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Dynamics of Rational Negotiation

Game Theory, Language Games and
Forms of Life

 Springer

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of Life

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Contents

1	Introduction	1
	References	8
2	Negotiation, Game Theory and Language Games	11
1	Introduction	11
2	Negotiation	17
3	Game Theory	19
4	Cooperative Games	20
5	Non-Cooperative Games	25
6	Rien ne va Plus	27
7	Language Games	31
	References	39
3	Bargaining and Game Theory	41
1	Introduction	41
2	Competition	42
3	Cooperation	45
4	The Nash Equilibrium	49
5	Mixed Strategies	52
6	The Functions of Bluffing and Lying in Negotiation	56
	References	59
4	International Negotiation and Forms of Life	61
1	Introduction	61
2	The Concept of Forms of Life	62
3	Lifestyle Versus Form of Life	64
4	Central Elements of Forms of Life	66
5	Objections to the Proposed Model	68
6	Unresolved Problems	70
	References	72

5	Psychological Aspects of Negotiation	75
1	Introduction	75
2	Preconditions for Negotiations	76
3	Persuasive Communication	78
4	Legal Consequences of Deception	79
5	Negotiation Tricks	81
6	Deception and Body Language	87
	References	91
6	Negotiation and Mediation	93
1	Introduction	93
2	Definition of Mediation	93
3	Mediation and Game Theory	96
4	Suitability of Negotiators for Mediation	98
5	Characteristic Elements of Conflicts	102
6	Types of Mediation	106
	References	113
7	Conclusion	115
	Bibliography	123

List of Figures

Chapter 2

Fig. 1	Chessboard	12
Fig. 2	Possible combinations among one or more negotiators with one or more objectives	20
Fig. 3	Payoff matrix in cooperative games	22
Fig. 4	Payoff matrix with two negotiators choosing among two options	28
Fig. 5	Stag hunt	31

Chapter 3

Fig. 1	Zero-sum game	43
Fig. 2	Saddle point	44
Fig. 3	Prisoner's dilemma	47
Fig. 4	Mixed strategy	53
Fig. 5	Pareto dominant/Nash equilibrium	56

Chapter 5

Fig. 1	Dual concern model	77
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Chapter 6

Fig. 1	Game options	96
Fig. 2	Phases of conflict escalation	104
Fig. 3	Escalation of conflict between negotiators	105

Chapter 1

Introduction



This volume presents a systematic analysis of the interrelationship that exists between different parties in the negotiation process. In the past, special interest has been placed on studying the formal aspects of the process.¹ In this study, we approach the topic from a new point of view. Our main concern is the interconnectedness between negotiation, game theory, the language games involved in negotiation and the forms of life in which negotiators are embedded. One of the difficulties in understanding the meaning of the technical terms used in negotiations is that they originated in distinct traditions, resulting in different meanings being attached to them. This is a relevant issue that becomes obvious in the following example. In Spanish, French and German, there is no distinction between the words “play” and “game”, while in English, there are two clear distinctions. The generic term “play”, “jeu” or “Spiel” refers to an original concept in which the notions of “entertainment”, “recreational activity” or “unregulated play” are easily confused with the meaning of “game” in English qua physical or mental competition with certain rules that are followed by opposing participants. This difference in meaning is reflected in the history of development that the term has undergone in each tradition.

This semantic and methodological change took place slowly. Inspired by his trips to Paris between 1672 and 1676, Gottfried Leibniz developed an interest in games of luck that were popular in every major capital city at that time. Proof of this is a series of short publications dedicated to the games of “Quinquenove”² and “Bassette”,³ respectively. Based on this experience, Leibniz created an academy

¹ Zermelo (1913, 501–504), Borel (1924, 204–224), von Neumann (1928, 295–320), Morgenstern (1935, 337–357), von Neumann and Morgenstern (1944) (2004), Nash (1950a, 48–49), Arrow (1951).

² Quinquenove is a historic dice game of luck. A treatise on the game was published in Rémond de Montmort (1708).

³ The game of Bassette, which took so many victims in France, was invented by the Italian Bassetti and was introduced around 1674 at the French court by Justiniani, ambassador of the Republic of Venice in France.

of games and developed a mathematical theory of board games that can be found in his volume *New Essays on Human Understanding*. In this work, he examined the mathematical foundations of gambling and wrote a critical reply to John Locke's famous philosophical *Essay Concerning Human Understanding*, published in 1690.⁴ He pleaded for a new type of logic that would account for degrees of probability and recommended combining it with the analysis of games of luck. He pointed to the need for a mathematical analysis and well-reasoned book on all kinds of games. For Leibniz, the mathematical theory of games of luck is part of the argument he developed against the Lockean approach. In Book IV, Chapter XVI he deals precisely with degrees of agreement in "Des Degrés d'Assentiment" and describes his point of view in the following paragraph:

"J'ay dit plus d'une fois qu'il faudroit une *nouvelle espèce de Logique*, qui traiteroit des degrés de probabilité [...]. Il seroit bon que celui qui voudrait traiter cette matière poursuive l'examen des *jeux de hasard*; et généralement, je souhaiterais qu'un habile mathématicien voulut faire un ample ouvrage bien circonstancié et bien raisonné sur toute sorte de jeux, ce qui serait de grand usage pour perfectionner l'art d'inventer, l'esprit humain paraissant mieux dans les jeux que dans les matières les plus sérieuses."⁵

To understand what Leibniz's proposition corresponds to, it is necessary to reconstruct the reasoning that led him to formulate it. His approach was based on the question of how we can use our judgement when we have only incomplete knowledge of a situation. The approach proposed by Leibniz differs fundamentally from Locke's reasoning.⁶ While Locke considered probability as the appearance of a connection with truth, Leibniz maintained that it stands in a relation of conformity to truth. Where Locke discerned only an accumulation of past experiences practically impossible to remember, Leibniz conjectured an open system in continuous motion in which current beliefs can be revised once new elements appear. Whereas Locke concluded that, because of the difficulties he perceived, it is necessary to decide in full awareness of this uncertainty, Leibniz distinguished between the time of deliberation, in which judgement is exercised on beliefs based on probabilities, and the time of decision, which, once made, must be carried to its conclusion. Leibniz explained his position in the following quotation:

"Dans nos propres affaires, surtout dans les matières fort importantes, où il est encore permis de s'embarquer et de reculer, et où il n'est pas préjudiciable de suspendre l'exécution et d'aller bride en main, les arrêts de notre esprit, fondés sur des probabilités ne doivent jamais tellement passer *in rem judicatam*, comme les jurisconsultes l'appellent, c'est-à-dire pour établis qu'on ne soit disposé à la révision du raisonnement, lorsque de nouvelles raisons considérables se présentent à l'encontre. Mais quand il n'est plus temps de délibérer, il faut suivre le jugement qu'on a fait avec autant de fermeté que s'il était infaillible, mais non toujours avec autant de rigueur."⁷

⁴ Leibniz (1765) (1985), Vol. II. Chapitre XVI, §9, 514.

⁵ See footnote 4.

⁶ Leibniz (1765), Chapitre XVI. Locke (1690) (1975).

⁷ Leibniz (1765) (1985), Vol. II. Chapitre XVI, §3, 500.

In matters of great importance, where a position can be fixed or withdrawn, it is relevant to proceed with tense reins. Leibniz indicated that decisions based on probability should never be valid *in rem judicatam*, a phrase used by juriconsults. Therefore, we can never maintain the assertion that we are unwilling to review any consideration if significant new reasons are presented against it. Once the process of deliberation has passed, a judgement must be maintained as firmly as if it were infallible, but not always with the same rigour.

What role does the Leibnizian project of a mathematical game theory play in this context? To answer this question, we must discern two fundamental elements: on the one hand, Leibniz saw the need for a systematic treatment of knowledge regarding different degrees of probability, for which games of luck offer an ideal framework. On the other hand, the situation in which the players find themselves being forced to decide is not only representative of this uncertainty but also stimulates their capacity for invention. A theory of board games conceived in this way would therefore allow us to understand how one can make the best use of one's judgement when forced to make a decision in a situation in which one only has access to incomplete information.

Even more precise comparisons can be drawn between Leibniz's outline and the beginning of its elaboration by Borel. In Leibniz's passage in the *New Essays on Human Understanding*, we find the two pillars on which Émile Borel would—more than two centuries later—elaborate a mathematical theory of games based on the “chance and the skill of the players”.⁸ Chance requires recourse to the calculation of probabilities, while the player's skill intersects with inventiveness and manifests itself in a choice of strategy. Leibniz had argued that in a situation of uncertainty, which characterises most games, once a player has decided on a strategy, he or she must maintain it until an outcome becomes manifest. Leibniz viewed game situations as more conducive to perfecting the art of invention than to the carrying out of any other serious activity. Borel underlined that players not only have to follow the rules of ordinary logic, for instance by eliminating failed strategies but also need to take psychological factors into account. By “psychology”, he was referring to the ability to elicit an opponent's strategy and to surprise the other player by replacing the expected rules with other rules invented during the game.⁹

Borel has long been credited with being the first to introduce the concept of a mixed strategy, essential for the solution of two-player zero-sum games. Unlike the so-called pure strategy, a mixed strategy, rather than constituting a specific action, refers to the utilization of a distribution of probabilities across the set of actions available to a player. This definition is not intuitively obvious even today. However, it is by means of this mathematical “trick” that the problem posed by a game in which the players have at least partially different interests could be solved.

A strong objection came from the methodological field and required further clarification.¹⁰ In his work, Ludwig von Mises rejected the assumption that an analogy

⁸ Borel (1921, 199–203).

⁹ Borel (1921, 199–203), Borel (1924, 204–224).

¹⁰ A detailed study evaluating the use and disuse of game theory can be found in Rapaport (1962, 108–119).

can be drawn between games and business. He reduced games to mere skill and cunning and compared the players of a game to tricksters. Games are based on antagonism between two or more opponents, while businesspeople are interested in cooperation.¹¹ When he studied the behaviour of participants in duopolies and oligopolies, he recognised that negotiators become “rivals”. He described participants’ actions and reactions as comprising a mutual process of deception where the outcome depends on the opponents’ personal shrewdness.¹² He acknowledged that in oligopolies, an opponent’s actions may be inconsistent with his or her initial position. This conclusion is in line with similar conjectures made by the linguists J. F. Nash, J. P. Mayberry and M. Subik in their descriptions of duopoly,¹³ which suggested that participants’ behaviour should be examined from the point of view of game theory.

Evidently, as the scholars mentioned earlier were not familiar with the works of J. von Neumann, O. Morgenstern, John F. Nash, published in the journal *Annals of Mathematics*, they were also unaware of the type of game they were assessing in their evaluation, namely the “non-cooperative game”.¹⁴ They also denied that bargaining would be based on so-called game theory,¹⁵ which is expressed by formalised structures in mathematical terms. Without being aware of it, they were applying the so-called zero-sum game,¹⁶ which involves two sides and in which the result is an advantage for one side and an equivalent loss for the other. In other words, the gain of one player is equivalent to the loss of the other, so the net benefit of the game equals zero. This behaviour is based on an antagonistic view of social relations, in which individuals compete for a finite amount of goods in the world, where a person’s gain produces a loss for the other person. This primacy of individual interests promotes zero-sum fallacies and generates decisions against the general interest. Consequently, any society that acts in antagonistic games is moving towards disintegration.¹⁷ The present volume aims to explain the dynamics of games, to shed light on unanswered questions and to explain the problems involved.

To date, negotiation proposals have been based on a reductionist-mechanistic model according to which negotiators are viewed as poker players or military strategists with certain psychological characteristics. In this artificial “world”, the culture they belong to, the language they speak, the traditions to which they are linked, the ways they behave, etc. seem to play a secondary role when it comes to doing business or interacting with each other. Negotiation is roughly understood as the procedure of generating profits and obtaining maximum benefit. These realities are often ignored, despite the fact that they tend to be a source of misunderstandings that lead to failed

¹¹ Von Mises (2011, 140).

¹² Von Mises (2011, 437ss).

¹³ Nash (1996, 47–60).

¹⁴ Von Neumann and Morgenstern (1944) (2004, xii–xiii). Nash (1950a, b, 157–158). Nash (1996, 3–4).

¹⁵ The compound “game theory” was coined by von Neumann and Morgenstern (1944) (2004) and Nash (1996).

¹⁶ Neumann and Morgenstern (1944) (2004, 220ss).

¹⁷ Von Mises (2011, 141).

negotiations. In fact, there is a significant number of problems addressed in the framework of the so-called Nash equilibrium that do not receive appropriate attention. The authors of the present volume focus on negotiators' behaviours, the language games used by negotiators and the forms of life to which they are linked as well as the background and training that influence negotiations.

All the elements mentioned above are relevant for decision-making. If we consider negotiation as a general system of actions, we observe certain recurring patterns of behaviour that can be systematised within game theory. Additionally, we must also consider the domain of language games and the forms of life within which the players operate.¹⁸ It seems that the social system has been left unthematized in game theory; therefore we think that it should be extended by taking these elements into account.¹⁹ We want to explain why relating game theory to language games and forms of life is important for the analysis of real-world negotiations. It may seem somewhat puzzling to read that game theory, which has been extensively and robustly studied, would need to be restructured when attempting to use its results in the analysis of negotiation. However, it turns out that game theory, in the form in which it currently exists, leaves several problems unanswered. In fact, the problem of bargaining as it is addressed in these pages, i.e., the problems that arise, have hardly been studied in their own right and their social, economic, political and even human significance. And, as we shall see, models of cooperative or non-cooperative games offer no explanation as to why certain negotiators choose one game or the other. Nor has due attention been paid to why psychosocial factors influence this decision. Moreover, we do not know, if bargaining is studied from a purely formal point of view and what kind of language games are applied to successfully obtain a profit.

In short, game theory leaves the question unanswered as to why a negotiator tends to choose one strategy and not another. Nor does it provide any insight into the framework in which bargaining takes place and how participants' forms of life affect bargaining itself. In this volume, we focus on expanding this field of issues, which has been left unsketched in classical game theories and therefore remains unresolved in the interaction between negotiators. All these issues, we believe, have an impact on negotiation and its ends and are an important source to be considered when assessing the results of negotiations. Game theorists have focused on the analysis of formal structures, completely neglecting other elements that have generated failures in their proposals. For instance, in the work of John von Neumann and Oskar Morgenstern, the problem of "bluffing"²⁰ is addressed as an obstructionist phenomenon that impedes negotiation. In his article entitled "The Bargaining Problem",²¹ J. Nash also faces a major problem in solving this type of bargaining, since psychological elements come into play, but also a lack of "background" knowledge, which creates

¹⁸ Gaffal (2022a, 101–110).

¹⁹ We disagree with A. Rapaport's view of game theory as a "science of conflict" as outlined in Rapaport, 1962, 108. The reason is that according to this view, game theory would inevitably lead to a dilemma and create a "tit for tat" relationship among individuals. Milinski (1987, 433–435).

²⁰ Neumann and Morgenstern (1944) (2004, 186ss).

²¹ Nash (1950a, b, 155–162), Nash (1996, 1–8).

certain disadvantages when it comes to formalising bargaining in negotiations. The intentional overlooking of elementary factors has had some unfortunate effects on the development of bargaining theory: first, game theory has been influenced by the parameters of “win” and “lose” so that formally developed models have been based on simple paradigms—mainly involving games of luck—that do not provide an adequate explanation of the interrelationship between negotiators under more complex conditions. Second, negotiations are viewed as simplified games, drawn via an analogy to gambling relationships in which “game” is considered a formal procedure governed by exact rules that can be described by an axiomatic system. In doing so, the term “gambling” has been homogenised. In these circumstances we need to examine games from a pragmatic perspective²² and introduce language games so as to extend their content.²³

As we will see below, the attempts made by J. von Neumann, O. Morgenstern, John F. Nash and other researchers partially fail because the study of bargaining from an exclusively formal point of view does not elucidate many of the processes underlying bargaining. This is because the concept of “game” is extrapolated to the bargaining problem, with the consequence that the procedural aspect is less visible. Therefore, our research sets out to describe the whole process of negotiation. It should be borne in mind that many negotiations are aimed at creating a negotiation framework and that their end is to make contact, to generate an agenda or to find common interests so that negotiations can be conducted in future. In most cases, such preliminary negotiations in which the parties’ intentions are to be determined remain unaddressed in game theory because most of the proposed models ignore the assumptions presented in the prenegotiations prior to the game itself.

Since this is an important aspect of negotiation, what must be considered from the outset is that mere participation in negotiations does not give rise to a binding obligation, as in the case of games. For instance, a letter of intent in which an agreement is outlined between two or more parties before an agreement is formalised plays an important role in preliminary negotiations. An invitation to negotiate is nothing more than an expression of a party’s willingness to exchange interests. Yet these preliminary processes are not fully represented in mathematical models, as researchers are mainly habituated to approaching the study from a purely formal point of view. In fact, greater importance has been given to two relevant factors to be considered when studying the dynamics of games: the objective of the negotiation and who makes the decisions in the negotiation. In both cases, a distinction has been made as to whether the subject is exclusively one or whether participants are involved. One-person decisions follow very different strategies compared to team decisions, in which multiple objectives play a role. The study of objectives and negotiators’

²² Levinson had developed a special interest in “Pragmatics” taking up the project designed by Wittgenstein when he applied the principle of “meaning is use” (Wittgenstein 2021, §43) to his investigations. He put it like this: “...the well-known slogan “meaning is use” and the insistence that utterances are explicable only in relation to the activities, or language games, in which they play a role”. Levinson (1997, 227).

²³ Padilla Gálvez and Gaffal (2013a, 2013b).