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Mediation and Conflict Management

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Mediation and Conflict Management

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Abstract:

Mediation is a popular process to manage conflicts, but there is little systematic insight into its mechanisms. This paper discusses the results from an experiment in which a mediator can induce two conflict parties to behave cooperatively. If the mediator recommends cooperative behavior and threatens to punish deviations, she achieves the efficient solution. Similar results even obtain if the mediator is biased towards one party or has no incentive to prevent the conflict. Communication between the mediator and the conflict parties increases cooperation, even if punishment is impossible. However, when cooperation fails, communication without punishment leads to particularly low payouts for the 'losing' party.

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1 Introduction

Common pool resources often lead to conflicts if property rights are not established and enforceable. Countries that are rich in oil and other natural resources often experience civil wars and/or get poorer over time (Van der Ploeg, 2009). This 'resource curse' occurs predominantly in states that suffer from weak institutions (Mehlum et al., 2006) and/or fractionalization in society (Van der Ploeg, 2009). The city of Kirkuk in northern Iraq provides a prominent example. Different ethnic groups compete for its control. Nearby, there is substantial oil production that is not authorized by the central government in Baghdad. Conflicts over common resources also occur in many other fields, where agents can have opposing preferences, e.g. marital decision making, industrial relations, corporate mergers or international relations. Mediation is one of the most widespread techniques for preventing conflict and promoting cooperation (Kydd, 2006) . Restrictions on data availability and selection problems imply that we have little systematic knowledge about the mechanisms of mediation. Using data from an experiment, this paper provides clean evidence on the impact of mediators on conflict outcomes.

There are many ways to prevent or solve conflicts. Negotiations between the different sides, sanctions against uncooperative behavior or the intervention of law enforcement agencies are potential solutions. Mediation is frequently used in situations where communication between agents is deficient and rigorous enforcement of rules is impossible or very expensive (Carnevale and Pruitt, 1992). Mediators act to restrain conflict behavior and try to induce cooperative solutions. e.g. in schools (Smith et al., 2002). In mediation processes, the conflict parties retain control over the outcome. A mediator has less power than an arbitrator who can impose a settlement.

Miall et al. (1999) distinguish between pure mediation and mediation with muscles. In the former case, the mediator can only communicate with the conflict parties. A mediator with muscles can also provide some positive or negative inducements. The literature on conflict mediation has a long standing controversy about which type of mediator is more effective (I. Svensson, 2007). Bercovitch et al. (1991) find that mediators with muscles are more successful with respect to international conflicts. According to Svensson (2007) this observation holds for military conflicts in particular, but not necessarily for nonviolent conflicts about power sharing or territories. More importantly, he considers communication skills and coercive power as complementary tools. Montiel and Boehnke (2000) observe that people in developing societies prefer a pure mediators while people in rich countries prefer a mediator with muscles. They also find that men prefer a muscular mediator but women do no not. However, as Greig (2005) points out, almost all empirical investigations into mediation suffer from selection bias, as conflict parties do not decide randomly if they will accept a mediator. Further severe empirical problems occur when researchers attempt to compare different conflicts, since most mediation processes are complex and key variables are unobservable. Hence, a large chunk of the literature is rather descriptive and uses well documented case-studies to support their arguments.

This paper uses experimental data to analyze the role of a mediator in a conflict. The experimental approach allows for a standardized conflict scenario with controlled variations in the mediator's power and her personal interests in the conflict. We focus on the preventive aspects of mediation. In our experiment two players faced a common pool problem. They could take out resources out of the pool over three rounds. The efficient solution was to leave the pool untouched all the time, but in the Nash equilibrium a rational selfish player empties the pool as early as possible. Differences in the economic interests of the subjects are the only cause of the conflict. We assigned subjects randomly to their specific role and we never revealed the identity of the other participants with whom they were interacting. Therefore, ideological, political or personal rivalries between the players do not provide alternative explanations for conflict behavior in this setting.

We compare the results from eight experimental treatments. Six treatments vary across two dimensions, mediator involvement and communication. Regarding mediator involvement, we look to see whether a third party (the mediator) can induce a better outcome than bilateral interaction between the conflict parties. Furthermore we investigate whether it is beneficial if this third party can sanction uncooperative behavior. In three of these six treatments the parties were able to communicate before each round. In the other three treatments, no communication was possible. Without a mediator the parties could communicate directly. If a mediator was present, this third player was able to communicate with each of the two other parties (who were not able to communicate between them). According to Carnevale and Choi (2000), this *caucus* approach of indirect communication is probably the most common tactic of mediation. It occurs in just about every context of mediation, e.g. in community mediation, labour-management mediation or international mediation. Goltsman et al. (2009) show theoretically that this mediation approach can dominate direct negotiations if the level of conflict is rather high because mediators can filter and manipulate transmitted information.

In treatments with a mediator, the third party received the average payout of the other two parties. She did not prefer one party over the other but she had a clear interest in realizing the efficient outcome. Two further treatments varied the interests of the third party in the conflict. In one treatment, the third party was not affected by the outcome of the conflict. In the other treatment she preferred one party over the other. In both of these treatments, the mediator was able to communicate and punish.

The mediator in this experiment resembles, to some extent, a social planner with more or less powerful instruments: communication and punishment. It is well known that both instruments can serve as a coordination device. Early summaries of the literature by Falk et al (2001) or Ostrom et al. (1994) show that this holds in common pool games. Gardner et al. (1992) show that both institutions actually go hand in hand. Velez et al. (2006) provide similar results from field experiments in Columbia. Various studies confirm the effectiveness of communication for different types of games and different means of communication, e.g. Isaac and Walker (1988) Brosig et al. (2003), Brosig et al. (2004) or Harbring (2006). Bochet et al. (2006) show that communication in online chat rooms has a similar effect on voluntary contributions as face-to-face communication. Brandts and Cooper (2007) find that communication has a powerful function in coordination problems as they occur in firms with so-called weakest link or o-ring technologies (M. Kremer, 1993) which occur in many firms.

Our experiment is similar to the one described by Brandts and Cooper (2007) as one party coordinates the two others which make the actual decisions regarding the common pool. These two parties cannot communicate directly. We deviate from Brandts and Cooper as the social optimum differs from the selfish interests of the two players. The pursuit of selfish strategies induces a conflict between these two players. As a further difference the coordinating player cannot induce cooperative behavior by committing herself ex-ante to reward cooperative behavior. All punishment decisions are made ex-post. The third party is therefore a mediator who intervenes because direct coordination between the two other parties is restricted.

The results show that communication reduced the average withdrawals significantly. However, to some extent, communication is an ambivalent mediation instrument. Losing parties in conflicts with communication received a significantly lower amount of money than losers in conflicts without communication. Punishment without communication also reduces the withdrawals but the actual costs of punishment destroy most of the gain in economic welfare. Communication increases the effectiveness of punishment. Both are complementary institutions. Many mediators used the communication to threaten punishment in the case of deviant behavior. It turns out that an explicit punishment threat at the beginning of the experiment is a very effective way to deter uncooperative behavior, even if it is just cheap talk.

Variations in the mediator's involvement in the conflict do not have a major impact on the results. A biased mediator is as successful as an impartial one. A mediator with no stakes in the conflict is almost as successful as an involved mediator. However, punishment threats are fewer and apparently less credible.

The paper is structured as follow. We present the experimental design in the following section, provide behavioral predictions in section 3, show the results in section 4 and conclude with a discussion.

2 The experimental design

All treatments in this experiment included a common pool game with two players, A and B. Over three rounds, these players could take (virtual) balls out of a (virtual) pool. Initially there were 20 balls in the pool. Every ball in the pool had a value which increased over time. In round 1 every ball taken out of the pool brought 1 point to the player who took the ball. In round 2 this benefit increased to 2 points, in round 3 it increased to 3 points. After round 3 every ball had a value of 4 points. These remaining points were shared equally between the 2 players. One point in this experiment exchanged into 0.40 Euros. The efficient solution is to leave the pool untouched. We speak of conflict whenever a player takes a ball from the pool in one of the three rounds.

In each round each player could take out all the remaining balls. The pool was never refilled. As both player made their choice simultaneously it was possible that the sum of their choices exceeded the number of balls in the pool. In this case the following sharing rule was implemented (with X denoting the number of balls in the pool, c_A denoting the choice of player A and c_B denoting the choice of player B). Player A receives $\frac{c_A}{c_A+c_B}X$ balls and player B receives $\frac{c_B}{c_A+c_B}X$ balls. If the resulting number of balls was not an integer it was rounded down.

In six out of eight treatments, a third player C (the *mediator*) was involved in the common problem. These treatments varied the mediator's power and her stakes in the conflict. In three treatments, player C could communicate with players A and B and withdraw points from each of them at the end of a round (*punishment*). In one treatment Player C (the third party) received the average payoff of players A and B at the end of the game. Since this mediator does not prefer A over B, we call her an *impartial* mediator. In another treatment, the mediator was *biased* as she received 2/3 of player A's payoff but only 1/3 of player B's. In the third treatment, player C had *no stakes* in the conflict. She received a fixed payment of 40 points irrespective of the conflict's outcome.

In three treatments the power of the (impartial) mediator was reduced. In one treatment, the mediator could only communicate with players A and B, in the other treatment could only punish A and B. In the third treatment, player C was a powerless bystander.

We can compare these six treatments with the two additional setups, in which no mediator was present. Players A and B played the common-pool game without external interference. In this experiment, one treatment allowed for direct communication between the conflict parties. In the other treatment without mediator, player A and B could not communicate with each other.

Communication took place before each round via free form chat-boxes only. Each communication interval lasted for five minutes. In the treatments with mediator, player C sent identical messages to players A and B before round 1. Players A and B were not able to send message to C at that stage. These opening statements provide clean evidence about heterogeneity in the communication behavior among the subjects in the role of player C. Before rounds 2 and 3, player C could chat with players A and B in separate boxes. In these treatments players A and B were not able to communicate directly.

In the communication treatment without mediator, players A and B wrote messages to each other before round 1. After five minutes these messages were transmitted to the respective other player. The players had 90 seconds time to read the messages but no chance to reply to each other. Before rounds 3, players A and B could chat freely with each other.

In the treatments with punishment, Player C could reduce the points of player A and/or Player B after each round. The maximum possible reduction was the number of points the respective player had acquired up to that point. For an impartial mediator, the reduction of 1 point implied effective costs of 0.5 points. The reduction of the payoff of one player reduced the average number of points of both players and the impartial mediator received this average payoff at the end of the game. Compared with other experiments this is relatively costly. For the biased mediator, a reduction of one point of player A's (B's) payoff implied a cost of 0.667 (0.333) points. The player C with no stakes did not receive the average of players A and B. To ensure comparability between the treatments, she had to pay 0.5 points for each point withdrawn. After each round all players received full information about takeouts, the current income and the punishment of each player.

Table 1 presents the treatments in this experiment, together with the number of independent observations in each treatment. Each group of two or three subjects provides one independent observation. The number of subjects in each treatment is written in parentheses.

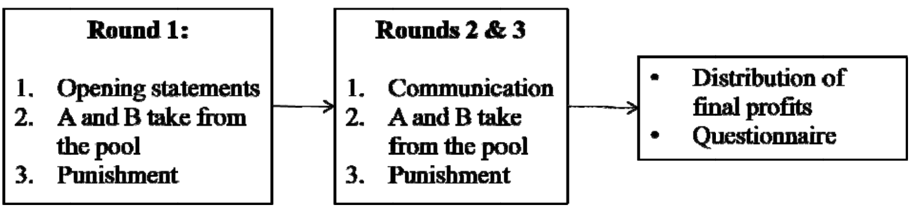
Table 1: The eight treatments with number of independent observations and subjects (in parentheses)

	Communication	No communication
No mediation	*C/noM*	*noC/no/M*
(No punishment)	13 (26)	12 (24)
Powerless Mediator	*C/noP*	*noC/noP*
(No Punishment)	14 (42)	17 (51)
Impartial Mediator	*C/P*	*noC/P*
(Punishment)	14 (42)	17 (51)
Biased Mediator	*C/P biased*	
(Punishment)	14 (42)	
Disinterested Mediator	*C/P no stakes*	
(Punishment)	15 (45)	

In *italics*: abbreviations for each treatment.

Figure 1 summarizes the structure of the experiment. The experiment had three rounds. In each round the conflict parties could take balls from the urn. In some treatments each round started with communication. At the end of each round some mediators were able to punish each conflict party. All subjects received immediate information about the decisions of the other players in their group.

Figure 1: Time sequence of the experiment



Procedural Details.

The experiment was computerized with the software "z-Tree" (U. Fischbacher, 2007). The recruitment was conducted with the software "ORSEE" (B. Greiner, 2004). Subjects were students from the University of Konstanz, Psychology students were not eligible to participate. All sessions took place at the University of Konstanz. 323 subjects participated in the experiment, 51 each in the treatments *noC/P* and *noC/noP*, 42 each in the treatments *C/P* and *C/noP* and 24 in the baseline treatment. No subject took part in more than one session.

Subjects were randomly assigned a role as player A, B, or C upon arrival at the lab. They received written instructions including comprehension questions that had to be answered correctly. A summary of the instructions was read aloud to ensure common knowledge of the game. All treatments were framed in a neutral manner.

Sessions without communication lasted for about 60 minutes; sessions with communication for about 80 minutes. Each experimental point was converted into 0.4 € (about $0.5 at that time) at the end of the experiment. Additionally, each subject received a show up fee of 4 €.

3 Behavioral Predictions

We identify conflict by observing if either player A or player B or both take balls from the pool. Two criteria help to evaluate a conflict and a mediator's success in conflict prevention: the combined payoffs of A and B (efficiency, denoted by $\sum \pi$) and the difference in their payoffs (inequality, denoted by $\Delta\pi$). Successful conflict prevention therefore maximizes the cumulative payoffs of the conflict parties and minimizes the differences between them. Conventional economic theory predicts a complete failure of conflict prevention in all treatments. In the sub-game perfect Nash equilibrium selfish rational players will choose to take all balls in round 1 in any treatment. Player C will never punish. Communication has no impact on the outcome. Results from previous studies suggest that such a worst case scenario will not occur. We derive predictions regarding the efficiency and the inequality in conflict outcomes. Furthermore we predict how the interests of the mediator shape the results of a conflict.

Predictions regarding efficiency

It is well known communication and punishment induces participants to cooperate. (e.g. Falk et al (2001), Ostrom et al. (1994)). Therefore players A and B should withdraw less balls and do so later in the game.

Prediction 1: Communication increases the combined payoff of A and B.
Prediction 2: If a mediator can punish uncooperative behavior, the combined payoff of A and B increases.

Since Gardner et al. (1992), Svensson (2007) and Velez et al. (2006) show that punishment and communication go hand in hand, we can make a third prediction.

Prediction 3: A combination of communication and punishment provides the highest combined payoff for A and B.

Prediction 1 suggests the following relationship between payoffs π in the treatments without a mediator:

$$\sum \pi\,(noC/noM) < \sum \pi\,(C/noM).$$

Predictions 1 to 3 also provide a ranking regarding π in the treatments with an impartial mediator:

$$\sum \pi\,(noC/noP) < \left(\sum \pi\,(C/noP) \lesseqgtr \sum \pi\,(noC/P)\right) < \sum \pi\,(C/P).$$

In the comparable treatment with indirect communication via the mediator (*C/noP*), the conflicting parties cannot send signals about their future behavior before round 1. Furthermore a direct communication between the conflict parties is impossible. In the treatment without the mediator *C/noM* the parties can send direct signal.

Prediction 4: Direct communication between the conflict parties provides a higher combined payoff than indirect communication via the mediator.

In treatment *noC/noP* the mediator cannot communicate or punish. Sheis a passive by-stander. In this case we do not expect that she has an impact on the behavior of the participants.

Prediction 5: A passive mediator has no impact on the combined payoff of the conflict parties.

Predictions 1, 4 and 5 imply the following relationship between payoffs π in the treatments with and without a mediator:

$$\sum \pi\,(noC/noP) = \sum \pi\,(C/noM) < \sum \pi\,(C/noP) < \sum \pi\,(C/noM).$$

Predictions regarding inequality

Predictions 1 to 5 focus on the efficiency of allocations. Now the focus is on the inequality in outcomes, denoted by $\Delta\pi$. Brandts and Cooper (2007) observe that some subjects induce a cooperative behavior by promising a high payment but they do not honor their promise. This can happen also in our experiment as communication allows each conflict party to reassure the other side about its own willingness to cooperate. Therefore many subjects will not take from the pool and some other subjects will exploit this behavior by taking from the pool anyway, particularly in round 3. If the mediator can punish, fewer subjects will exploit.

Prediction 6: In the treatments with communication but without punishment (*C/noP* and *C/noM*) the inequality in outcome is higher than in treatments without communication and treatments with punishment.

Prediction 6 implies the following relationships

- for treatments with a mediator

$$\Delta\pi(noC/noP) < \Delta\pi(C/noP) > \Delta\pi(C/P);$$

- for treatments without a mediator

$$\Delta\pi(noC/noM) < \Delta\pi(C/noM).$$

Predictions regarding a change in the interests of the mediator

Finally we look at the behavior in the treatments in which the mediator is either biased or has no stakes in the conflict. If the mediator is biased any punishment threat in direction of player A is less credible. Punishment threats by a mediator without any stake are even less credible. A lower credibility should have an impact on both efficiency and inequality. A lower credibility implies that possibility of punishment has a lower impact on the behavior.

Prediction 7: A biased mediator will achieve a lower overall payoff than an impartial one but a higher one than a mediator without stakes in the conflict.

Prediction 7 implies the following relationship between combined payoffs across the treatments:

$$\sum \pi\,(noC/noP) \leq \sum \pi\,(C/P\ \ biased) < \sum \pi \left(\frac{C}{P}\ no\ stakes\right) < \sum \pi\,(C/P).$$

Prediction 8: A biased mediator leads to a higher inequality in payoffs than an impartial one but to a lower one than a mediator without stakes in the conflict.

Prediction 8 implies the following relationship between differences in payoffs across the treatments:

$$\Delta\pi(C/noP) \geq \Delta\pi(C/P\ no\ stakes) > \Delta\pi(C/P\ biased) > \Delta\pi(C/P)$$

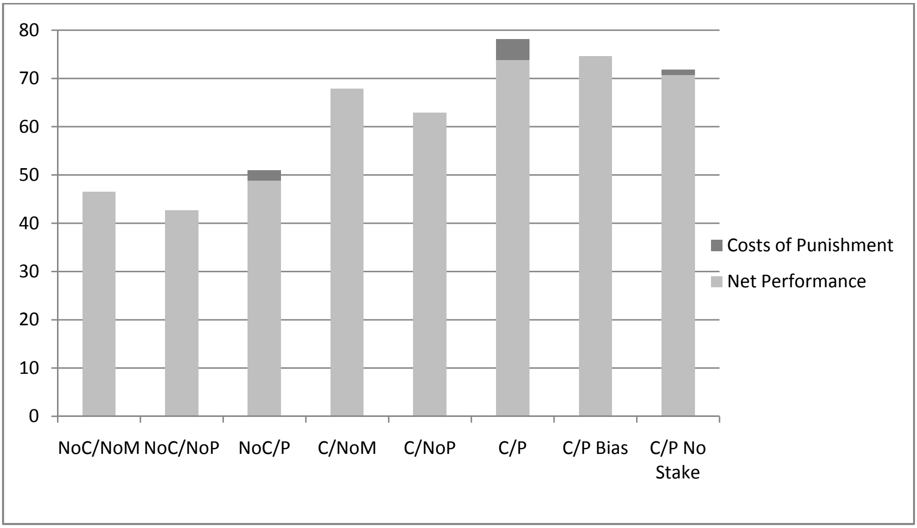
4 Results

We present results for each of the 8 predictions. The first focus is on efficiency, after that the analysis concentrates on the inequality in outcomes. Finally, we provide detailed information on the impact of communication on the results. All reported p-values refer to the Wilcoxon rank-sum test if not stated otherwise.

Efficiency

Figure 2 shows the overall performance (payoff) of A and B across the different treatment groups after punishment (net performance). These numbers reflect the success of conflict prevention. The figure shows that the welfare of the participants increases in the power of the mediator.

Figure 2: Overall performance of A and B after punishment across the "power" treatments (in points)



We can confirm prediction 1, as the treatments without communication provide the lowest welfare. According to the Wilcoxon rank sum test, the difference between treatments *noC/P* and *C/noP* is highly significant (p = .0019). However, the performance differences between all groups without communication (*noC/P, noC/noM* and *noC/noP*) are not significant which confirms prediction 5 but contradicts prediction 2.

The high cost of punishment cause the rejection of prediction 2. With punishment players A and B were more cooperative (p = .0453 for the comparison of pre punishment earnings between *noC/P* and *noC/noP*) but the impact of punishment reduced welfare. Punishment is only welfare increasing if it is linked with communication. The performance difference between *noC/P* and *C/P* is highly significant (p = .0000). A powerful mediator also dominates direct communication between the conflict parties (Treatment *C/P* compared with *C/noM*, p = .0149). The results suggest that communication and punishment are complementary institutions.

Interestingly, prediction 4 cannot be confirmed. Indirect communication via the mediator is not a significantly worse mechanism than direct communication between the conflict parties.

Variations in the mediator's involvement have little impact on the conflict's overall outcome (Prediction 7). The net performance in all three treatments with communication and punishment does not differ significantly. Again, punishment costs seem to play a role. In treatment *C/P* players A and B would have had a higher welfare than in the *No Stakes* treatment (p = .0512), but the larger punishment costs reduce this benefit.

Inequality of Outcomes

So far, the analysis has focused on the efficiency of the final allocation. Now it focuses on distributional aspects, in particular the outcome for a "loser" in a conflict. The experiment reveals that communication has a detrimental effect for some conflict parties (which confirms prediction 6).

Table 2 shows that conflict occurs more frequently in treatments without communication. However, increased cooperation in treatments without punishment (*C/noM* and *C/noP*) induces some subjects to exploit the other conflict party in round 3. Therefore, conflicts become asymmetric- Once a conflict occurs, the payoff differences between the two conflict parties are larger in these treatments than in the treatments without communication and punishment (*noC/noM* and *noC/noP;* all p-values are lower than .1). Likewise, the losing party in a conflict, i.e. the party with a lower payoff, is worse off in a conflict with communication but without punishment (again the p-values are at least lower than .1). Furthermore cooperating players are more likely to get nothing out of the pool if they are in the treatments without punishment (*C/noM* and *C/noP*). The Gini coefficients also show that communication without punishment leads to uneven payments if a conflict occurs. If punishment is possible, communication does not have this detrimental effect.

Compared with treatment *noC/noP*, the results also show that a mediator with no stakes in the conflict induces a larger inequality in payoffs once a conflict occurs (p = .065, prediction 8). However, the loser in a conflict is not significantly worse off. A comparison with the treatments *C/P* and *C/P Bias* also indicates that a mediator with no stakes induces some subjects to exploit the others (Prediction 8). Since the impartial and biased mediators are so successful in preventing conflicts, a meaningful statistical comparison of conflict outcomes is impossible. Interestingly, the *Bias* treatment does not lead to disadvantages for player B. On average, Player B is not worse off than player A and the mediators' statements do not suggest any major difference.

Table 2: Conflict frequency and asymmetry across the treatments

		Communication	No Communication
No Mediator (No Punishment)	Treatment	*C/noM*	*noC/noM*
	Share of conflicts among observations	57.14 %	91.67%
	Conflict asymmetry†	35.00	12.55
	Payoff for the 'Loser'‡	7.50	15.45
	Incidents of complete exploitation*	5	0
	Gini coefficient in case of conflict	.462	.217
Mediator (No Punishment)	Treatment	*C/noP*	*noC/noP*
	Share of conflicts among observations	61.54%	100%
	Conflict asymmetry†	44.25	14.41
	Payoff for the 'Loser'‡	8.00	14.12
	Incidents of complete exploitation*	6	1
	Gini coefficient in case of conflict	.494	.266
Mediator (Punishment)	Treatment	*C/P*	*noC/P*
	Share of conflicts among observations	14.29%	100%
	Conflict asymmetry†	30.00	25.35
	Payoff for the 'Loser'‡	18.50	12.82
	Incidents of complete exploitation*	1	3
	Gini coefficient in case of conflict	.336	.375
Mediator (Biased)	Treatment	*C/P bias*	
	Share of conflicts among observations	35,.71%	
	Conflict asymmetry†	23.60	
	Payoff for the 'Loser'‡	20.60	
	Incidents of complete exploitation*	1	
	Gini coefficient in case of conflict	.291	
Mediator (No Stakes)	Treatment	*C/P no stakes*	
	Share of conflicts among observations	46.67%	
	Conflict asymmetry†	41.43	
	Payoff for the 'Loser'‡	10.57	
	Incidents of complete exploitation*	4	
	Gini coefficient in case of conflict	.432	

† Average payoff differences between the conflict parties in case of a conflict before punishment is deducted
‡ Average minimum payoff for a participant in case of conflict.
* Number of subjects who get nothing out of the pool

Communication patterns

The previous analysis has shown that both direct communication between the conflict parties as well as indirect induces some people to leave the pool untouched. This power of persuasion is particularly transparent in the single group in which the mediator recommended a behavior which was not welfare maximizing. This incident occurred in treatment *C/P bias*. Player B had taken 1 ball in round 1, such that 19 balls remained in the pool. Before round 2, the mediator recommended that each player leaves the pool untouched in round 2 and that each player takes 9 balls in round 3, with 1 ball remaining in the pool. The other players reminded the mediator that the recommended strategy is not welfare maximizing but they did not insist on their opinion. In consequence, the mediator successfully convinced each player to behave in the proposed way by reassuring them that the respective other player will also follow the recommendation. Ex post it becomes obvious that the indirect communication harmed players A and B because both players agreed to follow a recommended strategy.

Other subjects exploited the cooperation induced by the mediator and took all balls out of the pool in round 3. In most cases, these participants made misleading promises about cooperative behavior. In treatments with a punishment possibility, a threat of punishment by the mediator deterred these exploiters. In all treatments with communication and punishment, the subjects did not empty the pool when the mediator threatened punishment in the opening statement. Such threats occurred in 11 out of 14 cases in treatment *C/P,* in 7 out of 14 cases in treatment *C/P Bias,* but only in 4 out of 15 cases in treatment *C/P No Stakes*.

Finally, it is also interesting that the mediator can substitute direct communication between the two conflict parties. In the treatment with direct communication, almost all subjects promised to leave the pool untouched. Most mediators used their opening statement to recommend the same cooperative behavior. Recall that this opening message was a uniform message from player C to players A and B without feedback. Nevertheless, the mediators achieve almost the same result on the conflict outcome, even in round 1, when the conflict parties had no chance to indicate their prospective behavior to the other side. Table 3 shows that few subjects pick from the pool in all treatments with indirect and direct communication.

Table 3: Share of subjects who take ball from the pool in round 1

	Communication	No Communication
No Mediator (No Punishment)	*C/NoM* 0%	*NoC/NoM* 54.17%
Mediator (No Punishment)	*C/noP* 6.67%	*noC/noP* 37.25%
Mediator (Punishment)	*C/P* 2.38%	*noC/P* 29.41%
Mediator (Biased)	*C/P Bias* 9.52%	
Mediator (No Stakes)	*C/P No Stakes* 0%	

5 Summary and Conclusion

This paper investigated the intervention of third parties in common pool games with two players. The treatments groups varied the powers and interests of the third party. The results show that third party intervention is effective. In particular, the combination of communication and punishment induces the efficient solution in most cases . This result holds even if the mediator is biased towards one party or her payoff does not depend on the conflict's outcome. Punishment alone is not welfare improving though this reflects the relatively high costs of punishment for the third party in this experiment. Communication contains some ambiguity. Once players deviate they empty the entire pool leaving cooperative players worse off than in treatments without communication. Such behavior occurs most frequently in situations when the mediator cannot or does not threaten punishment.

The American President Theodore Roosevelt once summarized his foreign policy strategy in the phrase "*Speak Softly and Carry a Big Stick*". The results of this paper suggest that this is a good recommendation for conflict mediators too, since punishment alone and communication alone are not as effective as the combination of both. After all, Roosevelt was a successful mediator himself. In 1906, he won the Nobel Peace Prize for negotiating the peace in the Russo-Japanese War.

This appraisal of *realpolitik* should not deny that punishment will remain a controversial factor in a mediation process. In this experiment, punishment was a well targeted economic sanction against an uncooperative agent. In many conflicts mediators may use tools that are more blunt. In this case, punishment may harm innocent bystanders rather than the deviant person. The use of military force is an obvious example. Even economic sanctions may harm ordinary citizens but not their ruthless dictator. In divorce cases children may suffer because the mediator acts against one parent. Potential 'collateral damages' are likely to affect both the effectiveness and the ethics of punishment.

It may surprise some readers that the mediator is fairly successful in many treatments. The comparison between mediated and direct negotiation and the effectiveness of mediators with no stake or a bias in the conflict seem encouraging for intervening third parties. Apart from punishment, the mediator in this experiment provided costless, but valuable services. Not only did she inform each party about the messages of the other one. The coordination effects of the opening statements show that the mediator became a moral authority of a sort. These services can compensate some drawbacks of indirect communication, bias or low incentives.

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Appendix: Instructions (Translated from German into English)

Notes for readers: These instructions are for participants of type C (i.e. the mediators) in the C/P treatment, i.e. with communication and punishment. The mediator is impartial. We highlight the differences in the following way:

- *Instructions which are specific for the communication treatments (C/P and C/noP) are written in italics.*
- <u>Instructions which are specific for the punishment treatments (C/P and noC/P) are underlined.</u>
- **Bold letters are derived from the instructions in German and emphasize important information for the participants.**

General Instruktions for Participants

Welcome to our economic experiment

Please read the following instructions carefully. You receive **4 Euros for your participation** in this experiment. Depending on the decisions of you and the other participants in this experiment, you may receive additional payments. Therefore we recommend to study these instructions in detail. If you have any question, please contact us **before** the experiment starts.

You must not talk with other participants during the experiment. Otherwise you are excluded from the experiment and receive no payments at all.

During the experiment we talk about points instead of Euros. At first, all your revenues are calculated in points. We exchange the final score into Euros at the end of the experiment. The exchange rate is

1 Point = 40 Eurocents.

At the end of this experiment, you receive payments for all your received points **and** the 4 Euros for participation in **cash**.

Now we explain the procedure of the experiment on the following pages in detail.

The Experiment

Setup:

There are three types of participants in this experiment: A, B, and C. The participants will be matched in groups of three, such that each group contains one participant of each type. All participants remain anonymous. Group matching occurs randomly at the beginning of the experiment. We will never reveal the identities of any member of any group.

The experiment is set up as follows. At first, a lottery assigns you to a group of three members who remain anonymous. In this group, you are participant C. The experiment includes three stages. You are always a participant C and you remain in this group during the entire experiment.

Now we explain the different stages of the experiment. Please read carefully as these instructions inform you about your decision possibilities and their impact on your payout. If you have any question, please ask **before** the experiment starts!

The stages of the Experiment:

Communikation

The experiment has three stages or rounds. In each stage, participants A and B make a decision. *(For communication treatments only:) Ahead of each decision communication via an online chat is possible. Please do not reveal your identity during communication. Your identifier in communication is "Participant C". We put some restrictions on communication as you can see below:*

Communication before round 1:

You can send messages to participants A and B which may contain your considerations about the game. These messages are identical for both participants for A and B. Both cannot answer you. If you want to send a message, please type in your text and press the 'Enter'-key.

Communication before round 2:

You can chat with participants A and B in separate chat boxes. By now, A and B can send you messages too. Both boxes are independent of each other. Participants A and B cannot communicate directly with each other. If you want to send a message, please type in your text and press the 'Enter'-key. Communication before round 3 is structured in the same way.

Your decisions

In this experiment, participants A and B can withdraw balls from an pool. Balls and pools are, of course, virtual. The pool contains 20 balls at the beginning of the experiment. In each of the three rounds, participants A and B can decide how many balls they want to take out of the pool. The pool **will not** be refilled after a round. Each withdrawn ball remains outside with the participant who took it.

In each round, each participant can take as many balls as the pool contains in this round. Both participants decide simultaneously without any information about the decision of the respective other person.

Of course, the sum of the withdrawn balls cannot exceed the number of balls in the pool. If the sum of the intended withdrawals exceeds the number of balls in the pool, the following division rule applies. The share for participant A is her intended withdrawal divided by the sum of both intended withdrawals. Likewise the share for participant B is her intended withdrawal divided by the sum of both intended withdrawals.

Only entire balls can be withdrawn. If the allotted share is not an integer, it is always **round down**. Therefore, excessive intended withdrawal can imply that the sum of actual withdrawals is smaller than the number of balls previously in the pool. In this case one ball is lost.

The following example may clarify the withdrawing procedure:

Suppose the experiment is in round three. In the previous rounds 16 balls hwere withdrawn altogether. 4 balls remain in the pool. Participant A wants to withdraw 3 balls, participant B 2 balls. Altogether they want to withdraw 5 balls which exceeds the number of balls in the pool. The balls are divided as follows:

Participant A wanted to take 3 balls which is equivalent to 60% of the sum of intended withdrawals (3+2 = 5). Therefore she gets 60% of the remaining 4 balls, i.e. 2.4 balls. Since 2.4. is not an integer, she will get only 2 balls.

Participant B wanted to take 2 balls which is equivalent to 40% of the sum of intended withdrawals. Therefore he gets 40% of the remaining 4 balls, i.e. 1.6 balls. Since 1.6 is not an integer, he will get only 1 balls. Overall, one ball is lost.

The value of the balls

Every withdrawn ball transfers points to the withdrawing person. The value per ball changes every round. Every ball withdrawn in round 1 transfers 1 point. Every ball withdrawn in round 2 transfers 2 points and every ball withdrawn in round 3 transfers 3 points. After round 3, all remaining balls in the pool have a value of 4 points. These points are equally divided between players A and B.

Table: Value of balls in each round of the experiment

Round	**Value per withdrawn ball**
Round 1	1 point
Round 2	2 points
Round 3	3 points
After Round 3	4 points (These points are divided equally between A and B)

Participant C

You are a participant C. You cannot withdraw balls from the pool. (For punishment treatments only:) After each round you can take points away from participants A and B. These points will be lost, you cannot transfer them to your own account. You cannot take more points than the respective participant owns at the moment, You do not have to take points away.

At the end of the experiment you will receive the average payout of participants A and B. If, for example, participant A has 17 points at the end of the experiment and participant B has 22 points, you will receive 19.5 points.

Examples:

Here you have two examples which show you how the experiment proceeds. *(For communication treatments only:) Communication is not considered in these examples.* The numbers in the example are chosen arbitrarily.

Example 1

Round 1: There are 20 balls in the pool. Participant A wants to take 1 ball. Participant B wants to take 2 balls. 17 balls remain in the pool. Participant A has 1 point, participant B 2 points.

(For punishment treatments only:) Participant C takes 1 point away from participant A, such that participant A has 0 points. Participant B can keep his 2 points.

Round 2: Now, there are 17 balls in the pool. Participant A wants to take 4 balls. Participant B also wants to take 4 balls. 9 balls remain in the pool. Participant A receives 8 point, participant B also receives 8 points and has now 10 points. (The scores are adjusted accordingly in the non-punishment treatments)

(For punishment treatments only:) Participant C takes no points away.

Round 3: Now, there are 9 balls in the pool. Participant A wants to take 3 balls. Participant B wants to take 2 balls. 4 balls remain in the pool. Participant A receives 9 points (3*3) and has now 17 points (8+9), participant B receives 6 points (2*3) and has now 16 points (10+6). 4 balls remain in the pool. Their value (4*4 points) is divided equally between A and B, each of them receiving 8 points. Altogether, participant A has 25 points (8 + 9 + 8). Participant B has 24 points (2 + 8 + 6 + 8; The scores are adjusted accordingly in the non-punishment treatments)

(For punishment treatments only:) Participant C takes 1 point away from participant A, such that participant A has 24 points. Participant C takes 4 points away from participant B, such that participant B has 20 points.

The average payout is 22 points. Participant C will receive 22 points.

Example 2

Round 1: There are 20 balls in the pool. Participant A wants to take 7 balls. Participant B wants to take 6 balls. 7 balls remain in the pool. Participant A has 7 points, participant B 6 points.
(For punishment treatments only:) Participant C takes no points away.

Round 2: Now, there are 7 balls in the pool. Participant A wants to take 5 balls. Participant B wants to take 7 balls. The participants want to take out more balls than the pool contains. The remaining balls have to be shared.
Overall, the participants wanted to take out 12 balls. Participant A wanted 5 balls which implies a share 41.67 balls (5/12). Participant B wanted 7 balls which implies a share 58.33 balls (7/12). With 7 balls remaining in the pool, A receives 2 balls (0.4167 * 7 = 2.917, this result will be round down to 2). B receives 4 balls (0.5833 * 7 = 4.083, this result will be round down to 2). 1 ball is lost. Hence, A gets 4 points (2*2) and 11 points in total. B gets 8 points and has 14 points in total.
(For punishment treatments only:) Again, participant C takes no points away.

Round 3:
Now, there are 0 balls in the pool. No player can withdraw any ball. Participant A has 11 points, participant B 14 points.
(For punishment treatments only:) Participant C takes 4 point away from participant A, such that participant A has 7 points. Participant C takes no points away from participant B, such that participant A has 14 points.
The average payout is 10.5 points. Participant C will receive 10.5 points. (The scores are adjusted accordingly in the non-punishment treatments)

You have further questions?

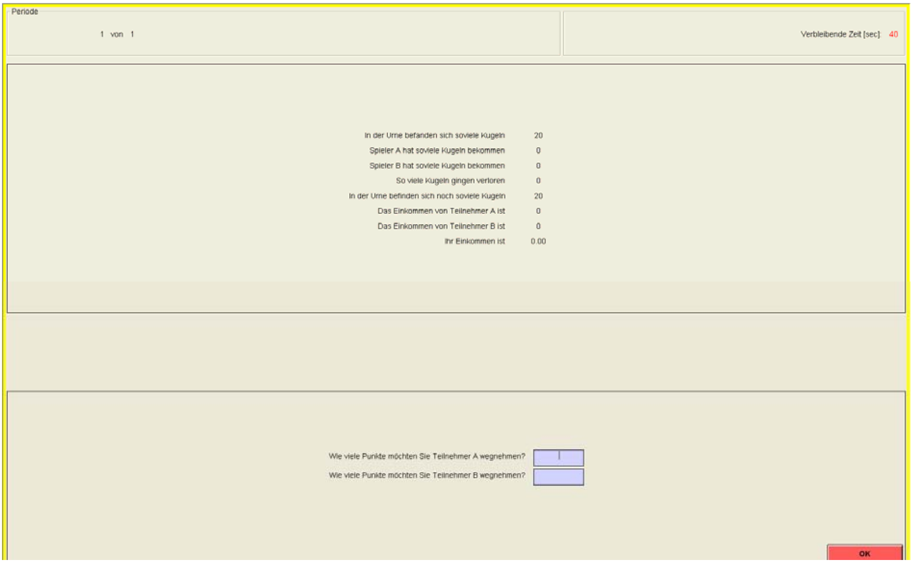
Procedure at the Computer

The experiment starts in round 1. *(only in communication treatments:) You can send messages* *to participants A and B for 5 minutes. These participants cannot respond. If you want to send a message, type the text and press the 'Enter'-key.*

The following picture shows the chat box. Write your messages in the field sown on the left side.

Afterwards, participants A and B decide how many balls they want to withdraw. The experiment continues once all participants have made their decisions.

You will be informed about the decisions of participants A and B. <u>(only in punishment treatments:) You can decide if, and how many points you want to take from participant A and from participant B. You do not have to write a number. Please press the OK button after you have made your decision (see following picture).</u>



Afterwards you proceed to round 2. Participants A and B will receive information about the scores. *(only in communication treatments:) You can chat with participants A and B for 5 minutes. Two separate chat boxes are available. A and B cannot communicate directly with each other (see picture below)*

*If you want to send a message to participant **A**, use the **left** box, write your message and press the 'Enter'-key.*

*If you want to send a message to participant **B**, use the **right** box, write your message and press the 'Enter'-key.*

Now the participants A and B decide how many balls they want to withdraw. The experiment continues once all participants have made their decisions.

You will be informed about the decisions of participants A and B. <u>(only in punishment treatments:) You can decide if, and how many points you want to take from participant A and from participant B. You do not have to write a number. Please press the OK button after you have made your decision (see following picture).</u>

Afterwards you proceed to round 3. Participants A and B will receive information about the scores. *(only in communication treatments:) You can chat with participants A and B for 5 minutes. Two separate chat boxes are available. A and B cannot communicate directly with each other (see picture below)*

*If you want to send a message to participant **A**, use the **left** box, write your message and press the 'Enter'-key.*

*If you want to send a message to participant **B**, use the **right** box, write your message and press the 'Enter'-key.*

Now the participants A and B decide how many balls they want to withdraw. The experiment continues once all participants have made their decisions.

You will be informed about the decisions of participants A and B. (only in punishment treatments:) You can decide if, and how many points you want to take from participant A and from participant B. You do not have to write a number. Please press the OK button after you have made your decision (see following picture).

Finally all participants receive about the final withdrawals and the overall payouts.

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