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Cognitive Biases in Negotiation: a Two-party Negotiation Experiment

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Abstract

The purpose of this master thesis is to investigate the role of cognitive biases in negotiations.

It is achieved through performing an experiment where a two-party negotiation is conducted. Following a predefined framework, two people have a limited amount of time to reach an agreement over a specific issue.

An analysis of the results is operated to effectively find and interpret which biases have emerged and how different styles of negotiation can lead to different agreements between the parties.

To better interpret the results of the aforementioned experiment, negotiation literature is previously reviewed. Specifically, negotiation definition, strategies and theories are addressed.

Due to the fundamental role that cognitive biases play in this experiment, the most important ones are defined, described and illustrated.

The thesis is thought to have used existing knowledge across the topics of negotiation and cognitive biases, while also suggesting future experiments and areas of research.

Abstract (italiano)

L'obiettivo di questa tesi di laurea magistrale è analizzare il ruolo dei bias cognitivi nelle negoziazioni.

È conseguito simulando una trattativa tra due persone. Seguendo delle istruzioni specifiche, esse sono chiamate a trovare un accordo in un ristretto intervallo di tempo.

Viene successivamente condotta un'analisi dei risultati per indagare ed interpretare quali bias cognitivi emergono e per verificare come diversi stili di negoziazione possano condurre ad accordi differenti.

Per comprendere in modo approfondito i risultati dell'esperimento, viene precedentemente rivista la letteratura riguardante le negoziazioni.

Dato il ruolo fondamentale dei bias cognitivi, i più importanti di essi vengono definiti e spiegati.

Nella stesura di questa tesi sono state utilizzate le conoscenze esistenti sui temi della negoziazione e dei bias cognitivi; vengono inoltre suggeriti possibili esperimenti futuri e nuove aree di ricerca.

INDEX

1. INTRODUCTION

Over the past sixty years the concept of negotiation has become increasingly important. While some decades ago negotiation courses did not even exist, now the subject has gained much more attention, with an ever increased emphasis on how to conduct a negotiation.
A large number of studies describing how to negotiate have emerged and people, especially managers and entrepreneurs, started to consider the subject with a different perspective.

Learning the best ways to conduct a negotiation is useful not only to common people (for example deciding with your wife which movie you will watch together), but especially to managers and entrepreneurs.
Mastering the art of negotiation means acquiring a set of skills that can make you avoid undesired outcomes.
The consequences of a single negotiation could be the one thing that enables a company to gain a significant competitive advantage with respect to competitors but it could also be the turning point leading to bankrupt.

Improvising is almost never the right path when it comes to negotiation: an adequate preparation and study of your counterpart is essential to reach an agreement that can be considered positive both for you and your opponent/colleague/wife/husband. Unfortunately, this is not always possible. It is complicated to obtain relevant information about a counterpart that you do not really know. A framework explaining a strategy to negotiate rationally is addressed.

Dealing with negotiation means dealing with cognitive biases. The topics are intertwined and in this thesis particular emphasis is put on the role biases play during a negotiation.
An experiment is being conducted and recorded to study the different styles of online negotiation that twenty people aged 20 to 30 adopt in order to reach an agreement.

In analysing the tactics used during a limited amount of time, the focus is specifically on what biases come into play in what moment of the negotiation.
Existing knowledge is used to study in depth the moves that lead to specific outcomes. Suggestions about future experiments are made to complement the findings of the experiment conducted for the writing of this master thesis.

2. NEGOTIATION

In this chapter, multiple definitions of negotiation will be presented, focusing mainly on a business setting.
Then the focal point will shift to the development of negotiation research, considering the contribution of distinguished authors.
The subsequent paragraph will be specifically about basic principles and terminology that are fundamental in the context of negotiation.
Finally, literature about online negotiation will be introduced, anticipating some topics that will be analysed in the following chapters of this master thesis.

2.1 Definition of negotiation

Before reviewing the literature on negotiations, the words that will be used in the thesis should be defined. First of all, negotiation is used everyday to resolve differences and allocate resources (Bazerman, Neale, 1993).
Negotiation is a basic means of getting what you want from others. It is back-and-forth communication designed to reach an agreement when you and the other side have some interests that are shared and others that are opposed (Fisher, Ury, Patton, 1991).
Shell (1999) suggest that a negotiation is an interactive communication process that may take place whenever we want something from someone else or another person wants something from us.
Thompson and Nadler (2002) think of negotiation as an interpersonal decision-making process by which two or more people make mutual decisions concerning the allocation of scarce resources.
Thompson further defines negotiation as an interpersonal decision-making process necessary when we cannot achieve our objectives single-handedly.
These are just some of the definitions that experts and authors have given to the concept of negotiation in recent years. There is not an expression that is better or more correct with respect to others: it is just the same thought rephrased multiple times using a few different words.

All these definitions state that negotiation is a process that involves at least two people. A party to a negotiation is a person (or a group of persons with common interests) who acts in accord with his or her preferences. The interests of negotiators are the preferences or utilities that each person has for the resources to be divided (Walton & McKersie, 1965).

If all the parties involved, with their own interests and priorities, are capable of reaching an agreement, the result will be the negotiation outcome (Thompson, Hastie, 1990). If they are not directed towards a solution that is convenient for all, the situation can end in an impasse. Strategies, particular methods and preexisting frameworks constitute the process.

2.2 Evolution of negotiation literature

In spite of the fact that the subject of negotiation as a whole can be viewed as rather recent, basic negotiation studies plausibly began to emerge around seventy years ago, period in which game theory literature started to grow. The interdisciplinary character of negotiation research has resulted in a field that has gone through numerous reinterpretations and repetitions of ideas and notions in this respect.

Considering some of the most important contributions with respect to their historical circumstances allows for a broad overview of the field's advancements, covering not only the related economic aspects but also other branches of knowledge.

Due to the fragmented structure of the negotiation research, a brief summary of some of the major theories is helpful to categorize the vast and not well defined topic of negotiation.

During the second part of the twentieth century, negotiation research went through several stages, each marked by different paradigms of thought.

Influenced by studies in game theory, economics, and mathematics, normative research prescribes what individuals would do if they were smart, totally rational and with no information asymmetries.

John Nash's studies were specifically about scenarios in which neither party needed to lose in order for the other to win, but instead the parties exchanged relevant knowledge in order to maximize the overall benefit (Thompson et al, 2010).

The research was for some aspects quite innovative but it was still based on the assumptions that the parties involved were fully rational.

Distributive and integrative bargaining were introduced in the middle of the 1960s by Walton and McKersie (1965) as notions belonging to a model of four sub processes of negotiation. Relying on preexisting knowledge and theories from psychology and economics, the two authors stated that distributive bargaining occurs when one party tries to maximize value at the expense of the counterpart, being straightforward and defining clearly their needs and the value they want to claim.

Integrative bargaining, on the contrary, is about enlarging the pie through cooperation between the parties, trying to reach a solution that can be considered acceptable and adequate for everyone involved.

Subsequent to this breakthrough in theory development, one of the most fundamental theoretical divisions in the field of negotiation began to emerge: normative research and descriptive research, in which negotiators do not always follow a rational path. Investigators have typically focused on objective, economic measures of performance. However, social-psychological measures are important because negotiators often do not have the information necessary to make accurate judgments of the bargaining situation (Thompson, 1990).

Tversky and Kahneman (1974) focused on the behavior of negotiators and found that they were biased and not rational in the process of making a final decision.

Other research was made by Raiffa (1982): his work was mainly about trying to generalize different notions into a framework containing the behavior to follow for bargainers.

Concomitantly with Raiffa's work, Fisher and Ury (1981) dealt with human behavior in integrative negotiations, considering the role of psychology.

Due to the fact that in the 1980's contributions spanned from behavioral decision theory to descriptive negotiation research, the 90's were strongly influenced by social psychology, exemplified by research on mental models, emotion, ethics, biases and perceptions (Bazerman et al, 2000).

In the last twenty years the direction of research has been more towards cognitive biases, which will be covered in the next chapters.

To sum up everything that has been stated so far, contributions in the field of negotiation shifted from game theory to considering the process of negotiation as complex, with many different sciences involved.
Psychology plays a crucial role in actual studies, mainly focused on trying to provide a simple and effective framework able to concentrate the most important findings so far.

2.3 Negotiation terminology and strategies

The significance of preparation in negotiations is acknowledged as an essential finding, particularly throughout practitioner literature. Fisher and Ury (2011) and Lax and Sebenius (2006) stress it with particular emphasis. “Critical” is how Bazerman and Moore (2009) define preparation.
After training and consulting with thousands of negotiators and dealmakers, Malhotra & Bazerman (2007) consider this in the business setting, claiming that they have discovered that the most costly mistakes occur before the negotiation even begins. Approaching a negotiation without an adequate preparation means, most of the times, accepting a more favorable deal for the counterpart or an impasse. The goal of negotiating is not to reach just any agreement, but to reach an agreement that is better for you than what you would get without one (Bazerman, Neale, 1992).
The finest negotiators plan ahead of time for their negotiation: it involves giving yourself some time to think about what you want, your interests and priorities, and the anticipated demands and alternatives of the opposing side.
Professor Leigh Thompson suggests that negotiators conduct a thorough self-evaluation before engaging in negotiations. She suggests that as part of your negotiating preparation, you must have clear the answers to two questions: What do I want to gain? If I do not reach an agreement, what is my alternative?
The target you set should be ambitious but reasonable. There are three pitfalls to avoid while setting a goal. Try not to set the bar too low, do not aim for a target that will make you question your own abilities. Your counterpart could accept your offer without even making a counter-offer: if this happens it means that you should reconsider the initial target and try to gain more benefit from the negotiation.

It is not reasonable to be overly ambitious: you could end without an agreement if you set your goals too high and refuse to concede some value to your opponent.
The third problem occurs when you have not dedicated an appropriate amount of time to consider all the possible impediments and to really understand what you really want. Negotiators typically see the opposing party's good-faith offers with skepticism or disappointment in this situation.
To enhance the chances of reaching a reasonable but ambitious objective, you will have to determine your BATNA, that is the *best alternative to a negotiated agreement*.
Once you determine your BATNA, you will face the upcoming negotiation with more confidence. You will know when and whether it's time to leave and pursue your best alternative.
Identifying your BATNA enables you to set your reservation value, defined as your walk-away point in the imminent discussion and the value at which you are indifferent to whether a negotiation ends with an agreements or in an impasse. If you are negotiating a price, your reservation value could be a specific figure under which you do not want to go.
Your reservation point may be represented as a bundle, such as the lowest pay, benefits, and duties you would accept to take a specific job, when it comes to an integrative negotiation.
Knowing what is your reservation point will prevent you from making two mistakes: accepting an agreement that is worse than your BATNA or rejecting an offer that is better than your BATNA.
In sum, negotiation preparation should be done with a clear vision of field. If you negotiate rationally and you are prepared to face different scenarios, you will have higher chances of reaching better results.
"Negotiating Rationally" is the title of the book of Bazerman and Neale (1992) in which they illustrate a framework divided in nine prescriptions, displayed hereafter.

1. "Assess what you will do if you do don't reach an agreement with your current negotiation opponent".
2. "Assess what your current negotiation opponent will do if they do not reach an agreement with you".

3. "Assess the true issues in the negotiation".

4. "Assess how important each issue is to you".

5. "Assess how important each issue is to your opponent".

6. " Assess the bargaining zone".

7. "Assess where the trade-offs exist".

8. "Assess the degree to which you might be affected by the tendency to irrationally escalate commitment to a previously chosen strategy, the mythical fixed-pie, anchoring and adjustment, the framing of the negotiation, the availability of information, the winner's curse, and overconfidence".

9. "Assess the degree to which your negotiation opponent might be affected by the tendency to irrationally escalate commitment to a previously chosen strategy, the mythical fixed-pie, anchoring and adjustment, the framing of the negotiation, the availability of information, the winner's curse, and overconfidence".

The two authors believe that the rational negotiator creates a strategy that fits the particular context in which the negotiation occurs in order to reach an agreement belonging to the bargaining zone, defined as the range of settlements within which it is better for both parties to agree than not agree. In prescription number 8 and number 9 some of the most common cognitive biases are presented: they will be further explained in Chapter 3.

Whether or not you decide, as a bargainer, to follow a certain framework to gain as much value as you can in a negotiation, you will have to develop a strategy.
Marks and Harold (2011) examine five negotiation strategies, briefly outlined below.
Collaborating: this technique is also known as integrating or problem-solving. This method reflects a strong care for one's own results as well as a high concern for whether the other party achieves their intended outcomes. A collaborative approach is defined by a desire to share relevant and accurate information in order to reach an agreement that benefits all parties concerned. The discovery of the core interests of people participating in the negotiation is emphasized in order to design a solution that fulfills the needs of both sides.

The *competing* strategy, also known as contending or dominating, is characterized by a stronger care for one's own outcomes and a lower concern for the outcomes of others. Persuading and threatening are some of the tactics used in a competitive approach.
An *accommodating* negotiating approach entails a high level of concern for other people's results and a low level of worry for one's own. Negotiators that employ an accommodating strategy are more concerned with ensuring that others achieve their goals. While this technique has drawbacks when trying to reach an agreement on key topics, it may be suitable when the focus is on the long term relationship or when negotiating from a position of weakness.
Compromising entails some care for one's own results as well as concern for the outcomes of others. A compromise plan would include using a give-and-take approach with the goal of finding an acceptable middle ground.
The last strategy involves *avoiding* circumstances that might necessitate bargaining. While there are times when using this particular strategy is appropriate, in many occasions it could lead to situations that "leave money on the table".
Avoidance reflects a low level of care for one's own and others' consequences.

2.4 Online negotiation

Negotiation is a method by which people settle differences. It is a process that takes place in many different environments and in various form. Other than the typical scenario in which managers gathered around a table discuss with another manager/colleague/opponent to reach an agreement, there are also other ways in which negotiations are conducted: online and through the telephone.
Face-to-face and telephone interactions are thought to generate greater social awareness and greater stability and cooperation than do online interactions.
When speaking in person, people are more likely to share information honestly, and the recipient is more likely to believe and act on that information. People who bargain online, being it via e-mail or via videoconferencing, are usually more likely to keep private information hidden. When they finally open up, the recipient is frequently hesitant to reciprocate. Information shared through electronic means such as e-mail is less likely to be truthful, less likely to be relevant and clear, and hence less helpful and

valuable than identical information exchanged face to face, according to negotiation research studies.

Stuhlmacher and Citera (2005) consider two perspectives concerning the effect of communication characteristics in negotiation, focusing on virtual negotiation.

The first perspective is called the *barrier effect*: it is based on the notion that the eye gaze signals dominance and therefore media that allow for the interchange of visual gazes during negotiation would result in less collaboration (Pruitt, 1981).

Virtual media, according to the *psychological distance* perspective, induce more depersonalization and less social effect than face-to-face encounters because they provide less informative signals and lower bandwidth.

Due to the covid-19 pandemic, online negotiation became a necessity because of the countless restrictions countries had to impose to protect the health of their citizens. Even if most of the literature about online negotiation tends to place this specific process below face-to-face interactions in terms of performance and reliability, the whole world suddenly had to adapt to a new normal.

It would be useless to report dozens of studies that end up with very similar findings. The same reasoning can be applied to frameworks: new frameworks on how to conduct virtual negotiations started to emerge. For practical purposes, one single framework by Thorsten Hofmann (2020) will be illustrated. The author provides ten rules that should be followed when digitally negotiating:

1. Pay attention to the technology.

2. Remember the "narrow field of view".

3. Minimize data protection and security risks.

4. Look out for the potentially increased awareness of differences.

5. Choose the right medium of communication for each phase of negotiation.

6. Do not interpret – Verify!

7. Remain cooperative and monitor your outcome.

8. Prepare yourself even more meticulously.

9. Consider the most likely scope of your deal.

10. Do not make online negotiations the new normal.

In the last rule of this framework the author wants to highlight the fact that, when possible, a face-to-face meeting will always be necessary in order to discuss how the deal is going and to find new ways of working together with your counterpart. Thorsten Hofmann believes that we, as humans, are "*social individuals, and only social interaction can lead us to trust and better results*".

3. HEURISTICS AND COGNITIVE BIASES

The first section of this chapter is about the definitions of heuristics and cognitive biases through the theories of some of the most renowned researchers.
The following part consists of an overview of the most common biases in negotiation setting.

3.1 Definitions of heuristics and cognitive biases

Rationality refers to the process that is supposed to lead to the best result, having previously evaluated the negotiator's interests and predisposition to risk.
Since in game theory it was assumed an unreasonable level of rationality, scholars started to develop cognitive negotiation theory (Malhotra, Bazerman, 2008).
Individual judgment is bounded in its rationality and we may learn more about decision making by describing and analyzing real decisions rather than relying only on prescriptive decision analysis (Simon, 1955). Prescriptive models try to define a precise way in order to make optimal decisions while descriptive models consider how decisions are actually made. In Simon's framework it is explained that individuals put a lot of efforts in trying to make rational decisions but most of the times they lack fundamental information that would help delineate the problem, the contrasting interests and so on. Time and costs constraints narrow the type and quantity of accessible information. When negotiating, people tend to satisfice: they often settle for a solutions that is good but not the best, ignoring all the possible alternatives.
In the mid 1970s Tversky and Kahneman were the firsts to introduce the concept of heuristics and biases in uncertain negotiations. They found that when people are about to make a decision they base everything on simplifying strategies, or rules of thumb, called heuristics. These are simple and intuitive rules that let us cope with the environment surrounding our decisions. The two authors define cognitive biases as people's consistent yet allegedly defective patterns of reactions to judgment and decision problems.

Bazerman and Moore (2002) describe four general heuristics that can be applied across the population.

The first is the availability heuristic: the degree to which instances or repetitions of an event are easily available in memory is used to estimate the frequency, likelihood, or likely causes of that event (Tversky, Kahneman, 1973).

The second one Is the representativeness heuristics: when judging a person, people will tend to look for peculiarities the person may have and compare them to already existing stereotypes. It can also work on an unconscious level and, when the information is poor, it can sometimes lead to discrimination.

Then there is the confirmation heuristic: people is encouraged to look for information that supports their ideas, mental models, and hypotheses while ignoring information that contradicts them. If there is no evidence to the contrary, people tend to assume that their thought and ideas are correct.

The last is the affect heuristic: the evaluations people make of a person, an object or an event occur prior to any reasoning. These evaluations (that most of the times are wrong) are then used as bases from which the final decision develops.

Raiffa (1982) worked on a framework considering what negotiators are likely to do in a behavioral perspective (Thompson and al, 2004). Raiffa believes that the negotiator should understand and forecast the counterpart's behavior.

Stanovich and West (2000) distinguish between System 1 and System 2 cognitive functioning. System 1 thinking is implicit, effortless, unconscious and automatic. It is used to make the majority of decisions in our life, especially immediate decisions.

System 2 refers to reasoning that is slower, conscious, explicit, effortful and logical (Kahneman, 2003). It is used when the decisions that have to be taken are of greater importance.

Everyone makes mistakes when it comes to judgment. These errors, or biases, occur more often in System 1 thinking than in System 2 thinking.

Some academics, such as Gigerenzer (1996), have criticized the heuristics-and-bias approach, arguing that the rules for assessing reasoning are too narrowly defined and divert attention away from comprehensive models of cognitive processes.

Before analyzing the most common biases, a final definition of cognitive bias is necessary to consolidate everything that has been stated so far.

A cognitive bias is a subconscious error that causes you to misunderstand information from the environment, affecting the rationality and correctness of your decisions and judgements. Biases are unconscious, automatic processes aimed to speed up and, theoretically speaking, improve the efficiency of decision-making and result when an individual inappropriately applies a heuristic.

3.2 Overview of most common biases

Despite the fact that hundreds of cognitive biases have been found across academic areas, certain biases appear more frequently in both general decision-making and specific negotiating literature (Thompson et al, 2004).
Since the purpose of this master thesis is to investigate the role of cognitive biases in negotiations and in the following chapters an experiment will be analyzed focusing on what biases occur during the recorded negotiation, only some of the most common biases will be illustrated.
Bazerman and Moore (2002) define overconfidence as the mother of all biases.
We could more readily double-check our ideas and rectify our errors if we were all suitably humble about the quality of our judgements. Instead, despite abundant proof of our own fallibility, we continue to think that our ideas and judgements are accurate (Pronin, Gilovich, Ross, 2004).
Overconfidence has been divided in three ways: overprecision, overestimation and overplacement.
Overprecision refers to the propensity to be overconfident in our judgements and conclusions, to be disinterested in verifying our beliefs, and to reject information that suggest we could be incorrect. In other words, people act as if they know the truth even if it is not the case.
In assessing how confident we are in a belief it is natural and often automatic to search only for supportive evidence, ignoring what could prove our position wrong.
Overestimation is the belief that we are better, smarter, more capable, more beautiful, or more popular than we are. As a result, we overestimate how much we can get done in a given amount of time or feel we have more control than we do.

Overestimation can manifest itself in self-enhancement, illusion of control, planning fallacy and optimistic biases.

Self-enhancement in the sense that we tend to view ourselves positively, not accurately (Dunning, 2005). We believe that our qualities are far better that they actually are.

S. C. Thompson (1999) thinks that the illusion of control arises when people believe they have the power and the ability to control the circumstances around them.

When people have little to no control, they usually overestimate it. When people actually have control, they often underestimate it.

The planning fallacy is intended as the tendency to wrongly appraise our skills and time management when it comes to complete a project (Buehler, Griffin, Ross, 1994).

Lastly, the tendency to overestimate the brightness of our future is known as unrealistic optimism (Sharot, Riccardi, Raio, Phelps, 2007), obviously belonging to the category of optimistic biases.

Overplacement is the mistaken belief that we are better than others on some dimensions, especially in competitive situations.

Opposite to overplacement, underplacement frequently occurs, leading to significant missed opportunities.

Beyond overconfidence and all its sub-categories, many other biases have an accurate definition.

Ease of recall: individuals consider events that are easier to recall from memory, based on vividness or recency, to be more frequent than events with the same frequency but less readily recalled instances.

Retrievability: individuals' perceptions of the frequency of events are influenced by how their memory structures influence the search process.

Insensitivity to base rates: individuals prefer to neglect base rates when estimating the likelihood of events if any additional descriptive information is supplied, even if it is useless.

Insensitivity to sample size: when evaluating the validity of sample data, people typically ignore the importance of sample size.

Misconceptions of chance: even when the series is too short for such assumptions to be statistically true, people predict a sequence of data created by a random process to seem random.

Regression to the mean: people often overlook the fact that exceptional events tend to regress to the mean in future trials.

The conjunction fallacy: people mistakenly believe that conjunctions are more likely than a wider set of events, of which the conjunction is a portion.

The confirmation trap: individuals prefer to seek confirmation for what they believe to be true while ignoring disconfirmatory data.

Anchoring: individuals make value estimates based on an opening value and, in most cases, make inadequate modifications from that anchor when determining a final value.

Conjunctive and disjunctive event bias: individuals have a tendency to overestimate the likelihood of conjunctive events while underestimating the likelihood of disjunctive ones.

Hindsight and the curse of knowledge: individuals tend to overestimate the degree to which they might have predicted the correct outcome after learning whether or not an event happened. Furthermore, while anticipating the behaviour of others, people do not consider that they may have information that others do not have.

Framing: even though changes in frames should have no influence on rational decision-making, different wordings of the same objective information drastically affect the judgments that individuals generally make.

Irrational escalation of commitment: when an individual's commitment to a previously chosen course of action exceeds what a rational model of decision-making would recommend.

Winner's curse: the tendency to believe that value is left on the table if an offer is accepted too quickly.

Endowment effect: If we have something in our possession or we believe it is ours we will work or fight harder to not lose it than we will to obtain it in the first place.

4. TWO-PARTY NEGOTIATION EXPERIMENT

In the first section of this chapter the negotiation experiment is presented and explained. Then the instructions given to the participants are illustrated and lastly some considerations about the limits of this experiment are expressed.

4.1 Methodology

Video conferencing is the tool utilized to run the experiment.
The game utilized in this experiment is a modified version of Kelley's renowned bargaining game for two people (1966). The game's structure may be split down into two components from an analytical point of view: a coordination subgame (purely cooperative) and a purely competitive subgame. The co-ordination subgame can end in parity; the competitive subgame implies that one's win is linked to the other's loss. If the competitive component dominates at this stage, the parties will strive to maximize their own profit at the expense of the other; if the cooperative component dominates, the parties will attempt to reach a fair agreement.
The experiment presented below is designed so that the collaborative component prevails over the competitive component. The peculiarity of the version of the game used in this study is the presence of both positive and negative payoff values in the individual payoff table. The participants are unaware of the game's structure, which they must learn in order to collaboratively arrive at one optimal solution.
The experiment is a bargaining game in which both negotiators have the same amount of information, but it is incomplete (they only know the information relevant to their division). The two negotiators are, respectively, the financial director of the American division and the financial director of the European division of the same multinational toy manufacturer. In the game, the financial directors have to negotiate the launch prices of three new products: Alpha, Beta and Gamma. The participants are aware of the particular market conditions that make the same price for a certain product correspond to different payoff values for the two divisions. The price is indicated by a letter (from A to I), while the payoff value corresponds to a certain number of points.

Table 1. below reports the payoff values side by side. For clarity, this table was not given to the participants. Its only purpose is to provide the reader with an overall vision.

Table 1: Payoff values of the American division (US) and European division (EU)

	Alpha		**Beta**		**Gamma**	
Prices	*US*	*EU*	*US*	*EU*	*US*	*EU*
A	-400	800	1800	1200	-800	2000
B	-100	600	1650	750	-600	1700
C	200	400	1200	300	-400	1400
D	500	200	750	-150	-200	1100
E	800	0	300	300	0	800
F	1100	-200	-150	750	200	500
G	1400	-400	300	1200	400	200
H	1700	-600	750	1650	600	-100
I	2000	-800	1200	1800	800	-400

Overall, each division has nine different price options for each product. Prices (letters) for different products may differ. It is now possible to identify the purely cooperative subgame and the purely competitive subgame that make up the experiment. The products Alpha and Gamma are based on the same payoff functions: the price for the American division of Alpha corresponds to the price of Gamma for the European division, but inverted. The same thing happens for the price of Gamma for the American division: it is the inverted price of the European division for Alpha. Thus, the two mangers can identify the pair of prices that makes their individual profits perfectly identical (1200 points by choosing prices *I* for Alpha and *A* for Gamma). Alpha and Gamma thus represent the cooperative subgame. The payoff of the Beta product, on the other hand, follows a "V" pattern, but reaches different maximum values at different points for the two divisions. Apparently a trade-off for Beta seems simpler

since both managers earn high positive amounts with both price *A* and price *I*. However, this illusion masks a purely competitive subgame in which there is no fair agreement.

The task assigned to the financial managers is to reach an agreement for the three products to reach the minimum target of 2150 points for each division.

Overall, taking into account all possible triplets that meet the target, the Zone of possible agreements (ZOPA) consists of 28 possible deals. The solutions are divided into fair and unfair solutions according to the degree of inequality between the payoffs they impose on the two divisions. The game does not involve perfectly fair deals but the difference between the two participants can vary from a minimum of 100 points (considered fair) to a maximum of 700 points (considered unfair). The best solutions constitute the pareto-efficient frontier and they are four: *IIA (2400,3000), IIB (2600,2700), HAA (2700,2600)* and *IAA (3000, 2400)*. These four triplets form the set of solutions with the highest joint payoff (sum of the two divisions): there is no agreement outside the frontier that is preferred by both negotiators or preferred by one and indifferent to the other. The triplets *IIA* and *IAA* (unfair) achieve a joint payoff of 5400 points, while the agreements *IIB* and *HAA* (fair) correspond to a joint payoff of 5300 points.

Twenty people aged 20 to 30 with an economic background were selected to take part in this negotiation experiment. Since it is a two-party negotiation, ten couples negotiated through Zoom, a famous video conferencing software.

All the participants were allowed to use a sheet, a pen and a calculator. Each manager knew their personal payoff table and the target but not the counterpart's payoff values. It was forbidden to exchange the original payoff tables.

The instructions were given twenty minutes prior to the beginning of the negotiation.

4.2 Instructions

Even though this master thesis is written in English, the negotiations were conducted in Italian. There are a number of reasons for this:
Most individuals are either embarrassed to be filmed or believe they lack the necessary expertise to take part in such an experiment. There are no good reasons to believe this because all of the participants have a background in economics and are familiar with the core economic ideas that underpin this experiment.
Given the difficulties in getting positive responses from certain participants, asking them to perform the experiment in English may have resulted in a rejection, delaying data collection.
Despite the fact that all participants have a level of English that would allow the experiment to be conducted in English, each participant's language property and ability to express oneself is unique. A situation where one party feels more at ease and is more inclined to take the lead in the negotiation than the other makes no sense, because the end result might be influenced by this disparity. A couple who reached a certain agreement in Italian might have ended up with a different outcome if the language used had been English.
Finally, even if two people have precisely the same level of English (which is impossible to measure), the ability to express themselves using their mother tongue leads to less conditioned behaviour and mental freedom. People were given the responsibility of bargaining to the best of their abilities without having to worry about proving their ability to interact in English: it was not meant to be an English test, it was a negotiation.
For all these reasons the instructions given to the participants were in Italian and the negotiations were entirely held in Italian.

In the interest of complete disclosure, the original instructions in Italian and the respective translations in English are shown below for both roles.

The instructions for both the financial directors have an identical description of the scenario. For practical purposes it will be presented only once, firstly in Italian and then in English.

Scenario – Italian version

Una multinazionale che produce giocattoli sta per lanciare tre nuovi prodotti sul mercato: Alpha, Beta e Gamma.
Il CEO di suddetta multinazionale ritiene che i prezzi di lancio dei prodotti debbano essere i medesimi sia in America che in Europa.
Il compito di stabilire questi prezzi viene affidato al direttore finanziario della divisione americana e al direttore finanziario della divisione europea dell'azienda.
Tramite una videochiamata, i due direttori finanziari sono chiamati a trovare un accordo.

Scenario – English version

A multinational toy manufacturer is about to launch three new products on the market: Alpha, Beta and Gamma.
The CEO of this multinational company believes that the launch prices of the products should be the same in America as in Europe.
The task of setting these prices is given to the financial director of the American division and the financial director of the European division of the company.
By means of a video call, the two financial directors are asked to come to an agreement.

The second part of the instructions were different between the two divisions.
First, the instructions for the American division are presented:

Instructions for the American division – Italian Version

Sei il direttore finanziario della divisione americana.

Sei a conoscenza del fatto che, a causa delle particolari condizioni di mercato europee ed americane, lo stesso prezzo per un certo prodotto corrisponde a valori di payoff differenti per le due divisioni.
Il valore di payoff corrisponde ad un certo numero di punti.
Al termine della negoziazione dovrete aver raggiunto un accordo per i prezzi dei tre prodotti in modo tale che ciascuno di voi riesca a raggiungere la soglia minima (target) di 2150 punti. L'accordo è valido solo se entrambi avete almeno 2150 punti.
Il CEO ha fornito sia a te che alla tua controparte nove prezzi tra i quali scegliere, indicati con una lettera (A, B, C, D, E, F, G, H, I).
Il CEO ha inoltre stabilito che, se tu e la controparte riuscirete a trovare un accordo che soddisfi il target richiesto, entrambi riceverete un premio fisso di $10.000, più un compenso variabile di $500 per ogni 50 punti superiori al target.
Nella tabella sottostante troverai per ogni prezzo i tuoi valori corrispondenti di payoff per i tre prodotti. Non sei a conoscenza dei valori di payoff della controparte.
La sola regola è il divieto di scambiare con la controparte le rispettive tabelle di payoff originali.
Tempo a disposizione per la negoziazione: 20 minuti.

Instructions for the American division – English Version

You are the financial director of the American division.
You are aware of the fact that, due to the particular market conditions in Europe and America, the same price for a certain product corresponds to different payoff values for the two divisions.
The payoff value corresponds to a certain number of points.
At the end of the negotiation you must have reached an agreement for the prices of the three products in such a way that each of you reaches the minimum target of 2150 points. The agreement is only valid if you both have at least 2150 points.
The CEO has given to both you and your counterpart nine prices to choose from, indicated by a letter (A, B, C, D, E, F, G, H, I).

The CEO has also decided that if you and your counterpart can come to an agreement that meets the required target, you will both receive a fixed premium of $10,000, plus a variable fee of $500 for every 50 points above the target.
In the table below you will find for each price your corresponding payoff values for the three products. You do not know the payoff values of the counterpart.
The only rule is that you must not trade your original payoff table with the counterpart.
Time available for negotiating: 20 minutes.

Table 2: Payoff table – American division

Prices	Alpha	Beta	Gamma
A	-400	1800	-800
B	-100	1650	-600
C	200	1200	-400
D	500	750	-200
E	800	300	0
F	1100	-150	200
G	1400	300	400
H	1700	750	600
I	2000	1200	800

Instructions for the European division are presented below:

Instructions for the European division – Italian version

Sei il direttore finanziario della divisione europea.
Sei a conoscenza del fatto che, a causa delle particolari condizioni di mercato europee ed americane, lo stesso prezzo per un certo prodotto corrisponde a valori di payoff differenti per le due divisioni.
Il valore di payoff corrisponde ad un certo numero di punti.
Al termine della negoziazione dovrete aver raggiunto un accordo per i prezzi dei tre

prodotti in modo tale che ciascuno di voi riesca a raggiungere la soglia minima (target) di 2150 punti. L'accordo è valido solo se entrambi avete almeno 2150 punti.
Il CEO ha fornito sia a te che alla tua controparte nove prezzi tra i quali scegliere, indicati con una lettera (A, B, C, D, E, F, G, H, I).
Il CEO ha inoltre stabilito che, se tu e la controparte riuscirete a trovare un accordo che soddisfi il target richiesto, entrambi riceverete un premio fisso di $10.000, più un compenso variabile di $500 per ogni 50 punti superiori al target.
Nella tabella sottostante troverai per ogni prezzo i tuoi valori corrispondenti di payoff per i tre prodotti. Non sei a conoscenza dei valori di payoff della controparte.
La sola regola è il divieto di scambiare con la controparte le rispettive tabelle di payoff originali.
Tempo a disposizione per la negoziazione: 20 minuti.

Instructions for the European division – English Version

You are the financial director of the European division.
You are aware of the fact that, due to the particular market conditions in Europe and America, the same price for a certain product corresponds to different payoff values for the two divisions.
The payoff value corresponds to a certain number of points.
At the end of the negotiation you must have reached an agreement for the prices of the three products in such a way that each of you reaches the minimum target of 2150 points. The agreement is only valid if you both have at least 2150 points.
The CEO has given to both you and your counterpart nine prices to choose from, indicated by a letter (A, B, C, D, E, F, G, H, I).
The CEO has also decided that if you and your counterpart can come to an agreement that meets the required target, you will both receive a fixed premium of $10,000, plus a variable fee of $500 for every 50 points above the target.
In the table below you will find for each price your corresponding payoff values for the three products. You do not know the payoff values of the counterpart.
The only rule is that you must not trade your original payoff table with the counterpart.
Time available for negotiating: 20 minutes.

Table 3: Payoff table – European division

Prices	Alpha	Beta	Gamma
A	800	1200	2000
B	600	750	1700
C	400	300	1400
D	200	-150	1100
E	0	300	800
F	-200	750	500
G	-400	1200	200
H	-600	1650	-100
I	-800	1800	-400

These were all the instructions given to the two “financial directors”.

4.3 Limitations

The main limit of this experiment is the scale. Twenty people were involved and ten negotiations were recorded. The same exact experiment with a larger number of participants would give a more significant result. This does not mean that the way in which the experiment was conducted makes no sense but it would have more significance if the sample were bigger. A reasonable number could be seventy or eighty people. However, as the master thesis has time and resource limitations, this was not possible.

Besides the total number of participants, another limit is the fact that all the negotiators are Italians. All of them share the same culture and were educated in Italy. Setting the negotiators pairs with people from different countries would be stimulating: maybe different techniques would collide, maybe the total number of agreements would be different, maybe in proportion it would be the same.

Many of them could face difficulties to reach an agreement if the counterpart had a totally different background along the lines of negotiations.

The fact that all the negotiators know the counterpart personally is a factor to take into considerations when it comes to analyzing the outcomes: the way you interact with the other party is different with a person that you know with respect to a stranger.

Another limit of this experiment could be the time dedicated to the preparation and to the negotiation: twenty minutes each.

Once concluded the experiment, some participants complained about the time saying that it was not enough for an adequate preparation. Others believed that twenty minutes to reach an agreement were too little and they had to rush their course of actions, altering their initial strategy.

The fact that the experiment was conducted online may be a limit: a comparison between face-to-face negotiations with the same rules could lead to interesting analyses.

Yet, with all this concerns, the thesis is thought to have produced interesting results and it might be used as a starting point for future research.

5. RESULTS

In this chapter each of the ten negotiations will be analyzed before giving a general overview of the agreements reached by the participants.
In the last paragraph some suggestions for future research are made.

5.1 Case-by-case analysis

In the following negotiations, the financial director of the American division will also be referred to as player 1, US director, American director, US.
The financial director of the European division will be also referred to as player 2, EU director, European director, EU.
The words *price* and *letter* will be used interchangeably.
The expression *range A-D*, for example, means that the prices considered in that particular moment are A, B, C and D.
The triplet ABC, means price A for Alpha, price B for Beta and price C for Gamma. This criterion of indicating the prices applies for every triplet indicated below.
The expression *EAD (2400, 2300)*, for example, means that with the triplet Alpha E, Beta A and Gamma C the American director totalizes 2400 points and the European director 2300.

Negotiation n. 1

The participants are both women.
The players agree to initially use a one-by-one approach. After considering Alpha for no more than thirty seconds, player 2 states that, studying her payoff table, the first prices of the table (from A on) are the most favorable for each product. Player 2 responds that in her table the first prices are the most favorable only for product Beta. In less the two minutes they reach an agreement on Beta B, functioning as anchor for the development of the bargaining. The two directors find out that the prices for Alpha

they are willing to accept are inverse. The price with the biggest payoff for US are from I backward while for EU they are from A forward. Then US suggests Alpha E.
EU director is willing to accept Alpha E only with Beta A (anchor) and Gamma from D backward. The financial director of the American division does not accept and makes a counteroffer, even if the triplet EAD is enough for both players to reach the minimum target. Competitivity enters the game: player 1 wants a higher level of payoff, translated in more money as a premium. Considering the anchor Beta A, US proposes Alpha D and Gamma F.
Making the necessary calculations, EU rejects the last offer because the target is not reached. US then comes back the triplet EAD, a deal that can be considered valid because both players exceed 2150 points.
They decide that the most important thing is to reach a valid triplet and they have it: it is EAD. They are not satisfied yet, so they put aside the valid triplet and continue bargaining. Ten minutes left. After some proposals by both players the triplet EIF is found and almost immediately discarded for no particular reason. When there are only two minutes to the end of the negotiation, both directors propose new triplets. The initial strategy of going one-by-one shifts to triplet proposals that would make the player making the proposal better off. Two minutes are not enough to utilize such strategy and all the offers are rejected. Even if they do not know each other's payoffs, both directors are not satisfied with the last-minute proposal, maybe because they are afraid of being deceived and they do not want the colleague to earn a higher figure. Right on time the financial directors come back to the original triplet: EAD. It's their final decision.

The suboptimal triplet EAD enables US to reach 2400 points, earning $12.500.
EU totalizes 2300 points, earning $11.500. EAD (2400, 2300) is a fair solution but US ends up with $1000 more with respect to the counterpart. The financial director of the American division was the first to enter in a competitive mindset and in the end she is able to reach an agreement that is not only valid but it also makes her earn more money than the counterpart.
In the beginning the collaborative part of the game prevails over the competitive one: both parts were willing to make concessions to the other player in order to receive

something on a different product. They fell in the fixed-sum trap: they tend to avoid negative values believing that it would be too favorable for the counterpart. EU never focuses too much on her total payoff, whichever agreement is fine. This is partially true for player 1: her competitiveness lead to a more favorable outcome for her.

Negotiation n. 2

The participants are two men.
The financial director of the European division suggests starting with Alpha. The US director shares his strategy: EU indicated a price for Alpha and US does the same for Beta while the letter for Gamma can vary depending on the other two values.
EU suggest Alpha A and US promptly shows his dissent. EU then suggests Alpha B: same result, US does not agree. EU continues to lead the negotiation proposing Alpha C and the financial director of the American divisions accepts the price temporarily, only to see if they can find a deal. It's now time to switch roles. In fact, US takes the lead and proposes Beta B: player 2 is hesitant. The same thing happens with Beta C. Player 1 suddenly proposes the price I for Beta and the director of the European division (caught off guard) is happy to accept the offer. The latter understands how the prices are ordered on the counterpart's table and shares his idea. From this moment on, both players seem to understand the structure of the columns of Alpha and Gamma. US, evidently still with unclear ideas, suggest that the best strategy would be to meet each other in the middle for both Alpha and Gamma. They focus on Alpha again: player 2 proposes Alpha E and Gamma E. Player 1 rejects the offer because the target is not reached and counteroffers the triplet FIE.
Player 2 is satisfied with this triplet because it reaches the target but both directors believe they can do better. In five minutes they could the negotiation. They decide to keep going because they want to earn more money.
EU tries EIF but it is not an appealing offer for US. Player 2 leads the negotiation again: he completely understands how to maximize his total payoff and suggests the triplet IIA. After some calculations, the American director admits he is a better off with IIA rather than FIE. EU says he would be better off, without specifying by how much.

US tries to change the price of Beta, proposing A instead of I. EU rejects the offer because he knows that IIA enables him to reach 3000 points: there is no higher total payoff considering the tables given to the participants. EU is firm in his position and rejects every subsequent offer made by US. The latter gives another try to the triplet IAA: it would give him 3000 points and 2400 to EU, the opposite of IIA.
EU rejects again the triplet and the directors come back to the previous agreement: IIA. In thirteen minutes they reach a valid agreement.

The triplet IIA is an optimal solution and lies on the Pareto-efficient frontier.
The financial director of the American division totalizes 2400 points, earning $12.500. The European director end up with 3000 points, earning $18.500. Even if the solution is optimal it is considered to be unfair, because one director earns $6.000 more than the other. At the beginning of the negotiation both players are reluctant to accept negative payoff. The fixed-sum effect lasts only for the fort few minutes. Even if they find a valid agreement they are both convinced that there is still value left on the table so they keep negotiating. When the two parties understand the structure of the game and the role that Alpha and Gamma play, the European director is the quickest to propose the best triplet for him. The American director accepts because the cooperative component outweighs the competitive one. The latter is present anyway but there is nothing that can make the European director change his mind. The two directors never say explicitly that they want to earn more than the counterpart: this reasoning is implicit in the course of actions they take. The behavior of the US director may be affected by the overplacement bias: he is convinced that he can, in some way, beat the other player and change his mind but this does not happen. In fact, he ends up accepting a triplet that leads to a big difference in the cash reward.

Negotiation n. 3

The financial director of the American division is a woman while the financial director of the European division is a man.
US immediately asks EU which products have the best payoff and says that in her table the worst payoffs are associated with product Gamma. The EU director admits that in

his table Gamma has the highest payoffs and asks US the same question. US reveals that Alpha gives her the highest payoffs. EU takes the lead and starts the negotiation proposing Beta I: US accept right away and gives also the alternative value H for Beta. Player 1 proposes H or I for Gamma but EU takes into consideration the first letters excluding A and B: he thinks she would not accept such prices.
Between C and F, US is willing to accept the letter F (because it is the only positive value and it seems that she wants to avoid negative payoffs). Considering Alpha F and Beta I, player 2 says that he need Gamma A or B to reach the target. He is lying but US rejects the offer. It is a chaotic situation. US has some doubts about the rules of the game and EU promptly explains everything. It becomes clear that for the first five minutes US has accepted or rejected proposals from EU according to a wrong criterion. Beta I is now considered as the anchor from which the prices of Alpha and Gamma will be based, according to EU. The American director has other ideas and explicitly says that she can accept prices for Beta from A to E: she clearly prefers to stay away from negative payoffs. EU changes his mind and accepts Beta A as a possible solution, but also B, H and I are good. The focus shifts to Alpha and US reveals that she accept F, G,H and I. EU is ok with Alpha F but want a concession on Gamma.
Gamma is now evaluated: US excludes once again negative payoff values. EU is the first to propose a triplet, EIE, but the American director does not reach the target. US tries to take the lead but EU is very determined to not concede power to the counterpart: he wants to be the one making proposals and barely let her colleague speak in this moment. They come back to Beta I, it seems to be a standoff. US declare that she does not gain much on Gamma and she wants to maximize her payoffs on Alpha and Beta. The financial director of the European division asks his colleague to reveal her highest payoff on product Beta: she would like Beta A. Now Beta A is defined.
They decide to define a range of possible prices both for Alpha and Gamma that would lead to valid agreement. Alpha has to be G or H and Gamma has to be between A and D. Considering Alpha H and Beta A, US proposes Gamma D. In this situation EU needs A or B for Gamma, otherwise he would not reach the target. They negotiate another minute on the correct price for Gamma. An agreement is reached with Gamma A because US is willing to concede something to the counterpart so that he could receive a higher premium. In fifteen minutes they come the final triplet HAA.

The triplet HAA is an optimal solution and lies on the Preto-efficient frontier.
The financial director of the American division totalizes 2700 points, earning $15.500. The European director ends up with 2600 points, earning $14.500. The solution is considered to be fair because there is a difference of $1.000.
From the negotiation the American director does not consider prices with a negative payoff. This happens also to the European director but, in order to reach an agreement he is ready to accept some values that are null or slightly negative. In some way they reveal to each other the structure of their tables (even if they never talk about numbers) but the whole negotiation never takes off. The two strategies were different: EU more competitive and dominant and US more condescending. US had difficulties in proposing her ideas because of the behavior of the counterpart. EU clearly overestimated his abilities in negotiating: he receives a lower premium with respect to his colleague even if the final triplet is optimal and one of the best in the whole game.

Negotiation n. 4

The financial director of the American division is a woman while the financial director of the European division is a man.
They decide to utilize a one-by-one approach. US proposes Alpha E. EU says it is not his ideal price and he would like to exclude all the prices below E. Both players state that E is not their best price for Alpha but for the moment they are ok with it. They move on bargaining the letters for Beta. EU proposes A,G,H and I (his highest payoffs for product Beta). Player 1 narrows it down to A or I. They decide I is the price they are looking for. Considering Alpha E and Beta I, they now negotiate the price of Gamma. The American director states she has a range of acceptable prices for Gamma (she excludes all the letters with negative payoffs). EU eliminates G,H and I and proposes F for Gamma. Us agrees. In five minutes, they have found a triplet that is valid for both of them: EIF. EU wants a higher total payoff and proposes three alternative triplets: AIG, BIG, CIG. Player 1 refuses because she would not reach the target. She proposes DAE: it is another valid triplet but EU refuses the deal because he would totalize more points with the previous triplet found (EIF). The bargaining continues: they start with Beta A. Player 2 has some more triplets to propose: EAA, EAB and EAC. US

counteroffers with EAC, specifying that she would be better off with Gamma D. EAD is the third valid triplet. They keep going. They cooperate because they have some time left and they both want to maximize their total payoffs. EU offers DAD but US would not reach the target.
They now anchor Alpha E, as they found with the third valid triplet. The cycle starts again: they reconsider EIF. Player 2 is indifferent between EIF and EAD. US proposes EAE, a triplet that would make her reach 2600 points, more than the other triplets already found. EU rejects the offer because he would not reach the target.
They now compare EAD and EAC: the price of Gamma is the bone of contention. The American directors prefers Gamma D while EU would be better with Gamma C.
EU is willing to accept EAD as long as it leads to a more favorable outcome for both of them. EU makes a final attempt: he proposes EIF and asks to the American director if she would be better off. She has more points with EAD. In eighteen minutes they come to an agreement on EAD.

The suboptimal triplet EAD enables US to reach 2400 points, earning $12.500.
EU totalizes 2300 points, earning $11.500. EAD (2400, 2300) is a fair solution but US ends up with $1.000 more than the counterpart.
During the negotiation the financial director of the American division falls in the fixed-sum belief. She excludes negative payoffs more than one time but in the end she accepts Gamma D with a small negative value. No player ever prevails over the other, no player focuses only in beating the counterpart, the main objective is to find an agreement. In the last minutes EU concedes something to US because he wants to conclude the negotiation with both players satisfied. In this case collaboration is far more important than competitivity. They are aware of their abilities, they never disrespect each other and they peacefully reach a final agreement that is good for both. So far this is the negotiation that entail the highest level of collaboration.

Negotiation n. 5

The financial director of the American division is a man and the financial director of the European division is a woman.

EU proposes the triplet AAA. It is the first time than a negotiation starts with a triplet proposal. US immediately rejects the triplet but he proposes to keep Beta A.
EU accepts and she is now given the possibility to choose the two remaining prices because the American director is very satisfied with Beta B. EU proposes Gamma C. US says he might accepts but it all depends on the price of Alpha. The Us director proposes I, G and H for Alpha: player 2 rejects these three prices. US remembers the counterpart that their goal is to reach 2150 points, they do not need to make a splash. She agrees with his colleague but she cannot really accept G, I or H for Alpha (she avoids negative payoffs). The focus shifts to Gamma: EU proposes B, C or D. Player 1 replies that that he would prefer prices below F but he is willing to accept D or E, if necessary. US understand the way in which the columns for Alpha and Gamma are structured. Given Beta B and Gamma D, player 1 ask for a compromise in Alpha and proposes the letter E. EU's payoff for Alpha E is zero: she does not even make calculations and refuses even if EAD (2400, 2300) would be a good deal. Player 2 proposes D instead: US rejects the proposal.
Since they cannot find an agreement they try to change Beta. EU proposes G, H or I. US refuses because his highest payoff for Beta is with price A. He makes it clear to his colleague and they decide to keep beta A.
They negotiate on Gamma now. US reveals that he would gain almost nothing with Gamma E and EU says it is the same thing for her. Gamma E is set. Given Beta A and Gamma E, player 1 proposes Alpha D. EU makes the calculation and then accepts. The American director believes the experiment is structured in this way: the only possible solution is the one they have found and it does not entail a big difference in earnings. He also explains to the European director that a big gain for one part means a big loss for the other part. They both check their calculation and they confirm the triplet DAE.

The suboptimal triplet DAE enables US to reach 2300 points, earning $11.500.
EU totalizes 2200 points, earning $10.500. EAD (2300, 2200) is a fair solution but US ends up with $1.000 more than the counterpart. This is the most evident case of fixed-sum. EU avoids negative payoff values at all costs. US is more open to this eventuality from the beginning. He believes to have understood completely the structure of the game and even explains it to the other player. Overconfidence is clear and in the end

the triplet they find is one of the worst between the 28 possible solutions. It is valid, but the joint payoff value is particularly low
EU is interested in finding an agreement: she never consider the experiment as a competition against the colleague.

Negotiation n. 6

The financial director of the American division is a man and the financial director of the European division is a woman.
EU shares her strategy with US: she thinks that the best thing to do is that she decides one price, the counterpart decides the price for the second product and together they will discuss the price for the remaining product.
The American director has something else in his mind: for the first product each player makes a proposal for a specific price, for the second product each players proposes a range of possible prices and for the third product they will discuss together the price.
EU would prefer to discuss together the price of Beta. It is difficult to understand what strategy they will use. There are many ideas but both players have not clear ideas in their minds.
Alpha is the first product considered. US says he would prefer a price belonging to the range E-H. EU is not satisfied with the range but she would prefer E, if necessary.
They end up setting Alpha F for now and they go on with the bargaining.
The financial director of the European division proposes the range A-D for Gamma and player 1 counteroffers with the range B-F. They decide to set price C for Gamma.
It is time to negotiate on Beta. US proposes C but player 2 does not agree. She proposes Beta I and US accepts: FIC is not a valid triplet because US does not reach the target. They confirm Beta I but the prices of Alpha and Gamma need to be adjusted.
Even if they have just decided Beta I, the American director proposes Beta B and EU does not agree. The focus shifts to Alpha. Keeping Beta B and Gamma I, the EU director proposes Alpha in the range A-E. Ten minutes have passed and US counteroffers again: he proposes EBD. Player 2 rejects the offer. Keeping Beta I, the American director proposes Alpha G: EU accepts but everything depends on the price of Gamma.

US proposes Gamma D, so the triplet would be GID. EU accepts and they now have a valid triplet with less than five minutes remaining.
EU wants to earn more and proposes E or F for Alpha. US refuses because he would not reach the target. The American director proposes Beta A, B or C. Player 2 refuses because the already agreed price I on Beta gives her the highest payoff.
Time is running out and they confirm the triplet GID.

The suboptimal triplet GID enables US to reach 2400 points, earning $12.500.
EU totalizes 2500 points, earning $11.500. EAD (2400, 2300) is a fair solution but US ends up with $1.000 more than the counterpart.
From the way in which the American director explains his strategy, right after EU explained hers, it seems he is a bit overconfindent: the tone of his voice and his manners are those of a very confident director, maybe too much. He never approaches the negotiation to beat the counterpart, he wants to reach an agreement.
Competitivity is the protagonist until the end of the negotiation, where The European director tries to maximize her payoff even if they had just found a valid agreement.
The fixed-sum belief is evident mostly in the beginning but the negotiation ends with both director accepting a negative payoff. Despite the initial chaos about which strategy to use, the final agreement can be considered good even if it is not optimal.
The framing of some offers by EU (proposing the triplet not in a sequential order) lead to some difficulties for US. Sometimes he needed a good amount of time to make calculations and to repeat the offers just received: he wanted to make sure he understood correctly. Other than that, the final result is considered satisfactory by both players.

Negotiation n. 7

The financial director of the American division is a woman while the financial director of the European division is a man.
The American director asks to the counterpart if he has a strategy in mind: he proposes the triplet BAC. She refuses because she would not reach the target and counteroffers the triplet III. EU cannot accept it. They try to reach an agreement with Beta B or I. EU

waits for an offers from US: she proposes Gamma H. He is willing to accept it only if Beta has the price I. The American director is ok with it. To reach the minimum target, player 2 says that he needs Alpha A, B or C (he is lying, the triplet CIH is 50 points below target). The problem is solved because player 1 does not reach the target with Alpha A, B or C. They discuss on the role of Beta. They come back to beta B or I.
US proposes Alpha C and Beta B but EU would need a change in the price of Gamma. The EU director insists on Beta I and he can also accept all the prices of Gamma except for H and I (negative payoff values for him). They try Gamma G and Alpha D. Considering Beta I, it is not a valid triplet considering because US does not reach the target. She proposes Alpha I. EU states that it is his worst payoff for Alpha: the American director understands the structure of the two different columns of Alpha. An attempt is made with Alpha E. The American director proposes Beta A, B or C and the counterpart chooses A, his second highest payoff for product Beta. With Alpha priced at E, Beta A, EU needs a price for Gamma between A and D. US makes some calculations using price D for Gamma and she is satisfied with this triplet: EAD.
The deal is done: E for Alpha, A for Beta and D for Gamma. They have found a valid triplet in less than nine minutes and they decide to stop negotiating.

The suboptimal triplet EAD enables US to reach 2400 points, earning $12.500.
EU totalizes 2300 points, earning $11.500. EAD (2400, 2300) is a fair solution but US ends up with $1.000 more than the counterpart.
Once again the effects of fixed-sum are clearly visible. Both players tend to avoid negative payoff values and leave value on the table because they try to meet in the middle for Alpha and Gamma. They do not even try to impose a specific value to each other. They are very calm and the only thing that matters is finding a valid triplet.
As soon as they find one the negotiation end. They are interested in trying to maximize their payoffs. Both players anchor to some values they consider valid but they do not stick to those values. When an alternative price for a product is found, they are willing to accept it without particular hesitation. In other words, there is no irrational escalation of commitment. No one ever prevails over the other and competition is not considered.

Negotiation n. 8

The participants are two men.
The American director shares his strategy: he proposes a triplet, then the EU proposes a triplet and then they start from there. The European director agrees.
US proposes HCI, a triplet that would give him 3700 points. EU cannot accept and, before proposing his triplet, player 1 suggests not to consider the highest payoffs because they will have to be content with lower values. A strange request by EU, given that he has just proposed a triplet with his second best value for Alpha, his second best value for Beta and his maximum payoff value for Gamma.
Anyway, the bargaining goes on. Player 2 proposes ABC but US does not reach the target. They switch to a one-by-one approach and US, who barely lets his counterpart speak, thinks they will find agreement for Alpha with and intermediate value. He contradicts himself proposing his three highest payoff values for Alpha: G, H and I.
EU does not consider negative payoff values and rejects the three prices. US states the he has perfectly understood the structure of the game while US offers B, C and D for Alpha. US talks over EU, again. He really believes that he knows how to reach an agreement. EU proposes the letters C, D and E for Alpha. They set Alpha C and they move on with Beta. EU would prefer A, H and I. Player 1 says A is perfect: EU is ok with A but asks the counterpart to accommodate his imminent requests for Gamma.
They now have Alpha C and Beta A, it is time to discuss the price of Gamma.
EU proposes the range A-C even if he would reach the target wit D and E too: he tries to maximize his total payoffs. Now he is in a more competitive mood with respect to US. The letters A, B and C are rejected by US. He then reveals that he would need a price in the range F-I. They cannot find a valid triplet.
US is the one making hypotheses. After almost ten minutes into the negotiation, he suggest another strategy (the correct one). He believes he has to accept a very low value (even negative if necessary) for the product in which the counterpart has his best payoff and vice versa. They would have to decide together on the remaining product.
EU does not trust his counterpart and remains on Alpha C. The financial director of the American division reiterates his idea and believes that there is no point in accepting intermediate values in Alpha.

Keeping in mind Alpha C and Beta I, US need Gamma I to reach the target while EU need Gamma G.
US tries to find a triplet following his strategy, being ready to accept low payoff values in one product in order to gain a lot on another one. He proposes alpha G. He asks to the counterpart to choose from some letter in Beta: EU chooses his maximum payoff, Beta I. The American director lets EU choose the letter for Gamma in order to reach the target. EU responds D but he is not too convinced (even If GID would be a valid agreement). EU states that he cannot accept Alpha G. He is confused and now he is ready to accept Gamma C, given Alpha G and Beta I. GIC is a valid triplet. To be sure, US asks one last time to EU if he would reach at least 2150 points. The European director states he does. Theoretically speaking, they have a deal. EU suddenly asks if Alpha is set at G. US repeats the triplet: GIC. This triplet is valid and would give 2200 points to US and 2800 points to EU.
The European director has 2800 points with the triplet GIC but he pretends to have misunderstood the price of Alpha. He lies and says that we does not reach the target by a few points. He proposes FIC because in thus way he would reach 3000 points: EU, instead, does not reach the required 2150 points.
EU proposes FHC but it is not a valid triplet (FHC would give him even more points than GIC). He consider the negotiation as a win lose game and he wants to win. He dares to propose also FIC. Two minutes left. EU proposes FCE. The European director refuses and proposes D for Alpha and E for Beta. He has no time to propose a price for Gamma: twenty minutes have passed. The directors were not able to find a valid triplet.

In the first minutes of the negotiation the American director emerges because he is the one leading. He is overconfident and too optimistic: in proposing his strategies, his posture and his attitude communicate confidence and the belief that, following what he says, an agreement will be reached.
In some of his first proposals he contradicts himself and tries to maximize his total payoff. His competitivity becomes less intense during the negotiation and in the end he just wants to reach a valid agreement. The opposite course of action characterizes the European director: he initially suffers the attitude of his colleague and follows.

Proceeding in the negotiation he becomes very competitive: he lies to EU saying the he would not reach the minimum target with the triplet GIC. Not only would he reach the target, he would earn a lot more than the counterpart. After this episode the two directors keep negotiating and when time has almost run out and the risk of ending the negotiation without an agreement is real, the European director decides not to recall the valid triplet found before.
In his competitive mind, it is better not to have an agreement than to accept a triplet that is unsatisfactory (even if, de facto, it is satisfactory). He believes that GIC would make EU earn more than him but it is not the case.

Negotiation n. 9

The participants are two men.
They consider Alpha first. EU proposes price C and US proposes the range D-I. The EU director says D and F may be a possibility. Keeping in mind these prices, they discuss Beta. The director of the American division reveals that F is his least favorable price and EU does the same for D. They consider A and both directors seem satisfied, US more than UE. They now discuss Gamma. Player 2 proposes Gamma A and player 1 says that he cannot accept A, B, C or D without adjusting the prices of Alpha and Beta. US also reveals that C and D are worse than B. EU proposes to change Beta but player 1 refuses (the letter A represents his highest payoff associated with Beta).
US proposes to keep Gamma D and to change the price of Alpha. Player 2 would prefer not to change Alpha because he claims there is not much margin. After taking some time to make the necessary calculations, the European director proposes Alpha E, keeping in mind Beta A and Gamma D. In eleven minutes they have found an agreement on a valid triplet: EAD.

The suboptimal triplet EAD enables US to reach 2400 points, earning $12.500.
EU totalizes 2300 points, earning $11.500. Even if there is $1000 difference between the two premiums, EAD (2400, 2300) is a fair solution. The directors were calm, confident in their abilities and the only goal was reaching an agreement.

In fact, they stop negotiating as soon as they find a valid agreement, even if there are nine minutes left.
No director ever tries to prevail over the other or impose their strategy. Except for the fixed-sum, no particular bias is evident.

Negotiation n. 10

The financial director of the American division is a woman while the financial director of the European division is a man.
The Eu director proposes the triplet CEB: player 1 refuses. EU now proposes Gamma H, EU is not satisfied. He tries to form a triplet using Gamma H, with Beta I and Alpha B. Offer rejected by EU but she proposes to keep Beta I or setting Beta B (her second best payoff for product Beta). She proposes BBH but EU does not reach the target.
EU offers another triplet: BBD but the offer is rejected by US. They try to find a valid triplet with Beta B. Considering Alpha D, US can accept F or G. Now they consider Beta I: EU proposes Alpha C and asks the counterpart to make an offer for Gamma. She proposes I but they do not find an agreement. Eu offers Alpha D, Beta B and asks EU a possible price for Gamma. She needs H or I: no deal.
US beliefs that the values are inverse for Gamma and EU says that they need to meet in the middle. They try to set Beta G. Both directors propose different triplet but nothing seems to work. They now set Gamma D and Beta C: EU would Alpha A but he know that US cannot accept it. When asked her preferred prices for Beta, the American excludes F (her only negative payoff for Beta) and would choose B.
Asking questions to each other they try a triplet with Alpha E and Beta A. EU proposes Gamma D: it is a valid triplet and EU says he would reach the target. US makes some calculations and before accepting the triplet she reminds the counterpart that more points equal more money. She proposes some alternatives for Beta and for Gamma: she tries to increase her total payoff. She finally accepts the triplet EAD when EU asks her if she would reach the target. They put this triplet aside and go on negotiating searching for a better triplet. They try set Gamma E. US proposes Beta I and EU accepts it. So with Beta I and Gamma E, US proposes Alpha G. This would be a solid improvement with respect to EAD (2400 point with EAD and 2600 with GIE).

Player 2 clearly admits that EAD is better for him. US offers Alpha F and EU says he would be better off with FIE with respect to EAD (100 points difference). Player 1 tries again with Alpha G: EU's answers is negative.
US is determined to change the triplet: she wants a higher premium. She proposes HAC: she would have 3100 points but EU does not reach the target.
The European director repeats that he would prefers FIE. US says the triplet is not bad but she would want something else. EU proposes other triplet to increase the total payoff of the counterpart but they do not find the right triplet. Two minutes left.
After asking EU if he totalizes a good sum, US accepts FIE as the final triplet. They have a deal.

The suboptimal triplet FIE enables US to reach 2300 points, earning $11.500.
EU totalizes 2400 points, earning $12.500. Even if there is $1000 difference between the two premiums, FIE (2400, 2300) is a fair solution. The European director tends to be the leader in conducting the negotiation because he is the one making the most proposals. Both directors initially do not care about the total payoff, they just want to reach an agreement. Once they find one, the priorities change. Fixed-sum is constantly present during the experiment because both players tend to avoid negative payoffs, especially US. Toward the end of the negotiation US reminds her colleague that they should maximize their payoff: it is just a reminder because she wants to be sure that EU earn an adequate premium. She is not in a competitive mindset, she genuinely wants both parts to succeed. EU is more competitive and when there two valid triplets on the table, he insists on the most favorable one for him: he delivers. He earns more than the counterpart. Both directors show remarkable time management skills: eighteen minutes are used but they never show the rush to reach an agreement. They make each other several offers and the negotiation keeps a good rhythm.

5.2 General trend

In this experiment, individuals frequently fall victim to an error of judgement called fixed-sum. The effect arises from the fact that each party involved in the negotiation believes that everyone has the same priorities with regard to the negotiated object. It follows that everyone is firmly convinced that a win for one party necessarily implies a loss for the other. In negotiations, on the other hand, it is possible to enlarge the cake before dividing it. In the experiment this error of judgement manifested itself when negotiating for Alpha and Gamma: both players tended to avoid negative payoffs, in some cases realizing that the maximum payoff for one division corresponded to the minimum for the other. Overcoming the fixed-sum effect meant recognizing which of the products was the more profitable: Alpha for the American director and Gamma for the European director. Only by recognizing the different priority of the three products did the negotiators manage to overcome the fixed-sum trap. By avoiding negative payoffs the zone of potential triplet was restricted to the space below the Pareto-efficient frontier.

This is one of the reasons why only two negotiations ended with an optimal solution. Apart from one negotiation where no agreement was reached and the two cases which ended with optimal solutions, all other negotiations ended with intermediate values of Alpha (D, E, F and G) and Gamma (D and E).

The aforementioned effect is a first obstacle to reaching an optimal solution.

Another obstacle was the inability to coordinate in order to establish a shared strategy by clearly stating their priorities. In some negotiations, despite the high degree of interactivity, the directors failed to reach one of the four agreements lying on the Pareto frontier. Overconfidence played an important role: arrogance and exaggerated confidence in one's own abilities rarely results in optimal agreements. In very few cases the participants decided to lie in order to achieve a higher payoff: in negotiation number 8 the players did not reach an agreement for this very reason.

When competitiveness came into play, the directors acted guided by the need to reach an agreement but above all by the desire to achieve a higher payoff.

Also noteworthy is the fact that although participants had twenty minutes to prepare for the negotiation, few of them used this time to think about possible solutions while most players waited for the other to make the first proposal.

5.3 Future research

Several possible areas for future research have been discovered as a result of the experiment presented in this thesis.
One recommendation for future research is to conduct the same experiment but involving people who do not know each other and then making a comparison of the results obtained in this thesis: by doing this, the role of cognitive biases could be investigated from a broader perspective. Another possibility is to frame differently the instructions only for one player and analyze if it would affect the final agreements. Recording the experiment with actual managers instead of twenty to thirty years old people with a background in economics could also show the difference in approaching the negotiation and in the tactics utilized to reach a valid triplet of prices.
Considering a larger sample would certainly make the results more meaningful, although interesting findings emerge from recording only ten negotiations. Making a comparison between a face-to-face scenario and an online scenario is another recommendation that could confirm or deny the findings of past research.
Not long ago face-to-face interactions were believed (and are still believed) to be the most efficient way of negotiating. Due to the Covid-19 pandemic, people were forced to get used to this new means of communication. Replicating the same experiments run in the past and comparing the new results with older findings could be the most efficient way to prove or disprove people and managers' preferences regarding the best way to conduct a negotiation. With respect to twenty years ago, individuals have developed different mindsets and are surely more used to digital tools. It would be interesting to study how the use of digital tools people are now accustomed to affects the way negotiations are conducted nowadays. Has online negotiation become more efficient than face-to-face negotiation after the Covid-19 pandemic? Is there a difference in the role of biases? These questions open up many possibilities for future research.

6. CONCLUSION

This master thesis has been guided by the following purpose:

To examine the role of cognitive biases in negotiations.

Starting from the literature about negotiation ad cognitive biases, the purpose has been met through a two-party negotiation experiment.
Twenty people aged between twenty and thirty were given the task of reaching an agreement following specific instructions.
Biases clearly emerged during the ten online negotiations. Despite the fact that this is an experiment with some limitations, it emphasizes the critical role of cognitive bias in reaching an agreement.
In this context, the emergence of a bias can translate into losing a few seconds or not reaching an optimal agreement: it is a game, there is no pressure. In real life, the consequences can be much worse, such as not being able to hire someone or not being able to reach an agreement with a manager on pressing issues.
These and many other reasons explain the importance of studying, analyzing and learning to recognize cognitive biases. These skills are and will increasingly be crucial not only for actual and future managers but for all individuals.
This master thesis is thought to have made use of prior knowledge in the domains of negotiation and cognitive biases, as well as recommending future experiments and study areas.

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