calculation reflects the risk that the plaintiff will lose on summary judgment.

Litigate

- Summary judgment granted 0.100 — $54,000
- Summary judgment denied 0.900 — $60,000
  - Win at trial ($100,000) 0.600 — 100,000 = $100,000; P = 0.540
  - Lose at trial ($0) 0.400 — 0 = $0; P = 0.360
- 0 = $0; P = 0.100
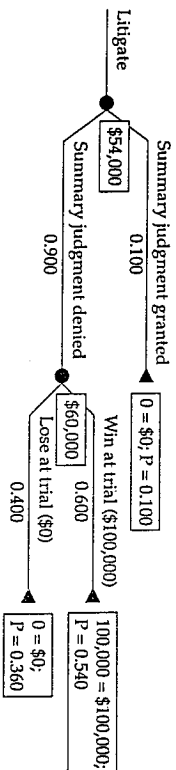
§11.2.5 The Analysis Is Only as Good as the Data

It is important to remember that the outcome of any analysis is only as valuable as the input. One must consider carefully the numbers assigned to the range of predicted awards and associated costs

at each terminal node. For example, where a party is paying for its attorney's time (not on a contingency fee), lower legal costs should be factored in at the terminal node where summary judgment is granted than at either of the terminal nodes that follow trial. Depending on the level of precision required, one may design a rough-cut model, limiting the range of possibilities and making bold assumptions about damages. Or, one may develop a more refined tree, taking into account numerous possibilities (even if some have low probabilities) and assigning probabilities to different levels of damage awards.

Notwithstanding the inherent imprecision in assigning probabilities to events at trial, the process of designing a decision tree can itself assist in valuing litigation. Thinking through the hurdles to be surmounted in order to prevail can help each side organize its thinking. Furthermore, performing more advanced calculations (such as sensitivity analysis, discussed in the next section) can identify those issues that have the greatest impact on case value, which can help focus negotiation strategy and research emphasis.

§11.3 SENSITIVITY ANALYSIS

Particularly where the parties' assessments on one or two issues diverge widely (from each other's or from the mediator's), it is worth asking how sensitive the case's expected value is to those issues. What if one's assessment of that issue were to change? How much difference would alteration of the assessment make? Sensitivity analysis answers such questions, whether done with formal computer-generated graphs or the ubiquitous legal pad and hand calculator.

Before turning to the method, a further explanation of sensitivity analysis is in order. The expected value of a case is derived from its many components, as delineated above. However, not all components are equally important; they have different degrees of influence on the expected value. For example, the parties may disagree strenuously on two issues, such as whether a particular witness's testimony would be admitted and whether lost profits would be the appropriate measure of damages in a business case. Both are uncertainties in the case, and sensitivity analysis could determine how much they matter

to the end result. In other words, if one were 100 percent certain (or 90 percent, or 70 percent, or 50 percent, etc.) that the witness's testimony would be admitted or that the lost profits measure would be applied, how would that change the expected value? If the expected value is highly sensitive to a given issue, a small change in the probabilities assigned to possible resolutions of that issue would lead to a large swing in the expected value.

Sensitivity analysis is particularly important when using decision trees in a litigation context because of the difficulty and artificiality inherent in assigning probability estimates. After all, no lawyer, judge, or mediator will see the exact same case tried 100 or even 10 times. Assigning probabilities to litigation uncertainties is often more difficult than doing so for business uncertainties, where a probability could be assigned by, for example, deriving a failure rate of a widget machine and plugging that rate into a decision tree for determining whether to upgrade equipment or continue a product line. When a party, counsel, or the mediator suggests a probability number at a given chance node, he or she may not be wholly certain of the number. When one says, "I think there is a good probability of winning," that may mean, in effect, "it is better than 50 percent." Could 65 percent be a better estimate? Maybe. Or, perhaps the "right range" is 55 percent to 60 percent. These numbers warrant further discussion where they are in dispute and where the expected value would be highly sensitive to a small percentage change.[1]

There are two basic and related ways to perform a sensitivity analysis. The first is simply to recalculate the tree, answering the "What if . . . ?" question. Assume that the defendant in the example described earlier disagrees strongly with the assessment of a mere 10 percent likelihood that the summary judgment motion will be successful. The defendant agrees that summary judgment is a "long shot," but more on the order of 25 percent. (After all, 10 percent makes it hard to justify the fees for the summary judgment motion.) The mediator might then recalculate the tree, substituting a 25 percent probability of summary judgment for the original 10 percent.
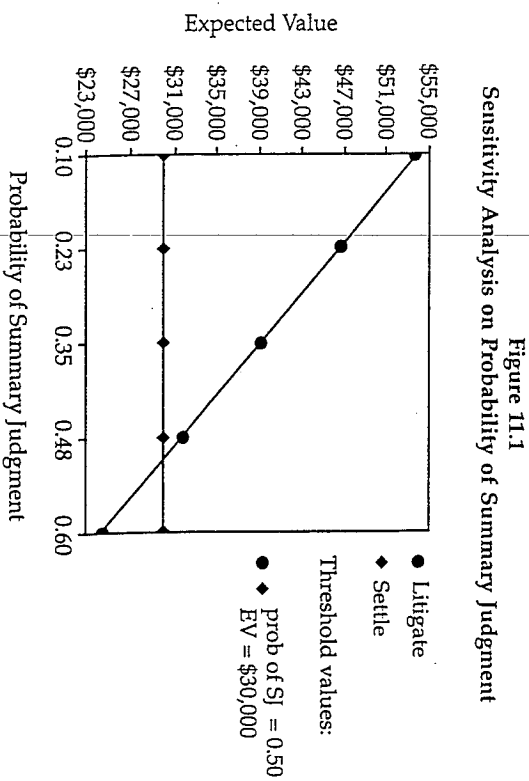
§11.3 [1]Discussion of divergence in sensitive probability assessments sometimes leads the parties to gather more information. If the analysis reveals a single issue to which the expected value is highly sensitive, on which each side is optimistic but not terribly confident because of large information gaps, the parties may be wise to invest modest resources to shed light on that issue alone before resuming mediation or direct settlement negotiations.

The resulting change in the expected value would demonstrate its "sensitivity" to the summary judgment issue. While a recalculation is quicker when the decision tree has been built using computer software, it can certainly be done by hand — using a calculator or "longhand" math — in the same way the tree was calculated originally.

The second way to perform sensitivity analysis involves isolating the issue in question and plotting a line whose slope indicates the relationship between changes in that issue and the case's expected value. For example, in our very simple example, plotting a sensitivity analysis on the summary judgment issue would yield the graph shown in Figure 11.1.

The strongly negative slope of the line shows that the expected value of the litigation decreases sharply as the probability that the plaintiff will lose on summary judgment increases. Given the dispositive nature of the summary judgment motion and its position at the far left of the decision tree, this result should not be surprising.

Whether you simply recalculate the tree multiple times using a range of probability or damage estimates or plot graphically the sensitivity of expected value to single issues will depend upon your

Figure 11.1
Sensitivity Analysis on Probability of Summary Judgment

Expected Value

$55,000
$51,000
$47,000
$43,000
$39,000
$35,000
$31,000
$27,000
$23,000

0.10   0.23   0.35   0.48   0.60

Probability of Summary Judgment

● Litigate
◆ Settle

Threshold values:
● prob of SJ = 0.50
◆ EV = $30,000

and the participants' facility with computer software and graphical interpretation. Whatever the form, sensitivity analysis can be particularly useful in a mediation context, as discussed in more detail below.

§11.4 FUNDAMENTAL VALUE OF DECISION ANALYSIS IN MEDIATION

Decision analysis can play a positive and critical role in the discussion, understanding, and impact of the participants' and the mediator's evaluation of the trial alternative. The balance of this chapter focuses on how using decision analysis in a mediator's evaluation can

- reduce the risks inherent in mediator evaluation;
- provide a rational basis for parting with emotional or extreme cases;
- enhance the value and impact of the evaluation;
- insure clarity of evaluative assessments;
- provide neutral language for discussion, reducing perceived pressure; and
- ease transformation of the dispute to a shared decision problem.

§11.4.1 Reducing the Risks of Evaluation

(a) *By Creating Distance Between the Mediator and the Evaluation*

Chapter 10 enumerates the risks inherent in mediator evaluation and suggests strategies to minimize them. The greatest potential harm is that recipients of the more negative evaluation will thereafter view the mediator as an adversary[1] — as an advocate for the other

§11.4 [1] As noted in The Value of Decision Analysis in Mediation Practice, 11 Negotiation J. 126-127 (1995), the mediator may elect not to introduce decision analysis any further into the process — not to mention it to the parties or counsel. The mediator may sense

side or for the evaluation itself. The mediator may come to be identified with his or her evaluation; the term "neutral feedback" loses all meaning. The mediator is no longer perceived as a credible neutral and thus cannot function effectively in a mediator's role.

Decision analysis creates a perception of distance between the mediator and the evaluation and, thus, avoids or mitigates this key risk. Using a decision analysis framework for evaluations shifts the participants' focus literally and figuratively toward the structure of the tree on a notepad, blackboard, easel, or computer screen, and toward the task of assigning probability estimates and values at its branches and nodes. The tree structure and logic are almost indisputably neutral, as is the process of considering various future possibilities, discounting for risk, calculating anticipated returns, and deducting anticipated costs. Even when the mediator builds a decision tree for a particular case, the tree's structure is generally the product of discussion and consensus. It is not hard to agree on the order of litigation steps and what might possibly happen at each chance node. Thus, when the mediator undertakes the more delicate task of assigning probabilities and payoffs, the neutral foundation has already been laid.

Assuming that the mediator has presented these assessments with sensitivity and cogent reasoning, their variance from the parties' assessments at certain points in a decision tree is less likely to undermine the mediator's perceived neutrality than would an equally negative but more traditional evaluation. When calculation of the tree leads to an expected value in a vastly different range than the party's previous settlement position, general mathematical principles seem as much to blame as the mediator. By stepping forward to assess probabilities and payoffs but stepping away from the calculated expected value, the mediator reinforces his or her distance from the evaluation. While acknowledging his or her input, the mediator can sincerely empathize with any disappointed parties, noting that the

that one or both will simply be unwilling or unable to understand and accept it as a basis for decision or discussion. Particularly where the mediator is a former judge or an experienced attorney playing a "senior statesman" role, the mediator's gestalt-sense — presented as an evaluation without reference to decision analysis — may be sufficiently powerful to cause significant movement in the parties' negotiating positions. In such cases, decision analysis will have played a quiet role in insuring the intellectual integrity of the evaluation, the mediation process, and its result.

logic of the analysis leads to the outcome. These dynamics render it less likely that a negative evaluation will be closely identified with the mediator. Indeed, the transparency of the analytic process makes it more difficult to suspect the mediator of manipulation or unholy alliance. Thus, despite the evaluation, the mediator's perceived neutrality may remain intact, as is essential in any mediation process.

As discussed in Chapter 10, section 10.6.8, one way to reduce the risk of evaluation is to evaluate as little as possible, "piggybacking" over the party's assessments on specific issues only where necessary. In some cases, without any mediator input, a party's assessments of probabilities, payoffs, and costs yield an expected value far different from its articulated settlement position. Here the evaluation is most powerful because it cannot be attributed to the mediator. No matter how disappointing, an evaluation built upon a shared, neutral logic and one's own assessment of each element of a case is extremely difficult for a rational, self-interested person to resist.

More often, a decision-tree calculated with a party's probability and payoff assessments yields an expected value fairly close to that party's settlement position. Nevertheless, the mediator can usually piggyback, providing his or her evaluation only for selected probabilities or values, leaving many of the party's assessments in place as reasonable (at least "for argument's sake"). Consider, for example,[2] a case in which the mediator agrees with the defense's estimate of a 60 percent chance of liability verdict, a 50 percent chance of some contributory negligence finding, and the actual damages range. Assume that the mediator differs greatly from the defense as to the contributory negligence percentage (by which damages would be reduced) and the probability of a punitive award. The mediator would calculate the decision tree using his or her probability estimates on the contributory negligence and punitive damages issues. If the mediator's reasoning on these issues is at least somewhat persuasive, it will be difficult for the defense representatives and counsel to reject wholly the tree's expected value; after all, it was derived from their evaluation on most of the issues. It is easier for a party to acknowledge that its views might be "a little bit colored" by its position in the case than to admit to being "completely wrong." Where the mediator's evaluation rides piggyback on a party's input,

[2]This and other examples are taken from Aaron, The Value of Decision Analysis in Mediation, 11 Negotiation J. 123-133 (1995).

its acceptance is less painful. Once again, the danger of the mediator being viewed as the adversary is greatly reduced.

(b) By Creating Distance Between the Parties and the Evaluation

Decision analysis can also help parties achieve emotional distance from a negative evaluation, while accepting its logical force. Particularly when decision makers in settlement were also involved in decisions leading to the dispute, a significant change in settlement position is sometimes felt or feared to be an acknowledgment of fault. For example, assume that a company's general counsel authorized a company action that is cited as grounds for the legal complaint in a case. For the general counsel, a central participant in the mediation, the personal attribution of error creates understandable resistance to settlement. A sufficiently complex decision tree structure displayed on an easel or computer screen might graphically demonstrate the insignificance of the general counsel's original authorization, as the issue of authorization is visually overwhelmed by a myriad of other variables and branches in the tree. Proof of the outcome's insensitivity to the general counsel's decision limits the attribution of fault to the general counsel for the outcome of the analysis, and consequential injury to ego, personal pride, or professional status.

If, in fact, the expected value of the analysis is not overly sensitive to the general counsel's difficult issue, the mediator can perform a decision analysis that adopts the general counsel's view on that issue and nevertheless justifies significant movement toward settlement. Having seen that the outcome (and the wisdom of a larger payment in settlement) is attributable to a different and larger set of circumstances, the general counsel feels free to seek a business solution rather than personal vindication in the courtroom.

§11.4.2 Providing a Rational Basis for Parting With Emotional or Extreme Cases

The previous sections discuss how a decision analysis approach can avoid or mitigate the potential harm in a mediator's presentation of his or her evaluation. In addition, decision analysis helps people

overcome emotional barriers to settlement by requiring that they reframe settlement as an intellectual decision problem. It can also supply a logistical justification for making concessions when a large recovery is, subject to low odds. Certainly, without using decision analysis, a mediator can advise highly emotional parties to separate their emotions from settlement and to settle if doing so would better serve their interests. But real emotional separation is extremely difficult.

For many people, the language and process of decision analysis help to achieve real reframing of the settlement decision and more effective separation of their emotions from that decision. The process of building the decision tree — assigning probability assessments at each chance node and payoffs (including costs) at each terminal node — shifts the framework and language of participants' discourse about the case. It takes time to understand the method, build the tree, and calculate the expected value. Discussion inevitably and appropriately takes place over probability assessments and payoffs. Psychological reframing occurs as that discussion comes to be phrased in terms of percentages instead of fault or right and wrong. Negotiation comes to be experienced as an intellectual decision problem, apart from the emotional impact of the underlying event. When the mathematical calculations yield an expected value for the case, that value seems neutral, rigorous, and intelligent.

In serious personal injury or wrongful death cases, it can be terribly difficult for people to refrain from equating enormous loss with enormous case value. For example, a bereaved husband in a wrongful death case may recognize a particular factual or legal weakness, but nevertheless feel obligated to measure case value by the immeasurably high value of his wife's life. Decision analysis provides a way to recast the family member-decision maker's sense of what the settlement represents and to feel that the enormity of the loss has been recorded and incorporated into the decision structure.

When decision analysis is used, the case's expected value becomes an alternative benchmark against which the other side's settlement offer or demand can be measured. This comparison is more productive and more rational than each side's measuring the other's offer or demand against its own, as commonly occurs. For example, in many settlement negotiations, an emotional plaintiff becomes angry when the defense's first offer falls far short of the plaintiff's original emotionally driven settlement demand. The plaintiff's reac-

tion tends to be: "They are offering so much less than I have demanded that they must have no regard for me." After seeing the decision analytic evaluation, the plaintiff is better able to understand the defense's previous settlement proposal. Distance from the case's expected value becomes the measure of reasonableness (or unreasonableness), rather than distance from any other offer or demand. Because each side realizes that the same analysis will be presented to the other, they come to understand why settlement far beyond the case's expected value is highly unlikely.

The most common kinds of cases in which emotions are highly influential include employment-related disputes — age discrimination, gender discrimination, and sexual harassment — and serious personal injury or wrongful death cases. While emotions often impair rational evaluation of settlement in such cases, it is one author's experience that even business disputes — both in small business and large corporate contexts — are often driven by deep emotions of the key decision makers.

For example, in the mediation of one high-stakes corporate dispute, high-level executives were heard to describe the alleged breach of an exclusivity provision in a joint venture in terms of spousal infidelity. Reframing was essential to settlement progress. Because the context was business, the framework of a rational business decision resonated in accordance with the disputants' professional, business identities.

Decision analysis can also be particularly helpful in what can be characterized as "extreme" cases — cases with extremely low likelihood of a liability verdict but extremely high damages in that unlikely event. In one author's experience, people often find it difficult to arrive at what they think is a reasonable settlement value for such cases. For example, in a product liability case, the corporate manufacturer of a medical device believed strongly in the integrity of its product, correctly noted the paucity of evidence of failure or causality, and thus had made a "nuisance value" settlement offer. However, they readily acknowledged that if liability were found, the plaintiff's medical condition would warrant extremely high damages. Applying decision analysis to the case allowed the defense team to feel that a substantial settlement offer was a rational, justifiable decision — rather than an abdication of belief in their product or response to pressure from a sympathetic personal injury plaintiff. Perhaps more important, it provided support for that decision in internal nego-

tiations with the corporate CEO to obtain additional settlement authority.

§11.4.3 Enhancing the Credibility and Impact of the Evaluation

(a) *The Lure of Disaggregation*

Parties in mediation often resist a reasonable but unfavorable analysis of a specific issue if they feel it will undermine their settlement position. In a reasonably complex case, however, the expected value of the decision tree is not readily apparent while the mediator works through the tree structure with the parties and assigns probabilities or values throughout the tree. This phenomenon makes the parties less resistant to the mediator's reasoning on each issue, rendering them more willing to listen because they do not know the implications for the likely settlement range. If the mediator's reasoning is persuasive when disaggregated, its expected-value consequences become more difficult to resist or ignore. For that reason, it may be more credible and influential with respect to the parties' settlement decisions.

(b) *Transparency Overcomes Cynicism over Middle Ground*

Using a decision analytic approach for evaluation also avoids the peculiar credibility problem created when a mediator's evaluation falls toward the middle of the gap between the parties' stated settlement positions. Whether justified or not, arbitrators' time-honored reputation for "splitting the baby" seems to have colored expectations of mediators as well. Parties often suspect or assume that mediators will promote a middle-ground compromise, regardless of the merits of a case. Against this backdrop, when the mediator's evaluation does put case value at or about the midpoint between the parties' previously stated settlement positions, the mediator is easily perceived as insincere and the evaluation as lacking credibility. A decision tree helps the mediator and the evaluation to avoid this trap, even at the midpoint. Where a mediator has built the decision struc-

ture with the parties, assigned probabilities and values in a reasoned dialogue, and calculated nonetheless an expected value at or about the midpoint, the result is far less suspect. The mediator and the evaluation can thus retain their credibility and power to influence settlement.

(c) *Linking the Parts to the Whole; Ending a Shell Game*

While parties to a legal dispute may acknowledge weaknesses on certain issues, it can be difficult for them to link individual strengths or weaknesses to a sense of overall value. When a mediator provides negative feedback on one issue, the recipients declare the "heart" of the case to rest with other issues. Thus, an issue-by-issue "dose of reality" fails to affect the parties' overall conception of settlement value. Whether due to strategy or psychology, the statement of case value becomes a constant and the relative importance of the issues shifts in response to mediator feedback. The mediator faces a shell game.

This problem often arises in cases that are highly complex, involve enormous pretrial investment on particular issues, or present issues of great emotional significance. In complex cases, the human tendency toward simplification and "sound bites" may be operative. Even as they acknowledge the complexity, multiplicity, and interdependence of issues, people tend to focus on central themes that are easily grasped. They value the case based on whose witnesses will win and whose will lose, who will be proved "good" and "evil." It is more difficult to evaluate the possible effect of a motion in limine, a motion for judgment notwithstanding the verdict, or an appeal.

This tendency is exaggerated when significant resources have been directed toward particular issues. For example, an expert may have been retained at great cost to estimate the value of lost profits. That expert's strong presentation may come to overshadow uncertainties such as the appropriate measure of damages, the plaintiff's claim to a share of lost profits, and the time frame that might be applied even if lost profits are awarded. In short, it is hard for people to see that winning the battle in which they have invested most heavily may not win the war, and winning the war may not yield the value anticipated. Decision analysis allows the parties to see more

clearly how the strengths and weaknesses of their respective positions on individual issues will affect their case's overall value. The structure can thus be used to demonstrate, easily and persuasively, the effect of each issue upon the whole.

(d) Assuring Mediator Accountability

Decision analysis can aid in the evaluative mediator's effort to influence the parties' settlement decisions. If you bear no responsibility for someone's decision, then you may have little interest in how he or she makes it or the outcome. But if you bear some responsibility for a client's decision, having intentionally influenced it, then you are right to be deeply concerned that the decision best serves the client's interests. For that reason, it is good practice for a mediator to use decision analysis to formulate his or her own evaluation of a case, whether or not the method is communicated to the parties. Using decision analysis provides an important check on intuition. The results of the decision analysis and intuition can be compared. If they fall within a narrow range, the mediator can present his or her evaluation without any misgivings about its potential power to influence the outcome. If they do not, the mediator should review his or her analysis again, before presenting any evaluation.[3]

§11.4.4 Assessing with Clarity

One important and often overlooked advantage of using decision analysis is that it achieves consistent clarity in the parties' (and the mediator's) communication of their assessments in the case. Decision analysis utilizes numbers—probabilities expressed in percentages and specific cost or payoff estimates. One cannot calculate a decision tree containing branches labeled "very likely" or "extremely unlikely." Building a decision tree requires precise statement of the estimated probability percentages of each possibility on each issue.

3For a discussion of this issue, see Aaron, The Value of Decision Analysis in Mediation Practice, 11 Negotiation J. 126-127 (1995).

The process of quantifying uncertainties can be tremendously enlightening for all involved because statements of percentages are not subject to ambiguity of meaning or interpretation: 75 percent is 75 percent. In contrast, a description of the probability of success as "very likely" may be intended and interpreted differently by different people. As part of a presentation to classes or professional workshops on decision analysis, one author commonly asks people to assign percentages to a series of phrases commonly used to describe levels or degrees of likelihood.[4] Invariably, one finds a wide range of percentages assigned to the same phrases. Indeed, certain descriptive phrases commonly yield ranges on different sides of 50 percent. The exercise demonstrates that when one person says the case is "very likely" to result in a liability finding, he or she may mean 60 percent. Another person's "very likely" may translate to a more optimistic 85 percent.

In some mediations, the participants' probability assessments reveal a significantly narrower or wider gap in their views of the case than their qualitative descriptions would have indicated. For example, both parties may have stated that they have a "good, strong case." But, that may mean a 60 percent chance of liability to plaintiff's counsel and a 45 percent chance of liability to defense counsel. The probability gap would be 15 percent. For better or for worse, quantifying the parties' assessments clarifies the settlement challenge. Similarly, when a mediator's evaluation on each issue is expressed in percentages, misinterpretation is avoided. The mediator's opinion is clear to the parties.

In many cases, the exercise of assigning probabilities to important uncertainties in a case clarifies communication between lawyer and client. The party who has been consistently reassured by counsel that he has a "good case" may be startled (and sobered) to learn that counsel still only assigns it a 55 or 60 percent chance of success. The client may have interpreted counsel's reassurances to mean a 75 or 80 percent chance of success and justified his vigorous pursuit or defense of the case on that unarticulated assumption. In other instances, a lawyer's assertion that a "strong" case is 90 to 95 percent likely to succeed may cause a more seasoned and realistic client to question the lawyer's judgment and settlement advice.

4Author Aaron learned this exercise from Jonathan Marks of JAMS/Endispute, who included it in his litigation risk analysis training materials many years ago.

§11.4.5 Reducing Perceived Pressure of Mediator Dialogue

Within a decision analysis framework, the ability to perform sensitivity analysis (particularly with computer software) permits dispassionate examination of hotly contested issues. Sensitivity analysis allows the mediator and the parties to "play" with the variables, perhaps incorporating the opposite view on an issue or testing the margins of each side's certainty levels. Yet, such inquiries tend not to be experienced as forcing movement toward settlement.

For example,[5] in the course of mediation of a claim involving posttraumatic stress disorder, the mediator had used decision analysis software to work through her own evaluation during a hiatus between mediation sessions. The case was difficult to evaluate because of the challenge of assigning values and probabilities to rather unusual issues and circumstances. During a telephone conversation with defense counsel to clarify certain issues, the mediator learned that he had also developed a decision tree modeling the case. They discussed the structure of their decision trees and the probabilities and values each had assigned at various branches.

The mediator and defense counsel discovered a relatively small difference in the probabilities they had assigned to one critical issue to which expected value was extremely sensitive. Defense counsel's damages estimates in the event of a liability finding were also somewhat lower than the mediator's, though both agreed that these estimates were barely better than guesses. During their conversation, the mediator recalculated the decision tree, first using defense counsel's probability assessment and the mediator's damages estimate, then the reverse (the mediator's probability assessment matched with the defense counsel's damages estimate). This process and the discussion around it enabled the mediator to probe the "soft spots" in counsel's analysis—where he was less confident of the chosen probability—without being perceived as exerting pressure. Counsel's response was to reflect rather than defend. Soon thereafter, he made an offer that settled the case.

In this example, the expected value's sensitivity to the probability of a particular issue tested each side's level of confidence in

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that probability assessment. In other instances, the expected value's insensitivity to a disputed issue helps quiet controversy on that issue; discussion or additional information gathering can then be directed toward other issues.

§11.4.6 Easing Transformation of the Dispute to a Shared Decision Problem[6]

Decision analysis helps parties escape the feeling that settlement is a personal or corporate concession by transforming it to an individual or business decision. The exercise of creating the decision tree structure and mounting it on a large paper easel or blackboard (or, better yet, on a large computer screen) removes the analysis from the arena of ego and emotion. Working through a decision analytic process feels (and is) neutral, rational, and intelligent.

Even where the mediator has provided most of the probability assessments, the decision analytic method and framework encourages the participants to see themselves as rational actors faced with an important decision. While they may not be delighted by the expected value—which they cannot control—the analysis reinforces their control over the settlement decision. When a party decides to adjust its settlement position as a result of the analytical result, that decision feels like an intelligent, rational adoption of the logic of the analysis rather than capitulation to an opponent.

§11.5 TECHNOLOGICALLY APPROPRIATE CHOICES

For the mediator who is less than comfortable with high technology, it will be reassuring to learn that decision analysis can be performed on a simple notepad, large easel pad, blackboard, or whiteboard;

those who wish to use a computer will find comfort in simple, user-friendly decision analysis software.

The wise mediator considers the appropriate level of technology for the particular audience and how best to introduce it within the process. At least initially, many participants are more receptive to decision analysis when presented in "low tech" ways, which more closely resemble the familiar scratch pad and personal thought process. For participants who require careful explanation and coaxing to entertain the approach, disaggregate uncertainties, apply probability estimates, and so forth, it is best not to stray from familiar media. Here, the mediator has to be quick with the pencil and calculator, particularly with more complex trees. While manual calculations are time-consuming, they allow the participants to see exactly how the results are derived. The process is transparent and, even if cumbersome, relies on simple multiplication, addition, and subtraction. By the time the expected value calculation is complete, even the least mathematically or technically inclined can see that it carries no mystery.

Within the realm of "low tech" media, it is best to procure a large surface so that all participants can view the tree structure as it is built. With a conventionally sized pad, even where the mediator makes valiant efforts to angle the pad to the center of the table, some participant involvement is inevitably lost. People lose enthusiasm when reading upside down and straining to see small pen scratchings, preferring to wait for the mediator to calculate the answer. In short, it is hard for more than one or two participants to actively engage in the process of building and calculating the tree, and its result seems more the product of the mediator's independent scribbling than of the participants in the private caucus. A large board is better than a smaller pad because it can contain a reasonably complex tree that all can read as it is built. The old-fashioned large paper easel may be the most versatile of the noncomputer media. It allows multiple versions of the tree to be drawn, calculated, and hung up with masking tape to frame the discussion. They can be transported from room to room, allowing the mediator to demonstrate that a consistent numerical evaluation is being communicated to both sides. They can also be rolled and transported between meeting sites, or into an office to be captured in a written evaluation report.

If the participants are not "technophobic" or overly resistant, a computer screen and software are the best vehicles for performing

the decision analysis for cases of any complexity. Using reputable computer software prevents mathematical error in performing calculations and creating the tree structure; for example, the common error of failing to have the probabilities at each chance node total 100 percent. Just as important, the technology renders the expected value calculation and sensitivity analysis instantaneously. Without a computer these calculations can be cumbersome and time-consuming. The computer's ability to process quickly can be of real significance for the process, as the speed of processing permits participants to experiment with different values as part of their discussion.[1]

Using computer software offers added value by facilitating discussion of the analysis among decision makers not present at the bargaining table. After a mediator's evaluation is presented and discussed in a mediation session, it is sometimes necessary to adjourn for a period of time to allow the parties and counsel to discuss the evaluation with the appropriate committee or other internal authority. A mediator's written report may not be nearly as effective here as the computer-generated decision tree and "rollback" calculation of expected value, particularly in a business setting.

The computer is often effective in business disputes because business people tend to have confidence in the computer's ability to generate valuable information. Many learned the principles of decision analysis for business strategy choices in business school. Thus, decision analysis software for evaluating legal or business disputes applies a familiar method in a technology they trust.

For other people, who may have had difficulty embracing the decision analytic approach or who view computers as alien and suspicious, the pad and the calculator may be the best choice, despite or even because of the slower pace. In many instances, it is best to

§11.5 [1] As noted in The Value of Decision Analysis in Mediation Practice, 11 Negotiation J. 123, 132:

A software's ability to display the distribution of possible outcomes predicted by a decision analysis can be used to test the parties' tolerance for risk. The possibility of a "zero verdict" or a "bankrupt-the-business" outcome seems that much more real when the software demonstrates, in whatever format, that a significant number of predicted outcomes fall within an intolerable range for a party. When mediation cannot bridge a negotiation gap, the decision analysis can lead to other settlement processes. For example, in at least one case, the parties agreed to a bracketed or "high-low" arbitration process, setting the award limits at points which eliminated the equivalent distribution of outcomes for each side, as determined by the mediator's decision analysis.

begin with the handwritten tree and to replicate its structure on the computer if that will help to perform a sensitivity analysis, to alter the tree in response to participant requests, or to generate a written report for review by other decision makers. When the shift is made to software, the participants should be able to recognize the computer-generated structure as essentially identical to the handwritten version presented earlier. The mediator should take pains to note any variations or refinements, while emphasizing that the computer software performs the same calculations as were done on the scratch pad.

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Achieving Closure: Settlement and Impasse Agreements