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An Experimental Analysis**

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## Abstract

Criminal procedure is organized as a tournament with predefined roles. We show that assuming the role of a defense counsel or prosecutor leads to role induced bias even if participants are asked to predict a court ruling after they have ceased to act in that role, and if they expect a substantial financial incentive for being accurate. The bias is not removed either if participants are instructed to predict the court ruling in preparation of plea bargaining. In line with parallel constraint satisfaction models for legal decision making, findings indicate that role induced bias is driven by coherence effects (Simon, 2004), that is, systematic information distortions in support of the favored option. This is mainly achieved by downplaying the importance of conflicting evidence. These distortions seem to stabilize interpretations, and people do not correct for this bias. Implications for legal procedure are briefly discussed.

Keywords: Coherence effects, Legal Decision Making, Biases, Parallel Constraint Satisfaction, Intuition

JEL: C91, D81, K14, K42

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## Introduction

Dramatic effects of social roles on behavior have been repeatedly demonstrated in social psychology (e.g., Haney, Banks, & Zimbardo, 1973; Janis & King, 1954; Thompson & Loewenstein, 1992; Vidmar & Laird, 1983; Zimbardo, 1965). It also has been shown that social theories are perseverant, once a subject has been induced to adopt them (Anderson, Lepper, & Ross, 1980), and that bias can result from a person being psychologically invested in a cause (Markman & Hirt, 2002). It has been discussed that this bias is highly relevant for law because roles influence (and often limit) choices (Sunstein, 1996), as well as preparatory acts, like the search for evidence (O'Brien, 2009). Role induce bias might also be one of the causes for attorneys overconfidence in predicting case outcomes (Goodman-Delahunty, Granhag, Hartwig, & Loftus, 2010). In the current paper, we are interested in the cognitive mechanisms that are induced by assuming the role of one or the other side in a legal dispute. Specifically, we focus on the mechanism of coherence construction (Robbennolt, 2004; Simon, 2004; Thagard, 2003) which might induce prosecutors and counsels for the defense to be—partially unbeknownst to themselves—biased by the role that has been assigned to them.

## Coherence Construction by Parallel Constraint Satisfaction

Coherence construction models assume that legal decision making is based on constructing and evaluating coherent interpretations or stories from the available pieces evidence (see Pennington & Hastie, 1988, for a classic approach). Formally, this can be implemented in parallel constraint satisfaction (PCS) models using symbolic networks (Glöckner & Betsch, 2008; Holyoak & Simon, 1999; Robbennolt, 2004; Simon, 2004; Spellman, 2010; Thagard, 2003). PCS models basically assume that automatically spreading activation processes lead to constructing the best (i.e., most coherent) interpretation—in the case of criminal procedure: a story about what happened that purportedly led to crime—under parallel consideration of all constraints resulting from the evidence and all logical relations. This is achieved in an overall evaluation of the structure of the evidence, which leads to increasing the weight given to (i.e., the activation of) information speaking for the strongest option and by decreasing the weight given to information speaking against it. Information is thus polarized (Simon, 2004, p. 523). This systematic reevaluation of the evidence is called a coherence shift<sup>1</sup> (Holyoak & Simon, 1999) or coherence effect (Simon, 2004). Coherence shifts have been demonstrated in a wide variety of tasks (e.g., Brownstein, Read, & Simon, 2004; DeKay, Patino-Echeverri, & Fischbeck, 2009a; DeKay, Patino-Echeverri, & Fischbeck, 2009b; Glöckner, Betsch, & Schindler, 2010; Russo, et al., 2008; Russo, et al., 1998; Simon, Krawczyk, Bleicher, & Holyoak, 2008; Simon, Krawczyk, & Holyoak, 2004) and particularly for legal judgments (Carlson & Russo, 2001; Glöckner & Engel, 2008; Holyoak & Simon, 1999; Simon, 2004). It has, however, been shown that coherence effects are transient and disappear after some time (Simon, Krawczyk,

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1 In a different research tradition, it is also referred to more generally as predecisional information distortion (e.g., Bond, Carlson, Meloy, Russo, & Tanner, 2007; Brownstein, 2003; Russo, Carlson, Meloy, & Yong, 2008; Russo, Meloy, & Medvec, 1998).

et al., 2008). In three studies we investigate in how far coherence effects drive role-induced bias and whether individuals are able to correct for the bias when being motivated to so.

## **Previous Research on Role-Induced Bias**

Role-induced bias has already been demonstrated in a previous study (Simon, Snow, & Read, 2004). Participants were asked to assume the role of a third year law student assigned to a retired judge who serves as an arbitrator in labor law disputes. Participants were informed that the judge had already heard the evidence and taken her decision (the contents of which was unknown to the participants). In the cover story, it was announced that participants would later be asked to assist the judge in drafting her opinion (which actually did not happen). After reading the evidence, participants were asked to give their own verdicts. Simon et al. found significant biases on judgment induced by assigned roles, and coherence shifts in the direction supporting them.

In a further study, Simon, Stenston, and Read (2008) instructed participants to investigate a university cheating case to prepare an adversarial hearing. Participants were assigned different roles, either to investigate the case on behalf of the university or of the student, but they were also instructed to be fair and objective. Besides replicating the finding that role assignment leads to biased judgment and coherence shifts, Simon et al. showed that role assignment led participants to wish that their side would win. Using the same paradigm, it could be shown that the degree of partisanship, that is how strongly participants wanted their side (role) to win, increases the bias in judgments and information distortions (Simon, Stenstrom, & Read, 2009). A structural equation model analysis revealed a good fit of a model assuming that the effect of partisanship on judgments of guilt was simultaneously mediated by motivation and coherence shifts. It is the aim of this study to disentangle both causes, and to test whether role induced bias is even present if it is in conflict with participants' induced motives.

## **Mechanisms Causing Role Induced Bias**

Role induced bias might be caused by deliberate, motivated reasoning (Kunda, 1990).<sup>2</sup> Individuals might come to the conclusion that is mandated by their role, which would account for the motivational effect observed by Simon et al. (2008; 2009) and would be in line with research in social psychology (e.g., Janis & King, 1954; Zimbardo, 1965). Yet the bias might also emerge unintentionally (Kunda & Thagard, 1996; Monroe & Read, 2008), which could be explained by the automatic activation of unconscious goals in PCS networks. Furthermore, role-induced bias might be caused by confirmatory information search (e.g., Betsch, Haberstroh, Glöckner, Haar, & Fiedler, 2001; Fiedler, 2000; O'Brien, 2009; Snyder & Swann, 1978; Wason, 1960); people might mainly look up information supporting the hypothesis they have already formed, or they think is desired by their role.

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2 It should, however, be noted that motivated reasoning is not necessarily only a deliberate process (see also below).

If the bias was intentionally or unintentionally formed by motivated reasoning, one should expect it to disappear when motivational goals are changed. It is the primary purpose of our experiments to test whether role induced bias is lasting, even if participants have no longer any reason to be biased and if, to the contrary, they are motivated to judge neutrally. In this respect, PCS models are skeptical. Once induced, the bias should prevail even if goals change, and it should be relatively hard for people to form alternative interpretations. This prediction results from the fact that interpretations, once they have been formed, stabilize themselves by coherence shifts in the respective direction (Read, Vanman, & Miller, 1997). Stated differently, after forming the preferred interpretation, all pieces of evidence are viewed in the light of this interpretation, and their evaluation is biased to support it. Hence, adding single pieces of evidence will often not lead to changes in interpretation (there will be no accommodation). Rather the new information will be reevaluated to match the overall interpretation (there will be assimilation) (see Simon, 2004, for a discussion of this effect related to jurors failure to exclude inadmissible evidence). This could induce people to stick to their initial interpretation instead of correcting for role-induced bias even if they are no longer acting in the assigned role and have an incentive to form a more balanced view (see Experiments 1 and 2), or if, while the role persists, it now calls for accuracy, not for persuasion (see Experiment 3). Recent studies on the *Einstellung* (set) effect demonstrate such unintended stickiness effects even for (chess-) experts, showing that initially formed interpretations unconsciously bias further information processing against the explicit intent to look for alternatives (Bilalic, McLeod, & Gobet, 2008, 2010). However, findings on the transience of coherence effects (Simon, Krawczyk, et al., 2008) might indicate that also role-induced bias disappear after a cooling off period.

## **Policy Implications**

It is of high public interest to identify and reduce biases in legal decision making, and a large literature in the fields of law and psychology (see Daftary-Kapur, Dumas, & Penrod, 2010, for a recent review; e.g., Englich, Mussweiler, & Strack, 2005; Hastie, Schkade, & Payne, 1999a, 1999b) and empirical legal studies (e.g., Guthrie, Rachlinski, & Wistrich, 2000; Guthrie, Rachlinski, & Wistrich, 2007; Jolls & Sunstein, 2006; Korobkin, 2003; Rachlinski, 2006; Wistrich, Guthrie, & Rachlinski, 2005) is concerned with this issue. Our study contributes to this literature in that it informs policy makers about the robustness of role induced bias, and about the possibility to remove the bias by changing incentives.

Studies on settlements in tort cases provide a first indication that role-induced biases might even prevail in such situations (Loewenstein, Issacharoff, Camerer, & Babcock, 1993). In a deliberately ambiguous situation, participants were randomly assigned to the roles of plaintiff and defendant and asked to negotiate the settlement of a tort case. Payoffs depended on the negotiation outcome. Additionally, participants were informed that a real judge had already taken a decision and they were asked to predict his verdict, before they engaged in negotiations. If they came close enough, they received a bonus payment. While the negotiation range

was US\$ 10, the bonus was at most US\$ 1. Relative to the income from negotiating effectively, the bonus was thus relatively small. The predictions were influenced by assigned roles, but to a smaller degree than their judgment about a “fair” settlement price. The authors explain their overall pattern of results by the self-serving interpretation of fairness. The aim to earn more money in the experiment activated different fairness norms which in turn lead to differences in predictions and judgments. Later contributions demonstrate that the bias requires knowing the role (Babcock, Loewenstein, Issacharoff, & Camerer, 1995), that it can also be shown in the field (Babcock & Loewenstein, 1997), that it is reduced by damage caps (Babcock & Pogarsky, 1999) and by split-award statutes (Landeo, 2009).

## **Our Contribution**

Our main contribution is to test whether the mere assignment of a role biases judgment, even if the bias is no longer self-serving and if there are medium (Experiment 1) or high (Experiment 2) monetary incentives to correct for it. To that end we remove any motivational element for participants to bias judgment and give people a clear and explicit incentive to overcome potential biases in their predictions of the court ruling. We do so by two interventions. As in (Loewenstein, et al., 1993), we ask our participants to predict. But unlike the earlier experiment, in our experiment *only* prediction is incentivized. Also participants are not asked to predict *before*, but *after* acting in their assigned roles. Therefore when making their predictions, participants no longer have any pecuniary or moral reason to fulfill role expectations. Actually when they stay influenced by their previous role, they know this is likely to decrease their payoff. For predicting (postdicting) a court decision is the only task that is left, and the only monetary incentive present in the entire experiment. In the third experiment we induce an intrinsic motivation to correct for role-induced bias by making clear to the participants that a bias would be detrimental for their role and for the side they represent.

We also go beyond the literature in that we generate measures for the underlying mental processes. To that end, we add an information-board paradigm which allows for tracing peoples information search (e.g., Payne, Bettman, & Johnson, 1988). Additionally, we trace how the assignment of the role changes the valuation of the evidence. We thus measure coherence shifts (Holyoak & Simon, 1999). Using an exploratory account and without a definite hypothesis we record decision time to learn more about the underlying mental process (cf. Glöckner, 2009; Glöckner, 2010). Finally, the fact that we use a real criminal case with official model jury instructions and let people sketch pleadings should increase external validity.

## Hypotheses

Based on a PCS perspective, we predict that people assigned to the roles of defense counsel or prosecutor show role-induced biases even if they are asked to postdict a court decision after they have finished acting on the role and if they have a medium (Experiment 1) or high (Experiment 2) monetary incentive or if they are intrinsically motivated (Experiment 3) to predict correctly. We expect this to hold even when controlling for biases in information search (H1). This role-induced bias should be caused by stable coherence shifts in the respective directions (H2).

## Experiment 1

### Method

#### *Participants and Design*

The experiment was conducted at the decision lab of the Max Planck Institute for Research on Collective Goods in Bonn, Germany. One-hundred forty-nine students of different majors participated in the experiment, 63 of them were female. Participants were randomly assigned to the roles of prosecutor or defense counsel, constituting the only between-subjects factor. The experiment consisted of a pre-test and a main-test which were separated by an unrelated filler task that took about 15min. The overall experiment lasted between 1 and 1.5 hours and students received a show-up fee of 12 € (approximately USD 16.80). If they correctly predicted that the real court convicted the defendant, they received an extra 5 € (see below).

#### *Materials*

We use a translated and slightly modified version of a complex legal case constructed and repeatedly used by Dan Simon and colleagues (originally called Jason Wells case; Simon, Snow, et al., 2004); the complete case can be found in the appendix. In this case, a company accuses one of its employees of having stolen money from the company safe. The case consists of six pieces of information pro-guilty and contra-guilty, each. This information consists of facts and background beliefs. It is known that the money was stolen using the regular access code which only a few persons had. The money was stolen in the evening and the time was recorded. The crucial pro-guilty facts are a) the low number of persons who knew the access code to the safe from which the money was stolen, b) the high confidence level of an eyewitness who afterwards reported having seen the accused person at the site of crime, and c) the low relative frequency of a certain type of car in the region which was seen at the site of crime and which is also driven by the defendant. The strongest contra-guilty fact is that d) the defendant was seen shortly after the crime in a place which was hard to reach in such a short time. We frame the case as criminal procedure and use translated versions of the official model jury instructions of the Ninth Circuit (see appendix).



## Procedure

The experiment was fully computerized. Except for our manipulation of role, we closely followed the procedure used in previous studies on coherence shifts (Simon, Snow, et al., 2004). In the pre-test, subjects read short scenarios about social interactions. These scenarios contain the relevant cues of the legal case, albeit in different situations, and were rated on a gliding scale from -500 (*strongly disagree*) to 500 (*strongly agree*). For instance, participants read that a bystander was 95% confident of having identified a specific person bringing some flowers for a colleague after work. They then were asked how strongly they agree with the statement that the identification makes it likely that this person indeed brought the flowers.<sup>3</sup> After completing the filler task, participants completed the main study. To implement our manipulation of role, participants were instructed to assume the role of an intern with either prosecution or defense.

In both conditions they then learned that they would be asked to sketch the pleading for their side after they have read the evidence. They then were presented with case materials which consist of a general instruction, including the “beyond a reasonable doubt” standard of proof, some background information on the defendant, and isolated pieces of evidence, as described in the appendix. They could read all information at their own speed. Each piece of evidence that was presented had an easy to remember but neutral title. Participants were then given 20 minutes to sketch their pleading in a large text-box. Specifically, they were asked to write down an outline for a pleading in bullet-points. While sketching their pleadings, participants could look up all pieces of information in a computerized information-board (Figure 1), which is a standard paradigm in studies on preference decisions (Betsch, et al., 2001; Norman & Schulte-Mecklenbeck, 2010). Each information card was labeled with the titles introduced in the initial presentation and the information could be selected by mouse click. Subjects were free to revisit any of these pieces as many times as they wanted. We recorded both the average number and the duration of these visits (taking into account initial reading of all pieces of evidence, which was mandatory).<sup>4</sup>

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3 The social scenarios were carefully constructed by Simon et al. (2004) to allow measuring the same cues that are relevant for the legal case. Half of the questions concerned general beliefs and were essentially identical between scenario and case (e.g., generally, one can assume that a person who committed a crime will laps back into crime; generally, you can trust eye-witness reports if persons were seen once or twice). The remaining questions concerned evaluations of the situation such as the reliability of the eye-witness report for the specific situation.

4 Note that each of the 12 information pages contained several pieces of information (see Figure 1 and appendix). For the analyses reported below we classified each page as mainly containing pro guilty vs. contra guilty evidence or as being ambiguous. Pages titled Technician, Criminal record, White car, Debts, and Travel expenses were considered pro guilty evidence. Pages School, and Flower store were considered contra guilty evidence.

**Figure 1. Information Board and examples of evidence.**

Standard of proof	Accusation	Technician
School	Safe	Hans's career
Hans's Character	Criminal Record	White Car
Debts	Flower store	Travel Expenses

<p>Technician</p> <p>A technician who had been called to repair the photocopier testified that he had seen someone leave the accountant's office in great haste at about 7.15 pm. When questioned by the detective a day after the incident, the technician identified this person as Hans. When asked how sure he was about this, the technician said he was "at least 95%" certain. He explained that he had seen Hans once or twice before in the office.</p>
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*Note.* All 12 pieces of evidence that could be looked up are listed in the appendix with the short title in brackets.

Immediately after subjects had finished their sketch of pleading, they were asked to estimate (postdict) how a real German court had decided the (mock) case. To induce serious thought and to provide a high incentive for accuracy, in the instruction for this screen we promised an extra 5 € to those who predicted the decision correctly; actually this bonus was the only pay-off contingent on participants' action. To that end, and in the interest of even higher external validity, we had asked a criminal chamber of the regional court (*Landgericht*)<sup>5</sup> of Oldenburg to tell us how they would have decided, had exactly this evidence, with exactly this instruction on the standard of proof, been presented to them. Of these four judges, three would have convicted the defendant, while one would have acquitted him. So their overall decision was to convict. We recorded the time participants took for making this decision measured from onset of the instruction to making a final choice. Hence, the measure included time both for reading and deciding.

Subsequently, participants estimated the probability that the defendant had stolen the money from the safe which we used as subjective measure for the probability of guilt. Finally, to allow measuring coherence shifts, subjects re-rated the evidence from the pre-test, using the same scale.

5 In Germany, regional courts are courts of first instance for severe crime. The chamber that decided on our case materials usually hears first instance criminal cases.

## Results

Descriptive statistics for all major dependent measures separated by condition are provided in Table 1 and will be discussed in the following in detail.

**Table 1: Descriptive Statistics: Proportions and Means (with SE in parentheses).**

	n	p(guilty)		subjective p(guilty)	# of inspections		coherence effects (increase pre to post)		time prediction in sec
		predicted	verdict		pro guilty	contra guilty	pro guilty	contra guilty	
					Experiment 1: Prediction with 5 Euro Incentive				
Prosecution	73	64%		66% (3.1)	2.13 (0.15)	2.37 (0.18)	9.7 (10.2)	-125.1 (16.3)	20.8 (1.6)
Defense	76	50%		50% (3.4)	2.12 (0.10)	2.49 (0.14)	-54.5 (16.6)	-15.7 (14.4)	27.6 (2.5)
					Experiment 2: Prediction with 100 Euro Incentive				
Prosecution	50	56%	54%	65% (4.2)	2.22 (0.13)	2.35 (0.16)	17.6 (14.9)	-96.1 (19.0)	40.1 (4.5)
Defense	42	40%	31%	55% (4.7)	2.21 (0.13)	2.51 (0.18)	-61.9 (17.5)	-38.6 (20.6)	39.6 (4.0)
					Experiment 3: Predictions for Settlement				
Prosecution	13	46%	46%	65% (8.5)	2.32 (0.22)	2.11 (0.18)	-50.2 (42.5)	-111.25 (50.5)	
Defense	16	37%	31%	49% (7.8)	2.52 (0.24)	3.09 (0.35)	-133.9 (40.5)	19.8 (46.6)	

## Role-Induced Bias in Estimations of Verdict

As can be seen in Table 1, the assigned role influenced the estimation of the verdict, in that there were 14% more predictions of conviction for persons in the prosecution role, compared to persons in the defense role (in this and all following comparisons we report absolute differences in probabilities). This effect was accompanied by a 16% increase in the average subjective probability of guilt.<sup>6</sup> To test H1 for significance, we conducted a logistic regression with predicted verdict as the dependent variable and role as the explanatory variable (using robust standard errors). The effect of role turned out significant (Table 2, model 1).<sup>7</sup>

**Table 2: Six logistic regressions on prediction of conviction in Experiment 1.**

	(1) guilty	(2) Guilty	(3) guilty	(4) guilty	(5) guilty	(6) guilty
role prosecution (1=yes, 0=no)	0.59+ (1.76)		0.64+ (1.81)		-0.62 (-1.31)	-0.56 (-1.12)
Inspections of pro- guilty evidence		1.29*** (3.63)	1.31*** (3.68)			1.68** (3.25)
Inspections of con- tra-guilty evidence		-0.63* (-2.46)	-0.61* (-2.39)			-0.85* (-2.37)
reevaluation of pro- guilty evidence				0.0054** (2.77)	0.0057** (2.91)	0.0066** (2.79)
reevaluation of con- tra-guilty evidence				-0.011*** (-5.30)	-0.012*** (-5.04)	-0.012*** (-5.18)
Constant	3.19e-16 (0.00)	-0.87* (-2.15)	-1.26** (-2.77)	-0.24 (-1.04)	0.0027 (0.01)	-1.54** (-2.72)
Observations	149	149	149	149	149	149
Pseudo $R^2$	0.016	0.075	0.091	0.306	0.316	0.384

*Note.* Unstandardized coefficients; robust standard errors used; z statistics are given in parentheses below coefficients.

Variables “inspections” indicate how often the respective participant has viewed the total of pro- or contra-guilty pieces of evidence when preparing her pleadings. Variables “reevaluation” measure coherence shifts, as explained in detail in the next section.

+  $p < .05$  (one-sided), \*  $p < .05$  (two-sided), \*\*  $p < .01$  (two-sided), \*\*\*  $p < .001$  (two-sided)

To check the robustness of this result, we added the frequency of visiting pro-guilty vs. contra-guilty information as control variables. Although information inspections have a significant effect on the verdict (Table 2, model 2), adding them to role does not affect the main effect of role (Table 2, model 3), which provides additional support for H1. Note that the coefficient for role remained essentially the same as in the regression with only role as predictor. This suggests that the effect of role is not mediated by differences in information search.<sup>8</sup>

<sup>6</sup> All analyses reported in Table 2 also hold in regressions with subjective probability as dependent variable.

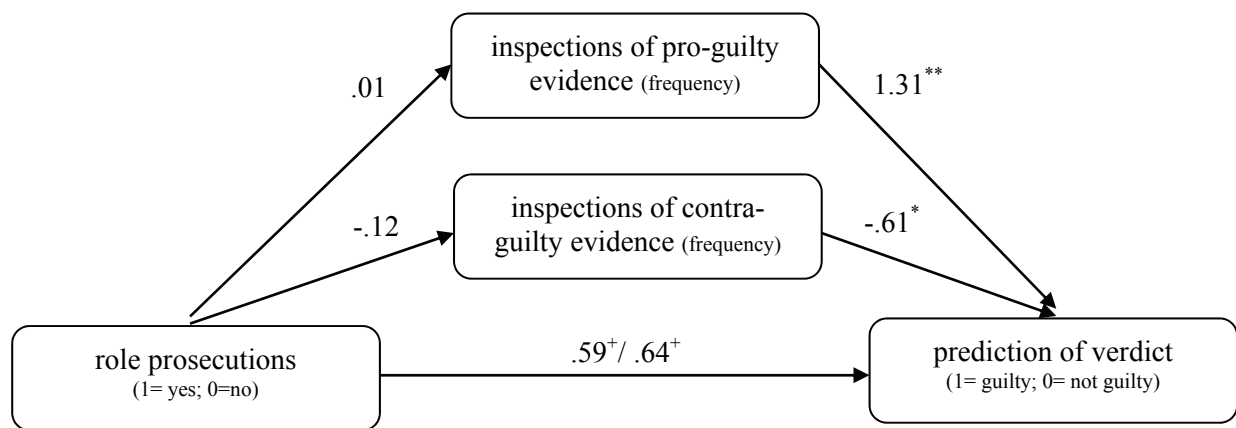
<sup>7</sup> Note, that since we have a directed hypothesis, a one-sided test has to be used, which turned out to be significant ( $p = .039$ ).

<sup>8</sup> The effect also prevails if we control for the time people took for visiting pro and contra-guilty evidence, not reported.

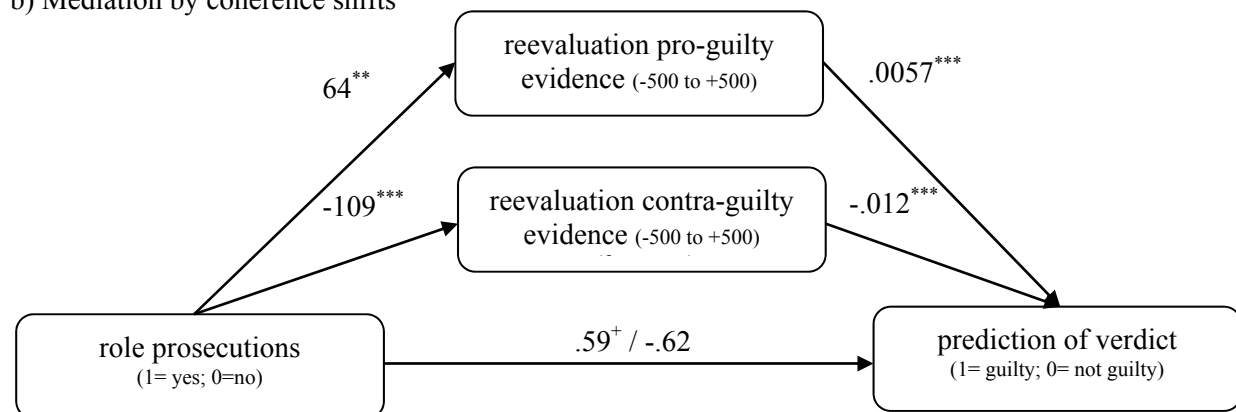
To test rigorously whether the effect of role on verdict is mediated by information search, we performed mediation analysis (Figure 2a). Since we want to test a mediation model with more than one mediator which includes continuous and binary variables, we cannot use the standard procedure proposed by Sobel (1982). Instead we revert to a methodology based on standardizing coefficients and bootstrapping (Ender, 2010; see also MacKinnon & Dwyer, 1993; Preacher & Hayes, 2008). The results reveal that the influence of role on the prediction of the judgment is not mediated by differences in information search. Neither one of the single indirect effects (pro-guilty: coeff = .002, 95CI: LL=-.11; UL=.12; contra-guilty: coeff = .019, 95CI: LL=-.04; UL=.12)<sup>9</sup> nor the combined indirect effect (coeff = .020, 95CI: LL=-.04; UL=.10) were significantly different from zero, which would be indicated by zero being outside the 95CI. As can be seen in Figure 2a, the direct effect did not decrease when including the information search variables.

**Figure 2: Mediation analysis for the effect of role on judgment.**

a) Mediation by information search



b) Mediation by coherence shifts



9 The indirect effect is the product of the coefficient explaining the mediator by the independent variable (in the first case: of role explaining the frequency of inspecting pro-guilty evidence) times the coefficient of the mediator explaining the dependent variable. The combined effect is the sum of all indirect effects. In all analyses we estimated coefficients and confidence intervals (CIs) based on 5000 iterations in bootstrapping. CIs from bootstrapping are bias corrected.

### *Coherence Shifts and their Impact on Prediction*

Our second hypothesis posits that role induced biases in predictions of verdicts are driven by coherence shifts, that is systematic revaluations of the evidence in the direction of the emerging judgment. This hypothesis would be supported by the data if we can show that coherence shifts mediate the effect of role on verdict predictions. To analyze the mediating role of coherence shifts on predictions, for each participant we first calculated average revaluation scores for pro-guilty and contra-guilty evidence by subtracting pre-test from post-test valuations of the same pieces of evidence. Revaluation scores can range from -500 to 500. Positive scores indicate that the valuation of the respective information was increased over the study; negative scores indicate that the valuation was decreased.

In line with previous findings, we observe systematic coherence shifts that are induced by role (Table 1). Participants in the prosecution role strongly devalue the contra-guilty evidence. By contrast, they give slightly more weight to pro-guilty evidence in the post-test as compared to the pre-test. Participants in the defense role strongly decrease the valuation of the pro-guilty evidence, while their evaluation of the contra-guilty evidence remains almost stable. Hence, role seems to induce differential effects on coherence shifts. Note, that coherence shifts were essentially confined to devaluing conflicting evidence, while supporting evidence is hardly affected. Furthermore, the spreading apart due to coherence shifts was overall much stronger for prosecution than for defense as indicated by the larger difference between reevaluations of pro- and contra-guilty arguments. We tested our second hypothesis using regressions and a mediation analysis. Logistic regressions reveal that coherence shifts explain verdict predictions (Table 2, model 4), and that the effect of role on judgment disappears if we control for coherence shifts (Table 2, model 5). As a robustness check, we also estimated the same model with additional controls for information search which lead to the same results (Table 2, model 6). Mediation analysis shows that coherence shifts indeed completely mediate the effect of role assignment (see Figure 2b). The revaluation of pro-guilty evidence (indirect effects: coeff = .068, 95CI: LL= .02; UL=.14) and of contra-guilty evidence (coeff = .24, 95CI: LL= .14; UL=.36) both individually and jointly (coeff = .31, 95CI: LL= .19; UL=.44) mediate the effect of role on verdict predictions. The overall indirect effect remains significant and does not change in size (coeff = .31, 95CI: LL= .17; UL=.44) if we control for amount and frequency of information search (pro- and contra-guilty, respectively) as covariates in the mediation clearly supporting H2. Note, that adding coherence shifts as mediators even reversed the effect of role on verdict predictions, which might indicate that persons try to correct for their previously assigned role. However, the reversed effect was not predicted and does not reach conventional significance levels in a two-sided test.

### *Influence of Deliberation Time on Role Induced Bias*

Finally, we aimed to test whether participants who take more time for making a prediction exhibit a smaller bias. This might be due to either of two mechanisms: a) people might be able to correct for the bias, particularly if they try hard and take a long time to decide, or b) per-

sons who are less biased a priori take longer to make the prediction. We do not aim to identify which mechanism prevails (i.e., the direction of causality for the effect) but merely take an exploratory account to investigate whether there is such an effect at all.

We therefore conducted a logistic regression with verdict prediction as dependent variable and role, deliberation time (ln-transformed) and their interaction as predictors (main effects were centered). The main effect of prosecution on guilt remained significant ( $b = .59$ ,  $z = 1.70$ ,  $p = .045$ , one-sided). More interestingly, however, we also found that participants who took longer to predict the court ruling were less prone to bias, as indicated by a significant interaction between time and role ( $b = -1.85$ ,  $z = -3.06$ ,  $p = 0.002$ ). Calculating the main effect of role for subsamples split along the median of deliberation times revealed that there was a role induced bias for persons with short ( $p = .003$ ) but not for persons with long ( $p = .66$ ) deliberation times.

## Discussion

Overall, our data support the notion that even in situations in which people have ceased to act in their assigned roles and have a monetary incentive to make correct predictions, a role induced bias prevails. The effect seems to be driven by coherence shifts that persons do not correct for. The effect of role on verdict prediction in this study (i.e., 14%) is comparable to the effect on verdicts observed in a previous study (Simon et al., 2008 found an effect of 17%). Interestingly, however, people that reflect longer do not exhibit role induced biases in predictions.

Note that by our study we can exclude three prominent alternative explanations. The bias cannot be self-serving, in a monetary sense. While acting in their assigned roles, participants did not take any money-relevant choices. The only monetary incentive was for accurate prediction of the court's decision. Second, although we find evidence for confirmatory information search, it does not mediate the effect of role on verdict prediction. Finally, the bias cannot result from an earlier decision participants have taken, as dissonance reduction would suggest (Festinger, 1957), because participants did not commit themselves at all to a choice.<sup>10</sup>

Nevertheless, it could be argued that participant's incentive for correcting their role induced bias was still too weak in our first study. Therefore we conducted a second study in which incentives for correct predictions were drastically increased.

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10 Since persons worked for about 20 minutes in their role, it cannot be ruled out that dissonance phenomena still played a role. Note, however, that Parallel Constraint Satisfaction processes have been successfully used to model dissonance phenomena as well (Shultz & Lepper, 1996). Therefore, at the process level, the exclusion of dissonance effects is not crucial for our argument.

## Experiment 2

### Method

Ninety-two participants took part in the study (55 female) and were recruited using the same procedure as in Experiment 1. The procedure was essentially the same as before except for two important modifications. We increased incentives to correct role-induced bias in that participants could now earn an extra amount of 100 € (approx. USD 140) for predicting the correct verdict, which was paid in 1 out of 10 cases. The instruction on the screen where participants indicated their prediction was changed accordingly. As a second modification, right before the post-test evaluation of the facts, participants indicated how they would have decided the case. We expected that the observed effects would be stronger if participants' predicted verdict and their own verdict align.

### Results and Discussion

As can be seen in Table 1, all important findings could be replicated. Decision time almost doubled, which indicates that our manipulation of motivation was effective. Nevertheless, we found a role induced bias of equal size also with these higher incentives. Participants in the prosecution role convicted 16% more often than participants in the defense role. The effect was marginally significant in the logistic regression ( $b = 0.73$ ,  $z = 1.47$ ,  $p = .07$ , one-sided) and reached conventional significance levels when excluding seven participants for which predicted and own verdict did not align ( $b = 0.87$ ,  $z = 1.91$ ,  $p = .028$ , one-sided).<sup>11</sup> We replicate the findings that controlling for information inspections did not reduce but even strengthen the effect of role on verdict. In contrast, the effect of role disappears when controlling for coherence shifts ( $p > .84$ ). The role-induced bias effect was again significantly mediated by coherence shifts ( $p < .05$ ;  $b = 0.63$  vs.  $b = -0.11$ ) but not by information inspection. Hence, the results again support our two hypotheses.

We also replicate the other effects observed in Experiment 1. The spreading apart due to coherence shifts is stronger for prosecution than for defense, and supporting evidence is less affected by coherence shifts than contradicting evidence (Table 1). The result also holds if restricting the analysis to persons for which verdict prediction and individuals' verdict aligned. The role-induced bias tended to decrease with time for thinking about the verdict but the interaction did not reach significance ( $b = -1.12$ ,  $z = -1.18$ ,  $p = 0.24$ ). Nevertheless, as in the previous study in a median split the quicker half showed the effect ( $p = .003$ ) whereas the slower half did not ( $p = .23$ ).

Overall, the results nicely replicate Experiment 1 in an environment with much higher incentives. They provide further support for H1. Role induced bias persists even if there is a strong monetary incentive to be accurate, and when controlling for confirmatory information search.

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11 Six of these persons predicted guilty although their own decision would have been "not guilty". Only one person showed the opposite pattern. Furthermore, as explained in note 7, since we have a directed hypothesis, a one-sided test is in order, so that our finding meets conventional standards.



The results also provide further support for H2 stating that role induced bias is driven by coherence shifts. Interestingly, also the remaining not hypothesized findings concerning decision time and coherence shifts could be replicated and seem to constitute stable effects. If participants are sensitive to monetary rewards, in our second experiment they have every reason to overcome a role induced bias. 100 € is about ten times the hourly wage of a research assistant. Yet participants may still feel committed to their assigned role and the extrinsic motivation might hinder intrinsic motivations to overcome the bias. In a third study we therefore induced the accuracy goal in a way that excludes a conflict between the role and accuracy. After they have handed in their sketch of the pleading, we expose participants to the opportunity for a plea bargain. We design the bargaining protocol such, and we explicitly tell participants, that it now is in the best interest *of the side they represent* to predict the court ruling correctly. With this design, we also get a second, normatively even more relevant dependent variable. We not only see how assigned roles bias participants' judgment (i.e. their predictions), but also how role biases their choices (i.e. their settlement offers).

## Experiment 3

### Method

Since we had depleted our subject pool, we could only recruit twenty-nine participants (17 female) for the study. The procedure was essentially the same as in study 2 except for one important modification. We removed the monetary incentive for making correct predictions. Instead, after participants sketched their pleading and before making verdict predictions they were informed that there is a possibility for a plea bargain.

The negotiation protocol is as follows: prosecutors indicate a minimum sanction. Defense counsels indicate a maximum sanction. If the minimum is below the maximum, the midpoint between both statements determines the sanction. Otherwise the court decides. The instructions should make it clear that, given this procedure, it is in the best interest of the side represented to predict the court ruling correctly (in terms of bargaining theory, the court ruling determines the outside option, see e.g. (Nash, 1950)). Participants were first asked to make this prediction, and were then asked to make a negotiation offer. The instruction was such that the range for negotiation offers could be between 0 and 100 monetary punishment units (i.e., daily rated fines). Participants were free not to make an offer at all. The modified part of the instruction is given in the appendix.<sup>12</sup>

Note, that given the bargaining protocol, no side has an interest in making exaggerated offers (cf. also Loewenstein et al., 1993). The higher a maximum the defense counsel states, and the lower the minimum the prosecutor states, the smaller the probability that a deal is struck, and hence the smaller the probability to improve one's side's outcome, compared with having the court decide. Consequently, with our design, negotiation offers not only provide a second de-

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12 Due to a programming error we did not record decision times for this study.

pendent variable. The negotiation procedure also, and critically, makes it detrimental for the side represented to be biased.

## Results and Discussion

Descriptively, the previous findings could be mainly replicated (Table 1). We again find role-induced bias for predicted verdicts (9%) and subjective probability of guilt (16%). Results on information inspection and coherence shifts are mainly provided for completeness but they should be interpreted cautiously given the large standard errors due to the small sample size.

We were most interested in the effect of role on settlement offers, that is, on choices rather than mere predictions, which could be between 0 and 100. As summarized in Table 3, offers for prosecution were significantly higher than for defense,  $t(27) = 5.00, p < .001$ . Half of the participants in the defense role did not want a settlement and indicated zero. Two participants in the prosecution role did so either and indicated 100. The role bias, however, remains significant even if these 10 participants are excluded. Settlement offer correlated with predicted verdict ( $r = .32, p = .09$ ; point-biserial correlation) and subjective probability of guilt ( $r = .37, p = .05$ ) but only at a medium level.

**Table 3: Settlement offers in Experiment 3**

	n	Settlement Offer		
		M (SE)	f[offer=0]	f[offer=100]
Prosecution	13	70.0 (6.8)		2
Defense	16	18.4 (7.5)	8	1

Despite the very small sample size, we thus find a significant bias for the normatively most relevant dependent measure, plea bargaining offers. Note that, in the instructions, we make it clear that exaggerated offers are not in the best interest of the side participants represent and it could be assumed that persons were intrinsically motivated to correct role induced bias. Compared with the findings by Loewenstein et al. (1993) on pre-trial settlements, we even observe a much stronger bias on settlement offers (i.e., Cohens'  $d = 1.9$  vs.  $d = .85$ ), although in their study there was no link between negotiations and the court ruling. The stronger effect in our study might be partially explained by the fact that writing an outline forces participants to elaborate the story supporting their side, and increases sunk costs. However, considering that there were multiple differences between these studies, further research is needed to empirically investigate the driving factors more systematically.

## General Discussion

In three studies, we investigate the effect of role-induced bias on legal judgments. We find strong role-induced bias even in a situation where we can exclude that it is self-serving since participants no longer act on their assigned roles when asked to predict a court ruling, and at this point they have neither monetary nor reputational reasons for tilting judgment. They on the contrary have a high monetary incentive to make unbiased predictions. And a comparison between experiments even indicates that role-induced bias does not decrease if the premium for accuracy is as high as ten times the hourly wage of a research assistant. Furthermore, results of the third experiment indicate that role-induced bias also prevails in situations in which persons can be assumed to be intrinsically motivated to make correct predictions.

The role-induced bias persists when we control for differences in information search. Information search has a consistent effect in that people show confirmatory information search and look up more often information that fits their final judgments which is, however, independent of the role-induced bias. In mediation analysis we show that the role-induced bias is driven by coherence shifts (i.e., systematic information distortions) that can be explained by coherence based reasoning and parallel constraint satisfaction (PCS) processes. We thus find support for the prediction of PCS that role-induced biases are more than just motivated reasoning or selective information search. Once “trapped” in an interpretation, it is hard to leave it and to come to a different interpretation. Coherence shifts modify the interpretation of information and stabilize these interpretations once they have been formed. Interestingly, though, we found in two studies that role-induced bias were absent in participants who took long to take a decision even though the effect was smaller with higher incentives. This can either be due to the fact that people without bias deliberate longer or that persons can partially correct for bias by deliberation. It is due to further research to investigate which effect prevails.

The finding that role assignment in court induces bias that people on average do not correct for even if they have a high incentive to do so and the additional finding that role-induced bias even more strongly affects offers for settlements have serious consequences for the legal system. The pure assignment of a role, even if there is no self-serving element, may have behavioral effects that cannot easily be reversed. For the law, this finding matters indirectly and directly. It matters indirectly since it suggests that those acting in court are indeed very likely to be biased. For in the court room, prosecutors and defense counsels have a clear incentive to win, with more or less direct relevance for their income. The bias should therefore even be stronger than in our deliberately much cleaner environment. This in turn puts the impartiality of courts at risk. It is beyond the scope of this paper to investigate to which degree the adversarial system nonetheless helps jury members and judges make unbiased decisions; it might, to the contrary, even be counterproductive in that it exacerbates the bias.

Yet most legal orders are not only concerned with court rulings. They also impose a certain degree of impartiality on court procedure (Green & Zacharias, 2004). Some legal orders, like the German, even prosecute prosecutors if they bend the law (in German Law: BGHSt 32,

357; 38, 282; 40, 177; 40, 272 [Federal Supreme Court for Criminal Law]), and they stipulate that defense counsels are “part and parcel of the judiciary”,<sup>13</sup> and therefore obliged to a minimum degree of impartiality. We are of course not opposed against such regulative ideas. Yet our findings question the realism of these normative statements.

Last but not least, prediction is a routine task for real life prosecutors and defense counsels. Prosecutors have to decide whether to charge the defendant. Defense counsels have to advise their clients whether to plead guilty. Depending on their expectations of the ruling, they decide on their strategy during the trial. They for instance invest more resources, plead more aggressively, or appeal against a ruling. Prediction is even more important in plea bargaining. Is it worth insisting on the trial? Which offer is good enough to be accepted? In the field, all of these decisions of course also have a motivational component. They directly help a defense counsel charge higher fees, and they help a prosecutor advance her career. We show that, even short of the motivational effect, there is a bias resulting from the mere fact that a person assumes a defined role. Procedural law has not only reason to be concerned about “hired guns”. Even if neither money nor career concerns were to play a role, representatives would still see the world in the light of their cause.

In our experiments, we investigated deliberation time using an exploratory account. We measured time for making a verdict prediction instead of manipulating it. Consequently, we do not know whether participants with less bias had a harder time coming to a prediction, or whether the fact that they deliberated longer removed both the bias and the coherence shifts. We thus do not know the direction of the arrow of causality. If deliberation causes debiasing, the normative implication is straightforward. The legal order would want to force those playing an active role in court to deliberate carefully. A cooling off period would be a first step into this direction (Simon, Krawczyk, et al., 2008). The obligation to give explicit reasons should also help. For this interpretation speaks that Simon (2004) could show that an explicit “consider the opposite” instruction reduces coherence shifts as well (see also Glöckner, 2008; Mussweiler, Strack, & Pfeiffer, 2000). Against this interpretation speaks that persons are usually not aware of the fact that they distort information (Simon, 2004).

If, to the contrary, the cause is that persons without bias take longer to make a prediction and these tendencies to make a bias are dependent on stable individual (personality) differences, constructing bias-proof proceedings is less easy. The legal order would need a sufficiently robust screening procedure. Converging evidence for this causal direction is provided by the finding that coherence shifts are indeed related to personality factors in that they increase with persons’ preference for consistency (Brown, Asher, & Cialdini, 2005; Cialdini, Trost, & Newsum, 1995; Nail, et al., 2001) and that coherence shifts mediate increases in confidence (Glöckner & Ostermann, 2010). Interestingly, it has also been shown that persons that have been selected to become jurors in the U.S. (Brown, et al., 2005) as well as real lay judges

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13 This is referred to by the German term: „ein Organ der Rechtspflege“, § 1 Federal Code for the Legal Profession (Bundesrechtsanwaltsordnung).

(*Schöffen*) in Germany (Glöckner & Ostermann, 2010) tend to show higher preference for consistency compared to students. Accordingly, it could be expected that coherence effects are stronger in persons involved in legal reasoning as compared to the mainly student population used in the current study. However the implication that some actors should be barred from court would have to be normatively justified and is likely to meet resistance due to the fact that jurors and lay judges should be selected such that they represent the general public (in German law: §36 II S. 1 GVG [Judicature Act]). Hence, if the second interpretation turned out to be true, chances are that the legal order would have to live with the bias in order to maintain the democratic goal of equal representation of the entire society in the jury.

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# Appendix

## Case Description

[page 1] You now take part in a trial on the case Hans H. at a regional court.

[page 2] Please assume to be in the role of a legal intern. You are currently working for the [defense/ prosecution]. Your advisor asks you to take part in the criminal trial Hans H. taking the perspective of the [defense / prosecution]. You will take part in the trial and hear all arguments of the defense and the prosecution. Afterwards you will be asked to sketch a pledge for the [defense / prosecution].

[page 3: Standard of Proof] Please note that in criminal cases accused persons are particularly protected. They should only be convicted if the evidence is so convincing that there is no reasonable doubt that the person is guilty. Proof beyond a reasonable doubt is proof that leaves you firmly convinced that the defendant is guilty. It is not required to prove guilt beyond all possible doubt. A reasonable doubt is a doubt based upon reason and common sense and is not based purely on speculation. It may arise from a careful and impartial consideration of all the evidence, or from lack of evidence. If after a careful and impartial consideration of all the evidence, the judge is not convinced beyond a reasonable doubt that the defendant is guilty, it is his or her duty to find the defendant not guilty. On the other hand, if after a careful and impartial consideration of all the evidence, the judge is convinced beyond a reasonable doubt that the defendant is guilty, it is his duty to find the defendant guilty.

[page 4] Hence, the judge has to come to one of the following conclusions:

If he concludes that there is no reasonable doubt, that the accused person has committed the crime then he has to decide guilty. If he comes to the conclusion that there is reasonable doubt, he has to decide not guilty.

[page 5: Accusation] Hans H. is accused of having stolen 5200 € from the safe of his employer Hausbau GmbH.

[page 6] Prosecution and defense bring forth the following pieces of evidence. All witnesses have sworn under oath to make statements that correspond to the truth only and have been warned that false statements can lead to criminal proceedings for perjury. After the hearing, the judge dictates a summary of the witness statements for the protocol. He reads the summary aloud and all witnesses agree that their statement was correctly documented.

[page 7: Technician] A technician who had been called to repair the photocopier testified that he had seen someone leave the accounts office in great haste at about 7.15 pm. When questioned by the detective a day after the incident, the technician identified this person as Hans. When asked how sure he was about this, the technician said he was “at least 95%” certain. He explained that he had seen Hans once or twice before in the office.

[page 8: School] Silvia, a manager of “Hausbau GmbH”, testified that she saw Hans at 8 pm on the evening in question, when they both picked up their children from an event at the school. Hans was wearing elegant trousers and a jacket he had not worn at work. Silvia testified that it takes between 45 and 50 minutes at that time of day to get from the office to the school at the other end of town.

[page 9: Safe] The accountant of the company witnesses: At the end of each day, she places all company cash in the safe. This safe is located at the rear of the accounts office. The safe is also used to store other sensitive documents, including bids and project reports. Apart from the accountant and her assistant, the construction managers, sales managers and managers have access to the safe. All in all, 8 people, including Hans, can use the safe. The safe has a time mechanism that records when the safe is opened and closed. One morning the accountant noticed that € 5,200 in cash was missing. The time mechanism showed that the safe had last been opened on the previous evening at 7:14 pm.

[page 10: Hans’s career] The boss of Hausbau GmbH witnesses: Hans H. is 34 years old. He lives in Frankfurt/Main with his wife, Katrin, and two children. Hans works for the large construction firm “Hausbau GmbH” (Hausbau Ltd.). After having worked as a foreman for more than two years, he complained to his superior that the job caused him back trouble. He (the boss) then offered Hans a job in the company’s administration offices, assigning him the role of construction manager. Hans’ task was to supervise the progress made on the various building projects and to coordinate the different groups.

[page 11: Hans’s character] A colleague says: Hans is generally considered to be a hard-working colleague. His colleagues say that he often seems reserved and at times even a little grumpy.

[page 12: Criminal record] The judge reads aloud Hans’ criminal record. At the age of 18, he was arrested for attempting to break into an apartment. He was convicted of this offence. Hans H. has not had a criminal record for the last 16 years.

[page 13: White car] Private detective P says: Hausbau GmbH has asked him to investigate the case. A CCTV camera, installed at the entrance of the office building, shows a car rapidly leaving a parking space in front of the building at 7:17 pm on the evening in question. However, the picture was out of focus and the detective was unable to read the license plate. The video shows a white XY car. The make of Hans H.’s car is XY, it is white, and he seen was seen driving to work in it on the day in question. According to the detectives’ investigations, 0.1% of all cars in the area are white XY cars.

[page 14: Debts] Furthermore, the detective says: He also found out that Hans paid back a loan of € 4,870 to his bank one day after the money had disappeared. The debts had accumulated in the last three months, and the bank had already threatened to take legal action.

[page 15: Flower store] Hans testified that he had taken out the loan to help his sister-in-law, who runs a flower shop in Aachen. She gave him back the money in cash and he used it to pay back the loan. Hans explained that he cannot prove this cash transfer with receipts, since in the floral business larger financial transactions are sometimes conducted in cash.

[page 16: Travel expenses] A colleague testifies that Hans H. told him the following: A few months before the incident, Hans had been summoned by his boss to discuss the payment of expenses claimed by Hans. Visibly annoyed, the boss had given out to Hans for claiming certain expenses with no justification. Hans had argued that other construction managers had been claiming the same expenses and that the boss had therefore been challenging him unjustly. His boss had disagreed, refusing to reimburse these costs and also making clear to him that a promotion he had already been promised would fall through on account of these events. Hans had been deeply hurt by this. In the following weeks, he had quite frequently been seen working late at the office.”

[page 17] The judge interrupts the trial for half an hour. Please use the time to sketch a pledge for the [defence / prosecution]. You can therefore look up all the record in the protocol.

[page 18] You have 20 min to sketch the pledge. Bullet-points suffice. You can check the evidence for the case as often as you like.

[page 19; sketch of pledge in a text-box; inspection of pages above possible]

[page 20] Please predict, which decision the judge will make. Please assume that he has exactly the same information as you and that your pledge has no influence on the decision. We have asked several real judges, how they would have decided the case. You receive a bonus payment of 5 €, if you predict the decision of the majority of judges correctly.

### **Modified Instruction for Experiment 3**

The instruction for participants' verdict prediction (i.e., page 20) was modified and a new page 21 with an instruction to measure offers for the settlement was added directly afterwards. The modified parts read as follows:

Given a request of the [prosecution/defense; i.e., the other party], the judge postpones the trial to the next day. The representative of the [prosecution/defense; i.e., the other party] asks you whether you would want to end the trial with an out-of-court settlement. If both sides agree on a sanction the trial would be finished. It is known that in similar cases guilty persons were convicted for a daily rated fine of 100 days by this judge. Hence, the accused had to pay his net income of 100 days to the state. Whether a settlement is beneficial for the [defense/prosecution; i.e., your side] depends on the expected verdict. To help you, representing the [defense/prosecution; i.e., your side] well, please predict the verdict of the judge you expect. [Hans will be acquitted / convicted]

[page 21] To assure a fair negotiation, you agree with the [prosecution/defense; i.e., the other party] to the following procedure: [You / the prosecution] note[s] the minimum day rate the accused has to accept in a closed letter. [The defense /you] write[s] the maximum day rate the accused is willing to pay to the state in another closed letter. You switch letters and the settlement will become active if the accused is willing to accept a day rate that is at least as high as the prosecution expects. Otherwise the judge decides. If the settlement becomes active, the day rate will be accepted that lies exactly in the middle between minimum request and maximum offer. Please now indicate the [minimum number of days the accused has to accept (if you do not want to make a settlement indicate 100) / the maximum number of days the accused is willing to pay (if you do not want to make a settlement indicate 0)].