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Bargaining and the Role of Negotiators' Competitiveness

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Résumé/Abstract

This paper experimentally tests the relation between subjects' competitiveness and bargaining behavior. Bargaining is investigated in a demand-ultimatum game, where the responder can request a share of the pie from the proposer. The re-sults show that highly competitive proposers earn less, since they make lower offers, which are more often rejected. Similarly, highly competitive responders achieve lower payoffs, since they request excessive amounts which induces lower proposals. These findings establish a link between competitiveness and bargaining as suggested by social and evolutionary psychology. Thus, we identify one driver of the empirical heterogeneity of bargaining behavior and outcomes. From a management perspec-tive our findings highlight that giving thought to employees' competitiveness before delegating them to participate in negotiations may pay off.

Mots clés/Keywords: Bargaining; Competitiveness; Experiment

Codes JEL/JEL Codes: C91; M54

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1 Introduction

Bargaining outcomes are of utmost importance for economic success. Organizational economics highlights the extreme significance of economic contracts which are concluded in various business functions such as sales (Luo 2002), human resource management (Lepak and Snell 1999), supply-chain coordination (Dana Jr 2012, Taylor 2002), or procurement (Bajari and Tadelis 2001). Empirical evidence documents extensive heterogeneity of bargaining outcomes in the terms and conditions of a contract. Examples range from starting wages (e.g., Gerhart 1990; Gilbreath and Powers 2006) and collective-bargaining agreements (Budd and Na 2000) to service goods (Castillo et al. 2013) and consumer goods (List 2003). Because of the economic relevance of negotiations, it is important to shed light on subjects' bargaining behavior and the emergence of diverse bargaining outcomes. The causes for these differences may be manifold. Possible determinants are institutional factors such as bargaining power or the regulation of an industry (e.g., Svejnar 1986). Other important determinants are social factors such as taste-based discrimination (Becker 1971), bargaining ability (Grennan 2014; Leibbrandt and List 2014), or preferences such as risk attitudes (Harrington 1990).

Social and evolutionary psychology suggests a set of traits or human characteristics that may account for differences in bargaining behavior. A widely discussed factor, which appears particularly relevant, is the degree of competitiveness of the negotiators as a measure of their "motivational orientation" (MO). The concept refers to their attitudinal disposition toward another. According to Deutsch (1960), three extreme cases can be distinguished: a cooperative, an individualistic, and a competitive MO. The latter refers to a bargainer's interest in doing better than the other party and at the same time the aim to do as well as possible for oneself. The subjects' MO is one driver for what economists refer to as individuals' competitiveness. Competitiveness comprises different characteristics, which jointly determine a subject's willingness and ability to perform in competitive environments. It follows that competitiveness may be related to the individual's risk preferences and beliefs about the own and the competitors' performance potential. The reason is that the aforementioned aspects influence the prospect and the evaluation of winning a competition. Moreover, additional factors relate to competitiveness, such as the pure preference for winning a competition and sociability, which affect the evaluation of a competitive environment *per se*.

Parallel to the diverse bargaining outcomes, experimental economics has emphasized that subjects reveal a high heterogeneity of competitiveness. For instance, men are significantly more competitive than women (e.g., Niederle and Vesterlund 2007; Croson and

Gneezy 2009). If competitiveness is linked to bargaining actions, the heterogeneity in competitiveness may explain the variability observed in bargaining outcomes. So far, the identification of the determinants of individual differences in bargaining behavior remains an open question. To our knowledge, the relation between individual competitiveness and bargaining outcomes has not been studied. One reason is that in empirical data it is difficult to study subjects' bargaining strategies, given that they are only partially revealed in the equilibrium bargaining outcome. In this respect, controlled labor-market experiments have proven to generate valuable insights (Charness and Kuhn 2011). Among other advantages, the lab offers convenient methods for eliciting subjects' preferences (for competition) that can be linked to bargaining behavior.

In this paper we build on the concepts of social psychology and the experimental evidence of diversity in individual competitiveness. Rather than focusing on institutional factors, we concentrate on the influence of competitiveness on bargaining. In particular, we experimentally address the question of whether and to what extent differences in subjects' willingness and ability to compete may explain bargaining behavior and the achievement of high profits in negotiations. In our setting, subjects work on a real-effort task. We identify competitiveness via a Becker-DeGroot-Marschak (BDM) mechanism (Becker et al. 1964) by a subject's remuneration choice in the work task. That is, competitiveness is interpreted as the minimum piece rate that a subject accepts in order to avoid a €1-winner-takes-all tournament (Ifcher and Zarghamee 2014). The higher this minimum piece rate, the higher the subjects' competitiveness. Having elicited each subjects' competitiveness, we make use of the strategy method (Selten 1965) to conduct an in-depth analysis of individual behavior in a demand-ultimatum game (Rigdon 2012). In this bargaining situation, two parties face an opportunity to realize individual gains, but only if they reach an agreement on how to split the given pie. The "responder" moves first and requests a share of the pie from the "proposer". The proposer then makes an offer on how to split the pie between the two parties. In a last step, the responder decides whether to accept or reject the offer. The benefits from bargaining could, for example, refer to gains from trade between a seller and a buyer, or they may relate to profits realized in a joint project. Our focus is on whether individual competitiveness explains bargaining behavior, i.e., proposers' offers and responders' request levels and their willingness to accept certain offers. Finally, we explore whether competitiveness can predict bargaining outcomes, i.e., proposers' and responders' profits.

The experimental data support the hypothesis that competitiveness crucially affects the behavior of subjects in both roles of our bargaining game. We find that highly competitive responders request higher amounts. We show that an inverted U-shaped relation exists between request levels and proposals. Put differently, offers increase in request levels but if request levels become too high, proposers lower their offers. Thus, a high level of competitiveness lowers the bargaining profits of responders. For proposers, we find that a higher degree of competitiveness leads to lower offers. At the same time, highly competitive proposers make less optimal offers to responders, i.e., they propose low amounts, which more often leads to rejections. As a result, we find that a high degree of competitiveness is harmful for the profits of proposers.

Importantly, we provide a detailed decomposition of subjects' competitiveness, i.e., their revealed intensity of a preference for the tournament. Thereby, we can isolate a number of factors, such as risk preferences and subjects' (perceived relative) performance determining their willingness and ability to perform in competitive environments. By controlling for these factors we show that there have to be other personal characteristics, like individuals' aggressiveness, their joy of winning or sociability, that impact bargaining behavior and cause the detrimental effects in bargaining outcomes.

In sum, our findings emphasize that competition preferences crucially matter for bargaining. We contribute to personnel economics and point out that before sending employees to participate in negotiations it may be wise to think about their competitiveness.

2 Experimental Design

Our experiment uses a within-subject design and is composed of five parts. In parts 1–3 we follow Niederle and Vesterlund (2007) and present subjects with a real-effort task. However, our elicitation of subjects' competitiveness is based on the approach of Ifcher and Zarghamee (2015). In part 4 we study subjects' bargaining behavior in a demand-ultimatum game similar to Rigdon (2012) by means of the strategy method (Selten 1965). In part 5 we elicit subjects' risk preference with the task of Eckel and Grossman (2002).

2.1 Real-Effort Task and Elicitation of Competitiveness

In parts 1–3 subjects take part in the same mathematical real-effort task (Niederle and Vesterlund 2007). In the task subjects have to add up four two-digit numbers.[1] An example of the real-effort task (a math problem to be solved) is presented in Table 1.

[1] Niederle and Vesterlund (2007) let subjects add up five two-digit numbers. We decided to apply a simplified version with four numbers as we also ran sessions with school kids. We use those data for another experiment.

Subjects have to enter the answer in the blank box. Having submitting an answer, subjects are presented with the next problem without being informed of whether the answer was correct or not.

75	33	12	19	

Table 1: Example of a problem in the real-effort task

Part 1 consists of two stages (A and B). In stage A subjects work for five minutes in the real-effort task. We follow Niederle and Vesterlund (2007) and pay subjects a piece rate (PR) for each correctly solved problem. The piece rate is 0.50 Talers. We applied an exchange rate of 2 Talers = €1. In stage B subjects have to estimate their performance relative to the other subjects in the room. In this regard, they guess whether they belong to the first, second, third or fourth quartile. They earn 2 Talers if they correctly guess the quartile they performed in.

In part 2 subjects are matched in groups of four and take part in a winner-takes-all tournament (WTAT). Subjects again spend five minutes completing the real-effort task. Here, their individual payments depend on their own performance compared to the performance of the three other participants in their group. If a subject achieves the best performance in the group, she earns 2 Talers for each correct answer. However, if a subject does not achieve the best performance, she earns nothing.

In part 3 subjects' remuneration is either a PR or a WTA tournament (WTAT). In order to determine the remuneration scheme, we apply an approach presented by Ifcher and Zarghamee (2015). Here, subjects are presented with a list of 21 settings, i.e., choices between different PR payments, ranging (in increments of 0.10 Talers) from 0.00 Talers to 2.00 Talers and a 2.00 Talers WTAT payment. The first choice is between a 0.00 Talers PR and a 2.00 Talers WTAT payment. The next choice is between a 0.10 Talers PR and a 2.00 Talers WTAT payment, and so on. The final choice is between a 2.00 Talers PR and a 2.00 Talers WTAT payment. Subjects are asked to indicate the minimum PR (between 0.00 and 2.00 Talers) that they would accept as payment in the real-effort task to avoid the 2.00 Talers WTAT payment. Our interest is in subjects' individual switching points from the WTAT payment to the PR payment of a certain Taler amount. Therefore, the list contains buttons where subjects can indicate their preference between a certain PR level and the 2.00 Talers WTAT. Subjects are told that clicking on a button would mean that all PR levels below the button are selected to be preferred over the WTAT payment. At the same time, the WTAT payment is selected to be preferred for all PR levels above the button. The lowest PR level that a subject prefers over the WTAT payment (switching point) determines the subject's strength of competitiveness. We opt for the approach of Ifcher and Zarghamee (2014), since it provides a larger action space than the simple binary choice variant of Niederle and Vesterlund (2007). This more informative measure is convenient for our purposes since we aim for the exploration of the correlation between competitiveness and bargaining behavior.

As soon as the subjects' choices for the 21 settings are completed, the computer randomly chooses one of the 21 settings to be relevant. A subject's choice in the selected setting (PR or WTAT payment) determines the remuneration condition for the subject. The subjects are informed of their payment conditions (PR level or WTAT payment) and are then given another five minutes for the real-effort task. If subjects work under the WTAT payment, their performance is compared to the performance of the other three members of the group they were assigned to in part 2 (Niederle and Vesterlund 2007).

2.2 Bargaining Game

In experimental economics bargaining actions are typically modeled in ultimatum games where subjects have to decide on the allocation of a pie (Güth et al. 1982; Gneezy et al. 2003). In part 4 of our experiment, we use the demand-ultimatum game introduced by Rigdon (2012). However, our experimental design differs in one major aspect. In contrast to Rigdon (2012) subjects' roles are not determined by their performance in a quiz.[2] Instead, we apply the strategy method (Selten 1965) and let our subjects decide in both roles in the demand-ultimatum game. That is, they make a decision both as a responder and as a proposer (Blanco et al. 2011). Letting subjects play both roles avoids entitlement effects, which can occur if subjects have earned their role as a result of a real-effort task. Moreover, this approach allows us to get a deeper understanding of the relation between competitiveness and bargaining. In more detail, subjects have to bargain on the division of €19. This pie has to be divided in integers. In order to minimize focal points, we explicitly choose an odd pie size.[3] We believe that otherwise (e.g., for a pie of €20) subjects may tend to coordinate on an equal split. A robust result in experimental economics is the failure to observe subgame perfect play in the ultimatum game, where players' payoffs are unequal (Gneezy et al., 2003; Smith and Wilson, forthcoming). The timing of our game is as follows: subjects first decide in the role of a responder on the integer request level (between 0 and €19) that they will claim

[2] In Rigdon (2012) subjects had to qualify in a quiz for the role of responder. That is, subjects who qualified in the top half of a quiz became responders.

[3] Güth et al. (2001) demonstrate that fair offers in occur less often in mini ultimatum games when equal splits are replaced by nearly equal splits.

from the proposer. This action may resemble a real-life situation where a job candidate is invited to talk to a negotiator about her wage request. In a next step, subjects decide in the role of a proposer. For each possible integer request they decided how many Euros (0–19) they would propose to the responder. Finally, all players again have to decide in the role of responder. Here, they have to indicate their minimum acceptance level of proposals. Again, we make use of a choice list where subjects are presented with all possible integer proposals between 0 and €19. We are interested in the switching point, i.e., the minimum proposal a responder would accept to switch from rejection to consent. Subjects are asked to click on one of 21 buttons. Subjects are told that clicking on a button would mean that all proposals below the button are selected to be accepted. At the same time, all proposals above the button (i.e., proposals below the minimum acceptance level) are selected to be rejected. For instance, if a responder would accept all proposals (between 0 and €19), she should click on the first button. Whereas if a subject would accept all proposals starting from €7 then she should click on button 8. After subjects have chosen their minimum acceptance level, the computer randomly determines subjects' roles and randomly matches the players into pairs. Based on the request level claimed by the responder the computer uses the proposer's strategy to determine the offer sent by the proposer. Afterwards, it checks whether the responder would accept this proposal. If the responder accepts it, both players receive the allocated split. Otherwise, both players earn nothing.

2.3 Elicitation of Risk Tolerance

In part 5 we measure subjects' risk preferences to be used as a control variable in our analysis. We apply the lottery-choice task introduced by Eckel and Grossman (2002). Subjects are presented with six gambles with two possible outcomes (low payoff/high payoff) each. Both events occur with a likelihood of 50%. Table 1 gives an overview of the gambles, their expected payoffs, and the corresponding constant relative risk aversion (CRRA) parameter. In the experiment subjects were only presented to the first three columns. They had to choose one of the six gambles. Afterwards, we conducted a post-experimental questionnaire.

2.4 Experimental Procedures

In our within-subject experiment, subjects were told that the experiment consisted of five parts but only received information about the current part. Before each part started,

Choice	Low Payoff (€)	High Payoff (€)	Exp. payoff	Implied CRRA Range
1	5.60	5.60	5.60	$3.46<r$
2	7.20	4.80	6.00	$1.16<r<3.45$
3	8.80	4.00	6.40	$0.71<r<1.16$
4	10.40	3.20	6.80	$0.50<r<0.71$
5	12.00	2.40	7.20	$0.00<r<0.50$
6	14.00	0.40	7.20	$r<0$

Table 2: The gamble choices. Risk is measured as standard deviation of expected payoff.

subjects received a new set of instructions explaining the procedure of the new part. Subjects also knew that at the end of the experiment one of the five parts would be randomly selected to be payoff-relevant. If part 1 was selected subjects received the corresponding payoffs of stage A and B.

The experiment was programmed in z-Tree (Fischbacher 2007). We conducted six sessions of the experiment with 24 subjects each. In total, 144 participants (70 women and 74 men) took part in the experiment. They had been recruited with ORSEE (Greiner 2015). The subject pool consisted of students from various fields of study at the University of Göttingen. Subjects' average earning was €11.87, including a show-up fee of €5. A session lasted approximately 60 minutes.

3 Data Structure of Bargaining Results: Simulations

In this paper we report the results of (directly) observed choices and data generated with simulation analyses. Subjects' competitiveness is measured in direct-response decisions (parts 1–3). Similarly, we directly measure subjects' risk tolerance in part 5. By contrast, the data in the bargaining game (part 4) is elicited with the strategy method (Selten 1965). This method enables us to elicit richer data on subjects' bargaining behavior. First, we can explore subjects' decisions in both bargaining roles, i.e., as *responders* and as *proposers*. Second, we can analyze proposers' behavior and the consequences for the success of the proposals for all possible bargaining strengths (request levels sent) of the responders. Brandts and Charness (2011) report evidence, based on a literature survey, that the results derived by the strategy method are generally not different from direct-response results.

In the bargaining game subjects first decide in the role of a responder on the level of the requested share of the pie. Afterwards, they decide as proposers for each possible request (of a matched responder) on the level of the proposal they will offer to the responder.

Finally, as responders, all subjects decide whether to accept or reject each of the possible proposals on offer. In the experiment the bargaining outcomes are determined by a random assignment of subjects' roles and a random matching with another person. In other words, the realized outcome is just one random draw out of many other possible assignments and matching. To correct for this sample selection bias, we run simulation analyses to determine subjects' unbiased bargaining realizations.

We let each responder play simulated ultimatum games with all other participants. That means that we focus on a responder's requested split and virtually match this responder with each of the other subjects in the role of proposers. We determine for all proposers the level of the offered proposal conditioned on the level of the requested split. As a consequence, the responder receives conditional proposals from all other players. In a last step, we focus on the minimum accepted proposal specified by the responder. This determines for each of the proposals whether it is accepted or rejected. If a proposal is accepted, the responder receives the proposal in Euros. If it is rejected, the responder payoff is zero. The outcomes for the proposers were generated analogously. Proposers also play simulated ultimatum games with each of the other subjects in the role of responders. A proposer's offer to a certain responder is determined conditional on the requested split of the responder. Again, the analysis checks for each responder whether they would accept or reject the offer sent by the proposer.

4 Results

4.1 Summary Statistics

Table 3 presents summary statistics of our data. The table focuses on subjects' characteristics and their actual choices in the bargaining game. It also presents the data generated with the simulation analysis. *Competitiveness* is the minimum piece rate (PR) subjects would accept instead of playing a winner-takes-all tournament (WTAT). In the WTAT, the winner receives a PR of 2.00 Talers, whereas the loser earns nothing. Our measure of competitiveness ranges from 0.00 Talers to 2.10 Talers. For subjects who prefer the tournament over a PR of 2.00 Talers, we set competitiveness to 2.10 Talers. In the table, we present subjects' competitiveness converted to Euro (i.e., 1 Taler = €0.50). The measure *risk tolerance* corresponds to the gamble chosen by subjects in the lottery choice. It ranges from one (safe lottery) to six (the most risky lottery). *Performance* refers to the number of solved puzzles in the real-effort task under tournament conditions. *Guess Quartile* corresponds to participants' relative performance guesses. That is, participants had to guess whether their performance ranks in the first, second, third or fourth quartile. In our bargaining game subjects had to make a decision in both roles. We elicited their behavior as responders and as proposers. *Request* is the amount (in Euros) which was requested in the ultimatum game when subjects decided as responders. *Received proposals by responders* is the average proposal responders would receive as a result of our simulation analysis. *Responder payoff* and *proposer payoff* are derived by the simulation analyses and represent subjects' payoffs when deciding in the respective roles.

observ. data	Competitiveness (in euros)	0.49	(0.28)
	Risk tolerance	3.68	(1.52)
	Performance	16.23	(6.50)
	Guess–Quartile	2.12	(0.84)
	Request	9.39	(2.55)
simul. data	Received proposals by responders	8.23	(0.49)
	Responder payoff	7.37	(1.60)
	Proposer payoff	8.49	(1.83)

Table 3: Summary statistics on observed and on simulated data. All monetary units in Euro. Standard deviations in parentheses.

Focusing on our measure of competitiveness, we find that, on average, subjects require a piece rate of €0.49 to refrain from participating in the tournament. The mean lottery choice of 3.68 suggests that subjects are typically risk-averse. Subjects' average performance under a tournament payment was 16.23. The average of guessed quartiles is 2.12, which indicates a tendency of overconfident behavior.[4] With respect to bargaining behavior, we find that responders request on average €9.39. In turn, they received an average proposal of €8.23. We find that the ultimatum game is more profitable for proposers who earn €8.49, as compared to responders who only get €7.37. This indicates that some proposals are rejected, as responder profits fall short of average proposals.

4.2 Bargaining Behavior and Optimal Offer Plan

In the bargaining game, participants first decide in the role of a responder on the amount to request from the proposer. The request is the only information available for the proposers when deciding how to split the payoffs. Figure 1 displays proposers' reactions, i.e., the average proposals for each request level of responders. This data is drawn from

[4]This is confirmed by the fact that approximately 25% of subjects ranked their performance in the first and third quartile, whereas 43% guessed that it was in the second quartile, and less than 5% believed that it was in the fourth quartile.

our simulation analysis. It represents the average proposal a responder would receive if she was matched with any individual of our sample. Interestingly, we observe that the relationship between offers and request takes an inverted U-shape which peaks at ten.[5]

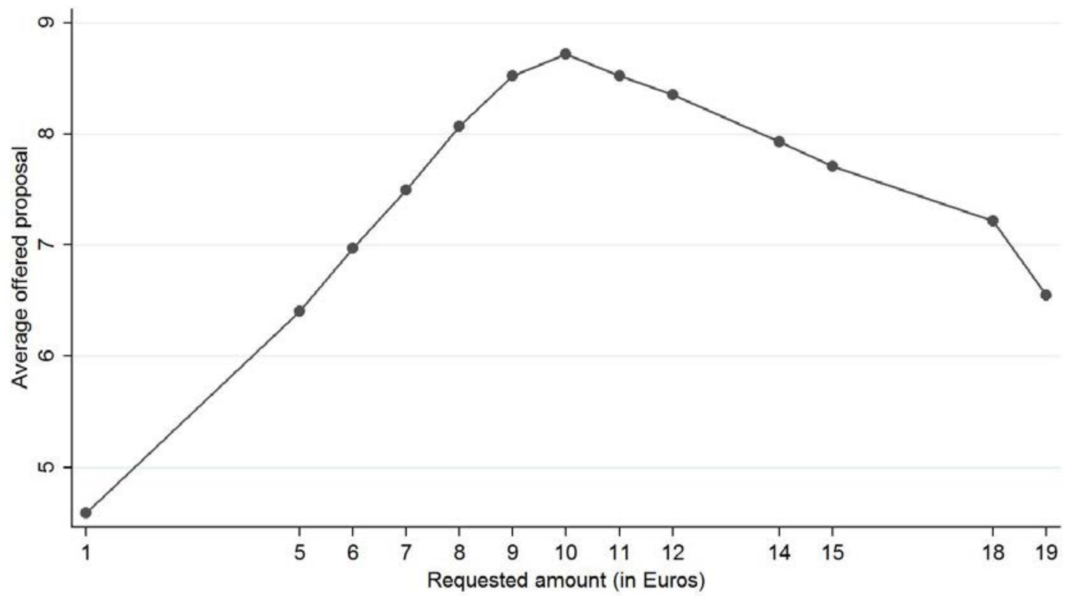

Figure 1: Proposals conditioned on the requested split

The relation confirms that proposers react to the requests sent by the responder. This behavior is only rational if the requested amount is informative for the proposer about the responder's level of acceptance. More precisely, an inverted U-shaped relation between responders' requests and their level of acceptance would justify the (average) pattern of individual offer plans.

	Acceptance level	
Request	1.172**	(0.505)
Request^2	-0.052**	(0.021)
Constant	-0.324	(2.848)
Observations	144	
R^2	0.042	

Standard errors in parentheses

**** p<0.01 ; ** p<0.05 ; * p<0.10*

Table 4: OLS estimates on level of acceptance.

[5]Note that the aggregate pattern is also supported by individual data. Here, we find that more than 50% of the individual offer plans are inverted U-shaped.

Table 4 reports OLS estimates which show evidence of an inverted U-shaped relationship between responders' request levels (*request*) and the minimum proposal they would be willing to accept (*level of acceptance*). The regression shows that it is indeed a good strategy for proposers to use responders' request levels, as a signal of their willingness to accept a proposal. Proposers apparently adapt their offer plans accurately to respective request levels.

With the simulated data we can calculate the optimal offer plan, i.e., the one which maximizes the expected payoff for each request level given all minimum acceptance levels for this request. Importantly, this optimal offer plan is also inverted U-shaped, with a peak at a request of 10. We can also measure how close proposers' offer plans get to this benchmark. There is a strong heterogeneity in the distance to the optimal offer plan, as some individuals clearly perform better than others (see section 4.4).

4.3 Competitiveness

We defined competitiveness as a measure of an individual's willingness and ability to perform in competitive environments. Given this definition and our elicitation method, we believe that it is a combination of subjects' risk preference, their ability in the task, and their belief as to how they rank relative to their opponents, that determines their willingness to enter the tournament. For all these factors we have incentivized measures in our data. However, presumably additional factors such as a joy of winning or a pure preference for competing with others, will also affect their decision. Table 5 presents the findings of an OLS regression on subjects' competitiveness. The results show that the higher the risk tolerance, the higher the performance in the tournament (Part 2 of the experiment), and the higher the guessed rank, the higher the measure of competitiveness. Thus, the measure of subjects' competitiveness is correlated with subjects' (belief on relative) performance and their evaluation of the uncertain and performance-based outcome in the tournament. This is consistent with expected utility maximization of risk-averse subjects with standard preferences, i.e., subjects only caring about their payoff.

In the following subsection, we first focus on responder behavior. In this respect, we show that competitiveness is a significant determinant of the behavior and performance of responders. We then turn to proposer behavior, i.e., we analyze how competitiveness affects the ability to propose optimal offer plans.

	Competitiveness	
Risk tolerance	0.038**	(0.015)
Performance	0.007*	(0.004)
Guess–Quartile	-0.066**	(0.029)
Constant	0.384***	(0.118)
Observations	144	
R^2	0.155	

Standard errors in parentheses
*** $p<0.01$; ** $p<0.05$; * $p<0.10$

Table 5: OLS estimates on competitiveness.

4.4 Competitiveness and Bargaining

To focus on the determinants of responder behavior we present OLS regressions on responders' request and acceptance levels. Models (1) and (3) solely include responders' competitiveness, whereas models (2) and (4) additionally incorporate measures on responders' (perception of relative) performance in the tournament, and their risk tolerance, as identified correlates of competitiveness. We thereby intend to verify whether additional determinants for subjects' willingness to enter the tournament are captured by our measure of competitiveness.[6] The estimates are reported in Table 6. Because of the prominent gender differences in competitiveness (Niederle and Vesterlund 2007) we control throughout for gender.

The estimation of model (1)–(2) shows that requests are significantly higher among more competitive subjects. Thus, the measure of competitiveness can explain responders' level of request. The results for model (2) indicate that this correlation is not driven by responders' (perception of their relative) performance or their risk tolerance. This shows that factors different from those determining the utility maximizing choice in the BDM mechanism for standard preferences seem to be decisive for responders' level of request. These additional factors may refer, for example, to subjects' aggressiveness or a joy of winning. Note that these factors are unlikely to be linked to subjects' fairness preferences as it is implausible that they should influence our measure on the willingness to enter the tournament. The insignificance of *performance* and *guess-quartile* in model (2) also suggests that a higher (relative) performance does not make responders feel more entitled to receive a higher share in the bargaining stage. This is reasonable as their effort does

[6] One can argue that including those regressors in model (2) and (4) along our competitiveness measure may raise the issue of multicollinearity. The Variance Inflation Factors for our predictors are not above 1.3 which is way below the rule of thumb that a factor of 10 or higher indicates problematic multicollinearity (Gujarati 2003).

	Request		*Acceptance level*	
	(1)	(2)	(3)	(4)
Competitiveness	2.115***	1.743**	0.268	0.423
	(0.734)	(0.801)	(1.075)	(1.172)
Risk tolerance		0.242		0.281
		(0.147)		(0.215)
Performance		0.003		-0.038
		(0.036)		(0.053)
Guess–Quartile		0.003		0.244
		(0.280)		(0.409)
Female		-0.030		0.458
		(0.439)		(0.643)
Constant	8.349***	7.608***	5.618***	4.393**
	(0.416)	(1.216)	(0.609)	(1.778)
Observations	144	144	144	144
R^2	0.055	0.075	<0.001	0.024

*Standard errors in parentheses; *** p<0.01 ; ** p<0.05 ; * p<0.10*

Table 6: OLS estimates on responder behavior.

not influence the stake size in the bargaining game.

A closer look at our data show that the 50% most competitive subjects request an average amount of €9.73, while the 50% least competitive subjects only request an average amount of €8.97. That is, responders with above median competitiveness request, on average, about 8.5% more. Finally, models (3) and (4) indicate that the minimum acceptance levels do not seem to be affected by competitiveness and any of the variables related to it included in the regression. As the level of acceptance is presumably related to subjects' fairness concerns this underlines that competitiveness does not comprise social preferences.

Result 1: – Competitiveness & Responders' Bargaining Actions –
(a) More competitive proposers request a larger amount.
(b) No relation between competitiveness and acceptance level exists.

Turning to proposers, at first it does not appear that competitiveness has a direct effect on the average level of proposals. If we concentrate on all possible requests between €1 and €19, we find that the correlation between competitiveness and average conditional offers is 0.011 (p=0.897). However, if we restrict our focus on offer plans for requests in the range from €1 to €10, we observe that competitiveness plays a role. The 50% most competitive individuals offer, on average, €6.46 while the average conditional offer of the 50% least competitive individuals is significantly higher (€7.09) (Mann-Whitney test, p=0.023). This is particularly relevant, as requests within this range represent 86.81% of our sample.

Using our simulated data, we can calculate the optimal offer plan of the proposers in the bargaining game. Deviating from this optimal strategy lowers expected profits. It is therefore interesting to explore how competitiveness interacts with the deviation from the optimal offer plan. Table 7 reports OLS estimates on the aggregate distance to the optimal offer plan. This *distance* is calculated as the sum of the absolute distances between the actual offer and the optimal offer for each possible request. Again, the first specification only incorporates *competitiveness*, whereas model (2) also contains the identified aspects of it. Findings suggest that there is a highly significant positive relationship between *competitiveness* and the aggregate distance from the offer plan. The estimated effect size is quite significant. According to model (1) proposers of average *competitiveness* show a 22.1% greater distance to the optimal offer plan than their non-competitive counterparts. More risk-tolerant individuals also choose suboptimal offer plans.

	Distance			
	(1)		(2)	
Competitiveness	16.373***	(4.697)	15.280***	(5.384)
Risk tolerance			1.879*	(0.987)
Performance			-0.266	(0.243)
Guess–Quartile			0.262	(1.878)
Female			-1.055	(2.952)
Constant	36.430***	(2.816)	34.329***	(8.170)
Observations	144		144	
R^2	0.071		0.104	

*Standard errors in parentheses; *** p<0.01 ; ** p<0.05 ; * p<0.10*

Table 7: OLS estimates on proposer behavior.

Result 2: – Competitiveness & Proposers' Bargaining Actions –
(a) More competitive proposers offer less if requests lie between €1 and €10.
(b) A positive relationship exists between competitiveness and the aggregate distance to the optimal offer plan.

Taken together, these two results indicate that the suboptimality of competitive subjects' offer plans is a consequence of offers being too low.

4.5 Competitiveness and Bargaining Outcomes

The previous section highlighted that bargaining behavior in both roles as proposer and responder, is affected by subjects' competitiveness. We now turn to bargaining outcomes, i.e., to the payoffs that result from individual choices. In this respect, Table 8 reports estimates on the average simulated payoffs in both roles. Models (1) and (3) incorporate only the individual measure of competitiveness. Again, we extend these specifications by the aspects that were found to be related to competitiveness (models (2) and (4)). Finally, model (5) also includes responders' minimum acceptance level. This is because we want to distinguish between the two potential drivers determining responders' profits, i.e., their request levels which translate into offers by the proposers and responders' minimum acceptance level which determines whether an offer will be accepted or not.

	Proposer's payoff		*Responder's payoff*		
	(1)	(2)	(3)	(4)	(5)
Competitiveness	-1.436***	-1.308**	-0.891*	-1.087**	-0.983**
	(0.514)	(0.546)	(0.480)	(0.519)	(0.434)
Risk tolerance		-0.242**		-0.105	-0.036
		(0.100)		(0.095)	(0.080)
Performance		0.057**		0.022	0.012
		(0.025)		(0.023)	(0.020)
Guess–Quartile		0.133		-0.122	-0.062
		(0.191)		(0.181)	(0.152)
Female		0.056		-0.446	-0.334
		(0.299)		(0.285)	(0.238)
Acceptance level					-0.245***
					(0.032)
Constant	9.195***	8.789***	7.812***	8.419***	9.495***
	(0.291)	(0.829)	(0.272)	(0.787)	(0.673)
Observations	144	144	144	144	144
R^2	0.052	0.121	0.024	0.064	0.350

*Standard errors in parentheses; *** p<0.01 ; ** p<0.05 ; * p<0.10*

Table 8: OLS estimates on simulated payoffs of proposers and responders.

It can be seen that *competitiveness* is significant and negative. Thus, the regression estimates reported in the first and second columns of Table 8 show that more competitive proposers earn less. This can be explained by the finding that more competitive proposers show a higher distance to the optimal offer plan (see Table 7). As a consequence, they earn less, as the payoff of proposers is only determined by the ability to match the optimal offer plan. However, we can deduce more by focusing only on situations where proposers' offers were accepted (see regressions in Table 9 in the Appendix). For successful negotiations there is no evidence that proposers' level of competitiveness influences their payoff. Hence, competitive proposers earn less because of too low proposals which are more often rejected. Note that according to model (1) proposers of average competitiveness are predicted to earn 7.7% less than proposers who are not competitive at all. We also find that lower risk tolerance and a better performance under tournament conditions are associated with higher profits for proposers, which mirrors the impact of these variables on the distance to the optimal offer plan (see Table 7).

The estimates of models (3)–(5) in Table 8 suggest that competitiveness also has a negative impact on the payoffs of responders. On the one hand, we do not observe that responders' acceptance behavior varies with competitiveness (see Table 6). On the other hand, we found that: (i) competitiveness positively correlates with requests, which induces higher proposals for lower levels, (ii) if responders request too much, proposers reduce their offers. The significantly negative coefficient suggests that the second effect dominates the first, i.e., competitive subjects obviously request too much and receive, on average, a lower offer. This is confirmed by the estimates of model (5) which controls for the minimum acceptance level. The fact that the coefficient of competitiveness remains significant with a similar effect size indicates that the negative impact of competitiveness on responders' profits must be at least partially attributed to responders' requests.

Result 3: – Competitiveness & Bargaining Outcome –
(a) More competitive proposers receive lower monetary outcomes, as they send lower proposals which are more often rejected.
(b) More competitive responders earn less, as they request levels which are too high.

4.6 The Role of Gender

In this section we focus on gender differences in preferences as reported in previous related studies. We also explore whether women and men behave differently in bargaining situations. Consistent with existing experimental findings, we observe that women are less risk tolerant than men (Mann-Whitney test, p=0.004) (Charness and Gneezy 2012) and perform less well under a tournament than men (Mann-Whitney test, p=0.002) (Niederle et al. 2013). We also find that women are moderately eager to enter competition (Mann-Whitney test, p=0.091), which is in line with the literature on gender differences in competitiveness (Niederle and Vesterlund 2007; Ifcher and Zarghamee 2014).

We turn to bargaining behavior and analyze whether the gender differences in competitiveness translate to gender differences in negotiations. If women behave less competitively than men, our previous insights would suggest that female proposers earn more than male ones. At the same time, the difference in competitiveness implies that women should earn more than men in the role of responders. The data on proposers' payoffs confirm this, i.e., female proposers earn slightly more (8.58) than men (8.40). However, the difference is not significant (Mann-Whitney test, p=0.613). A lower level of competitiveness implies for responders that they request less. This is what we also find, i.e., female responders request significantly less (9.21) than men (9.55) (Mann-Whitney test, p=0.049). Focusing on responders' payoffs, we find that females earn insignificantly less (7.17) than males (7.57) (Mann-Whitney test, p=0.650). We therefore do not find that less competitive female responders earn more than more competitive male responders. Recall that more forces than competitiveness is in play for responders' payoffs. That is, responders' payoff is also affected by social preferences, i.e., their sensitivity to accepting certain proposals. We find that female responders indeed express a higher minimum acceptance level of proposals (5.97) as compared to men (5.54). Hence, they are more likely to reject proposals.

To summarize, albeit we find that women behave slightly more competitively than men, we do not find that this leads to significant payoff differences in the role of proposers and responders. One reason may be that several opposing forces (competitiveness, fairness preferences) are at work at the same time when responders take their decisions. Another reason may be that the gender difference in competitiveness is less pronounced and is only weakly significant in our data.

5 Conclusion

We tested the relation between competitiveness and bargaining in a laboratory experiment. We analyzed competitiveness as subjects' willingness and ability to perform in competitive environments. The measure was elicited by applying a Becker-DeGroot-Marschak mechanism (Becker et al. 1964). We analyzed bargaining as subjects' strategies and their payoffs in a demand ultimatum game. Regarding responders' behavior we find a strong positive correlation between competitiveness and their requested share of the pie in the ultimatum game. As acceptance behavior is primarily driven by fairness concerns, we find no relation between competitiveness and the minimum acceptable offer. In our experiment, all proposers had to specify an offer for any request level they could receive. This allowed us to calculate the distance of every proposer from the optimal offer plan which would maximize the expected payoff. We find that higher competitiveness is associated with less optimal offer plans. As a consequence, competitiveness is detrimental for proposers' profits. This outcome results from low offers made by competitive subjects, which are in turn more often rejected. Moreover, competitiveness is related to lower payoffs for responders. We show that this is caused by low proposals sent to the responders, when they have requested too much. This evidence can be explained by the inverted U-shaped relation of request levels and proposals. Approximately, up to a fair allocation (€10), higher request levels translate into higher proposals. However, if request levels succeed the fair allocation, proposers decrease their offers. These findings establish a link between competitiveness and bargaining as suggested by social and evolutionary psychology. Thus, we identify a particular human preference as one source of the empirically observed heterogeneity of bargaining behavior and outcomes.

Our findings are robust with respect to subjects' risk preferences and their (belief of relative) performance. These factors are related to the expected utility maximization of standard economic preferences. That is, they encompass subjects' choice of the maximum piece rate they would accept instead of playing the tournament, i.e., our measure of competitiveness. Indeed, subjects' performance and their belief about how they perform relative to others, seem to play no important role for the choice of their bargaining strategies. This shows that there were no spillovers from the real-effort tournament performance to the bargaining stage. For example, a (perceived) entitlement in bargaining could have been induced by a (perceived) good relative performance in the real-effort task. However, our results identify subjects' risk preferences as a behavioral trait, which relates the willingness to compete with bargaining behavior. Most importantly, the robustness of the correlation between competitiveness and bargaining in light of these factors, reveals that our measure of competitiveness comprises additional aspects that are also relevant for the decision to enter the tournament. These aspects might refer to a pure joy of winning, and subjects' sociability or aggressiveness. Irrespective of the nature of these factors, on the one hand they induce a higher willingness to compete, and on the other hand they are detrimental to bargaining outcomes. Despite strong evidence of the interdependencies between competitiveness and bargaining and outcomes in our data, more research is needed to further isolate the primary driver of its relation.

Our insights contribute to a better understanding of the behavioral processes involved in bargaining actions. The analysis in this paper links individual preferences such as competitiveness, risk attitudes, and social preferences to subjects' behavior in negotiations. As a consequence, these findings may be valuable for personnel economics as they may help in the placement strategies of appropriate candidates to positions where bargaining skills matter. Our contribution is geared toward subjects' behavior in different bargaining roles, i.e., as responders and proposers. We therefore provide a comprehensive overview of the impact of competitiveness on bargaining actions. The paper emphasizes that it may be valuable to be aware of an employee's competitiveness before the person is delegated to participate in negotiations. Our findings demonstrate that competitive subjects' perform less successfully in negotiations, independent of their bargaining role. Thus, we highlight that one should take the idea that competitive people may achieve better bargaining outcomes with a grain of salt.

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Appendix

	Proposer's payoff (1)		*Responder's payoff* (2)	
Competitiveness	-0.385	(0.680)	0.552	(0.515)
Risk tolerance	0.001	(0.125)	0.145	(0.094)
Performance	-0.020	(0.031)	-0.024	(0.023)
Guess–Quartile	-0.432*	(0.237)	0.038	(0.180)
Female	-0.200	(0.373)	0.266	(0.282)
Constant	12.078***	(1.031)	8.505***	(0.781)
Observations	144		144	
R^2	0.027		0.039	

*Standard errors in parentheses; *** p<0.01 ; ** p<0.05 ; * p<0.10*

Table 9: OLS estimates on simulated payoffs of proposers and responders for successful negotiations.