Bargaining under Time Pressure

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Abstract: We experimentally investigate the effect of time pressure in a rich-context, unstructured bargaining game with earned status and competing reference points. Our results show that average opening proposals, concessions, and agreed shares are very similar across different levels of time pressure. Nevertheless, as predicted, time pressure systematically influenced agreements. In particular, the likelihood of bargainers reaching the explicit reference point outcome in agreements increases with time pressure, and the likelihood of reaching the implicit reference point (equal division) in agreements decreases with time pressure. Disagreement rates and the frequency of last-moment agreements are strongly affected: the disagreement rate rises dramatically with time pressure, and last-moment agreements are significantly more frequent. This effect is explained by a stronger connection between the tension in first proposals and the final bargaining outcome under time pressure than without time pressure.

Keywords: Bargaining; Disagreements; Last-moment Agreements, Reference Points; Time Pressure.

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1. Introduction

Whether it is wage negotiations, climate negotiations, political negotiations on disarmament deals or contract negotiations in general—a common feature is (often severe) time pressure toward the deadline for striking a deal in bargaining. Bargaining theory abstracts from time as a variable, as standard equilibria in most frequently used bargaining models are implemented instantaneously. This is, for instance, true for the Nash bargaining solution (Nash, 1950), alternating offers bargaining (Rubinstein, 1982), and many versions of war of attrition games (Bulow and Klemperer, 1998). However, for practical bargaining problems, the timing of offers and deadlines play a central role in bargaining strategies and outcomes. As a consequence of the lack of theoretical models, economists have mostly neglected issues of time pressure, deadlines, and timing in bargaining.

This paper provides a set of empirical insights based on an experiment in a rich bargaining context (Gächter and Riedl, 2005; Bolton and Karagözoğlu, 2013; Camerer et al., 2015) that yet has enough structure to be able to rigorously control for many important aspects. It extends the scarce existing evidence on the effects of time pressure from simple and highly structured bargaining games such as the ultimatum game (Sutter et al., 2003; Cappelletti et al., 2011) to a more realistic environment that allows for taking strategic timing decisions of offers and other bargaining parameters explicitly into account. For economists, it is relevant to understand the dynamics of bargaining under time pressure. It might ultimately lead to richer models of bargaining considering time, timing, and psychological aspects of time as explicit variables.

Our setup builds on the setup of Roth et al. (1998) and the more recent experiments by Gächter and Riedl (2005, 2006) as well as, for instance, Karagözoğlu and Riedl (2015). The bargaining task is to allocate a salary budget of size $X \in \{\overline{x}, \underline{x}\}$ with $\overline{x} > \underline{x}$. A real effort task before the negotiations accompanied by a story frame in the experimental instructions creates references points y_i and y_j for the two negotiators i and j. We implement $y_i > y_j$, and $\underline{x} < y_i + y_j < \overline{x}$. The latter condition implies that implementing the reference levels is consistent with the larger budget but inconsistent with the smaller

budget. Of course, there is a possible second, implicit reference point in such environments: the equal split. The negotiation outcome is an allocation tuple $\{z_i, z_j\}$ with $z_i + z_j = X$ or disagreement, resulting in the allocation $\{0,0\}$ if the two bargainers do not agree.

Our experiment uses an unstructured bargaining protocol, which allows the sequence and the timing of offers to be endogenously determined. Unstructured bargaining games have been successfully utilized by experimental economists in studying a great variety of topics such as coordination problems in the presence of multiple focal points, deadline effects (Roth et al., 1988), the role of information (Roth and Malouf, 1979), self-serving biases (Babcock and Loewenstein, 1997; Babcock et al., 1995), subjective entitlements and reference points (Gächter and Riedl, 2005), performance and production uncertainties (Karagözoğlu and Riedl, 2015), different justice ideals (Luhan et al., 2013), communication (Valley et al., 2002; Bolton et al., 2003), efficiency in markets for input and output goods (Crockett, Smith, and Wilson, 2009), interaction of hard versus soft bargaining power (Bolton and Karagözoğlu, 2013), asymmetric information and strikes (Forsythe, Kennan, and Sopher, 1991; Camerer et al., 2015), sensitivity of bargaining outcomes to disagreement payoffs (Anbarcı and Feltovich, 2013), and asymmetric exposure to risk (Embrey et al., 2014). As nicely summarized by Camerer et al. (2015), not only the unstructured bargaining protocol offers the researcher much richer data – especially on the negotiation process – than the structured alternatives but it is also more realistic than those; yet structured theoretical predictions can still be obtained.

Our main treatment variable in this setup is the time allotted to bargainers for reaching an agreement. In our low time pressure treatment (LTP), the bargainers are given 10 minutes, and in our high time pressure treatment (HTP), they are given 90 seconds. Further, we collected data for a 45 second deadline (SHTP: severely high time pressure) as a robustness check. Bargaining takes place anonymously in pairs through a real-time chat on the screen.

We observe a significant and sizeable increase in disagreement rates with high time pressure, and even more so with severely high time pressure. The disagreement rate rises

from 4.4% under low time pressure to 31.4% under high time pressure. In contrast to the results in many existing studies on structured bargaining, for which disagreement under time pressure is rare, the rich context with competing reference points seems to contribute to problems in reaching an agreement. The number of offers and counter-offers in our experiment indicate that it is not the physical limitations of time pressure that lead to the high disagreement rate. Even under severe time pressure, bargainers make several offers and counter-offers during bargaining, but agreements often take place much closer to the deadline. Our data indicate that the difference in first proposals of the two bargainers have much more explanatory power when explaining disagreement in the high time pressure condition than in the low time pressure condition. This observation can explain the much higher disagreement rate. It seems as if more distant initial proposals, and thus a higher level of initial conflict, can still be compensated for in long enough negotiations, but if there is time pressure, the situation might lead to digging. Interestingly, there are only small differences in the nature of final agreements between the time pressure conditions if reached. Nevertheless, we observe a higher likelihood of implementing the induced reference point in contrast to the equal split under high time pressure than under low time pressure. This indicates a stronger relevance of induced focal points in bargaining under time pressure. Furthermore, we observe that the influence of fairness judgments (or subjective entitlements) on agreements decrease under time pressure. All other variables (e.g., first proposals, concessions) are very similar across the conditions.

The rest of the paper is organized as follows. The next section presents an overview of the relevant literature. Section 3 provides research hypotheses and the details of our experimental design. In section 4, after describing the basic properties of our experimental data, we discuss our results on the influence of time pressure on multiple layers of bargaining and some robustness controls. In section 5, we discuss our findings and their implications, and we conclude.

2. Literature Overview

While there is a quickly growing literature on the relationship between response times and decisions in (experimental) economics, including papers that explicitly take time

pressure into account (see, for instance, Spiliopoulos and Ortmann, 2014, providing an excellent survey), there is no tradition of bargaining experiments including an explicit time component in economics. In negotiation science, in management, and in social psychology, in contrast, the literature on time and timing in bargaining is fairly large. Many of the studies in other disciplines, however, lack theoretical benchmarks or a normative solution, making it difficult to control for the (causal) effects of specific bargaining parameters. They often do not use salient incentives, either. In the following, we focus on contributions from the economics literature, and we discuss also those beyond economics that are still closely related to our approach.

Stuhlmacher et al. (1998) provide a meta-analysis of experimental studies on time pressure in bargaining. Their survey of the literature shows that the overall effects of time pressure depend on specific characteristics of the bargaining interaction such as the incentives given or the number of issues to be dealt with. However, the majority of the surveyed papers show an increase in concession-making and cooperation with a higher level of time pressure. A similar conclusion is drawn in an earlier meta-study on bargaining experiments in which time pressure is only one of several considered dimensions (Druckman, 1994). Druckman reports that time pressure in the form of deadlines has a stronger effect on concessions than other forms of time pressure. Moreover, subjects under time pressure reach agreements much faster. However, Yukl et al. (1976), Carnevale and Lawler (1986) as well as Mosterd and Rutte (2000) provide evidence that time pressure reduces the frequency of reaching agreements in bilateral negotiations in which bargaining parties can make offers and counter-offers. More specifically, in Carnevale and Lawler, the distinction between individualistic and cooperative bargainers is made; Mosterd and Rutte mainly focus on accountability vis-à-vis one's constituency. In short, the paradigms used in the psychological literature are quite diverse, and results are inconclusive. If at all, time pressure that is not prohibitively strong leads to more agreements rather than to an increase in disagreement.

In psychology, several potential general behavioral responses to higher levels of time pressure have been described. Payne et al. (1996) mention: (i) a potential acceleration in the rate of processing information (Ben Zur and Breznitz, 1981; Payne et al., 1988; Maule

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and Mackie, 1990; Kocher and Sutter, 2006; Lindner and Sutter, 2013); (ii) a greater selectivity of information processing such as giving more weight to negative information or becoming more risk aversive in certain domains (Ben Zur and Breznitz, 1981; Svenson and Edland, 1987; Kocher et al., 2013); and (iii) a change in strategies such as the use of simple strategies rather than complex ones (Christensen-Szalanski, 1980; Payne et al., 1988; Zakay, 1993).

The dynamics in multi-faceted bargaining processes can be complex. Harinck and De Dreu (2004), for instance, report results showing that individuals might get locked into early impasses more often under low than under high time pressure. Interestingly, the economics literature on time pressure in bargaining experiments, which is very small, goes to the other extreme. It usually used very simply and highly structured bargaining environments. Sutter et al. (2003) is one of the studies closest to ours. They experimentally investigate the impact of time pressure on proposer and responder behavior in a standard ultimatum game and observe that under time pressure responders reject about 60% of offers (especially those below the equal split), whereas without time pressure responders reject only 20% of offers (in particular only those below 20% of the pie). Controlling for offers, rejection rates of responders are significantly higher under a tight than under a very weak time constraint. However, understandably, this effect vanishes with learning in repeated one-shot play. Güth et al. (2005) look at deadlines in multi-period bargaining with constant and decreasing pie sizes. They show that a decrease in the pie size and alternating roles in repeated bargaining lead to earlier agreements, i.e. they attenuate the deadline effect.

Cappelletti et al. (2011) experimentally investigate how proposers in the ultimatum game behave when their cognitive resources are constrained by time pressure and by cognitive load. Time pressure in their case leads to a slight increase in offers, but the effect is only significant in one condition (with high endowments). Cognitive load does not seem to have a strong effect on offers in the ultimatum game. The paper by Cappelletti et al. bridges the gap between bargaining experiments and more general allocation decisions. There is an ongoing debate, with evidence on both sides, that concerns the question of whether intuitive (i.e. instantaneous) decisions are more or less

altruistic than decisions after reasoning (Rand et al., 2012, 2014; Tinghög et al., 2013; Verkoeijen and Bouwmeester, 2014; Myrseth and Wollbrant, 2015). Sometimes the empirical part of this literature uses time pressure to induce instantaneous decisions. Obviously, bargaining always involves the allocation of a pie and, thus, other-regarding preferences might play a role. Since the tightest deadline in our setup is 45 seconds, and thus far from instantaneous decision making, we however think that we do not speak directly to the literature on altruistic or egoistic impulses.

We are not aware of any other experimental bargaining paper with a time pressure variation, filling the gap between the existing studies based on highly structured bargaining games and the unstructured and complex variants used in psychology. Consequences of time pressure need to be studied in a rich/unstructured environment, but it is important to retain as much control as possible over the timing of offers, the nature of the offers, fairness judgments, concessions, communication etc. Such a setup is exactly the one implemented in this study.

3. Experimental Design and Hypotheses

In this section, we describe the experimental design in detail (section 3.1) and present our research hypotheses along with the corresponding empirical and/or theoretical support (section 3.2).

3.1 Experimental Design

We modify the experimental design introduced in Gächter and Riedl (2005) (and later used in several versions in Gächter and Riedl, 2006; Bolton and Karagözoğlu, 2013; Karagözoğlu and Riedl, 2015; Gächter et al., 2015) for our purposes. In this setup, randomly and anonymously paired subjects take on the role of department heads in a hypothetical company. They learn in the instructions (see the Appendix for details) that in the past, the top management of the company have distributed the salary budget based on the (relative) performances of two department heads. Now, due to exogenous/stochastic economic fluctuations the available salary budget increases/decreases and the top

management changes its policy. The two department heads will have to negotiate an allocation of the available budget among them.

The design induces an explicit reference point: we tell the bargainers that the top management of the hypothetical company they are working for paid the higher performing department head 14,000 points and the lower performing department head 7,000 (when the salary budget was 21,000), although the current circumstances are somewhat different than the past. This implies a 2/3-1/3 division backed up by earned status. Yet, there is possibly a second, implicit reference/focal point: in such environments low performers usually resort to the 1/2-1/2 division (see Messick and Sentis 1979, 1983; Gächter and Riedl 2005; Bolton and Karagözoğlu, 2013; Karagözoğlu and Riedl, 2015), which can be backed up by (i) equality, (ii) the fact that performances did not affect the size of the surplus to be shared, (iii) and the argument that the relevance of the asymmetric precedent is ambiguous.[1] The setup has been shown to be successful in studying the influence of reference points implemented by precedents and subjective entitlements on bargaining behavior.

We vary the time available to the bargainers for reaching an agreement as a between-subject treatment variable. In our low time pressure treatment (LTP), the bargainers are given 10 minutes, and in our high time pressure treatment (HTP), they are given 90 seconds. Further, we collected additional data with 45 second deadline for bargaining (SHTP: severely high time pressure) to check for robustness of results.[2] We also (randomly) vary the salary budget in the experiment (to make historical claims feasible or

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1 Figure A.2 in Appendix A.1 shows that these outcomes indeed act as reference/focal points: High-performers' first offers accumulate around 2/3-1/3 (mean = 0.69, median = 0.67) and low-performers' first offers accumulate around 1/2-1/2 (mean = 0.50, median = 0.53). Moreover, 28% of a total of 363 offers in HTP are equal to either exactly 2/3-1/3 or on the closest prominent numbers around 2/3-1/3 (i.e. the 17,000-10,000 division of the 27,000 budget), and 17% are equal either exactly to 1/2-1/2 or on the closest prominent numbers around 1/2-1/2 (i.e., the 8,000-7,000 division of 15,000 and the 14,000-13,000 division of 27,000). These percentages are 26% and 13% respectively for LTP (of a total of 1032 offers).

2 In the following, we will mainly focus on HTP and LTP. The findings from SHTP are discussed separately in section 4.3.

infeasible) as an exogenous treatment variable, which can be thought of as another robustness check of the results.

The budget size variation is implemented randomly within a given session. For practical reasons we conduct separate sessions for the different time pressure treatments. Since the experiment consists of a set of tasks that take a considerable amount of time and subjects start each stage simultaneously, our design is robust against the possibility that some subjects have preferences for finishing and leaving early. The latter was not possible. Table 1 summarizes the main elements of an experimental session in the sequence that they were presented to the participants. Below, we explain all important parts in detail.

Table 1. Sequence of Events

1. Reading instructions aloud
2. Performance task
3. Elicitation of beliefs on performance
4. Relative performance information
5. Budget size allocated to pairs
6. Subjective entitlements
7. Bargaining
8. Post-experimental questionnaire

Performance Task. After distributing instructions on paper, reading them aloud, and answering questions in private, bargainers' performances are measured using a general knowledge quiz (as in Gächter and Riedl, 2005; Bolton and Karagözoğlu, 2013; Karagözoğlu and Riedl, 2015; Dezső et al., 2015). The quiz consists of 50 multiple choice questions from various fields of knowledge. For each of these trivia questions there are five answer choices, and only one is correct (unanswered questions count as incorrect). Each participant receives the same set of questions in the same order and has 25 seconds to answer each question. All of this is made common knowledge among participants.

Elicitation of Beliefs on Performances. Since our subjects do not receive a precise information on the number of their (and others') correct answers, their entitlements (or fairness judgments) can be correlated with their beliefs on their relative performance in the task. Hence, we ask each subject to report her prediction on her own number of correct answers as well as her prediction on the number of correct answers of the other department head. These questions are incentivized using a linear scheme: for each perfect match between the guess and the actual performance, a subject earns 250 points. For each estimate with a deviation of 1(2) questions from the actual performance, a subject earns 125 (62.5) points; estimates with larger deviations do not receive any points. Subjects are informed about their earnings from this stage (i.e. the precision of their predictions) at the end of the experiment.

Relative Performance Information. Once the real effort task is completed and beliefs are elicited, everybody is told who in their pairs was the 'high performer' and who the 'low performer', depending on the number of correct answers given in the general knowledge quiz. In case of a tie, the one in the randomly assembled pairs who spent less time in answering questions becomes the high performer. If both subjects answered the same number of questions correctly and the time they spent in answering these questions was also identical, high and low performer roles are assigned randomly. If this possibility had realized, the pair would have been informed about it. Finally, following the provision of relative performance information, subjects are reminded of the salary distribution dictated by the top management in the past when the salary budget was 21,000 points.

Budget Size. In the experiment, we randomly generate two budget values $X \in \{\overline{x}, \underline{x}, \}$, one lower than the status quo value 21,000 and the other higher. For the first, historical claims (i.e. 14,000 and 7,000) are not jointly feasible, whereas for the second they are. We want to see whether the influence of time pressure (if any) on bargaining differs across these two conditions that capture differently challenging bargaining situations. To determine whether a pair will negotiate over an increased or decreased budget, a six-sided die is rolled. It is emphasized in the instructions that (i) the budget determination is a purely

random process, (ii) each side of the die has an appearance probability of 1/6, and (iii) the final outcome has nothing to do with the performances in the task. If a pair received a 1, 2 or 3 from the die roll, this implies bad economic conditions and a reduced salary budget of 15,000 points. Likewise, if a pair has a 4, 5 or 6 from the die roll, it implies good economic conditions and an increased salary budget of 27,000 points.

Subjective Entitlements. Previous experimental studies reported strong and significant correlations between subjective entitlements (or fairness judgments) and negotiation outcomes such as opening proposals, concessions, bargaining duration, and agreements (see Babcock et al., 1995; Babcock and Loewenstein, 1997; Gächter and Riedl, 2005; Bolton and Karagözoğlu, 2013; Feng et al., 2013; Franco-Watkins et al., 2013; Karagözoğlu and Riedl, 2015). We measure subjects' (potentially existing) subjective entitlements with a question, adapted from Babcock et al. (1995): "*According to your opinion, what would be a fair distribution of the salary budget from the vantage point of a non-involved, neutral arbitrator?*" Subjects are not informed about this question beforehand. The question is not incentivized. The judgments are reported privately; thus there is no strategic value in (mis-)reporting.

Bargaining. Bargaining is anonymous and unstructured in the experiment. Unstructured bargaining avoids exogenous first-mover effects and gives subjects as much bargaining freedom as possible (e.g., in the timing, sequence, number of proposals, communication used, etc.). In addition, it provides a rich data set on multiple layers of bargaining, which allows us to understand the effects of our experimental manipulation not only on outcomes, but also on the process of negotiations. It is particularly appealing for the study of time pressure in bargaining. Subjects exchange proposals that consist of an amount for themselves and an amount for the other department head. For convenience, sending inefficient proposals is not allowed. Subjects can also exchange verbal messages. A subject can send one verbal (practically of unlimited length) message per proposal (so that there is no confusion about which proposal is being discussed). Depending on the treatment, bargaining pairs have either 10 minutes (LTP: low time pressure) or 90

seconds (HTP: high time pressure). If subjects in a pair reach an agreement within the allotted time, their payoffs are implemented accordingly. If they do not, each subject in the pair earns zero points from bargaining.

In determining the deadlines for LTP and HTP, we are mainly concerned about two things: (i) the time pressure in HTP should not be excessive; subjects should still have some time to be able to exchange enough offers and counter-offers and be able to exchange at least short messages; and (ii) the deadline in LTP should not be too loose; if the time for bargaining in LTP constitutes a large portion of the total time spent in the lab, this may cause problems (e.g., boredom). In line with these considerations, we implemented 90 seconds for HTP and 10 minutes for LTP. These values lie well within the set of period lengths used in earlier studies that investigate time pressure effects on bargaining (for high time pressure, between 15 seconds and 90 seconds, and for low time pressure between 180 seconds and 30 minutes). Notice that there is only one bargaining round and no repetitions.

Post-Experimental Questionnaire. After the experiment, subjects are asked to report (i) their satisfaction about the bargaining outcome, (ii) their opinion about the legitimacy of the quiz as a measure of general knowledge, and (iii) their perceptions on the difficulty of the quiz (all on 7-point Likert scales). They are also asked to fill in justice centrality and belief-in-a-just-world questionnaires (Dalbert et al., 1987), a ten-item big-five personality questionnaire (Gosling et al., 2003), and a risk attitude questionnaire (Dohmen et al., 2011). Finally, subjects answer a few questions about their personal background (e.g., age, gender, field of study, monthly disposable income etc.).

The experiment was programmed with z-tree (Fischbacher, 2007). We conducted the experimental sessions at Bilkent University throughout 2014 and 2015.[3] In total, 318 (185 male, 133 female) students from various backgrounds with an average age of 21.3 participated in the experiment. A typical session lasted about 50-60 minutes, depending on the treatment. Subjects' total earnings were converted into cash with an exchange rate

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3   The LTP data used here is also used in Gächter et al. (2015).

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of 100 points equal 40 Turkish Lira (TL) Cents. The average earning per subject was approximately 40 TL (including a show-up fee of 5 TL), which corresponds to the total amount a student would pay for seven days of lunch at the student cafeteria.

3.2 Research Hypotheses

In this subsection, we present our hypotheses and supporting arguments for them. We focus on the following parameters: nature of agreements, frequency of 2/3-1/3 agreements, frequency of 1/2-1/2 agreements, tension (or conflict) in initial offers, frequency of disagreements, and frequency of last-moment agreements.

Earlier research on time pressure effects on bargaining showed that high time pressure induces lower resistance to conceding (see Yukl et al., 1976, Carnevale and Lawler, 1986; Roth et al., 1988; Lim and Murnighan, 1994; De Dreu et al., 2000). This is due to the proximity to a deadline, making reaching an agreement more urgent. Hence, individuals under high time pressure care less about their own position and are more willing to compromise. On the other hand, individuals under low time pressure care a lot about their own position or outcomes and are unwilling to concede to the other party (Druckman, 1994). As a result, in most of the studies, individuals under high time pressure seem to be more likely than parties under low time pressure to reach more *integrative* agreements.

Cappelletti et al. (2011) find that when cognitive resources are constrained (by time or by cognitive load) proposers in an ultimatum game are more likely to engage in a relatively effortless heuristic reasoning that leads them to choose the salient equitable split. Another support for such a prediction comes from the *intuitionist* approach (see Haidt, 2001; van Winden, 2007, among others), which stipulates that moral decisions are primarily driven by quick, automatic, effortless, and affective processes. Finally, Rubinstein (2007) finds that the equal division is the more instinctive choice in the ultimatum game.

In our experiment, there are two potential reference/focal points. The 2/3-1/3 division is the one explicitly induced by the experimental design, and the 1/2-1/2 division is the one implicitly present due to vagueness of the reasons in favor of 2/3-1/3 and due to the

equality norm. It is pointed out in the literature that individuals are imperfect decision makers and often rely on cognitive heuristics, which increase efficiency and speed while they may decrease accuracy and quality (Bazerman and Neale, 1983; Carnevale and Pruitt, 1992; Carrol and Payne, 1991). We stipulate that greater time pressure increases the need for coordinating devices and reliance on focal/reference points. The induced reference point, the 2/3-1/3 distribution – being more favorable to high performers – can act as such a coordinating device. The implicit reference point, the 1/2-1/2 distribution – being relatively more favorable to low performers – can also act as a coordinating device. However, the former has the advantage of explicitness and salience. Hence, we predict that (due to the greater salience of the 2/3-1/3 distribution as a reference point or focal point) time pressure favors high performers. These considerations are summarized in Hypotheses 1, 2, and 3.

Hypothesis 1. Average agreements are closer (further away) to 2/3-1/3 (from 1/2-1/2) divisions in HTP than in LTP.

Hypothesis 2. Time pressure increases the likelihood of observing 2/3-1/3 agreements.

Hypothesis 3. Time pressure decreases the likelihood of observing 1/2-1/2 agreements.

Time pressure may induce more agreeable first proposals if agents are afraid of final disagreements. Nevertheless, it may induce more aggressive first proposals if agents are afraid of bending over ex ante and receiving an amount they would find unfair. Hence, we do not have a directed hypothesis for the tension in first bargaining proposals. This is summarized in Hypothesis 4.

Hypothesis 4. The tension in first proposals is identical in HTP and LTP.

Carnavale and Lawler (1986), Stuhlmacher et al. (1998), De Dreu et al. (1999), and Mosterd and Rutte (2000) report that high time pressure makes disagreements less likely.

Druckman (1994) provides evidence that quicker agreements are observed, whenever time pressure is present. It is even argued that, as deadlines become closer, cooperation is increased (Druckman, 1971). Increased cooperation along with high time pressure makes agreements more likely (Carnevale et al., 1993).

However, there are also good arguments in favor of the opposite hypothesis. Given the presence of conflicting reference/focal points (and if the initial tension is identical across treatments, as hypothesized above), it could become more difficult to reach an agreement (Yukl et al., 1976; Carnevale and Lawler, 1986; Mosterd and Rutte, 2000). Hence, we predict that in HTP, we observe more frequent disagreements and last-moment agreements. These considerations are summarized in Hypothesis 5 and 6, respectively.

Hypothesis 5. The ratio of disagreements is higher in HTP than in LTP.

Hypothesis 6. The frequency of last-moment agreements is higher in HTP than in LTP.

4. Experimental Results

We organize the results section in the following way: Section 4.1 presents an overview of our results and applies non-parametric tests to the treatment variables. In section 4.2, we apply multivariate regressions to our data and analyze the determinants of agreements, allocations, the likelihood of disagreements, and last-moment agreements. Section 4.3 gives the data for the treatment with severely high time pressure, and section 4.4 provides additional analyses.

4.1. Descriptive Results and Non-Parametric Statistics

We compare agreements, tension in first proposals, concessions, bargaining duration, frequency of disagreements, and frequency of last-moment agreements across LTP and HTP. In other words, we first look at the "level" effect of time pressure on these characteristics of bargaining. Whenever we have a one-sided hypothesis, we use one-sided test statistics. In comparing means across treatments, we use Mann-Whitney-U

(MW) tests, and in comparing distributions of a random variable across treatments, we use Kolmogorov-Smirnov (KS) tests. In comparing ratios (or percentages), we use Fisher's exact tests. For reasons of succinctness and convenience, we label high performing department heads as "winners" and low performing department heads as "losers" throughout the results section. Fairness judgments, first proposals, and agreements are all given in winner's shares.
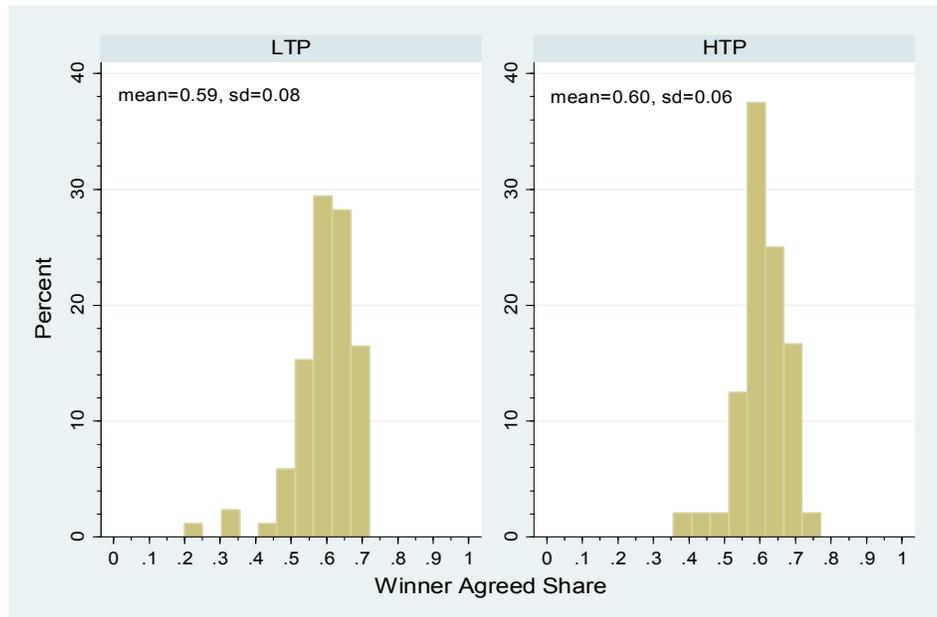
Figure 1. Distribution of Winner Agreed Shares in LTP and HTP

The average agreed share of winners is 0.59 in LTP and 0.60 in HTP (MW, p = 0.87; KS, p = 0.98). It is apparent that time pressure did not have any level effect on bargaining agreements. Notice, however, that we only look at agreements here and disregard disagreements for the time being.

Result 1. The average winner agreed share (and the distribution of winner agreed shares) does (do) not differ between LTP and HTP.

There is a large body of research consistently reporting that the tension (or conflict) in first proposals is a good predictor of the bargaining duration and the likelihood of disagreement (see Gächter and Riedl, 2005; Schweinsberg et al., 2012; Bolton and Karagözoğlu, 2013; Bochet and Siegenthaler, 2013; Luhan et al., 2013; Karagözoğlu and Riedl, 2015).
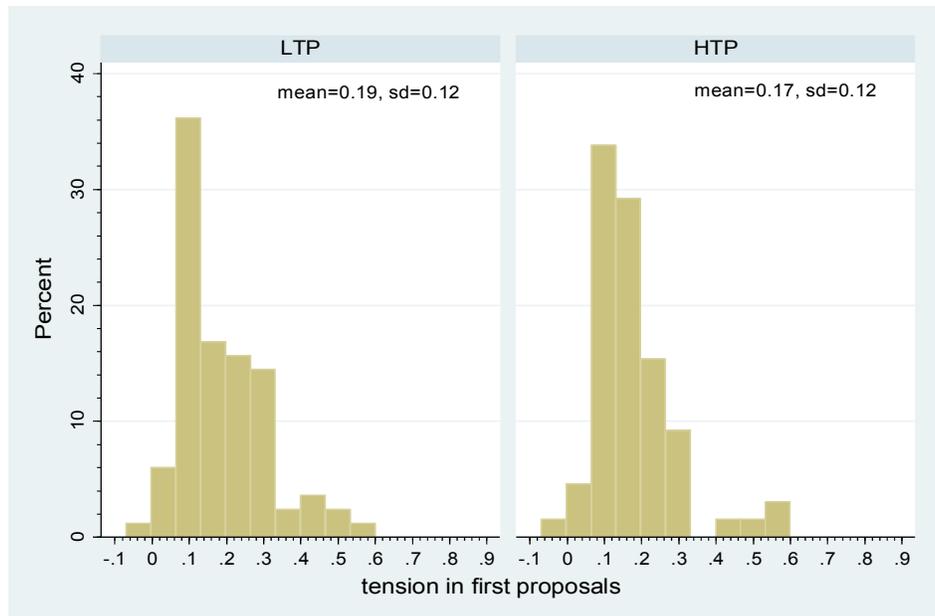
Figure 2. Distribution of Tension in First Proposals in LTP and HTP.

Since our subjects know the time allotted to them for bargaining, before they make their first proposals, the latter might have been influenced by the variation in the bargaining deadline, affecting the tension in first proposals. In contrast to such reasoning, the distributions in LTP and HTP given in Figure 2 do not present any evidence for a difference in the tension of first proposals (0.19 for LTP and 0.17 for HTP; MW, p = 0.40; KS, p = 0.61), which is in line with Hypothesis 4.[4]

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4   Figure A.2 in the Appendix shows that the same results are obtained for first proposals: first proposals (both of winners and losers) do not differ between HTP and LTP.

Result 2. The average tension in first proposals (and the distribution of tension in first proposals) does not differ between LTP and HTP.

Next we look at the timing of agreements in the two treatments. The average agreement time in LTP (395 seconds) is 65.8% of the allotted time (900 seconds), whereas the average agreement time in HTP (78 seconds) is 86.7% of the allotted time (90 seconds). Figures for the distributions are provided in the Appendix. Table 2 displays the distribution of agreement times in LTP and HTP. Numbers in the top row refer to the time intervals in percentiles (e.g., first 10% of the allotted time and so on) and the numbers in the second and third rows refer to the percentage of agreements that occurred in the corresponding time interval. 41% of all agreements in LTP are reached in the last 10% of the allotted time (i.e, between second 541 and 600), whereas 72.90% of all agreements in HTP are reached in the last 10% of the allotted time (i.e., between second 81 and 90).

Table 2. Distribution of Agreement Times in LTP and HTP

	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
LTP	5.90	7.00	9.40	9.40	4.70	4.70	5.90	7.00	4.70	41.00
HTP	0.00	2.08	4.17	0.00	2.08	4.17	2.08	6.25	6.25	72.90

Roth et al. (1988) is one of the first experimental economics studies that reports on the phenomenon of last-minute agreements. Later, their main result was replicated in many other papers (see Lim and Murnighan, 1994; Gneezy et al., 2003; Gächter and Riedl, 2005; Karagözoğlu and Riedl, 2015; Leider and Lovejoy, 2014; Camerer et al., 2015, among others). We predict that time pressure influences the likelihood of last-moment agreements. In particular, last-moment agreements should be observed more frequently in HTP than in LTP. Naturally, 'last-minute' is not late enough to be considered as last-moment in our experiment, since in HTP only 90 seconds is given to bargainers. Hence, we define last-moment agreements as those reached in the last five seconds before the bargaining deadline.

Table 3 shows the distribution of last-moment agreements across treatments. We observe that 26 pairs (out of 85 that reached an agreement; 31%) in LTP reach the agreement in the last five seconds, and 24 pairs (out of 48 that reached an agreement; 50%) in HTP reach the agreement in the last five seconds. A Fisher's exact test shows that the difference is significant, in line with Hypothesis 6.

Table 3. Last-Moment Agreements and Time Pressure

Last-moment	LTP	HTP	Total
0	59	24	83
1	26	24	50
Total	85	48	133
Fisher's Exact Test = 0.02			

Result 3. The frequency of last-moment agreements is significantly higher in HTP than in LTP.

Table 4. Disagreements and Time Pressure

Disagreements	LTP	HTP	Total
0	85	48	133
1	4	22	26
Total	89	70	159
Fisher's Exact Test < 0.001			

We know from earlier studies that disagreements are likely to be observed when bargaining parties hold strong and conflicting fairness views or hold on to conflicting reference/focal points and conflicting interpretations of precedents (Babcock et al. 1995; Babcock and Loewenstein, 1997; Gächter and Riedl, 2005; Birkeland and Tungodden, 2014; Dezső et al., 2015). We predicted that a variation in time pressure would influence the likelihood/frequency of disagreements. In particular, we predicted that the likelihood

of observing disagreements is higher in HTP compared to LTP. Table 4 shows the distribution of disagreements across treatments. We observe that 4 pairs (out of 89; 4.4%) in LTP disagreed and 22 pairs (out of 70; 31.4%) disagreed in HTP. A Fisher's exact test shows that the difference is highly significant ($p < 0.001$), strongly in line with Hypothesis 5.

Result 4. The frequency of disagreements is significantly higher in HTP than in LTP.

It is worthwhile emphasizing that the differences we observe between LTP and HTP are not due to a prohibitively high level of time pressure. As we reported above, the tension in first proposals (a variable describing an important layer of bargaining) is identical across treatments. The frequency of winners (losers) making the opening proposal in a pair (i.e., the very first offer in a pair) and the frequency of winners (losers) accepting an offer in a pair is also the same in the two treatments (Fisher's exact tests; p-values are 0.71 and 0.56 for winners, and 0.78 and 0.56 for losers). Moreover, the average number of proposals made in a pair is 11.5 in LTP and 5.2 in HTP. Despite an 85% decrease in allotted time (i.e. from 600 seconds to 90 seconds) the number of proposals dropped by only 54%. In other words, bargainers in our HTP treatment still found time to exchange enough proposals.

Figure 3 depicts the distribution of concessions in the two treatments. It shows that concession behavior is identical in LTP and HTP. MW tests show that average concessions, defined as the difference between what one has asked for oneself in one's first proposal and what one receives at the end based on the agreements, is identical across LTP and HTP ($p = 0.29$ for winners, and $p = 0.14$ for losers). KS tests deliver the same conclusions ($p = 0.57$ for winners, and $p = 0.54$ for losers). Combined with our findings on first proposals and initial tensions, the similarity of the concession behavior across treatments is telling about the increased disagreement rate under HTP: if the average initial conflict and the concession behavior are identical across two situations but the negotiators in the latter have 90 seconds to strike a deal instead of 10 minutes, naturally they will be the ones who are more likely to end up in stalemates.

To summarize our findings in this section: time pressure does not have a "level" effect on initial bargaining positions, concessions, or agreements. However, it has a significant effect (both statistically and economically) on the frequency of disagreements and last-moment agreements. In particular, it leads to a huge increase both in the frequency of disagreements and last-moment agreements among bargainers.
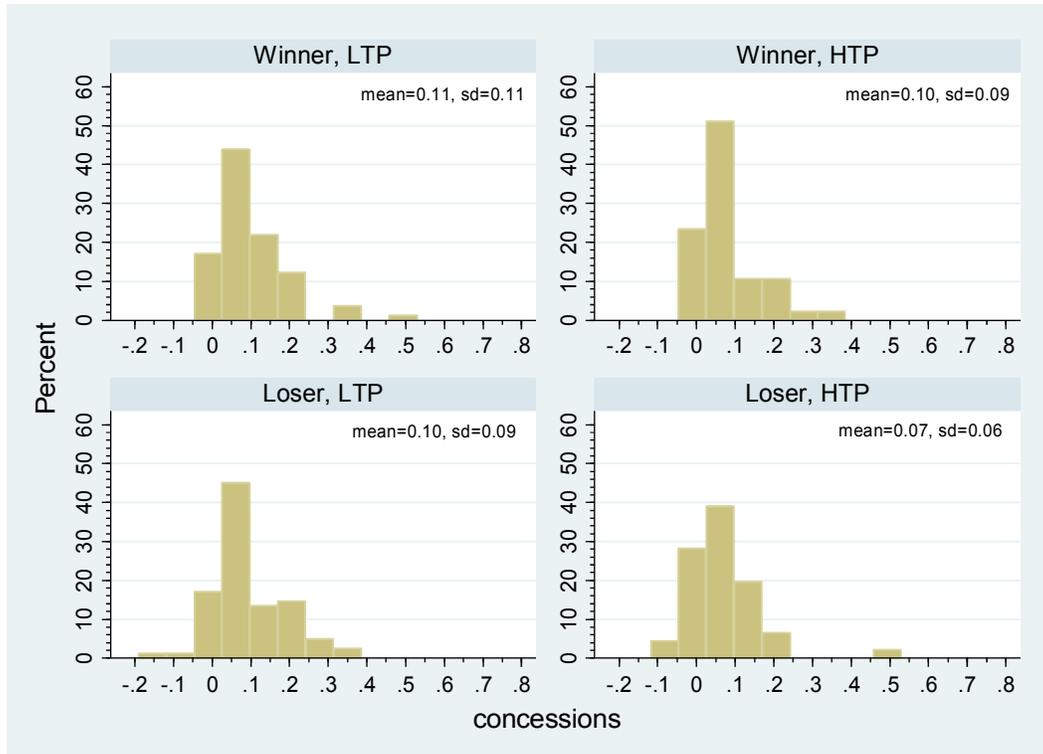
Figure 3. Distribution of Concessions in LTP and HTP.

4.2. Regression Analyses

We now move to multivariate regression analyses that inform us whether the time pressure has a "slope" effect on the parameters of interest. In each of the regressions, we include only the treatment variable and one or two main variables of interest. Regressions that include control variables such as a subject's justice centrality score, individual risk attitudes, agreeableness scores, gender composition of the pair, and the budget level are

presented in the Appendix. As one can quickly see, our results are very robust with respect to the inclusion of all control variables.

In what follows, we present two model specifications in each regression table: one without the interaction term(s) and the other with interactions. In some cases, we also report the results of an OLS specification in addition to probit, since the probit specification becomes unstable when there are only a few observation for one of the outcomes of the dependent variable (e.g., there are very few disagreements in LTP).

Table 5. 2/3-1/3 Agreements and Time Pressure (Probit)

Dependent Variable: Statusquo | equals 1 if 2/3-1/3 agreement, 0 otherwise		
Independent Variables	Specification 1	Specification 2
Time pressure	0.05 (0.30)	8.25^{**} (4.44)
W_fair	5.57^{***} (2.15)	7.00^{**} (3.54)
L_fair	1.75 (2.36)	8.16^{***} (3.13)
Time pressure*W_fair	--	-1.38 (5.21)
Time pressure*L_fair	--	-12.49^{***} (4.44)
Constant	-5.32^{***} (1.97)	-10.55^{***} (3.80)
# of Obs. = 133	Pseudo-R^2 = 0.07	Pseudo-R^2 = 0.15
	Wald-chi^2(3) = 6.96	Wald-chi^2(5) = 9.96
	Prob > chi^2 = 0.07	Prob > chi^2 = 0.08

Note: $^* = 10\%$, $^{**} = 5\%$, $^{***} = 1\%$ significance. Robust standard errors in parentheses.

Table 5 presents the results of (robust) probit regressions, investigating the effects of time pressure, winner entitlements, loser entitlements, and interaction variables on the probability of reaching an agreement that shares the budget according to a 2/3-1/3 division.

In this table and others, *Time pressure* is a dummy variable taking a value 0 for LTP and 1 for HTP; *W_fair* and *L_fair* denote winner and loser entitlements, respectively (in the share going to the winner) – the two are taken from the question regarding the allocation choice of a fair and neutral arbitrator. Finally, *Time pressure*W_fair* and *Time pressure*L_fair* are the corresponding interaction variables.

Focusing on Specification 2, we see that coefficients of both winners' and losers' entitlement (fairness) judgments are significant with the expected positive sign. As we

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hypothesized, time pressure has a significant and positive effect (it is also positive in Specification 1, but not significant). Both interaction terms have negative signs, but only the interaction with the losers' fairness judgment is significant. Negative coefficients for interaction terms imply that the effect of entitlements on the probability of reaching 2/3-1/3 agreements decreases with time pressure.

Result 5. Time pressure increases the likelihood of bargainers reaching agreements on the explicit/induced reference point, i.e. the 2/3-1/3 distribution.

Table 6. 1/2-1/2 Agreements and Time Pressure (Probit)

Dependent Variable: Equal | equals 1 if 1/2-1/2 agreement, 0 otherwise		
Independent Variables	Specification 1	Specification 2
Time pressure	-0.50 (0.44)	-23.3** (12.50)
W_fair	1.51 (2.07)	-0.61 (1.62)
L_fair	4.13 (3.82)	2.55 (4.13)
Time pressure*W_fair	--	12.14* (6.75)
Time pressure*L_fair	--	22.18* (13.24)
Constant	-5.07* (2.78)	-2.75 (2.29)
# of Obs. = 133	Pseudo-R^2 = 0.06	Pseudo-R^2 = 0.12
	Wald-chi^2(3) = 7.61	Wald-chi^2(5) = 5.00
	Prob > chi^2 = 0.06	Prob > chi^2 = 0.42

Note: * = 10%, ** = 5%, *** = 1% significance. Robust standard errors in parentheses.

Table 6 presents the results of (robust) probit regressions investigating the effects of time pressure, winner entitlements, loser entitlements, and interaction variables on the probability of reaching equal split (1/2-1/2) agreements.

Focusing on Specification 2 again, we see that the coefficient of winners' fairness judgment has the expected negative sign, but it is insignificant. The coefficient of losers' fairness judgments also has the expected positive sign, but it is again insignificant. As we hypothesized, time pressure has a significant and negative influence. Both interaction terms are (marginally) significant and have positive signs. This implies that the effect of entitlements on the probability of reaching 1/2-1/2 agreements increases with time pressure.

Result 6. Time pressure decreases the likelihood of bargainers reaching agreements on the implicit reference point, i.e. the 1/2-1/2 distribution.

Table 7. Agreements and Time Pressure (OLS)

Dependent Variable: W_agreedshare	winner's share in the agreement	
Independent Variables	Specification 1	Specification 2
Time pressure	0.001 (0.12)	0.29** (0.12)
W_fair	0.28*** (0.06)	0.36*** (0.08)
L_fair	0.10 (0.08)	0.18** (0.10)
Time pressure*W_fair	--	-0.26** (0.12)
Time pressure*L_fair	--	-0.20 (0.16)
Constant	0.35*** (0.06)	0.25*** (0.08)
# of Obs. = 133	F(3, 129) = 7.40	F(5, 127) = 5.51
	Prob > F = 0.0001	Prob > F = 0.0001
	R^2 = 0.08	R^2 = 0.10

Note: * = 10%, ** = 5%, *** = 1% significance. Robust standard errors in parentheses.

Table 7 presents the results of (robust) OLS regressions, investigating the effects of time pressure, winner entitlements, loser entitlements, and interaction variables on the agreed share from the perspective of the winner (*W_agreedshare*).

Focusing on Specification 2, we see that the coefficients of both winners' and losers' fairness judgments are significant and have the expected positive sign. As we hypothesized, time pressure has a significant and positive effect on winner agreed share. Both interaction terms have negative signs (only the interaction with the winners' entitlement is significant). This implies that the effect of entitlements on winner agreed shares decreases with time pressure. For the entitlements to influence agreements subjects need to spend effort in discussing, arguing, and fact-finding to justify their positions, for which they might have lacked time in HTP.

Result 7. Time pressure increases the share winners receive in agreements. The influence of subjects' entitlements on agreements decreases under time pressure.

Table 8. Disagreement and Time Pressure (Probit)

Dependent Variable: Disagree | equals 1 if disagreement, 0 otherwise		
Independent Variables	Specification 1	Specification 2
Time pressure	1.21*** (0.30)	0.56 (0.50)
Diff_first	2.04** (1.03)	-0.16 (1.74)
Time pressure*Diff_first	--	3.34* (2.24)
Constant	-2.08*** (0.37)	-1.63*** (0.40)
# of Obs. = 148	Pseudo-R^2 = 0.17	Pseudo-R^2 = 0.18
	Wald-chi^2(2) = 16.36	Wald-chi^2(3) = 20.96
	Prob > chi^2 = 0.0003	Prob > chi^2 = 0.0001

Note: * = 10%, ** = 5%, *** = 1% significance. Robust standard errors in parentheses.

Table 8 presents the results of (robust) probit regressions investigating the effects of time pressure, tension in first proposals (the difference in first proposals; *Diff_first*), and the interaction between the two variables on the probability of disagreements. Table A.8.1 in the Appendix conducts the analogous analysis, but with an OLS specification.

In all specifications, the time pressure coefficient has the expected positive sign (as we hypothesized), but it is significant only in specifications without interaction terms. The interaction of time pressure and the tension in first proposals has the expected positive sign and is significant in the two relevant specifications. This means that the effect of the tension in first proposals on the probability of disagreement increases under time pressure.

Notice that there are only four disagreements with low time pressure (out of 89 pairs), and probit models can become unstable if the binary dependent variable takes one of the two values only very infrequently. Therefore, as a further sensitivity analysis, we run an exact logistic regression with time pressure, a binary variable describing the tension in first proposals, and an interaction of these two as explanatory variables (see Table A.8.2 in the Appendix).[5] An exact logistic regression is recommended when the sample size is very small and/or when some of the cells formed by the dependent or

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5   The binary variable takes the value 1 for those bargaining pairs with tension in first proposals higher than the median and 0 otherwise. We converted the continuous variable *Diff_first* into the categorical variable *Binary_tension* due to computational problems that using the continuous one causes.

independent categorical variables contain very few observations.[6] Estimation results reported in Table A.8.2 also provide full support for our hypotheses.

Result 8. Time pressure increases the likelihood of disagreements.

Result 9. The influence of the tension in first proposals on the likelihood of disagreements increases under time pressure.

Result 9 is along the same lines as the findings of Kruglanski and Freund (1983), who report that time pressure increases primacy and anchoring effects, because people fail to revise early impressions of others.

Table 9 presents the results of (robust) probit regressions, investigating the effects of time pressure, tension in first proposals, and the interaction between the two on the probability of last-moment agreements (i.e. agreements reached in the last five seconds). In both specifications, the coefficients of time pressure and the tension in first proposals are highly significant and have the expected positive signs. The interaction term is not significant.

Table 9. Last-Moment Agreements and Time Pressure (Probit)

Dependent Variable: Last_moment	equals 1 if agreed in the last 5 seconds, 0 otherwise	
Independent Variables	Specification 1	Specification 2
Time pressure	0.62^{***} (0.26)	0.84^{**} (0.49)
Diff_first	3.19^{***} (1.24)	3.61^{***} (1.38)
Time pressure*Diff_first	--	-1.31 (2.77)
Constant	-1.08^{***} (0.28)	-1.16^{***} (0.30)
# of Obs. = 124	Wald-chi^2(2) = 9.53	Wald-chi^2(3) = 11.72
	Prob > chi^2 = 0.00085	Prob > chi^2 = 0.0084
	Pseudo-R^2 = 0.08	Pseudo-R^2 = 0.08

Note: $^* = 10\%$, $^{**} = 5\%$, $^{***} = 1\%$ significance. Robust standard errors in parentheses.

Result 10. Time pressure increases the likelihood of last-moment agreements.

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6   See http://www.ats.ucla.edu/stat/stata/dae/exlogit.htm for further details.

4.3. Robustness Check: More Severe Time Pressure

Time pressure does not imply linear reaction effects. Despite the differences in our two treatments LTP and HTP, one could potentially argue that the time pressure in HTP is not severe enough. Another argument could be that our results would break down with more severe time pressure, putting bargainers in an even more challenging environment.

To see whether we would observe additional behavioral changes under even more severe time pressure (SHTP), we ran two experimental sessions with a 45 seconds deadline. A total of 42 subjects participated in these sessions. In Table 10, we present averages and standard deviations (in parentheses) of important parameters describing the bargaining process and outcomes in SHTP, alongside their corresponding values in HTP.

Table 10 shows that there are some (statistically insignificant) differences in the expected direction (e.g., average winner agreed shares increasing with severe time pressure, disagreement and last-moment agreement frequencies increasing with severe time pressure), but all tests are far from being significant. Even a much larger number of observations for SHTP would hardly make the differences significant.

Table 10. Descriptive Statistics for SHTP (45 sec) and HTP (90 sec)

	SHTP (45 sec)	HTP (90 sec)	Test for Equality
W_first	0.70 (0.10)	0.69 (0.07)	0.70
L_first	0.50 (0.13)	0.52 (0.10)	0.55
W_concess	0.09 (0.13)	0.08 (0.08)	0.76
L_concess	0.10 (0.11)	0.07 (0.08)	0.54
W_agreedshare	0.62 (0.09)	0.60 (0.06)	0.97
% of disagreements	38.0	31.4	0.60
% of last-moment agreements	61.5	50.0	0.54

Note: For W_first, L_first, W_concess, L_concess, and W_agreedshare we use MW tests and for % of disagreements and % of last-moment agreements we use Fisher's exact tests.

4.4. Additional analyses

Justice Centrality. Carnavale and Lawler (1986) as well as Mosterd and Rutte (2000) report that the effects of time pressure on bargaining behavior could depend on the personal characteristics of negotiators. In our experiment, we measure personal

characteristics and attitudes such as justice centrality, agreeableness, and risk attitude (see the Appendix for details on the questionnaires). We do not observe systematic effects of these control variables in most of our analyses. Nevertheless, pair justice centrality turns out to be a statistically significant explanatory variable in disagreement regressions. Moreover, its effect seems to interact with time pressure. In particular, justice centrality at the pair level is negatively correlated with the probability of disagreements and the probability of last-moment agreements (see Tables A.6.1 and A.6.2). An increase in justice centrality of the bargaining pair reduces the probability of disagreement and the probability of last-moment agreements (conditional on agreement), which is a very plausible relationship.

Analysis of Communication. When conducting a content analysis of verbal messages during negotiations, we categorize subjects' verbal messages into categories of messages and compare the frequency of occurrence of these categories between LTP and HTP. Table 11 shows the results.

Table 11. Content Analysis of Chat-Messages in LTP and HTP

Category of messages	LTP	HTP
Greetings	27 (3.7%)	6 (5%)
Mentioning time-related concerns	53 (7.2%)	12 (10%)
Mentioning 2/3-1/3, the historical precedent, old system etc.	110 (15%)	16 (14%)
Mentioning 1/2-1/2 division	37 (5.1%)	4 (3.4%)
Mentioning fairness, justice, equality, equity, performances etc.	201 (27.5%)	35 (30%)
Threats, tactics, cheap-talk, mentioning the disagreement outcome	91 (12.4%)	21 (18%)
Mentioning need-based concerns	9 (1.2%)	1 (0%)
Mentioning integrative, cooperative aspects, common goals	155 (21.2%)	22 (19%)
Chitchat, seemingly unrelated conversations	12 (1.6%)	0 (0%)
Words of approval, agreement, and farewell etc.	37 (5.0%)	4 (3.4%)

In LTP, 178 subjects in eight sessions send 808 messages in total. In HTP, this number is 117 for 140 subjects. In both treatments, there are many (numerical) offers not

accompanied by verbal messages. We determine ten different message topic/content categories (see Table 11). A single message can contain elements from multiple categories (e.g., fairness and integrative aspects). Moreover, some messages cannot be classified in any of the categories.[7]

The three most frequently observed message categories in HTP are (i) fairness-related concerns (30%), (ii) integrative and cooperative aspects (19%), and (iii) threats, reputation building, and cheap talk (18%). Messages involving time-related concerns and references to the historical precedent also appear with non-negligible frequencies (10% and 14%, respectively). In LTP, the three most frequently observed message categories are (i) fairness-related concerns (27.5%), (ii) integrative and cooperative aspects (21.2%), and (iii) references to the historical precedent (15%). Overall, the conversations are very similar across the two conditions.

Timing of Offers, Concessions, and Dynamics of Bargaining. To gain further insights on factors leading towards increased disagreement rates in HTP, we conduct additional analyses on the timing and number of offers as well as concessions. For that purpose, we divide 90 seconds into two blocks of 45 seconds and compare the pairs that could not reach an agreement with those that reached an agreement on the basis of variables describing the dynamics of bargaining: the average duration until the opening offer, the average number of offers, and the average (remaining) conflict (as a percentage of the initial conflict) in each block.

The results in Table 12 are in line with our predictions. In particular, the pairs that could not reach an agreement (i) started bargaining later (4.66 seconds difference; just not significant according to an MW test), (ii) made a smaller number of offers in the first half, and (iii) made a greater number of offers in the second half.

Results in Table 13 are in line with both our predictions and the results in Table 12. In particular, the disagreeing pairs started with a higher conflict: (W_first − L_first) was

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7   Messages are classified by a research assistant who was not informed about our research questions and
    hypotheses.

0.22 for the disagreeing pairs and 0.15 for the agreeing pairs (p = 0.037).[8] After the first 45 seconds, on average 99% of the initial conflict was remaining in these pairs, whereas for the agreeing pairs, this ratio was 90% (p = 0.042). Similarly, at the end of the second half, on average, the remaining conflict was 75% of the initial conflict for the disagreeing pairs and 54% of the initial conflict (ignoring the fact that one of the subjects accepted an offer) for the agreeing pairs (p = 0.025).

Table 12. Timing and the Number of Offers

	Disagree	Agree	Difference
Timing of the Opening Offer (in secs)	15.64	10.98	4.66
Number of Offers in the 1st 45secs	2.27	2.65	-0.38**
Number of Offers in the 2nd 45secs	3.36	2.46	0.90**
Total number of Offers	5.63	5.11	0.52

Note: * = 10%, ** = 5%, *** = 1% significance.

Table 13. Dynamics of Concession-Making

	Disagree	Agree	Difference
Initial Conflict	0.22	0.15	0.07**
Remaining Conflict / Initial Conflict After the 1st 45secs	0.99	0.90	0.09**
Remaining Conflict / Initial Conflict After the 2nd 45secs	0.75	0.54	0.21**

Note: * = 10%, ** = 5%, *** = 1% significance.

Reasons for the 31.4% Disagreement Rate in HTP? As reported above, we observe a disagreement rate of 31.4% in HTP and only 4.5% in LTP. Below, we provide one plausible scenario for the comparatively very high disagreement rate in HTP. We run a three-stage least squares estimation to relate (i) differences in fairness judgments to

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8 It is worthwhile emphasizing here that the difference between subjects' fairness judgements across agreeing and disagreeing pairs is not significantly different (0.067 and 0.080, p = 0.49), which should be the case. Remember that our treatment manipulation was introduced after we had elicited subjects' fairness judgments.

differences in performances in the real effort task, (ii) differences in first proposals to differences in fairness judgments, and (iii) disagreement occurrence to differences in first proposals.

Table 14a. Disagreements under High Time Pressure

EQ. 1. Dependent Variable: Diff_fair | Differences in Fairness Judgments	
Independent Variables	# of Obs. = 65, R^2 = 0.06, F = 4.30, P = 0.04
Diff_Perform	0.005^{**} (0.002)
Constant	0.04^{**} (0.02)
EQ. 2. Dependent Variable: Diff_first | Differences in First Proposals	
Independent Variables	# of Obs. = 65, R^2 = 0.08, F = 4.23, P = 0.04
Diff_Fair	0.33^{**} (0.16)
Constant	0.15^{***} (0.02)
EQ. 3. Dependent Variable: Disagree | equals 1 if disagreement, 0 otherwise	
Independent Variables	# of Obs. = 65, R^2 = 0.08, F = 5.20, P = 0.02
Diff_First	1.08^{**} (0.47)
Constant	0.12 (0.10)

The three-stage least squares estimation results presented in Table 14a tell the following story about the disagreements in HTP: larger differences in real-effort task performances lead to larger differences in fairness judgments; larger differences in fairness judgments lead to larger differences in first proposals; and larger differences in first proposals make disagreements more likely.

Table 14b. Disagreements under Low Time Pressure

EQ. 1. Dependent Variable: Diff_fair | Differences in Fairness Judgments	
Independent Variables	# of Obs. = 83, R^2 = 0.00, F = 0.00, P = 0.99
Diff_Perform	0.00 (0.002)
constant	0.10^{***} (0.02)
EQ. 2. Dependent Variable: Diff_first | Differences in First Proposals	
Independent Variables	# of Obs. = 83, R^2 = 0.04, F = 3.16, P = 0.08
Diff_Fair	0.23^{*} (0.13)
constant	0.17^{***} (0.02)
EQ. 3. Dependent Variable: Disagree | equals 1 if disagreement, 0 otherwise	
Independent Variables	# of Obs. = 83, R^2 = 0.00, F = 0.01, P = 0.94
Diff_First	-0.015 (0.20)
constant	0.05 (0.05)

The results in Table 14b are for LTP. They do not indicate a similar story for LTP. Our preferred interpretation of the difference is that the connection between task performance, fairness judgments, and first proposals with agreement/disagreement is more pronounced in HTP than in LTP.

5. Discussion and Conclusion

Time pressure and deadlines are important characteristics of many bargaining situations. To fully understand their impact on bargaining processes and bargaining outcomes it is important to analyze a bargaining situation that is both rich enough in context and allows for much control. Until now, a study on the effects of time pressure in a rich bargaining context was missing in economics. Our setup extends existing results on the effects of deadlines, time pressure or cognitive load in structured bargaining games such as the ultimatum game.

Our experiment provides a set of relevant results and implications. First, the bargaining outcomes in terms of agreements differ between different time pressure conditions, but the magnitude of this difference is small. We observe a stronger tendency to settle at the explicit reference point (2/3-1/3) under high time pressure than under low time pressure. Conversely, the equal-split outcome becomes more frequent under low time pressure than under high time pressure. It seems that the most readily available cue or focal point becomes more prominent under stronger time pressure. Such a shift is in line with the availability heuristic.

Second, disagreement rates are much higher under high time pressure than under low time pressure. The corresponding figures are 31.4% and 4.5%, respectively. A robustness check in the form of a treatment with severely high time pressure confirms the tendency. Obviously, bargaining becomes much more inefficient under high time pressure than under low time pressure. This change is not due to a physical impossibility of making proposals, i.e. offers and counter-offers. The average number of offers made in a pair is still 5.2 under high time pressure (it is only a bit more than twice as high, 11.5 proposals, under low time pressure despite a more than six-fold increase in decision time).

Third, our preferred interpretation of the increase of disagreements under high time pressure emphasizes two aspects: (i) myopia of some bargainers regarding the difficulty of reaching an agreement in the last moment; and (ii) a stronger path-dependence from performance in the task, individual fairness judgments and first proposal to final agreement/disagreement under high time pressure than under low time pressure. Regarding the former, one can observe that those who bargain less efficiently in the first half of the interaction under high time pressure have more problems to reach an agreement before the deadline. Regarding the latter, we see that conflict and slow concessions are a potential cause of final disagreement in particular under high time pressure.

Fourth, it is interesting to notice that the nature of the communication, especially the content of the chat, is very similar across different time pressure conditions. Also, first proposals and concession behavior do not differ significantly.

Our experiment provides a first set of results. It questions the somewhat positive interpretation of time pressure in bargaining from social psychology and negotiation science. We show that time pressure in bargaining, even if it is not extremely strong, can have huge effects on the efficiency of negotiations. Setting too ambitious deadlines – especially in the presence of competing reference or focal points and self-serving reasons to back them up – might thus be hazardous in real-world negotiations. Naturally, there are still open questions that call for future research: Would experienced negotiators in a repeated interaction be able to increase bargaining efficiency? What if the induced reference point was the equal split or if we had varied the salience of different reference points by design? Would cognitive load or distractions from bargaining lead to similar results as the exogenous deadlines that we implement?

Ultimately, our results and the results from future research might contribute to a theory of bargaining that takes time and thus deadlines explicitly into account. The problem with such a theory is that it would have to model the bargaining process itself (such as concessions) and not only the starting point and the bargaining outcome. One promising route for future theoretical work on bargaining is to consider uncertainty and potential bounded rationality such as the consideration of reference points or specific

forms of myopia. We hope that our experimental results will be able to inform the development of new theories in the area of bargaining.

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A.1. Entitlements, First offers, Bargaining Process and Agreements

In the experiment, subjective entitlements are elicited before participants learn about the details of the bargaining procedures. Hence, there is no reason to expect that our treatment manipulation influences subjects' entitlements. Figure A.1 shows that this is indeed the case. Kolmogorov-Smirnov test results provide evidence that neither winner nor loser entitlements differ across LTP and HTP (p = 0.345 for winners, p = 0.161 for losers).
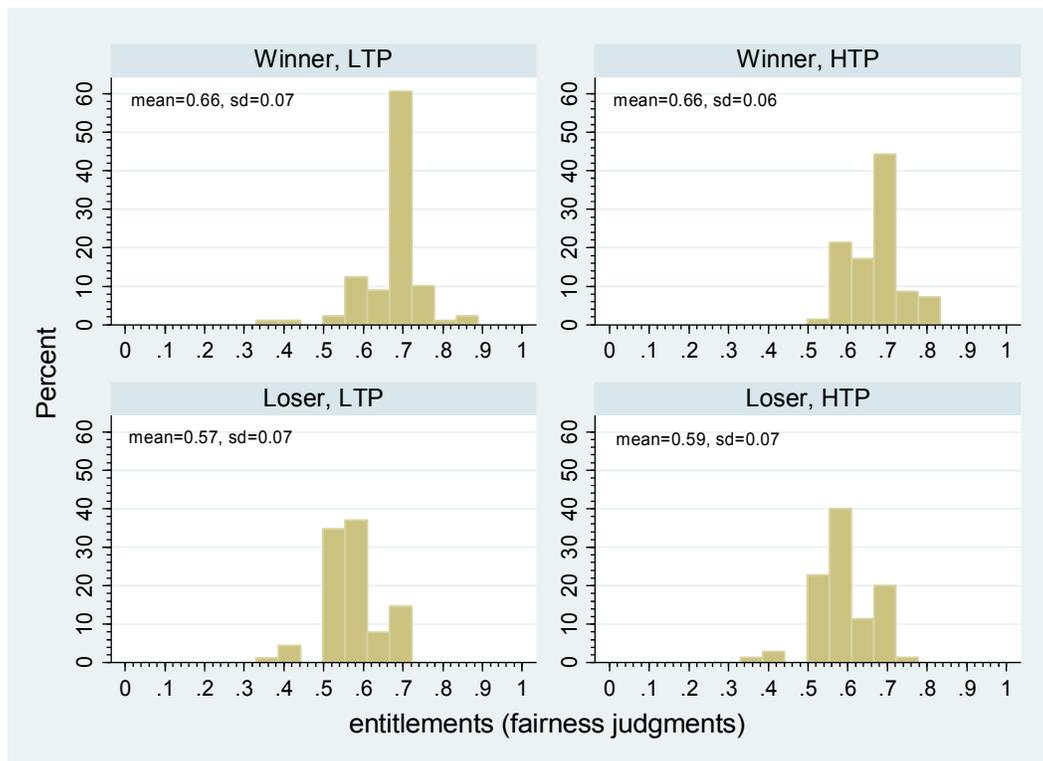
Figure A.1. Subjective Entitlements in LTP and HTP.

Mann-Whitney U test results show that average winner entitlements do not differ across LTP and HTP (p = 0.23). Average loser entitlements differ only marginally (p = 0.07), and the difference is small in magnitude (2% points).

Figure A.2 depicts the distribution of winners' and losers' first proposals across treatments. It shows that the induced reference point outcome, that is the 2/3-1/3 division, is utilized by high performers whereas the implicit reference point outcome, that is the 1/2-1/2 division, is utilized by low performers in making a first proposal. This is in line with Roth's (1985) argument: "[The] bargainers sought to identify initial bargaining positions that had some special reason for being credible, and that these credible bargaining positions then served as *focal points* that influenced the subsequent conduct of negotiations [italics in original]." Since 2/3-1/3 and 1/2-1/2 are possibly the two most salient (or credible) reference/focal points in our environment, it is natural to observe that they influence subjects' initial bargaining positions.
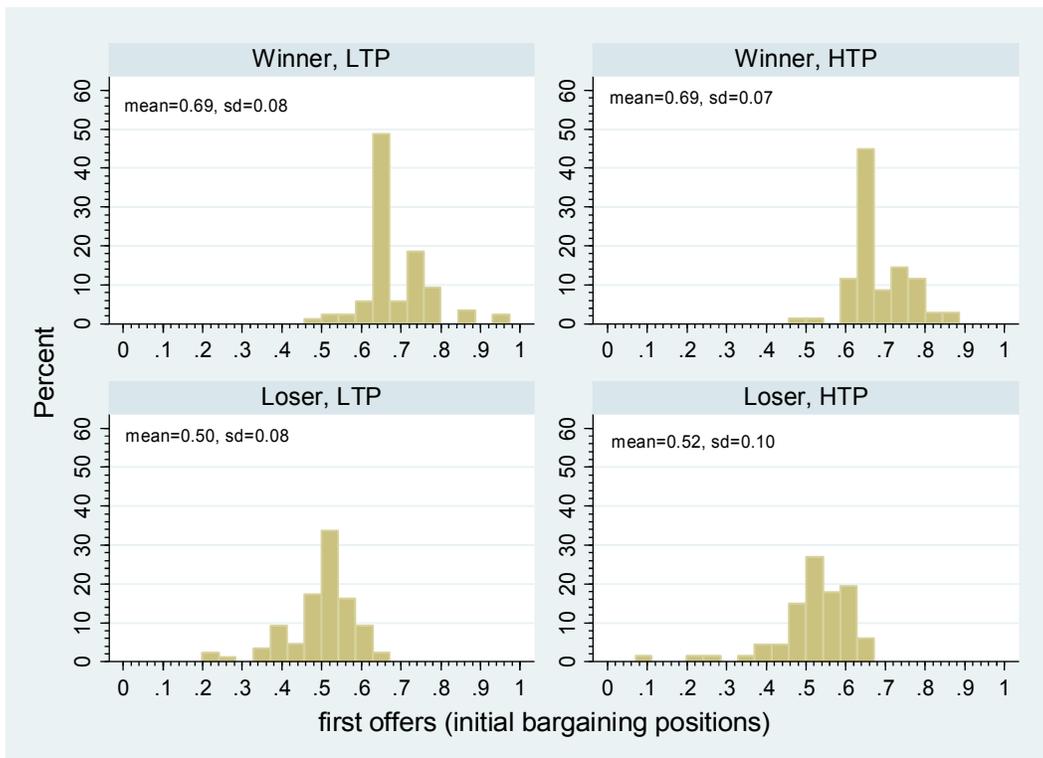
Figure A.2. First Offers in LTP and HTP.

Figure A.3 depicts the cumulative distribution of offers over the time intervals (measured as percentiles of the allotted time). Orange bars, between LTP and HTP bars, refer to a uniform distribution (i.e. if in each 10% time interval 10% of total offers were made). Until 80% of allotted time in LTP (that is until the 480th second) the distribution of offers lie above the uniform distribution and after that point the two distributions almost coincide. For HTP, a similar picture emerges, but the threshold is different (i.e., 50%), and the distance between the distribution of offers in HTP and the uniform distribution is smaller.
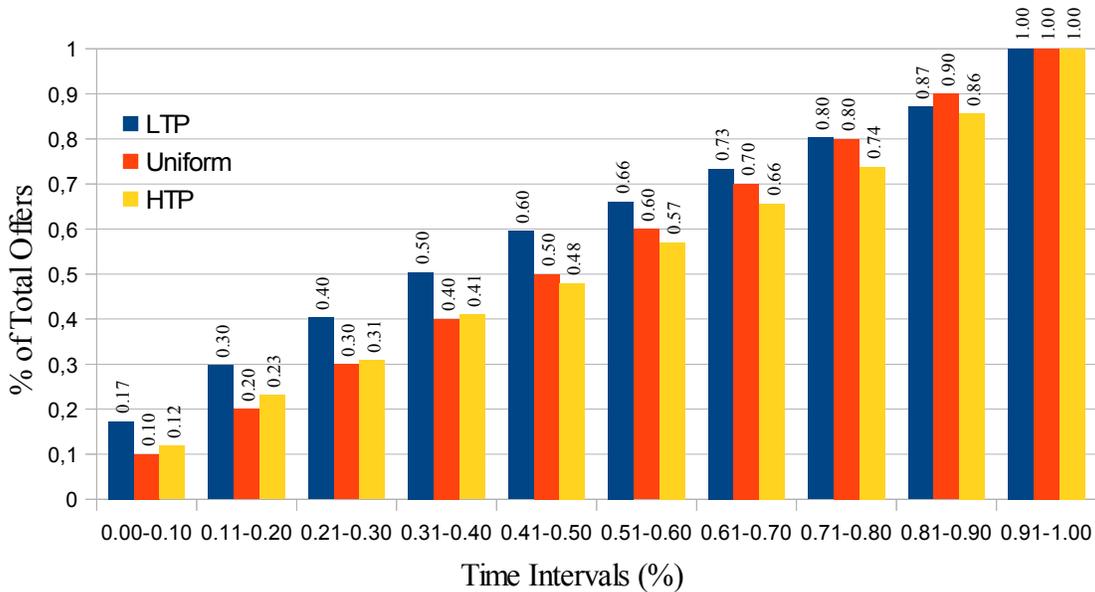
Figure A.3. Cumulative Distribution of Offers Across Time Intervals in LTP and HTP

Comparing average agreement times across LTP and HTP is not a very interesting exercise per se, since it is almost obvious that the average agreement time in LTP will be higher than the average agreement time in HTP. Nevertheless, Figures A.4.1 and A.4.2 still inform us about the distribution of agreement times and the frequency of last-moment agreements. For instance, the average agreement time in LTP (395 seconds) is 65.8% of the allotted time (900 seconds), whereas the average agreement time in HTP (78 seconds) is 86.7% of the allotted time (90 seconds).
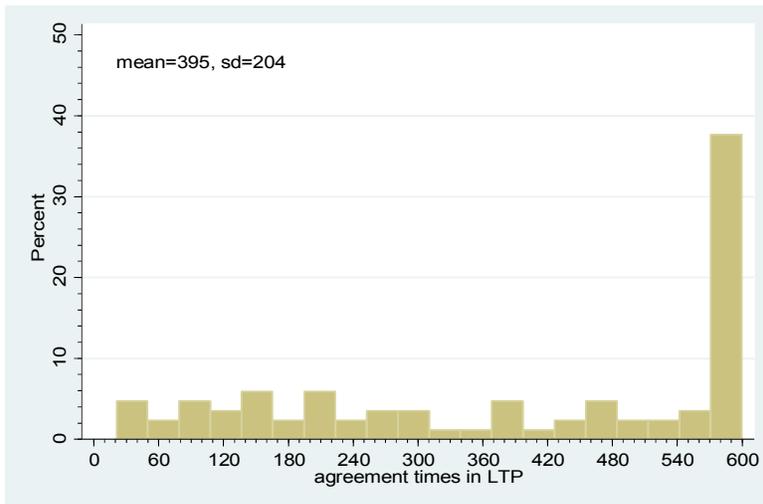
Figure A.4.1. Distribution of Agreement Times in LTP
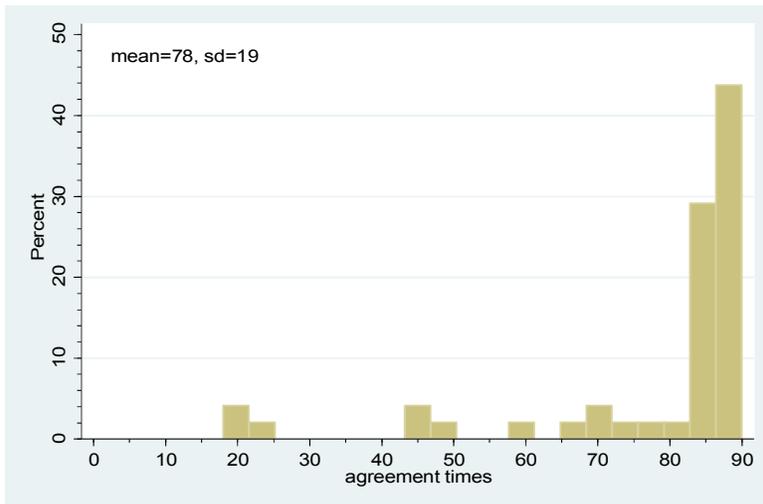
Figure A.4.2. Distribution of Agreement Times in HTP

A.2. Auxiliary Regression Analyses

Table A.1. Tension in First Proposals and Time Pressure (OLS)

Dependent Variable: Diff_first

Independent Variables	Specification 1	Specification 2
Time pressure	-0.01 (0.02)	-0.02 (0.03)
Diff_fair	0.29^{***} (0.11)	0.23^{*} (0.16)
Time pressure*Diff_first	--	0.15 (0.21)
Constant	0.16^{***} (0.02)	0.17^{***} (0.02)
# of Obs. = 148	$F(2, 145) = 4.47$	$F(3, 144) = 4.19$
	Prob > F = 0.013	Prob > F = 0.007
	$R^2 = 0.06$	$R^2 = 0.06$

Note: * = 10%, ** = 5%, *** = 1% significance. Robust standard errors in parentheses.

Table A.2.1. Winner Concessions and Time Pressure (OLS)

Dependent Variable: W_diff_first_agreed_sh

Independent Variables	Specification 1	Specification 2
Time pressure	-0.01 (0.02)	-0.24 (0.18)
W_fair	0.23 (0.18)	0.10 (0.24)
Time pressure*W_fair	--	0.36 (0.27)
Constant	-0.06 (0.12)	0.03 (0.16)
# of Obs. = 129	$F(2, 126) = 1.44$	$F(3, 125) = 6.71$
	Prob > F = 0.2399	Prob > F = 0.0003
	$R^2 = 0.03$	$R^2 = 0.05$

Note: * = 10%, ** = 5%, *** = 1% significance. Robust standard errors in parentheses.

Table A.2.2. Loser Concessions and Time Pressure (OLS)

Dependent Variable: L_diff_first_agreed_sh		
Independent Variables	Specification 1	Specification 2
Time pressure	-0.02 (0.02)	0.22* (0.13)
L_fair	-0.09 (0.10)	0.09 (0.13)
Time pressure*L_fair	--	-0.42* (0.22)
Constant	0.14** (0.06)	0.04 (0.07)
# of Obs. = 128	F(2, 125) = 1.95	F(3, 124) = 2.95
	Prob > F = 0.1471	Prob > F = 0.0352
	R^2 = 0.02	R^2 = 0.05

Note: * = 10%, ** = 5%, *** = 1% significance. Robust standard errors in parentheses.

A.3. Regressions with Control Variables

Table A.3. Agreements and Time Pressure (OLS)

Dependent Variable: W_agreedshare | winner's share in the agreement

Independent Variables	Specification 1	Specification 2
Time pressure	0.01 (0.01)	0.35*** (0.13)
W_fair	0.28*** (0.07)	0.37*** (0.08)
L_fair	0.09 (0.08)	0.19*** (0.10)
Time pressure*W_fair	--	-0.30** (0.12)
Time pressure*L_fair	--	-0.25 (0.17)
W_justice_centrality	0.00 (0.00)	0.00 (0.00)
L_justice_centrality	0.00 (0.00)	0.00 (0.00)
W_agreeable	-0.00 (0.00)	-0.00 (0.00)
L_agreeable	0.00 (0.00)	0.00 (0.00)
W_risk	0.00 (0.00)	0.00 (0.00)
L_risk	-0.00 (0.00)	-0.00* (0.00)
Budget_level	0.01 (0.01)	0.01 (0.01)
Same_sex	-0.01 (0.01)	-0.01 (0.01)
Constant	0.35*** (0.10)	0.22** (0.11)
# of Obs. = 133	$F(3, 129) = 3.08$	$F(13, 119) = 3.24$
	Prob > F = 0.0011	Prob > F = 0.0003
	$R^2 = 0.11$	$R^2 = 0.14$

Note: * = 10%, ** = 5%, *** = 1% significance. Robust standard errors in parentheses.

Table A.4. 2/3-1/3 Agreements and Time Pressure (Probit)

Dependent Variable: Statusquo | equals 1 if 2/3-1/3 agreement, 0 otherwise		
Independent Variables	Specification 1	Specification 2
Time pressure	0.10 (0.31)	9.88** (4.57)
W_fair	5.66*** (2.14)	7.21** (3.42)
L_fair	1.34 (2.19)	8.59*** (3.22)
Time pressure*W_fair	--	-1.76 (4.99)
Time pressure*L_fair	--	-14.79*** (4.54)
W_justice_centrality	0.02 (0.03)	0.02 (0.03)
L_justice_centrality	0.06 (0.04)	0.08* (0.05)
W_agreeable	-0.03 (0.06)	-0.02 (0.06)
L_agreeable	0.02 (0.07)	0.04 (0.08)
W_risk	-0.00 (0.00)	0.00 (0.00)
L_risk	-0.00 (0.00)	-0.00 (0.00)
Budget_level	-0.58** (0.28)	-0.62** (0.30)
Same_sex	-0.36 (0.28)	-0.57* (0.32)
Constant	-7.12*** (2.57)	-13.2*** (4.37)
# of Obs. = 133	Pseudo-R^2 = 0.14	Pseudo-R^2 = 0.24
	Wald-chi^2(11) = 21.82	Wald-chi^2(13) = 28.23
	Prob > chi^2 = 0.026	Prob > chi^2 = 0.008

Note: * = 10%, ** = 5%, *** = 1% significance. Robust standard errors in parentheses.

Table A.5. 1/2-1/2 Agreements and the Time Pressure (Probit)

Dependent Variable: Equal | equals 1 if 1/2-1/2 agreement, 0 otherwise		
Independent Variables	Specification 1	Specification 2
Time pressure	-0.95*** (0.39)	-22.27** (10.81)
W_fair	-0.48 (2.76)	-1.68 (3.17)
L_fair	3.64 (4.35)	2.92 (4.57)
Time pressure*W_fair	--	13.40* (7.07)
Time pressure*L_fair	--	18.70 (12.07)
W_justice_centrality	-0.11** (0.05)	-0.09*** (0.04)
L_justice_centrality	-0.05 (0.06)	-0.04 (0.06)
W_agreeable	0.09 (0.06)	0.06 (0.06)
L_agreeable	0.17** (0.09)	0.18 (0.12)
W_risk	-0.00 (0.00)	0.00 (0.00)
L_risk	0.00 (0.00)	0.00 (0.00)
Budget_level	-0.88* (0.50)	-0.82 (0.52)
Same_sex	0.04 (0.36)	0.11 (0.40)
Constant	-1.54 (3.27)	-0.68 (3.64)
# of Obs. = 133	Pseudo-R^2 = 0.28	Pseudo-R^2 = 0.31
	Wald-chi^2(11) = 32.06	Wald-chi^2(13) = 26.48
	Prob > chi^2 = 0.0007	Prob > chi^2 = 0.0147

Note: * = 10%, ** = 5%, *** = 1% significance. Robust standard errors in parentheses.

Table A.6.1. Disagreements and Time Pressure (Probit)

Dependent Variable: Disagree | equals 1 if disagreement, 0 otherwise		
Independent Variables	Specification 1	Specification 2
Time pressure	1.34*** (0.31)	0.64 (0.55)
Diff_first	2.08* (1.40)	-0.42 (1.90)
Time pressure*Diff_first	--	3.63* (2.67)
Pair_justice_centrality	-0.07*** (0.03)	-0.07*** (0.03)
Pair_agreeable	0.02 (0.04)	0.00 (0.04)
Pair_risk	-0.00* (0.00)	-0.00* (0.00)
Budget_level	-0.34 (030)	-0.30 (0.30)
Same_sex	0.36 (0.29)	0.35 (0.29)
Constant	1.83 (1.55)	2.50 (1.64)
# of Obs. = 148	Pseudo-R^2 = 0.27	Pseudo-R^2 = 0.28
	Wald-chi^2(7) = 31.95	Wald-chi^2(8) = 33.80
	Prob > chi^2 = 0.0000	Prob > chi^2 = 0.0000

Note: * = 10%, ** = 5%, *** = 1% significance. Robust standard errors in parentheses.

Table A.6.2. Disagreements and Time Pressure (OLS)

Dependent Variable: Disagree | equals 1 if disagreement, 0 otherwise		
Independent Variables	Specification 1	Specification 2
Time pressure	0.25^{***} (0.06)	0.04 (0.11)
Diff_first	0.47^{**} (0.26)	-0.05 (0.17)
Time pressure*Diff_first	--	1.21^{**} (0.53)
Pair_justice_centrality	-0.01^{**} (0.01)	-0.01^{***} (0.01)
Pair_agreeable	0.00 (0.00)	-0.00 (0.00)
Pair_risk	-0.00^{**} (0.00)	-0.00^{*} (0.00)
Budget_level	-0.05 (0.06)	-0.04 (0.06)
Same_sex	0.06 (0.05)	0.06 (0.05)
Constant	0.72^{**} (0.34)	0.92^{***} (0.36)
# of Obs. = 148	$F(7, 140) = 4.59$	$F(8, 139) = 4.12$
	$Prob > F = 0.0001$	$Prob > F = 0.0002$
	$R^2 = 0.21$	$R^2 = 0.24$

Note: * = 10%, ** = 5%, *** = 1% significance. Robust standard errors in parentheses.

Table A.7. Last-Moment Agreements and the Time Pressure (Probit)

Dependent Variable: last_moment	equals 1 if agreed in the last 5 seconds, 0 otherwise	
Independent Variables	Specification 1	Specification 2
Time pressure	0.59** (0.26)	0.80* (0.50)
Diff_first	3.70*** (1.30)	4.07*** (1.49)
Time pressure*Diff_first	--	-1.25 (2.81)
Pair_justice_centrality	-0.00 (0.02)	-0.00 (0.02)
Pair_agreeable	0.03 (0.04)	0.03 (0.04)
Pair_risk	0.00 (0.00)	0.00 (0.00)
Budget_level	0.49** (0.25)	0.47* (0.25)
Same_sex	-0.17 (0.24)	-0.18 (0.24)
Constant	-1.92 (1.37)	-2.09 (1.48)
# of Obs. = 124	Pseudo-R^2 = 0.11	Pseudo-R^2 = 0.12
	Wald-chi^2(7) = 16.14	Wald-chi^2(8) = 16.74
	Prob > chi^2 = 0.024	Prob > chi^2 = 0.033

Note: * = 10%, ** = 5%, *** = 1% significance. Robust standard errors in parentheses.

Table A.8.1. Disagreements and the Time Pressure (OLS)

Dependent Variable: Disagree | equals 1 if disagreement, 0 otherwise		
Independent Variables	Specification 1	Specification 2
Time pressure	0.27^{***} (0.06)	0.06 (0.10)
Diff_first	0.49^{**} (0.25)	-0.02 (0.16)
Time pressure*Diff_first	--	1.12^{***} (0.47)
Constant	-0.05 (0.05)	0.05 (0.04)
# of Obs. = 148	$F(2, 145) = 10.10$	$F(3, 144) = 7.52$
	$Prob > F = 0.0001$	$Prob > F = 0.0001$
	$R^2 = 0.15$	$R^2 = 0.18$

Note: * = 10%, ** = 5%, *** = 1% significance. Robust standard errors in parentheses.

Table A.8.2. Disagreements and Time Pressure (Exact Logistic)

Dependent Variable: Disagree | equals 1 if disagreement, 0 otherwise		
Independent Variables	Odds Ratio	95% conf. interval
Time pressure	4.78^{**}	0.83 – 50.52
Binary_tension	0.98^{**}	0.07 – 14.07
Time pressure*Binary_tension	3.02^{**}	0.16 – 57.35
# of Obs. = 148	Model score = 24.38	Pr $\geq$ score = 0.0000

Note: * = 10%, ** = 5%, *** = 1% significance.

A.4. Experimental Instructions (Translated from Turkish)

General Explanations for Participants

You are now participating in a decision-making experiment financed by TÜBİTAK and European Union. In the experiment you can –next to the fixed show-up fee of 5 TL– earn money with the decisions you make. The amount you'll earn may also depend on the decisions of other participants and the chance factor. It is, therefore, very important that you carefully read the following instructions. At the end of the experiment, you will be instantly and confidentially paid in cash all the money you have earned. During the experiment, we will speak of *points* instead of Turkish Liras. Thus, all your earnings will be presented in points. The total number of points you have earned during the experiment will be exchanged into TL at the end of the experiment. The exchange rate used for this conversion is:

100 points = 40 TL Kuruş.

The instructions you have received are for your private use only. From now on until the end of the session, unauthorised communication of any nature with other participants is prohibited. If you have questions, then please raise your hand. One of us will come to you to answer your question. On the following pages, we will describe the experimental procedures in detail.

Detailed Information About the Experimental Procedure

This experiment will consist of multiple parts. You will receive information about each part after the preceding part has ended. Be assured that your earnings in a particular part are unaffected by what happens in later parts.

Determining Performances and Salary Budgets

In this part of the experiment you are randomly paired with another participant in the lab. Neither during nor after the experiment will anybody be informed about who is paired with whom. You will remain to be paired with the same person throughout the session.

In the experiment, you and the person you are paired with ('other' for short) act in the role of **heads of departments** in a hypothetical company. Imagine that, in this company there is a total budget of **21.000** points for your (your and the other's) salaries. In the past, the policy of the company was to pay the salaries according to performance (how the performances are measured/determined in the experiment will be explained below). The department head with the higher (or better) performance was paid a salary of **14.000** points and the department head with the lower (or worse) performance was paid a salary of **7.000** points. Due to volatile economic conditions, there is now the possibility that the salary budget and the salary policy change, with the consequence that the hitherto valid salary claims may or may not be valid anymore. The new salary budget may be either **15.000** points or **27.000** points, depending on the exogenously determined financial factors affecting the company.

Due to changing economic conditions, the top management of the company does not want to dictate a salary distribution now. Therefore, you two are asked by the top

management to take the new situation into account and to negotiate a new salary distribution. If you can reach an agreement within the allotted time, the agreed amounts will be paid to you. If you cannot reach an agreement, both of you will be 'fired' in which case no payment will be made to any of you.

The experiment consists of two parts. The first part consists of the determination of your performances and the (random) determination of the salary budget. In the second part, you will be asked to bargain over the salary budget determined in the first part.

Determination of Performances
In this experiment your performances will be measured with a general knowledge quiz that consists of 50 questions. The department head who gives correct answers to a **greater** number of questions than the other department head in a pair has shown a **better** performance, and has therefore --given the firm's previous policy-- receives a salary claim of **14.000** points. The department head with a **worse** performance receives a salary claim of **7.000** points. The determination of performance is done as follows.

Each participant has to answer multiple-choice questions, where there is **exactly <u>one</u> correct answer** and several wrong answers. The questions concern several fields of knowledge. In total there are 50 questions. Each participant receives the **<u>same questions</u>** in the **<u>same order</u>**. You will be answering the questions on a computer. You will be given a maximum of **<u>25 seconds</u>** to answer each question. If you fail to give an answer within the 25 seconds, you will automatically move onto the next question. Unanswered questions will count as incorrectly answered questions.

You answer a question by **choosing the option you think is correct** and subsequently striking the **OK** button within **25** seconds. The next question then shows up automatically. After you and the other department head have answered all questions (or the time is over), you will answer some questions about your performances.

Beliefs on the Number of Correctly Answered Questions
In this step, you will be asked your beliefs about your and the other's performance in the general knowledge quiz. You can earn extra money depending on the accuracy of your predictions. In this step, for each prediction you make the following earning schedule will be used:

– If your prediction is exactly equal to the actual number of correct answers, you earn **250** points.
– If your prediction is equal to the actual number –1 or + 1, you earn **125** points.
– If your prediction is equal to the actual number –2 or +2, you earn **62,5** points.
– Otherwise, you earn **zero** points.

You will not be informed about how many points you earned in this part, until the end of the experiment. These points will be added to the other points you earned, converted into TL and will be paid to you at the end of the experiment.

Information About Relative Performance in the General Knowledge Quiz
Next, you will receive information on your screen about your actual performance in the general knowledge quiz, in comparison to the other department head.

If you have **more correct answers** in the general knowledge quiz than the other department head, then you are the **better** performing department head and the other is the **worse** performing department head.

If you have **less correct answers** in the general knowledge quiz than the other department head, then you are the **worse** performing department head and the other is the **better** performing department head.

If you and the other have the **same number of correct answers** in the general knowledge quiz, then the one who answered his/her questions in shorter time in total will be the department head with **better** performance whereas the other will be the department head with **worse** performance.

If both the number of correct answers and the time taken to answer are the same, the department head with better performance will be determined **randomly**. If this possibility materialises, you will be explicitly informed.

Determination of the Salary Budget
Random/stochastic events will determine the developments in economic factors. You may think of these developments as fluctuations in the demand for the company's product or changes in macroeconomic variables. These economic developments affecting the financial conditions of your company may be **favorable** or **unfavorable**. The economic conditions that arise will determine the salary budget of the company.

The randomly and exogenously determined financial conditions for the company are implemented in the experiment as follows: After your performances are determined in the general knowledge quiz, a fair die will be rolled for the company you work for. Die rolling process **is completely random. Therefore, the probability of each side showing up is 1/6.**

As stated above, there are two possibilities for the economic conditions:

1. If the die produces **1, 2** or **3**, this will be considered as **unfavorable** economic conditions. Unfavorable economic conditions result in a salary budget of **15.000 points**.

2. If the die produces **4**, **5** or **6**, this will be considered as **favorable** economic conditions. Favorable economic conditions result in a salary budget of **27.000 points**.

Below, you can find summary information about the performance determination, past salary policy of the company, and the salary budget determination process, for your reference.

The Summary of Performance Determination

The department head who answered **more** (*less*) questions correctly has the **better (worse)** performance. If the number of correctly answered questions are equal, the one who answered the questions in **shorter (longer)** total time has the **better (worse)** performance. If both your number of correct answers and the completion time are the same, the better performing department head will be determined randomly, in which case you will be informed.

The Salary Policy of the Company In The Past (21.000 points of budget):
The department head with a **better** performance received: **14.000 points**
The department head with a **worse** performance received: **7.000 points**

Summary of Determining the New Salary Budget
Die **1, 2 or 3** leads to **Unfavorable** economic conditions: **15.000 points** salary budget
Die **4, 5 or 6** leads to **Favorable** economic conditions: **27.000 points** salary budget

This finishes the first part of the experiment. The next part is the bargaining over the salary budget. The instructions for this part will be given later. Do you have any questions at this point? If you have a question please raise your hand. If there are no (more) questions we shall continue.

Bargaining

In this part of the experiment, you will bargain over the distribution of the current salary budget determined by exogenous economic conditions. You will have a maximum of **10 minutes** (in the HTP treatment **90 seconds**) to reach an agreement on the distribution of the salary budget, which is at your joint disposal. You do not have to use up all the bargaining time, but must not exceed it. If you do not agree on a distribution within 10 minutes, then you will earn **nothing** from this bargaining stage! If you do agree on a distribution then you will earn your share.

During bargaining you work with a **computer interface.** You will work with a screen that consists of four parts, which we will explain in what follows. (You can also look at a printed bargaining screen on the next page).

1. On the top left corner, you will see the salary budget you are bargaining over, information about your relative performance and the salary policy of the company in the past. You will see an area where you can enter your salary distribution offer (for you and the other department head), just below. There, you will also see a **'SEND'** button to confirm and submit your salary offer.

2. On the top right corner, you will see the messaging screen. The clock on the top shows the amount of time left for bargaining (in seconds). In the area just below the messaging screen, you will find a few hints on sending messages. You can find further details on sending messages later on this document.

3. On the bottom left corner, the standing (hence, currently valid) offers made by you and the other department head are displayed. Additionally, in the same area, there is an **'accept the offer'** button, which you would use if you wish to accept the currently valid offer of the other department head. If the other department head has not yet made an offer yet, a 'No offers have been made to you yet' message will be displayed in this area. Similarly, if you have not made any offer yet, 'You have not made an offer yet' message will be displayed.

4. On the bottom right corner, all offers made throughout the bargaining process are displayed. Here, you can see who has made the offer, the total number of offers made in your pair and your (yours and the other's) offers. For example, if you have made the first offer by proposing **x** for yourself and **y** for the other, "**you**" will be shown as the person who made the offer on the first line. Here, the number "**1**" will be there as the order of the offer you made, **x** as your salary and **y** as the other's salary.

When you wish to submit an offer, you may fill in both boxes on the top left section to make a salary offer for yourself and the other. The sum of the salary amounts you propose for yourself and the other must be equal to the total salary budget of the company. Then, you may submit your offer by clicking the **'SEND'** button. At this point, the following rules are valid.

1. An offer contains your salary proposals for **you** and the **other department head**. To make an offer you may either press **'tab'** to move to a box or you can click on the box in question with the help of the mouse.

2. The sum of the amounts you enter the boxes **cannot exceed** the salary budget of the company. This sum **cannot be less than** the salary budget either. If you enter such numbers you will see a warning message: **'Sum of the amounts you enter must be equal to the salary budget'.**

3. Only integer **numbers** are allowed. Decimals are not accepted.

4. A sent offer is **binding**, that is, if the other department head accepts your offer, bargaining is finished and both of you earn the points on which you have agreed upon. The same holds if you accept an offer of the other department head. You can only accept a standing offer; earlier offers are not valid any more.

As long as you have not pressed the "**SEND**" button you can still change the offer. Once you click the "**SEND**" button, your offer shows up on the screen of the other department head as well as on your own screen. You can always make a new offer, provided that neither you nor the other department head have accepted one and provided that there is still some bargaining time left.

If you wish to accept the other department's offer, you must click on **'Accept Offer'** button.

5. In addition to your numerical offers, you can also send verbal messages to the other department head. You can send your messages by typing them in the area above **'Some Hints on Sending Messages'**. You must make an offer before you can send a message. You can send only one message for each offer you made. You can do this by pressing the **<enter>** button on your keyboard after typing the message you wish to send. If your message is longer than one line, you will automatically move onto the second line as you continue writing. We would like to remind you that pressing **<enter> will not move** you to the second line, rather whatever you have written upto that point will be sent as your message!

6. You are not allowed to write messages that reveal your identity (eg., 'I am X from department Y') or messages that have a threatening voice (eg. 'I know who you are, if you don't give me the amount I want, you'll see').[9] If you send any such messages **you will not receive any payment.**

---

9   Threats in the form of bargaining tactics (e.g., "this is my final offer", "if you don't give me X, you'll get zero") are still allowed.

You may make changes to your messages as long as you don't press **<enter>**. If you wish to delete any part of your message you may do this by pressing the **<backspace>** button on your keyboard.

This is the end of the experimental instructions. Do you have any questions? If you do please raise your hand. If you do not we will continue.

Periyot

1 Toplam 1 | Kalan Süre [sec]: 294

Toplamda ▓▓▓ puanlik bir maas bütçesi üzerinde pazarlik yapmaktasiniz.

Siz **Yüksek** Performans gösterdiniz. Diger departman yoneticisi **Düsük** performans gösterdi

Geçmisteki Maas Politikasi: **Yüksek** Performans için ▓▓▓ **puan** , **Düsük** Performans için ▓▓▓ puandi

Siz : Ben yüksek performans gösterdim. Benim hakkim
Karşı Taraf : Dalga mi geçiyorsun. Eşit paylaşalim. Bir iki soru çok çözden dua bu kadar fark olur mu?
Siz : Peki böyle olsun o zaman
Karşı Taraf : Eşit paylaşalim
Siz : Ben daha fazla vermem
Siz : Bunu kabul et bak zaman da geçiyor
Karşı Taraf : Ben anlamam ikimiz de para alamaviz
Karşı Taraf : Hadi bunu kabul et madem zaten 200 puan fazla aliyorsun
Siz : Hadi bunu kabul et o zaman. Zaten azcik fark var

Yeni Bir Teklif Yap ve Gönder

Sizin maas miktariniz | 1350

Karsi tarafa kalan maas miktari | 1050

GÖNDER

Mesaj gondermeyle ilgili bazi ipuclari

1- Mesaj gönderebilmek için öncelikle bir teklifte bulunmalisiniz.

2- Yaptiginiz her teklif için sadece 1 mesaj gönderebilirsiniz.

3- Göndermek istediginiz mesaji yazip klavyenizdeki <enter> tusuna basarak mesaj gönderebilirsiniz.

4- Karsi tarafi tehdit edici ya da kendi kimliginizi açiga cikaran mesajlar göndermenize izin verilmemektedir.

Diger Departman Yoneticisinin Geçerli Olan Teklifi

Diger departman yoneticisinin maas miktari: | 1300

Size kalan maas miktari: | 1100

Teklifi Kabul Et

Teklif	Teklif sayisi	Sizin payiniz	Karsi tarafin payi
Siz	1	2000	400
Karsi Taraf	2	1200	1200
Siz	3	1600	800
Karsi Taraf	4	1200	1200
Siz	5	1400	1000
Siz	6	1400	1000
Karsi Taraf	7	1100	1300
Karsi Taraf	8	1100	1300
Siz	9	1350	1050

Geçerli olan teklifiniz.

Sizin maas miktariniz: | 1350

Karsi tarafa kalan maas miktari: | 1050

A.5. Post-Experimental Questionnaire

Questionnaire -A-

The following questions concern the determination of performance in the knowledge quiz. Please, indicate how strongly you agree with the statement, by circling the appropriate number; 1 = not at all, 7 = very much.

1. In a general knowledge quiz like this, pure luck decides who is able to answer more questions correctly.

     1   2   3   4   5   6   7

2. The one with better general knowledge is able to answer more questions correctly.

     1   2   3   4   5   6   7

3. In my view the knowledge questions are difficult.

     1   2   3   4   5   6   7

Questionnaire -B-

We would now like to know how you assess your own general knowledge. We ask you to indicate on the scale below where you position yourself with respect to your general knowledge, within the group of the participants of this experiment. Please, position yourself by choosing the percentage interval - on the scale below - where you think your own position relative to the other participants in this experiment is with respect to general knowledge. If you think, for example, that your general knowledge puts you in the top ten percent, then choose the interval 91-100; if in the lowest ten percent, then choose the interval 0-10, etc.

Your estimation of your position within the group of the participants of this experiment with respect to your general knowledge:

- 0-10%
- 11-20%
- 21-30%
- 31-40%
- 41-50%
- 51-60%

○ 61-70%
○ 71-80%
○ 81-90%
○ 91-100%

Questionnaire -C-

Below you will find various statements. Read each statement carefully and decide to what extent you personally agree or disagree with it. Choose the number which corresponds to this judgement.

1 = Strongly disagree, 2 = Disagree, 3 = Slightly disagree, 4 = Slightly agree, 5 = Agree, 6 = Strongly agree

1. I believe that, by and large, I deserve what happens to me.
2. I think basically the world is a just place.
3. I am convinced that in the long run people will be compensated for injustices.
4. There is rarely anything that angers me more than injustice.
5. I firmly believe that injustices in all areas of life (e.g., professional, family, politics) are the exception rather than the rule.
6. I think people try to be fair when making important decisions.
7. I believe that most of the things that happen in my life are fair.
8. I cannot really relate to people who do not care about justice.
9. I believe that I usually get what I deserve.
10. Injustice that I caused or did not prevent torments me for a long time.
11. I am outraged when I meet someone who is indifferent to injustice.
12. I think that important decisions that are made concerning me are usually just.
13. I am usually treated fairly.
14. I think injustice should always be emphasized.
15. I am confident that justice always prevails over injustice.
16. I believe that, by and large, people get what they deserve.
17. In my life injustice is the exception rather than the rule.
18. I think that I am more affected by injustice than most other people.
19. Overall, events in my life are just.
20. Sooner or later, justice will prevail.

Questionnaire -D-

Here are a number of personality traits that may or may not apply to you. Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

1 = Disagree strongly, 2 = Disagree moderately, 3 = Disagree a little
4 = Neither agree nor disagree, 5 = Agree a little, 6 = Agree moderately,
7 = Agree strongly

I see myself as:
1. _____ Extraverted, enthusiastic.
2. _____ Critical, quarrelsome.
3. _____ Dependable, self-disciplined.
4. _____ Anxious, easily upset.
5. _____ Open to new experiences, complex.
6. _____ Reserved, quiet.
7. _____ Sympathetic, warm.
8. _____ Disorganized, careless.
9. _____ Calm, emotionally stable.
10. _____ Conventional, uncreative.

Questionnaire -E-

Please click the option you find most appropriate!
"0 = not at all willing to take risks", "10 = very willing to take risks"

How do you personally assess yourself: Generally speaking, are you a person who is ready to take risks or are you trying to avoid risks?
     0 1 2 3 4 5 6 7 8 9 10

One can behave differently in different circumstances. In the following circumstances, how would you assess your readiness to take risks?

  Driving a car?
     0 1 2 3 4 5 6 7 8 9 10
  Making a financial investment?
     0 1 2 3 4 5 6 7 8 9 10
  In leisure time and when doing sports?
     0 1 2 3 4 5 6 7 8 9 10
  Regarding your professional career?
     0 1 2 3 4 5 6 7 8 9 10
  Regarding your health?
     0 1 2 3 4 5 6 7 8 9 10
  Regarding confidence in strangers?
     0 1 2 3 4 5 6 7 8 9 10

Please, consider what you would do if you face the following situation: Imagine that you win 100,000 Euro in a lottery. Right after receiving the prize, you receive a new offer from a reputable lottery company, which includes the following: there is a chance to double the amount of money you bet. In case you win, the prize will be immediately paid out. However, there is also an equally high risk of losing half of the money you bet. You can invest the 100,000 Euro into the lottery in whole or in part in the following ways or reject the offer entirely.

What part of the lottery winnings would you put in this new lottery, which is, on the one hand, risky and promises gains, on the other hand?

  ○ The whole amount of 100.000 Euro

  ○ An amount of 80.000 Euro

  ○ An amount of 60.000 Euro

  ○ An amount of 40.000 Euro

  ○ An amount of 20.000 Euro

  ○ Nothing at all

Another question about risk-taking. Please consider what you would do if you face the following situation: Imagine that you win 100,000 Euro in a lottery. Right after receiving the prize, you receive an investment offer from a reputable bank, which includes the following: within two years, there is a chance to double the amount of money you invest. However, there is also an equally high risk of losing half of the money you invest. You can invest the 100,000 Euro in whole or in part in the following ways or reject the offer entirely.

What part of the lottery winnings would you put in this investment opportunity, which is, on the one hand, risky and promises gains on the other hand?

- The whole amount of 100.000 Euro
- An amount of 80.000 Euro
- An amount of 60.000 Euro
- An amount of 40.000 Euro
- An amount of 20.000 Euro
- Nothing at all

Questionnaire -F-

At the end, some demographic questions:
    Age:
    Gender:
    Department of Study:
    Monthly Disposable Income: