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Role induced bias in court: An experimental analysis

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**Preprints of the
Max Planck Institute for
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**Role Induced Bias in Court:
An Experimental Analysis**

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Christoph Engel



MAX PLANCK SOCIETY



Role Induced Bias in Court: An Experimental Analysis

Andreas Glöckner / Christoph Engel

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Role Induced Bias in Court: 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 people are highly motivated to give unbiased judgments. 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. These distortions seem to stabilize interpretations, and people do not correct for this bias. Implications for legal procedure are briefly discussed.

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

JEL: C91, D81, K14, K42

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Introduction

If judicial procedure was an exercise in updating of prior beliefs, in the light of the evidence heard in court, the role of prosecution and defense would be very limited. They could search for new pieces of evidence. They could make sure that, given the new evidence, the posterior probability of guilt will be reassessed. If jury members applied the axioms of the theory of conditional probabilities, they would engage in Bayesian updating. Descriptive models that take into account bounded rationality but still follow a similar idea have been dubbed “meter” models of judicial decision-making (Lopes, 1993). They assume that each new piece of evidence induces the juror to update the estimated probability of guilt in a process of anchoring and adjustment (cf. Hogarth & Einhorn, 1992). By contrast, story-models assume that jurors are engaged in active sense-making and that they use the evidence for constructing coherent stories. Proponents of the latter approach have argued that legal decision-making is interpretative and relies on reasoning about the evidence, rather than an algebra-like process (Pennington & Hastie, 1988, 1992). It aims at constructing a coherent¹ mental model (also see Johnson-Laird, 1983).

The story model implies that prosecution and defense potentially have considerably more influence on the decision made by the judiciary, compared to meter models. This may be normatively problematic since prosecution and defense are not neutral spectators and might gain a high premium if they effectively advocate their cause. Moreover they themselves have to rely on interpretative reasoning processes. Such processes have been shown to be prone to judgment biases (Holyoak & Simon, 1999; Simon, 2004). In the current paper we isolate the second source of bias. By design, we exclude any monetary or reputation gain from succeeding in court. We investigate whether, even in a setting where the actor has nothing to gain from having an impact on the outcome of the case, the mere assignment of the role leads to bias. We thus explore whether distortions of information search, information processing, and judgment are induced by assuming the role of a prosecutor or a defense counsel. We address this concern from the angle of parallel constraint satisfaction (PCS) models, which are an extension and formalization of the story model which we describe next.

Decision Making Based on Parallel Constraint Satisfaction

The fundamental constructivist idea underlying the story model has been generalized to the concept of parallel constraint satisfaction that models coherence based reasoning processes 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—

1 In previous publications the term “consistent” was used by the second author of this paper referring to the same phenomenon (e.g., Glöckner & Betsch, 2008; Glöckner & Bröder, in press; Glöckner & Herbold, in press; Glöckner & Hodges, in press; Glöckner & Witteman, 2010).

under parallel consideration of all constraints resulting from the evidence and all logical relations.

PCS research shows that the mind transforms the information input by automatically accentuating initial advantages for one or the other interpretation of the evidence. As a result, information supporting the final decision is overestimated and conflicting evidence is underestimated. Information is thus polarized (Simon, 2004, p. 523). This systematic reevaluation of the evidence is called a coherence shift² (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, in press; Russo, et al., 2008; Russo, et al., 1998; Simon, Krawczyk, & Holyoak, 2004) and particularly for legal judgments (Carlson & Russo, 2001; Glöckner & Engel, 2008; Holyoak & Simon, 1999; Simon, 2004). Adding to previous findings (see Pennington & Hastie, 1992, for a differentiated discussion) these results strongly support story- and PCS-models and speak against meter models, since the latter models predict that the perception of the informational input remains unaffected by the decision process.

From the perspective of PCS models, the true role of prosecution and defense is more complex than for a meter model. Prosecutors and defense counsels do not only have to find additional inculpatory or exculpatory evidence. They also, and more importantly for the parties they represent, have to induce interpretations of this evidence by the jury. In their pleadings, they do so openly, by explicitly interpreting the evidence in a way that is favorable to their cause. In preparation, they themselves are likely to form interpretations that are unintentionally biased. It is this last effect we are interested in.

Mechanisms Causing Role-Induced Bias

The partially dramatic effects of social roles on behavior have been repeatedly demonstrated in social psychology (e.g., Haney, Banks, & Zimbardo, 1973; Janis & King, 1954; Zimbardo, 1965) and it has been discussed that they are highly relevant for law because roles influence (and often limit) choices (Sunstein, 1996). In the current paper, we do not aim at investigating the general influence of social roles, but are interested in specific parts of 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 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.

Such a 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

2 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).

retired judge who serves as an arbitrator in labor law disputes. Participants were informed that the judge has already heard the evidence and taken her decision. 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, Stenstrom, 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.

Role induced bias might be caused by deliberate, motivated reasoning (Kunda, 1990). 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; 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.

If the bias was intentionally or unintentionally formed by motivated reasoning, it should in principle disappear when motivational goals are changed, particularly if differences in previous information search are eliminated or controlled for. PCS models are in this respect less optimistic. Once induced, the bias should prevail even under changed circumstances, and it should in general be relatively hard for people to form alternative interpretations. This is due to 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 should 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 bal-

anced view (for a discussion of the possible effects of cognitive dissonance see below). 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).

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. Reducing biases with parsimonious interventions requires a thorough understanding of the factors causing them. In that spirit, we investigated whether role-induced bias emerges even in the absence of monetary and reputational incentives, and whether it prevails even if participants have a clear incentive to draw correct inferences, and even when controlling for information search. We also aimed at a more fine-grained analysis of the underlying processes from a PCS perspective, using additional dependent measures.

Studies on settlements in tort cases indicate 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, they 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. 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. 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).

While the literature has investigated several aspects of role induced bias in court, a clean test is missing that studies whether the mere assignment of a role biases judgment even against persons’ own interest and intention. This is our main contribution. In our study we incentivize the prediction of a real court ruling. We do so in a criminal case previously used in studies on coherence shifts. We study whether the mere assignment of a role biases judgment, even if the bias is not self-serving. To that end we remove any motivational element for participants to bias information and give people a clear incentive to overcome potential biases in their predictions of the court ruling. Fulfilling role expectations and not correcting for biases, in contrast, would on average decrease subjects’ payoff. Predicting (postdicting) a court decision is the only judgment task that is incentivized.

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 in tasks in which they have a high monetary incentive to predict correctly, and 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).

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 und 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 re-

ported 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. 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. 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, presented in the order of their strength. 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 while all pieces of information could be looked up 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 number and the duration of these visits.

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>		
<p>School</p> <p>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.</p>		

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 to correct for potential bias, we promised an extra 5 € to those who predicted the decision correctly; actually this bonus was the only payoff contingent on participants' action. To that end we had asked a criminal chamber of the regional court (*Landgericht*) 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.

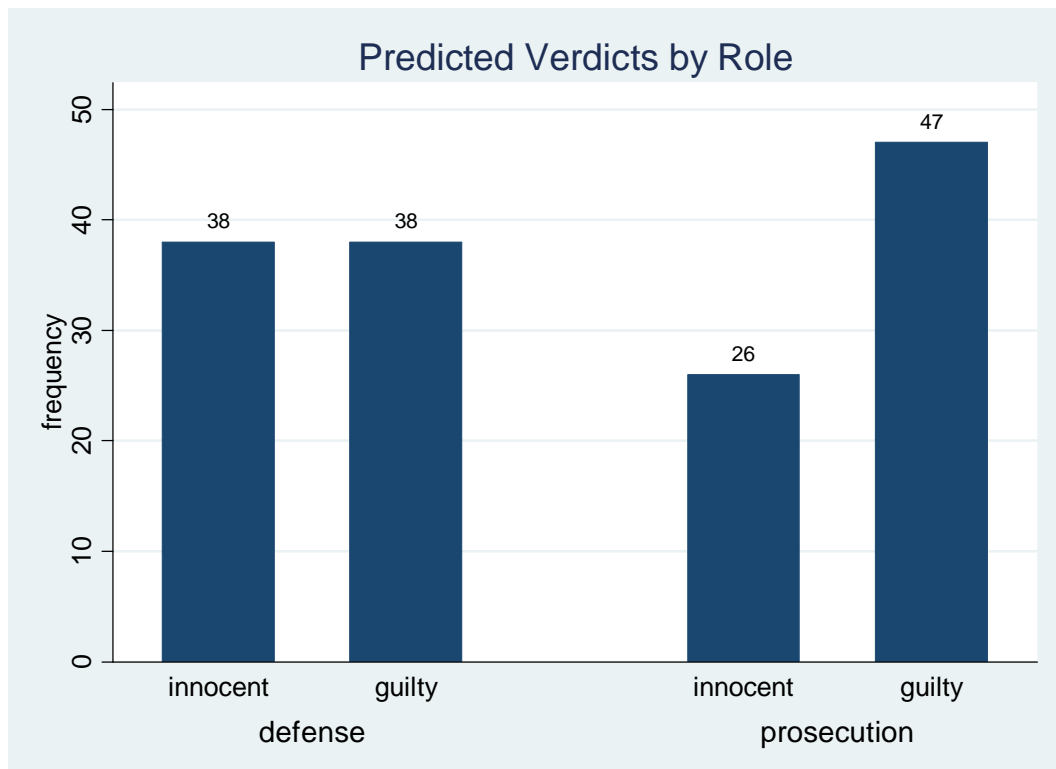
Subsequently, participants estimated the probability that the defendant had stolen the money from the safe. Finally, to allow measuring coherence shifts, subjects re-rated the evidence from the pre-test, using the same scale.

Results

Role-Induced Bias in Estimations of Verdict

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 (Figure 2).

Figure 2: Predicted verdict by assigned role.



To test H1, 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 1, model 1). The coefficient results in an odds ratio of 1.8 (i.e., $\exp(0.59) = 1.8$), indicating that the odds of estimating the verdict to be guilty as compared to not guilty are 1.8 times as high if the participant serves as prosecutor, compared with participants serving as defense counsels.

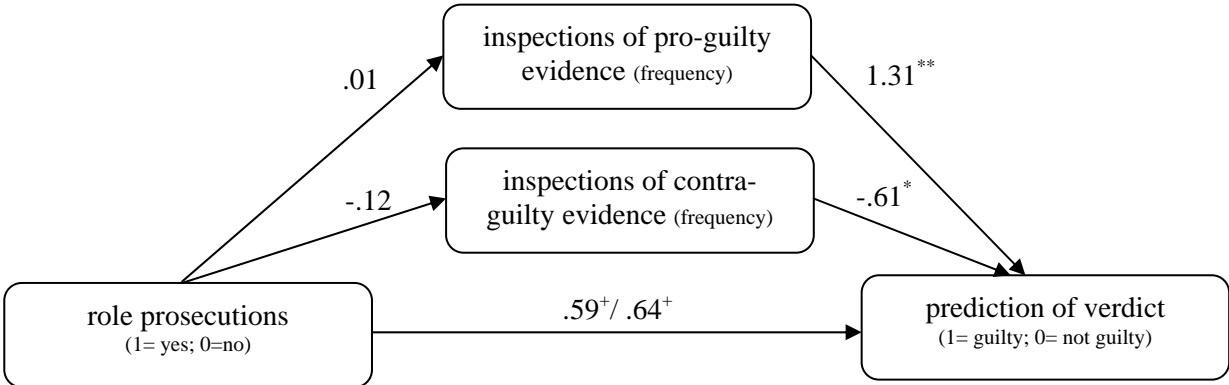
To check the robustness of this result, we added the frequency of visiting pro-guilty vs. contra-guilty information as control variables. Although information inspections have a significant effect on the verdict (Table 1, model 2), adding them to role does not affect the main effect of role (Table 1, 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.³

3 The effect also prevails if we control for the time people took for visiting pro and contra-guilty evidence, not reported.

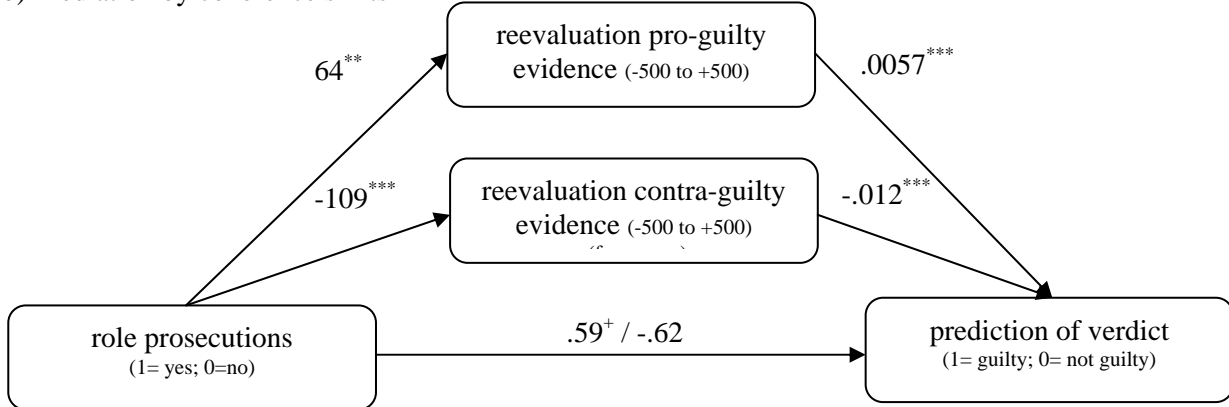
To test rigorously whether the effect of role on verdict is mediated by information search, we performed mediation analysis (Figure 3a). Since we want to test a mediation model with more than one mediator which includes continuous and binary variables, we cannot use the standard procedure proposed by 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)⁴ 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 3a, the direct effect did not decrease when including the information search variables.

Figure 3: Mediation analysis for the effect of role on judgment.

a) Mediation by information search



b) Mediation by coherence shifts



4 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.

Table 1: Six logistic regressions on prediction of conviction.

	(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 contra- 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)

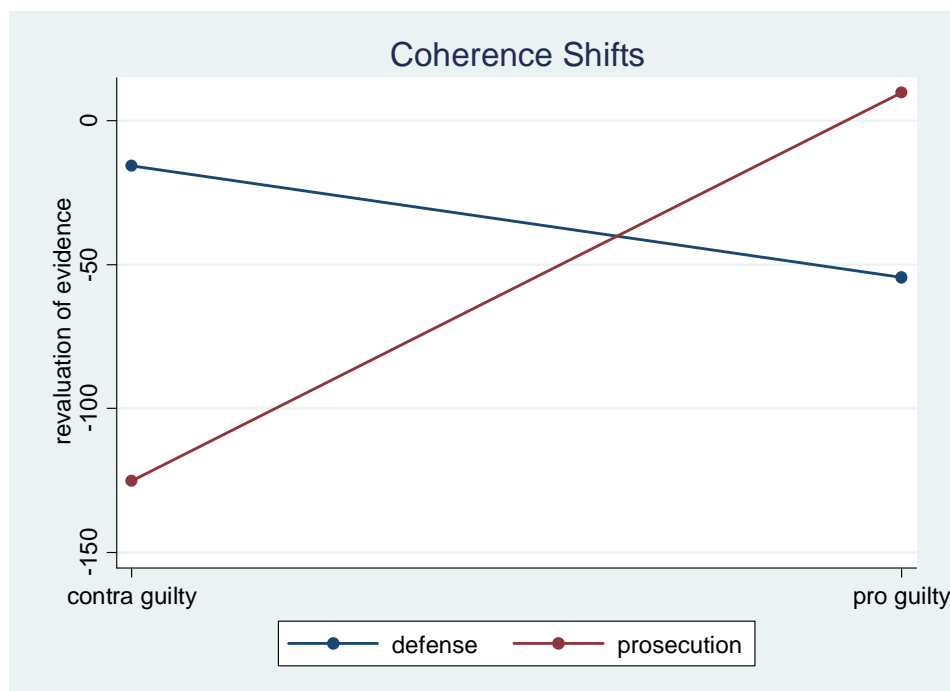
Coherence Shifts and their Impact on Prediction

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; negative scores indicate that the valuation was decreased.

In line with previous findings, we observe systematic coherence shifts that are induced by role (Figure 4). Participants in the prosecution role strongly devalue the contra-guilty evidence ($M=-125.14$, $SE=16.26$). By contrast, they give slightly more weight to pro-guilty evidence in the post-test as compared to the pre-test ($M=9.66$, $SE=10.24$). Participants in the defense role strongly decrease the valuation of the contra-guilty evidence ($M=-54.46$, $SE=16.52$), while their evaluation of the pro-guilty evidence remains almost stable ($M=-15.66$, $SE=14.39$). 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. To investigate this effect, we regressed revaluations of evidence on direction of evidence (pro-guilty = 1 vs. contra-guilty=0), prosecution role and their interaction (variables were centered for the regression). The main effects of role ($b = -22.68$, $t = -2.05$, $p = .042$) and direction ($b = 46.26$, $t = 2.64$, $p = .009$) were both significant. Most interestingly, we found a strong and significant interaction of role and direction of evidence, $b = 173.60$, $t = 4.98$, $p < .001$. Hence while prosecutors devalue contra-guilty evidence (the reference category) more strongly than defense counsels (main effect of role), and while pro-guilty evidence is devalued less strongly than contra-guilty evidence (main effect of direction of the coherence shift), prosecutors exhibit a much more pronounced difference between the valuation of contra-guilty and pro-guilty evidence (interaction effect) as indicated by larger difference for prosecution compared to defense in Figure 4.

Figure 4: Coherence shifts by role.



We tested our second hypothesis using regressions and a mediation analysis. Logistic regressions reveal that coherence shifts explain verdict predictions (Table 1, model 4), and that the effect of role on judgment disappears if we control for coherence shifts (Table 1, 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 1, model 6). Mediation analysis shows that coherence shifts indeed completely mediate the effect of role assignment (see Figure 3b). The revaluation of pro-guilty evidence (indirect effects: $\text{coeff} = .068$, $95\text{CI: LL} = .02$; $\text{UL} = .14$) and of contra-guilty evidence ($\text{coeff} = .24$, $95\text{CI: LL} = .14$; $\text{UL} = .36$) both individually and jointly ($\text{coeff} = .31$,

$_{95}CI$: $LL = .19$; $UL = .44$) mediate the effect of role on verdict predictions. The overall indirect effect remains significant and does not change in size (coeff = $.31$, $_{95}CI$: $LL = .17$; $UL = .44$) 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.

Robustness Checks

To double-check these results we investigated the influence of role on participants' subjective probability of guilt ratings, using linear regressions with the same predictors as in the logistic regression (see Table 1). We found the same effects as on predictions of verdicts. The effect of prosecution was significant, $b = 15.25$, $t = 3.31$, $p = .001$, that is, being in the prosecution role increased the estimated probability of guilt by 15%. The effect prevailed with similar strength if controlling for the time spent on forming a prediction and its interaction with role, and controlling for information search; the interaction effect had additional explanatory power ($p < .001$). The effect of role, however, completely disappeared if controlling for coherence shifts, $b = 2.75$, $t = 0.65$, $p = .516$.

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 do decide, or b) persons 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. We furthermore regressed reevaluations of pro-guilty and contra-guilty facts on decision time, role and their interaction. For both dependent variables we found that role induced bias reduced with longer deliberation time (pro-guilty: IE role*time $p = .046$; contra-guilty: IE role*time $p < .001$). For both pro-guilty and contra-guilty facts the effect was mainly driven by persons with short

deliberation time (both $p < .001$), whereas person with longer deliberation time did not show the role driven coherence shifts (both $p > .45$; median split used).

Overall, our data support the notion that even in situations in which people have a clear 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 and coherence shifts.

Note that in our study we can exclude three prominent alternative explanations. Motivational effects such as that persons tried to follow role expectations or directly profited from making judgments in line with role expectations were excluded by providing incentives to give the correct answer, and in that participants made predictions about verdicts of a real court instead of deciding themselves. Second, although we find evidence for confirmatory information search, it does not mediate the effect of role on verdict prediction. Finally, we can rule out post-decisional dissonance (Festinger, 1957), because participants did not commit themselves at all to a choice, which would be necessary for inducing dissonance.

Discussion

In the current study, 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 have neither monetary nor reputational reasons for tilting judgment and, on the contrary, have a high monetary incentive to make unbiased predictions. The 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, judgment bias and coherence shift were absent in participants who took long to take a decision. 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 an high incentive to do so has serious consequences for the legal system. The pure assignment of a role, with neither a self-serving element nor a reason for dissonance reduc-

tion, may have behavioral effects that cannot easily be reversed. 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. 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, neither self esteem nor the reduction of cognitive dissonance would play a role, representatives would still see the world in the light of their cause.

For the law, this finding matters since most legal orders impose a certain degree of impartiality (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”,⁵ 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. This will certainly not imply that either representative could be banned from the courtroom. But procedural law might want to think hard about interventions that make it as little likely as possible that biased representatives will also bias how the jury, or the judge for the matter, decide on the defendant’s life. The adversarial system is of course the classic response. But it remains to be shown how good it truly is in debiasing the jury and the judge.

In this experiment, 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 should 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, Bleicher, & Holyoak, 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

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

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, & Newsom, 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 (*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.

References

- Babcock, L., & Loewenstein, G. (1997). Explaining Bargaining Impasse. The Role of Self-Serving Biases. *Journal of Economic Perspectives*, *11*, 109-126.
- Babcock, L., Loewenstein, G., Issacharoff, S., & Camerer, C. F. (1995). Biased Judgements of Fairness in Bargaining. *American Economic Review*, *85*, 1337-1343.
- Babcock, L., & Pogarsky, G. (1999). Damage Caps and Settlement. A Behavioral Approach. *Journal of Legal Studies*, *28*, 341-370.
- Betsch, T., Haberstroh, S., Glöckner, A., Haar, T., & Fiedler, K. (2001). The effects of routine strength on adaptation and information search in recurrent decision making. *Organizational Behavior and Human Decision Processes*, *84*, 23-53.
- Bilalic, M., McLeod, P., & Gobet, F. (2008). Why good thoughts block better ones: The mechanism of the pernicious Einstellung (set) effect. *Cognition*, *108*, 652-661.
- Bilalic, M., McLeod, P., & Gobet, F. (2010). The mechanism of the Einstellung (Set) effect: A pervasive source of cognitive bias. *Current Directions in Psychological Science*, *19*, 111-115.
- Bond, S. D., Carlson, K. A., Meloy, M. G., Russo, J., & Tanner, R. J. (2007). Information distortion in the evaluation of a single option. *Organizational Behavior and Human Decision Processes*, *102*, 240-254.
- Brown, S., Asher, T., & Cialdini, R. (2005). Evidence of a positive relationship between age and preference for consistency. *Journal of Research in Personality*, *39*, 517-533.
- Brownstein, A. L. (2003). Biased predecision processing. *Psychological Bulletin*, *129*, 545-568.
- Brownstein, A. L., Read, S. J., & Simon, D. (2004). Bias at the racetrack: Effects of individual expertise and task importance on predecision reevaluation of alternatives. *Personality and Social Psychology Bulletin*, *30*, 891-904.
- Carlson, K. A., & Russo, J. E. (2001). Biased interpretation of evidence by mock jurors. *Journal of Experimental Psychology: Applied*, *7*, 91-103.
- Cialdini, R., Trost, M., & Newsom, J. (1995). Preference for consistency: The development of a valid measure and the discovery of surprising behavioral implications. *Journal of Personality and Social Psychology*, *69*, 318-328.
- Daftary-Kapur, T., Dumas, R., & Penrod, S. D. (2010). Jury decision-making biases and methods to counter them. *Legal and Criminological Psychology*, *15*, 133-154.

- DeKay, M. L., Patino-Echeverri, D., & Fischbeck, P. S. (2009a). Better Safe than Sorry: Precautionary Reasoning and Implied Dominance in Risky Decisions. *Journal of Behavioral Decision Making*, 22, 338-361.
- DeKay, M. L., Patino-Echeverri, D., & Fischbeck, P. S. (2009b). Distortion of probability and outcome information in risky decisions. *Organizational Behavior and Human Decision Processes*, 109, 79-92.
- Ender, P. (2010). binary_mediation: a new command to compute mediations with multiple mediators and binary and continuous variables in STATA. *UCLA: Academic Technology Services, Statistical Consulting Group*. <http://www.ats.ucla.edu/stat/stata/ado/analysis/>.
- Englich, B., Mussweiler, T., & Strack, F. (2005). The last word in court - A hidden disadvantage for the defense. *Law and Human Behavior*, 29, 705-722.
- Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.
- Fiedler, K. (2000). Beware of samples! A cognitive-ecological sampling approach to judgment biases. *Psychological Review*, 107, 659-676.
- Glöckner, A. (2008). How evolution outwits bounded rationality: The efficient interaction of automatic and deliberate processes in decision making and implications for institutions. In C. Engel & W. Singer (Eds.), *Better than conscious? Decision making, the human mind, and implications for institutions* (pp. 259-284). Cambridge, MA: MIT Press.
- Glöckner, A. (2009). Investigating intuitive and deliberate processes statistically: The Multiple-Measure Maximum Likelihood strategy classification method. *Judgment and Decision Making*, 4, 186-199.
- Glöckner, A. (2010). Multiple measure strategy classification: Outcomes, decision times and confidence ratings. In A. Glöckner & C. L. M. Witteman (Eds.), *Foundations for tracing intuition: Challenges and methods*. (pp. 83-105). London: Psychology Press & Routledge.
- Glöckner, A., & Betsch, T. (2008). Modeling option and strategy choices with connectionist networks: Towards an integrative model of automatic and deliberate decision making. *Judgment and Decision Making*, 3, 215-228.
- Glöckner, A., Betsch, T., & Schindler, N. (in press). Coherence shifts in probabilistic inference tasks. *Journal of Behavioral Decision Making*.
- Glöckner, A., & Bröder, A. (in press). Processing of recognition information and additional cues: A model-based analysis of choice, confidence, and response time. *Judgment and Decision Making*.

- Glöckner, A., & Engel, C. (2008). Can we trust intuitive jurors? Standards of proof and the probative value of evidence in coherence based reasoning. *MPI Collective Goods Preprint*, No. 38. Available at SSRN: <http://ssrn.com/abstract=1307580>.
- Glöckner, A., & Herbold, A.-K. (in press). An eye-tracking study on information processing in risky decisions: Evidence for compensatory strategies based on automatic processes. *Journal of Behavioral Decision Making*.
- Glöckner, A., & Hodges, S. D. (in press). Parallel constraint satisfaction in memory-based decisions. *Experimental Psychology*.
- Glöckner, A., & Ostermann, T. (2010). Preference for consistency increases the coherence effect and confidence in legal judgments. *Manuscript in preparation*.
- Glöckner, A., & Witteman, C. L. M. (2010). Beyond dual-process models: A categorization of processes underlying intuitive judgment and decision making. *Thinking & Reasoning*, 16, 1 - 25.
- Green, B., & Zacharias, F. (2004). Prosecutorial neutrality. *Wisconsin Law Review*, 837-904.
- Guthrie, C., Rachlinski, J. J., & Wistrich, A. J. (2000). Inside the judicial mind. *Cornell Law Review*, 86, 777-830.
- Guthrie, C., Rachlinski, J. J., & Wistrich, A. J. (2007). Blinking on the bench: How judges decide cases. *Cornell Law Review*, 93, 1-44.
- Haney, C., Banks, C., & Zimbardo, P. (1973). Study of prisoners and guards in a simulated prison. *Naval Research Reviews*, 26, 1-17.
- Hastie, R., Schkade, D. A., & Payne, J. W. (1999a). Juror judgments in civil cases: Effects of plaintiff's requests and plaintiff's identity on punitive damage awards. *Law and Human Behavior*, 23, 445-470.
- Hastie, R., Schkade, D. A., & Payne, J. W. (1999b). Juror judgments in civil cases: Hindsight effects on judgments of liability for punitive damages. *Law and Human Behavior*, 23, 597-614.
- Hogarth, R., & Einhorn, H. (1992). Order effects in belief updating: The belief-adjustment model. *Cognitive Psychology*, 24, 1-55.
- Holyoak, K. J., & Simon, D. (1999). Bidirectional reasoning in decision making by constraint satisfaction. *Journal of Experimental Psychology: General*, 128, 3-31.
- Janis, I., & King, B. (1954). The influence of role playing on opinion change. *Journal of Abnormal and Social Psychology*, 49, 211-218.

- Johnson-Laird, P. N. (1983). *Mental Models. Towards a Cognitive Science of Language, Inference and Consciousness*. Cambridge: Cambridge University Press.
- Jolls, C., & Sunstein, C. R. (2006). Debiasing through Law. *The Journal of Legal Studies*, 35, 199-241.
- Korobkin, R. (2003). The endowment effect and legal analysis. *Northwestern University Law Review*, 97, 1227-1294.
- Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin*, 108, 480-498.
- Kunda, Z., & Thagard, P. (1996). Forming impressions from stereotypes, traits, and behaviors: A parallel-constraint-satisfaction theory. *Psychological Review*, 103, 284-308.
- Landeo, C. (2009). Cognitive Coherence and Tort Reform. *Journal of Economic Psychology*, 30, 898-912.
- Loewenstein, G., Issacharoff, S., Camerer, C. F., & Babcock, L. (1993). Self-Serving Assessments of Fairness and Pretrial Bargaining. *Journal of Legal Studies*, 22, 135-159.
- Lopes, L. (1993). Two conceptions of the juror. In R. Hastie (Ed.), *Inside the juror: The psychology of juror decision making* (pp. 255-262). New York: Cambridge University Press.
- MacKinnon, D. P., & Dwyer, J. H. (1993). Estimating mediated effects in prevention studies. *Evaluation Review*, 17, 144.
- Monroe, B. M., & Read, S. J. (2008). A general connectionist model of attitude structure and change: The ACS (Attitudes as Constraint Satisfaction) model. *Psychological Review*, 115, 733-759.
- Mussweiler, T., Strack, F., & Pfeiffer, T. (2000). Overcoming the inevitable anchoring effect: Considering the opposite compensates for selective accessibility. *Personality and Social Psychology Bulletin*, 26, 1142-1150.
- Nail, P. R., Correll, J. S., Drake, C. E., Glenn, S. B., Scott, G. M., & Stuckey, C. (2001). A validation study of the preference for consistency scale. *Personality and Individual Differences*, 31, 1193-1202.
- Norman, E., & Schulte-Mecklenbeck, M. (2010). Take a quick click at that! Mouselab and Eye-Tracking as tools to measure intuition. In A. Glöckner & C. L. M. Witteman (Eds.), *Tracking intuition: Recent methods in measuring intuitive and deliberate processes in decision making*. (pp. 24-44). London: Psychology Press / Routledge.
- Payne, J. W., Bettman, J. R., & Johnson, E. J. (1988). Adaptive strategy selection in decision making. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 14, 534-552.

- Pennington, N., & Hastie, R. (1988). Explanation-based decision making: Effects of memory structure on judgment. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *14*, 521-533.
- Pennington, N., & Hastie, R. (1992). Explaining the evidence: Tests of the Story Model for juror decision making. *Journal of Personality and Social Psychology*, *62*, 189-206.
- Preacher, K., & Hayes, A. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*, 879.
- Rachlinski, J. J. (2006). Cognitive errors, individual differences, and paternalism. *University of Chicago Law Review*, *73*, 207-229.
- Read, S. J., Vanman, E. J., & Miller, L. C. (1997). Connectionism, parallel constraint satisfaction processes, and Gestalt principles: (Re)introducing cognitive dynamics to social psychology. *Personality and Social Psychology Review*, *1*, 26-53.
- Robbennolt, J. K. (2004). Evaluating juries by comparison to judges: A benchmark for judging. *Florida State University Law Review*, *32*, 469-509.
- Russo, J. E., Carlson, K. A., Meloy, M. G., & Yong, K. (2008). The goal of consistency as a cause of information distortion. *Journal of Experimental Psychology: General*, *137*, 456-470.
- Russo, J. E., Meloy, M. G., & Medvec, V. H. (1998). Predecisional distortion of product information. *Journal of Marketing Research*, *35*, 438-452.
- Simon, D. (2004). A third view of the black box: cognitive coherence in legal decision making. *University of Chicago Law Review*, *71*, 511-586.
- Simon, D., Krawczyk, D. C., Bleicher, A., & Holyoak, K. J. (2008). The transience of constructed preferences. *Journal of Behavioral Decision Making*, *21*, 1-14.
- Simon, D., Krawczyk, D. C., & Holyoak, K. J. (2004). Construction of preferences by constraint satisfaction. *Psychological Science*, *15*, 331-336.
- Simon, D., Snow, C. J., & Read, S. J. (2004). The Redux of Cognitive Consistency Theories: Evidence Judgments by Constraint Satisfaction. *Journal of Personality and Social Psychology*, *86*, 814-837.
- Simon, D., Stenstrom, D. M., & Read, S. J. (2008). *On the objectivity of investigations: An experiment* Paper presented at the Conference for Empirical Legal Studies.
- Simon, D., Stenstrom, D. M., & Read, S. J. (2009). *Partisanship and prosecutorial decision making: An experiment* Paper presented at the Conference for Empirical Legal Studies.

- Snyder, M., & Swann, W. B. (1978). Hypothesis-testing processes in social interactions. *Journal of Personality and Social Psychology*, *36*, 1202-1212.
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology*, *13*, 290-312.
- Spellman, B. A. (2010). Judges, expertise, and analogy. In D. Klein & G. Mitchell (Eds.), *The Psychology of Judicial Decision Making* (pp. 149-163). Oxford: Oxford University Press.
- Sunstein, C. (1996). Social norms and social roles. *Columbia Law Review*, *96*, 903-968.
- Thagard, P. (2003). Why wasn't O.J. convicted? Emotional coherence in legal inference. *Cognition & Emotion*, *17*, 361-383.
- Wason, P. C. (1960). On the failure to eliminate hypotheses in a conceptual task. *Quarterly Journal of Experimental Psychology*, *12*, 129-140.
- Wistrich, A. J., Guthrie, C., & Rachlinski, J. J. (2005). Can judges ignore inadmissible information? The difficulty of deliberately disregarding. *University of Pennsylvania Law Review*, *153*, 1251-1345.
- Zimbardo, P. (1965). The effect of effort and improvisation on self-persuasion produced by role-playing. *Journal of Experimental Social Psychology*, *1*, 103-120.

Appendix

Case Description

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. His 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. 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.

At the end of each day, the company’s accountant 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. After an investigation by a private detective, the firm instituted criminal proceedings against Hans H.

You will now be presented with the evidence from both parties. 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.

Please read the evidence carefully and try to understand everything. Take as much time to do this as you deem necessary. You do not have to learn the evidence off by heart – whenever necessary, you will be able to consult it again.

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 19:17 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 was seen driving to work in it on the day in question. According to the detective, 0.1% of all cars in the area are white XY cars. 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. 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.

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.

Hans testified that he has not had a criminal record for the last 16 years. At the age of 18, he was arrested for attempting to break into an apartment. He was convicted of this offence. Since then, he has never again been in conflict with the law.

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.

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.

Standard of Proof Instructions

(the instructions are available online at www.ce9.uscourts.gov (2003 ed.):

“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, you are not convinced beyond a reasonable doubt that the defendant is guilty, it is your duty to find the defendant not guilty. On the other hand, if after a careful and impartial consideration of all the evidence, you are convinced beyond a reasonable doubt that the defendant is guilty, it is your duty to find the defendant guilty.”

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