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the Last Word**

Experimentally Manipulating Order
and Provisional Assessment of the
Facts in Criminal Procedure

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Abstract

From a normative perspective the order in which evidence is presented should not bias legal judgment. Yet psychological research on how individuals process conflicting evidence suggests that order could matter. The evidence shows that decision-makers dissolve ambiguity by forging coherence. This process could lead to a primacy effect: initial tentative interpretations bias the view on later conflicting evidence. Or the process could result in a recency effect: the evidence presented last casts decisive light on the case. In two studies ($N_1 = 221$, $N_2 = 332$) we test these competing hypotheses in a mock legal case. Legal orders sometimes even expect judges to provisionally assess the evidence. At least they have a hard time preventing this from happening. To test whether this creates or exacerbates bias, in the second dimensions, we explicitly demand experimental participants to express their leaning, after having seen half of the evidence. We consistently observe recency effects and no interactions with leanings. If the legal order wants to preempt false convictions, defendant should have the last word.

JEL: C91, D01, D02, D91, K41

Keywords: criminal procedure, presumption of innocence, recency, primacy

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I. Research Question

The Universal Declaration of Human Rights stipulates: “everyone charged with a penal offence has the right to be presumed innocent until proved guilty according to law in a public trial at which he has had all the guarantees necessary for his defense” (article 11). Even if this presumption of innocence is not everywhere explicitly part of defendant’s constitutional rights, in substance the legal orders of civilized countries agree on this principle.¹ Yet legal orders diverge in their way of translating the principle into rules of criminal procedure. Art. 29.1 (US) Federal Rules of Criminal Procedure regulate the order of closing arguments as follows: prosecution speaks first, defense responds, and prosecution rebuts. Hence in the US, government has the last word. This is different under German law. § 258 II HS 2 Strafprozessordnung (code of criminal procedure) guarantees that “defendant has the last word”. Jurisprudence has extended this right to defense lawyers. If prosecution has reacted to the defense lawyer’s closing argument, the defense lawyer has the right to speak again, and government may not respond.² Both the defense lawyer and defendant in person may use the opportunity of the last word to completely revisit the evidence, to bring new evidence, and to present the case in a different light.³ Defendant shall be the last who has a chance to influence the court.⁴

Comparative lawyers often surprise their readers by demonstrating that apparent divergence between legal orders boils down to reaching the same conclusion on different doctrinal paths. Against this backdrop it is remarkable that there is a true difference between US and German law when it comes to concluding criminal procedure. In this article, we use experimental methods to investigate whether the difference matters, and whether the right of government to have the last word does indeed bias criminal courts against defendant. If we were to establish the effect, this would suggest that the solution found by US law is problematic in light of the constitutional guarantee of presumption of innocence.

In the courtroom, closing arguments are preceded by a lengthy criminal procedure. During this procedure, the jury has heard different stories and has seen conflicting evidence. It may be that this richer context neutralizes order effects in closing arguments. In this first attempt at rigorously testing the competing solutions of US and German law, we bracket this potential qualification. We radicalize the difference by also presenting the evidence only once, and either in a way that balances inculpatory and exculpatory evidence, or by bringing all the inculpatory evidence first (which implicitly gives defense the last word), or bringing all the exculpatory evidence first (which implicitly gives prosecution the last word).

Legal intuition need not get it right. The rule that gives defendant the last word rests on the intuition that the position a decisionmaker hears last is most likely to influence her choices.

1 See, e.g., for the US *Coffin v. United States*, March 4, 1895, 156 U.S. 432.

2 BGH July 29, 1976, Neue Juristische Wochenschrift 1976, 1951.

3 BGH February 2, 1956, BGHSt 9, 77.

4 BGH March 31, 1987, NSTZ 1987, 423.

Ample psychological evidence, that we review below, demonstrates that such a recency effect is far from obvious. In many contexts, a primacy effect has been found: the contender who has a chance to key the decisionmaker on one interpretation gains the upper hand. If there was a primacy effect in criminal procedure, not giving defendant the last word might be innocuous. The policy debate would have to focus on a different order effect. All over the world, criminal procedure starts by prosecution charging defendant with some alleged crime. But this need not imply that prosecution also has the right (or the duty) to bring all the inculpatory evidence, and to weave it together to a coherent story, before defense has a chance to present counter-evidence, and to cast doubt on prosecution's story.

In our experiments, we compare both orders of presenting the evidence (prosecution first, defense first) with a balanced treatment where roughly one piece of inculpatory evidence is followed by another piece of exculpatory evidence, and vice versa. We also aim at finding the mental process through which either primacy or recency is critical. A recency effect could simply result from the fact that information and the last interpretation are more easily accessible in memory. Yet in a literature that we review below, it has been shown that legal decision making is better characterized by a holistic process that aims at making sense of conflicting evidence by constructing a sufficiently coherent story. This suggests that the chance to influence this process of sense making is critical. We exploit the fact that, in earlier work, this process has been shown to lead to a re-evaluation of the evidence in the light of the ultimate decision. Using this measure, we show that, in our experiment as well, participants rely on this process for maximizing consistency. We cast further light on mental process by repeating all three treatments with an additional manipulation: after participants have seen half of the evidence (which is biased in the prosecution first or in the defense first treatments), we ask them to elaborate a provisional leaning. This manipulation gives us access to participants' intermediate attempts at creating meaning. We can study in which ways provisional understandings of the case translate into final assessment. This additional evidence also has direct policy relevance. The legal order cannot reliably prevent that triers engage in sense-making while they listen to incomplete evidence. Actually some legal orders even explicitly call for a provisional assessment of the evidence. An example again comes from German law. Prosecution cannot autonomously bring a case. The judge must first allow the charge to be brought, based on a provisional assessment of the evidence.⁵

In the next section, we develop the hypothesis to be tested from the literature. Sections 3 and 4 present the design and the results of Experiments 1 and 2. Section 5 concludes with discussion.

5 § 203 Strafprozessordnung: court proceedings are only allowed „if it appears sufficiently likely that defendant is guilty“.

Literature Review and Hypothesis

Primacy vs. Recency

Order effects of the presentation of information on judgement have been studied for a long time (see only Hogarth and Einhorn 1992, Gershberg and Shimamura 1994, Howard and Kahana 1999, Tan and Ward 2000, Lind, Kray et al. 2001, Piero, Mannetti et al. 2005, Duffy and Crawford 2008, Forgas 2011). In most settings, primacy is more important than recency, but recency effects have also been found (see the classification of results provided by Hogarth and Einhorn 1992), and there is intense work on identifying moderating factors.

Some of these studies specifically study legal decision making (for a discussion of the relevance of the pertinent psychological evidence for law see Lawson 1968, Kessler 1975, Davis 1984, Caldwell, Perrin et al. 2001), with rather mixed results. Pennington (1982) demonstrates a primacy effect on guilty verdicts if the strongest witness statements are presented first. Wells, Wrightsman et al. (1985) demonstrate that defense is more likely to get defendant acquitted if defense makes an opening statement early on, ideally even before the opening statement of prosecution. The study thus also finds a primacy effect. Kassir, Reddy et al. (1990) have participants watch an ambiguous piece of evidence, and manipulate whether it is preceded or followed by an explanation from either prosecution or defense. They find that participants high in need for cognition are more influenced by antecedent statements, while participants low in need for cognition are more influenced by posterior statements. Kerstholt and Jackson (1998) manipulate at which point participants are asked to tentatively assess the probability of guilt: after each new piece of evidence, or only after they have heard the entire evidence. In the first condition there is an unconditional recency effect. In the second condition there only is a recency effect if, additionally, participants have received background information. Costabile and Klein (2005) demonstrate that incriminating evidence has the strongest likelihood of influencing mock jurors when presented late in the trial. They thus find a straightforward recency effect.

Some of the oldest contributions to this literature are even closer to our research question. Insko (1962) has mock jurors try a criminal case when either a statement by prosecution or by defense is presented first. This statement can either be confined to statements favoring the presenter's case, or can also discuss and dismiss the counter-evidence. An order effect only occurs when the first statement does not take counter-evidence into account, while the second does. In that comparison, a recency effect is found. If participants are initially made aware of the fact that there is dispute, a primacy effect is found if a statement discussing counter-evidence precedes a statement confined to the respective side's case.

Stone (1969) has mock jurors decide a criminal case. In the prosecution condition, they first read the prosecution case, mark a tentative verdict, read the defense case, again mark a tentative verdict, and hear the final, forceful prosecution pleading. In the defense condition, partic-

ipants first read the defense case, everything else held constant. In this design, there is a clear primacy effect.

Walker, Thibaut et al. (1972) also manipulate whether participants first see the evidence for the defense or for prosecution, and cross this with the sequence from weak to strong or strong to weak arguments. In three of the four conditions, they find a significant recency effect.

Pyszczynski and Wrightsman (1981) manipulate whether prosecution or defense make opening statements that preview the evidence and indicate in which ways it would likely support their cause. Extensive opening statements by prosecution lead to more guilty verdicts if defense opening statements are also extensive. Extensive defense opening statements only lead to less guilty verdicts if prosecution opening statements are brief.

The existing evidence is thus mixed when it comes to a main effect of presentation order in the courtroom. We therefore do not formulate a directed hypothesis, but posit that the treatment difference matters:

Hypothesis: The order in which evidence is presented and arguments are made in the courtroom influences the verdict.

Mental Process of Jury Decision-Making

Court cases are typically ill defined. Even after all the available evidence has been presented, doubt remains. What has happened cannot be proven in a way that would live up to scientific standards. Characteristically, the evidence leaves room for competing interpretations. This is also how jurors see their task. They are engaged in sense making (Pennington and Hastie 1991) and constructing coherent stories from the evidence. Decision-making is interpretative (Pennington and Hastie 1988). It relies on reasoning about the evidence, rather than an algebra like process (Pennington and Hastie 1988). Jurors attempt at creating a narrative story from the pieces of evidence they have heard (Pennington and Hastie 1986, Pennington and Hastie 1988, Pennington and Hastie 1993, Pennington and Hastie 1993) which can be considered as a mental model (Pennington and Hastie 1988); (also see Johnson-Laird 1983).

Jurors decide by matching stories to the representation of the verdict categories given to them in the judge's instructions on the law (Pennington and Hastie 1986). Whether a story is accepted, or whether it is selected, depends on its goodness of fit (Pennington and Hastie 1993). In this assessment, jurors look out for coverage, coherence and uniqueness (Pennington and Hastie 1992). Coverage, coherence and uniqueness also determine the level of confidence (Pennington and Hastie 1988, Pennington and Hastie 1992).

This is not a deficiency. Juror decision-making is not second-rate. In order to make powerful mathematical tools, such as Bayes' theorem, applicable, scientists must artificially remove all ambiguity. The judiciary does not have this luxury. It would not be permissible to "decontext-

tualise" the case. This explains why, jurors and professional judges alike, must at least partly rely on their intuition (Day 1987, Guthrie, Rachlinski et al. 2007).

There is mounting evidence on the character of the mental process that underlies story construction, and it has been argued that the same process underlies all forms of intuitive decision making (Glöckner and Betsch 2008a). In line with the basic claim from *Gestalt* psychology (Markus and Zajonc 1985), the assessment of the evidence often seems to be holistic (Simon 2004) and relies at least partly on an automatic process that has been developed from perception. It can be modelled by parallel constraint satisfaction (PCS) network models (Simon and Holyoak 2002). According to these connectionist models, decision-making progresses bidirectionally (Holyoak and Simon 1999, Simon, Krawczyk et al. 2004, Simon, Snow et al. 2004, Simon, Krawczyk et al. 2008). Not only do facts determine conclusions. Potential conclusions also affect the perception of the evidence. The mental model reconfigures itself until maximal coherence is achieved (Simon 2004).

The mechanism transforms the information input by automatically accentuating initial advantages for one or the other interpretation of the evidence. Over the consecutive iterations, information supporting the final decision is overestimated and conflicting evidence is underestimated. Information is thus polarized (Simon 2004). This process has been dubbed a coherence shift (Simon, Pham et al. 2001). It has been shown that coherence shifts can be pronounced (Simon 2004). Normally the construction of consistent interpretations is unconscious. Only the result is propelled back to awareness, for instance in the form of the feeling that one interpretation of the evidence is most appropriate ("I cannot prove it, but when I see it I know it"). In other cases feelings of sudden insight ("now I get it") or of unease ("something is fishy here") are produced.

Note, however, that intuitive processes operate in close interaction with conscious deliberate processes of information search, information construction and supervision (Glöckner and Betsch 2008). Hence "deciding intuitively" does not necessarily mean that individuals do not deliberate before making a decision. Jury members will of course pay attention to the information presented, and they will consider it deliberately. Yet the core process of information integration: making sense of the information, forming a consistent interpretation that results in favoring an option, will be based on automatic processes. Conscious and unconscious pieces of information are considered and the information integration process remains opaque to the decider.

Coherence based reasoning could consistently explain a primacy *or* a recency effect. Primacy effects might result from the fact that coherent interpretations are formed after seeing the initial evidence. Coherence effects lead to overly confident interpretations that could cause later evidence to be assimilated to these initially generated interpretations. Alternatively, evidence that is presented late might receive particularly high weight, since attention focuses on this evidence and gives it higher activation, leading to recency effects. Actually both effects might be at work. If that were true, the final judgment (and decision) would depend on the relative

weight of either effect. This is how the leaning manipulation becomes important. It can be expected that initial leaning enhances the effect of early interpretations. This might tilt the balance in favor of a primacy effect.

In two studies we investigate primacy vs. recency effects in legal judgments, the moderating effect of initial leanings and the relation to coherence effects.

Study 1

Method

Participants and design. 221 persons participated in the experiment (mean age = 22.3 years, $sd = 3.9$), 138 of which were female. Participants were recruited from the local subject pool using ORSEE (Greiner 2004). The study took roughly 45 min and participants earned a fixed fee of 10 € for their participation. Participants were randomly assigned to the four cells of a 2 (order: pro-guilty-first vs. balanced) x 2 (leaning: yes vs. no) design. The pro-guilty first conditions presented the evidence in the following order: pro_g[uilt]1-5; [leaning: yes vs. no]; neutr1; con_g1-3; neutr2. The balanced conditions included the same facts but in the order pro_g1; con_g1; pro_g2; con_g2; pro_g3; [leaning: yes vs. no]; neutr1; pro_g4; pro_g5; con_g3.

Materials. We use a translated and slightly modified version of a complex legal case constructed and repeatedly used by Dan Simon and colleagues (Holyoak and Simon 1999, Simon 2004, Simon, Snow et al. 2004); the complete case can be found in the appendix. We used the case in a version in which the posterior probability of the accused person Hans being guilty was very high ($> 99.9\%$; (Glöckner and Engel 2013)). In this case, a company accuses one of its employees of having stolen money from the company safe. The evidence consists of twelve pieces of information. 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 date of crime in a place which was hard to reach in such a short time. We tell participants that they assume the role of a (mock) jury member. We frame the case as criminal procedure. Participants are given the “beyond a reasonable doubt” model instructions of the Ninth Circuit.⁶

The experiment is conducted online, using the software Unipark. Participants act anonymously. All information is presented to them, and collected from them, on the computer screen.

6 The instructions are available online at www.ce9.uscourts.gov (2003 ed.).

Since we are interested in order effects, participants only see each piece of evidence once, in defined order as described above. They are not given the opportunity to revisit the evidence.

In stage 1, subjects read short scenarios about social interactions. These scenarios contain the relevant cues of the legal case in different, non-legal situations and are rated on a scale from -5 (*strongly disagree*) to 5 (*strongly agree*). For instance, participants read that an eyewitness was 99% confident of having identified a specific person bringing some flowers for a colleague after work. They then are asked how strongly they agree with the statement that the identification makes it likely that this person indeed brought the flowers. At this stage, we also ask for demographic information, but of course completely preserve anonymity, and administer the Preference for Consistency personality questionnaire by Cialdini, Trost et al. (1995).

In stage 2, subjects are presented with case materials that consist of a general instruction, including the standard of proof, some background information on the defendant, and isolated pieces of evidence. At the end of this stage, individuals indicate their decision. They rate the confidence in their decision on a scale ranging from *completely uncertain* (0) to *completely certain* (10). They have to estimate the probability that the accused person had stolen the money from the safe (all estimates in percent). Decision time is recorded. The order of the evidence was manipulated as described above. After half of the evidence a leaning was requested by roughly half of the participants as follows:

“You now have received half of the evidence for the case. Please take a bit of time to think about the case. Towards which judgment would you lean, based on the available evidence? Your leaning is of course not binding and you can decide differently after you have seen the remaining evidence. I lean towards (a) that Hans H. is guilty of committing the crime vs. (b) Hans H. is not guilty.”

In stage 3, subjects re-rate the evidence, using the same scale as in the first part from -5 (*strongly disagree*) to 5 (*strongly agree*). They, for instance, indicate how strongly they agree with the claim that eyewitness identification with 80% certainty makes it likely that the defendant had stolen the money.

As core dependent measures we record verdicts (guilty vs. not guilty) and estimated probability that defendant has committed the crime. As further dependent measures we collect confidence, subjective probability necessary for conviction, and twice the evaluation of evidence (before knowing what the experiment is about, and after passing judgement).

Results and Discussion

Figure 1 has our main result: if inculcating (pro-guilty) evidence is presented first, the probability of defendant being convicted (Figure 1, left) as well as the assessed probability of Hans being guilty (Figure 1, right) is substantially lower than if evidence order is balanced. Hence, there is descriptive evidence for a recency effect. The effect of order on verdicts, however, does not reach conventional levels of significance (Mann Whitney, $N = 221$, $p = .2131$),

whereas the effect on probability of guilt does ($p = .0105$). The leaning manipulation does not have a significant effect on either dependent variable.

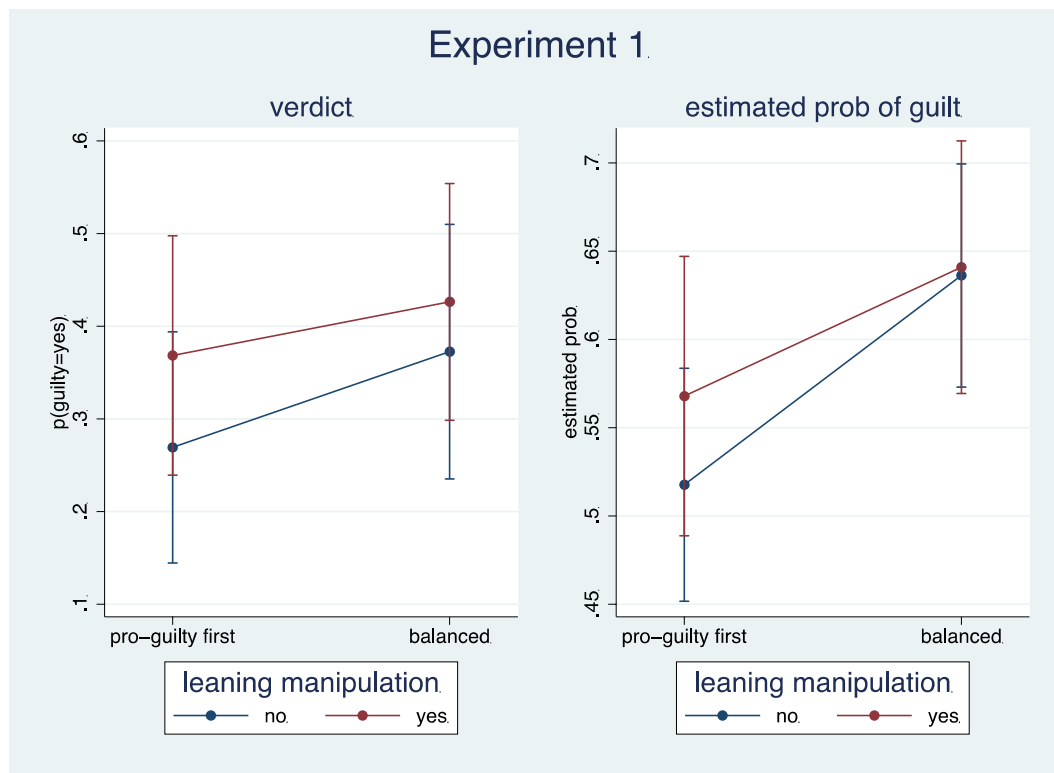


Figure 1
Judgment and Assessment of the probability of guilt in Study 1

$p(\text{guilty}=\text{yes})$ is the probability of guilty; estimated prob is the probability judgment of Hans being guilty.

The regressions in Table 1 cast further light on these results. Models 1 and 2 essentially replicate the non-parametric findings. They show that interacting both independent variables does not generate any additional results, for either dependent variable.

The most important parametric message is in model 3. In a structural model, we simultaneously estimate both dependent variables. We first learn that, unsurprisingly, the estimated probability of guilt predicts verdicts: the more a participant deems it likely that defendant is guilty, the more this participant is likely to convict defendant. But since we simultaneously estimate both components, we can now test for an indirect effect of a balanced presentation on verdict through changes in the estimated probability of guilt.⁷ This indirect effect turns out significant (coef = 1.261, se = 0.573, $p = .028$). Hence we not only find an effect of the balance manipulation on probability estimates (OLS component of the structural model) and of probability estimates on verdicts (logit component of the structural model). We also know that

⁷ Technically we test the multiplicative effect of the balanced presentation of the evidence on the estimated probability of guilt times the effect of this estimate on the verdict, against the nul hypothesis that this effect is 0.

the balance manipulation *does* have an effect on verdicts, through the channel of probability estimates.⁸

	model 1	model 2	model 3	
	univariate	univariate	structural model	
	Logit	OLS	Logit	OLS
dv	verdict	prob_guilt	verdict	prob_guilt
lv				
leaning manipulation	.460 (.417)	.050 (.051)	-.041 (.642)	.050 (.050)
balanced	.477 (.427)	.119* (.045)	-.406 (.600)	.119* (.051)
leaning manipulation* balanced	-.235 (.571)	-.045 (.070)	.094 (.846)	-.045 (.070)
prob_guilt			10.637*** (1.426)	
Cons	-.999** (.313)	.517*** (.329)	-7.538*** (1.058)	.518*** (.036)
N	221	221		221
p model	.3906	.0272		
R ²	.0108	.0363		

Table 1
Regressions predicting choices and judgements in study 1

model 1 and verdict component of model 3: logit; model 2 and prob_guilt component of model 3: OLS
model 3: (generalized) structural model, simultaneously estimating both components with (full) maximum likelihood
reference category: inculpatory evidence is presented first
prob_guilt: estimated probability of defendant being guilty
standard errors in parenthesis
*** p < .001, ** p < .01, * p < .05

This gives us

Result 1: If mock jurors see the exculpatory evidence most recently before deciding, they assess the probability of defendant having committed the crime to be lower than if inculpatory and exculpatory evidence are presented in balanced order. On this indirect channel, the order in which the evidence is presented also affects verdicts.

In the language introduced in our theory section, we thus find a recency effect; we can rule out a primacy effect.

Importantly, in all treatments we find pronounced coherence shifts, supporting the idea that decision making relies on coherence-based reasoning: depending on the decisions participants

8 Note that the indirect effect is not automatic. It requires that the same participants whose choices in one component of the structural model are systematically explained by one element of the multiplicative effect also exhibit a systematic reaction to the relevant explanatory variable on the other component of the structural model. Consequently one would not find a significant indirect effect if the effect of estimated probability on verdicts was chiefly driven by participants whose probability estimates *do not* strongly react to the fact that the evidence was presented in a biased order.

have taken, they overvalue supporting evidence, and they undervalue conflicting evidence, compared with the assessment of probative value assigned to individual pieces of evidence presented in a neutral context. On average, evidence is shifted toward the favored option by 4% of the total rating scale ($M = .42$, $SE = 0.05$). Coherence shifts did, however, not differ between the conditions of the 2 x 2 design in a regression including both main effects and their interaction.

In study 1 we had only compared the balanced presentation of the evidence with a setting where all the inculpatory evidence is presented first. This design choice has been motivated by external validity. We wanted to test whether giving defendant the last word (as in German law) gives defendant an advantage. Yet since we find a recency effect, it is important to learn whether it indeed is critical which party pleads last, and to rule out that the results might only be due to some specifics of the balanced condition. Therefore in Study 2 we compare all three orders: the evidence is balanced; inculpatory evidence is presented last; exculpatory evidence is presented last.

Study 2

Method

In our second experiment, we had 332 participants, 208 of them were female. Mean age was 24.95 years ($sd = 4.75$). Participants earned a fixed fee of 10 € for their participation. Procedure and design were essentially the same as in Study 1, except for some minor improvements that were required to logically allow presenting the facts also in the new reversed order (see Appendix). We also added the HEXACO 60 questionnaire (Ashton and Lee 2007) as distractor after the preference for consistency measure.⁹ Most importantly, however, we now also include a con-guilty-first condition, leading to a 3 (pro-guilty-first vs. balanced vs. con-guilty-first) x 2 (leaning: yes vs. no) between-subjects design.

Results

Figure 2 shows that, overall, Study 1 replicates very well. Despite the fact that the leaning manipulation should have accentuated a potential primacy effect, for both dependent variables we find a clear recency effect. The magnitude of the effect is relatively substantial and the relation seems to be mainly linear. Changing from balanced to pro-guilty first decreases the probability of a guilt verdict by roughly 10%. Non-parametrically, this difference is weakly significant (Mann Whitney, $N = 213$, $p = .0658$). Changing from balanced to con-guilty first increases the probability of a guilt verdict by almost 15% ($N = 243$, $p = .0349$). The difference between pro-guilty first and con-guilty first is highly significant ($N = 208$, $p = .0002$). For the other dependent variable, the estimated probability of guilt, we find a significant difference

9 http://www.hexaco.org/downloads/ScoringKeys_60.pdf.

between pro-guilt first and the balanced presentation (Mann Whitney, $N = 213$, $p = .0152$) and between pro-guilt first and con-guilt first ($N = 208$, $p = .0002$), but not between balanced and con-guilt first.

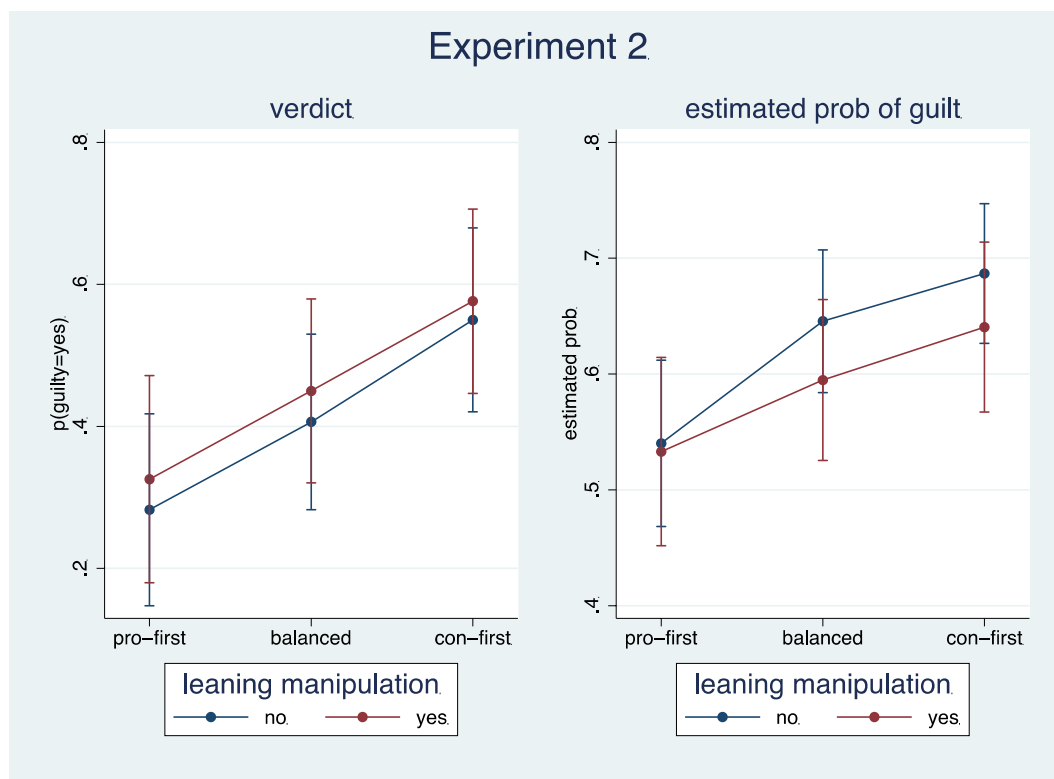


Figure 2
Judgement and Decisions in Study 2
 verdict is either 0 (innocent) or 1 (guilty)
 assessment is the subjectively estimated probability of defendant being guilty

Table 2 repeats the regressions of Table 1 for the new sample. We replicate that, for both dependent variables, the interaction between the leaning manipulation and the order manipulation is immaterial. This is remarkable. Asking participants to deliberate about the provisional assessment of the evidence, and to express a provisional verdict, does not matter more if the evidence is biased that individuals have seen up till this point. In keeping with the non-parametric statistics, in model 1 we find a significant effect of con-guilt first, indicating that defendant is worse off if exculpating evidence is heard first. But this effect disappears in the verdict component of model 3, i.e. when controlling for the estimated probability of guilt. We however find significant indirect effects of either order manipulation on verdict, through the effect on the estimated probability of guilt (coef = 1.266, se = 0.607, $p = .037$ for balanced order; coef = 1.761, se = 0.630, $p = .005$ for con-guilt first). This also implies that the direct effect of the con-guilt first manipulation on verdict is mediated by the effect of this order on the estimated probability of guilt.

	model 1	model 2	model 3	
	univariate	univariate	structural model	
	logit	OLS	logit	OLS
dv	verdict	prob_guilt	verdict	prob_guilt
lv				
leaning manipulation	.203 (.462)	-.007 (.054)	.485 (.713)	-.007 (.054)
balanced	.552 (.415)	.105* (.047)	-.147 (.605)	.105* (.049)
con-guilt first	1.132** (.418)	.147** (.047)	.328 (.599)	.147** (.050)
leaning manipulation* balanced	-.025 (.588)	-.044 (.071)	.231 (.904)	-.044 (.071)
leaning manipulation* con-guilt first	-.097 (.592)	-.039 (.072)	.198 (.911)	-.039 (.071)
prob_guilt			.120*** (.013)	
Cons	-.932** (.328)	.540*** (.036)	-8.660*** (1.048)	.540*** (.037)
N	332	332		332
p model	.0147	.0076		
R ²	.0325	.0436		

Table 2
Regressions predicting choices and judgements in study 2

model 1 and verdict component of model 3: logit; model 2 and prob_guilt component of model 3: OLS
model 3: (generalized) structural model, simultaneously estimating both components with (full) maximum likelihood
reference category: inculpatory evidence is presented first
prob_guilt: estimated probability of defendant being guilty
standard errors in parenthesis
*** p < .001, ** p < .01, * p < .05

Hence in the light of study 2, we can strengthen Result 1 and find

- Result 2:
- a) If mock jurors see the exculpatory evidence most recently before deciding, they assess the probability of defendant having committed the crime to be lower than if inculpatory and exculpatory evidence are presented in balanced order, and even lower than if they have last heard the inculpatory evidence.
 - b) If they last see the exculpatory evidence, they are most likely to acquit the defendant. If the evidence is presented in a balanced order, this is less likely. If they last see the inculpatory evidence, this is least likely.

Again we find consistent coherence effects with evidence being shifted in the direction of the verdict by 5% of the 11 point rating scale ($M = .57$, $SE = .05$) but no differences between conditions (all $p > .05$).

Thus far, the evidence suggests that the leaning manipulation does not have an effect on estimated probability of guilt and verdict. For legal policy, this would be welcome news. It is dif-

difficult for the legal order to prevent such provisional assessments by the judge or the jury. Prosecution and defense may also try to exploit this possibility strategically. This would not be a concern if provisional assessments are immaterial for the final verdict, or for the assessment of guilt. To see whether this is indeed true, we add the provisional verdict to the structural model.¹⁰ If we do, we see a much more differentiated picture. As one should have thought, treatment affects the provisional verdict (Figure 3, blue bars). If participants initially exclusively see the inculpatory evidence, they are inclined with about 60% to convict defendant.¹¹ Yet if the first half of the evidence is partly inculpatory and partly exculpatory, this probability is already down to about a quarter.¹² If they have only seen the exculpatory evidence, the probability is down to little more than 10%.¹³

Provisional verdict affects the subjective probability that defendant has committed the crime. If the provisional verdict was conviction, the subjective probability that defendant has committed the crime increases by almost 25%.¹⁴ Yet when assessing the probability of defendant being guilty, participants correct for the original bias: The effects of the order manipulations on provisional verdict and on the estimated probability of guilt have opposite sign. The correction is best seen in the predicted values from the three components of the structural model collected in Figure 3. If participants hear the exculpatory evidence first, they lean towards conviction with only 11.9% probability. But after they have heard all the evidence, they estimate the probability that defendant is guilty to be 64.1%. By contrast, if they first have heard the inculpatory evidence, they lean towards conviction with 60.5%. But after they have heard all the evidence, they estimate the probability that defendant is truly guilty to be only 53.3%. Finally if the evidence is balanced throughout, only 26.7% lean towards conviction, but ultimately they estimate the probability of guilt to be as high as 59.5%.¹⁵ Actually, the very fact that we find significant order effects in the component of the structural model predicting probability estimates proves that participants correct for the bias inherent in the order of presentation. Otherwise the effect of order on probability estimates would have to be mediated by their effect on leanings. We even have a precise measure of the size of the correction: it directly follows from these treatment effects, and is 14.3% if the evidence has been balanced, and 22.5% if they have heard the inculpatory evidence first.

10 We of course can only do so for the treatments with the leaning manipulation since otherwise we do not have this data. We estimate an all-linear model, so that coefficients can directly be interpreted as marginal changes in probabilities. All coefficients and significance levels can be read off Figure 2. In the appendix we report both this model and the mirror model that estimates both binary components with logit.

11 The constant of this component of the structural equation model is .605.

12 $.605 - .338 = .267$.

13 $.605 - .486 = .119$.

14 The coefficient of a provisional verdict of guilt on the ultimate estimate of the probability of guilt is .242.

15 We use this treatment to illustrate how this prediction is calculated. The constant of the component of the structural model explaining probability estimates is .387. If the partial evidence has been balanced, the leaning component of the structural model predicts that, in this treatment, participants lean towards conviction with probability .267. Multiply this prediction with the coefficient of leaning in the component explaining probability estimates, to get $.267 * .242$. Finally add the direct effect of balanced presentation of the evidence on the estimated probability of guilt, which is .144. Hence the model predicts, in this treatment, the estimated probability of guilt to be $.387 [\text{cons}] + .242 * .267 [\text{leaning}] + .144 [\text{balanced}] = .596$.

Finally, if we control for the provisional verdict, the final verdict is no longer exclusively predicted by the subjective assessment of the facts reflected in the estimated probability of guilt. Rather we find independent effects of both the provisional verdict and the order treatment. Despite the fact that participants have already corrected for the bias inherent in the presentation of the evidence when estimating the probability of guilt, they once more correct when translating the estimated probability of guilt into a verdict. If the evidence has been presented in a balanced order, this second correction (by 12.3%) is, however, only weakly significant ($p = .074$).¹⁶ The second correction (by 22.6%) is significant at conventional levels in comparison between pro-guilt first and con-guilt first. From Figure 3 we also learn that treatment effects on verdicts are more pronounced than on estimated probability of guilt. This is likely due to the fact that we have given participants a beyond a reasonable doubt instruction.

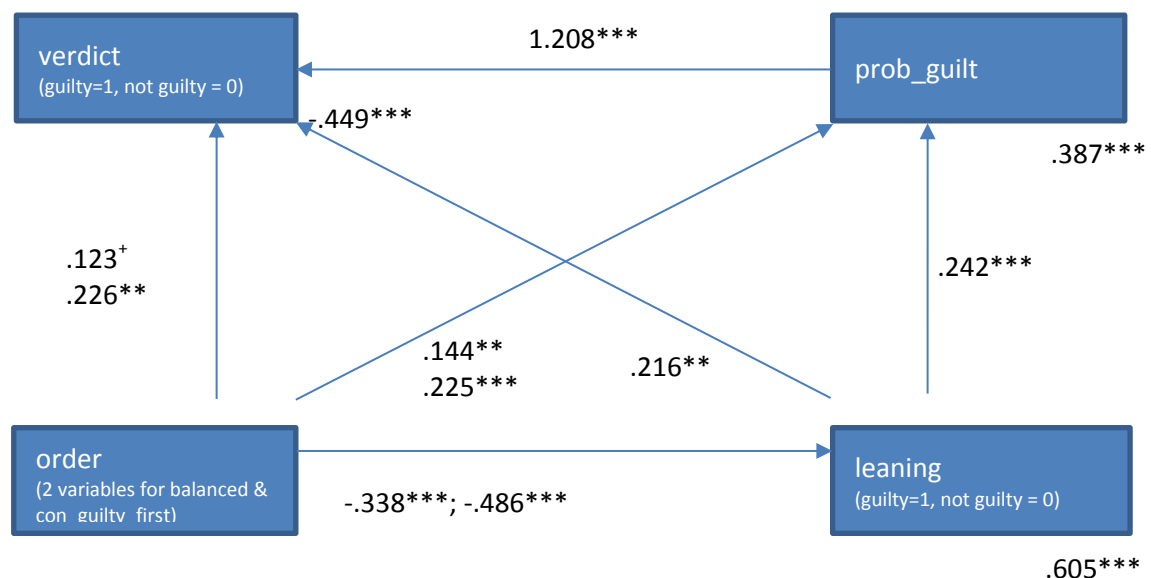


Figure 2

Study 2: Complete Structural Model

structural equation model

data from treatment with leaning manipulation only

coefficients and significance levels are reported

constant is reported with the respective dependent variable, it refers to pro-guilt first as the reference category

if two coefficients are reported, the first is for balanced order, the second is for con-guilt first; pro-guilt first is the reference category

*** $p < .001$, ** $p < .01$, * $p < .05$, + $p < .1$

see Appendix for full model

16 On could, of course, also express the correction as one in comparison between the balanced order and either unbalanced presentation. We just wanted to keep the reference category constant throughout the paper.

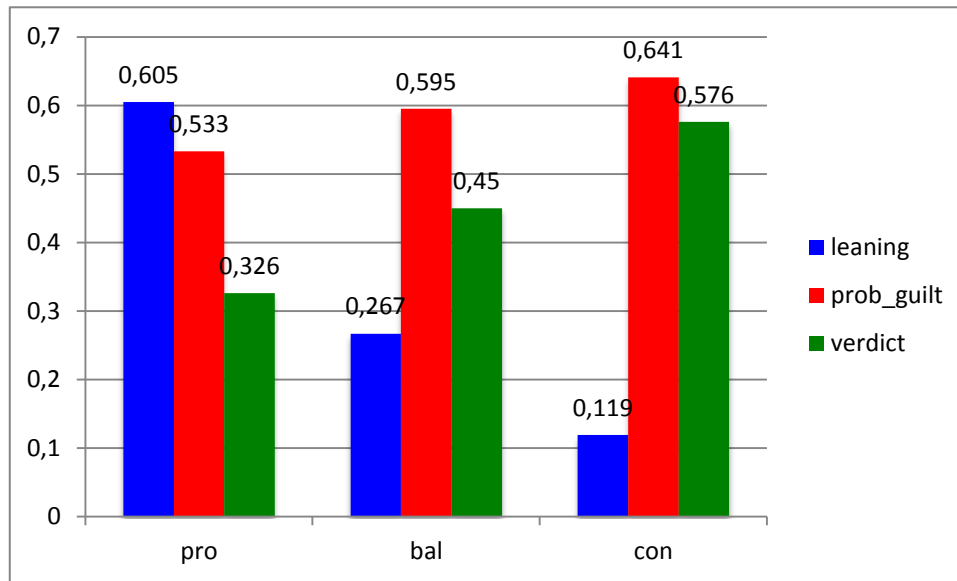


Figure 3
Study 2: Predicted Values from Complete Structural Model
 all results in fractions of 1 (for % multiply by 100)
 pro: pro-guilt first; bal: balanced order; con: con-guilt first

We conclude

Result 3: If individuals are induced to provisionally formulate a verdict, on the basis of incomplete evidence, they correct their final assessment for the resulting bias.

Discussion

Officially, legal orders around the world are united: convicting a person, and inflicting a criminal sanction on her, is one of the most severe exercises of sovereign powers. These powers shall not be used wrongly, if ever possible. This is why the presumption of innocence is in many countries even constitutionally protected. And this is why false convictions carry much more weight than false acquittals. Consequently juries are instructed to only convict defendant if she has been found guilty “beyond a reasonable doubt”. Legal orders should therefore be concerned if a feature of criminal procedure facilitates conviction. In this paper, we investigate whether the order in which the parties present the evidence is one such feature. This is not only a theoretical question. US and German law differ in this very respect. While in Germany, “defendant has the last word”, in the US prosecution is allowed to react to the pleadings of the defense attorney with a rebuttal.

Experiments are not meant to map the real life setting they aim at understanding. Experiments are tools for identifying causal effects. In the interest of clean identification, experiments deliberately bracket contextual elements that might well matter; finding out whether this is the case is left to future work. Our experiment is no exception from this rule. It may well be that bias does less result from the order in which the evidence is presented to a judge or jury, and

more from the way how the parties or their representatives interpret this evidence. Since our theory is based on the claim that judicial decision-making is an exercise in sense making, which results in parallel constraint satisfaction, we deem this effect to be quite likely. But this would be an additional (additive or multiplicative) effect. In this paper, we focus on the antecedent question whether bias already results from the order in which the evidence has been presented. In the courtroom, finding out whether defendant is guilty is often not just an inference task. Jurors may have sympathy with the victims of the crime, they may be appalled by the cruelty of the crime, or they may want to protect defendant against what they see as an illegitimate exercise of state power. We do not mean to rule out that the order of presenting the evidence carries more weight in such an emotionally laden environment.

In study 2, we find an effect of either order on verdict. Yet we have found only a trend in the expected direction when testing the direct order effect in study 1. And in study 2, the difference between pro-guilt first and balanced presentation on verdict is only weakly significant. We therefore caution readers against overinterpretation of our results. Still, recent methodological debates have highlighted that one cannot expect to find full replication of each single significant effect in repeated studies. It is therefore assuring that the coefficients point into the same direction and are very similar in both studies.

Furthermore, we find a very robust indirect effect: order affects how triers assess the probability that defendant is guilty which, in turn, affects how they decide the case. Even to the extent that this does not translate into a significant direct effect, this result should be a source of concern. Verdict is a dichotomous decision, while the assessment of probability of guilt influences the decision about the severity of the sanction. This suggests a troublesome source of bias. However, based on our findings, legal orders need not be concerned that judges or jury members provisionally assess incomplete evidence. If this creates bias, they are likely to correct for it. This is comforting news for criminal policy.

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Appendix

Complete Structural Model

	all linear	generalized structural model
verdict		
leaning	.216** (.065)	2.842** (.994)
prob_guilt	1.208*** (.101)	10.752*** (1.811)
balanced	.123+ (.069)	2.066* (1.036)
con-guilt first	.226** (.074)	2.915** (1.092)
cons	-.449*** (.072)	-9.859*** (1.810)
prob_guilt		
leaning	.242*** (.047)	.242*** (.047)
balanced	.144** (.052)	.144** (.052)
con-guilt first	.225*** (.055)	.225*** (.055)
cons	.387*** (.048)	.387*** (.048)
leaning		
balanced	-.338*** (.083)	-1.436** (.427)
con-guilt first	-.486*** (.084)	-2.430*** (.509)
cons	.605*** (.064)	.425 (.312)

Table 3

Complete Structural Model

functional form: prob_guilt: OLS; guilt, leaning: model 1: linear probability model, model 2: logit

reference category: pro-guilt first

leaning and verdict: dummy that is 1 if participant (provisionally) decides in favor of conviction

Instructions Study 1

The following are the translated instructions of the balanced treatment. The instructions of the proguilty first treatment only differs by the order in which, in the main experiment, the pieces of evidence are presented. In the *NoLeaning* treatments, participants are not asked for their provisional assessment, after having seen half of the evidence.

Welcome to this scientific study!

In the following questionnaires you will make decisions concerning several scenarios.

Please read the instructions and questions carefully and answer honestly and as precise as possible.

Anonymity will be assured and data will be used only for scientific purposes.

Please click CONTINUE to start the first part of the study. Thank you in advance for participating.

Data in this study are important and they will be matched with results from other studies using an anonymous code.

Please work carefully and answer all questions. We exclude persons from subsequent studies that do not work carefully.

I agree that my data will be matched with other data via an anonymous code and I am aware of the fact that I can be excluded from further participations for not working with sufficient care.

(If you do not want to agree, please close the window. You then will not take part in this study and receive no payment for it.)

☐ accept

Please indicate in small letters your personal code.

The code consists of the following components:

SECOND letter of the first name

FIRST letter of the first name of the mother

First letter of the first name of the father (if unknown use "**")

SECOND letter of the place of birth

DAY of the birthday (e.g. 12 für 12.07. or 08 für 08.03.)

Assessment of Social Scenarios

Please provide assessments for the following questions concerning social, economic and legal situations. For each question you will be provided with a short summary of the relevant information followed by statements concerning the situation. You should assess, in how far you agree or disagree with the statements. It is not expected that you have expertise in the respective areas. Please try to use your general knowledge for making your assessments.

The scenarios are unrelated. Please assess them independently.

The provided information can be incomplete, please still try to provide as good assessments as possible.

Please indicate for each statement in how far you agree or disagree. Use the following scale and mark the respective value:

-5	-4	-3	-2	-1	0	1	2	3	4	5
strongly disagree					neutral					strongly agree

Scenarios

1. Susanne works as programmer for a big insurance company. One evening after all other employees had left, she passed the accounting office. She recognized a men, who rushed into the office and put a bunch of flowers on the desk of Sandra S. Sandra is an accountant and a shy person. It is hard for her to build relationships with male persons. On the next day Susanne recognized that Sandra

was somewhat absent-minded. Sandra told her, that there was no card on the bunch of flowers and that she would like to figure out who send her the flowers. When Susanne told her that she had seen the men, Sandra was visibly delighted. Sandra thought that it was Hubert K., who works in a travel agency in the first floor. Susann offered to go down and to check, whether she recognizes him. Sandra waited nervous in her office. When Susanne came back, she said that she had recognized Hubert and that he was the men she had seen on the evening before. Sandra asked instantly, how certain she was about that. Susanne said, that she is „at least 99%“ certain that Hubert K was the men. She added, that she had seen Hubert once or twice before in the building.

a. Susannes identification of the men makes it likely, that Hubert K. put the bunch of flowers on Sandras desk.

-5	-4	-3	-2	-1	0	1	2	3	4	5
strongly disagree					neutral					strongly agree

b. Generally, one can assume that one is able to correctly identify persons that one has seen once or twice before.

-5	-4	-3	-2	-1	0	1	2	3	4	5
strongly disagree					neutral					strongly agree

2. Katja, a doctoral student in education science at the University of Frankfurt, should present her thesis at an important conference taking place at the University. When she arrived at the conference building, she frightened recognized that she had forgotten her slides at home. It was 18:45 and the presentation was scheduled for 19:30. She called at home and reached her husband who just had come home from walking the dogs. He promised to bring the slides to the campus. Katja asked him to put on some elegant pants and a jacket. At this time it usually takes 40-45 minutes to drive from their house to the campus.

a. It is unlikely, that Katjas husband will reach the campus in time before the presentation at 19:30.

-5	-4	-3	-2	-1	0	1	2	3	4	5
strongly disagree					neutral					strongly agree

b. In the evening rush hour it is hard to shorten driving time even when driving aggressively.

-5	-4	-3	-2	-1	0	1	2	3	4	5
strongly disagree					neutral					strongly agree

3. Linda works as a salesperson at a electronic store in Ulm. In the recent months, she has made 8000 € debts at her bank. The bank has menaced to take legal steps. Shortly afterwards, Linda payed her depths back and it was unclear how she got the money. She explained, that she had made the depths only to help her brother, who works in a flower store in Augsburg and was in financial troubles. Linda said that she paid the depths back with the money she received back from her brother. She explained that she had no receipts for the transaction since in the flower business also larger financial transactions are occasionally done in cash.

a. Linda paid the depths at the bank back with the money she received back from her brother.

-5	-4	-3	-2	-1	0	1	2	3	4	5
strongly disagree					neutral					strongly agree

b. In the flower business, also larger financial transactions are occasionally done in cash.

-5	-4	-3	-2	-1	0	1	2	3	4	5
strongly disagree					neutral					strongly agree

4. A software company figured out that one of their employees had late at night accessed the accounting system of the company from home and had stolen 7000 €. A private detective was asked to conduct an investigation that focused on the employer Werner O. The investigations revealed that the accounting system was accesses over the internet provider LinkNet. The employee Werner O uses LinkNet as internet provider. About 0.01% of the local internet users used LinkNet as internet provider.

The fact that Werner O. uses LinkNet as internet provider makes it likely that it was Werner who accessed the accounting system.

-5	-4	-3	-2	-1	0	1	2	3	4	5
strongly disagree					neutral					strongly agree

5. Generally it is likely that persons who once committed a crime will laps back into crime.

-5	-4	-3	-2	-1	0	1	2	3	4	5
strongly disagree					neutral					strongly agree

6. Anja P. works as a marketing manager for a gas station chain. She visits some days a week gas stations of the company in the state Saarland. Each month, she submits her receipts to get reimbursed for her expenses. One day she was called by her visibly annoyed boss who objurgated her for billing not allowed costs. Anja argued that many other colleagues billed the same costs and that it was unjustified to attack her. Her boss disagreed. He declined to reimburse the costs and made clear that a previously promised advancement of Anja will be canceled due to this incident. Anja was deeply offended by this incident. In the coming weeks she was often seen working late in the evening in the office.

a. Anja tried to find a way to take revenge at the company for the punitive measure against her.

-5	-4	-3	-2	-1	0	1	2	3	4	5
strongly disagree					neutral					strongly agree

b. Generally, one can assume that people who are treated unfairly will do mean things.

-5	-4	-3	-2	-1	0	1	2	3	4	5
strongly disagree					neutral					strongly agree

c. The reaction of Anja to the, from her perspective, unjustified punitive measure was that she wanted to prove herself for her boss in that she worked harder.

d. Generally, one can assume that people that feel unjustified criticized in their job aim to work even harder to prove themselves.

[the distractor tasks PFC questionnaire and demographic questions are omitted]

In this part of the study you are asked to make a judgment as judge in a criminal case against an employee of a company.

The prosecutor has opened a criminal case against the employee Hans H. The company accused Hans H. of stealing 5200 € from the companies safe. Please imagine to be the sole judge in this case and that you have to make a judgment.

The legal case proceeds as follows: first the evidence will be presented (which is undebated) and the arguments of both sides will be presented. Your task is the following: based on the evidence and the arguments you should judge whether Hans H. is guilty for taking money from the safe of the company or not.

According to the rules for legal cases you have the two following possibilities for judgment:

- 1) if you are convinced that Hand H. has stolen the money, then you have to judge Hans H. guilty.
- 2) otherwise you have to judge Hans H. not guilty.

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 the judge 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 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.

Hans H. is accused of having stolen 5200 € from the safe of his employers “Hausbau GmbH”.

Prosecution and defense present the pieces of evidence listed in the following. All

All witnesses are sworn and informed that they commit perjury if they do not tell the truth.

You will be presented with all pieces of information for the case. Afterwards you should make a judgment. Please note that the information is presented to you only once. Therefore please read them carefully.

[ProGuilty1]

The accountant of the company testifies: at the end of each day she puts the cash money in the safe of the company. The safe is located in the back-part of the accounting office. The safe is also used for storing other sensible materials such as offers and project reports. Apart from the accountant and

her assistant, the construction managers, sales managers, and managers also 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. At the morning in question, the accountant noticed that € 5,200 in cash was missing that she put there the evening before. The time mechanism showed that the safe had last been opened at 19:14 the previous evening.

The prosecution argues that this speaks strongly for the guilt of Hans H., since only very few people have access to the safe and can reach it during the day.

[ConGuilty1]

Silvia, a manager of "Hausbau GmbH", testified that she saw Hans at 20:00 on the evening in question when they both picked up their children from an event at 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.

The defense argues that it is not possible that Hans H. after the act, which has been committed at latest at 19:14, could have completely changed clothes and then in such a short time could have arrived at the school, particularly since the streets in the city are very crowded at this time.

[ProGuilty2]

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 19:15. When questioned by the private detective P a day after the incident, the technician identified Hans as the person he had seen. When asked how sure he was about this, the technician said he was "at least 99%" certain. He explained that he had seen Hans once or twice before in the office.

The prosecution argues that the fact that Hans H. was seen briefly after the assumed time of the offence at the site of crime speaks for him taking the money.

[ConGuilty1]

The boss of „Hausbau GmbH“ testifies: Hans H. is 34 years old. He lives in Frankfurt/Main with his wife Katrin and two children. After having worked as a foreman for more than 2 years, he complained to have back pain. He, the boss, then offered Hans a position as a construction manager in the company's administration offices. Hans' task was to supervise the progress made on the various building projects and to coordinate the different groups.

The defense argues that it is very unlikely that a family father who has been treated respectfully by his boss commits a crime and harms the company.

[ProGuilty1]

You read the extract from the police records: It states that Hans H. was convicted at the age of 18 years for having tried to break into an apartment. In the remaining 16 years Hans H. no further criminal incidents are recorded.

The prosecution argues that the fact that Hans H. was in conflict with the law before and that his inhibition threshold for committing a crime is relatively low, which speaks for the possibility that he has committed the crime.

[Leaning manipulation and assessment]

You have now seen half of the evidence for the case. Please take a bit of time to think about the case! To which judgment would you lean based on the currently available information? Your preliminary judgment is not binding and you can of course change it after receiving the second part of the information.

I lean to the judgment that

O Hans H is guilty of committing the crime.

O Hans H is not guilty.

[Neutral1]

A colleague of Hans testifies: All thought Hans to be a hard-working employee. Often he is a bit distant. From time to time he is a little grumpy.

The prosecution argues that the distance and grumpiness of Hans H. speak for the fact that he could have committed the crime.

The defense argues that a hard-working employer would not commit such an act.

[ProGuilty4]

The private detective P testifies: "Hausbau GmbH" has asked me to investigate the accident. 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 on the evening in question. However, the picture was out of focus so that it was not possible to read the license plate. The video shows a white car of type "XY". The make of Hans H.'s car is XY, it is white. Other colleagues reported that they have seen Hans driving it to work that morning. P has done further investigations and he estimates the percentage of white cars of type "XY" in this area to be 0.01%.

The prosecution argues that the additional observation of the car of Hans H. close to the site of crime further strengthens the witness report of the technician and speaks for Hans having been at the site of crime and committing the crime.

[ProGuilty5]

The detective further testified: he has found out that Hans paid off his bank loan of € 4,870 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.

The prosecution argues that Hans H. took the money from the safe to pay his debts back.

[ConGuilty3]

The accused explains that he took out the loan to help his sister-in-law, who runs a flower shop in Aachen. She returned the money in cash and he used it to pay back the loan. Hans explained that he couldn't prove this cash transfer is due to the common practice in the floral business. In this business also larger financial transactions are sometimes conducted in cash.

The defense argues that Hans H. did not take the money but paid his debts back with the money from his sister-in-law.

[Neutral2]

A colleague testifies that Hans H. told him the following: A few months before the incident, he had been summoned by his boss to discuss the payment of certain expenses claimed by Hans. The boss reproved Hans for claiming expenses without justification. Hans argued that other construction managers had been claiming the same expenses and that the boss was therefore challenging him unjustly. His boss disagreed and refused to reimburse the costs. He also made clear to Hans that a promotion he had already been promised would fall through on account of these events. Hans was deeply hurt by this incident. In the following weeks, he was frequently seen working late at the office.

The prosecution argues that the experienced hurt makes it likely that Hans H. wants to take revenge at his boss.

The defense argues that Hans H. was late in the office to compensate for his mistake.

Judgment

You have read the evidence and the arguments of both parties. Now you should judge whether Hans H. is guilty of having stolen the money from the safe [typo: "of the bank" it should have been "company"] or not.

According to the rules of the legal procedure you have two possibilities to judge:

- 1) If you have come to the conviction that Hans H. has stolen the money then you have to judge Hans H. guilty.
- 2) Otherwise you have to judge Hans H. not guilty.

Try to make take into account in your judgment the evidence and arguments as sound and fair as possible.

☐ guilty

☐ not guilty

How certain are you in your judgment?

fully

certain

completely

uncertain



How high do you estimate the probability that Hans H. has taken the money from the safe?

___ percent

Independent of your judgment:

How high would the likelihood of Hans taking the money at least have to be for you to judge him guilty in this criminal case?

___ percent

Please indicate for the following statements how strong you agree or disagree with them.

-5

-4

-3

-2

-1

0

1

2

3

4

5

strongly
disagree

neutral

strongly
agree

- 1.1 If Hans would have stolen the money it would have been unlikely that he could have come to the school until 20:00.
- 1.2 In the evening rush hour it is hard to shorten driving time even when driving aggressively.
- 2.1 Hans paid back his debts with the money that he received back from his sister in law.
- 2.2 In the flower business, also larger financial transactions are occasionally done in cash.
- 3.1 The identification of Hans by the technician make it likely that Hand was the person that rushed out of the accounting office.
- 3.2 Generally, one can assume that one is able to correctly identify persons that one has seen once or twice before.
4. The fact that Hans drives the same care that was seen at the cite of crime makes it likely that it was indeed Hans who was recorded by the CCTV camera.
5. Generally it is likely that persons who once committed a crime will laps back into crime.
- 6.1 Hans tried to find a possibility to take revenge at the company for the punitive measures of his boss.
- 6.2 Generally, one can assume that people who are treated unfairly will do mean things.
- 6.3 The reaction of Hans to the, from his perspective, unjustified punitive measure was that he tried to work harder to prove himself at his boss.
- 6.4 Generally, one can assume that people that feel unjustified criticized in their job aim to work even harder to prove themselves.

Thank you very much for completing the computer questionnaire.

Differences in Instructions for Study 2

The second study include not only the pro-guilty-first and the balanced condition but also a new con-guilty-first condition. To allow for the reversed ordering a few minor changes to the facts had to be included as described in the following (that of course remained constant between conditions). Additionally, the two neutral arguments, which contained both exculpating and inculpatory evidence, needed to be split in order to be able to have just con-guilty-arguments before the leaning.

Splitting of Neutral1:

[Neutral1 → now con guilty]

A colleague of Hans testifies: All thought Hans to be a hard-working employee. Often he is a bit distant. From time to time he is a little grumpy.

The defense argues that a hard-working employer would not commit such an act.

[Neutral1 → now pro guilty]

The prosecution argues that the distance and grumpiness of Hans H. speak for the fact that he could have committed the crime.

Splitting of Neutral2:

[Neutral2 → intro]

A colleague testifies that Hans H. told him the following: A few month before the incident, he had been summoned by his boss to discuss the payment of certain expenses claimed by Hans. The boss reproved Hans for claiming expenses without justification. Hans argued that other construction managers had been claiming the same expenses and that the boss was therefore challenging him unjustly. His boss disagreed and refused to reimburse the costs. He also made clear to Hans that a promotion he had already been promised would fall through on account of these events. Hans was deeply hurt by this incident. In the following weeks, he was frequently seen working late at the office.

[Neutral2 → now pro guilty]

The prosecution argues that the experienced hurt by the accusation of a wrong expenses claim as well as the withdrawal of the promised promotion makes it likely that Hans H. wants to take revenge at his boss.

[Neutral2 → now con guilty]

The defense argues that Hans H. was late in the office to compensate for his mistake.

[ConGuilty3]

The accused explains that he recently paid back a large amount of money since three month ago he took out a larger loan to help his sister-in-law, who runs a flower shop in Aachen. She returned the money in cash and he used it to pay back the loan. Hans explained that he couldn't prove this cash transfer is due to the common practice in the floral business. In this business also larger financial transactions are sometimes conducted in cash.

The defense argues that Hans H. has a solid financial status and has sufficient money to pay back debts and therefore he had no reason to steal the money.