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# Howard Raiffa: The Art, Science, and Humanity of a Legendary Negotiation Analyst

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## **Introduction**

Widely considered to be the “father of negotiation analysis,” Howard Raiffa was my thesis adviser, colleague, and friend for more than thirty years. With a range of colleagues from different disciplines, he cofounded the Program on Negotiation (PON) at Harvard Law School in 1983, which has thrived to this day as a consortium of faculty and graduate students from Harvard University, the Massachusetts Institute of Technology, and Tufts University.

Over the years, an eclectic group of scholars at PON have developed multiple approaches to the challenges of negotiation, mediation, and conflict resolution. By far, PON is best known for its development of “interest-based” negotiation, a concept that underpins the best sellers *Getting to Yes* (Fisher and Ury 1981; Fisher, Ury, and Patton 1991), *Getting Past No* (Ury 1991), *Difficult Conversations* (Stone, Patton, and Heen 1999), *Beyond Reason* (Fisher and Shapiro 2006), and other influential prescriptive works that elaborate an interest-based approach.

But along with many other academic institutions, PON has nurtured less popularly known, more formal streams of work generally associated with traditional academic disciplines such as economics and cognitive psychology. For example, PON-linked faculty members have undertaken important game-theoretic and experimental investigations of negotiation-related phenomena, especially from a behavioral viewpoint.

Among these more formal streams of work, “negotiation analysis” has become most distinctively associated with Harvard and especially with

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Howard Raiffa, his students, and his colleagues. The negotiation-analytic approach evolved from earlier intellectual traditions to which Raiffa and various collaborators made decisive contributions. It is no exaggeration to say that Howard Raiffa essentially defined three distinctive fields – statistical decision theory, decision analysis, and negotiation analysis – and greatly influenced several others including game theory.

I can imagine no better way to understand the nature and origins of negotiation analysis than to track the highlights of Raiffa's intellectual trajectory, to which I devote the first part of this article. In doing so, I explain the conceptual foundations of negotiation analysis, especially in comparison with game theory, decision analysis, and relevant behavioral traditions. I also briefly sketch ongoing developments in negotiation analysis and its close cousins by a number of people working in the area.

I start with Howard's intellectual trajectory in part because it so influenced my own, both in spirit and analytic orientation. More importantly, his evolving methodological quest seems largely inseparable from the personal qualities I will later elaborate. Howard was a truly admirable person, and the nature of his work shaped who he was in myriad ways. So recounting his intellectual story gives me the opportunity to share the nuggets of insight I gleaned from Howard about dealing with people, solving problems, doing research, teaching effectively, building institutions, and forging a legacy.

Many professors vaguely hope that their work will prove valuable to the world in practice. But, over his lifetime, Howard went beyond that general hope to develop a formal, but actionable, prescriptive theory for individual and joint decision making under uncertainty. As I describe Howard's path, it seems inescapably to constitute a lifelong evolving intellectual *project* rather than a series of loosely related interests. I take inspiration from the cumulative quality of his work over the years.

## **Howard Raiffa's Intellectual Trajectory and the Origins of Negotiation Analysis**

### ***Game Theory***

As a graduate student in mathematics at the University of Michigan in the early 1950s, Howard was drawn to the excitement of game theory, which had been launched by John von Neumann and Oskar Morgenstern (1944) with their magisterial *Theory of Games and Economic Behavior*. Game theory held the high promise of characterizing a wide variety of human "strategic" interactions – the moves and countermoves in cooperative and competitive situations – using a small number of scientific principles. In 1957 Raiffa coauthored with psychologist Duncan Luce his first major work, *Games and Decisions* (Luce and Raiffa 1957), which presented a powerful and lucid synthesis, major extension, and searching reconsideration of the limits of this game theory roughly a decade after its founding. To this day, *Games and*

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*Decisions* remains a standard, notable in particular for the tight relationship between its precise mathematics and underlying human phenomena. Much of game theory, both before and after, stood out for its mathematical elegance but often seemed to lose sight of its supposed links to actual conflict and cooperation. Moreover, as I elaborate below, game theory's emphasis on "equilibrium" solutions sharply limits its prescriptive value for many classes of negotiation problems.

### ***From Game Theory to Statistical Decision Theory***

*Games and Decisions* explored the interaction of self-interested, consciously "strategic" players, but Howard's attention increasingly turned to a critical subset of this class of problems, namely that of individual decision making or "games against nature." More precisely, these are decisions under uncertainty whose outcomes depend on uncertain or "chance" events whose occurrence is best represented probabilistically. For example, success in drilling for oil depends on the chance event – from the driller's subjective perspective – of whether oil is present underground, not on "nature" taking countermoves to outwit the driller. Working closely with Robert Schlaifer and John Pratt in the early 1960s, Howard essentially defined "statistical decision theory" in two books: *Introduction to Statistical Decision Theory* (Pratt, Raiffa, and Schlaifer 1995) and *Applied Statistical Decision Theory* (Raiffa and Schlaifer 2000).

Traditional or "classical" statistical methods – the stock in trade of the great majority of social scientists even to this day – generally rely on "objective" probabilities and do not typically take into account prior beliefs or evidence about the phenomenon under investigation. By contrast, the more sophisticated "statistical decision theory" developed by Howard and his colleagues used "Bayesian" methods to incorporate wide classes of "subjective probabilities" into formal analyses as well as to combine new data and evidence with prior views to produce updated inferences.

Familiar "objective probabilities" are most closely associated with repeatable events such as coin tosses or dice rolls that can be interpreted in terms of their relative frequencies. For example, there is a one-sixth chance of a two coming up on a single roll of a fair die. Among other characteristics, carefully assessed "subjective probabilities" extend the logic of objective probabilities to uncertain events that do not permit meaningful interpretations in terms of repeatable, relative frequencies. For example, in an otherwise unique situation, Howard might "judgmentally assess" a one-third chance that a negotiator named David would walk away from a potential deal.

Many social scientists have not had exposure to the formal foundations and methodologies of assessing and using subjective probabilities, especially behavioralists trained almost exclusively in classical statistics with "objective" probabilities derived from relative frequencies. To such people, the notion of subjective probability – as a judgmental degree of belief about a unique uncertain event – may seem dubious, almost like pure guesswork. But as part

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of the Bayesian statistical tradition, such concepts are both theoretically rigorous and quite useful. (See Spetzler and Stael von Holstein [1975] and Hampton, Moore, and Thomas [1973] for discussions on the formal theory and practical assessment of subjective probabilities.)

***From Statistical Decision Theory to Decision Analysis***

Although statistical decision theory offered an elegant means to incorporate subjective uncertainties into decision problems, the work was still very much in the spirit and form of mathematical statistics. By 1968, Howard had published a short, highly influential book, *Decision Analysis*, which essentially launched the field bearing this name. Almost engineering in spirit, decision analysis offered a robust, accessible means for making decisions under uncertainty. In essence, a decision analyst would approach a problem by disaggregating it into (1) a sequence of choices and uncertain events together with (2) a precise description of the possible consequences of each choice and each uncertain event and (3) the decision maker's value tradeoffs as well as attitudes toward time and risk incorporated into an evaluation of the consequences.

Careful assessments of the uncertainties and evaluations of the consequences transformed a qualitative problem into a quantitative one involving (often subjective) probabilities and values. The earlier work by Howard and his colleagues on statistical decision theory offered ready-made conceptual and computational tools to account for the elements of uncertainty while various analytic devices clarified the values at stake. Explicitly invoking a set of appealing axioms, these probabilistic and valuation factors could be precisely combined into a rigorously defined measure – “von Neumann–Morgenstern subjectively expected utility” – that ranks different possible courses of action according to their desirability.

Decision analysis employed many influential concepts from game theory and economics which purported to be *descriptively* accurate, that is, based on how people *actually* behave. But Howard's synthesis offered a resolutely *prescriptive* approach to individual decision making. In other words, he astutely and accurately realized that people do *not* actually make decisions in this logical, disciplined manner, as economic and game-theoretic models typically posit, but instead *should* wish to do so once they had thought hard about these problems. Indeed, the difficulties experienced even by bright, motivated students taking courses in decision analysis – understood as how one ideally *should* make decisions under uncertainty given precise, appealing assumptions – highlight the distance between actual decision making and the idealized assumptions behind game-theoretic “rationality.” As such, decision analysis soon became the backbone of quantitative methods courses in schools of business and public policy worldwide, with a full complement of academics seeking to further the methodology and its application.

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In subsequent years, Howard refined and advanced the decision-analytic approach with a series of coauthors, in particular extending it with Ralph Keeney to encompass common situations in which a single factor such as money is insufficient to capture the multiple attributes at stake in the outcome of a decision. Their work was reflected in *Decisions with Multiple Objectives* (Keeney and Raiffa 1976), which offered heuristic and extensive mathematical techniques for making formal trade-offs among conflicting interests in individual decision making.

Further, Howard and others joined with prominent psychologists such as Amos Tversky to sharply distinguish among descriptive, prescriptive, and normative theories of decision making, approaches that are often confused; the product of a collaboration among David Bell, Howard, and Tversky (1988) became *Decision Making: Descriptive, Normative, and Prescriptive Interactions*. The marriage of decision analysis and systematic behavioral research gave rise to an important subfield, “behavioral decision theory,” which, along with many other developments in this thriving field, has been cogently characterized by Ward Edwards, Ralph F. Miles, Jr., and Detlof van Winterfeldt (2007) in their edited volume *Advances in Decision Analysis*.

#### ***From Decision Analysis Back to Interactive Decision Problems and Negotiation Analysis***

In its most common form, decision analysis prescribes a systematic decomposition of the decision problem under uncertainty: structuring and sequencing the parties’ choices and chance events, then separating and subjectively assessing probabilities, values, risk, and time preferences. The von Neumann–Morgenstern expected utility criterion offers a simple method to aggregate these elements into a measure that explicitly ranks possible actions to determine the optimal choice. As noted above, this approach is especially well suited to decisions “against nature,” in which the uncertainties, such as the probability that a hurricane will strike Caracas in August, are not “interactive”; that is, they are not affected by the choices of other involved parties anticipating one’s actions.

But when decision making is interactive – as is true in negotiation, when each party’s anticipated and actual choices affect the other’s, and vice versa – assessment of what the other side will do qualitatively differs from assessment of “natural” uncertainties. Of course, the theory of games, Howard’s initial intellectual focus, was developed to provide a logically consistent framework for analyzing such interdependent decision making. In standard game-theoretic analyses, full descriptions of the courses of action open to each involved party are encapsulated into “strategies.” Rigorous analysis of the interaction of strategies leads to a search for “equilibria” or plans of action such that each party, given the choices of the other parties, has no incentive to change its plans. A great deal of analysis by game theorists seeks conditions for unique equilibria among such strategies.<sup>1</sup>

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Game theory has been especially useful for understanding repeated negotiations in well-structured situations. It has offered useful guidance for the design of auction and bidding mechanisms, has uncovered powerful competitive dynamics, has insightfully analyzed many “fairness” principles, and flourishes in many economic and other social science contexts. With nonspecialist audiences in mind, a number of analysts have described some of the most useful contributions of game theory for understanding negotiating behavior.<sup>2</sup>

A fully rational “baseline” analysis helps one to understand how a rational other side might possibly respond to a counterpart’s proposed move. Urging consistent, if not fully rational, behavior on the subject of one’s advice is often wise. After all, well-structured, repeated negotiations may penalize departures from rational behavior. Despite the evident value of game-theoretic analysis, however, Howard and others realized that using the dominant game-theoretic approach to predict equilibrium outcomes resulting from the strategic interactions of fully rational players does not always produce powerful prescriptions for negotiators. Many negotiating situations are neither well-structured, repeated, nor embedded in a market context.

Furthermore, three more fundamental aspects of mainstream game theory often limit its prescriptive value. First, on standard assumptions, there often exist numerous plausible equilibrium concepts, each with many associated equilibria – and no *a priori* compelling way to choose among them. Second, even where one party wishes to act rationally, the other side may not behave as a strategically sophisticated, expected utility maximizer, thus rendering conventional equilibrium analyses less applicable. A large and growing body of behavioral evidence suggests that people systematically and significantly violate the canons of rationality (see Tsay and Bazerman 2009). Although negotiators normally exhibit purposive behavior, they many times depart significantly from the “imaginary, idealized, super-rational people without psyches” (Bell, Raiffa, and Tversky 1988: 9) needed to make many game-theoretic analyses tractable or even relevant.

Third, the elements, structures, and “rules” of many negotiating situations are not completely known to all the players, and even the character of what is known by one player may not be known by another. The frequent lack of such “common knowledge” fatally limits – from a prescriptive standpoint – much equilibrium-oriented game analysis. Even where it is possible to shoehorn such a situation into the form of a well-posed game and gain insights from it, the result may lose much prescriptive relevance. (See Sebenius 1992, 2002, 2007 for a more fully developed discussion of these points and their analytic implications).

Ironically, after his first intellectual milestone, the brilliant game-theoretic assessment of interactive decision making *Games and Decisions*, Howard had largely refocused, via statistical decision theory and decision analysis, on noninteractive, individual decision problems “against nature.” But

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two decades later, he consistently found himself drawn back to interactive problems such as negotiation, in which the *joint* decisions of the involved parties mutually influence one another in determining outcomes. Considerable experience, however, had made Howard acutely conscious of the limits, briefly described above, of an orthodox game-theoretic approach for developing good prescriptive theories for negotiators.

Hence, he developed a hybrid approach that has become known as “negotiation analysis.” Not only did this approach seek to overcome key limits of game theory, it became a vital intellectual bridge. For years, a great scholarly divide had existed between work that was predominantly descriptive and that which was predominantly prescriptive. Analysts such as game and mathematical economists generally explained what “rational” people *should* do, while organizational and social psychologists, for example, often focused on describing and explaining what real people *actually* do. While there were exceptions, especially informal ones, the intellectual divide was real and ran deep.

Howard’s integrative perspective on negotiation, however, was explicitly “asymmetrically prescriptive/descriptive,” that is, advising one side what it *should* do – conditional on what the other side is most likely in fact *to do*. Of course, decision and negotiation theorists had elegant prescriptive frameworks but were relatively thin on rigorous or empirically grounded description. Analogously, much behavioral work carefully accounted for how people do behave but was quite *ad hoc* or simply silent on the prescriptive side. (Amos Tversky’s work brilliantly illustrates this latter category.) In his 1982 book, *The Art and Science of Negotiation*, Howard’s asymmetrically prescriptive/descriptive theoretical orientation explicitly yoked *a priori* prescriptive theory to the theoretical and empirical work of behavioral scientists who rigorously described and accounted for actual behavior. This has greatly enriched both the rigor and relevance of negotiation analysis. (An additional perspective is what Howard calls “externally prescriptive/descriptive,” a stance appropriate to advising third parties such as mediators and arbitrators about how best to act, given assessments of the protagonists.)

As a direct result of Howard’s conceptual integration, much behavioral work – such as that of Max Bazerman, his students, and colleagues – now directly feeds prescriptive frameworks and, in turn, is informed by them. This work both preceded and paralleled the rise of the experimental economists, such as Alvin Roth, who have been reconstructing economic theories in the light of careful behavioral lab studies rather than stylized, *a priori* assumptions about human behavior.

Much excellent work has been done by many people squarely on one side or the other of the prescriptive/descriptive divide. From my point of view, however, the real bridge builders have been Howard Raiffa from the analytical, prescriptive side and Max Bazerman from the behavioral, descriptive one. In particular, each has influenced many other scholars to

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adopt and develop this asymmetrically prescriptive/descriptive approach, which now thrives both explicitly and implicitly. Howard's work has set the stage for powerful prescriptive theories, conditioned on rigorously grounded description.

Following his retirement in 1996, Howard sought to advance a more unified approach to decision making, drawing on the various emphases of his earlier work. Indeed, he was quite productive, coauthoring a popular and synthetic book on decision making, *Smart Choices*, with John Hammond and Ralph Keeney (Hammond, Keeney, and Raiffa 1998) as well as an update of the mathematical *Introduction to Statistical Decision Theory* with Pratt and Schlaifer (Pratt, Raiffa, and Schlaifer 2008). With David Metcalfe and John Richardson, Howard (Raiffa, Richardson, and Metcalfe 2002) synthesized much of his life's work on individual and joint decision making – from solo choices to auctions and to negotiations – in the accessible *Negotiation Analysis: The Science and Art of Collaborative Decision Making*.<sup>3</sup>

### **Negotiation Analysis: A Rough Methodological Characterization**

Although somewhat eclectic, major works in the field of negotiation analysis since *The Art and Science of Negotiation* in 1982 have sought to develop prescriptive theory and useful advice for negotiators and third parties. Like decision analysis, negotiation analysis typically disaggregates the problem into characteristic elements. It generally assesses the full set of involved parties and their potential coalitional alignments, their underlying interests, and their alternatives to negotiated agreement. It analyzes a range of approaches to productively manage the inherent tension between competitive actions to “claim” value individually and cooperative ones to “create” value jointly, as well as potential efforts that could change perceptions of the setup of the negotiation itself. Most of these several negotiation elements exist in more popular negotiation handbooks, but negotiation analysts have carefully worked out the precise analytic relationships among these factors and have developed a range of technical tools for evaluating and forging them into useful prescriptions.

Because advice to one side does not necessarily presume the full (game-theoretic) rationality of the other side(s), negotiation analysts increasingly draw on the findings of behavioral scientists and experimental economists. Negotiation-analytic prescriptions typically expect intelligent, goal-seeking action by the other parties, but not necessarily full game-theoretic (interactive or “strategic”) rationality. As such, they tend to deemphasize the application of game-theoretic solution concepts or efforts to find unique equilibrium outcomes except in well-structured situations in which the conditions for equilibria warrant such solutions. Such descriptive assessments of the other parties need not assume tactical naiveté; as contextually appropriate, the



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assessments can incorporate none, a few, or many rounds of “interactive reasoning.” Further, this approach does not generally assume that all the elements of the negotiation or “game” are common knowledge. Instead, to evaluate possible strategies and tactics, negotiation analysts generally focus on changes in perceptions of the “zone of possible agreement” and the (subjective) distribution of possible negotiated outcomes conditional on various actions.

In the skeptical view of John Harsanyi (1982: 123), the negotiation-analytic approach boils down to “the uninformative statement that every player should maximize expected utility in terms of his subjective probabilities without giving him the slightest hint of how to choose these subjective probabilities in a rational manner.” Negotiation analysts, however, have isolated distinct classes of factors that can improve subjective distributions of negotiated outcomes. Understanding the dynamics of creating and claiming value can improve the confidence the prescriber has in the usefulness of his or her advice. Psychological considerations can help, as can cultural observations and knowledge of organizational constraints and patterns, historical similarity, systematic decision-making biases, and contextual features. Less than full-blown game-theoretic reasoning can offer insight into strategic dynamics as can blends of psychological and game-theoretic analysis. When one relaxes the assumptions of strict, mutually expected, strategic sophistication in a fixed game, Howard’s (1982: 359) conclusion is appealing: that some “analysis – mostly simple analysis – can help.” (For summaries and evaluations of negotiation-analytic frameworks and technical tools, as well as extended evaluations of the methodological differences from game theory, see, e.g., Sebenius 1992, 2001, 2002, 2007.)

### ***Negotiation Analysis: Representative Works***

If descriptive psychological approaches to negotiation lack a prescriptive framework, if decision analysis is not directly suited to interactive problems, and if traditional game theory presupposes too much rationality on all sides, then negotiation analysis represents a response that links prescriptive and descriptive research traditions. This approach has been used to develop analysis and prescriptions for the simplest bilateral negotiations between monolithic parties, for negotiations through agents or with linked “internal” and “external” aspects, for negotiations in hierarchies and networks, and for more complex coalitional interactions, as well as for moves “away from the table” to change the setup of the perceived negotiation itself, including the challenge of “negotiation design” to enhance the likelihood of desirable outcomes.

While a full literature review is well beyond the scope of this article, a number of representative works illustrate some key directions of the field. And a natural caution is in order: because “negotiation analysis” is not a sharply defined field but rather an emergent prescriptive approach as broadly

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characterized above, any literature assessment will necessarily include works that belong to other traditions as well.

Prior to the *Art and Science of Negotiation*, one of the first works that could be said to be in the (later) spirit of negotiation analysis was Thomas Schelling's *The Strategy of Conflict* (1960) followed by his *Arms and Influence* (1966). The point of departure of these works was game-theoretic, but they proceeded with less formal argument and their analysis had a far broader direct scope. Although nominally in the behavioral realm, Richard Walton and Robert McKersie's (1965) *A Behavioral Theory of Labor Negotiations* drew on Schelling's work as well as rudimentary decision and game theories. It highlighted distinctions between so-called "integrative" (loosely, positive sum, or win-win) and "distributive" (loosely, zero sum, or win-lose) bargaining as well as the "intraorganizational" negotiations that take place in tandem with the bargaining between labor and management.

After Howard's *The Art and Science of Negotiation*, I published an extended application of some of these ideas in the context of the mammoth Law of the Sea (LOS) negotiations, *Negotiating the Law of the Sea: Lessons in the Art and Science of Reaching Agreement* (Sebenius 1984). The second part of this book developed several negotiation analytic topics independent of the LOS context (the nature of joint gains and the underlying bases of value-creating deal designs, as well as "negotiation arithmetic" or the analysis of "adding and subtracting issues and parties").

Using the wide range of insights in *The Art and Science of Negotiation* as a point of departure, David Lax and I developed an overall negotiation analytic method in the first part of *The Manager as Negotiator* (Lax and Sebenius 1986) that highlighted a small set of consistently critical elements; the second part of our book focused on this method applied to managerial negotiations within and among organizations. While earlier works had mainly treated the "integrative" and "distributive" aspects of negotiation as distinct and separable, Lax and I reconceptualized these fundamental processes as "creating value" and "claiming value" and showed how they were analytically and practically inseparable. Our concept of the "negotiators' dilemma" explained how competitive moves to claim value individually could drive out the cooperative moves necessary to create value jointly, as well as a number of means for productively managing this inherent creating-claiming tension.

*Negotiation Analysis*, edited by H. Peyton Young (1991), furthered this evolving tradition in a somewhat more formal vein. I (Sebenius 1992) outlined a methodological synthesis of this emerging field in a *Management Science* article, "Negotiation Analysis: Characterization and Review." Further contributions in the same vein include *Wise Decisions*, edited by Richard Zeckhauser, Ralph Keeney, and myself (Zeckhauser, Keeney, and Sebenius 1996), which was published on the occasion of Howard's retirement from teaching. More works in this tradition include Howard's (1997) *Lectures on Negotiation Analysis*, and, adding insights from organizational and

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information economics, *Beyond Winning* by Robert Mnookin, Scott Peppet, and Andrew Tulumello (2000). In this latter work, Mnookin and his colleagues highlighted and developed three critical tensions in negotiation: between creating and claiming value, between assertiveness and empathy, and between principal and agent. Kenneth Arrow and his colleagues (1995) drew on several methodological traditions to highlight the analytic role of “barriers” to agreement. In a trade context, John Odell’s (2000) *Negotiating the World Economy* offered an extended demonstration of the power of these concepts in international relations theory building. While negotiation-analytic in spirit, the common points of departure of the works described above were formally analytic: game theory, economics, and decision analysis.

Often in parallel with the analysts discussed above, another group of researchers was coming increasingly close to a negotiation-analytic view, but from an explicitly behavioral starting point. With roots in the cognitive tradition pioneered by Daniel Kahneman and Amos Tversky (1974) and elaborated by behavioral decision theorists,<sup>4</sup> behavioral scholars began in the late 1980s and early 1990s to explicitly link their work to that of Howard and his colleagues. In particular, Margaret Neale and Max Bazerman’s (1991) *Cognition and Rationality in Negotiation*, the more popularly oriented *Negotiating Rationally* by Bazerman and Neale (1991), and Leigh Thompson’s (2001) *The Mind and Heart of the Negotiator* pulled together and developed a great deal of psychological work on negotiation – both cognitive and social – in an asymmetrically prescriptive/descriptive framework. *Negotiation Genius*, a practitioner-oriented work by Deepak Malhotra and Max Bazerman (2007), has a strongly behavioral but prescriptive flavor.

An excellent review of research studying the psychological side of negotiation can be found in an article by Bazerman, Jared Curhan, and Don Moore (2000). Reviews focusing on developments on the social psychological side can be found in an article by Bazerman, Curhan, Moore, and Kathleen Valley (2000). Burgeoning research in experimental economics (Kagel and Roth 1995) and what Colin Camerer (1997) described as a “behavioral game theory” blends game-theoretic and psychological considerations in rigorous experimental settings. Daniel Kahneman’s landmark *Thinking, Fast and Slow* (2011) grounds many of these phenomena in behavioral science, although negotiation is just one of the many areas his book explores. These efforts began to more systematically and formally develop what had been, in the works of Howard and his colleagues, a descriptive tradition that had been largely *ad hoc* and casually empirical.

### ***Negotiation Analysis beyond the Table: The Role of Setup***

Although most negotiation analysis focuses on the interactive process “at the table,” with the elements of the situation assumed to be well specified and fixed, a continuing strand of inquiry has involved moves to change the

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perceived negotiation itself or to set up a different one in the first place. For example, in the *Art and Science of Negotiation* as well as in *Negotiation Analysis*, Howard analyzed several mechanisms for collective decisions including a range of auctions and bidding schemes, processes for “fair division,” and voting procedures. Implicitly, depending on the characteristics of such mechanisms and of the situation at hand, negotiators or third parties might seek to convert a standard face-to-face process into a different and more appealing setup.

Indeed, for some time both analysts and practitioners have realized that certain actions by negotiators can best be understood in terms of a tacit or explicit negotiation over what the game itself will be.<sup>5</sup> To proceed further down this line of analysis, we need to ask precisely what determines a negotiation’s perceived setup. One answer seems simple and compelling but has deep implications: *a negotiation’s setup is simply that which the parties act as if it is* (Lax and Sebenius 1986). Ariel Rubinstein (1991: 919) took a similar view in attempting to increase the real-world relevance of game theory when he argued that a game-theoretic model “should include only those factors which are perceived *by the players* to be *relevant*” (emphasis in the original). Adam Brandenburger and Barry Nalebuff (1996: 234–235) compatibly observed that “people draw boundaries and divide the world up into many separate games. It’s easy to fall into the trap of analyzing these separate games in isolation. . . . The problem is that mental boundaries aren’t real boundaries . . . you can create new links between games or sever existing ones. And by doing so you can change the scope of the game.”

As such, there is no *a priori* reason why this or that issue or party should be included, why this or that interest should be excluded, or why this or that basic process choice should be made or mutually accepted. If the parties come to deal with a particular set of issues, alternatives to agreement, or basic process choices, then those elements in fact make up part of that negotiation’s setup. In an early example, Walton and McKersie (1965) focused on how negotiators seek to change perceptions of the game by what they called “attitudinal restructuring.” In the context of competitive business strategy, Brandenburger and Nalebuff (1996) developed a powerful, analogous logic for “changing the game,” describing both an overall approach and including many ingenious examples of this phenomenon. This means that a perfectly legitimate, highly relevant, and potentially valuable form of analysis may involve a search for ways to change the perceived setup – even though the menu of possibilities may not be common knowledge.

In *3-D Negotiation*, David Lax and I (2006) identified, highlighted, characterized, and systematically analyzed major classes of moves intended to change a negotiation’s setup, focusing on elements such as parties, interests, no-deal options, as well as the sequence and basic process choices. Illustrated by numerous detailed examples from practice, we made such “setup moves,” which often take place away from the table, into a core dimension or

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centerpiece of our negotiation-analytic approach (along with more traditional tactics and deal design choices). Indeed, *3-D Negotiation* made explicit and systematic how purposive action on behalf of the parties can *change* the very structure of the situation and, therefore, the outcomes. Michael Watkins's (2006) *Shaping the Game* developed a related logic for game-changing moves as did his earlier book with Susan Rosegrant, *Breakthrough International Negotiations* (Watkins and Rosegrant 2001).

Issues can be linked or separated from the negotiation to create joint gains or to enhance leverage. Parties may be "added" to a negotiation to improve one side's no-agreement alternatives as well as to generate joint gains or to extract value from others. The process of choosing then approaching and persuading others to agree may best be studied without the common assumption that the game is fully specified at the outset of analysis. (For examples of process sequencing to build or break coalitions, see Sebenius 1996.) Although perhaps less commonly, parties can also be "subtracted" - meaning separated, ejected, or excluded - from larger potential coalitions. For example, the Soviets were excluded from an active Middle East negotiating role in the process leading up to the Camp David accords that involved only Israel, Egypt, and the United States.

One of the most familiar classes of setup moves has to do with what Guhan Subramanian (2010) refers to and analyzes as "deal process" choices. For example, one well-known result in auction theory (Bulow and Klemperer 1996) confirms that transforming a two-party negotiation into an active auction with additional bidders vying for a deal can be a potent value-claiming strategy. Under fairly stringent conditions, this analysis suggests that adding another bidder improves the seller's expected outcome relative to more skillful bargaining by the seller without that extra bidder.<sup>6</sup> Subramanian and Zeckhauser (2005) argued that treating auctions and negotiations as separate processes is problematic both in practice and theory. Using the term "negotiauction," they offer advice to buyers and sellers on the most promising setup choices depending on the types of parties and assets under consideration.

In line with this focus on changing the negotiating setup, negotiation scholars have also pointed out that situations often offer considerable scope for creative "negotiation design" to enhance the chances and value of agreement. Case examples of this phenomenon dissected in negotiation-analytic terms include the work that Singaporean legal scholar and ambassador Tommy Koh did as president of the Third United Nations Conference on the Law of the Sea (Antrim and Sebenius 1991), former United States Senator George Mitchell's efforts to broker a peace accord in Northern Ireland (Curran and Sebenius 2003), and, in contrast, the work undertaken by Richard Holbrooke, former U.S. Ambassador to the United Nations, to achieve the Dayton Accords that ended the war in Bosnia (Curran and Sebenius 2003), as well as U.S. Trade Representative Charlene Barshefsky's choices with

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respect to negotiating a United States–Chinese Intellectual Property Regime (Hulse and Sebenius 2003). I have also analyzed a range of detailed negotiation design issues for large-scale negotiation conference diplomacy – specifically for climate change talks, chlorofluorocarbon control, and the Law of the Sea (Sebenius 1991, 1995a, 1995b).

In other settings, negotiation design choices may involve the choice of discrete processes such as optimally matching various alternative dispute resolution mechanisms to different classes of disputes: “matching the forum to the fuss” (Sander and Goldberg 1994). Lawrence Susskind, Sarah McKernan, and Jennifer Thomas-Larmer (1999) have carefully analyzed numerous design choices for public disputes. Closely related is the question of influencing a *stream* of negotiated outcomes to improve the odds of mutually beneficial agreements; examples include the design of organizational dispute resolution systems (Ury, Brett, and Goldberg 1988; Costantino and Merchant 1996). Finally, the institutional and regulatory context may be consciously shaped to influence the frequency and quality of negotiations carried out within that setting. For example, Michael Wheeler and his colleagues (Wheeler 1994; Wheeler, Gilbert, and Field 1997) evaluated the design characteristics chosen to stimulate productive negotiations in Massachusetts over hazardous waste treatment facilities as well as a New Jersey system designed to foster socially desirable intermunicipal trading of affordable housing obligations.

In short, once the analytic focus moves beyond the direct interaction of the parties to the setup of the negotiation itself – treating the parties, interests, no-deal options, sequence, and basic processes as choice variables rather than as fixed and given – the realm of negotiation analysis opens up to such questions as linkage and separation, coalition building and breaking, as well as negotiation design. In this spirit, David Lax and I have developed the concept of the “multi-front negotiation campaign” (Sebenius 2010; Lax and Sebenius 2012). The focus of a negotiation campaign is not the individual deal but the orchestration of many subsidiary agreements that, ideally, set up the most promising possible situation for an ultimate target agreement. With the setup itself potentially “in play,” the architecture of negotiating encounters, with important outcome implications, becomes a key prescriptive lever.

Exemplified by the pioneering work of Howard Raiffa, the emergent prescriptive field of “negotiation analysis” evolved from roots in game theory, statistical decision theory, and decision analysis. Drawing from each of these fields but methodologically distinct from them, negotiation analysis has mainly adopted an “asymmetrically prescriptive/descriptive” orientation. It develops the best possible advice for what one or more parties *should do* conditional on empirically grounded assessment of what the other side(s) actually *will do*. An extensive literature has developed, often making the traditional assumption of a well-specified and fixed situation for analysis. Relaxing this requirement, however, puts the setup of a negotiation itself into the realm of choice.

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## **Howard Raiffa: A Personal and Analytical Appreciation**

In seeking to characterize Howard Raiffa, it is almost impossible to separate the person from his evolving intellectual core, which I described above. This fiercely original scholar was unfailingly positive, modest, and generous as a human being and teacher. When virtually anyone entered his office, his unforgettable voice and manner invariably reflected welcome and delight. As I recall, he never said a negative word about anyone. (After a while, however, you could calibrate his real feelings toward those few people of whom he disapproved: “perhaps not my very favorite person” meant “*look out!*”)

While critically discerning, he supported his students and junior colleagues to an extent unusual among advisors. For example, like many of his doctoral students, I periodically sat for long hours on the screened porch of his house on School Street in Belmont, Massachusetts – deep in discussion with Howard about draft chapters of my dissertation. These penetrating conversations were leavened by Estelle, Howard’s wife, who would sometimes join in, occasionally with icy lemonade during breaks on hot days. Of course, I joined him at plenty of meetings in his Harvard Business School (HBS) and Kennedy School offices, but being welcomed into his home meant a lot and changed the character of the interaction and our relationship. I was hardly unique among his doctoral students, who numbered more than a hundred (with their bound theses proudly displayed in sequence on his office bookshelves.)

When he and Estelle learned that Nancy Buck and I were to be married in New York, where we had been living after I left Harvard for a few years for the world of private equity, they made the trip to New York in honor of the occasion (and, perhaps, to vet Nancy). Few who knew the Raiffas would have been at all surprised that they took time from their busy lives for that journey.

### ***Seeking the “Analytic Essence” of a Problem through Simplification***

A recurring theme in discussing a challenging problem with Howard was his insistence on stripping down the situation to its “analytic essence,” or the simplest representation that embodied what seemed to be its core attributes. If a seven-party negotiation was on the examination table, Howard would probe to see if we could replicate the dynamic of interest in a three-person, or even two-party, negotiation. Then, the idea was to reason rigorously about the simpler situation, which was often much clearer and easier to comprehend.

As you came to understand this easier case, the analytic question became how to add back levels of complexity to see if and how things changed fundamentally as you approached the problem as originally formulated. “Under what conditions,” Howard would ask, “does the phenomenon you’ve sorted out in the simpler case generalize (or not) to situations of greater and greater complexity?” Along with others who have studied with Howard, I have consistently found this approach useful in thinking through messy

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negotiations. Still ringing in my ears is Howard's admonition: "What's the simplest version of this problem that we believe will capture its analytic essence? Can we start by analyzing that one?"

***A Premium on Communicating Clearly in Writing and Teaching***

For some reason, several of those "screen porch" conversations have stuck with me. In retrospect, they reveal a great deal about Howard. In one such discussion, I remember having proven a conjecture after several weeks of work. We discussed the substance for a while and Howard complimented me when my proof seemed right. But perhaps two-thirds or more of that discussion focused neither on the substance nor the mathematics. Instead, he concentrated on my exposition, including words, equations, graphs, and layout. In particular, I had not "written the mathematics" in a natural way that flowed naturally and communicated with the reader. ("Remember, an equals sign is a verb.") Did I continually visualize a momentarily puzzled reader with whom my words and equations would easily and naturally connect? Had I simplified my sentences to their essence? Had I really thought about where paragraph and section breaks should fall? Had I labeled and annotated the graphs and charts so each was self-contained and its implications readily understood?

Not only was Howard's own writing a model of seemingly informal precision, but he often adopted the device of writing in dialogue form. His counterpart in these analytic dialogues was normally a skeptical, modestly intelligent person whom Howard sought to gently enlighten and convince, not impress with brilliance or flourishes. He structured these dialogues to address several of his counterpart's likely points of confusion and objections in a casual, almost folksy manner. One secret of Howard's effectiveness and the breadth of his influence was his insistence on communicating powerful ideas well beyond analytic insiders.

This premium on clarity extended to his teaching. Howard seemed to chafe a little under the expectations of traditional HBS case teaching pedagogy. Many decorated faculty members would begin a class by calling on a student for an "opening." Sometimes this would be decision-focused, but often it was mainly to summarize the case situation. Other students would gradually fill in the essential case facts and highlight the core decision for analysis and discussion during the balance of the class.

As I watched Howard teach, three characteristics stood out for me. Not surprisingly, he explained challenging concepts in a remarkably lucid fashion. He also maintained high standards while being deeply respectful of and kind to his students - which was no surprise to those of us who knew him.

I think he was also impatient with the fifteen to thirty minutes of class time that some traditional case method instructors spent setting up the key decisions by eliciting case facts from students. Thus, in Howard's era of transparencies and overhead projectors, he would often begin a case



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discussion by presenting the essentials on a series of slides over perhaps five minutes. Then he would look to the class to debate positions on the key issues. For many years, I regarded this technique as cleverly designed to maximize the time available for creative and analytic class discussion, rather than regurgitation of case facts. (Of course, there was some risk that class members, knowing that the case would be summarized up front, might shirk preparation – but this never seemed to be a problem in practice.)

Howard's approach did indeed permit more time for a much higher level of analysis and discussion. But only later did I realize that, on occasion, these upfront "case review and setup slides" served quite another purpose for him. They reminded *Howard* of what on earth this case was about and set him up to lead the discussion. I cannot say that I have not used a slide show version of Howard's case review technique at least a few times during especially busy times in my life.

### ***Genuine Embrace of Diverse Intellectual Traditions***

During another such screen porch talk, I recall struggling with a mathematical conjecture, clumsily seeking to model how information transfers from one party to another when the negotiators are discussing contingent deals. We talked about it for a while, when Howard said, "Jim, that is closely related to a fundamental and fairly abstract paper by Bob Aumann (1976) on common knowledge; you should try to extend Aumann's result." A fellow graduate student eventually helped me to do so (Sebenius and Geanakoplos 1983), but doing so required a fair amount of technical mathematics to crystallize the insight.

I mention this moment because during that same discussion, Howard and I puzzled at length about how the chair of the U.N. Conference on the Law of the Sea, in which I'd been involved, had built consensus among a large number of highly disparate parties. The latter conversation, while loosely analytical, had a far more political and institutional character. Meaningful generalizations would, at best, be qualitative. But Howard was equally at home with – and took seriously and was genuinely respectful of – such inherently different forms of knowledge and the intellectual capital they might represent.

Only later did I realize how rare and special was Howard's quality of valuing and being comfortable with very different forms of knowledge from the highly mathematical to the experimental, from the mid-level generalization to the institutional. Similarly, he regarded different disciplinary approaches – statistical, economic, mathematical, psychological, legal, and historical – as potential sources of insight that might complement his own preferred methodologies. If you thought hard and carefully about a problem, and could credibly demonstrate that you had crystallized an insight that could apply more broadly, Howard would be thrilled.

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By contrast, many scholars are so committed to a particular methodology and its first cousins that, even if superficially tolerant of other approaches, they may harbor a secret contempt for them. This does not mean that Howard was uncritically accepting of alien disciplines and modes of thought; rather, he was genuinely open to quality work of many kinds. His default mode was receptivity, not rejection.

An example: as a young faculty member with a somewhat mathematical bent, I found myself teaching negotiation to graduate students at the Kennedy School. My approach drew heavily on the analysis in Schelling's *Strategy of Conflict* and in Howard's *Art and Science of Negotiation*. The runaway best seller, *Getting To Yes*, recently written by two colleagues, Roger Fisher and William Ury (1981), also influenced many of my students with its simple but useful maxims (e.g., "Focus on interests, not positions," "Separate the people from the problem," etc.). With some pride, I remember crafting a final exam that assigned *Getting to Yes* and asked students to critically evaluate and provide counterexamples to each of these maxims.

Later showing my exam to Howard, I remember him agreeing that, indeed, *Getting to Yes* had plenty of analytical shortcomings and that I had usefully challenged my students. I was at least somewhat pleased with myself. "But the more interesting and much harder question, Jim," he asked, "is why people find Roger and Bill's little book so valuable in so many negotiating situations. Can you get to the heart of this question and understand the analytic essence of its genuine appeal and value?" In short, Howard was perfectly fine with analytically debunking aspects of a popular bestseller. That was relatively easy. But his real interest lay in identifying and truly appreciating its powerful underlying contributions, which as my view evolved I realized were substantial. (See Sebenius 2013 for a later appreciation of *Getting to Yes* and its many relatives.)

From 2001, I have chaired or co-chaired a PON initiative that annually honors a "Great Negotiator." Honorees have included such luminaries as George Mitchell for his work in Northern Ireland and Richard Holbrooke for his negotiations that led to the Dayton Accords that ended the horrific Bosnian war. My colleagues and I write cases on these remarkable women and men from around the world before they are invited to Harvard for hours of videotaped interviews in front of a large audience of students, faculty, and guests. The results become the basis for teaching materials, articles, and books.

Seen from one perspective, these "Great Negotiator" events merely showcase individual cases, selected on the basis of their success. They include no larger sample, no paired comparisons with failure cases, and no theorems derived from the experience. Howard, however, was always an enthusiastic supporter of these events, attended several of them well after his retirement, and eagerly discussed with me and others what we could legitimately learn from the remarkable experiences of our Great Negotiators. Clearly, he saw

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intellectual and practical value from probing individual cases in search of new dynamics or unexpected phenomena – well beyond the intriguing anecdotes that inevitably come from high-profile protagonists discussing high-profile negotiations.

Howard's genuine embrace of different methodologies and diverse forms of knowledge helped him connect at an intellectual as well as a personal level with a wide range of scholars from multiple disciplines. This orientation also greatly enhanced his numerous institution-building initiatives.

***Stubborn Intellectual Honesty with a Deep Moral Core***

When I was a graduate student in 1978 taking Raiffa's HBS course on competitive decision making that focused on negotiations, a *Wall Street Journal* reporter attended some of the classes. Students were partially graded on how well they did against other students in a series of increasingly complex negotiation exercises. Howard, his students, the HBS faculty, and HBS alumni were stunned when on January 15, 1979, they read a front page *Wall Street Journal* article headlined "At Harvard, Lying Is a Matter of Course" (Bulkeley 1979). The article stirred passions worldwide over just what unethical practices business schools were fostering in their students.

Howard was deeply hurt by this controversy that seemed manifestly unfair. From my perspective, and that of many others, Howard Raiffa was probably the least likely and least deserving HBS faculty member to be branded as unethical; in fact, he would have been more likely to have been nominated as a moral exemplar than many, if not most, of his faculty peers.

Howard's response to this painful episode was revealing. It would have been easy for him to simply denounce lying ("strategic misrepresentation") and outlaw it in the negotiation exercises. But in reality, people often do not tell the truth in negotiations (about, e.g., whether they have another offer or their real reasons for leaving a previous job).

Howard did not shrink from this inconvenient truth or adopt a simplistic moral stance. Rather, he sought to enlighten his students about the role of lying, the conditions that make it more likely, and how to detect and handle lies in negotiation. He demonstrated analytically how the appealing notion that "if you lie, you'll do better in negotiation," while sometimes true, was false and counterproductive under a wide range of circumstances. He showed students clever devices to promote cooperation in "social dilemma" games when lying appears to be the dominant strategy. He carefully analyzed and wrote about negotiations in which full open truthful exchange (FOTE) was the norm, in part because FOTE aligned with his values and in part to show its benefits: FOTE can help negotiators stuck in a haggling mode to move to joint problem solving.

In short, bouncing back from this painful assault on his integrity, Howard characteristically remained honest, spoke the truth (including that lying

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sometimes *does* pay), and used the most effective weapons in his analytic arsenal to help students see positive potential in what would often be ethically challenging situations. And he made his own personal views and high ethical standards clear as well as his elevated aspirations for the students, many of whom were impressed and sought to emulate their remarkable professor.

***Connecting People, Focusing Small Groups on Specific Research Products, and Building Institutions***

Not only did Howard appreciate varied approaches to creating intellectual capital, he connected a wide range of people to each other, often leading to collective research initiatives and lifelong friendships. For example, as Howard became increasingly interested in what evolved into negotiation analysis, he helped convene, cochair (with me and David Lax), and actively contribute to the “Negotiation Roundtable.” The roundtable met weekly or bi-weekly, often with eight to twenty faculty and students actively participating.

In some cases, roundtable members and others would get together for an intensive period of time to work on a problem of keen interest. For example, Howard and Estelle once hosted me, David Lax, and Eric Lander (then an HBS postdoc, now head of the Harvard-MIT Broad Institute for biomedical and genomic research) for three days at a lovely cabin on Squam Lake in New Hampshire. There, we spent hours each day dissecting and contrasting a dozen complex negotiations, seeking generalizations.

In general, rather than deal with a semi-random set of topics, Howard gently urged roundtable members to consistently choose papers, cases, and invited guests that supported the passionate research efforts of a small number of its members, who were committed to a specific project. I have since found this to be a powerful model, in many contexts, for collaborative research efforts.

David and I were its early beneficiaries, examining countless articles on and cases of managerial and organizational negotiations. From this, we ultimately coauthored *The Manager as Negotiator* (1986) as a direct result of the roundtable. Later, sustained areas of focus included climate change negotiations and negotiating joint ventures. Arthur Applbaum, now a distinguished professor of professional ethics at Harvard, served as a rapporteur of this group for a time and soon became one of Raiffa’s doctoral students. (He later said of Howard, the chair of his dissertation committee, that “he, more than anyone else, taught me what it is to think, and he, more than anyone else, taught me what it is to be kind.”) The Negotiation Roundtable was extremely active for a decade or so and continues to meet from time to time as topics beckon.

Relative to other well-known entities and institutions that Howard played central roles in founding, such as Harvard’s Kennedy School of Government, the International Institute for Applied Systems Analysis in

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Austria, the Managerial Economics Department at Harvard Business School, and the Decision Sciences program at Harvard, the Negotiation Roundtable was a modest, low-profile initiative. But to varying degrees, the same characteristics that explain Howard's remarkable success in building institutions were also on display in his nurturing of the roundtable. These included his intellectual quest and depth; his insistence on communicating clearly to a wide audience in speech and writing; and his personal warmth, modesty, and generosity; as well as his knack and taste for connecting people who would interact happily and productively.

Such qualities also led Howard to play a major role in the creation of the Program on Negotiation in 1983. When I think of PON, my memories range back to a several-month period starting in late 1978 when Howard had frequently urged me to meet William Ury, an anthropology graduate student working closely with Roger Fisher at Harvard Law School. Concurrently, Howard urged Bill to get together with me. When Bill and I finally connected, our sunny afternoon conversation in my shabby Putnam Avenue apartment in Cambridge continued long after dusk had darkened the room. Each of us mirrored aspects of our respective mentors: mathematically inclined, I was taken with decision analysis and game theory while Bill inclined to the relational and cultural.

Although our intellectual lenses differed, each of us had somehow developed a fascination with negotiation, not only as an intrinsically intriguing academic subject, but as a field in which theory might truly serve practice. Each of us had tasted practice: I had served on the U.S. delegation to the Law of the Sea negotiations and Bill had worked on conflict resolution projects in the Middle East and at a Kentucky coal mine. As Ph.D. students, we now sought to learn and develop prescriptive theory that would genuinely help negotiators with their toughest challenges. That quest has blossomed into a lifelong friendship.

But back to the formation of PON: through Bill and Howard, I met and began to interact regularly with Roger Fisher, who directed the Harvard Negotiation Project (HNP) at Harvard Law School. Soon, guided by our mentors and a diverse group of remarkable senior faculty, Bill and I were among the eager graduate student apprentices who helped build on HNP's foundation to launch the broader Program on Negotiation. The roster of actively involved senior faculty, who were PON's real founders, rapidly expanded over time beyond Fisher and Raiffa. Initial and early members included Frank Sander from Harvard Law School, Lawrence Susskind from MIT's Department of Urban Studies and Planning, Robert McKersie from MIT's Sloan School of Management, Deborah Kolb from Simmons College, David Kuechle from Harvard's Graduate School of Education, and Jeffrey Rubin from Tufts University. Through the mid-1990s, Howard Raiffa and the Negotiation Roundtable were core components of PON, which for a number of years functioned as a kind of umbrella entity for various projects.

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Subsequently, many more faculty and students have been drawn into PON's orbit, making it one of the global centers for the theory and practice of negotiation, mediation, and conflict resolution in various domains.

Some people generate brilliant ideas. Some embody marvelous human qualities. Some spawn intellectual progeny and find ways to connect compatible people. Some launch one or more institutions that endure, grow, and make a real difference. Very few can lay credible claim to all these attributes and accomplishments. Though he never would have said so himself, and might have modestly resisted the honor, Howard Raiffa would be a first ballot choice for this tiny, distinguished group.

### NOTES

This article draws heavily on and quotes extensively from the article "Negotiation Analysis: From Games to Inferences to Decisions to Deals," which appeared previously in *Negotiation Journal* (Sebenius 2009). It is used here with permission.

I would like to thank David Lax, my long-time coauthor and collaborator, with whom many of these ideas have been jointly developed both conceptually and practically. My greatest intellectual debt, however, is to Howard Raiffa, to whose memory this article is dedicated. This article represents an evolution of my earlier syntheses and assessments of the emerging field of negotiation analysis, including Sebenius (1991, 2001, 2002, 2007, 2009), and draws closely and extensively on those works.

1. See the classic discussions of von Neumann and Morgenstern (1944) and Luce and Raiffa (1957); for more recent insightful assessments, with special regard to bargaining, see Roth (1985), Aumann (1989), Harsanyi (1989), and Rasmusen (1989).

2. See, for example, Weber (1985), Myerson (1991), and Young (1991).

3. Ironically, as a student and junior colleague of Raiffa's in the early 1980s, profoundly influenced by graduate work in decision analysis, I unsuccessfully urged that *The Art and Science of Negotiation* should instead be called *Negotiation Analysis*, the title he chose some twenty years later for a much-expanded version of the book (Raiffa et al. 2002). This was unusual. Normally, when I came up with something supposedly "new" in my dealings with Howard, I would find versions of the same idea elegantly expressed somewhere in his prior work.

4. See for example, Einhorn and Hogarth (1988) along with the other excellent collections of papers in Kahneman, Slovic, and Tversky (1982) and Bell, Raiffa, and Tversky (1988).

5. I investigated this phenomenon, dubbing it "negotiation arithmetic" or "adding" and "subtracting" issues and parties (Sebenius 1983, 1984).

6. For extensions and qualifications, however, see Bajari, McMillan, and Tadelis (2002).

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