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The DNA of Negotiations as a Set Theoretic Concept:

A Theoretical and Empirical Analysis

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Abstract

This study examines the factors and the processes that contribute to a satisfying outcome for negotiations. Based on a set-theoretic framework, the authors investigated managers from various countries in terms of their approach to negotiation. The fuzzy set Qualitative Comparative Analysis (fsQCA) uses detailed data on preparation, information exchange, persuasion, creativity in problem solving and overcoming deadlocks, break-up behavior, as well as how to achieve a satisfying outcome, to test the joint sets of successful outcomes. The implications of these results are relevant for practitioners and future research and highlight necessary and sufficient conditions for a successful negotiation outcome.

Keywords: Business Negotiations, fuzzy set QCA, DNA structure, Cooperation, Conflict Resolution

1. Introduction

Negotiations belong to the basic social interaction processes and they have formed a cognitive scheme and differ between people and cultures. The research into negotiation is vast and derives from psychology, decision analysis to game theory, thus considering human behavior, group behavior and rational behavior. In this research on negotiation we distinguish between different models of analysis as well as different ways of conceptualizing negotiation and its outcome. Basically, most frameworks deal with factors and elements which influence the negotiators and then strategies and behavior which lead to the outcome and satisfaction between the parties. This study examines the various paths to a satisfying process and outcome of a negotiation. An international dataset with global respondents distinguishes between those of domestic negotiations and international negotiations. Theoretically, cases derived from the responses distinguish the antecedent conditions of the negotiations that influence the outcome condition which are in this case satisfied outcome and satisfied process.

The main contributions of this article lie in the set theoretic approach providing causal relationships and paths to an outcome, as well as in the use of a dataset which was translated into conditions of a set-theoretic treatment linking negotiation process and outcomes. The aim is to test if a consistent theoretical and empirical analysis has predictive power and will help to identify how best to negotiate in both domestic and international settings. The study contributes to the negotiation literature by providing a clear analysis of the routes which involve antecedents, concurrent and consequential constructs for a co-operative and a conflict resolution in negotiation. The research investigates if these pathways are connected to the DNA of negotiations (Fells, 2012) and combine together with the basic components of a negotiation process to provide routes of co-operation (preparation, information exchange, creative solutions) and conflict resolution mechanisms for the routes that are in conflict

(preparation, power, persuasion, deadlock). The findings show how negotiators perceive the elements of a negotiation leading to a successful process, but more importantly a successful outcome.

2. Negotiation Literature

2.1. The Negotiation Process

The process of negotiation as a communication tool between different hierarchical levels within families, workplaces, political parties, trade unions and firms, as well as between countries has been studied for a very long time from different academic perspectives. The pillars of negotiation research draw knowledge from psychology (Gelfand and Brett, 2004), decision analysis (Raiffa, 1982) and game theory (Schelling, 1960) to investigate in either a symmetric descriptive, symmetric prescriptive or asymmetric descriptive/prescriptive approach to negotiation. The negotiation situation can be analyzed from an individual's behavioral perspective, a decision-analytic, and a rational game theoretical and also from a negotiation analytical approach which considers the negotiation process as a combination of both elements (Raiffa, 1982; Raiffa et al. 2002).

Raiffa (1982) and Raiffa et al (2002) investigate negotiations and offer set template solutions for successful negotiations. Raiffa et al (2002) analyze single party issues, single party multiple issues and multi-party negotiations to identify what makes a negotiation successful. General questions of how people make decisions with each other and how they understand the other negotiator's position can lead to better outcomes. By developing the notion of negotiation as DNA, this article would move away from these template solutions; it considers each negotiation as unique, which would fit the 'DNA' structure. An abstract view of a negotiation is necessary to understand the components, but then like in a human genome the negotiation unfolds in an individual manner. This is a novel contribution to negotiation

theory and adjusts to the needs of practitioners. It is therefore necessary to combine the abstraction of the negotiation, but also the practical approach of the negotiation as process.

Besides the behavioral contingencies of the negotiators, the earliest theoretical work of negotiation dealt with structuring the process (Sawyer and Guetzkow, 1965). The study uses the negotiation process to understand and explain the logic for success (Sawyer and Guetzkow, 1965; Moran and Stripp, 1991; Weiss, 1993; Salacuse, 1999; Ghauri and Usunier, 2003; Manrai and Manrai, 2010; Fells, 2012). The main components of a negotiation framework are the antecedent, concurrent and consequential conditions. These conditions align with the 'DNA' of negotiation and reflect independent and dependent variables of the negotiation process.

Antecedents. Every negotiation framework starts with the antecedents. They comprise of preparation, atmosphere, and background of the negotiator as relevant elements of the first stage of the negotiation process. Considering the negotiation process as a sequence of offers and counter-offers, the framework enables to specify the constructs for the analysis. To position preparation, preferences and negotiator background as construct, the analysis of the process is dependent on the initial antecedent conditions (Sawyer and Guetzkow, 1965).

Power. The assessment of power plays a crucial role to determine the outcome in an indirect and sometimes even direct way. Greenhalgh et al (1985) identify the role of perceived situational power and antecedent objective power as an important part of their preference/power/personality model. Their findings suggest that negotiator preferences are determining outcomes, but personality and power are mediated by the negotiators preferences. Kim et al (2005) define distinguished and conceptualized power in negotiations. They provide a comprehensive approach to analyzing power and focus on an episodic form of power that rises and falls into the category of influence in negotiations. These authors also

consider power as a force (when it is episodic and targets are seen as objects), discipline (when power is systemic and targets are treated as subjects) or domination (when power is systemic and targets are treated as objects). This perspective of power can be beneficial for negotiation research and applications. Gelfand et al (2006) investigate the dynamics of power and suggest high levels of power as linked with self-interested behavior and judgmental inaccuracy in conflict. They suggest that power in negotiation is likely to be used in a more socially responsive way and dependent on the presence of relational self-construals (RSC) as psychological negotiation constructs (Gelfand et al, 2006). The issue of power is especially important when considering that a negotiator contributes to a coalition, which can change the power constellation and the value claims (Polzer et al. 1998).

Information Exchange. Researchers in international negotiations (Brett and Okumuru, 1998; Adair and Brett, 2004, 2005; Adair, et al, 2007) consider the information exchange between the parties as an important factor influencing the negotiation process. Studies in international negotiation highlight that different cultures have different solutions for providing, exchanging and gaining information. Adair et al (2007) examine how different cultures exchange information during the negotiation process. They find US negotiators will be earlier in providing information and Japanese negotiators will need more time to exchange information. Crott et al (1980) conclude with experimental evidence that if negotiators are allowed to exchange information truthfully, their results will be better and the payoff differences will be smaller. Thompson (1991) investigate the effects of mutual and asymmetric information exchange and stress that it is not necessary that both negotiators provide and seek information, but joint outcomes improve significantly even when only one negotiator provides or seeks information. Negotiators who provide information for the other party are not at a disadvantage for doing so (Fells, 2012). Updating the information gained in the negotiation process is an important approach towards culturally intelligent negotiation

processes in cross-cultural negotiation research (Imai and Gelfand, 2010). The culturally intelligent negotiator adapts - cognitively and epistemologically - to the negotiation process. This article benefits from the adaptation process in negotiations and the empirical investigation of managers with international experience.

Negotiation Process. Brett et al (1989) emphasize the difficulty for negotiation researchers to develop an approach that integrates the cognitive, motivational and social-interactive components of the negotiation process. Researchers find it is not only necessary to achieve what the other side offers, but also to want to accept what the other side offers. This implies that the parties understand and judge their own hierarchy of standards, their joint conflict resolution mechanisms, and the focus of the negotiation. The understanding of the goals will then have an influence on the outcome of the negotiations. Brett et al (1989) make a clear statement that decision-making focused models divert attention from interactions between parties and goal discovery as an important part of the negotiation process. A further important development of negotiation research is the findings of Greenhalgh et al. (1985) who highlight the effect of personality, power and preferences on the bargaining outcome. The authors investigate a personality/power/preference model and found negotiators preferences are direct determinants of the process and outcome.

Negotiation outcome. All frameworks emphasize that the outcome for negotiation should be an agreement (contract or a relationship) as a consequential construct in a model. The theoretical concept investigates the factors and constructs that influence outcomes. The approaches vary and the results suggest many possibilities from negotiator preferences, personality and power (Greenhalgh et al., 1985), framing and negotiator overconfidence (Neale and Bazerman, 1985) to control beliefs and intergroup interactions (Ford, 1983). Brett and Okumuru (1998) investigate the relationship between frequencies of reciprocated contentious communication strategy to the outcome of a negotiation. Their prescriptive

approach finds that breaking the bond of reciprocity categorizes the process as counter-productive and this can be resolved by combining reciprocation with a non-contentious communication (Brett et al. 1998). These strategies are techniques for avoiding the increasing levels of conflict and for emphasizing integrative negotiation solutions such as cooperative strategies. Neale and Bazerman (1985) consider loss and gain-focused approaches. They suggest that negotiators choose certain outcomes when evaluating the prospect of perceived gain and losses. The behavior of managers is more risk-seeking when there is the potential of loss, whereas they become risk-averse when there is the potential of gain (Kahneman and Tversky, 1979). Patton and Balakrishnan (2010) investigate expectations about future negotiation interaction and their impact on the negotiation process and outcome. These implications of expectations, behavior, and the complexities of strategies affecting the outcome are taken into account in the dynamic framework appear n in Figure 1.

Insert Figure 1 here.

Fells (2012) proposes a framework in which the conditions of a negotiation process can be compared to the DNA structure. He develops the connection between the dimensions (issue, action, process) and the satisfying outcome of a negotiation. In line with previous frameworks (Moran and Stripp, 1992; Weiss, 1993; Salacuse, 1999; Ghauri and Usunier, 2003; Manrai and Manrai, 2010), the basic structure of a negotiation is a logical process and can be transferred into a framework.

2.2. Negotiation and DNA

The comparison between a negotiation process and DNA is a recent concept and for this study a phenomenon of interest. The study highlights that testing a new framework should lead to new insights and robustness. Fells (2012) stresses that issue, action, process dimensions are connected in a pragmatic manner to lead to satisfied outcomes for both parties. This epistemological approach has its roots in empiricism. The observations of negotiation processes help to abstract the conditions. The idea to use the DNA structure as a metaphor for negotiations derives from the idea that each negotiation has a special unique structure and can be seen as an imprint of the negotiation process. The two strands of the negotiation DNA helix represent the two parties; the twist in the helix represents the parties competing, yet they are linked and so have to cooperate. In management this analogy occurs in the context of organizations which includes staff, structure, systems and culture (Govindarajan and Trimble, 2005). The relationship between organisms and organizations is a metaphor for negotiations which has many types of components involved and constructed to an outcome. The application in the organizational DNA by these authors is limited and does not relate carefully to the structure of DNA. In this respect the DNA explanation is the starting point, and the DNA definition relates to negotiations and is useful for the purpose of testing a structure of DNA in the negotiation process.

The link between the information stored in DNA and the information of a negotiation process (US Library of Medicine, 2013, p. 10) follows from the definition below (see Figure 2):

“The information in DNA is stored as a code made up of four chemical bases: adenine (A), guanine (G), cytosine (C), and thymine (T). Human DNA consists of about 3 billion bases, and more than 99 percent of those bases are the same in all people. The order, or sequence, of these bases determines the information available for building and maintaining an organism, similar to the way in which letters of the alphabet appear in a certain order to form words and

sentences. DNA bases pair up with each other, A with T and C with G, to form units called base pairs. Each base is also attached to a sugar molecule and a phosphate molecule. Together, a base, sugar, and phosphate are called a nucleotide. Nucleotides are arranged in two long strands that form a spiral called a double helix. The structure of the double helix is somewhat like a ladder, with the base pairs forming the ladder's rungs and the sugar and phosphate molecules forming the vertical sidepieces of the ladder. An important property of DNA is that it can replicate, or make copies of itself. Each strand of DNA in the double helix can serve as a pattern for duplicating the sequence of bases. This is critical when cells divide because each new cell needs to have an exact copy of the DNA present in the old cell."

This information is relevant in the same way as the genetic code known as ACGT (GenEd, 2013, p.19): "Genetic Code ACGT is an acronym for the four types of bases found in a DNA molecule: adenine (A), cytosine (C), guanine (G), and thymine (T). A DNA molecule consists of two strands wound around each other, with each strand held together by bonds between the bases. Adenine pairs with thymine, and cytosine pairs with guanine. The sequence of bases in a portion of a DNA molecule, called a gene, carries the instructions needed to assemble a protein.".

Insert Figure 2 here.

The design of DNA applies to the design of the success in a negotiation process. The next section will discuss theoretical approaches to the application of this idea to negotiation outcomes.

2.3.Negotiation and Set Theory

A set theoretic approach is ideal for analyzing the various paths to a satisfying negotiation outcome. The research questions and hypotheses build upon preparation,

information exchange, solution creativity, overcoming deadlocks (which can all be seen as collaborative), and persuasion, (including concessions, splitting the difference and making threats), which are reflective of a more integrative negotiation. The negotiators at some point may assess their power position (particularly if they then feel they are in a strong position) and how this might impact upon their subsequent strategy. The parties may encounter a deadlock, rather than the negotiations ending unsuccessfully, they would consciously take action to overcome and resolve the deadlock. This situation may require the parties or a single party to move away from previously distributive approaches to more conciliatory ones.

The relevance of the conditions of set theoretic relationships is clear when considering the different convergent and divergent paths towards a satisfying outcome. The transfer of the constructs of this framework (shown in Figure 1) into conditions of the negotiation process combines into joint sets of negotiation outcome or process, respectively. This study tests the framework using a set theoretic approach of fuzzy set Qualitative Comparative Analysis (fsQCA) to confirm the analogy of the DNA structure of negotiations. The existence and the size of joint sets indicate the successful paths towards a satisfying outcome (Rihoux and Ragin, 2009).

This basic concept of a set-theoretic relationship influences the outcome of a negotiation and applies to the components as identified in Figure 3. The outcome condition is a function of antecedent, power/information and concurrent conditions.

Insert Figure 3 here

3. Hypotheses

This section presents the hypotheses derived from the theoretical underpinnings explained in the previous section. The components of a negotiation process are critical in the negotiation literature. It is essential to test which paths of conditions will lead to a positive outcome. Categorizing a successful sequence of conditions in the negotiation, the researchers

test whether effective preparation and information exchange combined with using creativity to find a solution should lead to a satisfying negotiation outcome. Using this sequence and combination of conditions as a basic formula for a satisfying process and outcome, this approach leads to the following hypotheses. H1: The joint sets of good preparation and information exchange relate positively to creativity and satisfaction with outcome.

Good preparation (in terms of thinking about the other party's negotiation objectives) should lead to more open information exchange, for example through full explanations and through receiving clear answers. These two together should lead to creativity in searching for solutions by using the more open processes such as brainstorming and spontaneity, and to a lesser extent through discussion of priorities and differences. There will be no deadlocks and little or no persuasion (perhaps just some final trading off or splitting the difference) which should result in higher satisfaction with outcome and with process. Taking these basic considerations into account, the next step is testing the set theoretic relationships. The relevant conditions are then preparation, information exchange, creative solutions, and interchangeably overcoming deadlocks and persuasion. The outcome conditions are satisfied negotiation outcome and satisfied processes.

Two alternative hypotheses reflect a somewhat more competitive path to a good result. The first path is that deadlocks are part of the progress towards a satisfying outcome; the second is that persuasion is necessary to achieve this result. These steps may seem counter intuitive but the reality of facing a deadlock may provoke a creativity that was not necessary in an uncontentious negotiation; being confronted by a persuasive argument may have the same creativity-inducing effect.

H2a: The joint set of good preparation, information exchange, creative solutions and overcoming deadlocks is necessary to lead to a satisfying outcome. H2b: The joint set of

good preparation, information exchange, creative solutions and persuasion is necessary to lead to a satisfying outcome.

A more explicit competitive path to an outcome involves notions of power and rather than solution creativity, the use of splitting the difference (concession making) to achieve a final outcome. This path would need to consider how the conditions 'preparation', 'assessment of power', 'persuasion' and 'split the difference' will impact the outcome. Deadlocks may occur and need to be overcome, which gives rise to another path that might lead to a satisfactory outcome.

H3: The joint set of good preparation, assessment of power, persuasion and split the difference is necessary to lead to a satisfying outcome. H4: The joint set of good preparation, power, persuasion and overcoming deadlocks is necessary to lead to a satisfying outcome.

However competitive negotiations can become even more conflictual and involve the use of threats and so two further hypotheses are worth considering. H5: The joint set of good preparation, power, persuasion and threats are necessary to lead to a satisfying outcome. H6: The joint set of good preparation, power, threats and overcoming deadlocks are necessary to lead to a satisfying outcome.

Insert Table 1 here.

These propositions and hypotheses are guiding our thinking towards testing the right paths for satisfying processes and outcome in negotiations.

4. Method

4.1. Participants and Questionnaire

Participants. Similar to previous researchers (Adler et al. 1987; Volkema, 1999, 2004), our participants are from graduate management programs and alumni lists from

business schools. These included business schools in Australia, Denmark, The Emirates, Germany, Hong Kong, Singapore, the United Kingdom and the United States. Professional organizations of general management, human resources and supply chain management were contacted and through their assistance business managers of these organizations responded to the questionnaire. The questionnaire was hosted on Survey Monkey and was available online for a period of 12 months until mid-2012 to enable a broad field of negotiator feedback. The response rate of online tools is as expected lower and the majority of respondents came from managers studying in business schools. The profile of the respondents is as follows: role of the respondent at the time of their negotiation included owner/CEO (6%), general managers (18%), a buyer's role (12%), sales and human resources (both 11%). Approximately 15% of respondents have a technical expertise role such as a lawyer or information systems manager. In terms of the type of negotiation under consideration, the two dominant types are procurement and sales negotiations (28% and 23% respectively) followed by commercial negotiations (14%). The industries are across the sectors from oil and gas, jewellery, energy, manufacturing, food, health, to IT industry and banking. One third of the respondents are female. The majority of negotiations are intra-cultural negotiations, but there are about 40 inter cultural negotiations included. The countries and regions cover China, Europe, Gulf nations, North America, India and Pakistan, South East Asia, Australia and New Zealand.

Questionnaire. In an international collaboration, the return of 240 usable questionnaires comprises the same amount of dyad negotiations. An introductory open-ended summary question helps the respondent to focus on a particular negotiation, rather than give generalised responses.The questions are in 4, 5 and 7 Likert Scales and connect to the framework of Fells (2012). The questionnaire consists of 13 negotiation specific questions with sub-questions included. The scope is from preparation, start of the negotiation, negotiation strategy, power, information exchange, creativity, persuasion, deadlocks,

negotiation process and outcome. The questionnaire reflects the framework above and was then transferred into fuzzy set memberships for each condition. This design enables a more detailed approach towards data analysis.

4.2. fsQCA and Data Collection

Having identified the conditions for a set theoretical treatment of negotiations, the next step is to use the fsQCA to analyze the data. Though fsQCA is now more and more frequently and successfully used for small N-cases and qualitative research, the researchers use fsQCA for the underlying dataset of 290 dyad negotiations collected from managers. Ragin (1987, 1994, 2000, 2008) and Rihoux and Ragin (2008) suggest that fsQCA can be used as well for large numbers (Ns). The data derives from a questionnaire which had 5-point Likert scales, but also 4-point scales avoiding the neutral sets. This approach helps to position the data within the empty and full set easier than expected, with a fuzzy approach and enables the identification of membership sets in between the crisp sets of 0 and 1. The calibration in the next section gives more details about the context of the answers. The resulting role of the conditions connects to the theoretical underpinning. The definitions and role of conditions link the set theoretic negotiation analysis with the fsQCA of the data set.

Using a more specific combination of conditions, the study uses the constructs of preparation, information exchange, creative solutions with persuasion, overcoming deadlock, power and threat. The use of fsQCA for negotiation behavior follows recent work and its application to consumer behavior (Woodside et al, 2011; Woodside and Zhang, 2013), culture and compensation behavior (Greckhamer, 2011) and the classifications in organization theory (Kvist, 2007). The management literature has taken on this method to investigate complex configurations and behavior which serves the negotiation analysis well.

4.3. Calibration

For the fsQCA analysis, the questions and their dimensions translate into conditions and the relevant values between 0 (empty) and 1 (fully set). The calibration points help to position the answers of the questionnaire as fuzzy sets.

The choice of conditions derives from the framework and the component of a negotiation DNA. Preparation as an antecedent condition is a crucial part of the model. The researchers added power and information exchange as relevant conditions for the outcome of a negotiation. Concurrent conditions are in connection with the negotiation process and contain persuasion, creative solution seeking, overcoming deadlocks, and threats. These strategies are part of the negotiation process. Finally, the satisfying negotiation outcome naturally transfers into the consequent or outcome condition. The satisfying outcome is therefore the dependent variable. For a negotiation DNA, preparation and outcome are the outer strands of the DNA and the concurrent conditions are the four blocks of the DNA which can have different grades dependent on each negotiation. For this reason, the four chemical blocks of the DNA relate to the fuzzy values of the conditions (persuasion, creative solution seeking, overcoming deadlocks, and threats). The different degrees of these components in negotiations will help to develop the negotiation DNA. Table 2 outlines the calibration of the fsQCA.

Insert Table 2 here.

5. Fuzzy Set QCA Analysis and Results

5.1. Descriptive Statistics

The mean values and standard deviations for the variables (conditions) of the investigations show the coverage of most of the cases cover and the results support preparation, power, information exchange, deadlocks and the satisfying outcome. Lower

means are for threats, split the difference and persuasion. The descriptive statistics for this study follows in Table 3 below.

Insert Table 3 here.

5.2. Results for the joint sets of Preparation, Information, Concurrent Conditions

This study considers the fsQCA analysis of the joint sets of the conditions—preparation, information exchange, creative solutions and persuasion—leading to a satisfied outcome and a satisfied process. Similarly, we compared the results to the joint sets of the conditions - preparation, information exchange, creative solutions and overcoming deadlocks – in relation to the outcome and process being satisfactory.

HQ1: Prep∩Information ∩ Creativity. HQ 2a: Prep∩Information ∩Persuasion ∩ Creativity. HQ 2b: Prep∩Information ∩Deadlocks∩Creativity

Truth table analysis. To consider the hypotheses first and then show the relationship between the conditions and outcome conditions in connection with the consistency, the hypotheses hold. The analysis of the truth table for the conditions *preparation, information exchange, creative solution and persuasion* leading to a satisfying outcome is identical to the same conditions leading to a satisfying process. The same is true for the conditions preparation, information exchange, creative solution and overcoming deadlocks. For this reason, the truth tables for the outcome condition ‘outcome’ replace the condition ‘process’.

Insert Table 4 here.

The truth table in Table 4 shows a high number of cases have joint sets of preparation, information exchange, creative solution and persuasion leading to a satisfying outcome. The

highest consistency of the cases is for the joint sets with preparation, information exchange and creative solution leading to a satisfying outcome accounting for 35 cases with 0.94 consistency and this result verifies Hypothesis 1 and the three conditions of information exchange, creative solution and persuasion with 10 cases accounting for this path with a consistency of 0.95. All four conditions of preparation, information exchange, creative solution and persuasion combined in a joint set occur in 29 cases, with a very high consistency of 0.91. Another joint set of three conditions with 0.91 is the path of preparation, creative solution and persuasion with only 3 cases. The highest number of cases with a high consistency for two conditions is the path of information exchange and creative solution, with 14 cases and 0.92 consistency level.

If overcoming deadlocks can replace the condition ‘persuasion’, then the result is similarly strong results with 0.91 consistency level (Table 5). The results in the truth table confirm the relevance of preparation, information exchange, creative solution and overcoming deadlocks as necessary condition for the satisfying outcome.

Insert Table 5 here

The results of the truth table analysis in Table 5 demonstrate that all combinations and paths are leading to a high consistency. 31 cases cover the joint set of all conditions. In 32 cases the three conditions preparation, information exchange and creative solution occur with a high consistency of 0.95. Similarly, information exchange, creative solution and overcoming deadlocks are the path for 10 cases and a consistency of 0.94. Three cases confirmed the path of preparation, creative solution and overcoming deadlocks, whereas only two conditions of information exchange and creative solution are in 15 cases; four cases have preparation and creative solution leading to satisfying outcome. These strong results confirm

that the satisfying outcome is a function of preparation, information exchange, creativity and overcoming deadlocks.

Necessary Conditions. The analysis of the necessary condition for the combinations of conditions and the various paths, show very high consistencies for both persuasion and overcoming deadlocks in combination with the conditions preparation, information exchange, and creative solution. In order to test the negations as well, table 6 confirms the results for the necessary conditions.

Insert Table 6 here.

Subset/Superset Analysis. Detailed results of the subsets in Table 7 give a clear indication that the joint set of preparation, information exchange, creativity and persuasion is consistent with 0.91 and a size of 0.44 (coverage). The joint set of preparation, information exchange and creativity is found with 0.91 of consistency and a very high coverage of 0.67, which means that the joint set area covers a large space.

Insert Table 7 here

As the truth table in Table 8 shows, the necessary conditions of the path of overcoming deadlocks shows higher consistency. The strongest results are for the full joint set with 0.92, the joint set of preparation, information exchange and creativity with 0.92 and the three conditions of preparation, information exchange and overcoming deadlocks. The path preparation, creativity and overcoming deadlock is close to 0.91, similar to information exchange, creativity and overcoming deadlocks.

Insert Table 8 here.

5.3. Results for the joint sets of Preparation, Power and Concurrent Conditions

The negotiation outcome is a function of preparation, information exchange, in combination with creativity, persuasion and overcoming deadlocks. Adding to the importance of preparation as antecedent condition, power as influencing current conditions, the focus is now on persuasion, split the difference, overcoming deadlocks and threats as significant for the negotiation process. The following hypotheses need to be tested respectively.

The paths influenced by power instead of information lead as well to a satisfying outcome. The findings show that several paths are possible. Comparing the most successful paths to a satisfying outcome, a high consistency of 0.91 is the threshold for successful negotiations. This section investigates the necessary and sufficient conditions for power or conflict resolution dominated scenarios.

Necessary Condition. Analyzing the necessary conditions for each of the paths leading to the satisfied outcome of alternative solutions, Table 9 compares the results and it is clear that the strongest result comes from preparation, power, persuasion and overcoming deadlock.

Insert Table 9 here.

Having seen that the necessary condition for the path of preparation, assessment of power, persuasion and overcoming deadlocks is important for the satisfied outcome solution, we now move towards analyzing the truth table and sub/superset analysis of this path to improve the results about the background of these conditions.

Truth Table Analysis. The Table 10 truth table analysis demonstrates a high consistency for the joint sets of preparation and power with 0.93, preparation, persuasion and overcoming deadlocks with 0.92, and preparation and overcoming deadlocks with 0.94. This makes the result of the previous analysis even stronger in terms of the relevance of deadlocks in either preparation, persuasion or information exchange with creative solution.

Insert Table 10 here.

The truth table of Table 10 confirms that the joint set is a necessary condition for 12 cases with a consistency of 0.90. The next three joint conditions with a high consistency leading to satisfying outcome is the joint set of preparation, persuasion, overcoming deadlocks with 11 cases with a consistency of 0.91. Furthermore, preparation, power and overcoming deadlocks as a joint set are significant with 0.93 consistency level in 6 cases. Two conditions with high consistency are then preparation and overcoming deadlocks with 0.94, and 8 cases showing this result. Preparation and power are joint sets in 13 cases with consistency of 0.93.

Sub/Superset Analysis. Analyzing the sub/superset conditions in Table 11 confirms that the joint set of all four conditions falls into the consistency with 0.91 and a coverage of 0.3.

Insert Table 11 here.

Sufficient Condition. The XY-plot below shows the relationship of the cases as asymmetric relationships. The information dominated solutions do not hold for sufficient results as leading to satisfying outcomes. The consistency and coverage level of the joint sets of power dominated solutions (preparation, power, persuasion and overcoming deadlocks)

point towards the solution as shown in Figure 4. Adding creativity to the sufficient conditions of the power dominated solution consistency is 0.90 and coverage 0.58. This is a very strong result for sufficiency in the DNA of a negotiation.

Insert Figure 4 here.

6. Discussions and results

6.1. Results and Implications

The results confirm a clear pattern supporting the hypothesis that preparation, information exchange and creativity are necessary conditions to have a satisfied outcome of both national and international negotiations. H1 is supported with these results and the negotiators who prepare well and exchange information are positively related to creativity and satisfaction with the negotiation outcome.

Path H1—Preparation, Information Exchange, Creative Solution. This route to a satisfied outcome is benign or power free, perhaps even as a non-contentious route to agreement. There is a variant to this collaborative model in that even if the negotiators have not prepared well, they are able to information exchange and engage in solution creativity and will achieve a satisfactory outcome – but this route is not as common, nor as productive (in leading to satisfactory outcomes) as the preparation, information exchange and solution creativity path. This approach can *overcome deadlocks* as second concurrent condition (H2a).

Path H2a—Preparation, Information, Creativity, Overcoming Deadlocks. Similarly, the benign, cooperative path can persuade the counterpart and its reflection holds in hypothesis 2b (H2b) that joint co-operation, information exchange, creative solutions and persuasion are necessary to lead to a satisfying outcome.

Path H2b—Preparation, Information, Creativity, Persuasion. Adding the power component will lead to another path in the negotiation process and outcome. The empirical investigation of hypotheses 3, 4, 5 and 6 supports the conflict resolution paths. A clear result is that overcoming deadlocks in various combinations (preparation, information exchange, creativity, but also with power and persuasion) leads to satisfying outcomes.

Path H3, H4, H5 and H6—Preparation, Power, Creativity, Persuasion, Overcoming Deadlocks. A more general observation about deadlocks is that they are necessary in order to bringing the negotiations to an end, but they are as well an opportunity to adopt new perspectives that lead to creative solutions. Hence the joint set of preparation ∩ information exchange ∩ overcoming deadlocks ∩ solution creativity in combination leads to outcome satisfaction. The research can conclude that while deadlocks should not be encouraged, neither should they be avoided, as overcoming deadlocks will be an opportunity for a satisfactory outcome. When it comes to necessary conditions for a satisfying outcome information exchange in combination with persuasion and creative solutions can equally overcome deadlocks.

More importantly, considering situations of power in negotiations the findings are striking, since the joint set of preparation, power, persuasion, deadlock and creative solution are necessary and sufficient conditions for a satisfying outcome. This result is a significant finding given that deadlocks are typically regarded negatively. It suggests that further exploration is necessary into the role of deadlocks, and how they are overcome. This study also contributes to our understanding of the role of power in negotiation as a path to a satisfying outcome.

Using the metaphor of DNA for negotiation success, the investigation confirms that various strength and weaknesses of the components lead to different results of negotiations or

still to different satisfying outcomes. The complexity of negotiations captured in a DNA model of Figure 2 offers a research agenda with equifinal solutions which are appropriate for the depth of the analysis. Like each human has a DNA code, each negotiation in the dataset has a code which is typical for each negotiation process. What management research can take from the DNA structure is applicable to the negotiations and their components (preparation, power/information, concurrent conditions I and II).

6.2. Limitations and future research

As with every research, this investigation has limitations. The application of fsQCA to a large dataset is a benefit, but has its limitations. So far the negotiations do not distinguish between cultural profiles and different domestic and international settings. One avenue of research would be to use the DNA perspective on negotiations to explore the impact of culture on the management of the process and to explore the interaction between culture and the type of negotiation being undertaken. More research into the potentially constructive role of deadlocks in the negotiation process is important and this is an area for further investigation. Two aspects would be to explore how negotiators realise the emergence of a deadlock in their negotiations and to examine more closely the strategies they use to handle and overcome the deadlock.

6.3. Conclusion

This study highlights that the DNA of negotiations has theoretical, empirical, practical and negotiation analytical consequences. Theoretically, the connection between negotiation analysis and set theoretical analysis provides a logical path for co-operative and conflict solving strategies towards satisfying outcomes. Negotiation theory, so far analyzed from psychology, economics and managerial decision analysis, benefits from set theoretic tools for the analysis of complex negotiation scenarios. The antecedent condition (preparation)

complements with power and information exchange. The path of preparation, power, overcoming deadlocks, and persuasion shows a conflict resolution route which is less cooperative than the paths of preparation, information exchange and creativity. Theoretically, the joint sets of these combinations show an equifinal path to satisfying outcomes and a set theoretical approach for solving negotiation problems.

Empirically, the dataset with 290 dyad negotiations covers dimensions which have not previously been taken into account (such as power, information exchange, persuasion, deadlocks and threats). The fsQCA methodology helps to create robust results for negotiation analytical problems and contributes to the literature in this respect. The findings provide the necessary and sufficient conditions for the joint set options in negotiation scenarios. The large dataset analysis by the means fsQCA contributes to the literature, shifting the use of this tool from small N to large numbers of cases.

The results not only have theoretical and empirical relevance, but also provide practical solutions for negotiators. Linking the structure of negotiations to a DNA profile, the findings support the special features of each negotiation and the similarity of the basic conditions which are the bricks of each and every negotiation. The best results for a satisfying negotiation outcome stem from co-operative solutions and a conflict resolution mechanism which sees the potential of overcoming deadlocks as a challenging strategy to improve the outcome. Good preparation, power, persuasion, creativity and overcoming deadlocks as joint set lead to satisfying outcomes.

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TABLES:

Table 1: Hypotheses for the fsQCA

Hypotheses		Path to an outcome
Hypothesis 1:	The joint sets of good preparation and information exchange are positively related to creativity and satisfaction with an outcome.	Cooperative Path
Hypothesis 2	2a: The joint set of good preparation, information exchange, creative solutions and overcoming deadlocks are necessary to lead to a satisfying outcome. 2b: The joint set of good preparation, information exchange, creative solutions and persuasion are necessary to lead to a satisfying outcome.	Cooperative Path
Hypothesis 3:	The joint set of good preparation, power, persuasion and split the difference are necessary to lead to a satisfying outcome.	Conflict Resolution Path
Hypothesis 4:	The joint set of good preparation, power, persuasion and overcoming deadlocks are necessary to lead to a satisfying outcome.	Conflict Resolution Path
Hypothesis 5:	The joint set of good preparation, power, persuasion and threats are necessary to lead to a satisfying outcome.	Conflict Path
Hypothesis 6:	The joint set of good preparation, power, threats and overcoming deadlocks are necessary to lead to a satisfying outcome	Conflict Path

Table 2: Calibration of Variables

Variable (and label)	Definition for coding	Role in theoretical model	Coding gradations	Breakpoints
Preparation on	Issue Importance; Time Pressure; Alternatives; Other party's strategy Quality of outcome for other issue.	Preparation is a necessary condition for a satisfactory outcome and is an antecedent condition	0=not at all 0.33= a little 0.67= a lot 1=a great deal	0.33; 0.67
Assessment of Power	Kim et al (2005) consider power as force (when it is episodic and targets are seen as objects), discipline (when power is systemic and targets are treated as subjects) or domination (when power is systemic and targets are treated as objects).	Power relates to the interdependence of the parties and they treat each other as subjects or objects. Who needs whom more? we needed much more we needed somewhat more equal they needed somewhat more they needed much more	0=we needed the agreement much more 0.25=we needed the agreement somewhat more 0.5=Equal 0.75=They needed the agreement somewhat more 1=they needed the agreement much more	0.25; 0.5; 0.75
Information Exchange	Information exchange as critical component in the DNA of a negotiation process.	Other party fully explained their position. Negotiation is a learning process by which the negotiators try to understand each other's true situation	0 =Not at all 0.33=A little 0.67=moderately 1=a great deal	0.33; 0.67
Creative Solution	Creative Solution is a way to explore options in a negotiation process and to encourage co-operation between the parties.	It can be seen as issue, process and action dimension to a satisfied outcome. The creative compromise shows the relevance of this particular condition in the model.	0.25=Concession 0.5=Middle ground 0.75=Creative 1=Firmer	0.25; 0.5; 0.75
Split the Difference	Part of a persuasion strategy to offer an outcome	It is a concurrent condition which in combination with cooperative strategies influences the outcome.	0= Not at all 0.25= a little 0.5= moderately 0.75= a great deal 1= fully	0.25; 0.5; 0.75
Persuasion	Each restated its case.	This is an action dimension and considers how the outcome should be achieved.	0=not at all 0.33=a little 0.67=a lot 1 =a great deal	0.33; 0.67
Overcome Deadlock	There are many ways to overcome a deadlock and this general term comprises more strategies such as agreeing to differ, parties adjourn, bringing new people in, continue to argue suggest a mediator	This is an important element which can lead to success or failure. It has implications on the outcome – action and process dimension.	0=not at all 0.33=a little 0.67=a lot 1 =a great deal	0.33; 0.67

Outcome	Satisfaction with Outcome: Extremely; Very; Moderately; Neither nor; Moderately unsatisfied; Very unsatisfied Extremely unsatisfied	This is a condition which is a match of negotiation analysis and set theory as both need outcomes for their results. It is on one hand when the deal/contract starts, but also a technical condition for the fsQCA tool. This benefits the analysis.	0= fully out 0.1 = mostly but not fully out 0.4 = more or less out 0.6 = more or less in 0.9 = mostly but not fully in 1 = fully in	0.1;0.4;0.6;0.9

Table 3: Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum	N Cases	Missing
Preparation	0.5837319	0.2748851	0	1	276	6
Power	0.4883513	0.2594082	0	1	279	3
Information	0.5816726	0.2971928	0	1	281	1
Creativity	0.75	0	0.75	0.75	106	176
Persuasion	0.5196441	0.335716	0	1	281	1
Split-difference	0.3615	0.292444	0	1	280	2
Threats	0.2983094	0.3433055	0	1	278	4
Deadlock	0.4458781	0.3280176	0	1	279	3
Sat. Outcome	0.6570922	0.2715259	0	1	282	0

Table 4: Truth Table

Preparation	Information	Creativity	Persuasion	number	Outcome satisfied	raw consist.	PRI consist.	product
1	1	1	0	35	1	0.94981	0.91154	0.86580
1	1	1	1	29	1	0.91085	0.83563	0.76114
0	1	1	0	14	1	0.91663	0.81714	0.74902
0	1	1	1	10	1	0.95591	0.90263	0.86284
0	0	1	1	5	0	0.90692	0.75775	0.68722
0	0	1	0	4	1	0.92506	0.80067	0.74067
1	0	1	0	4	1	0.94069	0.83251	0.78314
1	0	1	1	3	1	0.91089	0.75076	0.68386

Table 5: Preparation, information exchange, creative solution and overcoming deadlocks

Preparation	Info exchange	Creativity	Deadlock	number	Outcome satisfied	raw consist.	PRI consist.	product
1	1	1	0	32	1	0.952692	0.9155	0.87219
1	1	1	1	31	1	0.923341	0.859539	0.793648
0	1	1	0	15	1	0.944288	0.879756	0.830743
0	1	1	1	10	1	0.940502	0.871795	0.819924
0	0	1	1	6	1	0.936352	0.845787	0.791954
1	0	1	0	4	1	0.943525	0.834448	0.787323
1	0	1	1	3	1	0.946914	0.856427	0.810963
0	0	1	0	2	1	0.937923	0.815018	0.764424

Table 6: Necessary conditions for Hypotheses 2a and 2b And Their Negations.

Solution	Prep∩Information∩ Creativity∩ Persuasion H2a	Prep ∩Info∩ Creativity∩ ~Persuasion Negation	Prep∩Info∩ Creativity∩ Deadlock H 2b	Prep∩Info∩ Creativity∩ ~Deadlock Negation
Consistency	0.97	0.969	0.969	0.969
Coverage	0.764	0.771	0.777	0.762

Table 7: Subset/Superset analysis

	raw consistency	coverage	combined
Preparation ∩Information∩ Creativity∩Persuasion	0.910858	0.448088	0.754880
Preparation∩Information∩Creativity	0.913108	0.677596	0.789953
Preparation∩Information∩Persuasion	0.908715	0.450137	0.686898
Preparation∩Creativity∩ Persuasion	0.894447	0.466530	0.692716
Information∩Creativity∩ Persuasion	0.914784	0.508880	0.718041
Preparation∩Information	0.891011	0.694673	0.691021
Preparation∩Creativity	0.897375	0.719126	0.699036
Preparation∩Persuasion	0.884921	0.470629	0.604773
Information∩Creativity	0.894793	0.805192	0.725879
Information ∩ Persuasion	0.891113	0.510929	0.623761
Creativity∩ Persuasion	0.885153	0.553826	0.638494
Preparation	0.854597	0.740301	0.550212
Information	0.823568	0.856421	0.566694
Creativity	0.853846	0.909837	0.589362
Persuasion	0.820875	0.564072	0.491116

Table 8: Subset/Superset for preparation, information exchange, creative solution and overcoming deadlocks

	raw consistency	coverage	combined
Preparation∩ Information ∩Creativity∩Deadlock	0.923341	0.440984	0.753468
Preparation∩ Information ∩Creativity	0.922168	0.671722	0.787664
Preparation∩ Information ∩Deadlock	0.923341	0.440984	0.684571
Preparation∩Creativity∩Deadlock	0.909963	0.466667	0.695206
Information ∩Creativity∩Deadlock	0.908669	0.481148	0.702323
Preparation∩Information	0.899233	0.688798	0.691477
Preparation∩Creativity	0.905480	0.713252	0.699565
Preparation∩Deadlock	0.896056	0.468716	0.606086
Information ∩ Creativity	0.903078	0.809563	0.729733
Information ∩*Deadlock	0.887778	0.485246	0.610970
Creativity∩*Deadlock	0.884633	0.530055	0.629226
Preparation	0.861400	0.734427	0.550778
Information	0.831056	0.864208	0.570627
Creativity	0.860842	0.908471	0.591240
Deadlock	0.831926	0.538252	0.489195

Table 9: Necessary condition for Hypotheses 3, 4, 5 and 6 to reach a satisfied outcome

Solution	Prep∩Power ∩ Persuasion ∩Split difference H3	Prep∩Power ∩ Persuasion∩ Deadlocks H4	Prep∩Power∩ Persuasion∩ Threats H5	Prep∩Power∩ Threats∩ Deadlocks H6
Consistency	0.90	0.91	0.89	0.89
Coverage	0.75	0.74	0.73	0.75

Table 10: Truth table for preparation, power, persuasion and overcoming deadlocks

Preparation of	Power assessment	Persuasion-	Deadlock	Number	Satisfied Outcome	raw consist.	PRI consist.	product
1	0	0	0	17	1	0.931051	0.847506	0.789071
1	0	1	0	14	0	0.88081	0.728928	0.642047
1	1	0	0	13	1	0.933765	0.853998	0.797433
0	1	1	1	12	0	0.892442	0.759851	0.678123
1	1	1	1	12	0	0.908984	0.809807	0.736102
1	0	1	1	11	1	0.917856	0.826193	0.758326
1	1	1	0	11	0	0.896902	0.759727	0.681401
0	1	0	0	10	1	0.919598	0.80606	0.741251
1	0	0	1	8	1	0.944822	0.872816	0.824656
1	1	0	1	6	1	0.937808	0.85592	0.802689
0	1	0	1	4	1	0.928536	0.829512	0.770231
0	0	0	1	3	1	0.929314	0.828946	0.770351

Table 11: Sub/Superset analysis of preparation, power, persuasion and deadlocks

	consistency	raw coverage	combined
Preparation∩Power∩Persuasion∩Deadlock	0.908984	0.305694	0.664537
Preparation∩Power∩Persuasion	0.885328	0.376889	0.642886
Preparation∩Power∩Deadlock	0.909179	0.367363	0.641912
Preparation∩Persuasion∩Deadlock	0.900752	0.384724	0.651870
Power∩Persuasion∩Deadlock	0.886795	0.331624	0.616044
Preparation∩Power	0.890291	0.509133	0.623029
Preparation∩Persuasion	0.839509	0.505694	0.605964
Preparation∩Deadlock	0.890924	0.479764	0.610811
Power∩Persuasion	0.855396	0.433822	0.582248
Power∩Deadlock	0.876566	0.406314	0.573815
Persuasion∩Deadlock	0.847949	0.421872	0.572594
Preparation	0.826433	0.738107	0.539295
Power	0.835741	0.619504	0.512666
Persuasion	0.749087	0.601128	0.460546
Deadlock	0.814260	0.551072	0.485373

FIGURES:

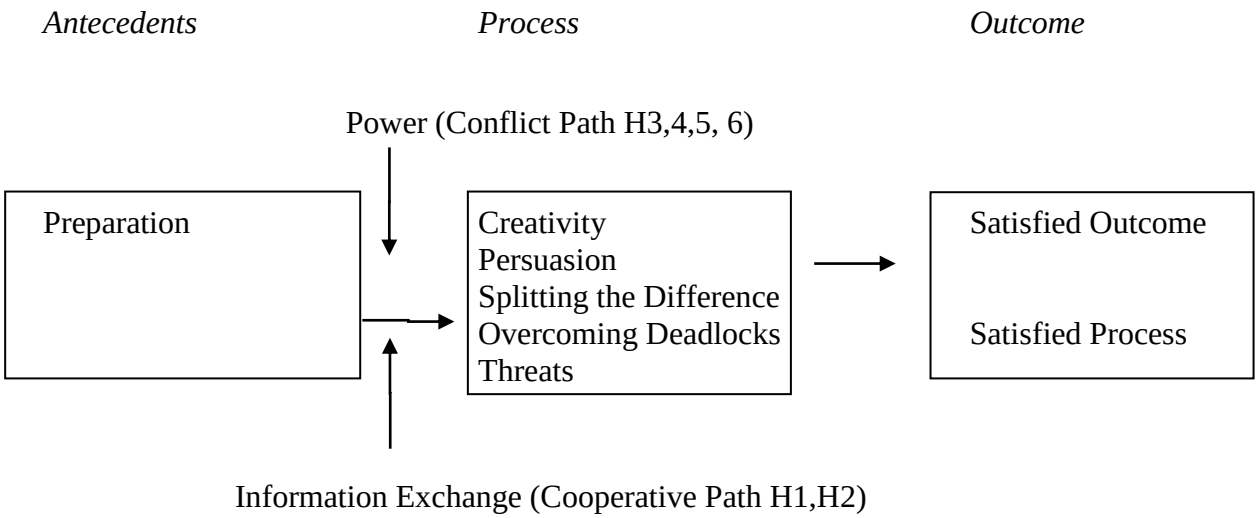


Figure 1: The negotiation process and outcome as a result of preparation, power/information and concurrent conditions

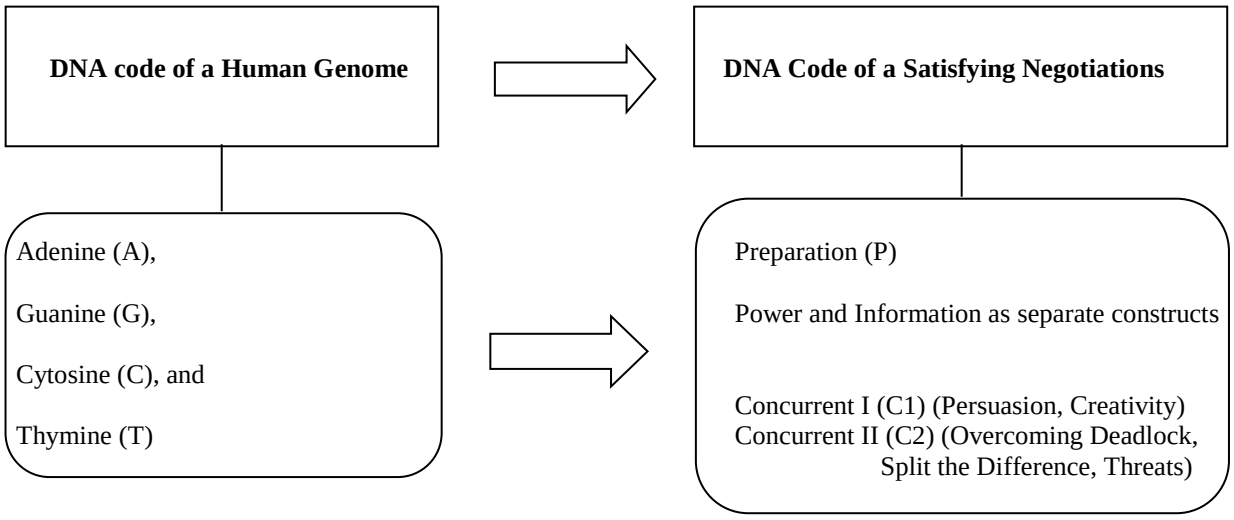


Figure 2: DNA Code of Satisfying Negotiations

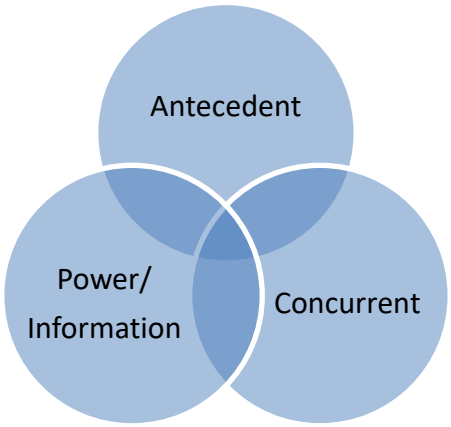
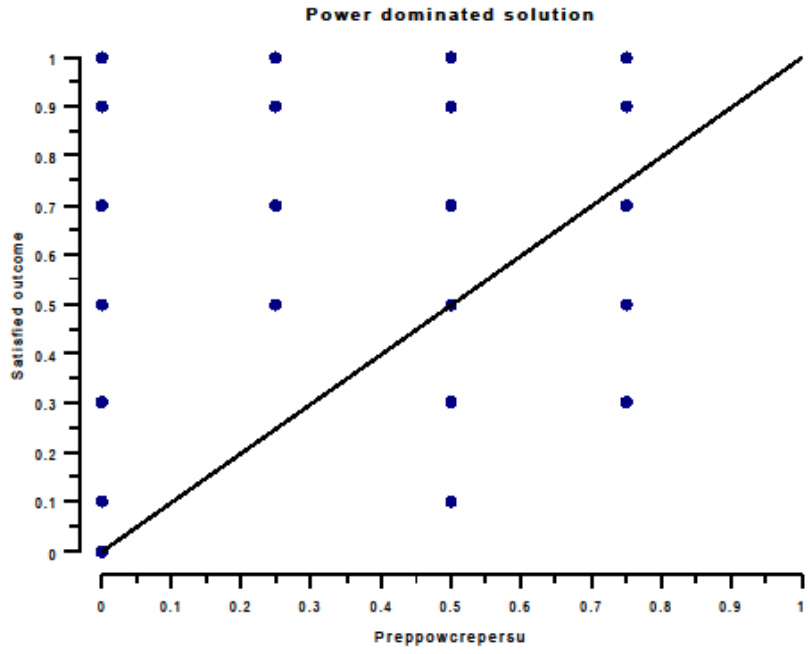


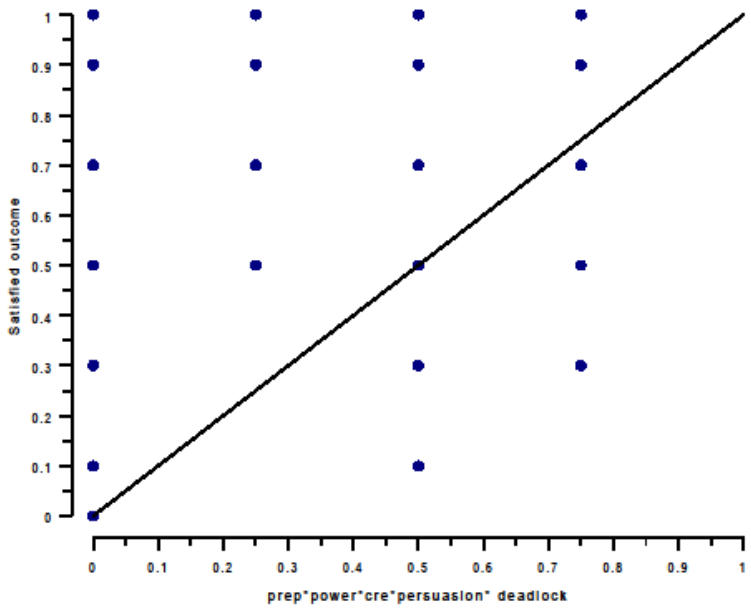
Figure 3: The basic dimensions and conditions for a satisfying negotiation outcome in set theoretic relationships

Consistency 0.85



Coverage 0.65

Consistency 0.90



Coverage 0.58

Figure 4: XY-plot for power dominated joint sets (preparation, power, persuasion creative solution and overcoming deadlocks)