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Henner Gimpel

Preferences in Negotiations

The Attachment Effect

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Preferences in Negotiations

The Attachment Effect

With 33 Figures and 21 Tables

Springer

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Karlsruhe, Mai 2007 *Henner Gimpel*

Contents

List of Figures XII

List of Tables XIV

1 Introduction 1
- 1.1 Related Work and Fields of Research 5
- 1.2 General Background 10
- 1.3 Overview and Structure 12

2 Theories on Preferences 15
- 2.1 Microeconomic Modeling of Preferences 21
  - 2.1.1 Rational Choice Theory 21
  - 2.1.2 Limited Descriptive Validity of Rational Choice 28
- 2.2 Prospect Theory 33
  - 2.2.1 Decision Under Risk 33
  - 2.2.2 Riskless Multi-Issue Choice 39
  - 2.2.3 Alternative Non-Neoclassical Utility Theories 46
- 2.3 Preference Construction and Stabilization 48
  - 2.3.1 Adaptive Decision Making Processes 49
  - 2.3.2 Empirical Evidence 58
- 2.4 Neural Basis of Preferences 62
- 2.5 De Gustibus non est Disputandum 66
  - 2.5.1 Stability of Preferences 66
  - 2.5.2 Summary 71

3 Preferences in Negotiations 73
3.1 Negotiations 74
3.1.1 Interdisciplinary Research 74
3.1.2 Negotiation Process Model 82
3.1.3 Biases in Negotiations 87
3.2 Origin of Reference Points 92
3.2.1 Property Rights 92
3.2.2 Expectations 96
3.3 The Attachment Effect in Negotiations 98
3.3.1 Graphical Example 99
3.3.2 Formalization 101
3.3.3 Simplifications of the Model 105
3.3.4 Implications for Negotiations 107
3.3.5 Summary 110

4 Internet Experiment 111
4.1 Experimental Design 112
4.1.1 Procedure 113
4.1.2 Course of a Session 115
4.1.3 Treatments and Agent Strategies 120
4.1.4 Discussion of Design Features 121
4.1.5 Hypothesis on Treatment Effects 127
4.1.6 Foundations of the Analysis 131
4.2 Experimental Results 132
4.3 Modifications of the Experiment Design 136

5 Laboratory Experiment 141
5.1 Experimental Design 142
5.1.1 Procedure 143
5.1.2 Course of a Session 145
5.1.3 Treatments and Agent Strategies 152
5.1.4 Discussion of Design Features 156
5.1.5 Hypotheses on Treatment Effects 160
5.2 Foundations of the Analysis 170
5.2.1 Statistics to be Used 170
5.2.2 Distances in the Agreement Space 176
5.2.3 Overview of the Analysis 178
5.3 Non-Parametric Analysis 179
5.3.1 Overview of the Data 179
5.3.2 Binary Choice 190
5.3.3 Sources of Utility 195
5.3.4 Preference Uncertainty 200

5.3.5 Summary of Non-Parametric Results 204
5.4 Parametric Analysis 206
5.4.1 Foundations of the Estimation 207
5.4.2 Maximum Likelihood Estimation 211
5.4.3 Reliability of the Estimation 215
5.5 Summary of Results 222

6 Conclusions and Future Work 225
6.1 Summary of Contribution and Review of Work 226
6.1.1 Contribution 226
6.1.2 Implications 233
6.2 Limitations of the Present Work 236
6.3 Future Work 241

References 245

List of Abbreviations and Symbols 267

List of Figures

1.1 Structural overview 13

2.1 Approaches to human decision-making 19
2.2 Example for alternatives in a two-issue choice situation . . 23
2.3 Stylized value function in prospect theory 35
2.4 Adaptation of reference points and loss aversion 36
2.5 Stylized probability weighting function in prospect theory 37
2.6 Estimated probability weighting functions in prospect theory 40
2.7 Reference dependence in multi-issue choice 42

3.1 Negotiations in the Montreal Taxonomy 83
3.2 Detailed process perspective on bilateral negotiations . . . 85
3.3 Agent decision-making model in a negotiation 86
3.4 Example of the attachment effect in a negotiation 100
3.5 Example of gains from trade being destroyed by the attachment effect 108
3.6 Example of gains from trade being created by the attachment effect 109

4.1 Alternating offer negotiation (screen shot) 117
4.2 Offer by the second landlord (screen shot) 118
4.3 Preference elicitation (screen shot) 119
4.4 Hypothesized reference points for different subjects given the offer sequences 129

5.1 Product selection (screen shot) 147
5.2 Alternating offer negotiation (screen shot) 148
5.3 Satisfaction rating (screen shot) 149

5.4 Offer by agent B (screen shot) 150
5.5 Offers by agent C (screen shot) 151
5.6 Examples for offers by the software agents 154
5.7 Subjects' courses of studies 180
5.8 Number of offers in negotiations with agent A 183
5.9 Euclidean distance of offers to the counterparty's ideal outcome. 188
5.10 Interrelation of the number of offers with agent A and the choice of the reference product 192
5.11 Response times for the choice of an offer by agent C 203
5.12 Reference points given the maximum likelihood estimates 214
5.13 Conditional likelihood functions for single parameters . . . 217
5.14 Conditional likelihood functions for pairs of parameters . 218
5.15 Distributions of estimated probabilities of choosing product 1 given the reference points 220
5.16 Expected reference points in the internet experiment given the maximum likelihood estimates from the lab experiment 221

List of Tables

2.1 Alternative choices in a response mode experiment 31
2.2 Alternative choices in an improvements versus trade-offs experiment 45

4.1 Offer sequences used by the software agent 121
4.2 *WTA* values elicited in the experiment 133

5.1 Inferential statistics used in the data analysis 178
5.2 Subjects' age in years 179
5.3 Subjects' experience with experiments in general and with negotiation experiments 180
5.4 Results of product selection 181
5.5 Usage of negotiation tactics 185
5.6 Frequency of successions of negotiation tactics 186
5.7 Results of tests for correlation between distances of offers and offer numbers 189
5.8 Contingency table on the effect of treatments on product choice 191
5.9 Contingency table on the effect of the arbitrator on product choice 193
5.10 Contingency table on the effect of gender on product choice 194
5.11 Contingency table on consumption utility for issue 1 197
5.12 Contingency table on consumption utility for issue 2 197
5.13 Contingency table on gain/loss utility given an outcome of one unit on issue 1 198
5.14 Contingency table on gain/loss utility given an outcome of one unit on issue 2 199

5.15 Contingency table on gain/loss utility given an outcome of zero units on issue 1 200
5.16 Contingency table on the reported complexity of choice among offers by agent C 204
5.17 Maximum likelihood estimate of parameters in the linear attachment effect model 211

1

Introduction

> *People make mistakes. More interestingly, people make a variety of systematic and predictable mistakes. The predictability of these mistakes means that once we identify them, we can learn to avoid them.*
>
> (Bazerman, 2006, p. 13)

Negotiations are complex, ill-structured, and uncertainty-prone processes subject to half-truths, tricks, and other means of psychological warfare (Ströbel, 2003, Ch. 2). In other words, negotiating is a demanding task with plenty of potential for making mistakes. As Bazerman (2006) points out, identifying and understanding systematic mistakes may lead to improved negotiation processes as well as facilitate the engineering of negotiation support systems. One possible systematic bias in negotiations regards attachment and the endogeneity of reference points and preferences. The following historical example illustrates the importance of endogenous reference points in negotiations, i.e. reference points that emerge in a negotiation as a results of the negotiation itself.

On September 17, 1978, Egyptian President Anwar Sadat and Israeli Prime Minister Menachem Begin signed the Camp David Accords. Prior to this agreement, Egypt and Israel had been enemies for three decades and had fought four wars. The Camp David Accords established a framework for the Egyptian-Israeli relations and led to a later peace treaty. The tense Camp David negotiations, during which US President Jimmy Carter mediated between Sadat and Begin, took thirteen days. Both parties refused to negotiate directly. On day eleven, Sadat declared he would unilaterally terminate the negotiation proceedings and leave Camp David without signing any agreement. The reason was, as reported by Carter (1982, pp. 392–393), that

> ‘His own [Sadat’s] advisers had pointed out the danger in his signing an agreement with the United States alone. Later, if direct discussions were ever resumed with the Israelis, they could say, “The Egyptians have already agreed to all these points. Now we will use what they have signed as the original basis for all future negotiation.” It was a telling argument.’

The fear was that an intermediate step endogenously determined during the year-long negotiation process could serve as reference point for the evaluation of subsequent offers and agreements. Finally, the negotiators reached an agreement, signed the Camp David Accords and, in March 1979, a peace treaty, which was a major step in the Middle East peace process.

Carter’s report explicitly illustrates the importance of reference points and their possible endogeneity to a negotiation process. Furthermore, the Camp David negotiations in particular concerned multiple issues (withdrawal from the Sinai, status of the West Bank, etc.). These two aspects—endogenous reference points and multi-issue negotiations—fall within the scope of the present work. While Sadat’s advisers were aware that offers and intermediate outcomes can serve as explicit reference points, the study at hand is concerned with unconscious, systematic mistakes and biases to which a negotiator might be prone and can learn to avoid.

Besides introducing multi-issue reference points, the historical example serves to illustrate three concepts in negotiations addressed in the present work, with the following differences: Firstly, the negotiation between Israel and Egypt was a matter of international politics whereas the study at hand is concerned with commercial negotiations on the exchange of goods and services among economic entities. Secondly, the negotiation was mediated by a third party (Carter); the present work deals with negotiations in which the parties directly exchange offers. Thirdly, Sadat and Begin represented countries with diverse populations; the study at hand, however, is concerned with monolithic parties. Whether or not the results obtained in this study transfer to mediated political negotiations among non-monolithic parties, however, is beyond the scope of the present work.

In a negotiation, parties exchange offers. If these offers are mutually agreeable, an agreement may be reached. Consequently, the specific offers exchanged in a bilateral multi-issue negotiation likely influence the parties' expectations in the outcome of the negotiation.[1] Expectations in turn (unconsciously) influence the parties' reference points and whether offers and agreements are evaluated as gain or loss relative to the respective reference point. As suggested by prospect theory, gains and losses are evaluated differently, and hence, the location of a party's reference point influences her[2] preferences and trade-offs between issues. The systematic effect offers have on preferences via expectations and reference points is termed *attachment effect* in the following. The attachment effect models that a negotiator's expectation of future possession affects her attachment and obsession with possible agreements and, consequently, her concessions during a negotiation. Studying this systematic bias affecting negotiators is intended to facilitate rational negotiating and the engineering of negotiation support systems.

The attachment effect in negotiations is assessed both theoretically and experimentally in the present work. Two empirical phenomena suggest its existence and that its study may well be worthwhile: Firstly, auction fever is related to endogenous preferences in a market mechanism other than negotiations, and secondly, the rejection of Pareto improvements, i.e. changes which make one party better off after a negotiation without harming the other party, might be due to the endogeneity of preferences in negotiations.

Auction Fever

Auction fever or *bidding fever* describes the phenomenon of bidders becoming caught up in the dynamics of an auction and outbidding their initial upper limit price (e.g. Heyman, Orhun, and Ariely, 2004; Ku, Malhotra, and Murnighan, 2005). One of the possible explanations put forward for auction fever is the attachment effect: If a bidder in an auction has the highest bid for a long time, for example, she might expect to win the auction, feel that the good being auctioned 'almost certainly belongs to her possession,' and become attached to the good. If so, she perceives a loss when someone else 'takes away her good' by submitting a higher bid to the auction. As many people are loss-averse (Kahneman and Tversky, 1979), the bidder might try to regain the good by submitting higher and higher bids, thereby becoming caught up in the dynamics of the auction. Analogously, in negotiations, the attachment effect might result in a kind of *negotiation fever*: During the negotiation process, parties could become attached to a certain element of the object of negotiation and therefore possibly perceive a loss when the counterparty proposes a trade-off which would result in the sacrifice of this element.

---

[1] The term expectation is used to denote anticipation throughout the study rather than the statistical meaning.

[2] Female pronouns will usually be used for referring to single negotiators throughout the study. In some cases, male pronouns help in differentiating two negotiators.

Rejection of Pareto Improvements

Block et al. (2006), among others, analyze data gathered with the Inspire negotiation support system. First, preferences are elicited in a pre-negotiation phase. Then the negotiation is conducted. In the event that an inefficient agreement is reached, Pareto improvements are generated by the Inspire system and presented to the negotiators. 58% of the agreements in their data set turned out to be inefficient with respect to the preferences elicited in the first phase. However, only 23% of negotiators reaching such an inefficient agreement were willing to accept the proposed Pareto improvements. At first sight, this seems puzzling and irrational, but if preferences are endogenous and change during the negotiation, the system's proposal in the post-negotiation phase may be unacceptable with respect to the ex-post preferences. This might explain the low acceptance rate. Other explanations are outlined and tested empirically by Block et al.

Vetschera (2004b) analyzes utility functions, offers made, and final agreements in a related set of Inspire negotiations. He reports that in about 25% of the cases, negotiators violated consistency in the sense that their observed behavior did not fit the ex-ante elicited utility functions. A change in preference structure predating the seemingly inconsistent behavior is one of several possible explanations. Meanwhile, nuisance in the specific utility elicitation technique employed in the first phase of negotiation support might serve to explain the observed inconsistencies as well; Vetschera presents a number of other possibilities.

Research Questions

At this juncture, several important concepts have been introduced and the focus of the study has been defined: bilateral commercial multi-issue negotiations and changes in the negotiators' preferences that may be triggered by attachment and reference points. More precisely, the following four questions guide the subsequent analysis:

1. Are preferences endogenous to negotiations, i.e. are they influenced by the specific course of a negotiation?
2. Can models that allow for endogeneity of preferences predict behavior significantly better than models relying on exogenous preferences?

3. Is there a systematic bias of preferences depending on the offers exchanged in a negotiation?
4. If it is the case that preferences are reference-dependent, how is the reference point determined?

Delving into these questions is worthwhile because the answers have implications for preparing and conducting negotiations as well as for the engineering of negotiation support systems. The first question implicitly challenges the applicability of traditional economic rational choice models for understanding and conducting negotiations. If it can be answered affirmatively, the next step is to compare the models listed in the second question vis-a-vis their ability to predict negotiator preferences. The third question builds upon the first by raising the possibility that the offers exchanged in a negotiation might play a pivotal role; it also provides the implicit foundation for building the model called for in the second question. Finally, the fourth question adds another hypothesis as to how offers might influence preferences, namely via reference points. Answers to the four questions will be presented in the concluding Chapter 6 based on a theoretical and experimental analysis.

1.1 Related Work and Fields of Research

Work related to the study of preferences in negotiations comes from various fields, most prominently from negotiation analysis and behavioral decision research, prospect theory, game theory, cognitive psychology, and information systems research. The purpose of this section is twofold: Firstly, it relates the present work to previous literature and indicates how the different aforementioned fields influence the following study. (At this point, numerous references will be cited without going into detail; a more in-depth discussion will follow in the next chapters.) Secondly, the section presents a detailed discussion of the two most closely related studies: experiments by Kristensen and Gärling (1997a) and Curhan, Neale, and Ross (2004).

Negotiation Analysis

Negotiation analysis integrates (behavioral) decision sciences and game theory to bridge the discrepancy between descriptive and prescriptive approaches to negotiations. This field of research was initiated by Raiffa (1982) who proposed an *asymmetric prescriptive/descriptive approach* in his seminal book on the art and science of negotiation. Descriptions of behavior in negotiations compiled largely from research in psychology, behavioral economics, and experimental economics form the basis for advising negotiators on how to negotiate rationally.

A core element of the descriptive basis of negotiation analysis is a set of common biases in negotiations. These biases predict how decision-makers' cognition and behavior systematically deviates from prescriptive models. One example is the famous *fixed pie illusion*: It was found that negotiators often disregard the integrative potential of multi-issue negotiations and assume that their preferences strictly oppose their counterparty's preferences. Thus, they focus on competitive issues, and as a result, agreements are frequently either inefficient or unable to be reached at all (Bazerman, Magliozzi, and Neale, 1985; Thompson and Hastie, 1990; Thompson and DeHarpport, 1994; Fukuno and Ohbuchi, 1997). Other common biases in negotiations are anchoring and adjustment (e.g. Northcraft and Neale, 1987), framing (e.g. Bazerman, Magliozzi, and Neale, 1985), the availability bias (e.g. Pinkley, Griffith, and Northcraft, 1995), overconfidence (e.g. Kramer, Newton, and Pommerenke, 1993), the illusion of conflict (e.g. Thompson, 1990), reactive devaluations (e.g. Ross and Stillinger, 1991), escalation of conflict (e.g. Bazerman and Neale, 1983), ignorance of the other's behavior (e.g. Bazerman and Carroll, 1987), and egocentrism (e.g. Camerer and Loewenstein, 1993); see Section 3.1.3 for a review of these biases in negotiations as well as a more extensive bibliography. Further collections of common biases used in negotiation analysis are provided by Neale and Bazerman (1991, Ch. 3 & 4), Bazerman and Neale (1992, Part I), Bazerman et al. (2000), and Bazerman (2006, Ch. 10).

The present work identifies the attachment effect as an additional, novel bias in negotiations. The different biases and studies do not contradict each other, but together constitute a large part of the descriptive basis on which negotiation analysis builds.

So far, the references to common biases have served to position the present work in the context of negotiation analysis; they will be discussed in greater depth in Chapter 3. In the following paragraphs, the two studies most closely related to the attachment effect are examined in more detail.

Endogenous Preferences in Negotiations

In terms of research on negotiations, reference-dependent evaluation of offers is not new. Most studies do, however, assess static exogenous reference points like market prices or reservation prices (Kahneman, 1992; White et al., 1994). A reservation price is the price beyond which a negotiator would prefer not reaching an agreement at all (Raiffa, 1982, Ch. 4). The present work analyzes how reference points are endogenously determined in the process of negotiating; in this regard, it is most closely related to the work by Kristensen and Gärling (1997a) and Curhan, Neale, and Ross (2004).

Kristensen and Gärling (1997a) study the selection process of one of several possible reference points in single-issue negotiations on the price of condominiums that subjects hypothetically consider for purchase. As part of their experiment, they induce a reservation price and assume that it might function as an exogenous reference point. Hence, prices might be evaluated as gains or losses from this reference price. Meanwhile, they regard the seller's initial offer as a second possible reference point. This second reference is endogenous to the negotiation process. In a series of experiments, Kristensen and Gärling vary the values and relative location of these two possible reference points and analyze which of the two affects offers by having their subjects play the role of buyers. They find that most commonly, the sellers' initial offers are adopted as reference points by buyers. In some settings, however, the exogenous market price is influential as well. The authors conclude that although negotiators take various pieces of information into account, there is no single dominant reference point (as e.g. suggested by White et al., 1994).

Two aspects about the work by Kristensen and Gärling are especially noteworthy here: Firstly, the authors provide evidence that offers might be adopted as reference points. In this respect, their results are in congruence with the present work. In fact, their findings can be explained by the attachment effect model, which will be discussed in Section 3.3. Secondly, the authors assume that the adoption of a reference point is all-or-none (e.g. Kahneman, 1992). Under this premise, Kristensen and Gärling describe difficulties in explaining why different pieces of information affect reference points. They speculate that either subjects switch from one reference point (e.g. the reservation price) to another (e.g. the initial offer) over time, or that the measured effect reflects an 'average' of the subjects' various reference point. This problem can be alleviated by explaining their results with the attachment effect. The adoption of reference points is not in fact all-or-none (Strahilevitz and Loewenstein, 1998). The attachment effect allows that different pieces of information enter into a negotiator's expectations with respect to the outcome of the negotiation and thus influence reference points. How strongly information affects reference points depends on the reliability of the information and the negotiator's subjective judgment on how relevant it is for the final agreement.

In contrast to the work by Kristensen and Gärling (1997a) described above, the present study will concern multiple issues, involve an alternating offer exchange rather than just a single offer, will not be solely hypothetical, and will not assume that the adoption of a reference point is all-or-none.

Curhan, Neale, and Ross (2004) experimentally study changes in negotiators' preferences during a multi-issue negotiation with a focus on dissonance and reaction theory. The two main hypotheses are as follows: Firstly, cognitive dissonance theory (Festinger, 1957; Festinger and Aronsons, 1960) suggests that decision-makers tend to reduce discrepancies that might exist between different cognitive patterns. In the context of multi-issue negotiations, this means that a negotiator might feel more positively about an offer once she proposed it to her counterparty as potential agreement. Secondly, reaction theory (Brehm, 1966) suggests a reactive devaluation of any offers received from the counterparty. In the experiment by Curhan et al., subjects bilaterally negotiated on three issues of a student loan contract; in each round, both negotiators simultaneously write down offers, then rate each potential agreement with respect to its desirability, and finally have two and a half minutes to argue, explain, etc. Agreement is reached when both parties write down the same offer in any given round.

Curhan et al. indeed find evidence that their subjects' preferences were influenced by the offers exchanged. As dissonance theory suggests, subjects tended to express higher preference for contracts they themselves had offered. This tendency was even stronger when a contract became the final agreement. The evidence for reactive devaluation is inconclusive.

In the present context, two aspects of the study by Curhan et al. are worthy of mention: Firstly, the experiment suggests—as does the present study—that preferences might change endogenously over the course of a multi-issue negotiation dependent on the offers exchanged. Secondly, Curhan et al. attribute the increased preference for offers a negotiator has proposed herself and for agreements to dissonance; it can, however, also be explained by the attachment effect. This will be discussed in Section 3.3 after the attachment effect is described in more detail.

Prospect Theory

A core element of the attachment effect is the dependence of preferences on reference points. With respect to the implications of reference points, the present work is most closely related to a study by Tversky and Kahneman (1991), who extend the concepts *reference dependence* and *loss aversion* from risky choices (Kahneman and Tversky, 1979) to riskless multi-issue choices. The field study by Hardie, Johnson, and Fader (1993) is one of the few works to empirically test the existence of issue-wise reference points and their implications on trade-offs between issues. The significance of (exogenously given) reference points for negotiations is discussed by Kahneman (1992).

With respect to the origin of reference points, the present work draws on the traditional view that the status quo of property rights determines the reference point as well as on the alternative interpretation that expectations are essential in determining the location of a reference point. To this end, the attachment effect is related to the endowment effect (e.g. Knetsch, 1989; Kahneman, Knetsch, and Thaler, 1990; Camerer, 2001), the history of ownership effect (Strahilevitz and Loewenstein, 1998) and the role of expectations (Köszegi and Rabin, 2006). Furthermore, the attachment effect in negotiations is comparable to the explanation of auction fever via attachment or quasi-endowment (e.g. Heyman, Orhun, and Ariely, 2004; Ku, Malhotra, and Murnighan, 2005; Abele, Ehrhart, and Ott, 2006).

Game Theory

The present work neither introduces nor uses a game theoretic equilibrium model. While game theoretic modeling would generally be a conventional methodology for assessing the strategic interaction of negotiators, it is not pursued in the present study as there are infinitely many Nash equilibria in alternating offer multi-issue negotiations under incomplete information, and (to date) no meaningful refinement of this equilibrium concept exists capable of singling out a small set of equilibria or a set of reasonably homogenous equilibria (cf. Sec. 3.1.1).[3]

Nevertheless, the present work is related to game theoretic studies of bilateral single-issue bargaining, most closely to the models by Shalev (2002), Li (2004), Hyndman (2005), and Compte and Jehiel (2006). All these authors incorporate reference-dependent preferences into more or less standard models of bargaining, assume that the reference point is endogenously determined in a negotiation, and identify equilibrium strategies and characteristics of equilibria. The formalization of the attachment effect that will be presented in Chapter 3 was inspired by (an earlier version of) the model by Compte and Jehiel (2006). See Section 3.3.3 for a more detailed discussion of these single-issue equilibrium models and how they relate to the attachment effect.

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[3] Note that a negotiation analytic approach would be appropriate even if a unanimous equilibrium could be derived in theory. Game theory builds on the rationality of all players whereas negotiation analysis aims at more pragmatic advice on how to negotiate in the absence of 'hyper-rational' agents.

Information Systems

Electronic communication media in negotiations, negotiation support systems, and automated negotiations are studied in computer science and information systems research. Research in this field includes process models for negotiations that relate to the present study. Most notably, these are the media reference model by Schmid (1999) and Lechner and Schmid (1999), parts of the Montreal Taxonomy by Ströbel and Weinhardt (2003), and a distinction in private and shared information in negotiations proposed by Jertila and Schoop (2005). These process perspectives are employed to identify sub-processes in negotiations and correlate them to mental processes in which negotiators might be prone to biases (cf. Sec. 3.1). Furthermore, there is a correlation between the information systems research literature (especially on negotiation and market engineering) and the study of negotiator perception and behavior (e.g. Köszegi, Vetschera, and Kersten, 2004, and Lai et al., 2006).

Related Publications

Design and results of the internet experiment (cf. Ch. 4) have been accepted for publication by the *Group Decision and Negotiation* journal (Gimpel, 2007). The results described there are integrated into the present work to give a comprehensive account of the attachment effect and the experimental evidence. Furthermore, drafts of and ideas from the present work have been presented at various conferences: Dagstuhl Seminar 'Computing and Markets' 2005, Schloss Dagstuhl, Germany (Gimpel, 2005); Annual Meeting of the Gesellschaft für Experimentelle Wirtschaftsforschung 2005 (GEW 2005), Cologne, Germany; Annual Meeting of the Economic Science Association 2005 (ESA 2005), Montreal, Canada; Group Decision and Negotiation 2005 (GDN 2005), Vienna, Austria; Dagstuhl Seminar 'Negotiation and Market Engineering' 2006, Schloss Dagstuhl, Germany (Gimpel, 2006).

1.2 General Background

The general background of the present work is twofold: On the one hand, it is situated in research on *negotiation analysis*; on the other hand, it belongs to the field of *negotiation and market engineering.*

Negotiation analysis, with its asymmetric prescriptive/descriptive approach to analyzing negotiations and advising parties how to negotiate rationally, was already introduced as related work in the previous section. The focus of negotiation analysis is on the individual parties in a negotiation (individual decision-makers, non-monolithic parties, mediators, arbitrators, etc.) and their behavior. On the contrary, the focus of *negotiation and market engineering* is on the design of institutions and systems that structure the interaction of individuals and organizations.

In recent years, economics has exhibited a tendency to partially evolve from a positive science to an applied engineering discipline. In positive economics, researchers develop and verify (abstract) theories that explain and predict human and organizational behavior. In contrast, economic engineering is often called a design science, the art of economics, or applied policy analysis. Economic engineers correlate insights from positive economics to real world problems and situations. They create new and innovative artifacts to extend the limits of human and organizational capabilities (Colander, 1994; Hevner et al., 2004; Gimpel and Mäkiö, 2006).

The engineering of the FCC spectrum auctions in the US (e.g. McAfee and McMillan, 1996), the job market for graduates in medicine (Roth and Pearson, 1999), and the electric power market in California (Wilson, 2002) all teach an important lesson: It is difficult to comprehend an economic or social system unless one can intervene and experiment with it. It is even more difficult to predict a system's future behavior, unless it has been shaped and engineered so as to work 'appropriately' (Guala, 2005, Ch. 8). Another area of recent development that clearly underscores the necessity of engineering markets and negotiations is the increasing presence and relevance of electronic markets. While in traditional physical markets the rules might evolve over time, electronic markets make the conscious and structured design of the rules of interaction indispensable, as they have to be implemented in computer systems and do not allow spontaneous changes. Smith (2003) points out the necessity of a structured approach to engineering markets in his Nobel Prize lecture by stating that 'all worthwhile social institutions were and should be created by conscious deductive processes of human reason' (pp. 504–505). A predominant domain where economic engineering has been applied in the last decade is market design (Roth, 2002; Varian, 2002); Weinhardt, Holtmann, and Neumann (2003) coined the term *market engineering* to denote the conscious, structured, systematic, and theoretically founded procedure of analyzing, designing and introducing electronic market institutions. See also

Neumann (2004) and Weinhardt and Gimpel (2006) for a more extensive discussion.

The argument for the conscious design of market institutions such as financial exchanges, spectrum auctions, and electricity markets likewise applies to engineering (electronic) negotiations. Negotiations are ubiquitous; electronically supported negotiations have become essential for business life over the past few decades. Recent years have witnessed significant changes in electronic markets and trading organizations enabled by new technologies. These new technologies have created substantial opportunities for negotiation support and automated trading. The design of systems that are easy to use and can satisfy negotiators' requirements reflects the *negotiation engineering* approach (Kersten, 2003; Ströbel, 2003). This engineering approach utilizes results from positive economics and other disciplines to find solutions to practical problems.

The major challenge in negotiation and market engineering is to assess the behavior of the participating agents: How will they respond to a given economic institution (an auction mechanism, negotiation protocol, etc.), IT infrastructure, or market operator business structure? How will their behavior be affected by the socio-economic and legal environment in which these entities are embedded? Different tools from various disciplines are used to assess agent behavior (Weinhardt, Holtmann, and Neumann, 2003; Kersten, 2003; Ströbel, 2003; Weinhardt and Gimpel, 2006); among these are (game) theoretic modeling, computer simulations, field studies, and experiments. The present work is situated in this research on negotiation and market engineering: It studies the preferences and behavior of negotiators, thus contributing to the positive basis upon which negotiation engineers can devise protocols and systems to assist negotiators; these can then be deployed to engineer other market institutions.

1.3 Overview and Structure

The structure of the work at hand is schematized in Figure 1.1. After the present introduction to the context of this work, Chapter 2 presents and compares several theories on preferences as a first approach to a theoretical understanding of the cognition and behavior of negotiators. This comprises traditional microeconomic theory, behavioral economics, cognitive psychology, and the neuro-sciences.These approaches to human decision-making differ with respect to internal coherence, congruence with reality, abstraction, and predominant research methodologies. There is no overall best theory on preferences for studying multi-issue negotiations. Behavioral economics and reference-dependent preferences are, however, most important for the subsequent chapters.

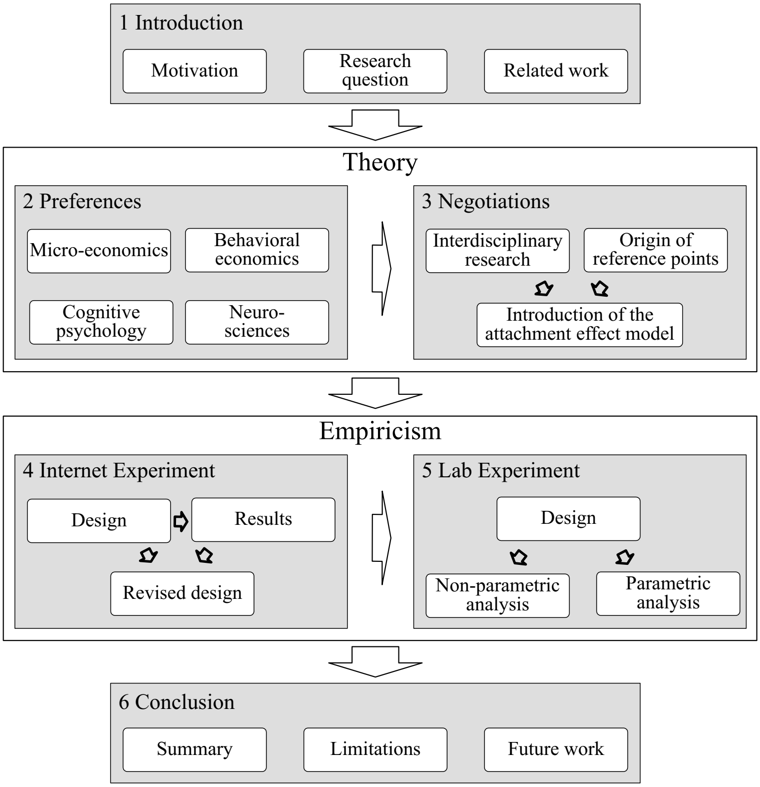
1 Introduction
Motivation
Research question
Related work
Theory
2 Preferences
Micro-economics
Behavioral economics
Cognitive psychology
Neuro-sciences
3 Negotiations
Interdisciplinary research
Origin of reference points
Introduction of the attachment effect model
Empiricism
4 Internet Experiment
Design
Results
Revised design
5 Lab Experiment
Design
Non-parametric analysis
Parametric analysis
6 Conclusion
Summary
Limitations
Future work

Fig. 1.1. Structural overview

Chapter 3 then investigates the specifics of negotiations and decision-making in negotiations. It starts by sketching the interdisciplinarity of research on negotiations. The focus of the presentation centers on game theoretic models that correspond to the microeconomic theory on preferences presented in Chapter 2 and on negotiation analysis related to the behavioral perspective on preferences. Based on the general assumption that preferences are defined relative to reference points, the origin of such reference points is discussed. The traditional supposition is that the status quo serves as a reference point, whereas more recently, the role of expectations has gained prominence. Based on expectations, the attachment effect in negotiations is exemplified, modeled, and discussed in Section 3.3.

Chapter 4 empirically tests for the existence of the attachment effect that was introduced theoretically in the previous chapters. The design and the results of an internet experiment on multi-issue negotiations between human subjects and a software agent is reported. In the experiment, negotiators exchange offers on the terms of a (hypothetical) tenancy contract and are subsequently asked to judge the importance of single issues in the contract. The data suggests that negotiators' preferences are systematically biased by the attachment effect. At the end of the chapter, the design is revised by lessons learned from the experiment to rule out possible concerns regarding the validity of results in a follow-up experiment.

Chapter 5 presents a second experiment to reinforce both the internal and external validity of the results from the internet experiment. The experiment is conducted in the lab with salient rewards and—as the first experiment—this second experiment favors the attachment effect model over a traditional rational choice model. This is shown by several non-parametric statistics and an estimation of the parameters in the attachment effect model allows the quantification of the effect of single offers on reference points.

Chapter 6 concludes the work by summarizing the results and contributions to research on negotiations. It critically discusses the limitations of the present work and indicates directions for possible future work on endogenous preferences in negotiations and markets in general.

2

Theories on Preferences

> *I have said on another occasion, and it seems to me important enough to repeat it here, that he who is only an economist cannot be a good economist. Much more than in the natural sciences, it is true in the social sciences that there is hardly a concrete problem which can be adequately answered on the basis of a single special discipline.*
>
> (Hayek, 1967, p. 267)

Since negotiators are decision-makers, understanding a negotiation requires a deep understanding of the negotiators' decisions. As Hayek suggests, the theoretical foundations in this chapter address decision-making and preferences from the viewpoint of different disciplines. The origin of preferences and their stability over time varies widely across fields: Economists, for example, usually assume preferences to be an underlying property of any individual and to be stable over time. If an agent's choice changes over time, then either the production technology available or the information at hand have changed—preferences do not. This widely used perspective is most notably vindicated by Stigler and Becker (1977) in a seminal paper arguing against the assumption of changing preferences and it is outlined in several microeconomic textbooks, e.g. Kreps (1990), Varian (1992), Mas-Colell, Whinston, and Green (1995).

Another perspective on preferences takes a more psychological view: Preferences are constructed by the time an agent faces a choice situation. In this perspective, preference construction is a mental process highly dependent on the context of the decision environment. Therefore, preferences are not (necessarily) stable over time—preferences change along with the context. The context includes, for example, the framing of a decision as winning or loosing, the arrangement along with other choices, and the social situation. This second perspective on preferences is frequently used in psychology and behavioral economics, e.g. by Payne, Bettman, and Johnson (1993), Bettman, Luce, and Payne (1998), Hoeffler and Ariely (1999), and Ariely, Loewenstein, and Prelec (2003).

The topic of the present work is to study decision-making in negotiations. Preferences are the traditional economic modeling device to assess what decision-makers—like negotiators—want to achieve and how they compare different possible outcomes. Thus, they are essential to understand behavior in negotiations. However, as briefly sketched in the last paragraphs, there are different theories on preferences and their properties. To shed more light on these different theories, this chapter reviews microeconomic and psychological approaches to human decision-making. The remainder of the preamble to this chapter is devoted to introducing some terminology and to present a rough classification of the different approaches along three dimensions: (1) their degree of abstraction, (2) the predominant research methodology, and (3) the underlying theory of truth. This classification intends to show the usefulness of the coexistence of different theories on preferences and the fact that a study can gain by drawing on different theories. Reviewing specific theories on preferences then starts with the traditional microeconomic view presented in Section 2.1.

Approaches to Human Decision Making

Economic theory builds abstract, oftentimes mathematical models of the real world. Like any model, economic models reduce the complexity of the real world by simplifying assumptions like the rationality of agents. The aim of economic theory is to clarify the connections between different types of concepts, arguments, and patterns of reasoning. Economic theorists (usually) do not claim that their assumptions are descriptively valid. Their purpose is not to model individual decision-makers as close to reality as possible; it rather is to make reasonable simplifying assumptions so that models highlight the interrelation of important economic concepts and institutions and, furthermore, that their suppositions should on aggregate correspond to reality. A good economic model is realistic in the sense that it orders perception of real life phenomena (Rubinstein, 2001).