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Lying, Spying, Sabotaging: Procedures and Consequences

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Abstract

We study individuals who can choose how to compete with an opponent for one nonzero payoff. They can either nudge themselves into a set of rules where they have the same information and actions as their opponent, or into unfair rules where they spy, sabotage or fabricate their opponent's move. In an experiment, we observe significant altruism under rules which allow for fabrication and sabotage, but not under rules which allow for spying. We provide direct evidence that this altruism emanates from an ethical concern about the rules of the game. How individuals deal with this concern – whether they nudge themselves into fabrication-free, spying-free, or sabotage-free rules, or whether they assume the power to fabricate or sabotage to compensate their opponent by giving all payoff away – varies along with individuals' attitudes towards paternalism.

JEL: D02,D03, D63,D64

Keywords: Moral Judgement, Psychological games, Institutional design, lying aversion, sabotage aversion, spying aversion, unfair competition

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1 Introduction

In 2013, E. Snowden's leaks of classified information about global surveillance activities by the U.S. secret service led to an international diplomatic crisis. The leaks documented that – in pursuit of preventing terrorist attacks – the U.S. secret service had systematically and pre-emptively intercepted and stored private communication and information on U.S. citizens, foreign governments, heads of friendly nations, and sabotaged internet encryption as a means to this end.[1] In his interviews with the Guardian, Snowden stated that *'he was willing to sacrifice all [...] because he could not in good conscience allow the destruction of privacy and basic liberties [...]'* (Greenwald, MacAskill, and Poitras 2013). Similarly, D. Ellsberg risked a 115 years sentence under the Espionage Act of 1917 cost by leaking the Pentagon Papers to reinstate the U.S. public's and congress's right of information about the government's evaluation of the vietnam war (Cooper and Roberts 2011; Sheehan 1971).

Lying, spying, and sabotaging are of fundamental relevance to economics. The pursuit of self-interest in which market agents strive for innovation and low prices to maximize revenue and gain ultimately benefits the welfare of a society (Smith 1904). Yet, competitive pressure may also induce agents to manipulate a competitor's cost, to fabricate information regarding her solvency to investors, or to spying her business secrets to outperform her opponent. If opportunities to do so arise fairly evenly in the market and all market participants unanimously exploit them, competition still serves societal welfare. Yet, if some agents systematically resort to such activities while others deem they are ethically wrong, the self-regulating behaviour of the market place – Smith's invisible hand – is at stake.

Lying, spying, and sabotaging share the common aspect that they erode the nature and welfare implications of competition. If firms who compete spy on and sabotage each other or their customers, fabricate and plant rumours on tax non-compliance or financial difficulties of their competitors, competition ultimately selects the most ruthless, but no longer the most cost-efficient or innovative market agent. A tournament incentive scheme implemented to detect and qualify high ability employees for a promotion, may no longer fulfil that purpose if employees spy, lie, or sabotage. Therefore, central economic concepts seem to rely on the idea that self-interested agents compete equally (un)fairly.

At the same time, fabrication-, spying-, and sabotaging-like activities are part of many people's work lives. Online shops collect, analyse, and complete information on clients' buying behaviour to develop comprehensive customer profiles, personnel managers screen social media to obtain information about the social life, and the character of job candidates (Brown and Vaughn 2011), credit reference agencies collect and analyse information on financial inci-

[1] Comments by NSA officials do not deny these activities and state they are 'hardly surprising' (Larson, Perlroth, and Shane 2013). Similarly, insiders broke practices of 'parallel construction' in the U.S. Drug Enforcement Administration to Reuter's journalists Shiffman and Cooke (2013): the 'fabrication' of investigative trails to cover up that trails are actually based on inadmissable evidence from NSA warrantless surveillance.

dents in people's lives[2], employees who develop or maintain software for cyber-security seek to exploit weaknesses in firms' or nations' security systems. Little is known about how individuals react to the nature of such work. The introductory examples imply that, even after self-selecting to a workplace, people's reactions differ.

Our paper studies this heterogeneity. Which psychological cost – if any – do fabrication, spying, and sabotaging induce, and what is the nature and source of this cost? Which behavioural strategies do individuals employ to deal with it? Since field data are scarce given the secretive nature of the activities at hand, we construct a laboratory experiment. In a *fabrication game*, individuals fabricate and submit – unbeknownst to their opponent – information about the opponent's decision to a third party who validates both parties' decisions. In a *spying game*, individuals *look up* their opponent's decision – unbeknownst to their opponent. In a *sabotaging game*, individuals override – unbeknownst to their opponent – the opponent's choice. Throughout, spying, fabrication, and sabotage enable the individual to implement either a selfish, or an altruistic payoff allocation. Individuals can also opt out of these activities and nudge themselves (Thaler and Sunstein 2008) into a fabrication-free, spy-free, or sabotage-free interaction with their opponent.

The *purposes* of fabrication, spying, or sabotage may be altruistic ones. The desire to prevent terrorist attacks aims at saving lives; paying attention to the person-organization fit when hiring new employees may foster job satisfaction, a harmonious work atmosphere, and reduce moral hazard; matching clients with the products they wish to buy saves them time and cost. If, however, employees feel that the activities which they carry out to achieve these ends infringe others' rights and are wrong *per se*, employees may not succeed in justifying their work through its purpose and suffer a psychological cost.

To see whether such concerns are at play in our *fabrication*, *spying*, and *sabotaging* games, we elicit how individuals make moral judgements, that is, how they typically arrive at the conclusion that an action is either right or wrong. Relying upon Piaget's (1948) and Lawrence Kohlberg's (1969; 1984) field research and G. Lind's (1978; 2008; 2002) methodological work, we elicit which moral ideals individuals employ when judging the right or wrong of an action, and use these to model the behaviour we observe.

We find three types of behaviour. A first type complies with rational self interest: she *fabricates*, *spies*, and *sabotages* to take all payoff. A second – 'procedural' – type avoids either activity and nudges herself into a fair set of rules. A third – 'compensatory' – type opts into these activities to give all payoff away. The shares of these types differs substantially depending on whether unfair competition involves fabrication, sabotage, or spying. The 'procedural' type is most prevalent in the fabrication game. The 'compensatory' type occurs most often in the sabotaging game, and *never* in the spying game. Looking into the ethical ideals which these types invoke when judging whether an action is right or wrong, we observe that

[2]The German Schufa credit reference agency for example, holds and sells information about purchases, credit demand and credit worthiness of 75% of the German population.

individuals are the more likely to be of the procedural and also of the compensatory type, the more they refer to individual rights and the democratic social contract when making a moral judgement. Therefore, both departures from rational self-interest emanate from the same ethical ideal, and the foregone payoff is linked to the infringement of the opponent's unprotected decision and information rights.[3]

Why would some individuals who are concerned about an opponent's rights opt out of fabrication, spying, or sabotage while others expressly use these activities to give all payoff away? The 'procedural' type reinstitutes her opponent's information and decision rights while the 'compensatory' type trades these rights off against a monetary compensation. We speculate that the 'procedural' type may have scruples against exerting power – be it to whatever ends – as opposed to the 'compensatory' type who assumes power and gives all payoff away. To test this idea, we classify individuals on a sociological taxonomy of *materialists* who value hierarchy, duty, and power, and *postmaterialists* who value individuality, the emancipation from authorities, and autonomy (Baker and R. Inglehart 2000; Helmut Klages and Gensicke 2006; Ronald Inglehart 1977). Indeed, 'procedural' types score significantly higher on postmaterialist values than 'compensatory' types and 'compensatory' types score significantly higher on materialist values. These values seem to govern how individuals who deem that fabrication, spying, or sabotage infringe a second party's unprotected rights, 'correct' or 'compensate' this infringement of their ethical ideals behaviourally.

Our results imply several challenges for the procedural design of organizations. Rules and processes which allow or require fabrication, spying, and sabotage may severely deplete individuals' work motivation, effort and productivity, endanger team cohesion and employees' psychological health, cause absenteeism and can severely affect the success of an organisation (Carpenter, Matthews, and Schirm 2010; Korsgaard, Schweiger, and H. J. Sapienza 1995). Our paper shows that not only the victims of these activities, but also the people who carry them out suffer from doing so. Similarly, national or regional cultures with traditions and norms that foster or do not prevent unfair competition, may hinder an efficient market and the economic development of entire countries (Guiso, P. Sapienza, and Zingales 2006). In the light of our findings, firms do – before introducing even weak competitive incentives – need to design and implement institutions which effectively prevent unfair competition. Since control is usually imperfect, this goal is not easily achieved.

This paper provides a comparative study of fabrication, spying, and sabotaging, of the

[3]Given that only the degree to which individuals invoke this specific moral ideal matters, the only preference type to date which could explain the varying amounts of altruism which we observe, are Chlaß, Güth, and Miettinen 2009's *purely procedural preferences* which express inequity aversion over parties' decision rights (freedom of choice), and their information rights. Note that when eliciting how individuals make moral judgements about situations, individuals could refer to every of the moral ideals upon which economics has formulated a preference: social norms, others' expectations, social image, others' intentions, reward or punishment prospects, and the status quo. We elicit individuals' propensity to invoke this entire set of moral arguments to judge whether an action is right or wrong and use this entire set of preferences to explain the rules and allocations they choose. However, no other ideal than the respect for individual's equal position of rights shows a significant impact.

behavioural reactions these activities induce, and a detailed investigation into the sources of these reactions. Our study links in particular to the literature on selfish black lies which harm others, and on altruistic white lies which benefit others (Erat and Gneezy 2012)[4]. This literature currently focuses on a controversy about why people tell the truth. Is truth-telling a focal point for intuitive decision makers (Cappelen et al. 2013; Lightle 2014) who do not understand the monetary benefits from lying? Is lie aversion disguised self-interest because one expects the truth to be mistaken for a lie anyway (Sutter 2009)? Do people suffer a psychological cost when lying which they trade off against the potential gains (Erat and Gneezy 2012; Gneezy 2005; Miettinen 2013)? Could guilt aversion, i.e. an aversion against disappointing others' expectations trigger this psychological cost (Battigalli, Charness, and Martin Dufwenberg 2013), or is there pure lie aversion which does not depend on expectations or consequences at all (Hurkens and Kartik 2009; López-Pérez and Spiegelman 2013)? In our setting, we find the latter and provide evidence that fabrication aversion emanates from a more general type of preferences about the equality of rights.

Sabotaging has received less attention, mainly in the framework of tournament games, in effort choice, or real effort games. Therein, individuals can increase others' costs of effort, or directly destroy others' outcomes. Sabotaging becomes the more frequent, the higher the monetary benefit entailed (Christine Harbring and Irlenbusch 2011) and decreases if an explicit label emphasizes the nature of the activity. This raises the question whether i) similarly to lying, sabotage is sensitive to outcomes, and also induces ii) some psychological cost which individuals trade off. Spying has, so far, hardly been studied at all – despite the massive media coverage in the aftermath of the NSA leaks, and recurrent public debates on privacy, information security and data protection in our highly digitalized life[5]. This paper studies fabrication, spying, and sabotage in a unifying framework which allows individuals to assess either activity in terms of its consequences but also allows them to avoid these activities entirely if they are felt to be innately wrong. Throughout, we find that individuals who nurture ethical ideals about the equality of *rights* – not payoffs – derive disutility from competing unfairly by infringing their opponent's equal position of rights. This ideal has not yet been discussed in the context of lie and sabotage aversion, or fair competition.

In the next section we illustrate our setup, section 3 outlines our experimental design in more detail. Section 4 presents the results, section 5 analyzes to what extent individuals' ways to make moral judgements and their values can organize those. Section 6 discusses our results and which economic preference models might explain them, and Section 7 concludes.

[4] Another strand of research (Abeler, Becker, and Armin Falk 2014; Fischbacher and Föllmi-Heusi 2013; Gibson, Tanner, and Wagner 2013) studies lies which have no effect on others' payoff, or put differently, which only harm the experimenter. The authors document both payoff-dependent and payoff-independent (pure) lie aversion.

[5] The only exception is a theoretical study by Solan and Yariv (2004) who study the cost of information acquisition on spying activities in a theoretical model assuming expected payoff maximization. In another context, Whitfield (2002) and Milinski and Rockenbach (2007) show that spying might be pervasive in the mammal world for evolutionary reasons, i.e. type detection, and reputational concerns.

2 Lying, spying, and sabotaging: rules and payoffs

This section briefly illustrates which notions and payoff consequences of fabrication and sabotage we study in this paper. Table 1a) shows our spy-, lie-, and sabotage-free set of rules about how two parties A and B can interact to allocate one ex-post nonzero payoff. Neither party has *information* about the opponent's move and hence, both parties are equally well off in terms of information. Parties also have the same *freedom of choice*: each party has two pure actions L and R each of which can be preferred by the same degree over the other given *some* circumstance: each action allows the individual to take all payoff for exactly one specific choice of the opponent (Jones and Sugden 1982).

B can choose the set of rules; she can either opt for this 'fair' set of rules, or she can opt for a second set of rules where she spies, sabotages, or fabricates A's decision. Under this second 'unfair' set of rules, B transforms payoff matrix 1a) into payoff matrix 1b) where L^A and R^A denote the spied[6], fabricated, or sabotaged versions of A's actions L and R. This way, B obtains two identical dominant strategies LR^A and RL^A which secure all payoff for sure and A's choice becomes payoff-irrelevant.

Table 1: How does party B profit from spying, sabotaging, or fabricating A's decisions? Normal forms of the fair, and the unfair set of rules.

1a) the 'fair' set of rules

		party A: L	party A: R
party B	L	0 100	100 0
	R	100 0	0 100

1b) the 'unfair' set of rules

		party A: L	party A: R
party B	LL^A	100 0	100 0
	RL^A	0 100	0 100
	LR^A	0 100	0 100
	RR^A	100 0	100 0

We study three different activities through which B can transform payoff matrix 1a) into 1b). First, B can opt for a set of rules where she *spies*, that is, looks up A's decision while A cannot see B's choice. We describe spying more accurately in the extensive form game of Fig. 2 and describe the 'unfairness' of this set of rules in section 6 by the inequality in parties' information partitions over the outcomes – i.e. over the terminal histories – of the game at the time when parties choose their actions[7].

Second, B can opt for a set of rules where she *sabotages* A, that is, replaces A's decision

[6]Note that for the spying case, the normal form in table 1b) is not completely accurate since it suggests that A and B choose simultaneously. For B to be able to spy A's decision, however, A must already have made her choice. We capture these differences more accurately in section 3.1 by means of the extensive game form.

[7]The ideas used to express the unfairness of rules by the inequality in the distribution of information or decision rights and the corresponding quantitative measures are taken from (Chlaß, Güth, and Miettinen 2009).

and chooses in A's stead. Thus, if A chooses L, she may suddenly encounter the consequences of action R and vice versa. To date, sabotage has been conceptualized as increasing an opponent's cost of producing output (C. Harbring et al. 2007), as directly reducing others' output (Christine Harbring and Irlenbusch 2011), as destroying others' output (A. Falk, E. Fehr, and Huffman 2008), or as manipulating how others' output performance is evaluated (Carpenter, Matthews, and Schirm 2010). In each formulation, sabotage redefines the link between the sabotaged party's action and the consequence – or utility – attached to this action, see e.g. appendix D. When B sabotages, she does not necessarily acquire information about what A has, or would have chosen; rather, she infringes A's freedom of choice. We capture sabotage in the extensive form game of Fig. 3 and describe the unfairness of this set of rules by the inequality in decision rights across parties A and B in section 6.

Third, B can transform payoff matrix 1a) into 1b) by anonymously reporting a *fabricated* decision for A which – upon reaching a third party – becomes payoff-relevant. Here, we think about planting or spreading rumours about an opponent which upon reaching a superior, become payoff-relevant while nobody observes whether the rumour was intentionally planted or just an innocent or failed guess. In this paper, the fabricated action always becomes payoff-relevant such that fabrication is always 'successful'.

Throughout, we study fabrication, spying, and sabotage as *clandestine* activities. Party A never learns whether B opted for the fair, or for the unfair set of rules, that is, whether B spied, sabotaged, or fabricated A's decisions. Hence, A does not know whether the payoff matrix is 1a) or 1b). B can cheaply arrive or 'nudge' herself into the spy-, lie-, or sabotage-free set of rules, or into the set of rules which allows for fabrication, spying, or sabotage. This nudge could be a party's choice to walk to her own desk without passing her colleague's (or deliberately passing that desk, respectively) in order to forego (or obtain) the chance to spy or manipulate that colleague's progress. Similarly, it could be avoiding the coffee corner to prevent being part in creating or spreading rumours about others.

More formally, we can measure A's freedom of choice in Jones's and Sugden's (1982, 1998) *metric of opportunity*. Strategies L and R do not expand A's freedom of choice in 1b) since no economic preference type would predict that $R \nsim L$. If R and L are identical then A does not prefer choice set $\{L, R\}$ to choice set $\varnothing$ in 1b). In 1a), however, $R \nsim L$ in some circumstances and hence A may prefer choice set $\{L, R\}$ to $\varnothing$. Therefore, when B chooses the 'unfair' set of rules, she reduces A's choice set compared to 1a), and compared to her own choice set. If B deemed that both parties should have equal decision rights, she would hold reservations against doing so. These reservations should crowd out shen B can secure all payoff under *both* sets of rules and hence, cannot affect A's freedom of choice. These reservations should also lessen as soon as A exerts some control over how much L and R expand B's freedom of choice via punishment or reward, see appendix C. Finally, such reservations should exist under fabrication and sabotage which attach new consequences to A's actions, but not under spying which affects A's relative position of information rights but not her freedom of choice.

Table 2: Experimental design

Treatment	*Spy*		*Sabotage*		*Lie*	
Payoff regime	Neutral	Competitive	Neutral	Competitive	Neutral	Competitive
B-participants	# 52	# 54	# 53	# 53	# 47	# 44
Part 1	**Baseline** B chooses probability α of interaction structure S_2 A chooses her strategy In S_2, B learns A's strategy / In S_2, B overrules A's strategy / In S_2, B reports A's strategy to C B chooses her own strategy					
Part 2	**Reward and Punishment** B chooses probability α of interaction structure A chooses her strategy In S_2, B learns A's strategy / In S_2, B overrules A's strategy / In S_2, B reports A's strategy to C B chooses her own strategy A chooses punishment/reward schedule without knowing B's choices of α, or the situation, or B's strategy B submits 1st order beliefs about punishment and reward schedule.					
Part 3	**Covariates** Risk Aversion Envy Moral Judgement Test (pen and paper) Materialist and Postmaterialist values (pen and paper) Demographics					

3 Experimental Setup

The experimental design consists of three parts in each session. For each part, new instructions were shown on screen.[8] In part 1, there are two parties A and B, and B chooses between a 'fair' (S_1), and an 'unfair' (S_2) interaction structure at her own discretion. Part 1 also elicits A's and B's behaviour within the chosen interaction structure. Part 2 proceeds the same way except that A now has a symbolic punishment and reward option to express her (dis)agreement with B's potential choices of the interaction structure. Part 3 elicits a variety of preferences, values, and demographics to better understand the nature of individuals' decisions. We describe parts 1 and 3 in more detail below, and explore part 2 in a companion paper (Chlaß and Riener 2015). Only one of the first two parts was paid out, part 3 was always paid, and no feedback was given in between parts. Table 2 summarizes this paper's 3×2 between subjects factorial design which studies three pairs of 'unfair' and 'fair' interaction structures under two payoff regimes. It was common knowledge that the experiment proceeded in a *perfect stranger design*. All sessions were roughly balanced on gender.

3.1 Part 1: Choosing between two Sets of Rules

Figure 1 describes the structure of part 1 in all experimental sessions[9]. There are two players labeled A and B who have an initial endowment of 50 ECU (€ 2.50). At the root of the game

[8] In a given part, participants had no information about the contents of potentially upcoming parts. Instructions are available from the authors upon request.

[9] Appendix A provides participant B's decision screen for her choice of the interaction structure, and her decision screen in S_2 for treatments SPY, SABOTAGE, and LIE.

tree, player B always chooses how she wishes to interact with player A. More particularly, B chooses the probability α that the 'fair' interaction structure S_1 occurs rather than the 'unfair' interaction structure S_2. This likelihood α has a default value of $\alpha = 50\%$. If B wishes to change α, she incurs cost $c(\alpha) = 0.1 \cdot |50 - \alpha|$ ECU[10] which is deducted from her payoff. Hence, player B can make one interaction structure certain at the relatively small cost of 5 ECU (25 Euro Cents). Once B has submitted her choice of α, chance draws the interaction structure accordingly. Player A neither knows B's choice of α, nor the actual interaction structure which was drawn. She always chooses between left (L), right (R), and the toss of a fair coin between the two. Only player B's choices depend on the actual interaction structure which was drawn. If interaction structure S_1 occurs, A and B play a constant sum game, but only B knows it. In S_1, B has the same choices as player A – namely (L), (R), and the fair coin – and neither player has information about her opponent's move. Interaction structure S_1 is the same in all treatments. Interaction structure S_2, however, differs across treatments. In treatment SPY, interaction structure S_2 grants B *information about player A's choice* but is otherwise identical to constant sum game S_1. In treatment SABOTAGE, S_2 grants B the option to *replace player A's choice* and is otherwise identical to S_1. In treatment LIE finally, S_2 requires that player B *report her own choice, and a choice for* A – without actually knowing A's choice – to player C who confirms the reported choices and makes them payoff-relevant. Apart from B's reporting, S_2 is identical to S_1.

Whereas the *rules* of the 'unfair' interaction structure S_2 differ across our three treatments, B always faces the same allocation choices. In all treatments, B can exploit her privilege in S_2 to obtain exactly the same material advantage. We will vary the size of this material advantage later on in two payoff regimes, see section 3.2. To summarize the different treatments:

Treatment SPY In the spying treatment, interaction structure S_2 was designed such that B sees player A's choice and can therefore condition her decision on A's choice whereas A does not know B's move, see Figure 2. If B chooses S_2, we say that she decides to spy on A since B acquires information about A unbeknownst to the latter. B grants herself a privilege in information about A's choice.

Treatment SABOTAGE In the sabotaging treatment, S_2 was designed such that player B cannot see A's choice. However, B must set A's decision to either L or R, and thereby "overrule" A's choice thus making A's choice payoff-irrelevant. In choosing S_2, we say that B decides to sabotages A because B decides to impair A's autonomy of choice unbeknownst to A[11]. In Figure 3, a replaced action is denoted by superscript A, e.g. LR^A means that player B chooses L herself and sets A's choice to R.

[10] This corresponds to 0.1 ECU for each percentage point by which B changes the default probability $\alpha = Prob(S_1) = 50\%$ where 1 ECU = 0.05 Euro Cents.

[11] Another way to describe this paper's sabotaging notion is that unbeknownst to A, B changes the meaning

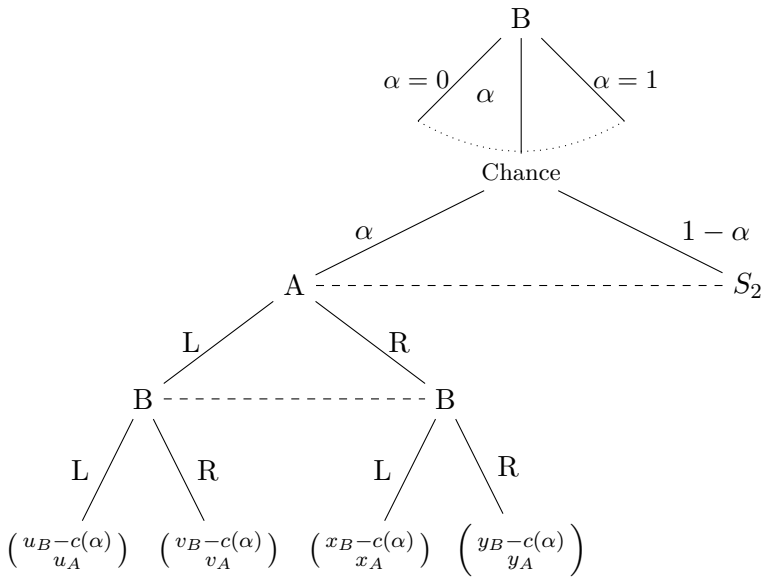


Figure 1: Basic Game Structure

Note: This tree illustrates the structure of part 1 (see table 2) for all treatments. S_2 is a place holder for the 'unfair' interaction structure S_2 which differs across treatments LIE SPY and SABOTAGE, see Figs. 2 (SPY), 3 (SABOTAGE), and 4 (LIE).

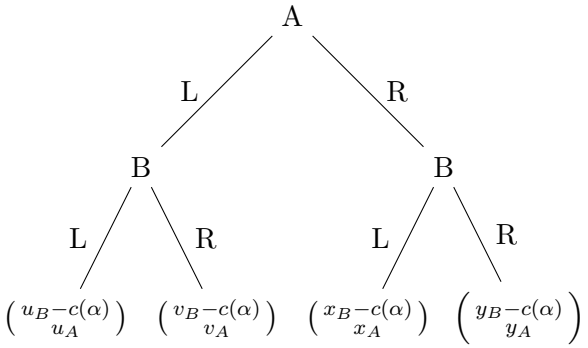


Figure 2: The 'unfair' interaction structure S_2 in treatment SPY.

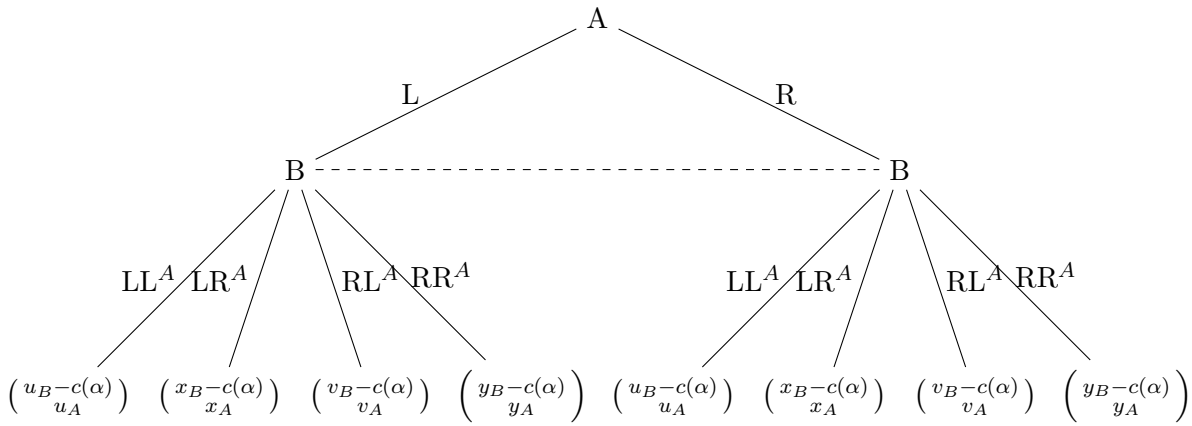


Figure 3: The 'unfair' interaction structure S_2 in treatment SABOTAGE.

Treatment LIE In the fabrication treatment, S_2 was designed such that B cannot see A's choice. Instead, S_2 requires B to report choices for A and B to an additional player C who has no other function than to confirm the choices reported to her, thus making them payoff-relevant. Through choosing S_2 we say that B decides to fabricate information about A since she must make up a choice for A when reporting to C.[12] In figure 4, superscript A indicates the action B chooses to report for A. Player C's trivial task to confirm the decision is labelled *co*, i.e. *'confirm'*.

3.2 Part 1: which advantage can B secure by lying, spying, or sabotaging?

We implement all three treatments LIE, SPY, and SABOTAGE in two payoff regimes. In a *payoff-neutral* regime, B cannot secure a material advantage through opting for S_2. In both interaction structures S_1 and S_2 B always fully controls her own payoff, and A's choice has no payoff consequences in any interaction structure. Therefore, B does not make A's choices any more payoff-irrelevant by opting for S_2 rather than S_1 and B does therefore not infringe A's freedom of choice through choosing S_2. Since B can for sure obtain all payoff in all interaction structures, we call B's choice of the interaction structure *payoff neutral*. Table 3b) illustrates parties' payoffs in S_1 for this payoff regime: through choosing L, B obtains $100 - c(\alpha)$ ECU for sure; the payoff table for S_2 is identical. In the payoff neutral setting, we observe B's attitudes toward fabrication and sabotage when these do not infringe A's freedom to choose,

of A's actions, or redefines the relation between A's actions and their outcomes. Appendix D shows Busch's (1906) cartoon of pupils Max and Moritz who replace the tobacco in their teacher's pipe with blackpowder. When the teacher lights the pipe, it explodes to his surprise rather than starting to smoke.

[12] If we informed B about A's choice in S_2, B could decide to truthfully or untruthfully report this choice. We do not give B this option in order to prevent lying by telling the truth (see e.g. Sutter 2009). For an illustration, take a B participant who is lie-averse because she does not wish to be taken for a liar by others. She could safely opt into S_2 and lie about A's choice if she thinks C will interpret her message as the truth. In our setting, we prevent this: if B does not wish to lie, she has to avoid S_2 since player C knows the rules of the game and knows that B cannot know A's choice. This way, we keep the three treatments SPY, SABOTAGE, and LIE comparable.

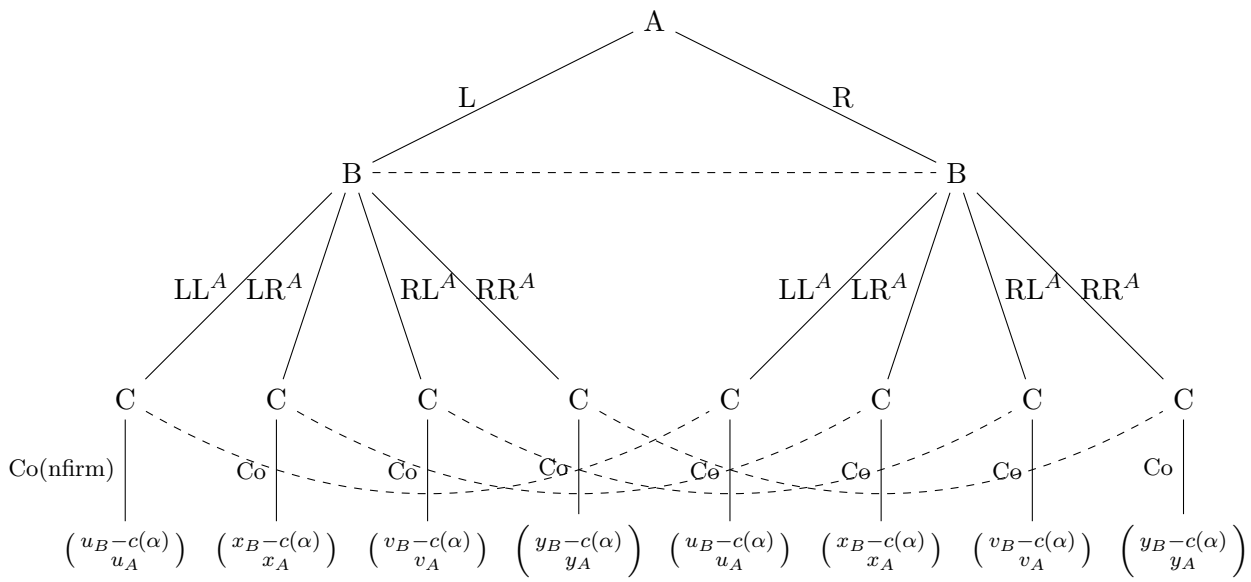


Figure 4: Interaction structure S_2 in treatment LIE.

and B's desire to satisfy her curiosity through spying when she cannot acquire payoff-relevant information. Note, however, that in absence of any payoff implications, B participants might no longer grasp the moral content of opting for S_2.

In the *competitive payoff* regime, we study a winner-takes-it all scenario. A and B play a constant-sum game in which either A or B obtains the entire payoff, and the other player obtains nothing. Table 3c) shows how parties' payoffs depend on their own and on their opponent's payoffs in the 'fair' interaction structure S_1. We see that player B does not fully control her payoff in S_1 which always varies along with A's choice. If in such a payoff constellation, B enables herself to spy or to manipulate A's choice, she obtains full control over her own payoff. This is exactly what B can achieve by opting for S_2 rather than S_1. Thereby, B transforms payoff table 3c) into table 1b) and – in contrast to the neutral setting – clearly reduces A's freedom to choose.

The mixing possibility. As mentioned before, players A and B also have an explicit option to toss a fair coin between L and R in interaction structures S_1 and S_2.[13] Hence, B has an ex-ante fair (Bolton, Brandts, and Ockenfels 2005) and kind (Sebald 2010) option in all interaction structures. We will, however, see that B never uses her mixing option in the experiment – which is not surprising since B can also mix over the two interaction structures before arriving in any.

[13]Specifically when payoffs are competitive, player B is likely to randomize in S_1 since she does not know or cannot set A's choice. In S_2, where she either knows, or can set A's choice, B is less likely to randomize. To make both interaction structures as similar as possible in all aspects apart from the spying, lying, or sabotaging feature, we always offer subjects a button to explicitly mix in S_1 and S_2 for all treatments.

Table 3: Payoffs in interaction structure S_1.

3a) **General**

		A: L	A: R
B	L	$u_B - c(\alpha)$, u_A	$x_B - c(\alpha)$, x_A
	R	$v_B - c(\alpha)$, v_A	$y_B - c(\alpha)$, y_A

3b) **Payoff Neutral**

		A: L	A: R
B	L	$0 - c(\alpha)$, 100	$0 - c(\alpha)$, 100
	R	$100 - c(\alpha)$, 0	$100 - c(\alpha)$, 0

3c) **Competitive**

		A: L	A: R
B	L	$0 - c(\alpha)$, 100	$100 - c(\alpha)$, 0
	R	$100 - c(\alpha)$, 0	$0 - c(\alpha)$, 100

Note: Table 3a) presents the general payoff structure of interaction structure S_1, table 3b) the respective payoff values for the payoff neutral regime, and 3c) for the competitive regime.

3.3 Part 2: Giving A a symbolic punishment or reward option

In part 2 of each session, subjects repeat part 1 while it is common knowledge that A can punish or reward B's choice of the interaction structure. More specifically, it is known that A submits a punishment and reward schedule in which she decides whether to subtract up to 30 ECU, or to add up to 30 ECU to B's payoff, if B chose S_1 1) for sure, 2) with $\text{Prob}(S_1) \in [75\%, 99\%]$, 3) with $\text{Prob}(S_1) \in]50\%, 75\%[$, 4) with $\text{Prob}(S_1) = 50\%$, or if she chose S_2 with 5) $\text{Prob}(S_2) \in]50\%, 75\%[$, with 6) $\text{Prob}(S_2) \in [75\%, 99\%]$ or 7) if she chose S_2 for sure. Each ECU punishment or reward costs A the same amount. B submits which punishment and reward schedule she expects A to submit. If B guessed the entire schedule correctly, she earned 35 ECU. Guessing A's punishment or reward correctly for one of the seven cases outlined aboved earned B 5 ECU. For each ECU by which B deviated from A's actual punishment or reward, B earned 0.08 ECU less. For a detailed analysis of this stage, see (Chlaß and Riener 2015).

3.4 Part 3/ Moral preferences, Envy, Risk Attitudes and Values

In part 3 of each session, we elicit several subject characteristics and preferences to better understand the nature of subjects' choices in our experiment. These controls are described below. Finally, subjects also submit a variety of demographics, i.e. their field of study, their semester, age, and gender.

Envy & Risk Preferences We briefly elicit envious preferences to see how much participants dislike being materially worse off than others. To that end, subjects were randomly rematched in a perfect strangers design and submitted their choice between the options "10 ECU for themselves and 10 ECU for the other" or "10 ECU for themselves and 20 ECU for

the other" knowing that a fair coin would decide whether their own decision, or their opponent's decision determined their payoff from this task (see for example Bartling, Ernst Fehr, André Maréchal, et al. 2009). Subsequently, subjects chose between lotteries and sure payoffs in a Holt-Laury price list format.[14]

Moral Judgement Test Subsequently, subjects completed the standardized moral judgement test (M-J-T) developed by G. Lind (1978, 2008), see appendix G for an excerpt. As we have mentioned before, subjects might deem it unethical that the rules of the game grant B the privilege to obtain more information than A, or the privilege to override A's choice ('it is unfair/immoral to favour one person over another by granting her more rights or greater privileges'). There could be many other moral ideals motivating B's choice of the interaction structure such as a social norm that parties should have equal chances to obtain the one nonzero payoff, or a social norm not to lie, spy, or sabotage, or a desire to satisfy some expectation of A, or the desire to show kind intentions toward A.

To test which – if any – of these motivations is at play, we first need a means to describe how B participants typically derive whether an action is right or wrong – for instance, which arguments or moral ideals they employ to do so. An individual typically feels comfortable to use only some of the many moral arguments which exist: each individual therefore has preferences over ways of moral argumentation (see e.g. Kohlberg 1984; G. Lind 2008; Piaget 1948). Lawrence Kohlberg studied extensively which arguments individuals in the field actually use to judge the right or wrong of an action and classified the many types of argumentation he encountered into six ways of argumentation (Kohlberg (1969, pp. 375), see Appendix F) which we discuss in more detail in section 5. Lind's moral judgement test elicits individuals' preferences over precisely these ways of argumentation. To that end, the test presents subjects with two stories. The first story describes how workers break into a factory in order to find and steal evidence that management was listening in on them. The second story describes that a woman who is fatally ill asks a doctor to medically assist her suicide. After each story, subjects first state whether they deem the respective protagonists' behaviour right or wrong. Subsequently, the test lists arguments one might put forth to judge the workers' (or doctor's) actions. Each argument represents one way of moral argumentation from Appendix F. Subjects can agree or disagree to employ each argument for judging the protagonists' behaviour on a nine-point Likert Scale. Four test items (arguments) are used to characterize an individual's preference over each of Kohlberg's six ways of argumentation. The test was administered in pen and paper format to keep its design and structure fully intact. Section 6 uses these results to identify the respective economic preference types underlying the behaviour which we observe.

[14]The lottery payoffs are 10 ECU and 35 ECU, the sure payoff is 25 ECU, respectively. The probability of the low lottery payoff increased in steps of 10% such that subjects submitted ten choices between a lottery and a sure payoff.

Materialist & Postmaterialist Values In the extensive form games of Figs. 2–4, B can express her dislike of interaction structure S_2 in two ways. She can either pay for S_1 and avoid power or paternalism altogether, or pay for S_2, assume power and exert it to A's advantage, i.e. be paternalistic toward A. Both behaviours might emanate from B's dislike that the rules of the game in figure 1 allow her to spy, lie, or sabotage A. If B reasons this way, and wishes to compensate A for the way in which the rules of the game treat her, the compensation strategy will vary along with B's attitudes toward exerting power (and hence, toward being paternalistic). We therefore elicit individuals' values along the well-known dichotomy *materialism-postmaterialism* (Helmut Klages and Gensicke 2006; Ronald Inglehart 1977) where materalists—amongst other things—appreciate power, order, obedience, and hierarchy whereas postmaterialists value individualism, autonomy, and self-fulfillment. Instead of using Ronald Inglehart's four questions from the World Values Surveys to classify postmaterialists and materialists, we use the German inventory developed by Klages and Gensicke (see e.g. 2006)[15]. We elicit individuals' scores on these scales by means of a twelve item questionnaire recently re-validated on the German population. The items which individuals rank on a scale from 1 to 7 can be found in appendix H.

3.5 Implementation

In total we ran 36 sessions with altogether 630 participants (303 B-participants, 303 A-participants, and 24 C-participants) from January until June 2012 resulting in roughly 50 decisions per treatment. 309 (49%) of all participants were male. The average payment which included a show-up fee of €2.50 was €7.94 (B-participants: €9.65, A-participants: €6.35, C-participants: €6.30) with a minimum of €3.60 and a maximum of €12.10. A session lasted approximately 50 minutes including payment. Subjects were undergraduate students from the University of Jena which were randomly recruited from all fields of study via the opt-in web based online platform ORSEE (Greiner). We did not elicit any information that would allow us to identify subjects. Payouts were distributed in sealed envelopes.

4 Results

4.1 Which interaction structure do B participants choose?

Table 4 details how many B participants paid for interaction structure S_1, and how many paid for interaction structure S_2 which – depending on the treatment – would either allow

[15]Klages and Inglehart worked in parallel. Inglehart stipulated there would be a shift from materialist to postmaterialist societies, whereas Klages (1984) predicted that a value synthesis would take place, leading amongst others, to so-called *realists* who would combine the postmaterialist desire for autonomy with a desire to compete and perform (classic materialist value). Klages's inventory includes items to identify postmaterialists, pure materialists, individuals who do not score high in either value class, and other 'mixed types', see appendix H. The inventory has been regularly validated throughout thirty years of research and continues to be so.

Percentages of B-participants paying for interaction structure S_1 ('fair') and S_2 ('unfair') per treatment

treatment	LIE				SPY				SABOTAGE			
payoff regime	payoff neutral[17]		competitive		payoff neutral		competitive		payoff neutral		competitive	
#nr. of B players	#47		#44		#53		#53		#52		#54	
interaction structure	S_1	S_2	S_1	S_2	S_1	S_2	S_1	S_2	S_1	S_2	S_1	S_2
% who pays	17%	6%	20%	11%	4%	36%	9%	68%	8%	35%	4%	69%
median change of α	13%	30%	10%	20%	25%	20%	50%	25%	17.50%	20%	16%	25%
% who does not pay	77%		68%		60%		23%		58%		28%	

Table 4: Choices over Procedures for all treatments.

them to spy, sabotage, or lie. B participants' procedural choices differ significantly across treatments. There are significantly[16] more B participants who choose the spying (Fisher's Exact test, *p-value* < 0.01) or the sabotaging procedure (Fisher's Exact test, *p-value* < 0.01), than there are B participants who choose the lying procedure. We do not observe such a difference between the spying and sabotaging procedures (Fisher's Exact test, *p-value* $= 1$). These findings are the same for the payoff neutral, and the competitive payoffs regime. Also, the percentage of B participants who prefers the default – a fair chance draw between the interaction structures – is significantly higher in treatment LIE (77% and 68%, respectively) than in SPY (Fisher's Exact test, *p-value* < 0.02) or SABOTAGE (Fisher's Exact test, *p-value* < 0.02).

Result 1: Subjects opt less often into fabricating information than they opt into spying or sabotaging.

The payoff neutral setting shows that many B-participants nudge themselves into interaction structures which allow them to spy (36%) and sabotage (35%) even when there is no material advantage to be gained. Subjects do therefore seem to intrinsically enjoy gathering information and replacing others' actions when this does not affect the other party's payoff. Interestingly, median payments for S_2 are qualitatively larger than those for S_1 in both LIE and SABOTAGE. Only in treatment SPY, B players who prefer the spying-free procedure S_1 are willing to pay more than those who prefer the spying procedure S_2.

4.2 Which allocation do B participants choose?

B players' choices of the interaction structure cannot be fully understood without taking the allocation they opt for into account. Take a B player who increases the likelihood of interac-

[16] Two shares (relative frequencies) are compared via one-sided Fisher's Exact tests, three and more frequencies, e.g. the share of B participants paying for the S_2, S_1, or who do not pay anything at all, are compared via Chi-square tests using exact, i.e. simulated, p-values.

[17] A brief reading example: In treatment LIE with neutral payoffs, there were 47 B participants. 17% of them paid for S_1 and 6% for S_2. The 17% who paid for S_1 made at the median, S_1 13% more likely than S_2. The 6% who paid for S_2, made, at the median, S_2 30% more likely than S_1. 77% of 47 B participants left the default 50-50 chance of arriving in either S_1 or S_2.

Which allocation do B-participants impose when they hold the power to do so?
selfish: (payoff B: 100, payoff A: 0); altruistic: (payoff B: 0, payoff A: 100)

treatment	LIE[19]			SPY			SABOTAGE		
payoff regime	payoff neutral		competitive	payoff neutral		competitive	payoff neutral		competitive
interaction structure	S_1	S_2	S_2	S_1	S_2	S_2	S_1	S_2	S_2
# nr. of B players.	#25	#22	#25	#20	#33	#40	#22	#30	#28
selfish	80%	77%	32%	90%	94%	100%	82%	87%	29%
equal chance	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
altruistic	20%	23%	68%	10%	6%	0%	18%	13%	71%

Table 5: B's choices of the payoff allocation in the 'fair' (S_1) and the 'unfair' (S_2) interaction structures.

tion structure S_2 in the competitive payoffs setting. She may wish to obtain the chance to lie, spy, or sabotage to her own material advantage. She may yet also wish to obtain the power of giving all payoff away in an attempt, for instance, to compensate A for the rules of the game.[18] Table 5 shows the payoff allocations B players impose when they hold the power to do so: under payoff neutrality, B can impose her preferred allocation in S_1 and S_2, whereas under competitive payoffs, B can only do so in S_2. The allocation (B,A):(0,100) where B gives all payoff away is labelled 'altruistic', the allocation (B,A):(100,0) where B keeps all payoff is labelled 'selfish'. 'Equal chance' denotes cases where B chooses to toss a fair coin between the selfish, and the altruistic allocation.

In treatment SPY, 93 B participants could impose their preferred allocation: all 53 under payoff neutrality, and the 40 who arrived in S_2 under competitive payoffs. 89 of them (96%) took all payoff. In treatments LIE and SABOTAGE instead, we observe a substantial amount of altruism. In SABOTAGE, 72 B participants could impose their preferred allocation: all 52 under payoff neutrality and the 28 who arrived in S_2 under competitive payoffs. 28 of those 72 B participants (39%) gave all payoff away. In treatment LIE, 72 B participants could impose their preferred allocation: all 47 under payoff neutrality, and the 25 who arrived in S_2 under competitive payoffs. 27 of those 72 B participants (38%) gave all payoff away. Thus, we observe significantly more altruism in LIE or SABOTAGE than in SPY (Fisher's exact tests, *p-value* < 0.01). We observe no such difference between LIE and SABOTAGE (Fisher's exact test, *p-value* $= 0.87$).

[18] It might also be that B participants choose interaction structure S_2 with the intention of taking all payoff, but once arrived in the lying, spying, or sabotaging procedure, feel too guilty to do so. We analyze B players' moral motivations to be altruistic in S_2, and the determinants of choosing S_1 rather than S_2 in section 5.

[19] A brief reading example: In treatment LIE with payoff neutrality B can impose her preferred allocation in S_1 and S_2. Out of 47 B participants, 25 arrived in S_1. 80% of them kept all payoff for themselves, 20% gave all payoff away, and nobody tossed a coin. The remaining 22 B participants arrived in S_2. 77% of them kept all payoff, 23% gave all payoff away, nobody tossed a coin. With competitive payoffs, B can only impose the allocation in S_2. Out of 44 B participants, 25 arrived in S_2, 32% of which kept all payoff, and 68% of which gave all payoff away. Nobody tossed a fair coin.

Result 2: We observe significantly more selfish allocations in treatment SPY than in SABOTAGE or LIE.

Treatments LIE and SABOTAGE induce significantly more altruism under *competitive payoffs* than under *payoff neutrality* (Fisher's exact tests, $p\text{-value} < 0.01$), but not treatment SPY (Fisher's exact test, $p\text{-value} = 0.13$). In LIE with competitive payoffs, 17 of those 25 B players (68%) who fabricate information give all payoff away compared to 10 out of 47 (21%) under payoff neutrality. In SABOTAGE with competitive payoffs, 20 of those 28 B participants (71%) who sabotage give all payoff away compared to only 8 out of 52 (15%) under payoff neutrality. In SPY *all* B participants who spy on A exploit the information they acquire to *take* all payoff. Section 2 discussed that under competitive payoffs, treatments LIE and SABOTAGE empower B to impair A's freedom of choice which is not the case under payoff neutrality. Treatment SPY in turn grants B additional information about A in both payoff settings. If B deemed that a procedure should not grant her the power to impair A's freedom of choice, and if this drove B's altruism, then B participants' altruism should vary across our 3×2 treatments exactly as it does.

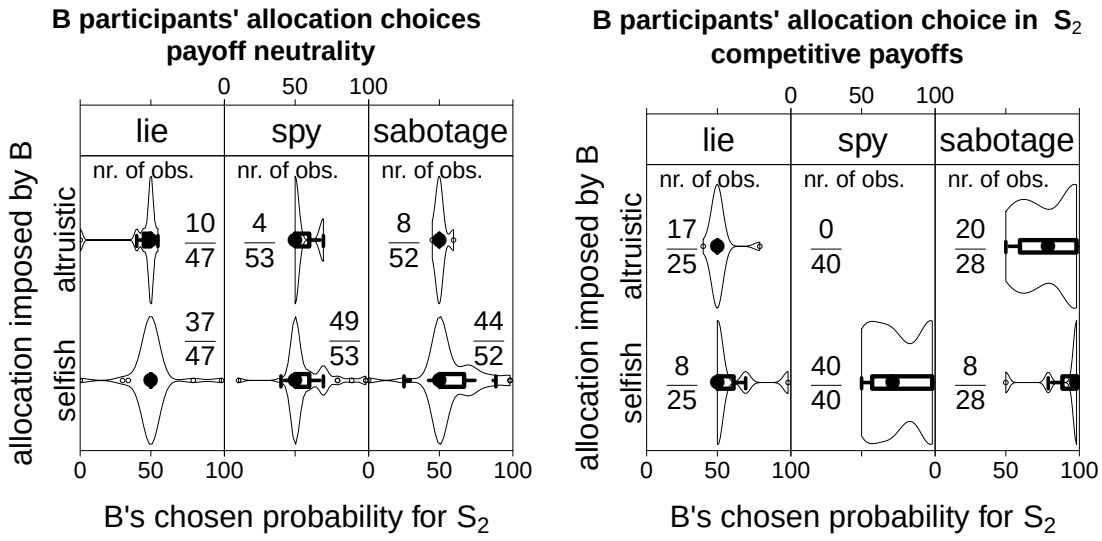
Result 3: B participants are significantly more altruistic when the treatment empowers them to impair A's freedom to choose than when it does not.

Figure 5 illustrates how much information B participants' choices α of the interaction structure discloses about their allocation decision. The X axis shows how likely B participants made the 'unfair' interaction structure S_2 and the Y axis shows B participants' choice of the allocation. Under *payoff neutrality* (left graph) *altruistic* B participants in LIE, SPY, and SABOTAGE typically leave the default and arrive with a 50% chance in the 'unfair' interaction structure S_2. All distributions of probability choices are centered at 50% which is also the median (fat black dot). In treatment LIE, *selfish B participants* also leave the default, and B participants' procedural choices do therefore not reveal which allocation they will choose. In SPY and SABOTAGE, however, a visible share of selfish B participants increases the probability of S_2 such that the distributions of probability choices (violin in the lower parts of panels SPY and SABOTAGE, left graph) show fat right tails. If a B participant's choice falls within such a tail, she therefore signals she will impose the selfish allocation.

Turning to *competitive payoffs* (right graph), altruistic B participants in LIE typically arrive in S_2 by a 50% chance whereas the distribution of choices by selfish B participants shows

[20] A brief reading example: take the right graph ('competitive payoffs'), and therein the third panel 'sabotage'. The upper half depicts those 20 B participants of altogether 28 who arrived in S_2 where they could impose the allocation under competitive payoffs and imposed the altruistic allocation. The horizontal boxplot shows that within this group of altruistic Bs, 25% (the left boundary of the boxplot rectangle equals the 25% quantile of the distribution) chose probabilities for S_2 smaller or equal to roughly 60%; 75% (the right boundary of the boxplot rectangle) chose values smaller or equal to 100%. The black dot shows the median probability for S_2 in this group. The horizontal violin around this boxplot is wide at values which many B participants chose, and narrow where few choices are located. Looking at the selfish group in the lower part of panel sabotage with 8/28 observations, the violin shows that most selfish Bs set the probability of S_2 to values close to or at 100%.

Figure 5: B PARTICIPANTS' CHOSEN PROBABILITY FOR THE UNFAIR INTERACTION STRUCTURE S_2, AND THEIR CHOICE OF ALLOCATION WHEN THEY COULD IMPOSE IT (LEFT GRAPH: PAYOFF NEUTRALITY, RIGHT GRAPH: COMPETITIVE PAYOFFS)[20].



a fat right tail. Similarly, nearly all selfish B participants in SABOTAGE make S_2 certain while most altruists increase the probability of S_2 less pronouncedly. In LIE and SABOTAGE therefore, procedural choices which fall within the right tail of their distribution signal that a selfish allocation will be imposed. In SPY, every increase in the probability of S_2 signals B will take all payoff.

Result 4: Only resolute attempts at fabrication and sabotage indicate B will take all payoff. In contrast, every attempt at spying results in B taking all payoff.

5 Moral motivations

In this section, we try to understand the nature of our main results: i) why some B participants who opt into the 'unfair' interaction structure give all payoff away while others take all payoff, ii) why this amount of altruism differs across treatments, and iii) why some B participants nudge themselves into the 'unfair' interaction structure S_2 while others opt into S_1 and why their shares vary significantly across treatments.

It may be that B participants who give all payoff away do in general, simply care more about others' payoffs than they care about their own. Other than out of a natural disposition, however, B participants may also choose the altruistic allocation because they care about being taken for a nice person, because they wish to fulfill A's payoff expectations and do not wish to let A down, or because they wish to comply with a social norm stipulating equal chances for all parties to obtain the one ex-post nonzero payoff and tossed a fair coin

between both allocations. Alternatively, B participants may care about the distribution of rights in each interaction structure which systematically disadvantages A.[21] Treatment SPY grants B privacy of her own choice but empowers B to monitor A's. Treatments SABOTAGE and LIE grant B the freedom to choose between two actions but in the competitive payoffs setting, empower B to grant or to deny A the same right. B participants who deem that A's position of rights should not lie within their discretion may wish to compensate A. Since SPY disadvantages A in terms of information whereas LIE or SABOTAGE affect her freedom of choice, this compensation may vary across treatments. The moral ideals discussed here might also underlie B participants' decision to opt into the 'fair', rather than into the 'unfair' interaction structure. In order to understand whether one, or several of the moral ideals outlined above are at play, we first need to describe how a given B participant arrives at the conclusion that a specific course of action is right.

Jean Piaget and Lawrence Kohlberg have studied extensively how individuals in the field make such moral judgements, see e.g. (Piaget 1948, Kohlberg 1984). They observed individuals who referred to the absence of punishment or the existence of a reward, to others' expectations, or to a social norm – i.e. which action the majority of people in a society or a peer group would adopt – to derive the right course of action. Other judgements invoked the status quo ('it is right to do what we have always done in this situation'), or referred to the law. Individuals would also refer to the social contract and look at whether an action respected the individual's rights, or the equality of rights across individuals stipulated therein. Finally, some moral judgements would refer to concepts *beyond* the social contract such as human rights, human dignity, or some other general ethical principle considered to be universally valid. Kohlberg (e.g. 1969, pp. 375) classifies these various moral ideals into six types. Table 6 reviews the two types in particular which invoke individual rights.[22] We characterize B participants' use of all six ways of argumentation (see appendix F for a complete classification and examples) by their test scores from the moral judgement test administered in phase 3 to model B participants' altruism and their procedural choices.

We begin with *competitive payoffs* where we classify B participants into type i) who pays for interaction structure S_1 and arrives there, type ii) who sets the probability for interaction structure S_2 to $\alpha \geq 50\%$ and, if arriving in S_2, uses her lying, spying or sabotaging option to

[21] The corresponding formal preference models built upon the moral ideals mentioned are guilt aversion (ideal: comply with others' expectations) as in (Battigalli and Martin Dufwenberg 2007), preferences for equal expected payoffs (ideal: comply with a social norm that everybody's chances to obtain the payoff should be equal) as in (Bolton, Brandts, and Ockenfels 2005), and purely procedural preferences (ideal: equality of rights across parties) (Chlaß, Güth, and Miettinen 2009).

[22] To date, only one type of economic preferences builds upon these classes. Chlaß, Güth, and Miettinen (2009) let individuals choose between largely outcome-invariant allocation procedures which distribute parties' rights of information or participation either equally or unequally. Thereby, individuals' procedural choices systematically linked to the degree by which subjects referred to democratic rights guaranteed by the social contract, i.e. postclass 1 in table 6. Chlaß and Moffatt 2012 find that dictator game giving links to postclass 2, and hypothetical transfers by recipients in dictator games to postclass 1.

Argumentation	Motivation for moral behaviour
postconventional	*postclass 1.* Social contract orientation, in which duties are defined in terms of the social contract and the respect for others' rights as recorded in that contract. Emphasis is upon equality and mutual obligation within a democratic order. *postclass 2.* The morality of individual principles of conscience such as the respect for the individual will, freedom of choice etc. Rightness of acts is determined by conscience in accord with comprehensive, universal and consistent ethical principles.

Table 6: Kohlberg's two classes of postconventional (outcome-invariant) moral argumentation (Ishida 2006).

give all payoff away[23], and a type iii) who prefers not to influence the interaction structures and arrives in S_2 where she takes all payoff. In a series of simple binary Logit models, we contrast each of these types with the most selfish type iv) that we observe: the one who pays for S_2 where she exploits her lying, spying, or sabotaging option to keep all payoff for herself. We regress each pair of types on two dummies for treatments LIE and SABOTAGE, on individuals' moral judgement characteristics, on risk and envy preferences, and where collected, on Helmut Klages' materialism-postmaterialism scores.

The left of tables 7 compares the procedural type i) who pays for interaction structure S_1 to the most selfish type iv) who is our reference category. Out of the treatment dummies, only LIE increases the frequency of type i) by 49%, $p\text{-}value < 0.01$. The more strongly a given B participant refers to *postclass 1* arguments – the social contract and the respect for individual rights – the *more* likely she is of procedural type i) whereas the use of *postclass 2* arguments – general ethical principles of conscience – makes individuals less likely to be of procedural type i). B participants who invoke ethical principles are more likely not to influence the draw of the interaction structure and hence, more likely to be of type iii). They may deem it unethical to exert any power over A's position of rights at all. Risk attitudes do not show a significant impact and do not affect the significance of other variables, as is the case for all further controls, see appendix I.

[23] If she arrives in S_1 where she cannot determine the allocation, no restriction is imposed on the allocation. We also classified two B participants as type ii) who make S_1 slightly more likely, but arrive in S_2 and give all payoff away.

[24] All estimated Logit models were tested downwards (reduced) from large specifications which included all two way interactions to those determinants which were significant. We report marginal effects of explanatory variables, i.e. by how many per cent the response dummy is more likely to take on a value of One, if the respective explanatory variable increases by one unit. The moral preferences are computed as in previous studies (Chlaß, Güth, and Miettinen 2009; Chlaß and Moffatt 2012): we take the mean rank over all four arguments referring to the same type (class) of moral argumentation for all six types of moral argumentation (class 1 to 6 in table F) and adjust each mean rank for the difference between the largest and smallest value a subject ever ticks in the entire test. These averages are then normalized on the entire sample of B participants, subtracting the sample mean and dividing by the sample standard deviation. Initial model specifications always include the complete set of six moral preferences elicited in the test for each participant.

PROCEDURAL TYPE (I)			ALTRUISTIC TYPE (II)		
Argument	*Effect*	*std.err.*	*Argument*	*Effect*	*std.err.*
lie	0.49	0.17^a	*lie*	0.50	0.04^a
postclass 1	0.16	0.08^b	*sabotage*	0.49	0.05^a
postclass 2	-0.15	0.07^b	*postclass 1*	0.10	0.03^a
[*risk aversion*	-0.05	0.03]	[*risk aversion*	0.01	0.02]

Table 7: WHICH DETERMINANTS[24] MAKE THE PROCEDURAL TYPE (I) (N=56), AND THE ALTRUISTIC TYPE (II) (N=121) MORE LIKELY THAN THE MOST SELFISH TYPE (IV)?
Note: The significance levels of the z-tests are indicated by $a : p < .01$, $b : p < .05$ $c :, p < .10$

Turning to the right of tables 7, the altruistic type is 50%, *p-value* < 0.01, more prevalent in treatment LIE and 49%, *p-value* < 0.01, more prevalent in SABOTAGE than in SPY. The more strongly B participants refer to *postclass 1* arguments, the more likely they are of type ii) who gives all payoff away in the 'unfair' interaction structure. A one-unit increase in individuals' use of these arguments increases the likelihood of type ii) by 10% *p-value*< 0.01. As before, risk attitudes do not show a significant effect, as is the case for all other controls, see appendix I.

Surprisingly, types i) and ii) share a concern about individual rights and the social contract as opposed to the most selfish type iv) who spies, lies, and sabotages to her own advantage.[25] Their motivations being the same, these types may differ in their view how to rectify the infringement of A's rights: type ii) might seek the 'unfair' interaction structure to exploit her power for A's good and give her all payoff whereas type i) may prefer to directly reinstall A's rights by opting for the 'fair' interaction structure. If true, both types should differ in their attitudes toward *power*. Klages' materialism and postmaterialism scores elicited in part 3 allow us to test this idea. Materialists value the existence of hierarchy, order, duty and should consequently classify more often as type ii) than type i). Postmaterialists value individual autonomy, dislike power and should more often classify as type i). Indeed, a one-unit increase on Klages' postmaterialism scale[26] makes the procedural type i) who avoids power by 12%, *p-value*$= 0.00$, more likely. A one-unit increase on materalism increases the likelihood of being type ii) who opts into S_2 and gives all payoff away by 12%, *p-value*$= 0.01$. Accounting for these variables, the effect of *postclass 1* arguments for type i) in tables 7 increases in size and significance(45%, *p-value*$= 0.00$). Both types do therefore seem to care equally strongly for the infringement of A's rights but – due to their attitudes toward power – choose different strategies to compensate A. In summary, we find that the moral ideal underlying B partici-

[25] Since the effect of *postclass 1* arguments is less significant for type i), she might have a weaker concern than ii) and might wish to give away less payoff. Note, however, this also in the 'unfair' interaction structure, B could toss a fair between both allocations and did not need to give all payoff away for sure if she wanted to allocate some payoff to A.

[26] We take the mean rank over all questionnaire items belonging to one class, see Appendix F.

pants' willingness to forego payoff always springs from the same source – an ethical concern about the distribution of rights.

A similar logic can explain the remaining type iii) who arrives in the 'unfair' interaction structure by the toss of a fair coin where she takes all payoff. These selfish individuals who avoid influencing the interaction structure to their own advantage score 14%, *p-value*< 0.03 stronger on postmaterialist values and 15%, *p-value*< 0.04 lower on materialist values than the most selfish reference type iv). At the same time, a concern for A's position of right also makes the occurrence of this type 15%, *p-value*< 0.04 more likely.

In the *payoff neutral treatment* where B does not impair A's freedom of choice through opting for the unfair interaction structure S_2, this ethical concern crowds out, and no ethical ideal can be confirmed to underlie B's behaviour. Ethical concerns for A's position of rights also crowd out if we make parties' position of rights more equal by extending A's freedom of choice through a symbolic punishment and reward option which B cannot avoid in any interaction structure[27]. Hence, when B cannot even out or infringe parties' equal position of rights, or when these positions become more similar, concerns about the rules of the game consistently crowd out.

Result 5: Ethical ideals about the equality of rights explain B's willingness to forego payoff and the variation in this willingness across treatments. Attitudes toward materialist and postmaterialist values explain how B prefers to rectify the infringement of her ethical ideal.

6 Underlying Preferences & Discussion

In this section, we discuss which preferences might underlie B-participants' behaviour and whether or not our results confirm or contradict their being at play. We restrict our attention to the nontrivial, i.e. the competitive payoff setting where B can only take all payoff for sure if she opts for S_2, that is, if she lies, spies, or sabotages.

Self-interested opportunism. If B only cares about her own material payoff, she opts into the 'unfair' interaction structure S_2 for sure. She does so by paying 5 ECU to set $\text{Prob}\,(S_2) = \alpha = 1$. In interaction structure S_2, she chooses allocation (B: 100, A: 0) either by opting for a strategy combination $\{B : RL^A, A : \{\cdot\}\}$, or $\{B : LR^A, A : \{\cdot\}\}$. Hence, B receives $100-5 = 95$ ECU and A receives 0 ECU in treatments LIE, SPY, and SABOTAGE[28].

[27] Appendix B shows the normal form for S_1 and S_2 with punishment or reward: A can now reduce, or increase the extent to which B prefers each strategy over the other in S_1, and in S_2. Table 17 shows the results from our companion paper (Chlaß and Riener 2015): neither types i), ii) or iii) are motivated by postclass 1 arguments anymore, if contrasted with the most selfish type iv). Other moral ideals crowd in.

[28] That 95 ECU is the largest possible payout can be seen from comparing the payout of the following cases: If B opts into S_1 for sure, she pays 5 ECU to set $\alpha = 0$ and receives an expected equilibrium payout of 50 ECU in S_1, overall $50 - 5 = 45$ ECU. If B leaves the default $\alpha = 0.5$, she receives an equilibrium payout of 50 ECU from S_1 which occurs with 50% probability, and a payoff of 100 ECU from S_2 which also occurs with 50% probability. Hence, her overall expected payoff from not influencing the set of rules is $0.5 \cdot 50$ ECU $+0.5 \cdot 100 = 75$ ECU. Making S_2 one per cent more likely costs 0.1 ECU, but yields an expected payoff increase

Clearly, self-interested opportunism can neither explain the differences in altruism, nor the variation in B participants' procedural choices across treatments LIE, SPY, and SABOTAGE, nor the link with individuals' moral judgement from section 5.

Pure Altruism. If B only cares about her opponent's material payoff, she pays 5 ECU for setting Prob $(S_2) = \alpha = 1$ to opt into interaction structure S_2 . Therein, she chooses allocation (B: 0, A: 100) either via strategy combination $\{B : LL^A, A : \{\cdot\}\}$, or $\{B : RR^A, A : \{\cdot\}\}$. B receives -5 ECU and A receives 100 ECU in LIE, SPY, and SABOTAGE. Altruistic preferences should therefore be unlikely to explain any differences in allocation choices or procedural choices between treatments LIE, SPY, and SABOTAGE.

Preferences for equal expected payoffs. B may be willing to forego some of her maximal payoff to grant A more equal chances on the one ex-post nonzero payoff (Brandts et al. 2005). Put differently, B may be inequity-averse over expected payoffs and e.g. have utility $u_B = a_B \cdot E(y_B) - 0.5 b_B \left(y_B \cdot 100^{-1} - 0.5\right)^2$ with y_B her own expected payoff, $a_B \geq 0$ B's inequity aversion against disadvantageous inequality, and $b_B \geq 0$ B's inequity aversion against advantageous inequality. In S_1, two perfectly selfish players would each choose to toss the fair coin between L and R which at the same time, guarantees ex-ante equality in payoffs. In S_1, B's corresponding utility is hence $a_i \cdot 50$ with no disutility from advantageous inequality. In S_2, B can also toss a fair coin which equalizes expected payoffs irrespective of A's choice and moreover, B can mix over her strategies such as to generate any distribution of chances on the one ex-post nonzero payoff she prefers. If B has a_B, b_B such that she cannot reach her preferred distribution of chances in S_1, she prefers S_2. Since payoffs are the same in LIE, SPY, and SABOTAGE, this decision is always identical. Unless participants differ systematically in their degrees of inequity aversion across treatments, preferences for equal expected payoffs are unlikely to explain any of the differences we observe between LIE, SPY, and SABOTAGE. Moreover, preferences for equal expected payoffs stipulate that individuals refer to social norms to judge which action is right.[29] In our setting, B participants' preferences to do so did not explain their choices of S_1, or their altruism in S_2. Both linked to a different moral ideal suggesting other preferences.[30]

Preferences for kind procedures (Sebald 2010). A and B may care for the *kindness* of a procedural choice (the kindness of a person who chooses a procedure is equal to the kindness of the distribution of outcomes which this procedure is expected to induce) and, upon observing a kind (unkind) procedural choice, be kind (unkind) in return. In our setting, it is commonly

of $0.01 \cdot (95 - 75) = 0.2$ ECU. Hence, the 95 ECU which B earns from making S_2 sure are her maximal payoff.

[29] Preferences for equal expected payoffs are built around a social norm that parties' outcomes should ex-ante be equal. The moral judgement test which we use elicits individuals' preferences over these ideals, and hence, test whether the 'necessary conditions' for inequity aversion, reciprocity, guilt aversion etc. hold.

[30] Theoretically, social norms may stipulate that carrying out activities such as lying and sabotaging, is per se morally more severely wrong than spying. Two conflicting norms in each treatment – stipulating expected payoff equality versus avoiding the unfair procedure S_2 – with the second having a different power of attraction in LIE, SPY, and SABOTAGE might therefore have explained some of the treatment differences which we report. Empirically, however, we do not find any evidence that B participants' preference to invoke social norms guides their willingness to forego payoff in our setting.

known that A never observes B's procedural choice. However, A may hold expectations about B's procedural choice, and B may expect A to have such expectations. *a) suppose B expects A to expect S_2.* In this case, A expects to have no opportunity to reciprocate and she is always neutral toward B. This implies that B's payoff from reciprocity is zero and her preferences in S_2 coincide with self-interest: B chooses either $\{B : RL^A, A : \{\cdot\}\}$, or $\{B : LR^A, A : \{\cdot\}\}$ which earn her $100-5 = 95$ ECU. *b) suppose instead that B expects A to expect S_1.* When B is called upon to choose between L and R, she can only choose between efficient strategies: neither L nor R destroy the pie. If B believes A plays L with probability q_L and R with $1-q_L$, B's kindness in choosing L equals $q_L \cdot 100+(1-q_L)\cdot 0-(q_L \cdot 100+(1-q_L)\cdot 0+q_L \cdot 0+(1-q_L)\cdot 100)/2$.[31], and her kindness in choosing R equals $q_L \cdot 0+(1-q_L)\cdot 100-(q_L \cdot 100+(1-q_L)\cdot 0+q_L \cdot 0+(1-q_L)\cdot 100)/2$. If B believes that A tosses the fair coin, i.e. $q_L = 0.5$ which is the only Nash-equilibrium in S_1, then B's choice of L and R is exactly neutral toward A. Since B is not unkind in equilibrium, A need not reciprocate, and the payoffs from reciprocity in S_1 are Zero. Hence, A and B implement the selfish solution and each tosses a fair coin which yields both players 50 ECU. Even B participants who prefer kind over unkind procedures therefore opt into S_2 which earns them $100 - 5$ ECU. This holds for LIE, SPY, and SABOTAGE. Moreover, preferences for kind procedures stipulate that players derive utility from procedural choices which intend to induce kind outcomes whereby an outcome is kind if it satisfies some norm of payoff equality. We could not confirm that individuals' tendency to invoke social norms or intentions when judging the right and wrong of an action statistically explained any departures from rational self-interest in LIE, SPY, or SABOTAGE.

Guilt aversion. If B is guilt-averse, she wishes to avoid disappointing A's payoff expectations, or wishes to avoid being blamed by A for doing so (Battigalli and Martin Dufwenberg 2007). In phase two, we elicited B's expectations about A's symbolic punishment or reward plan for a broad range of procedural choices[32] – symbolic in the sense that punishment and reward are too small to induce reciprocal motives. These symbolic punishment and reward plans contain compound information how much A disapproves of a given procedural choice, and of the corresponding allocation choice she expects. B in turn could expect symbolic punishment when she believes A expects to be let down, and a symbolic reward otherwise. However, B's expectations about A's punishment and reward plans are inconsistent with this idea. B participants expect more symbolic punishment for choosing the unfair set of rules S_2 in SPY than for choosing it in LIE (one-sided Wilcoxon Rank Sum tests, *p-value* < 0.01 for

[31] $q_L \cdot 100 + (1 - q_L) \cdot 0$ is A's payoff from B choosing L when B believes A plays L with probability q_L This payoff is compared to the average payoff for A over all pure strategies which are still available to B at a given node: since B can still choose between L and R, this average payoff for A over B's pure strategies L and R is: $(q_L \cdot 100 + (1 - q_L) \cdot 0 + q_L \cdot 0 + (1 - q_L) \cdot 100)/2$. A payoff for A equal to this average payoff is neutral, payoffs for A greater than this average are kind (M. Dufwenberg and Kirchsteiger 2004).

[32] A's expectations about B's choice of the interaction structure, and B's choice of the allocation may differ across LYING, SPYING, and SABOTAGING, for instance, because there are different social norms regarding lying, spying, or sabotaging which may in turn imply that the shares of individuals in the population who lie, spy, and sabotage differ, or because individuals also hold expectations whether or not others lie, spy, or sabotage, and expect others to have such expectations, too.

$\alpha \in]0.5, 0.75[$, for $\alpha \in]0.75, 0.99[$, and for $\alpha = 1$). Expectations between LIE and SABOTAGE or SPY and SABOTAGE do not differ. Hence, B's frequent choices of S_2 in SPY as compared to the rare choices of S_2 in LIE cannot be explained by a desire to avoid what A would *not* like B to do, or explain why we observe no altruism in SPY. Also, the normative ideal underlying guilt-aversion – that individuals invoke others' expectations to derive the right action – neither explained B participants' procedural nor their allocation choices. Guilt aversion is therefore unlikely to explain any differences between LIE, SPY, and SABOTAGE.

Purely Procedural Preferences. B participants may have ethical concerns against distributing rights of information or decision rights unequally across parties (Chlaß, Güth, and Miettinen 2009). Suppose B's linear utility function includes the following element: $-\beta_B max\{\#\mathcal{I}_B^z - \#\mathcal{I}_A^z, 0\} - \alpha_B max\{\#\mathcal{I}_A^z - \#\mathcal{I}_B^z, 0\}$ where $\#\mathcal{I}_A^z - \#\mathcal{I}_B^z$ measures the difference between the cardinalities of party A's and B's information partitions over the terminal histories $z \in Z$ of a game, and α_B and β_B express B's aversion against advantageous, or disadvantageous inequality in information rights, respectively. Starting with SPY, B knows her own, but not A's choice in S_1. B's information partition over the four terminal nodes of S_1 therefore has cardinality two. In S_2, B's information partition over the four terminal nodes has cardinality four: she knows the terminal node of the game for sure. Since A does not know the interaction structure, her information partition has cardinality eight irrespective of the interaction structure chosen by B. B's choice of S_1 does therefore not much improve A's relative position of information rights. In LIE and SABOTAGE, B's information partition over the terminal nodes has cardinality two in S_1 and S_2; A's cardinality is always eight. Suppose, however, that in LIE and SABOTAGE there is a similar concern against the unequal distribution of decision rights. B's utility function might include element $-\beta_B max\{\#S_B - \#S_A, 0\} - \alpha_B max\{\#S_A - \#S_B, 0\}$ where $\#S_B - \#S_A$ counts the difference in cardinalities between parties' pure strategy sets, counting only such strategies which induce genuinely different outcomes. Then, B has two pure strategies which expand her freedom of choice in S_1 and two S_2[33]. A in turn has two pure strategies in S_1, and one (or zero) in S_2. Therefore, B holds the power to grant A's equality in decision rights through opting for S_1. Inequity aversion over the distribution of rights could therefore explain the amount of altruism in LIE and SABOTAGE and its absence in SPY; it could also explain the decline of altruism in the payoff neutral-setting where B has neither the power to rectify the distribution of information, nor decision rights. Indeed, the moral ideal underneath B's altruism in this paper is identical to the moral ideal underlying Chlaß, Güth, and Miettinen's (2009) *purely procedural preferences*. However, *purely procedural preferences* cannot explain why the ethical ideal they spring from has different behavioural implications *within* LIE, SPY, and SABOTAGE: how they can motivate some individuals to prefer S_1, and others to prefer S_2 and give all payoff away.

Preferences for power & control. If B prefers to maintain power and control (Bartling,

[33]The degree to which those two expand B's freedom of choice is, however, greater in S_2 than S_1.

Ernst Fehr, and Herz 2014), she maximizes her utility by opting for interaction structure S_2 where she exerts full power over the allocation. In S_2, she holds the exclusive right to decide and implements whatever allocation she prefers. Preferences for power and control can therefore not explain the differences in procedural choices and altruism in s_2 across LIE, SPY, and SABOTAGE. Similarly, the finding that procedural choices and altruism in S_2 should link to ethical ideals about the equality of individual rights suggests a simple preference for power is not at play[34]. Preferences for power can, however, explain why the exact same ethical ideal about the equality of rights underlies B participants' choices of S_1, and their altruism in S_2. B participants who prefer power and control prefer to opt into S_2 and give payoff away to compensate A for her unequal rights; those who dislike exerting power would opt into S_1 and actually grant A equal decision rights. Indeed, we find that B participants who likely value power – who score high on Klages's materialism values – rather opt into S_2 whereas those who value the autonomy of the individual – Klages's postmaterialists – opt into S_1. This holds equally for treatments LIE and SABOTAGE where we elicit these values. The same logic applies if B participants' preferences for power would ultimately stem from a dislike of having others interfere with their own decisions (Neri and Rommelsperger 2014): in S_2, nobody can interfere with B's decision and she can impose whatever allocation she prefers.

risk attitudes. In both interaction structures S_1 and S_2, B chooses between the same ex-post payoffs – 100 ECU, or 0 ECU. Only in S_2, however, she can obtain 100 ECU for sure. Risk averse B participants would therefore always prefer S_2. Since B cannot obtain a higher ex-post payoff than these 100 ECU through incurring additional risk, also risk-loving or risk-neutral B participants prefer S_2 where they take all payoff for sure. Risk attitudes can therefore not explain the variations of altruism across our LIE, SPY, or SABOTAGE treatments. Indeed, we could not confirm that risk attitudes explained B participants' choices of the interaction structures, or their altruism in LIE, SPY, or SABOTAGE.

experimenter demand effects. Other than having addressed any of these preferences, we might— despite a strictly neutral framing — have induced a social experimenter demand effect (Zizzo 2010) in that the existence of an experimenter, or the awareness of participating in an experiment affected B participants' behaviour. If so, a significant share of them should be motivated by a desire to satisfy our expectations and to behave in a way which pleases us. If so, Bs' behaviour should link to the extent by which they refer to others' (our own) expectations about their behaviour. We do not find that Bs' preferences to refer to i) others' expectations, or ii) or to be taken as a nice person when deciding about the right and wrong of an action explain any part of our findings.

[34] A preference for power would be a preference for maximizing one's own rights. The *purely procedural preferences* above build this idea into a framework of inequity aversion over decision rights (Chlaß, Güth, and Miettinen 2009) [one feels the infringement of one's own rights more immediately than one feels the infringement of another individual's rights], a preference for power would imply a disutility from having *less* decision rights, i.e. losing control over the payoff distribution to other individuals, but no disutility at all from having *more* decision rights than others.

7 Conclusion

This paper studies by which degree, how, and why, individuals compete either fairly, or unfairly with an opponent for one ex-post nonzero payoff. In an experimental setting, one party chooses the rules of a constant sum game: she can opt into a constant sum game where neither she, nor her opponent has information about the other's choice, and both parties have equal decision rights. She can also opt into a constant sum game where she manipulates the consequences of her opponent's action (SABOTAGE), or spies the opponent's choice (SPY), or fabricates and reports this choice to a third party who makes this report payoff-relevant (LIE). A party may sabotage, spy, or fabricate to take all payoff, or to give all payoff away. The material incentive to do so is identical across SABOTAGE, SPY, and LIE.

Our results are first, that individuals resort more often to sabotage and spying than they resort to fabrication. Specifically when the game cannot be won for sure through fair competition, sabotage and spying attempts nearly double from 35% to 70%. Attempts to actively fabricate are comparatively rare and hardly vary.

Second, the amount of altruism across situations in which individuals fabricate, spy, or sabotage, differs substantially. Specifically when individuals can only win the game for sure through unfair competition, 68% of all individuals who fabricate information end up giving all payoff to their opponent, 71% of those who sabotage give all payoff away but *everybody* who spies does so to take all payoff.

Individuals who opt into fair competition and those who opt into unfair competition but end up giving all payoff away forego substantial amounts of payoff. To understand the motives underlying these departures from rational self-interest, we elicit the moral ideals which individuals invoke to judge whether an action is right or wrong (G. Lind 1978, 2008)[35]. We use the entire set of moral preferences elicited for each individual to model her i) choice of the fair set of rules, or her ii) choice of the unfair set if she gives all payoff away and contrast each behaviour with those participants who compete unfairly to win the game. Surprisingly, both departures from rational self-interest link to the same moral ideal. The more an individual invokes the equality of individual rights and the social contract when judging about the right or wrong of an action, the more likely she opts into fair competition, and the more likely she fabricates or sabotages to benefit the opponent. We conclude that fabrication and sabotage induce a psychological cost through infringing the opponent's position of rights and that individuals forego material payoff to rectify this infringement.

The key to understanding why the two types adopt different strategies to rectify the op-

[35]Sociologist Jean Piaget and psychologist Lawrence Kohlberg did the first early field work on the types of moral argumentation which individuals actually use when making a moral judgement. In Georg Lind's (1978) test, subjects are asked to make a moral judgement about i) workers who break into a factory to steal evidence about a company's crime and ii) a doctor who medically assists suicide upon a patient's request. Once subjects have stated their opinion, they are presented with different arguments to judge that protagonist's behaviour. Each argument belongs to a certain type of moral argumentation (Kohlberg 1969, 1984).

ponent's position of rights are their scores along the well-known materialism-postmaterialism value scales. The more an individual values power and hierarchy (materialism), the more often they lie or sabotage to give all payoff to the opponent. The more individuals value individual autonomy and dislike power (postmaterialism), the more they prefer to grant their opponent the same rights and to compete fairly with her. Both types therefore seem to adopt different strategies to rectify the violation of the same moral ideal.

The only preference type to date which consistently explains the variation of altruism which different types of unfair competition induce are Chlaß, Güth, and Miettinen's (2009) purely procedural preferences which describe inequity aversion over the distribution of decision and information rights: if only unfair competition wins the game for sure, an individual depletes her opponent's relative position in terms of decision rights through fabrication, and sabotage; spying hardly deteriorates the opponent's relative position in terms of information rights further since all activities are clandestine anyway, i.e. the opponent does not know she is being spied. If fair, and unfair competition can win the game for sure, an individual's decision to compete unfairly merely takes payoff-irrelevant decision rights from the opponent and does therefore not deteriorate the opponent's freedom of choice: in this case, fabrication and sabotage do not deteriorate the opponent's position of rights and no payoff need be foregone to compensate her. This is exactly what we observe.

The heterogeneity in individuals' attitudes toward lying and sabotage is so substantial that one may well entertain doubts whether competition selects the highest quality if such activities are possible at all: if a highly talented individual has strong reservations against sabotaging others while a less talented competitor has not and manages to successfully sabotage the former, competition will not correctly sort qualities, and have very different welfare effects than economics relies upon.

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A Screenshots

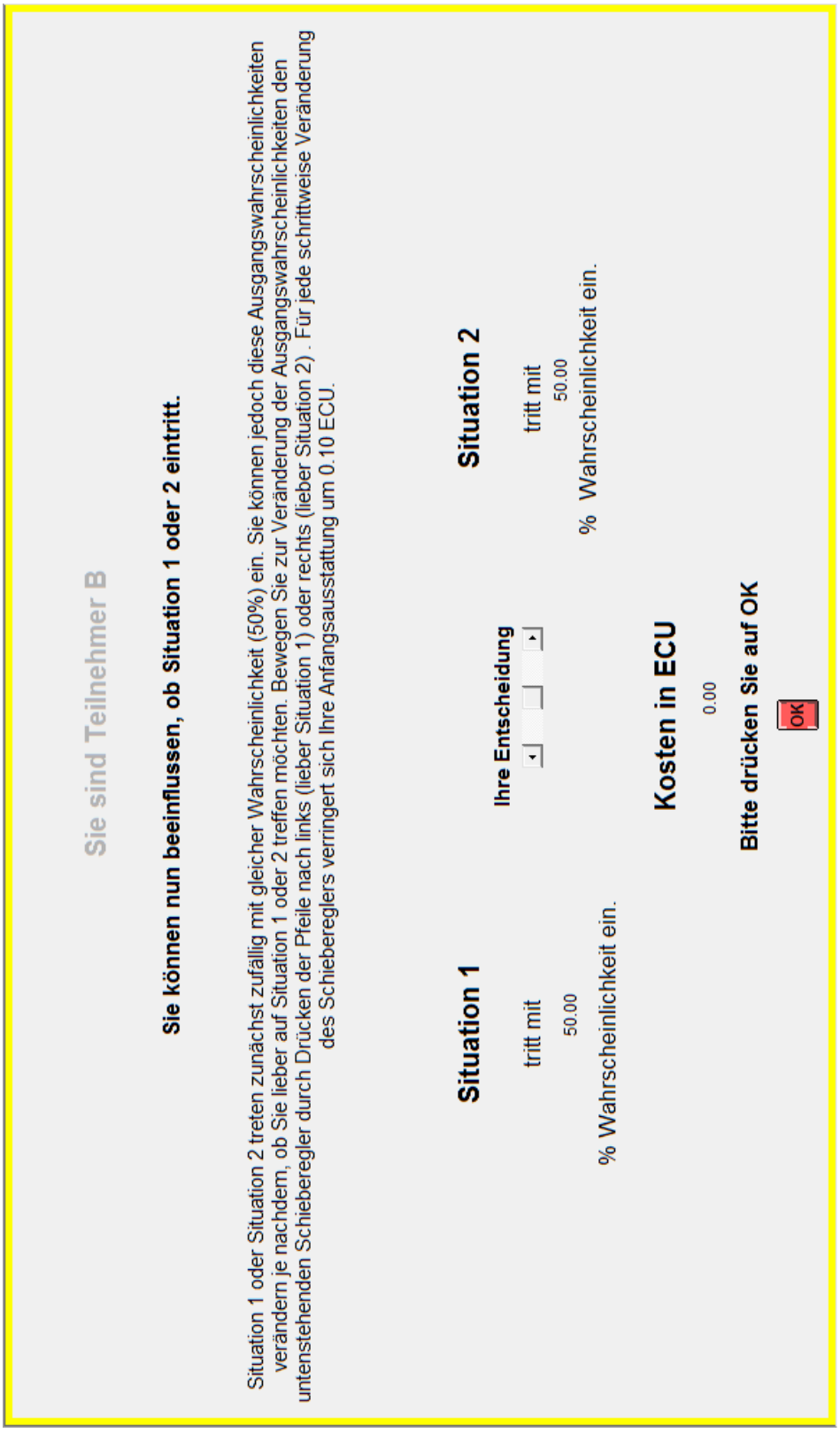

Figure 6: *B*'s probability choice of the situation[36]

Figure 7: *B*'s decision screen in the unfair set of rules, treatment SPY.

Figure 8: B's DECISION SCREEN IN THE UNFAIR SET OF RULES, TREATMENT SABOTAGE.

Figure 9: *B*'s decision screen in the unfair set of rules, treatment LIE.

B Normal form representation of the payoff neutral regime.

Table 8: Payoff neutrality: party B does not gain additional freedom of choice through spying, sabotaging, or fabricating A, and does not infringe A's freedom of choice.

8a) the 'fair' set of rules

		party A L	party A R
party B	L	100 0	100 0
	R	0 100	0 100

8b) the 'unfair' set of rules

		party A L	party A R
party B	LL^A	100 0	100 0
	RL^A	0 100	0 100
	LR^A	100 0	100 0
	RR^A	0 100	0 100

C Normal form representation of the competitive payoffs regime with symbolic reward and punishment (Chlaß and Riener 2015).

Table 9: A's symbolic punishment and reward option makes her relative position of rights more equal to B's: A can reduce (or increase) the extent to which B prefers L over R by 30 ECU, and reduce/increase the extent to which B prefers RL^A or LR^A over LL^A and RR^A by 30 ECU in S_2.(ibid.)

9a) the 'fair' set of rules

		party A L	party A R
party B	L	$100-[0,30]$ $0+[-30,30]$	$100-[0,30]$ $0+[-30,30]$
	R	$0-[0,30]$ $100+[-30,30]$	$0-[0,30]$ $100+[-30,30]$

9b) the 'unfair' set of rules

		party A L	party A R
party B	LL^A	$100-[0,30]$ $0+[-30,30]$	$100+[0,30]$ $0+[-30,30]$
	RL^A	$0-[0,30]$ $100+[-30,30]$	$0-[0,30]$ $100+[-30,30]$
	LR^A	$100-[0,30]$ $0+[-30,30]$	$100-[0,30]$ $0+[-30,30]$
	RR^A	$0-[0,30]$ $100+[-30,30]$	$0-[0,30]$ $100+[-30,30]$

D Defining sabotage: Max and Moritz (Busch 1906).

Figure 10: Max and Moritz fill their teacher's pipe with black powder.

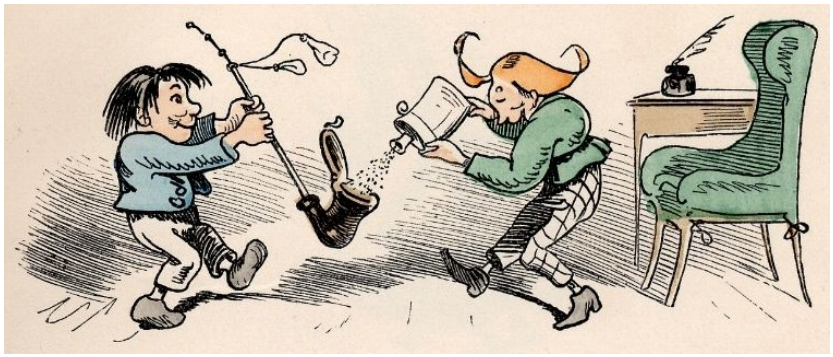

Figure 11: Lighting the pipe has now a new consequence for the teacher.

E Experimental Results: Absolute figures

Number of B-participants paying for interaction structure S_1 ('fair') and S_2 ('unfair') per treatment

treatment	LIE[37]				SPY				SABOTAGE			
payoff regime	payoff neutral		competitive		payoff neutral		competitive		payoff neutral		competitive	
#nr. of B players	#47		#44		#53		#53		#52		#54	
interaction structure	S_1	S_2	S_1	S_2	S_1	S_2	S_1	S_2	S_1	S_2	S_1	S_2
% who pays	8	3	9	5	2	19	5	36	4	18	2	37
median change of α	13%	30%	10%	20%	25%	20%	50%	25%	17.50%	20%	16%	25%
% who does not pay	36		30		32		12		30		15	

Table 10: Choices over Procedures for all treatments.

Which allocation do B-participants impose when they hold the power to do so?
selfish: (payoff B: 100, payoff A: 0); altruistic: (payoff B: 0, payoff A: 100)

treatment	LIE[38]			SPY			SABOTAGE		
payoff regime	payoff neutral		competitive	payoff neutral		competitive	payoff neutral		competitive
interaction structure	S_1	S_2	S_2	S_1	S_2	S_2	S_1	S_2	S_2
# nr. of B players.	#25	#22	#25	#20	#33	#40	#22	#30	#28
selfish	20	17	8	18	31	40	18	26	8
equal chance	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
altruistic	5	5	17	2	2	0	4	4	20

Table 11: B's choices of the payoff allocation in the 'fair' (S_1) and the 'unfair' (S_2) interaction structures.

[37] A brief reading example: In treatment LIE with neutral payoffs, there were 47 B participants. Eight of them paid for S_1 and three for S_2. The eight who paid for S_1 made at the median, S_1 13% more likely than S_2. The three who paid for S_2, made, at the median, S_2 30% more likely than S_1. 36 of 47 B participants left the default 50-50 chance of arriving in either S_1 or S_2.

[38] A brief reading example: In treatment LIE with payoff neutrality B can impose her preferred allocation in S_1 and S_2. Out of 47 B participants, 25 arrived in S_1. 20 of them kept all payoff for themselves, five gave all payoff away, and nobody tossed a coin. The remaining 22 B participants arrived in S_2. 17 of them kept all payoff, five gave all payoff away, nobody tossed a coin. Under competitive payoffs, B can only impose the allocation in S_2. Out of 44 B participants, 25 arrived in S_2, eight of which kept all payoff, and seventeen of which gave all payoff away. Nobody tossed a fair coin.

F Kohlberg's six ways of moral argumentation

Table 12: Six ways of moral argumentation (summary by Ishida 2006, examples from the authors).

argumentation	Classes of motivation for moral behavior	It is good not to lie/spy/sabotage the opponent because...
preconventional way	***Class 1.*** Orientation to punishment and obedience, physical and material power. Rules are obeyed to avoid punishment. ***Class 2.*** Naïve hedonistic orientation. The individual conforms to obtain rewards.	...I can be punished If do; ...because I'll get a reward if I do not.
conventional way	***Class 1.*** "Good boy/girl" orientation to win approval and maintain expectations of one's immediate group. The individual conforms to avoid disapproval. One earns approval by being "nice". ***Class 2.*** Orientation to authority, law, and duty, to maintain a fixed order. Right behavior consists of doing one's duty and abiding by the social order.	...recipient or experimenter expect me to/will think I am a nice person ...because it is the norm not to do so; ... because it is against the law; ... because doing so would endanger all order in our society
postconventional way	***Class 1.*** Social contract orientation. Duties are defined in terms of the social contract and the respect of others' rights. Emphasis is upon equality and mutual obligation within a democratic order. ***Class 2.*** The morality of individual principles of conscience, such as the respect for the individual will, freedom of choice etc. Rightness of acts is determined by conscience in accord with comprehensive, universal and consistent ethical principles.	...the opponent's civic rights to privacy, and to democratic participation must be respected, or else be compensated; ... the opponent must as an equal human being be free to choose, to state her own will or else be compensated.

G An Excerpt of the Moral Judgement Test by Georg Lind (1976, 2008)

Doctor

A woman had cancer and she had no hope of being saved. She was in terrible pain and so weak that a large dose of a pain killer such as morphine would have caused her death. During a temporary period of improvement, she begged the doctor to give her enough morphine to kill her. She said she could no longer stand the pain and would be dead in a few weeks anyway. The doctor decided to give her a overdose of morphine.

Do you agree or disagree with the doctor's action ...

I strongly disagree — I strongly agree

-3	-2	-1	0	1	2	3

How acceptable do you find the following arguments *in favor* of the doctor's actions?
Suppose someone argued he acted *rightly*...

...because the doctor had to act according to his conscience. The woman's condition justified an exception to the moral obligation to preserve life

I strongly reject — I strongly accept

-4	-3	-2	-1	0	1	2	3	4

. . .

...because the doctor was the only one who could fulfill the woman's wish; respect for her wish made him act as he did.

I strongly reject — I strongly accept

-4	-3	-2	-1	0	1	2	3	4

How acceptable do you find the following arguments *against* the doctor's actions?
Suppose someone argued he acted *wrongly*

. . .

...because he acted contrary to his colleagues' convictions. If they are against mercy-killing the doctor shouldn't do it.

I strongly reject — I strongly accept

-4	-3	-2	-1	0	1	2	3	4

. . .

...because one should be able to have complete faith in a doctor's devotion to preserving life even if someone with great pain would rather die

I strongly reject — I strongly accept

-4	-3	-2	-1	0	1	2	3	4

NOTE: This excerpt of the moral judgement test MJT is reprinted with kind permission by Georg Lind. It does not faithfully reproduce the formatting of the original test. For ease of readability, the original test numbers each item, and the alignment slightly differs from this excerpt. The dots represent items which have been left out. The full test cannot be published due to copyright protection.

H Klages's and Gensicke's (2006) materialism - postmaterialism scales[39]

Table 13: Questionnaire items for each of Klages's and Gensicke's three value dimensions to identify materialists, postmaterialists, and mixed types in the German population (Helmut Klages and Gensicke 2006).

value category I duty and acceptance values	**value category II hedonistic and materialistic values**	**value category III idealistic values and public participation**[40]
✓ respect law and order	✓ have a high living standard	✓ develop one's fantasy and creativity
✓ need and quest for security	✓ hold power and influence	✓ help socially disadvantaged and socially marginal groups
✓ be hard-working and ambitious	✓ enjoy life to the full	✓ also tolerate opinions with which one actually cannot really agree
	✓ assert oneself, and one's needs against others	✓ be politically active

conventionalists	high scores on value category I. Intermediate scores for value categories II and III. Clear hierarchy between both value categories → approximation of Inglehart's materialists (Helmut Klages and Gensicke 2006).
idealists	high scores on value category III. Intermediate scores for value category II. Clear hierarchy between both value categories. Lower scores on value category I than conventionalists → approximation of Inglehart's postmaterialists (Helmut Klages and Gensicke 2006).
hedonic materialists	Score lower than conventionalists in value category 1. Score lower than idealists in value category III. No hierarchy in importance of value categories (all similarly important). One of Inglehart's 'mixed types' – neither materialist, nor postmaterialist.
resigned without perspective	lower scores on value category I than conventionalists. lower scores on value category III than idealists. Comparably low cores on value category II as conventionalists and idealists. Clear hierarchy in importance of values. One of Inglehart's 'mixed types' – neither materialist nor postmaterialist
realists	no value hierarchy, all three categories similarly important; 'synthesis' of values. One of Inglehart's 'mixed types' –neither materialist, nor postmaterialist.

[39] Klages and Gensicke (2006) use these value categories to characterize the types which are described below: conventionalists, resigned people, realists, hedo-materialists, and idealists. In this paper, we do not cluster people into these groups; we use the importance which each individual attributes to a given dimension – taking the mean rank over all questionnaire items pertaining to the same category of values – and use these three ranks per individual to model their choice of the fair rules as opposed to their altruism under the unfair rules.

[40] Value category III corresponds to Ingelhart's postmaterialism values. In Klages' value synthesis, genuine postmaterialists have high scores on idealistic values and public participation, and low scores on hedonistic and materialist values (value category II). Higher ranks on value category III make the procedural type i) in

I B participant types: do demographics, or other moral preferences play a significant role?[41]

PROCEDURAL TYPE (I)			ALTRUISTIC TYPE (II)		
Argument	*Effect*	*std.err.*	*Argument*	*Effect*	*std.err.*
lie	0.49	0.17^a	*lie*	0.50	0.04^a
postclass 1	0.16	0.08^b	*sabotage*	0.49	0.05^a
postclass 2	-0.15	0.07^b	*postclass 1*	0.10	0.03^a
[*risk aversion*	-0.04	0.04]	[*risk aversion*	0.01	0.02]
[*Age*	0.00	0.02]	[*Age*	0.00	0.01]
[*Gender:male*	0.08	0.12]	[*Gender:male*	0.04	0.06]
[*Envy*	0.06	0.12]	[*Envy*	0.02	0.06]
[*sabotage treatment*	0.05	0.16]	[*Kohlberg class 1*	-0.10	0.04^b]
[*Kohlberg class 1*[42]	-0.20	0.21]	[*Kohlberg class 2*	-0.01	0.05]
[*Kohlberg class 2*	0.09	0.12]	[*Kohlberg class 3*	0.05	0.04]
[*Kohlberg class 3*	0.11	0.11]	[*Kohlberg class 4*	0.05	0.05]
[*Kohlberg class 4*	0.02	0.12]	[*Kohlberg class 5*	-0.00	0.05]

Table 14: WHICH DETERMINANTS MAKE THE PROCEDURAL TYPE (I) (N=56), AND THE ALTRUISTIC TYPE (II) (N=121) MORE LIKELY THAN THE MOST SELFISH TYPE (IV)?
Note: The significance levels of the z-tests are indicated by $a : p < .01$, $b : p < .05$ $c :, p < .10$

PROCEDURAL TYPE (I) WITH (POST)-MATERIALISM SCORES		
Argument	*Effect*	*std.err.*
postclass 1	0.48	0.11^a
postclass 2	-0.40	0.11^a
materialism	-0.10	0.05^b
postmaterialism	0.20	0.04^a

Table 15: MODELING THE PROCEDURAL TYPE I) VS THE MOST SELFISH TYPE IV) ADDING B PARTICIPANTS' MATERIALISM AND POSTMATERIALISM SCORES, WHERE AVAILABLE (N=19)
Note: The significance levels of the z-tests are indicated by $a : p < .01$, $b : p < .05$ $c :, p < .10$

section 5 more likely. Value category II corresponds to Inglehart's materialism values. Higher ranks in this value category makes the altruistic type ii) in section 5 more likely. Value category I does not significantly influence B participants' choices in the experiment.

[41] The core model is a joint estimation of all variables without brackets. In brackets, we see which coefficients and significance levels would result if we jointly added risk attitudes, all demographics, all other Kohlbergian classes, and the sabotage dummy to the core model. Naturally, this extended model has higher variance, i.e. less precision, than the core morel and the insignificance of additional controls might be due to this fact. However, none of the additional variables in brackets would have a significant effect if it were added by itself, or in small groups with other controls, to the core model. Hence, the insignificance of all additional controls

FAIR-COIN TYPE (III) WITH (POST)-MATERIALISM SCORES		
Argument	*Effect*	*std.err.*
postclass 1	0.15	0.07^{b}
materialism	-0.15	0.03^{a}
postmaterialism	0.14	0.06^{b}
risk aversion	0.06	0.04

Table 16: WHICH DETERMINANTS MAKE TYPE III) WHO TOSSES A FAIR COIN BETWEEN THE INTERACTION STRUCTURES MORE LIKELY THAN THE MOST SELFISH TYPE IV) WITH B PARTICIPANTS' MATERIALISM AND POSTMATERIALISM SCORES WHERE AVAILABLE (N=16)
Note: The significance levels of the z-tests are indicated by $a : p < .01$, $b : p < .05$ $c :$, $p < .10$

J Purely Procedural Concerns crowd out under punishment/reward[43] (Chlaß and Riener 2015).

PROCEDURAL TYPE (I)			ALTRUISTIC TYPE (I)		FAIR COIN TYPE (III)	
Argument	*Effect*	*std.err.*	*Effect*	*std.err.*	*Effect*	*std.err.*
Kohlberg 1	−0.16	0.04^{a}	(−)	(−)	−0.10	0.04^{b}
Kohlberg 3	0.20	0.09^{b}	(−)	(−)	(−)	(−)
Kohlberg 4	0.14	0.06^{b}	0.11	0.05^{b}	(−)	(−)
postclass 1	−0.17	0.11^{b}	−0.15	0.05^{a}	0.03	0.05
expected punishment	0.08	0.04^{c}	0.17	0.04^{a}	0.35	0.10^{a}
expected reward	(−)	(−)	−0.07	0.04^{b}	−0.14	0.05^{a}
lie	(−)	(−)	0.56	0.05^{a}	(−)	(−)
sabotage	(−)	(−)	0.25	0.08^{a}	(−)	(−)

Table 17: CONTRASTING THE PROCEDURAL TYPE I), THE ALTRUISTIC TYPE II), AND THE FAIR COIN TYPE III) WITH THE MOST SELFISH TYPE IV) WHEN A CAN PUNISH OR REWARD B'S PROCEDURAL CHOICE.
Note: The significance levels of the z-tests are indicated by $a : p < .01$, $b : p < .05$ $c :$, $p < .10$

does not result from the inefficiency of the estimation.

[42]Turns insignificant if we start deleting other insignificant variables and is not significant if added to the core model.

[43]Binary logit models where the dependent variable is a pair of types: either type (I) vs the most selfish type (IV), or type (II) vs type IV) or type (III) vs type (IV). Kohlberg 1,3, and 4 correspond to the Kohlbergian ways of argumentation in classes 1, 3, or 4 from table 12 in section F. Variables which are insignificant and not of interest have been deleted from the specification, variable which have an effect on some, but not all types are marked with (−) when they are insignificant.