Putting the Gender Pay Gap on the Table

Teaching Strategic Empathy by means of Negotiation Support System to Enhance Women's Performance in Salary Negotiations

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Abstract

Enhancing women's negotiation performance has shown to be a complex task as existing stereotypes diminish the effectiveness of traditional negotiation strategies and traditional means for negotiation training lack accessibility and scalability. To target these issues, this research investigates to what extent Negotiation Support Systems (NSS) can be leveraged to teach Strategic Empathy - a recently introduced negotiation strategy - to women and whether this can improve their negotiation performance. In specific, the effect of teaching Strategic Empathy by means of NSS was tested with respect to enhancing women's main performance barriers: i) low self-efficacy, and ii) a lack of persistence. Based on a literature review, a tutoring system that integrated Strategic Empathy was developed and tested through the online experiment. The findings provided strong evidence on the effectiveness of using a NSS to teach Strategic Empathy. Women revealed significantly higher levels of perspective-taking and their understanding and use of Strategic Empathy was shown to increase over time. Also, a significant positive effect was found of Strategic Empathy on women's self-efficacy. No significant positive effect was found of Strategic Empathy on persistence. The high cognitive load of the experiment and a lack of intrinsic motivation were suggested as potential causes for this finding.

Overall, this work demonstrates the applicability of using NSS to teach Strategic Empathy and its effectiveness for enhancing women's self-efficacy in salary negotiations. By doing so, it contributes towards a solution to decrease the gender difference in negotiation performance. Moreover, it provides directions for future research as studies can build further on enhancing the system and experimental design, and deepening the understanding of the relationships between Strategic Empathy, confidence, and persistence.

Keywords: *Negotiation, Negotiation Support Systems, Gender, Strategic Empathy, Confidence, Persistence*

Table of Contents

1 Introduction

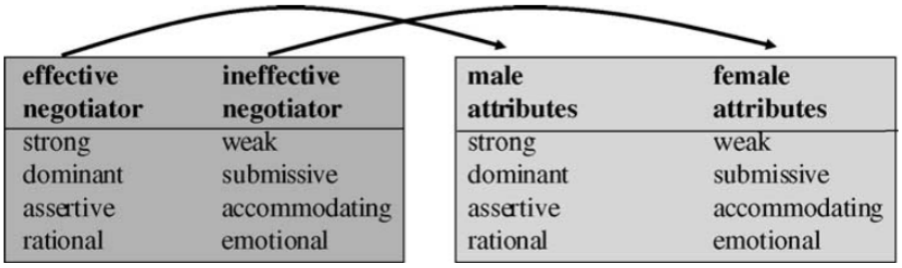
1.1 Problem Definition

To date, the majority of women hold an adverse attitude towards salary negotiations. Compared to men, women experience significantly more anxiety and self-doubt leading up to such an event. Interestingly, women have proven to be very successful when negotiating on behalf of others (eg. peace negotiations; Krause et al., 2018), but fail to achieve high personal gains when negotiating for themselves (eg. salary negotiations; Kulik & Olekalns, 2012). In salary negotiations, women lack confidence and are uncertain of when and how to bargain (Bowles & Babcock, 2013). Many women don't dare to ask at all, are not aware that there is room for negotiation, or are afraid to offend or hurt the other (Babcock, 2003). Moreover, due to low self-efficacy, inexperience, and low goals, women respond to resistance with reduced persistence. While rejection is argued to be the start of a negotiation (Voss, 2016), few women persist after hearing "no" from their opponent (Ma et al., 2019; Bowles & Flynn, 2010). A lack of persistence has been argued to have a significant negative effect on negotiation performance and outcome (Ma et al., 2019; Bowles & Flynn, 2010; Kay & Gist, 1997).

While the topic of gender and negotiations has been addressed in literature from a variety of angles, a consensus is evident on the complexity of how to improve women's performance and the outcomes they achieve in negotiations. Negotiation researchers, teachers, and policymakers have attempted to find solutions to target this issue. However, till present day, the strategies that have been put forward to improve women's negotiation skills (i.e., using a relational account, feminine charm, and confrontation) have been ineffective (Mazei et al., 2020). The lack of conclusive findings on effective strategies is a result of conflicting beliefs on the cause of this gender divide (Kray & Thompon, 2004). Moreover, the discussion is not static but varies across cultures and has been co-evolving with the position of women in society (Shan et al., 2019).

One of the major discussions resides around "nature versus nurture" as a cause for the difference in performance between gender. For many years, the majority of literature argued that women and men approach negotiations fundamentally differently. They argue that men are assertive, independent, and rational, whereas women are emotional, accommodating, and interdependent (Deaux & Lewis, 1984; Niederle & Vesterlund, 2008). Moreover, literature states that women see themselves in relation to others rather than independently and therefore devalue economic outcomes of negotiations over social outcomes, such as trust among negotiating partners and willingness to work together in the future (Amanatullah et al. 2008; Niederle & Vesterlund, 2008).

More recent literature, on the other hand, aligns with the "nurture" perspective and argues that the aforementioned predominant view has led to stereotyped negotiation theories that disadvantage women (Bowles, 2005). Namely, the traits identified as masculine and those that are feminine correspond directly to the characteristics that are generally associated with effective and ineffective negotiation skills respectively, see figure 2.1 (Kulik & Olekalns, 2012). Because of this strongly advocated link between masculine traits and effective bargaining behavior, women experience self-doubt and hesitation towards negotiations. As a result, women set lower goals, ask for less, and are willing to accept lower offers (Kray & Thompson, 2004). Similarly, the negotiation partner on the other side of the table holds stereotyped expectations about their counterparts' negotiation style and performance. Their judgment and evaluation standards are biased, disadvantaging female negotiators (Kulik & Olekalns, 2012).



effective negotiator	ineffective negotiator
strong	weak
dominant	submissive
assertive	accommodating
rational	emotional

male attributes	female attributes
strong	weak
dominant	submissive
assertive	accommodating
rational	emotional

Figure 1.1: Negotiation and Stereotype Traits (Kray & Thompon, 2004)

These stereotyped expectations also construct a social context that hinders women to improve their performance by simply adopting a more competitive - agentic - negotiation style. The most effective negotiation behavior as identified in figure 2.1, in fact, generally backfires when exercised by women and results in worse negotiation outcomes. Bowles et al. (2007) revealed that while competitively negotiating women were regarded as more competent compared to non-negotiating women, they were also regarded as demanding and unfriendly. Consequently, negotiators indicated to be less interested in hiring and working with competitive women. Sufficient evidence reveals the backlash that is triggered when women adopt gender-incongruent behavior such as self-promotion, competitiveness, authoritative leadership styles, or criticism (Kolb & McGinn, 2011; Brescoll & Uhlmann, 2008; Schneider, 2017). The dilemma that arises from these findings is evident: while agentic negotiation strategies are argued to be most effective, women's negotiation performance and outcomes are negatively affected by such behaviors.

Recent developments bring forward a new view on effective negotiations that may be able to provide a solution to this existing dilemma. Related studies argue that traditional negotiation theory that solely focuses on rational problem-solving is outdated (Holmes & Yarhi-Milo, 2017; Longmire & Harrison, 2018; Galinsky et al., 2008). According to Voss (2016), negotiations are profoundly psychological processes in which empathy and emotional intelligence can lead to superior outcomes. Successful negotiators should focus on perspective-taking; trying to understand the opponent's incentives, desires, and boundaries (Johnson & Gratch, 2020). This approach - frequently referred to as Strategic Empathy - suggests a different set of traits to be significantly influential in negotiation, among which social intuition, flexibility, and empathic capabilities (Schneider, 2017; Roberts, 2016; Martinovski et al., 2007). Interestingly, the elements that are stated as qualifications for effective negotiators according to Strategic Empathy are typically presented in the literature as female traits (Bowles & Babcock, 2013). This suggests that enhancing negotiation performance does not require women to adopt masculine behavior and challenge the backlash to gender-incongruent behavior. Instead, Strategic Empathy provides a potential negotiation strategy that could guide women to leverage their strength and target the issues that are currently diminishing their negotiation performance: confidence and persistence.

Namely, by means of Strategic Empathy, negotiators are argued to establish valuable insights about their opponent's negotiation position as well as their own. Negotiators become more aware of the possible alternatives and creative solutions. As a results, negotiators can become more confident about their own negotiation position, and may persist in the negotiation even if the opponent reacts with resistance. This potential of Strategic Empathy with respect to targeting the current issues in women's negotiation performance is discussed in more depth in section 2.1.4.

Taken together, teaching women Strategic Empathy appears to be a potentially effective strategy to contribute to decreasing the gender difference in negotiation performance. Traditional means for negotiation training, however, lack accessibility and scalability (Johnson, 2019). Negotiation workshops and courses at a university are usually quite expensive and have limited capacity. Consequently, research on virtual negotiation training tools has gained interest over the past decade. Accelerated by the advancements in the field of virtual agents, a growing body of research has focused on the development of human-agent systems that simulate negotiations (Broekens et al., 2010; Johnson, 2019; Johnson & Gratch, 2020). These systems allow users to practice and improve their negotiation knowledge and skills. Limited studies have focused on NSS and women in specific. Also research

on teaching Strategic Empathy by means of these so-called Negotiation Support Systems (NSS) is lacking.

1.2 Research Objective

Research shows that the majority of women perform significantly worse in salary negotiations compared to men and continuously receive lower outcomes (Kulik & Olekalns, 2012). Due to low goals, information scarcity, and inexperience, women lack confidence and respond to resistance with reduced persistence. Enhancing women's negotiation performance has shown to be a complex task as existing stereotypes diminish the effectiveness of traditional negotiation strategies (Bowles et al., 2007). Moreover, traditional means for negotiation training, such as workshops and courses at a university, lack accessibility and scalability (Johnson, 2019). This asks for a revisit of both the best practices that are taught to women in order to enhance their performance as well as the NSS that are designed to help enhance negotiation skills. This research aims to target this issue by investigating the question: Can NSS be used to teach Strategic Empathy to women and does this improve their negotiation performance?

1.3 Research Question

The aim of this research is to answer the main research question: Can NSS be used to teach Strategic Empathy to women and does this improve their negotiation performance? To do so, the research follows a step-wise process guided by a number of sub-questions. First, the research will focus on Strategic Empathy and NSS. NSS are investigated as a potential means to teach Strategic Empathy. In other words, the first sub-question investigates the extent to which Strategic Empathy skills can be taught, practised, measured, and improved by means of a Negotiation Support System. Accordingly, the following two sub-question is formulated:

> *SQ1: Can NSS be used to teach Strategic Empathy?*

Secondly, the focus is shifted to the effect of such a system with respect to enhancing their negotiation performance. This is done in two steps. First, the effect on the level of confidence is analysed - sub-question two - and second, the effect on the level of persistence is analysed - sub-question three. As such, the two major issues are being targeted that have been highlighted by literature to contribute to the gender difference in negotiation performance. Accordingly, the second and the third sub-question are as follows:

> *SQ2: Does teaching Strategic Empathy by means of a NSS enhance women's confidence in salary negotiations?*

> *SQ2: Does teaching Strategic Empathy by means of a NSS enhance women's persistence in salary negotiations?*

1.4 Research Approach

To answer the research questions and fulfil the research objective, a structured research approach is followed with two main phases: Firstly, an extensive literature review was conducted to establish an overview of the related work, determine the current status of the research field, and identify existing knowledge gaps. Secondly, an online experiment was conducted in which (exclusively female) participants participated in a negotiation simulation through a Negotiation Support System. The Negotiation Support System was specifically designed and developed for this study. The statistical results obtained from the experiment are used to answer the research questions. Figure 1.1 shows the research approach for each of the different sub-question and specifies the aimed output of each of them.

#	Research Question	Research Approach	Output
1	Can NSS be used to teach Strategic Empathy?	Literature Review, Online Experiment, and Statistical Analysis	An NSS for teaching Strategic Empathy and statistical results
2	Does teaching Strategic Empathy by means of a NSS enhance women's confidence in salary negotiations?	Online Experiment and Statistical Analysis	Statistical results
3	Does teaching Strategic Empathy by means of a NSS enhance women's persistence in salary negotiations?	Online Experiment and Statistical Analysis	Statistical results

Figure 1.2: Research Approach

1.5 Research Relevance

Gender equality in the labor market has remained high on the political agendas of developed countries, as in previous years the increasing attention and efforts directed to the issue have shown limited results (Ellwood et al. 2020). Not only has the share of women in leadership positions globally stabilized around 20 percent, a significant gender pay gap also persists in almost all occupations (Equileap, 2020). The Organization for Economic Co-operation and Development (OECD) showed that in all OECD countries, the median earnings of men are around 13 percent higher than those of women (OECD Stats, 2019). Literature highlights gender differences in negotiation performance as one of the prominent factors contributing to the so-called glass ceiling that limits gender convergence (Save-Soderbergh, 2019). Research shows that the majority of women perform significantly worse in salary negotiations compared to men and continuously receive lower outcomes (Kulik & Olekalns, 2012). In a major study on graduates, Babcock & Laschever (2003) reveal that 57 percent of the men and only 7 percent of the women negotiated on the compensation for their first job. The impact of salary negotiation performance is not limited to financial outcomes, rather they are multi-issue negotiations in which also non-financial elements are on the table such as vacation days, flexibility, and long-term perspective. Moreover, the impact of salary negotiation performance significantly influences social outcomes such as reputation and organizational relationships. As a result, poor performance in salary negotiations leads to serious downstream consequences, including less access to resources, mentoring, training, and promotion opportunities (Kulik & Olekalns, 2012). Taken together, the fact that women consistently negotiate lower salaries ripples down to a large number of factors that are hindering equality in the workforce. As aforementioned, existing strategies have proven to be ineffective and traditional training methods are costly and lack scalability. Establishing a better understanding of effective strategies and possible designs for virtual training tools could enhance to effect and reach of negotiation training. By doing so, it could allow women from different social backgrounds and geographic locations to learn how to negotiate a fair salary. Empowering them to avoid the negative downstream consequences of poor negotiations and break through the glass ceilings that hinders gender equality in the labor market.

1.6 Report Structure

The report will be structured as follows. Chapter 1 introduces the research context and relevance by introducing the main problem, and the approach by which this study aims to target the issue and contribute it's solution. Next, Chapter 2 is dedicated to the literature review which illustrates the current research domain and existing knowledge gaps. The key elements - Strategic Empathy and Negotiation Support Systems - are described and the possible integration of the first into the latter is investigated. Chapter 3 presents the Research Gap and the Empirical Framework. Furthermore, the hypothesis for the online experiment, that emerged from the Empirical Framework, are introduced. This chapter is followed by Chapter 4, Instrument Design, in which the system is introduced which has been designed and developed for the experiment. Chapter 5 describes the methodology used for

the experimental design, participants' characteristics, the procedures, and finally the measures used. In Chapter 6 the data collected during the experiment is introduced and the results are presented. Next, Chapter 7 is dedicated to the discussion on the results and how they relate to the main aim of the research. Finally, Chapter 8 provides a summary of the main findings of the research.

2
Literature Review

The aim of this chapter is to review the existing literature concerning Strategic Empathy, Negotiation Support Systems, and the possible integration of the first in the latter. It will establish a thorough understanding of the main concepts and the associated research domains. By doing so, it will target the first sub-question, as stated in the previous section.

2.1 Strategic Empathy

This section will introduce the negotiation strategy Strategic Empathy. First, a definition will be formulated of the main two concepts of this chapter: empathy and Strategic Empathy. Second, Strategic Empathy is linked to women's negotiation performance and the earlier identified issues: a lack of confidence and persistence. Using literature, the potential value of Strategic Empathy to target these issues is highlighted, strengthening the motivation for the focus on this negotiation approach.

2.1.1 Empathy Defined

In literature, there exists a lack of consensus on the definition of empathy. The concept has various dimensions and is often regarded from different angles. Mead (1969) defines empathy as: "the intellectual or imaginative apprehension of another's condition or state of mind", while others define empathy as a process of perspective-taking and demonstrating an accurate, objective understanding of another's needs, feelings, and motives (Vecchi et al., 2005; Mead 1993). The different views find common ground in stating that empathy is the ability to understand another's perspective but should not be confused by or conflated with sympathy. Sympathy is an emotional response to the condition or situation of another person, while empathy does not require one to feel for, or agree with the other side. Instead, empathic capabilities enable one to objectively comprehend the other person's emotional and cognitive state. Because of the wide-spread confusion between the two concepts, empathy is often mistakenly associated with altruism and compassion. On the contrary, empathy can be leveraged with solely egoistic intentions. For example, empathic skills are crucial for chess players to anticipate the next moves of their opponent and win the game. Hence, as defined by Holmes and Yhari-Milo (2017); "empathy refers to the ability to take the perspective of others and understand their cognitive and affective states without necessarily sympathizing with them".

From a neuroscientific perspective, a distinction is made between emotional- and cognitive empathy. The first refers to apprehending and appropriately responding to another's feelings and emotions, and the latter - cognitive empathy - refers to comprehending the perspectives and intentions of others (Holmes & Yahri-Milo, 2017). Various studies have investigated the effect of these two types of empathy in relation to negotiations, however, different terms have been used for the two concepts. Galinsky et al. (2008) referred to the concepts as empathy and perspective-taking, where the first participants were instructed to imagine what the negotiation opponent was feeling, and the perspective-taking condition instructed the participants to imagine what the other was thinking. Others investigated the two types of empathy and referred to the concepts as empathic concern and perspective-taking, where empathic concern was associated with both emotional empathy and sympathy (Weisz & Cikara, 2020). Another frequently used distinction between the different dimension of empathy are the following three major subprocesses (Xiao et al., 2016):

1. Emotional simulation - An affective response that often entails sharing the emotional state
2. Perspective-taking - A cognitive capacity of knowing another's internal states including thoughts and feelings
3. Emotion regulation - Regulating personal distress from the other's pain to allow compassion and helping behavior.

Similar to the neuroscientific viewpoint, there is a clear distinction between emotional and cognitive elements. The existent lack of consensus on the definition of empathy is indicative of the complexity and multi-dimensionality of the phenomena. In this research, we focus on the perspective-taking element and follow the definition given by Holmes and Yahri-Milo (2017): "The ability to take the perspective of others and understand their cognitive and affective states without necessarily sympathizing with them". When leveraged strategically in the context of negotiations, it can be referred to as Strategic Empathy.

2.1.2 Strategic Empathy Defined

Strategic Empathy is a negotiation strategy that advocates leveraging perspective-taking skills to gain crucial information on the cognitive and affective states of the opponent and anticipate their behavior (Grover, 2016). A substantial body of research provides evidence on the beneficial influence of perspective-taking on negotiation outcomes (Galinsky et al., 2008; Weisz & Cikara, 2020). Consequently, empathy has been argued as essential for the optimization of negotiation outcomes, both financial and social. Perspective-taking is argued to provide a strategic advantage. Salary negotiations can be seen as optimization problems with imperfect information and a high degree of uncertainty. Due to the lack of perfect information, even the identification of fully rational outcomes requires a good understanding of the opponent's perspective (Trötschel et al., 2011). Negotiators that manage to acquire personal details about their opponent have a significant advantage for their bidding strategy. Specifically, good perspective takers are able to identify efficient concession making opportunities on low- versus high-preference issues, so-called logrolling. By doing so, personal gain can be optimized while minimizing conflict with their counterpart (Trotschel et al., 2011). As such, an understanding of the other's intentions and priorities leads to more creative solutions and optimizes value creation (Holmes & Yahri-Milo, 2017).

The verbal and non-verbal behavior opponent reveals very valuable information about a negotiator's thoughts, intentions, and desires (Van Kleef et al., 2006). Offering patterns, hesitation, or display of emotions such as anger can disclose preferences and focus points for the negotiator to leverage in their proposals. In literature, one of the most common Strategic Empathy techniques in negotiation research and training is the so-called best alternative to a negotiated agreement (BATNA) strategy. By adopting this technique, negotiators consider the other side's alternatives in case no agreement is reached. This provides insights into the opponent's reservation price and can establish realistic expectations of the negotiation (Galinsky & Mussweiler, 2001). A perspective-taking mindset can also be induced by means of mindset priming (Trotschel et al., 2011). Prior to negotiations, participants are asked to play a game (non-related to negotiations) that required an understanding of the counterparts preferences. By doing so, mindset priming manipulated an outward focus. Johnson and Gratch (2020) manipulated participants towards perspective-taking by instructing the opponent to communicate it's preferences both explicitly (verbally communicating goals) and implicitly (through offer patterns). Participants were evaluated on how well they attended to this information.

Other studies leveraged more general perspective-taking instructions to initiate other-oriented focus. For example, prior to negotiations Galinsky et al. (2008) prepared their participants by saying: 'Try to understand what [the opponent is] thinking, what their interests and purposes are in selling the station. Try to imagine what you would be thinking in that role". However, Trotschel et al. (2011) showed that not all types of perspective-taking have the same beneficial effect on negotiation outcomes. They discovered that attending to other's preferences may also strengthen biases, such the anchor effect, and result in lower personal gains. Focussing on the opponent's target price and one's own BATNA personal alternatives if no agreement is reached) both have a negative effect on negotiation outcome (Trotschel et al., 2011)

Perspective-taking is very challenging some people, while for others do it naturally. Understanding the other's intentions and priorities requires one to be able to see the situation from the other's point of view. The degree to which people are able to do so is often referred to as Perspective-Taking Ability (Davis, 1980, 1983; Gillin et al., 2011; Galinsky, 2001). While this is an ability that people can learn, the initial level is determined by a person's personality. Some people are inherently more aware of others and are better at understanding a view other then their own. Hence, adopting Strategic Empathy and gaining insights about the opponent, is may vary across people depending on their personalities.

An understanding of the other's intentions and goals alone does not directly lead to better deals. In order to successfully leverage perspective-taking skills in negotiations, negotiators should be able to utilize the elicited information to identify complementary objectives and conceive potential solutions (Johnson Gratch, 2020). Hence, Strategic Empathy consists of the following elements:

i) Attend to verbal, emotional, and non-verbal cues of the opponent to gain information
ii) Leverage this information to comprehend the other's perspective, eg. goals, incentives, etc.
iii) Anticipate the opponent's moves based on the retrieved understanding of their perspective

2.1.3 Strategic Empathy for Women's Negotiation Performance

The main issues, as identified earlier, that hinder women to become better negotiators are i) women's low self-efficacy in their negotiation skills and ii) lack of persistence after rejection, and iii) the fact that strategies to target these issues have failed due the backlash that is triggered when women leverage these strategies. Strategic Empathy shows potential to enable women to overcome these barriers. First of all because the elements that are required for effective negotiators according to Strategic Empathy are typically presented in the literature as female traits (Bowles and Babcock, 2013). Women are not instructed to adopt gender-incongruent behavior, thereby avoiding a potential backlash. Next, Strategic Empathy can increase women's self-efficacy as it promotes behaviour with which women are more familiar and confident. Finally, Strategic Empathy can enlarge a negotiator's perceived room for negotiation which has an effect on both confidence and persistence.

The perceived negotiation room refers to the number of options a negotiator believes to have other than accepting the opponent's offer (Ma et al., 2019). In negotiation, the opponent challenges the other through showing resistance and trying to reduce the other's perceived room for negotiation. This is done through statements such as: "This is the best I can do" (Lee & Ames, 2017). Such statements signal an ultimatum and aim to convince the other that there is no further room to negotiate. Negotiators that already have low perceived room for negotiation are extra triggered by such statements and thus are likely to receive lower negotiation outcomes (Ma et al., 2019). Due to a lack of confidence, women tend to set lower goals, are more risk-averse, and devalue their own negotiation position (Busse et al., 2017). Consequently, they have a low perceived room for negotiation and tend to give up when faced with an ultimatum (Ma et al., 2019). Miles and La Salle (2007) stated: "negotiators with low self-efficacy respond to resistance with reduced persistence, giving up, and withdrawing in a negotiation context, leading to reduced negotiation outcomes". Hence, enlarging a negotiator's perceived room for negotiation can enhance both self-efficacy and persistence (Busse et al., 2017).

Strategic Empathy has the potential to increase the perceived room for negotiation. Namely, Strategic Empathy allows the negotiator to gain crucial information about their opponent's preferences and priorities (Trotschel et al., 2011). Such information helps to enlarge the perceived room for negotiation as it can reveal details that strengthen one's personal negotiation position and disclose more creative solutions (Holmes & Yahri-Milo, 2017). In other words, negotiators who adopt Strategic Empathy are expected to be more likely to identify that their negotiation counterpart has options even when their counterpart claims that they cannot make any more concessions. Consequently, they would ignore the ultimatum and persist in the negotiation (Ma et al., 2019). Enlarging the perceived room for negotiation, in turn, strengthens a negotiator's self-efficacy (Miles & LaSalle, 2007) and increases their persistence (Ma et al., 2019). Among other factors, self-efficacy and persistence have a strong influence on the performance of a negotiator (Bowles and Babcock, 2013).

One factor that influences this interaction is people's Perspective-Taking Ability. As introduced earlier, the degree to which people are able to take the point of view of another differs (IRI; Davis, 1980, 1983). For some people empathy is an inherently larger part of their personality than for others. Consequently, the extent to which people can adopt Strategic Empathy effectively differs. Similarly, the effect of the strategy on the perceived room for negotiation will vary according to the degree of adoption of Strategic Empathy. The effect of Strategic Empathy on confidence and persistence, as introduced above, is depicted in Figure 3.2.

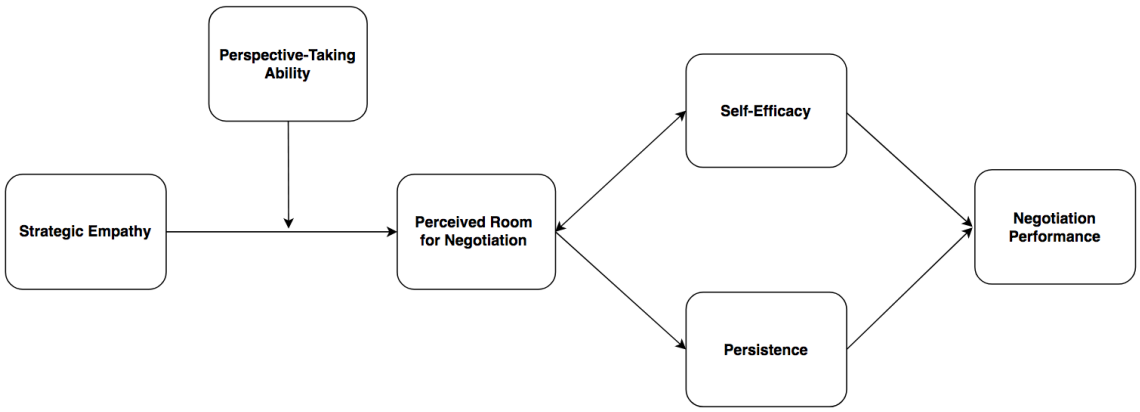


Figure 2.1: Strategic Empathy and Women's Negotiation Performance

2.2 Teaching Strategic Empathy through NSS

Computer-based negotiation training has the potential to address limitations of traditional training means. Namely, training options are often inaccessible and costly as scalability is limited due to logistic constraints (Ding et al., 2017; Johnson et al., 2017). Also, in human-to-human negotiation training and practice, measuring students' progress in a systematic, objective manner is challenging (Stevens et al., 2018). Moreover, NSS provides a means for a more controllable and unbiased practice environment including feedback based on objective measures (Johnson et al., 2019). Evidence even suggests that people feel more comfortable practicing with an autonomous agent than with other people (Gratch et al., 2016).

Distinct NSS have been introduced to enhance the skills of negotiators in these various stages of a negotiation. Some systems aim to enhance the information gathering in the preparation stage by for example scraping salary benchmarks from the internet to help the user set their reservation and target price (Van Gool, 2021). The majority of negotiation tutoring systems focuses on the interactive part. Here, agents are used to allow the user to practice the interaction in a negotiation. User learn how to maximize personal or mutual gain, make effective concessions, and when to accept or walk away (Jonker et al., 2012; Kim et al. 2009; Mell & Gratch 2016). However, enhancing negotiation skills is not just about trying to increase the financial outcome of a person. Jonker et al. (2012) argued: "Negotiations are not just about money, but also about good relationships, awareness of all issues being negotiated, personal preferences of both parties, knowledge of your alternatives (if no deal is reached), and reflection on your performance". Similarly, enhancing Strategic Empathy skills by means of NSS has various dimensions. This section will investigate to whether NSS can be used to teach Strategic Empathy skills. First, a basic understanding is established of NSS and the current research field, next the integration of Strategic Empathy into these system is discussed. Here special attention is given to the evaluation of Strategic Empathy as this shows to be the least researched and most challenging element.

2.2.1 Negotiation Support Systems

Over the past decades, negotiation has been a popular topic of research in the artificial intelligence domain (Jennings et al., 2001). Especially, advancements in the field of virtual agents contributed to the fast-growing body of research on NSS (Stevens et al., 2018; Johnson, 2019). Initially, the focus has been on agent-to-agent negotiations. In these types of studies, agents exchange thousands of offers per second to determine the solution space and find the most economically efficient agreement. By simulating and analyzing different negotiation strategies and offering patterns these systems structure negotiations and determine optimal decision-making (Baarslag et al., 2014; Jonker et al., 2012). As such, negotiations are regarded as mathematical problems that can be targeted through structured mechanisms and classical economic and rational principles, such as game theory (Johnson, 2021).

While these systems provide valuable insights for researchers on the complexity of negotiation structures and strategies, the importance of the linguistic and emotional aspects of the process have been increasingly acknowledged (Nazari et al., 2015; Baarslag et al., 2015). Fully rational NSS neglect unique characteristics of human communication and decision-making and thus fail to imitate real-world human-to-human negotiations (Jonker et al., 2012). Human negotiators are influenced by not just economic trade-offs but also subjective factors, such as losing face, reputation, and a good relationship, play a key role in their decision-making. NSS for human-agent interaction are required to attend to their human opponent by analysing and interpreting their verbal and non-verbal communication. Consequently, research started to focus on the integration of Affective Computing (Broekens et al., 2010; Van Kleef et al., 2006; Johnson & Gratch, 2020). Affective Computing allows for the analysis of information expressed through a person's verbal and non-verbal behaviour. Implicit information both aurally - tone of voice, intonation, number of silences - and visually - smile, gaze direction, and body postures - can indicate emotional states such as anxiety, dominance, and anger (Mania et al., 2020; Park et al. 2012; Van Kleef et al., 2006). In addition, by means of Natural Language Processing (NLP), linguistic patterns of a negotiator can be identified as well as the emotion that is revealed through speech, such as tenseness, confidence, and energy level (Park et al., 2012). By analyzing linguistic and affective behavior in an automated manner, NSS can help human negotiators become more aware of the role that these different variables have on negotiation performance, perception, and outcome (Jonker et al., 2012). Consequently, these so-called human-aware NSS can be leveraged as training tools to help improve users' negotiation knowledge and skills.

2.2.2 Integrating Strategic Empathy into NSS

As aforementioned, NSS is argued as to be an effective means to teach and enhance people's negotiations skills. This section aims to investigate to what extent NSS can be leveraged to teach Strategic Empathy. The teaching methods used in virtual tutoring systems often resemble the traditional negotiation teaching process; preparation, execution, reflection. The preparation phase aims to enhance user's knowledge on main negotiation principles and strategies, such as avoid early commitment and make efficient concessions. Next, users can apply the newly introduced principles and practice negotiation through role-play. And finally, the reflection phase should enable performance evaluation and self-reflection. In other words, the integration involves the introduction, practice, and evaluation of Strategic Empathy by means of a technical system.

A number of systems have been introduced that allow users to negotiate with human-like agents for training purposes. Systems such as the conflict resolution agents (Gratch, DeVault, & Lucas 2016), pocket negotiators (Hindriks & Jonker 2008), IAGO (Mell & Gratch 2016) and Bilat (Kim et al. 2009) have been proven effective. One major distinction that can be identified among the different designs is the degree of freedom in communication. Interactivity in existing systems ranges from free text input, where the user is not restricted in their responses, to completely scripted interaction, in this case users can choose their speech acts from a set of options in a menu (Gratch et al., 2021). Ding et al. (2017) proposed a completely passive user interaction but focused on learning through virtual cognition. Their negotiation training system enabled participants to improve their negotiation knowledge and self-efficacy through passively engaging in negotiation while a personalized voice-over articulated their stream of thought during each step. The PocketNegotiator introduced by Jonker et al. (2017), omitted the language element as a whole and focused on teaching and optimizing

the construction of offers (Jonker et al., 2017).

Others chose more semi-interactive methods in which users have to react to an offer by selecting an option - accept, propose a counter offer or walk away - and complement it by argumentation, either written or verbal (Spiliotopoulos et al., 2020). In this way, users have the possibility to practice how to formulate their argument, feel more engaged in the process and receive feedback on their verbal and non-verbal behaviour. Design choices on interactivity levels mainly depend on the research narrative, the desired level of control, and technical feasibility (Othlinghaus-Wulhorst & Hoppe, 2020). Predefined response options are easier to implement and analyse, however it holds significant limitations for the analysis of verbal and non-verbal behaviour and certain emergent patterns of interaction will be neglected (Alam et al., 2017)

Till present day, Gratch and Johnson (2020) have been unique in aiming to integrate perspective-taking teaching into the interactive phase. Their agent expresses it's aims through implicit information, offer patterns, in order to train the user's perspective-taking capabilities. Their study however showed limited success as this approach mostly seemed to confuse users (Johnson & Gratch, 2020).

Performance evaluation in reflection phase is often limited to to economic metrics based on reservation and target price (Gratch, 2021). Aspects other than economic variables are largely untouched. One of the reasons for this research scarcity is that they are difficult to quantify and thus challenging to integrate into an automated system as NSS (Gratch, 2021). Johnson et al. (2019) aimed to extend the existing automated evaluation methods beyond economic metrics. They proposed an automated feedback system based on the five major negotiation principles as introduced by Harold Kelly (1996). According to Kelly, good negotiators 1) avoid early concessions, 2) make efficient concessions, 3) encourage their opponent to make concessions, 4) shape their opponent's perception of value, and 5) do their homework. The principles were quantified into measurable values such as agreement time, single-issue offers, and the number of rejections (Johnson et al., 2019). Other studies proposed models that identified common errors through multimodal analysis. These models evaluated negotiators' behaviour by highlighting misinterpretation of an opponent's nonverbal cues (Hoegen et al. 2019), unintentional preference disclosure through behaviour changes (Sagi & Dehghani, 2014), and errors regarding emotion regulation. While these studies provide intriguing insights, they fail to provide a uniform evaluation framework for non-economic negotiation performance evaluation. Research and design challenges related to automated evaluation and feedback of non-economic aspects of negotiation performance stem from the ill-defined nature of the domain of negotiation and the lack of structured assessment metrics (Johnson et al., 2019). Performance metrics and analysis highly depends on the context and the associated learning objectives (Othlinghaus-Wulhorst & Hoppe, 2020). Similarly, the evaluation of Strategic Empathy involves some significant challenges and no systematic approach has been proposed yet. Consequently, in order to realize the integration of Strategic Empathy into NSS, this phase requires more in-depth research. As such, the following section discusses automated evaluation and feedback of Strategic Empathy in more detail.

2.2.3 Evaluation of Strategic Empathy

The evaluation of Strategic Empathy is a challenging and fairly unaddressed topic of research, in particular automated analysis and feedback has been limited. The creation of systematic evaluation methods is hindered by the lack of a generally accepted definition. Moreover, defining empathy in terms of observable indicators is difficult as it emerges from internal mental processes (Xiao et al, 2016). Traditionally, the measurement of empathy has relied on the subjective assessment through human raters, either self-reported or by an external party (Imel et al., 2014). The assessments have been based on empathy scales and indexes such as the Interpersonal Reactivity Index (IRI; Davis, 1980, 1983; Ku et al., 2015; Galinsky, 2001), the Basic Empathy Scale (BES; Jolliffe & Farrington, 2006; Marchi et al., 2020), and Model of Emotion in Negotiation and Decision-Taking (MEND; Martinovski Mao; 2009). Such frameworks provide a level of standardization, thereby simplifying reporting and enabling the comparison of different levels of cognitive and emotional empathy.Davis (1983) introduced the IRI which consists of seven subscales including the Perspective-Taking Scale (PT) and the Empathic Concern Scale (EC). The individual levels are determined by a number of statements which are answered on a 5-point Likert scale ranging from "Does not describe me well" to "Describes me very well". Similarly, the BES guides self-reflection on emotion through questions like: "what prevalent emotions have you felt during the interaction" (Jolliffe & Farrington, 2006). While providing

valuable insights, these methods are subject to human biases, are time-consuming, and prohibit large scale measurement. Research on automatic decoding of empathic behaviour exists, though typically outside the context of negotiation. The majority of related literature focuses on medical and psychotherapy training, such as motivational interviewing (Imel et al., 2014). Automated evaluation methods present in literature will be discussed below, with the aim to select the most suitable means for the system of this study.

Non-verbal Behaviour

In practice, empathy is signaled to and identified by the opponent through expressive behaviors, including facial expression, posture, voice, and linguistic patterns (Martinvski et al., 2007). A number of studies on computational empathy analysis have attempted to develop multimodal modals that automatically detect empathy through behavioural cues. Currently, however, it is still an open question which non-verbal features specifically should be leveraged for automatic classification of empathy (Olsen Oertel, 2020). The most commonly applied methods are data-driven approaches that rely on manually annotated data and thus require annotation guidelines (Xiao et al., 2016). Different frameworks have been used for the creation of training data, including the Gross model (Alam et al., 2017), Toronto Empathy Scale (Spreng et al., 2010), Empathetic Communication Coding System (ECCS; Yao et al., 2020). The studies provided some evidence on facial expressions, such as frowning eyebrows, a forward-tilted posture, to indicate high levels of empathy (Holmes & Yahri-Milo, 2017). Multiple studies also highlighted entrainment - an interpersonal pattern of behavioural mimicking - to be a quantifier of empathy (Xiao et al., 2016; Holmes & Yahri-Milo, 2017).

Language

Other studies focus on measuring empathy through discourse and linguistic analysis. In particular, studies targeting perspective-taking turn to language as it can disclose insights in cognitive processes. A distinction can be made between two major approaches; content- and function oriented. On a content level, empathy has been shown to be expressed through mirroring - repeating part of the words used by the other - (Vecchi et al., 2004), paraphrasing (Martinovski et al., 2016), summarizing (Vecchi et al., 2004), and open-ended questions (Johnson et al., 2019). Martinovski et al. (2016) explored the linguistic and discursive realizations of empathy with a special emphasis on rejection of given empathy. They identified self-reports, guessing metal states, and paraphrasing ofother's self-reports to be linguistic manifestations of empathy. Explicit rejections, criticism, and self-reports of honesty were highlighted as linguistic identifiers of rejection of empathy (Martinovski et al., 2016).

The second approach analyses linguistic styles and function words that reflect relevant cognitive processes. The analysis of linguistic characteristics, such as pronouns, verbs, adverbs, and word length, can reveal a speaker's attentional allocation, level of cognitive complexity, and degree of perceptual processes. All of which have been shown to be effective measures for the level of perspective-taking (Tausczik & Pennebaker, 2010; Litvak et al., 2016; Van Swol et al., 2021). Attentional allocation, measured by personal pronouns and verbs, can identify a person's focus. Personal pronouns signify how one is relating oneself to another, either self-oriented or other-oriented (Ata, 2015). Van Swol et al. (2021) showed a positive correlation between the use of "we" pronouns and one's perspective-taking ability. They argued that frequent use of "we" pronouns is indicative of an outward focus. However, Tausczik and Pennebaker (2010) urged for caution during evaluation of "we" pronouns due to potential ambiguity of the so-called Royal We - where the speaker is actually not including oneself - and the actual "we" referring to all communicating partners. A number of studies provided evidence on the predictive capacity of first person singular for perspective-taking (Woolf et al., 2012; Ata, 2015; Martinovski et al., 2016) and second personal pronouns (Murray et al., 2012; Martinovski et al., 2016). Verb tenses can determine temporal attention (Tausczik & Pennebaker, 2010). In negotiations, attentional focus can reveal whether a negotiator is attending to their own performance or to the opponent's behaviour and preferences.

Aforementioned functional methods neglect the semantic meaning of words. By contrast, Linguistic Inquiry and Word Count (LIWC) software allows for the analysis of linguistic features while attending to categories related to the semantic meaning of words. The text analysis program calculates the percentage of words in a given text that fall into one or more of the 80 linguistic, psychological

and topical categories indicating various social, cognitive, and affective processes (Pennebaker et al., 2007). Figure 2 depicts six of the LIWC categories related to psychological processes.

	LIWC category	Explanation	Key words (examples)
Psychological Processes / Content	Social processes	Communication related to family, friends, people	Daughter, husband, friend, neighbor, baby, boy, talk
	Affective processes	Positive or negative emotions, anger, sadness, anxiety, joy excitement	Love, sweet, happy, cried, ugly, nasty, hate, kill, annoy
	Cognitive mechanisms	Communication related to thought and reasoning	Think, know, consider, cause, should, would, guess
	Perceptual processes	Language describing observations and senses	Hear, feel, view, see, touch, listen
	Biological processes	Communication describing bodily functions	Eat, blood, pain, hands, spit, clinic, love, eat
	Relativity	Language describing motion, space, time	Area, bend, exit, arrive, go, down

Figure 2.2: LIWC Psychological Process Categories (Litvak et al., 2016)

Two of the LIWC categories in specific - cognitive and perceptual processes - have also been used in literature to measure perspective-taking (Woolf et al., 2012; Van Swol et al., 2021; Litvak et al., 2016). Litvak et al. (2016) measured perspective-taking expressed in social media posts through the analysis of LIWC psychological process categories and found a strong correlation for perception processes language. In addition, a significant body of research found a positive correlation between the level of perspective-taking and cognitive complexity expressed through language (Kennedy et al., 2015; Van Swol et al., 2021; Murray & Woolf, 2012). Van Swol et al. (2021) analysed the relation between perspective-taking and language in group discussions and found that perspective-takers used more cognitive processes language. Also Martinovski et al. (2016) found mitigators such as 'I think', 'I feel', and 'I know' to signal empathy.

2.3 Summary Literature Review

This chapter provided an overview of the existing literature concerning Strategic Empathy, Negotiation Support Systems, and the possible integration of the first into the latter. Literature revealed the complexity and lack of consensus of the concepts of empathy and Strategic Empathy. The identification of the different dimensions of empathy - emotional and cognitive - was crucial as their effectiveness on salary negotiations differs. While emotional empathy decreases negotiation success, cognitive empathy - often referred to as perspective-taking - is argued to have a positive effect on salary negotiation performance. Namely, perspective-taking enables a negotiator to elicit crucial information about the opponent's preferences and goals, and by doing so allows enhanced value creation and generates more creative solutions. As such, Strategic Empathy has been defined in this research as a negotiation strategy that advocates leveraging perspective-taking skills to gain crucial information on the cognitive and affective states of the opponent and anticipate their behavior. Next, Strategic Empathy was linked to women's negotiation performance and it's value to the earlier identified issues was researched. Literature revealed a positive link between Strategic Empathy and enhancing confidence and persistence. Namely, the information and insights gained by adopting Strategic Empathy can enlarge the perceived room for negotiation as it can reveal the strengths of one's own negotiation position and disclose more creative solutions (Holmes & Yahri-Milo, 2017). Enlarging the perceived room for negotiation, in turn, was found to strengthen a negotiator's self-efficacy (Miles & LaSalle, 2007) and increases their persistence (Ma et al., 2019).

The literature review continued to the substantial research field of NSS and discussed both the agent-to-agent interaction systems as well as those for agent-to-human interaction. The literature showed that virtual tutoring showed to be a credible, scalable option for teaching negotiation skills. The potential integration of Strategic Empathy was found to involve a number of research challenges and knowledge gaps, which will be further discussed in section 3.1. Overall, the literature highlighted the potential value of teaching Strategic Empathy by means of NSS. Automated evaluation and feedback of Strategic Empathy showed to be the most challenging element, as evaluation metrics are lacking. Based on the literature, the system for this study is designed and developed. The design choices and final design of this system is presented in Chapter 4.

3
Conceptual Framework

This chapter presents: (1) the research gap disclosed by the literature review regarding women's salary negotiation performance, Strategic Empathy, and NSS (2) an empirical framework, and (3) a list of hypotheses that emerged from the conceptual framework.

3.1 Research Gap

The problem identification introduced a knowledge gap in the field of women and salary negotiation performance. Namely, appropriate strategies to target the barriers that are currently hindering enhancing their performance are lacking. The literature review revealed the positive effect of perspective-taking in negotiations, however, little research has been done on how to teach this strategy. In particular, literature on virtual perspective-taking training is lacking. Furthermore, automated evaluation of Strategic Empathy has shown to be a challenging and fairly unaddressed topic of research. Linguistic perspective-taking metrics have been presented by literature, but none has been tested in a negotiation context. Finally, the effect of virtually teaching Strategic Empathy to enhance women's negotiation performance has remained unresearched up to this point.

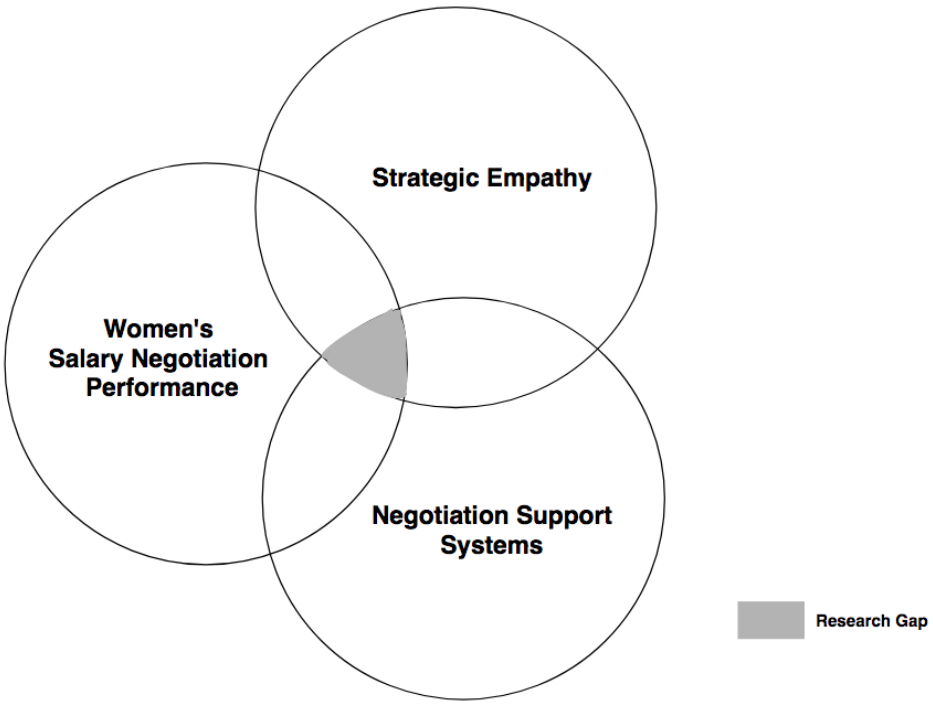


Figure 3.1: Research Gap

This research aims to contribute to the research field by targeting the identified research gap, see figure 3.1. First, it aims to address the lack of strategies and means to enhance women's negotiation performance. It aims to investigate to which extend virtual Strategic Empathy training can contribute to decreasing the gender difference in salary negotiation performance. Because of the focus on NSS, it targets the existing scarcity of scalable, accessible means for negotiation training and contributes to the literature on virtual perspective-taking training and automated evaluation and feedback of Strategic Empathy. Due to the complexity and the many factors that influence women's negotiation performance, this research focuses on the two major barriers: low self-efficacy, and a lack of persistence.

3.2 Conceptual Framework

The main issues, as identified earlier, that hinder women to become better negotiators are i) women's low self-efficacy in their negotiation skills and ii) lack of persistence after rejection. Strategies to target these issues have failed due to the backlash that is triggered when women leverage these strategies. Namely, the typically masculine behavioral traits that negotiation research argues as essential to negotiation success have an adverse effect for women. Consequently, Strategic Empathy has been put forward in this research as a potential strategy to enhance women's performance without risking the backlash. Literature revealed a potential positive effect of Strategic Empathy on persistence. Strategic Empathy allows the negotiator to gain crucial information about their opponent's preferences and priorities. Such information helps to enlarge the perceived room for negotiation as it can reveal details that strengthen one's personal negotiation position and disclose more creative solutions. Hence, negotiators who adopt Strategic Empathy are expected to feel more confident about their own negotiation position and are expected to be more persistent when they are confronted with resistance from their opponent (Ma et al., 2019), section 2.1.4 elaborates on this relationship in more depth.

One more factor that has to be taken into account for this research scope is people's perspective-taking ability. Namely, the degree to which people are able to step into the shoes of another varies (IRI; Davis, 1980, 1983). Some people are inherently more empathic than others. Consequently, the effectiveness of the virtual Strategic Empathy training may differ depending on the initial perspective-taking ability of the user.

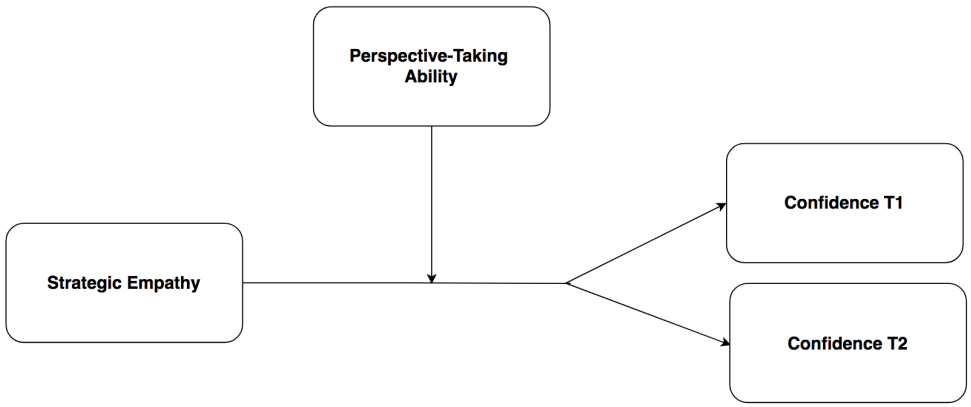


Figure 3.2: Empirical Framework 1: The effect of Strategic Empathy on Confidence

Taken together, the online experiment of this study focuses on two major parts: i) Does teaching Strategic Empathy by means of a NSS enhance women's confidence in salary negotiations (SQ2), and ii) Does teaching Strategic Empathy by means of a NSS enhance women's confidence in salary negotiations (SQ3). As such, two empirical frameworks are presented. One for the effect of Strategic Empathy on the level of confidence, and one for the effect on the level of persistence, see Figure 3.3

and Figure 3.4 respectively.

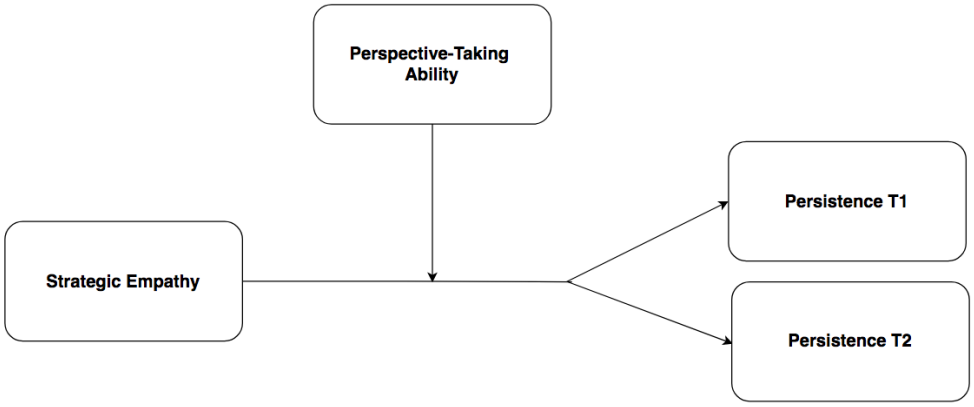


Figure 3.3: Empirical Framework 2: The effect of Strategic Empathy on Persistence

3.3 Hypothesis Development

Following from the empirical framework, the two hypotheses were constructed to be tested in the experiment. The hypotheses are aimed to answer the main research question of whether NSS be used to teach Strategic Empathy to women and whether this improves their negotiation performance. More specifically, through enhancing their understanding of Strategic Empathy, facilitating practice, and evaluating their performance, their self-efficacy and level of persistence are aimed to increase.

The following hypotheses emerged from the conceptual framework as introduced above. First, the effect of Strategic Empathy is tested with respect to enhancing women's self-efficacy. The experiment aims to assess whether teaching Strategic Empathy by means of an NSS can enhance the confidence of participants. To do so, the first hypothesis is constructed:

> *Participants who adopt Strategic Empathy are expected to be more confident in the negotiation.*

Secondly, the effect of Strategic Empathy is tested with respect to enhancing women's persistence. Accordingly, the second hypothesis is as follows:

> *Participants who adopt Strategic Empathy are expected to be more persistent in the negotiation.*

Thirdly, the effect of the participant's initial perspective-taking ability, measured by a personality test, is tested. The participant's perspective-taking ability at the start of the experiment is expected to influence the prior analysed effect of Strategic Empathy on confidence and persistence. Namely, the initial perspective-taking ability of participants is expected to influence the degree to which they learn and adopt Strategic Empathy, and thus their level of confidence and persistence. Accordingly, the third hypothesis is constructed:

> *Participants with high Perspective-Taking Ability are expected to adopt Strategic Empathy more easily and thus be more confident and more persistent in the negotiation.*

4
Instrument Design

The previous chapter identified a number of important knowledge gaps and research challenges concerning women's negotiation performance, Strategic Empathy, and NSS. This chapter presents the system that has been designed and developed for this study. This is the system that has been used in the online experiment. The different components of the system that are related to the design and development of the system are discussed, including human-agent interaction, the offer logic, the integration of Strategic Empathy, and evaluation and feedback.

4.1 Goal-setting

Jonker et al. (2012) argue that the preparation phase should not only focus on enhancing the user's understanding of strategies and principles but also on their own preferences. In the Pocket Negotiator, the NSS presented in their study, this phase includes a preference elicitation interface that allows users to construct their own preferences and determine their underlying interests. Goal setting is argued to be an essential step in preparation for effective negotiation and claiming value. Hence, the system should enhance users' understanding of their own preferences and objectives by encouraging users to take a moment to specify their own objective for an upcoming negotiation. In the system designed for this study, this step is included by requesting the users to specify their target deal for the upcoming negotiation. This encourages them to take a moment to determine their own preferences, priorities, and boundaries. Additional goal-setting components, such as the ranking interests element included by Jonker et al. (2012), are left out of the designed system to ensure a concise system and avoid exceeding the maximum cognitive load of the participants in the experiment.

4.2 Human-Agent Interaction

Research shows that an interactive component is crucial for tutoring systems, especially for meta-cognitive skills such as those essential to effective negotiation (Chi et al., 2011). Through elements like role-play, users can apply newly introduced principles and consequently strengthen their learning process. NSS research has shown the effectiveness of leveraging a virtual agent for the interactive component (Lin, Oshrat, and Kraus 2009). Simulating and practicing negotiations with an automated agent shows to improve people's negotiation skills (Johnson Gratch, 2020).

The level of interactivity in human-agent role-play varies across systems. The degree of freedom in communication ranges from free text input, where the user is not restricted in their responses to scripted or no text. For this study, the level of interactivity of the system had to be sufficiently high to facilitate empathy from the user to the virtual agent. Moreover, the interaction had to resemble real life interaction and enable an intuitive exchange of arguments. At the same time, the time and cost constraints limited the technical possibilities. Consequently, a semi-interactive design was conceived where the answers of the agent adapted to the topic of argument of the user, while at the same time, they were independent of the actual content of the user's argumentation. This is realized in the following manner. After the creation of a counter-offer, the user is asked to specify the issue they would like to discuss, as well as providing their argumentation (minimum of 200 characters). Based on the issue that is selected, the agent returns a response appropriate to the issue that was selected. Moreover, the agent keeps track of the choice behaviour of the user and adjusts it's responses accordingly to avoid repetition of answers. This design choice has enabled the challenge

of natural language understanding to be sidestepped, while still accomplishing a realistic, intuitive communication flow. The final design of the interaction is presented in Figure 4.1. The full the interactivity graph can be found in Appendix A.

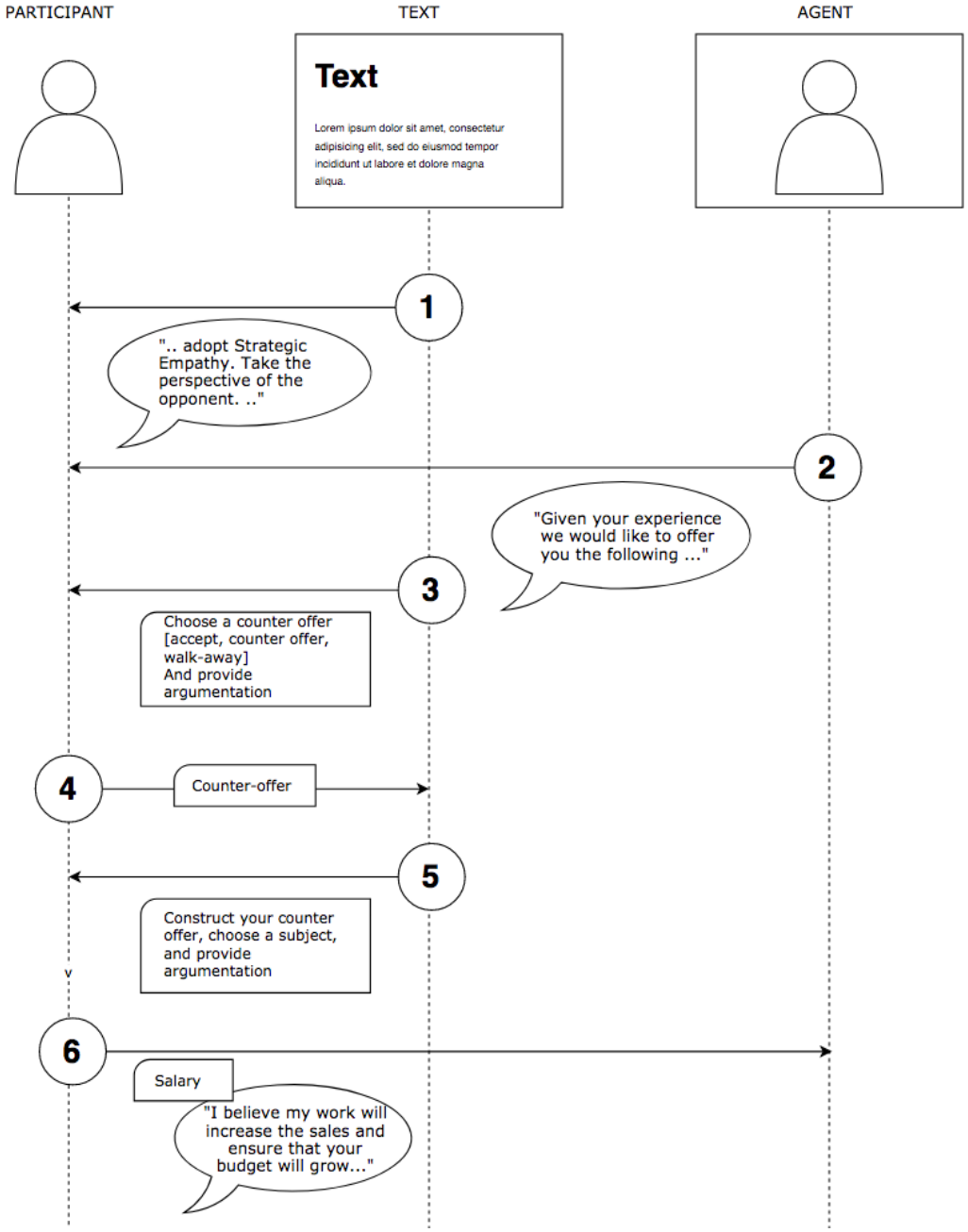


Figure 4.1: Interaction Design

4.3 Bidding Strategy

In the context of negotiation, a part of the negotiation outcome is determined by the extent to which a negotiator continues to negotiate when they are faced with resistance. Experienced negotiations are able to identify that their negotiation counterpart has options even when the opponent signals that no further concessions can be made (Ma et al., 2019). The designed system aims to teach this behaviour to users and allow them to practice with how to respond to resistance. Hence, a hard-headed agent is chosen for the design of the offer logic. In addition, ultimatums are introduced in the role-play

part signalling that there is no further room to negotiate. During the negotiation simulation, the virtual opponent communicates statements such as: “This is the best I can do”. A positive feedback mechanisms is in place in the system to encourage user’s to ignore the signalled ultimatum and choose to suggest a counter-offer. Persistent behaviour of users is rewarded by a better bid from the opponent.

Different reaction to resistance can be distinguished during negotiations. The first type of behaviour is to give in and not negotiate any further. The The second type can be described as "stubborn". Here, negotiators continuously target a single issue, despite receiving rejection from their opponent. For example, if someone addresses salary three times in a row. The third type of behaviour can be referred to as "flexible". Here, negotiators target many different issues rather than targeting an issue multiple times. For example, someone would first address salary once, then working hours, and then the number of days working from home.

One can argue about the effectiveness or value of either type of persistence. However, in this research, the designed system is designed to encourage the type that is most challenging to women, which would be the “stubborn” persistence type. This system wants to teach women not to stop when getting a rejection, but to continue the negotiation and address the issue again. As such, the offer logic of the designed system rewards the "stubborn" type of behaviour most generously. The offer logic, as integrated into the system, is depicted in Figure 4.2 and can also be found in Appendix A.

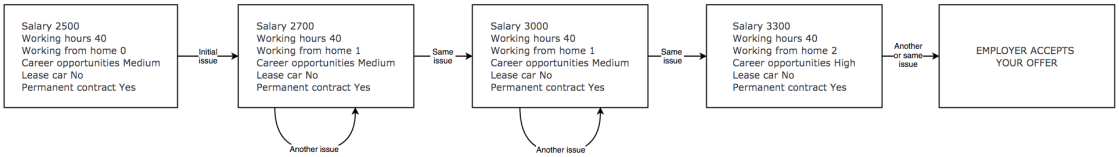


Figure 4.2: The Designed System’s Offer Logic

4.4 The integration of Strategic Empathy

One of the major objectives of the system is to educate women on the potential of Strategic Empathy and enable them to practice this strategy. First of all, the system should explain the strategy in a clear way that enlightens users on the strategy’s utility. The challenge is that the attention curve of users is limited, especially is an online setting. Hence, the knowledge transfer should be comprehensive as well as compact. Next, the system should allow users to practice the strategy in a realistic negotiation scenario. The nature of the strategy, however, raises the question: what is required to facilitate practicing Strategic Empathy capabilities? The strategy requires negotiators to retrieve information about their opponent, both factual and emotional, and leverage this knowledge in the creation of bids and the associated argumentation. For Strategic Empathy in specific, the information element is crucial. Hence, users should be able to retrieve information about the opponent and should be able to have an intuitive conversation with the agent.

The primary step for the integration of Strategic Empathy into the system is defining Empathy and Strategic Empathy. Following from the literature review, the focus has been set on the perspective-taking element - A cognitive capacity of knowing another’s internal states including thoughts and feelings - and the definition given by Holmes and Yahri-Milo (2017, p. 1): “The ability to take the perspective of others and understand their cognitive and affective states without necessarily sympathizing with them”. Strategic Empathy has been defined as a negotiation strategy that advocates leveraging perspective-taking skills to gain crucial information on the cognitive and affective states of the opponent and anticipate their behavior. Strategic Empathy has been defined by the level of perspective-taking and the extent to which this is effectively leveraged leading to a better negotiation outcome. The design of the integration of Strategic Empathy has been guided by this definition and the engineering requirements established in the previous section. The means of introducing the

strategy to the users have been kept simple and static. The main reason for this design choice has been to avoid overwhelming the user with new information and preserving their attention. Next, the information retrieval element of Strategic Empathy has been facilitated in two ways. First, by providing the user information about the opponent prior to the negotiation. To maintain a realistic scenario, it is presented as information that the user has retrieved through research and earlier conversations. Secondly, the agent reveals information through it's argumentation. Each argument contains some insights into the agent's position, incentives, or constraints. In this way, the design complied with the feasibility constraints, while still providing a realistic and intuitive negotiation simulation that encourages users to leverage information about the opponent in their own bids and argumentation.

4.5 Evaluation and Feedback

Reflection through evaluation and feedback has been stated as essential to learning and growth processes (Johnson et al., 2019). Research shows that learning is enhanced through engaging cognitively and emotionally and through reflecting upon one's own actions (Kolb & Kolb 2012). Moreover, assessing users' negotiation outcomes and the factors that have shaped this outcome allows for actionable feedback. Hence, the system must include performance metrics for persistence, Strategic Empathy, and negotiation performance. Plus, provide feedback to the users based on these metrics, such that the users can effectively reflect on their performance. The metrics should not be subject to human biases or be time-consuming, as this prohibits large scale deployment as is desired in a NSS. They should be objective and systematic.

The varying definitions and applications of Strategic Empathy has led to a lack of evaluation metrics present in literature. The challenge lies in how to measure and evaluate the user's level of adoption of Strategic Empathy in an automated way. The to-be-designed system must tackle this issue in order to effectively teach women how to adopt this strategy in negotiations. The system must be able to assess Strategic Empathy skills. However, the literature review revealed the complexity of defining and measuring Strategic Empathy (Holmes & Yahri-Milo, 2017; Weisz & Cikara, 2020). To do so, the system needs: i) coherent definition of Strategic Empathy, ii) clear evaluation metris, and iii) means to measure, analyse, and report performance based on the metrics.

Research disclosed the importance of evaluation and reflection. Consequently, determining effective evaluation metrics is essential. As aforementioned, persistence will be measured by the number of counter offers. For the evaluation of Strategic Empathy some difficulties arise as a result from the ill-defined nature of the domain of negotiation and the lack of structured assessment metrics (Johnson et al., 2019). Performance metrics and analysis highly depend on the context and the associated learning objectives (Othlinghaus-Wulhorst & Hoppe, 2020). The literature review disclosed two design options: non-verbal analysis and linguistic analysis. The analysis of nonvebal behaviour, however, appeared to need more research until it can be used as evaluation metrics in NSS. Linguistic analysis is more deployable as a substantial body of research reveals language to accurately reflect cognitive processes, like perspective-taking. Attentional focus, measured by instances of second-person pronouns, and LIWC categories - perceptual and cognitive - have been proven to be best to quantify Strategic Empathy levels. While negotiation research on linguistic analysis for empathy is limited, existing literature provides sufficient evidence on the effectiveness of measuring attentional focus and the LIWC categories cognitive and perceptual processes. Therefore, these two approaches are included in the design for the evaluation of Strategic Empathy.

The system will include a reflection element where users are asked to reflect on their own negotiation performance, outcome and their understanding of Strategic Empathy. Next, a feedback element provides advise on room for improvement. Personalized feedback given back to users will be limited due to feasibility constraints. However, general feedback will be given on the two major elements of the system: persistence and Strategic Empathy. This feedback will help grow the understanding of users of influence of both elements and encourage them to improve on these two factors in their next negotiation.

4.6 Summary Instrument Design

The instrument design, guided by the literature review, showed that a learning process by means of a tutoring system has multiple phases; introduction and goal-setting, practice, evaluation, and reflection. For the introduction and goal-setting, a definition of Strategic Empathy was required to introduce the strategy to the user. Moreover, a component needed to be in-place to guided users in getting a better understanding of their own goals for the upcoming negotiation. The practice phase has been designed to include role-play in a negotiation simulation where the virtual agent fulfills the role of the user's negotiation opponent. Thirdly, evaluation, required automated Strategic Empathy metrics to determine the user's degree of adoption of Strategic Empathy in the negotiation. For this system, linguistic metrics have been chosen to determine the users' level of perspective-taking in an automated manner. Next, feedback was needed in the reflection phase as this can highlight room for improvement and strengthen the learning curve of the user. For the designed system, the reflection element was set to include a personal reflection part and general feedback. By going through these phases, users are expected to establish and enhance their Strategic Empathy skills. The full process design is depicted in Figure 4.3.

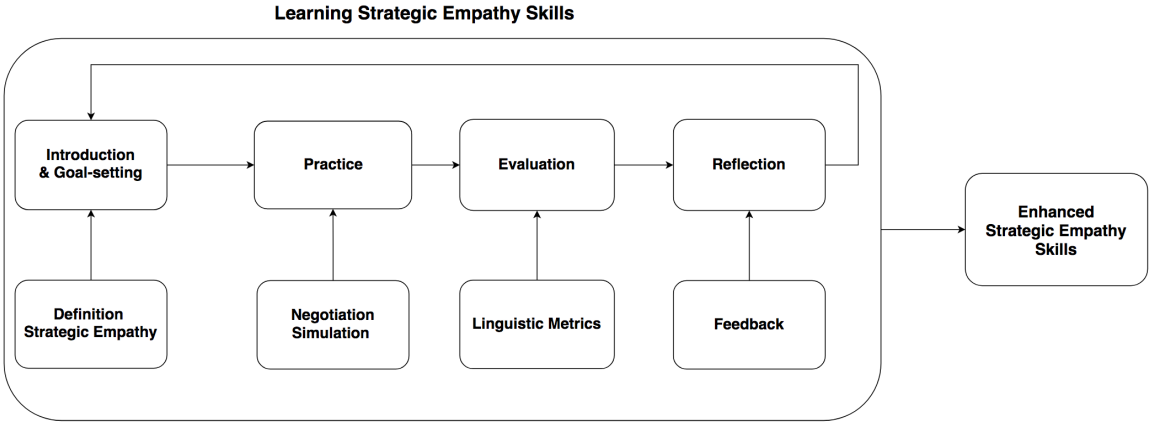


Figure 4.3: Process Design

5 Methodology

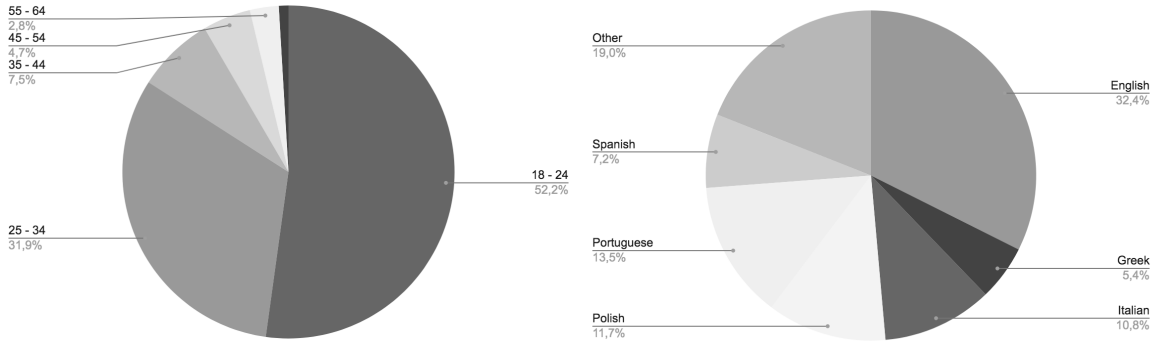
This chapter presents the design and methodological approach of the the online experiment. First, the descriptives of the sample are presented. Next, the procedure of the experiment is explained. And finally, the materials and measures are discussed.

5.1 Ethics Approval

This research obtained the ethical approval by the Human Research and Ethics Committee (HREC) of the Technical University Delft.

5.2 Participants

The total of 141 participants were randomly assigned to either the experimental or the control group. Of these participants 30 did not successfully complete both rounds of the experiment (two negotiation exercises) and were thus eliminated from the sample. The final sample thus included 111 participants (experimental group: 56, control group: 55). The majority of the participants were recruited through the online crowd sourcing platform Prolific. Prolific is specifically dedicated to connecting researchers to high quality research participants. For this study participants were exclusively female. This allowed a scoped down, in-depth study of women's negotiation behaviour and performance, and the introduced system's effect on these variables. Furthermore, a high proficiency in English was required, as the system is in English and the formulation of arguments is an important element of the experiment. Finally, also a number of quality filters were applied, i) participants had to have successfully completed more than 10 studies on platform, and ii) participants had to have a 95 percent or higher approval rate in earlier studies. The majority of the participants were between 18 and 24 years old (52.2 percent) and more than a third was between 25 and 34 of age (31.9 percent), see Figure 5.1a. The most common mother tongue among the participants was English (32.4 percent), though a high diversity of other languages were also present in the sample, see Figure 5.1b.



(a) Age

(b) Mother Tongue

Figure 5.1: Participants' Demographics

The participation was entirely voluntary and all participants were informed about the research purpose, content, and risks. Also communicated was the type of data that would be collected and the measures taken to minimize the associated risks (all data have been anonymized).

5.3 Procedure

The online experiment had a 2 (condition: experimental v. control) x 2 (role: employee v. employer) design. However for this study only the participants that were assigned to the employee role are taken into account. The influence of the different roles was left out of scope. In the experiment, participants were randomly assigned to one of the four experiment groups. Moreover, the experiment was longitudinal as it consisted of two rounds of the same negotiation exercise. The longitudinal element was introduced to identify a potential learning curve in negotiation performance between the first and the second round.

The experiment was fully conducted online. By means of a Qualtrics link, participants were directed to the introduction phase of the experiment. This phase included the opening statement, informed consent questions, and the IRI personality test (IRI; Davis, 1983) to determine the participant's perspective-taking ability. Next, participants got a link to one of the four experiment groups. All groups received basic information about the negotiation exercise, they had to specify their own target deal, and they got information about the preferences of their opponent. Half of the participants were randomly assigned to the experimental group. In addition to the prior introduced content, the experimental group also received an introduction to Strategic Empathy, see Appendix A. Subsequently, following the method of Galinsky et al. (2001), participants in the experimental group were told that considering their counterpart's perspective is a promising strategy to increase their negotiation performance. The Strategic Empathy condition introduced to the experimental group was formulated as follows:

> *"In preparing for the negotiation and during the negotiation, adopt Strategic Empathy. Take the perspective of the opponent. Try to understand what they are thinking in their situation. After reading your role, try to visualize yourself on the other side of the table, in that role, thinking as the opponent. Use the information that you have gained about the opponent in your argument supporting your bids."*

The other half of the participants received only the neutral negotiation instructions and served as a base rate comparison. This group from now on be referred to as the control group. The negotiation exercise was the same for all groups, only the bids and the arguments of the opponent were adjusted to the associated role; either employee or employer. The negotiation exercise started with the initial offer of the opponent (see chapter 5.3 on offer logic for the specifics of the initial offer for both groups). After the initial offer, for every offer of the opponent, participants had the option to counter offer, accept, or walk-away. In case they chose "counter offer", they had to specify their bid, choose an argumentation theme, and formulate their argument (at least 200 characters). The negotiation exercise ended when either the participant accepted the bid of the opponent, walked away, or when the opponent accepted the offer of the participant (see offer logic chapter 5). After the negotiation exercise all groups were asked to fill in a couple of reflection questions on their own negotiation performance. The experimental group also had to answer six questions about their own perceived Strategic Empathy understanding and performance. Finally, all groups received general feedback on persistence, and the experimental group also received an evaluative message on Strategic Empathy.

After completing the first negotiation exercise, participants were given a second link that directed them to the second negotiation exercise. To separate the two exercises, a distraction game was in place at the start of the second link. After the distraction game, the second negotiation exercise was identical to the first. Also, participants remained in the same type of experiment group for the second negotiation exercise as they were in the first. At the end of the second negotiation exercise participants received a completion code that proved their successful participation in the experiment.

5.4 Materials

5.4.1 Negotiation Support System

The system used for the experiment has been introduced in the previous chapter. As the experiment consists of a repeated negotiation exercise, the system was constructed as follows. It consisted of three parts; i) an introduction part, ii) the part for the first round of the experiment, and iii) the part for the second round. Each part was entered through its own link. To connect the different parts, the next link was provided at the end of each part. Part two and three were almost identical and resembled the design that has been introduced in the prior chapter. Experiment part ii) and iii) were separated by a distraction game. In the game, participants had to identify three differences in two alike images. In addition to the designed negotiation simulation, the parts also included a number of questions for the collection of the measures relevant to the experiment. These measures will be introduced in the next section.

5.4.2 Negotiation Task

Following the negotiation set-up of the Pocket Negotiator (Jonker et al., 2012), participants engaged in a 6-issue negotiation task (salary, working hours, working from home, career opportunities, lease car, permanent contract). The scenario involved a small technology company where participants were asked to either adopt the role of employee, seeking a job and negotiating with the HR manager. Or they were asked to play the employer as CEO of the company negotiating with a potential employee. For each of the issues a range was given within which they had to find an agreement. For example, they could negotiate a salary between €2500 to €4500 a month. To motivate performance, participants received a fixed participation fee, and low quality participation could be rejected.

5.5 Measures

5.5.1 Perspective-Taking Ability

To assess the participants' perspective-taking ability a personality test was introduced at the start of the experiment. Like in many related studies (Litvak et al., 2016; Van Swol et al., 2021), the personality test was constructed by the IRI perspective-taking questions of Davis (1983). Participants were asked to answer to what extent they agree or disagree on ten different statements describing their own behaviour and mindset towards others. The questions were answered on a five-point Likert scale (from 1: "Does not describes me well" to 5: "Describes me very well"). The questions can be found in Appendix A. For the analysis, the resulting scores for perspective-taking ability were divided into two categories: low- and high perspective-taking ability. This was done by means of a median split; all values equal to and above the median were assigned to high perspective-taking category and rest was assigned to the low category.

5.5.2 Strategic Empathy

To verify the effectiveness of the system with respect to teaching Strategic Empathy, the linguistic perspective-taking metrics have been chosen for the manipulation check. To do so, three metrics were chosen to identify the level of perspective-taking from the argumentation provided by the participants: i) the number of second-person singular pronouns (you, your, your), ii) the number of words belonging to the cognitive LIWC category, and ii) the perceptual LIWC category. For the manipulation check the mean of the three metrics will be used.

Attentional Focus The first metric, the number of second-person pronouns, is used to measure attentional focus. Quantifying the number of instances of second-person pronouns present in a participant's argumentation indicates whether one is self-oriented or other-oriented (Murray, 2013). To also capture all references associated with the opponent, the metric included both instances of "*you*" and "*your*". By doing so, common statements such as "I understand your point" and "which

will benefit your company" were also categorized as other-oriented. For each of the participants, two attentional focus score was calculated: one for the first round, and one for the second round. For each round of the experiment, the score was constructed by combining all the participant's arguments (one piece of argumentation per counter-offer), counting the number of instances of second-person pronouns. Finally, the number of instances was divided by the total number of words used by the participant. Hence, the number of instances was normalized by the number of words used by the participant in that particular experiment round.

Perceptual and Cognitive LIWC category The other two linguistic metrics analysed the argumentation of the participants on a deeper level. The LIWC metrics provide insights into psychological and cognitive processes expressed through language (Pennebaker et al., 2015). The first, the perceptual processes LIWC category, includes language describing observations and senses. For example, in a negotiation context this would relate to statements such as "I can hear that I this is an important issue for you" and "I see that you are very passionate about your work". The second, cognitive mechanisms LIWC category, regards language related to thoughts and reasoning. Statements such as "I understand your concern" and "I know this is important to your company". Similarly to the first metric, the scores were calculated by counting the number of instances of the category words used by the participant. Normalization of these two metrics was done in the same way as for the second-person pronoun feature: by dividing the number of instances by the total number of words used.

Cumulative Feature For the manipulation check a collective score was calculated for the linguistic features. To do so, the mean was taken of all three metrics per round. Hence, two overall linguistic scores were calculated per participant, one for each experiment round.

5.5.3 Dependent Measures

Confidence
The level of confidence of participants was investigated by means of the LIWC linguistic metric called Clout. The Clout metric is a nontransparent summary variable in LIWC that is meant to indicate the level of confidence conveyed in the text (Moore et al., 2021). The Clout score determines whether a writer is writing from a perspective of confidence and certainty or the language is more indicative of doubt and uncertainty (Pennebaker et al., 2015). The Clout score ranges from zero to a hundred. A high clout score suggests high confidence while a low score suggests a more tentative manner of speaking (Pennebaker et al., 2015). In this study the level of confidence is analysed across groups (experimental and control) and over time (T1 and T2).

Persistence
Persistence will be measured by the number of counter offers provided by the participant during the whole experiment round. In other words, the level is persistence is equal to the number of counter-offers made by the participant up until an agreement is reached or either one of the parties has walked-away from the negotiation. Hence, two persistence score will be calculated per participant, one for each negotiation round.

6 Results

This chapter presents the main findings from the experiment in which the designed artifact has been tested. First, the descriptives and correlations are provided. Second, the results of the hypothesis testing are presented. Third, supplementary analyses are offered.

6.1 Data Cleaning and Formatting

All data has been collected through the developed system in the software Qualtrics and received as a .csv format. The software Python has been used for data formatting, such as the conversion of arguments to scores for the linguistic metrics. A number of Spacy modules and a LIWC module were utilized for this purpose. Also, Python was used for the analysis of the participant's behaviour during the negotiations, such as the issues that they targeted and in which order. The JASP software was used for the statistical analysis of the data.

6.2 Manipulation Check

The manipulation check was included to assess the extent to which the system effectively explained and encouraged the adoption of Strategic Empathy to the participants in the experimental group. To do so, the linguistic patterns across the experimental and the control group were analysed. The mean of all three linguistic perspective-taking metrics was used to assess the frequency of use of these words. The results showed a very significant overall effect of the experimental condition on the use of the linguistic features ($F(107)=38.230$, $p<0.001$, $\eta^2 = 0.261$). Moreover, the frequency of use of linguistic features increased significantly from the first round (T1) to the second round (T2) ($F(107)=6.564$, $p<0.05$, $\eta^2 = 0.042$). In particular, the interaction between the experimental condition and the frequency of linguistic features across the different rounds was very strong ($F(107)=40.497$, $p<0.001$, , $\eta^2 = 0.262$), see Figure 6.1. In other words, the results prove that the experimental group leveraged Strategic Empathy and that the level of Strategic Empathy increased in the second round (T2) compared to the first round (T1). Hence, the manipulation check can be confirmed.

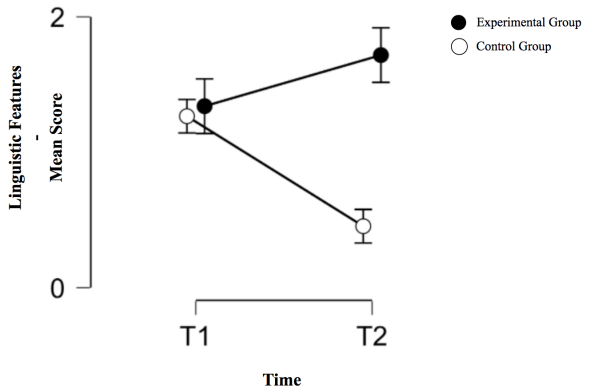


Figure 6.1: Manipulation Check

6.3 Descriptives

This section presents the descriptive statistics of the three dependent measures; the perspective-taking metrics, self-perceived Strategic Empathy, and persistence.

6.3.1 Confidence

The descriptive statistics of the confidence levels of the participants is depicted in Figure 6.2. In the table, the data is split based on the Confidence levels in the first round (T1) and in the second round(T2), and further split between the experimental group (1) and control group (0). The levels of skewness affirms the assumption of normality as all values of skewness are below an absolute value of 2 (Field, 2008).

		N	Mean	Std. Deviation	Skewness	
					Statistics	Std. Error
Confidence T1	0	55	24.49	23.66	1.054	0.3217
	1	56	26.57	29.62	0.8135	0.3190
Confidence T2	0	55	12.38	19.51	1.819	0.3217
	1	56	31.73	29.85	0.5405	0.3190

Figure 6.2: Descriptive Statistics Persistence

6.3.2 Persistence

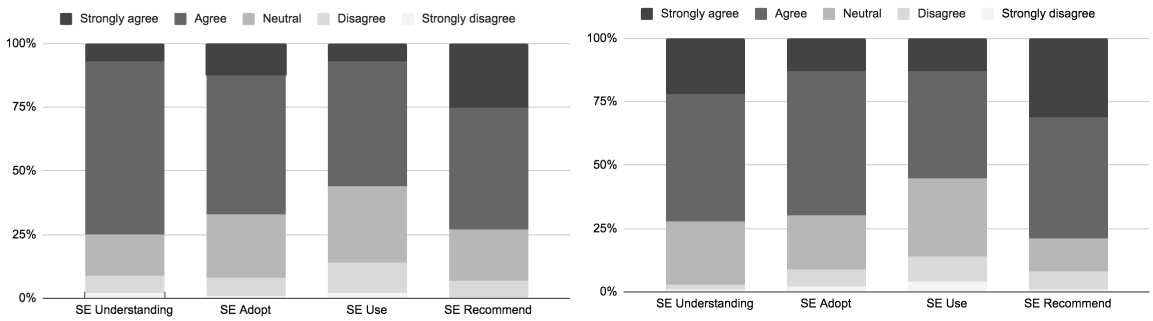
The descriptive statistics of the persistence levels of the participants is depicted in Figure 6.2. In the table, the data is split based on the Persistence levels in the first round (T1) and in the second round(T2), and further split between the experimental group (1) and control group (0). The levels of skewness affirms the assumption of normality as all values of skewness are below an absolute value of 2 (Field, 2008). The distribution plots can be found in Appendix B.2.

		N	Mean	Std. Deviation	Skewness	
					Statistics	Std. Error
Persistence T1	0	55	2.073	1.597	0.8680	0.3217
	1	56	1.518	1.250	0.7104	0.3190
Persistence T2	0	55	2.273	1.545	0.4607	0.3217
	1	56	1.607	1.330	0.8658	0.3190

Figure 6.3: Descriptive Statistics Confidence

6.3.3 Self-Perceived Strategic Empathy

At the end of each of the negotiation rounds, a questionnaire was included with reflection questions on participants' understanding and self-perceived performance of Strategic Empathy (experimental group only). The questionnaire originates from the one used by Huffmeier et al. (2017) and has been slightly adapted to this use case. All the questions were answered on a five-point Likert scale (from 1: "Highly Disagree" to 5: "Highly Agree"). The self-reflective questions can be found in Appendix A.7. Figure 6.2 presents the distribution of the answers per element i) the level of understanding of Strategic Empathy, ii) the degree to which they put themselves in the other's shoes (adopted Strategic Empathy), and iii) the degree to which they used Strategic Empathy for the creation of their arguments and bids. Figure 6.1 shows the responses after the first and second negotiation exercise, respectively.



(a) Round 1

(b) Round 2

Figure 6.4: Level of Self-Perceived Strategic Empathy Skills Experiment Group

From the results it becomes clear that the majority of the participants felt that they successfully understood, adopted, and used the strategy. Moreover, the self-reported understanding of Strategic Empathy slightly increases in the second round (M = 3.89, SD = 0.88) compared to the first round (M = 3.745, SD = 0.75), see Figure 6.3. Self-reported adoption and use stayed fairly stable across the two rounds, with a slight decrease in the second round.

	N	Mean	Std. Deviation	Skewness	
	Statistics	Statistics	Statistics	Statistics	Std. Error
Understanding SE T1	55	3.745	0.7508	-1.446	0.3217
Adopt SE T1	55	3.745	0.7750	-0.5087	0.3217
Use SE T1	55	3.509	0.8136	-0.3515	0.3217
Understanding SE T2	55	3.891	0.8750	-1.503	0.3217
Adopt SE T2	55	3.727	0.8914	-1.540	0.3217
Use SE T2	55	3.473	1.034	-0.8637	0.3217

Figure 6.5: Descriptive Statistics Self-Perceived Strategic Empathy Experimental Group

6.4 Hypothesis testing

The following section will present the statistical analysis needed for answering of the research questions.

6.4.1 Strategic Empathy and Confidence

The effect of Strategic Empathy on confidence was tested by means of the LIWC metric called Clout. The level of confidence was analysed across groups and over time. The results showed that the argumentation of the experimental group indicated a significantly higher level of confidence compared to that of the control group ($F(107)=10.140$, $p<0.01$, $\eta^2 = 0.085$). Also, in the experimental group, the level of confidence was found to significantly increase from T1 to T2 ($F(107)=4.264$, $p<0.05$, $\eta^2 = 0.038$), while the level confidence of the control group decreased. Hence, teaching Strategic Empathy is found to have a significantly positive effect on the participants' level of confidence and thus the first hypothesis can be confirmed.

6.4.2 Strategic Empathy and Persistence

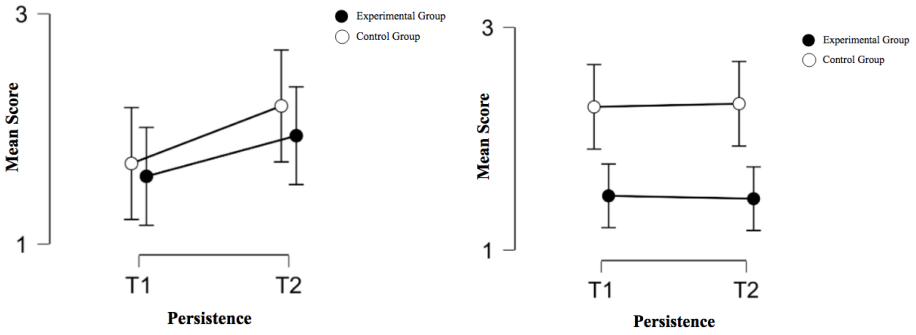
The second hypothesis predicted an association between Strategic Empathy and the level of persistence of participants. Participants who adopt Strategic Empathy were expected to be more persistent in the negotiation compared to those who did not adopt the strategy. In contrast to the prediction, the results did not confirm a positive effect of Strategic Empathy on persistence. Taking the repeated measurement into account, the effect Strategic Empathy on persistence was not significant (F(107)=0.13), p=0.719). Similarly, Strategic Empathy did not show to have an overall positive effect on persistence. On the contrary, overall the control group showed to be significantly more persistent than the experimental group (F(107)=3.944, p=0.05, η^2 = 0.035). For both the experimental and the control group, the level of persistence did increase across the two rounds (*experimental*: T1: M = 1.52, SD = 1.25, T2: M = 1.61, SD = 1,33; *control*: T1: M = 2.07, SD = 1.60, T2: M = 2.27, SD = 1.51), however this trend was not significant (F(107), p = 0.128).

6.4.3 Strategic Empathy and Perspective-Taking Ability

The third hypothesis predicted an association between a participant's Perspective Taking Ability and their level of confidence and persistence. Namely, the initial Perspective Taking Ability of the participant was expected to influence the degree to which someone can successfully understand, learn and leverage Strategic Empathy. Participants who scored high on Perspective Taking Ability are expected to adopt Strategic Empathy more easily and thus be more confident and more persistent in the negotiation.

For the level of confidence, the Perspective Taking Ability of participants did not show to have a significant effect (F (107) = 0.004, p = 0.949). Also the interaction between Persistence and Perspective Taking Ability did not show to be significant (F(107) = 0.191, p = 0.663).

For the level of persistence, the results showed no significant overall effect of Perspective Taking Ability on persistence (F(107) = 0.014, p = 0.907). However, the interaction between Persistence and Perspective Taking Ability did show an interesting trend (F(107)=2.315, p=0.131). Therefore, the effects within this interaction were further analysed with the help of a simple main effect analysis. This analysis revealed a significant effect of Perspective Taking Ability on the Persistence x Strategic Empathy interaction. Namely, for women who scored low on Perspective Taking Ability the Persistence x Strategic Empathy interaction was not significant (neither in T1 nor in T2; F(107) = 0.214, p = 0.646). For women who scored high on Perspective Taking Ability the Persistence x Strategic Empathy was significant (both in T1: F(107) = 5.075, p < 0.05; and in T2: F(107) = 6.838, p < 0.05). Looking at the data, however, revealed that this significant effect was contrary to the predicted effect. Namely, women with high Perspective Taking Ability showed to be significantly more persistent in the control group than in the experimental group, see Figure 6.6. Therefore, the hypothesis was denied.



(a) Low Perspective-Taking Ability (b) High Perspective-Taking Ability

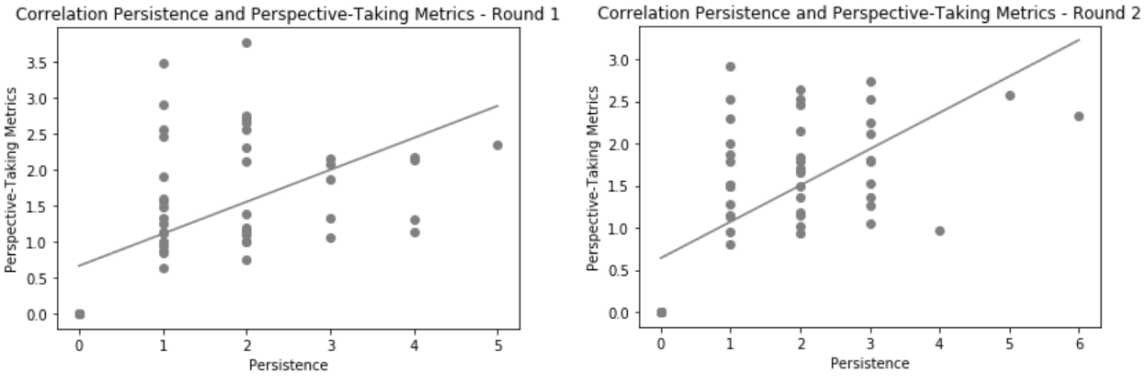
Figure 6.6: Effect of Perspective-Taking Ability

6.5 Supplementary Analysis

A number of supplementary analysis were conducted to further investigate the unexpected negative effect of Strategic Empathy on persistence. Three types of analysis were done with the aim to find an explanation for the previous findings. First, the effect of Strategic Empathy in persistence was analysed again, but this time taking the degree of adoption, measured by the linguistic metrics, into account. Second, the affect and motivation of the participants was analysed by means of various LIWC categories. Third, different types of persistence were analysed to get a better insight into the difference in negotiation behaviour across the different groups.

6.5.1 Strategic Empathy Levels and Persistence

The third hypothesis tested the effect of Strategic Empathy on persistence, however, the degree of adoption was not taken into account. The level of Strategic Empathy exercised by the participants within the experimental group can vary depending on level of understanding, effort, and abilities. This variance in adoption may have had influences on the overall measured effect of Strategic Empathy on Persistence. To investigate this influence in more detail, the effect of the degree of Strategic Empathy on persistence was analysed. The linguistic features (mean score) were taken as an indicator for the degree of adoption of Strategic Empathy. A significant effect was found of the frequency of use of linguistic features on the level of persistence ($F(104) = 116.819$, $p < 0.001$, , $\eta^2 = 0.485$). A very strong correlation was found between the overall linguistic features (mean score) and persistence, both in the first round ($r(56) = 0.55$, $p<0.001$) and the second round ($r(56) = 0.64$, $p < 0.001$). Figure 6.11 depicts the correlation in the different rounds. In other words, participants that adopted Strategic Empathy more strongly (measured by linguistic features) were more persistent in the negotiation.



(a) First Round

(b) Second Round

Figure 6.7: Correlation between Perspective-Taking Metrics and Persistence

6.5.2 Linguistic Insights: Affect and Motivation

To gain better insights into the affect and motivation of the participants, the following analysis investigated linguistic patterns across groups by means of LIWC categories. For affect, the following LIWC categories were analysed i) positive emotion, ii) negative emotion, iii) anger, iv) sad, v) anxiety. The emotional states of participants, signaled through the words used in their argumentation, can provide insights into how they experienced the negotiation, the system, and the experiment as a whole (Pennebaker et al., 2007). The motivation of participants was analysed by means of i) the money category and ii) the reward category. Both provide an indication of the drive of a participant in the negotiation (Pennebaker et al., 2007). The analysis investigated whether there was a significant difference in use of the aforementioned LIWC categories, across the two groups (experimental and control) and over time (T1 and T2).

Thema	LIWC Category	Time	Time*cond	Time * PTA	Time * PTA * cond
Affect	1. Positive	2.133	0.033	3.269	2.184
	2. Negative	3.132	0.342	0.171	0.104
	3. Anger	4.973 *	0.264	0.297	0.163
	4. Sad	3.078	0.352	0.521	0.009
	5. Anxiety	3.243	1.238	0.556	1.085
Motivation	6. Money	0.497	3.804	0.781	4.893 *
	7. Achieve	0.324	1.3e-4	0.029	0.532

* p-value < 0.05 ** p-value < 0.01 *** p-value < 0.001

Figure 6.8: Within Subjects Effects: Affect, Motivation and Confidence Across

The findings of the difference in use over time (T1 and T2) and across groups (experimental and control) are depicted in Figure 6.8 and Figure 6.9, respectively. The results show that the degree of anger-related words significantly increases over time ($F(107) = 4.973$, $p < 0.05$, $\eta^2 = 0.044$). Moreover, for use of words related to money increase over time was significantly different across the two group ($F(107) = 4.65$, $p = 0.054$, $\eta^2 = 0.004$). The money drive increased in the experimental group, while in the control group it decreased. Furthermore, women who scored low on Perspective-Taking Ability show to have a significantly stronger money drive compared to women who scored high on Perspective-Taking Ability ($F(107) = 4.713$, $p = 0.032$, $\eta^2 = 0.042$). Finally, also the use of money category words is strongly correlated with the level of persistence, both in the first ($r(107) = 0.302$, $p < 0.01$) and the second round of the experiment ($r(107) = 0.212$, $p < 0.05$).

Thema	LIWC Category	Cond	PTA	Cond * PTA
Affect	1. Positive	0.769	0.145	0.011
	2. Negative	1.195	0.067	0.003
	3. Anger	0.389	0.066	0.028
	4. Sad	1.818	0.141	0.215
	5. Anxiety	0.088	0.470	0.098
Motivation	6. Money	0.041	4.713 *	0.131
	7. Reward	0.009	0.006	0.085

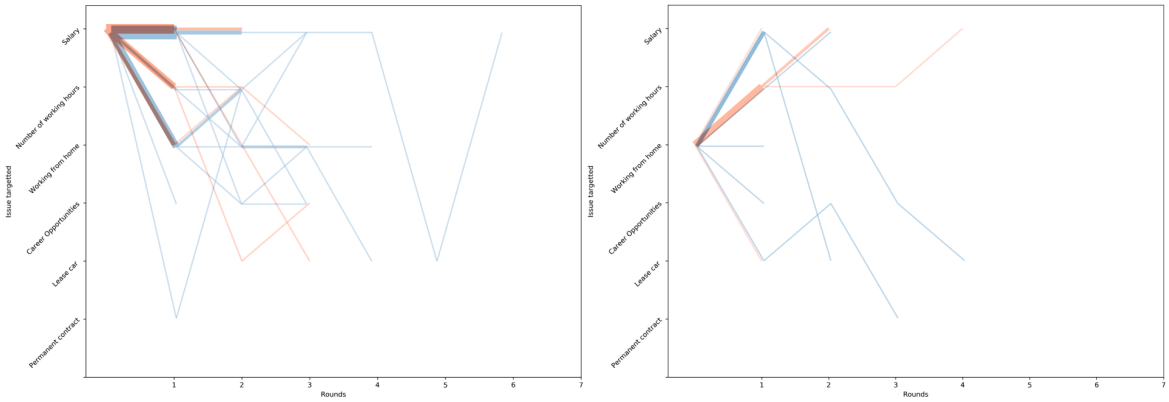
* p-value < 0.05 ** p-value < 0.01 *** p-value < 0.001

Figure 6.9: Between Subjects Effects: Affect, Motivation and Confidence Across

6.5.3 Negotiation Behaviour

Up unto this point, persistence has been referred to and measured by the total number of counter-offers made by a participant. However, this metric does not provide insights into whether participants targeted the same issue repeatedly or switched issues every bid. This section investigates this difference in behaviour across the experimental and control group. The behaviour of the participants during the negotiation has been visualised in Figure 6.12. The graphs depict all paths with the same starting points (the initial issue that they addressed) and shows the pathways from the initial issue to their final issue. The width of the lines represents the number of participants that have followed

the same path. The experimental group (orange) and the control group (blue) have been depicted in the same diagram, but with different colored lines.



(a) Initial Issue Salary

(b) Initial Issue Working from Home

Figure 6.10: Behaviour Graph

Three types of behaviour were also analysed in a quantitative manner. Three metrics were utilized: i) the number of switches to a distinct issue a participant made, ii) the number of times the same issue is targeted in a consecutive manner iii) the number of times an issue is targeted multiple times across the whole round. The first type counted the number of switches between different issues, eg. counter-offer 1: salary, counter-offer 2: lease car. The second counted the number of repetitions on a single issue in a consecutive order, eg. counter-offer 1: salary, counter-offer 2: salary. The third counted the number of targeting repetitions on issues across the whole round, eg. counter-offer 1: salary, counter-offer 2: lease car, counter-offer 3: salary. All three types were calculated as a percentage of the total number of counter-offers minus 1. This was done as participants who provided only one counter-offer did not switch nor repeatedly targeted an issue. Hence, participants who provided none or a single counter-offer got 0 percent for both metrics. These metrics provide insights into the negotiation behaviour of the participants and the way they react to a rejection. For example, when receiving a "no" from the opponent to salary raise, some participants will continue to working hours, while others will target salary again.

The results showed that Strategic Empathy did not have a significant effect on either three type of behaviour. Neither did the behaviour change significantly in the second round compared to the first round. Both groups switched between issues more often than repeatedly targeting an issue. The experimental group showed to target issues multiple times more frequently than the control group. The experimental group scored higher on the third metric than the control group, repeatedly targeting issues (not necessarily in an consecutive manner). For the experimental group, the average repeatedly targeted issues was 10 percent (SD = 21 percent), where for the control group this was only 8 percent (SD = 21 percent). However, the difference in behaviour between the two groups was not significant. Overall, the findings on the difference in behaviour between the two groups were limited. Further research may need to look at more nuanced metrics and more in-depth analysis of the negotiation behaviour.

7 Discussion

This chapter will discuss the scientific and practical relevance of the previously introduced results. Moreover, it will shed light on relevant limitations of the conducted research and provide suggestions for further research.

7.1 Scientific Relevance

This study has provided evidence on the effectiveness of using a NSS to teach Strategic Empathy. The results proved that the experimental group, to whom the strategy was taught, adopted Strategic Empathy in the negotiation. Moreover, a learning curve was apparent as Strategic Empathy levels were shown to increase in the second round compared to the first round. These findings were complemented by the self-reported levels of Strategic Empathy which supported the same conclusion. The majority of the women felt that they successfully understood, adopted, and used the strategy in the negotiation. Moreover, more than 75 percent reported that they would recommend Strategic Empathy to their friends. In this way, the study has provided evidence for the value of the developed system and the chosen approach to integrate Strategic Empathy into the system. The results suggest that the method of introduction, practice, and feedback used in this system is adequate for teaching Strategic Empathy to women. Consequently, it reinforces the potential benefits of using agents to teach negotiation skills and improves the understanding of virtual perspective-taking training (Johnson & Gratch, 2020; Johnson, 2019; Broekens et al., 2012). Moreover, the findings are in harmony with earlier psycho-linguistic literature (Tausczik and Pennebaker, 2010; Litvak et al., 2016; Ata, 2015; Van Swol et al., 2021), as they revealed that cognitive processes, such as perspective-taking, are conveyed in language through linguistic patterns. These results also give direction to further research on Strategic Empathy evaluation metrics and contribute to the scarce body of research on automated evaluation of empathy and Strategic Empathy (Alam et al., 2017; Flemotos et al., 2021; Olsen & Oertel, 2020).

Next, the effect of the system was tested with respect to women's negotiation performance. As introduced earlier, literature has attributed the ill-performance of women in salary negotiations to two major issues: i) low self-efficacy, and ii) a lack of persistence. Effective strategies to improve these issues are lacking as traditional best practices have proven ineffective due to the backlash that they trigger when adopted by women. Strategic Empathy was put forward as it shows the potential to avoid the backlash as it advocates for the use of traits that are traditionally seen as more feminine (Schneider, 2017; Roberts, 2016; Martinovski et al., 2007). To validate this narrative, literature should be complemented by empirical evidence. This study, however, did not go into more detail on this topic. Instead, the effectiveness of Strategic Empathy was tested with respect to the two major performance barriers: i) confidence and ii) persistence.

A significantly positive effect was found of Strategic Empathy on women's self-efficacy. Women who adopted Strategic Empathy conveyed significantly higher levels of confidence in their argumentation compared to those who did not. Moreover, the level of confidence of women who learned Strategic Empathy significantly increased over time, while the level of confidence of the control group decreased. In other words, women became more confident in the negotiation as their level of understanding and adoption of Strategic Empathy increased. Confidence has been proven to be crucial to negotiation success (Scheider, 2012; Miles & La Salle, 2007), and has been stated as one of the main factors that is diminishing women's negotiation performance. Consequently, these findings

reinforce the substantial body on the positive effect of perspective-taking on negotiation performance (Trotschel et al., 2011; Galinsky et al., 2008; Weisz & Cikara, 2020). In addition, it complements the existing body of research as limited studies have investigated the effect of perspective-taking on a negotiator's confidence. The earlier introduced relationship between Strategic Empathy, perceived room for negotiation, and confidence is supported by these findings. It suggests enlarges the perceived room for negotiation, through insights about the opponent, makes a negotiator feel more confident in a negotiation even if the opponent reacts with resistance. However, the experimental design did not include self-reflective questions on perceived room for negotiation, the participant's level of confidence, or the root of their (lack of) confidence. Therefore, no conclusion can be made on the mechanisms that give rise to the positive relationship between Strategic Empathy and women's self-efficacy. Further research should investigate this relationship further.

Overall, the proven effect supports the predicted value of teaching Strategic Empathy to overcome the lack of confidence that is hindering women's negotiation success. By doing so, it contributes to the knowledge gap on effective strategies to enhance women's self-efficacy in salary negotiation (Mazei et al., 2020; Kray & Thompson, 2004).

In contrast to the expectations, no overall positive effect was found of Strategic Empathy on persistence. On the contrary, overall the control group showed to be significantly more persistent than the experimental group. This significant difference in persistence showed to be particularly strong for one subgroup: women who scored high on Perspective-Taking Ability. The analysis of the second hypothesis showed that teaching Strategic Empathy with the developed system had a negative effect on women with high Perspective-Taking Ability. Namely, for this sub-group, the control group showed to be significantly more persistent than the experimental group. Also, within the experimental group, the women with high Perspective-Taking Ability revealed to be less persistent than those with low Perspective-Taking Ability.

A number of factors can be suggested to have contributed to these unexpected results. First, the overall difference in persistence between the groups could be due to the time- and energy-consuming nature of the experiment. Especially for the experimental group, the experiment included a number of additional preparation steps. For example, for this group, an extra step was included in which the strategy was explained and instructions on how to use the strategy were given. Also at the reflection step, the experimental group required more time to complete all the steps. Consequently, the missing effect of Strategic Empathy on persistence could be due to the substantial cognitive load of the experiment for the experimental group.

Secondly, the previous explanation can be complemented with a pattern found in the findings on the drive of the participants. As the majority of the participants were scouted by means of the platform Prolific reward and money play a substantial role in their participation in the experiment. Some participants may be more driven to perform well in the experiment in order to ensure that they will be rewarded. Namely, poor quality can lead to rejection, which has consequences for their compensation and future participation on the platform. In this way, money functions as an intrinsic motivation in the experiment, and thus is expected to be a strong motivator to perform well. Consequently, the LIWC drive metrics - money and reward - were expected to disclose insights into the motivation of the participant in the negotiation, but also on their motivation in the experiment itself.

The findings confirmed this prediction as the use of money category words was shown to be strongly correlated with the level of persistence. The analysis also revealed that women who scored low on Perspective-Taking Ability revealed to have a significantly stronger money drive compared to women who scored high on Perspective-Taking Ability. In other words, taking into account the aforementioned narrative, the sub-group of low Perspective-Taking Ability women showed to have a stronger intrinsic motivation in the experiment.

Taking the two aforementioned potential explanations together, cognitive load and intrinsic motivation, a clear image becomes visible. Namely, in the experimental group, women with high Perspective-Taking Ability revealed to be less persistent than women with low Perspective-Taking Ability. In addition, among the women who scored high on perspective-taking ability, the control group revealed to be significantly more persistent. The introduced findings suggest that the cognitive load of the experiment was a lot higher for the experimental group, and women with high perspective-taking ability showed to have lower intrinsic motivation to perform well. Hence, women in the experimental group with high perspective-taking ability were the least persistent sub-group. This has resulted in the unexpected findings.

The supplementary analysis investigated the effect of Strategic Empathy on persistence in more detail, taking the degree of Strategic Empathy into account and also looking at the levels of perspective-taking in the control group. A very strong correlation was found between the degree of Strategic Empathy and persistence, both overall and within the experimental group. In other words, participants that adopted Strategic Empathy more strongly (measured by linguistic features) were more persistent in the negotiation. These findings align with earlier work (Trotschel et al., 2011; Galinsky et al., 2008; Weisz & Cikara, 2020), and suggest a positive effect of Strategic Empathy on persistence.

Taking into account the earlier stated effect of the cognitive load and intrinsic motivation, these findings that an enhanced experimental design may lead to a more positive effect of Strategic Empathy on persistence. Future research may, for example, want to include a longer break in between the two rounds of the experiment. This extra time could also be beneficial for the experimental group to digest the information on Strategic Empathy and establish an enhanced understanding of the strategy. To neutralize the effect of intrinsic motivation, a different reward or experimental environment could be tested. The fully online nature of the experiment may have lowered the motivation of participants to perform well. Moreover, a more diversely sourced group of participants, not all from the Prolific platform, may also neutralize the effect of intrinsic motivation and lead to different insights.

Overall, the findings of this study provide evidence for the effectiveness of leveraging NSS to teach Strategic Empathy. Moreover, the results showed a positive effect of teaching Strategic Empathy on confidence. By doing so, it contributes to the knowledge gap on effective strategies to enhance women's self-efficacy in salary negotiation (Mazei et al., 2020; Kray & Thompson, 2004). The effectiveness of this system to enhance persistence showed to be limited, in particular for women who scored high on Perspective-Taking Ability. However, a couple of credible explanations for this finding came forward from the supplementary analysis. These explanations provide directions and improvements for the experimental design of further research.

7.2 Practical Relevance

This research studied to what extent Strategic Empathy can be integrated into NSS for teaching to enhance women's negotiation performance. First of all, this study showed that it is possible to integrate Strategic Empathy into NSS for tutoring purposes. This finding has practical relevance because it reinforces the potential benefits of using agents to teach negotiation skills (Johnson / Gratch, 2020; Johnson, 2019; Broekens et al., 2012), and thus provides insights for the design of future negotiation training tools. In fact, these insights provide value beyond the negotiation context. The design and development of for example virtual empathy training tools for psychology or medical students can also be informed by the results from this study (Olsen & Oertel, 2020; Yao et al., 2020). Furthermore, the system developed in this study is one of the few systems that have aimed to bridge the existing gap between NSS and dialog systems (Rosenfeld, 2014; Malchanau et al., 2018; Zhao et al., 2018). The creation of a negotiation agent that considers a natural language interface enables the analysis of and feedback on users' argumentation during negotiations. By doing so, it provides a new dimension of negotiation training and allows for more automated evaluation metrics and feedback.

Next to language, this study also collected information on the negotiation behaviour of participants. While the analysis on negotiation behaviour - switching and repetitive targeting - did not lead to any significant findings, the data collected by the system can function as input for future studies and systems. The data provides insights into women's negotiation behaviour and the difference in behavioural patterns across the two experiment groups. This data can be used for further analysis into behavioural patterns in negotiation and women's negotiation behaviour in specific. Moreover, the effectiveness of the different types of behaviour can be studied and of which the findings can potentially lead to more advanced evaluation metrics for behavioural patterns of negotiators.

This study also has substantial practical relevance as it targets a very current issue. Recently, many governments, non-profits, and large corporate organisations have been showing effort to target the gender pay gap (Ellwood et al. 2020). However, solutions have been scarce and appropriate strategies have been lacking (Mazei et al., 2020). This research has contributes towards a solution

for this societal problem as it puts forward a new strategy and provides evidence on its value to enhance women's confidence. Moreover, a system has been developed and designed that can be used to teach this strategy to women in a cost-effective, accessible manner. By doing so, this study has demonstrated how technology can be leveraged to solve societal issues and reinforces the need for socio-technical design methods and solutions. Taken together, this study provides a solution and a means to empower women from different social backgrounds and geographic locations to learn how to negotiate a fair salary.

7.3 Limitations & Further Research

For the results presented above a number of theoretical, methodological, and practical limitations should be taken into consideration.

Experimental Design
First of all due to the fully online nature of the experiment, the space, and circumstances in which the participants conducted the experiment have been uncontrolled. Hence, the potential effect of the environment on participants' attention and effort has not been taken into account. Secondly, all participants were asked to formulate their arguments in English while for the majority this was not their native language. This is particularly important to notice for this research as many metrics were based on the linguistic patterns of participants. Similarly, despite that culture has been identified as a significant factor in behavioural differences in negotiations (Shan et al., 2019), it has been kept out of scope for this research. Consequently, further research may investigate the role of culture and mother tongue on the performance- and linguistic metrics in a negotiation context.

Strategic Empathy
Strategic Empathy was integrated into the design and the experiment at different stages i) teaching (explanation in text), ii) practicing (interaction with implicit information about the opponent's preferences), iii) evaluation (perspective-taking metrics) and iv) feedback (generic feedback in text). A number of limitations have to be mentioned with relation to these design choices. First, all of these phase have been shaped by the definition chosen for Empathy and Strategic Empathy for this research. Due to the varying definitions present in literature, the definitions chosen for this research are not the only possible point of view. Many other views and dimensions could be investigated, and could potentially lead to varying or additional insights. Moving on to the teaching phase, it has to be noted that the teaching was limited as a trade-off had to be made between comprehensiveness and conciseness. A more elaborate explanation could lead to a better understanding, but potentially at the cost of the execution. Namely, due to a longer introductory phase, the participants' effort could diminish due to the extensiveness of the process. On the other hand, the chosen design provides no opportunity to ask questions, request additional information, or view examples. As such, the understanding and execution of Strategic Empathy may have varied across the participants despite of the high self-reported understanding. Further research can investigate alternative, more elaborate, methods of introduction for Strategic Empathy.

For the interaction phase, a number of limitations can also be discussed with regard to the integration of Strategic Empathy. First of all, a design choice was made for a non-embodied agent, this may have limited the participants' degree of empathy and the amount of information that could be deduced from the opponent. On the other hand, the inclusion of an embodied agent would have increased the experimental variance too much. The effect of an embodied agent and non-verbal information on participants' Strategic Empathy skills could be researched in future work. Similarly, the influence of the type and behaviour of the opponent could be investigated in future research. Different types of opponents (female, male, competitive, or cooperative) may influence the level and effectiveness of Strategic Empathy.

The evaluation of Strategic Empathy was done by means of linguistic metrics (second-person pronoun, LIWC perceptual, and LIWC cognitive). Non-verbal behaviour was left out of scope for this research but shows great potential for enabling automated analysis of Strategic Empathy. Hence, the creation of non-verbal behavioural metrics for (Strategic) Empathy could be further investigated.

Finally, the feedback phase, similar to the teaching phase, was limited due to time constraints and

a design trade-off was made between comprehensiveness and conciseness. Personalized feedback was missing and the general feedback could have been more elaborate with examples and advise. Also, a reflective step could be added in which participants need to adjust a previously given argument and align it better with Strategic Empathy. In this way, the feedback is more interactive and thus more effective. Potentially, the linguistic metrics could aid with enabling instant, personalized feedback on Strategic Empathy levels. Future research could analyse the effect of such feedback on the learning curve of participants and their confidence and persistence.

Confidence and Persistence as a metric for success
Setting confidence and persistence as a metric for success has been among the major design choices of this research. This choice has shaped the analysis and results and thus relevant limitations associated with this decision should be addressed.

First of all, as mentioned earlier, the findings revealed a positive effect of Strategic Empathy on confidence. However, they did not provide insights into the mechanisms that gave rise to this positive relationship. Consequently, future research could supplement the linguistic metrics with self-reported questions on the participants' perceived for negotiation, the level of confidence, and the root of the (lack of) confidence. In addition, the results may depend on elements of the system- and experimental design, such as the negotiation task, agent behavior, or metrics. Thus, these findings need to be replicated with other experimental set-ups, agent architectures, and evaluation metrics.

Several limitations also qualify the results on persistence. Namely, persistence is highly affected by the participant's intrinsic motivation and the urgency felt by the participant to reach a high negotiation outcome. However, due to the experimental nature and the online set-up, the incentive for participants to perform may have been limited. In addition, the extensive duration of the study (average duration of about 30 minutes) may have caused decreasing effort and diminishing attention. As a result, persistence levels may not have accurately reflected negotiation skills. Hence, further research may need to investigate the level of persistence in a real-life negotiation or in an experimental setting with a lower cognitive load and a higher incentive to perform well.

Moreover, the type of metrics used to determine persistence also shaped the retrieved findings. Persistence was measured by the number of counter-offers provided by the participant during a whole experiment round. However, DiCerbo (2014) highlighted the dependency between the progress someone made towards a goal and their level of persistence. Hence, in order to effectively measure persistence, one needs to identify a person's goal and base their measure of progress on the extent to which the goal is being reached (DiCerbo, 2014). Similarly, the negotiation scenario, task, and details may have shaped the level of persistence. For example, the salary scale was set from €2500-€4500, which for some participants may be above their target salary in real-life and thus they would be earlier satisfied with the opponent's counter offer. Moreover, the negotiation scenario (small technology company) may be hard to relate to for a number of people. Possibly a lack of ability to relate also reduces the level of participant's persistence. The effect of these different variables and the metrics used would need further research.

Finally, a bias in the design of the system prevented the analysis of the effect of Strategic Empathy and confidence on the negotiation outcome. Hence, no direct link can be drawn between confidence and persistence and negotiation outcome. Similarly, the findings can not provide direct evidence on the value of Strategic Empathy to enhancing women's negotiation performance. Moreover, the relationship between high negotiation performance in the designed NSS and in a real-life negotiation has still to be affirmed. The extent to which the experimental setting reflects a real-life situation can be challenged. Especially as negotiations are such complex social processes where many factors determine negotiation performance and outcome. In particular for women who's expectations, confidence and behaviour are influenced by social constructs and stereotypes. Similarly, the opponent's expectations and judgments are formed by the environment and their These complex social interactions and dependencies are difficult to simulate in a virtual agent such as the one used in this research. And thus, success in the experimental, online setting can not directly be translated into success in real-life situations. Further research should thus focus on the effect of Strategic Empathy, confidence, and persistence on negotiation outcome, and test the effect in a real-life negotiation.

8
Conclusion

The aim of this research was to investigate whether NSS could be leveraged to teach Strategic Empathy to women. By doing so, it aimed to target the gender difference in salary negotiation performance and the lack of effective strategies to solve it. The ill-performance of women in salary negotiations has been attributed to two major issues: i) low self-efficacy, and ii) a lack of persistence. In addition, traditional negotiation strategies have proven ineffective as they often trigger a backlash when adopted by women. Moreover, traditional means for negotiation training, such as workshops and courses at the university, lack accessibility and scalability. Consequently, a revisit was needed of both the best practices that are taught to women in order to enhance their performance as well as the NSS that are designed to help enhance negotiation skills.

This research investigated a new strategy: Strategic Empathy and a new means for teaching this strategy: NSS. For this study, a NSS was designed and developed that integrated Strategic Empathy for training purposes. The designed system integrated Strategic Empathy through facilitating i) teaching (explanation in text), ii) practicing (interaction with implicit information about the opponent's preferences), iii) evaluation (linguistic, perspective-taking metrics) and iv) feedback (generic feedback in text). The system was leveraged in an online experiment in which its effect was tested on women's confidence and persistence. Also, the effect of the initial Perspective-Taking Ability of women was taken into account as this was expected to influence the degree to which they were able to easily learn and adopt Strategic Empathy.

The findings provided evidence on the effectiveness of using a NSS to teach Strategic Empathy. Women who learned the strategy, by means of the designed system, conveyed significantly higher levels of perspective-taking in their argumentation compared to women who did not learn Strategic Empathy. Moreover, a learning curve was apparent as Strategic Empathy levels were shown to increase as a result of repetitive use of the system. Consequently, these findings provide an answer to the first sub-question of this study: NSS can be used to teach Strategic Empathy.

Next, a significant positive effect was found of Strategic Empathy on women's self-efficacy. Women who adopted Strategic Empathy conveyed significantly higher levels of confidence in their argumentation compared to those who did not learn the strategy. Moreover, the level of confidence of women who learned Strategic Empathy significantly increased over time, while the level of confidence of the control group decreased. In other words, women became more confident in the negotiation as their level of understanding and adoption of Strategic Empathy increased due to practice with the system. As such, the second sub-question - Does teaching Strategic Empathy by means of a NSS enhance women's confidence in salary negotiations? - can be affirmed.

No significant positive effect was found of Strategic Empathy on persistence. On the contrary, the control group showed to be significantly more persistent than the experimental group. This significant difference in persistence showed to be particularly strong for one subgroup: women who scored high on Perspective-Taking Ability. The supplementary analysis disclosed the high cognitive load and a lack of intrinsic motivation to be a potential cause for this unexpected pattern. The supplementary analysis also revealed a strong correlation between the level of Strategic Empathy, measured by the linguistic features, and the level of persistence. Hence, an enhanced experimental design has been suggested for future research as this might lead to different insights. This design should enlarge the participants' level of understanding of Strategic Empathy, while lowering the adverse effect of cognitive load and intrinsic motivation. Additional suggestions for future research included the replication of the findings in with other agent architectures, evaluation metrics, and in real-life negotiation.

Overall, the findings of this study provide evidence that NSS can be leveraged to teach Strategic Empathy and that this enhances the self-efficacy of women. While a number of studies have shown the beneficial effect of perspective-taking on negotiation performance, this study has been unique through i) focusing on women in specific and the use of NSS to teach, practice, and enhance Strategic Empathy skills. As such, this study contributes to the research field as well as towards a solution for an urgent societal issue: the gender pay gap.

9 References

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A Appendix A

A.1 Engineering Requirements

Number	Requirement	Rational
RQ1	Enhance and evaluate women's confidence and self-efficacy	Women's low self-efficacy and lack of confidence in their negotiation skills causes an adverse attitude towards negotiations and hinders enhancing their outcome
RQ2	Enhance and evaluate persistence	Women lack of persistence after rejection
RQ3	Enhance users understanding of effective negotiations and Strategic Empathy	Many women lack experience and knowledge of negotiations and effective strategies. Hence, negotiation training should start with some theory on the basics.
RQ4	Facilitate an interactive element of role-play	An interactive element like role-play has been argued as crucial for human tutoring, especially for meta-cognitive skills such as those essential to Strategic Empathy..
RQ5	Encourage users to practice formulating their arguments	Formulating an argument enhances cognitive and emotional engagement of the users which in turn enhances learning. Moreover, the language used by the users reflects the level of perspective-taking.
RQ6	Evaluate the level of perspective-taking	In order to measure the level of Strategic Empathy effectively exercised by a user, the system must evaluate the level of perspective-taking and the negotiation outcome achieved.
RQ7	Evaluate the user's negotiation outcome	In order to measure the level of Strategic Empathy effectively exercised by a user, the system must evaluate the level of perspective-taking and the negotiation outcome achieved.
RQ8	Provide personalized feedback	Research shows that feedback and reflection is essential to learning and growth processes.
RQ9	Feasible to be developed in a time period of one month	Time constraint

Figure A.1: Engineering Requirements

A.2 Offer Logic

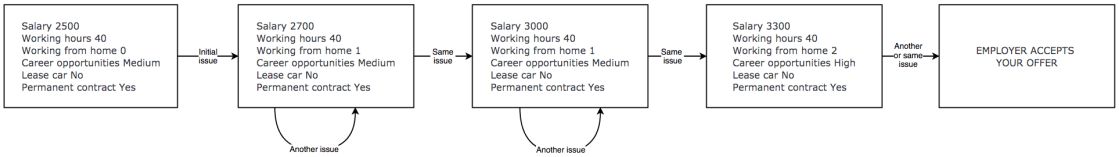


Figure A.2: Offer Logic System

A.3 Interaction Graph

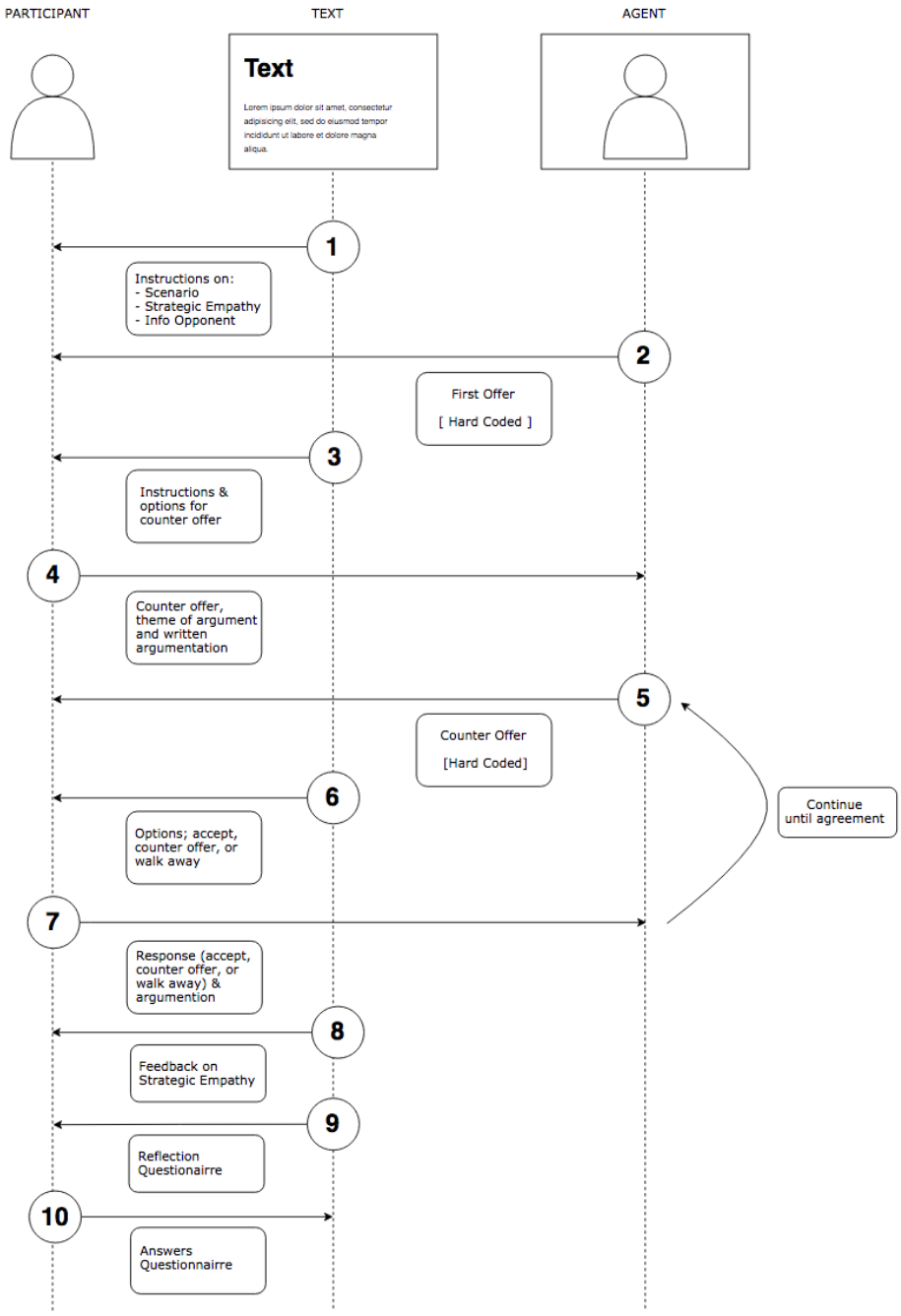


Figure A.3: Interaction Design Overview

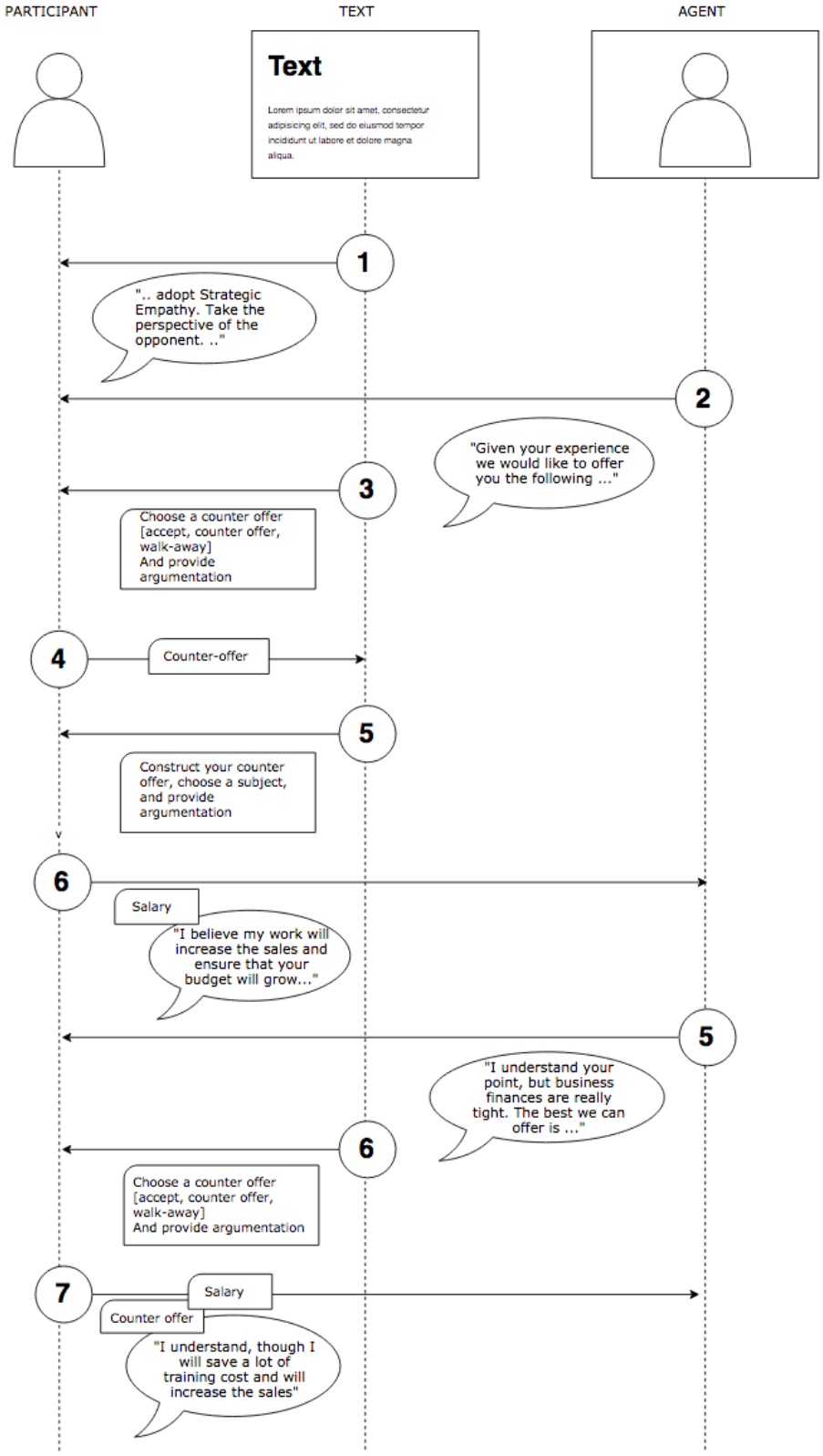


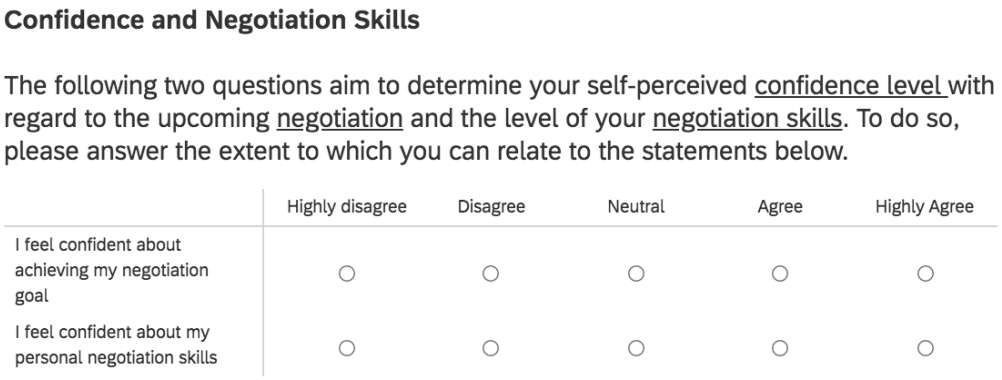
Figure A.4: Interaction Design Example

A.4 Negotiation Strategy and Task Details

Variable	Metric	Reference
Negotiation Task Employee	The negotiation exercise involves a contract negotiation between an employer and a prospective employee. You fulfill the role of employee. You are seeking a position at a young technology company and are going to engage in a contract negotiation with the HR manager of the company. In order to get the job you need to reach an agreement on 6-issues: Salary, Working hours, Career opportunities, Number of days working from home, Lease car, and Permanent contract	Johnson & Gratch (2020)
Negotiation Task Employer	The negotiation exercise involves a contract negotiation between an employer and a prospective employee. You fulfill the role of employer. You are the CEO of a young technology company and are going to engage in a contract negotiation with a prospective employee. The employee aims to fill the role of Project Manager in your company. In order for the employee to get the job you need to reach an agreement on 6-issues: Salary, Working hours, Career opportunities, Number of days working from home, Lease car, and Permanent contract	Johnson & Gratch (2020)
Strategic Empathy Explanation	You are about to partake in a salary negotiation. There are many possible strategies to approach such negotiations. In this particular negotiation, we would like to introduce one strategy to you called Strategic Empathy. Strategic Empathy is a negotiation strategy that promotes the use of perspective-taking skills where you try to understand the opponent's incentives, desires, and boundaries. Information about the opponent's position is valuable for you to use when you are constructing and argue for your bids. In short, Strategic Empathy consists of the following elements: i) Gain information on the interests and preferences of the opponent, ii) Use this information to create and argue for your offers	
Experimental condition	In preparing for the negotiation and during the negotiation, adopt Strategic Empathy. Take the perspective of the opponent. Try to understand what they are thinking in their situation. After reading your role, try to visualize yourself on the other side of the table, in that role, thinking as the opponent. Use the information that you have gained about the opponent in your argument supporting your bids.	Galinsky et al. (2001)

Figure A.5: Negotiation Strategy and Task Details

A.5 Confidence Assessment



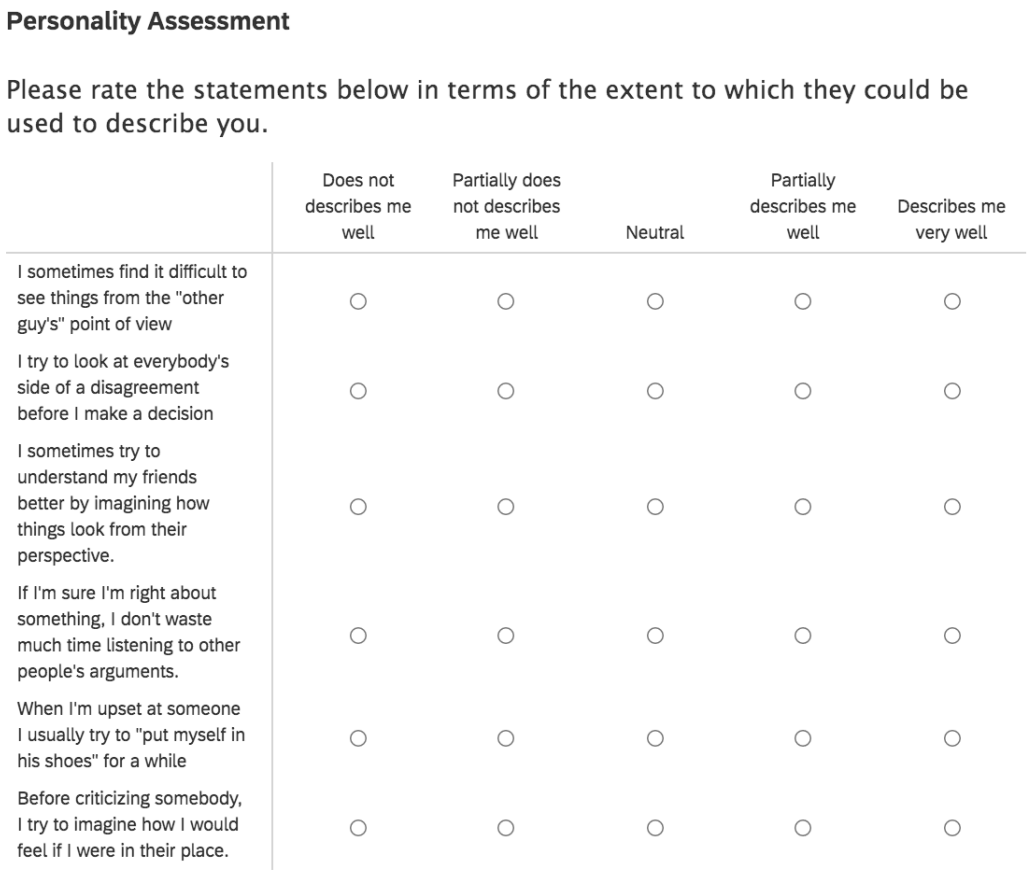
Confidence and Negotiation Skills

The following two questions aim to determine your self-perceived confidence level with regard to the upcoming negotiation and the level of your negotiation skills. To do so, please answer the extent to which you can relate to the statements below.

	Highly disagree	Disagree	Neutral	Agree	Highly Agree
I feel confident about achieving my negotiation goal	○	○	○	○	○
I feel confident about my personal negotiation skills	○	○	○	○	○

Figure A.6: Confidence Assessment

A.6 Personality Test



Personality Assessment

Please rate the statements below in terms of the extent to which they could be used to describe you.

	Does not describes me well	Partially does not describes me well	Neutral	Partially describes me well	Describes me very well
I sometimes find it difficult to see things from the "other guy's" point of view	○	○	○	○	○
I try to look at everybody's side of a disagreement before I make a decision	○	○	○	○	○
I sometimes try to understand my friends better by imagining how things look from their perspective.	○	○	○	○	○
If I'm sure I'm right about something, I don't waste much time listening to other people's arguments.	○	○	○	○	○
When I'm upset at someone I usually try to "put myself in his shoes" for a while	○	○	○	○	○
Before criticizing somebody, I try to imagine how I would feel if I were in their place.	○	○	○	○	○

Figure A.7: Personality Test - Perspective-Taking Ability

A.7 Reflection Questions

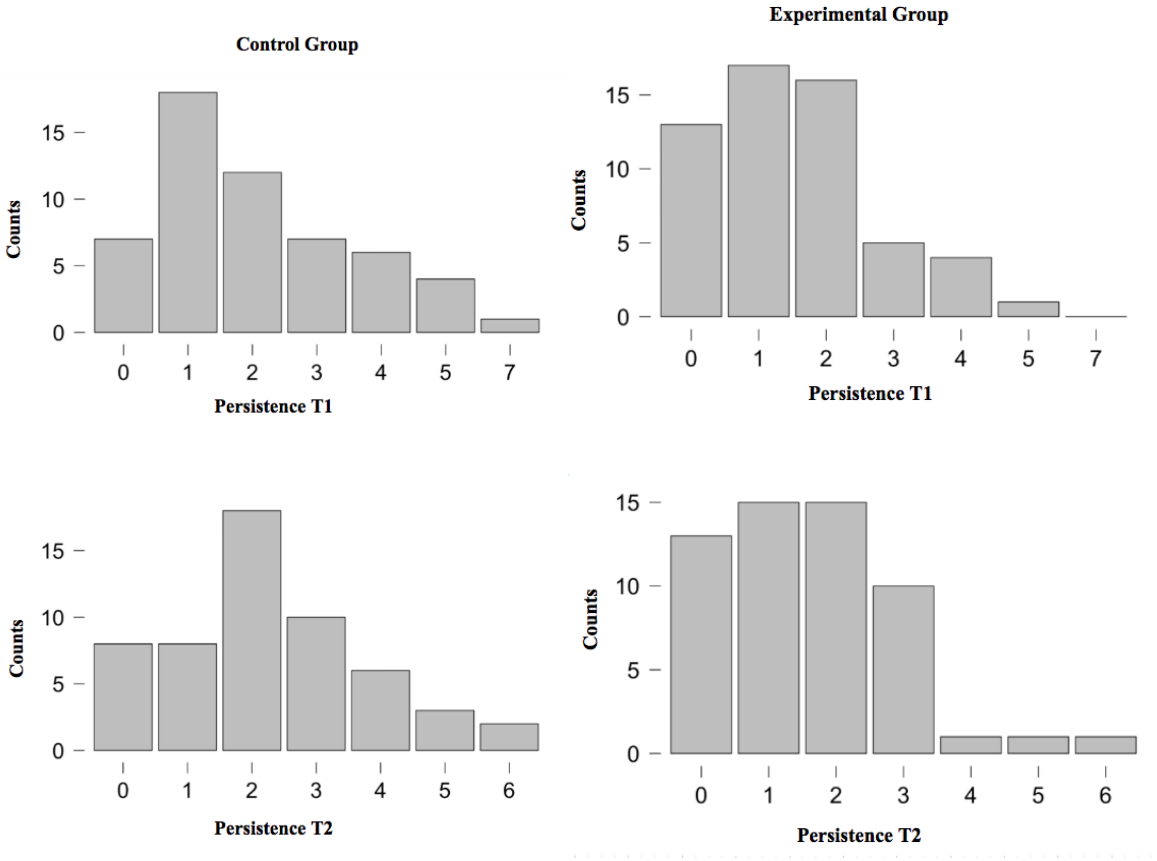
Reflection

You have successfully completed the negotiation exercise. To close off, we would like to ask you a few reflection questions. Based on the previous negotiation exercise, please rate the following statements (ranging from strongly disagree to strongly agree).

	Strongly disagree	Disagree	Neurtal	Agree	Strongly agree
I am satisfied with the negotiation outcome.	○	○	○	○	○
I am satisfied with my own negotiation performance.	○	○	○	○	○
I have a thorough understanding of the negotiation strategy Strategic Empathy.	○	○	○	○	○
In the previous negotiation, I was successful in putting myself into the shoes of my counterpart	○	○	○	○	○
I was able to effectively use Strategic Empathy for the creation and argumentation of my bids.	○	○	○	○	○
I would recommend Strategic Empathy as an effective strategy to my friends for any upcoming salary negotiations	○	○	○	○	○

Figure A.8: Reflection Questions on Strategic Empathy and Satisfaction

B
Appendix B



(a) Control Group (b) Experimental Group

Figure B.1: Distribution Plot Persistence Levels