

Lenses of evidence: Empirical anticipation of the juror mind



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Overview

- How do people represent evidence in mind?
- Why is mental representation important for psychology?
- Why is mental representation important for evidence law?
- *Lens 1*: The self representation
- *Lens 2*: The expert representation
- *Lens 3*: The anchor representation...
- Conclusions
- Future directions

Lenses of evidence: Mental Models as mental representations

Mental Models

- Principle of Truth
- Principle of Parsimony
- Principle of Consistency
- Alternative Possibilities
- Qualitative Weighting

Weighting Models Theories

- Principle of Independent Weighting
- Principle of Inclusiveness
- Principle of Quantification
(e.g., Oaksford & Chater, 2007)

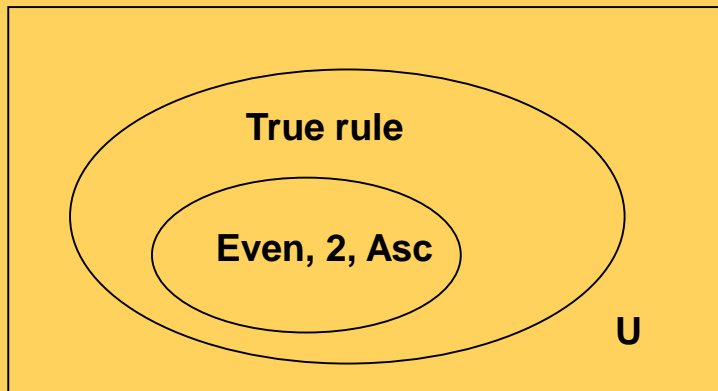
Johnson-Laird (2006), *How people reason*

The Self lens

- From logical tasks to legal contexts: *Confirmation bias*
- In the *2-4-6* task participants are asked to discover a rule that the number sequence 2-4-6 conforms to:
- And they tend to generate the hypothesis '**even and ascending in twos**'.
- And they tend to generate **positive tests** such as: 10-12-14, 16-18-20, 22-24-26...
- The experimenter responds 'yes' because these tests fit with the true rule, which is in fact 'any ascending number sequence'.
- These positive tests correspond simultaneously with the hypothesis and the truth.
- Unless a **negative test (i.e., refutation)** of the hypothesis (1-5-9), which is consistent with the truth but inconsistent with the hypothesis is prompted, then participants will never discover the truth.

The logic of prejudiced thinking in the 2-4-6 task

Embedded false hypothesis
in the 2-4-6 Task:



Embedded false hypothesis
in stereotypical thinking:

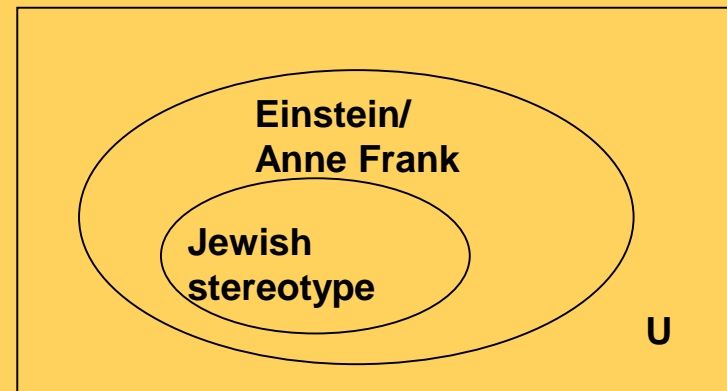


Figure 1: Embedded false hypotheses in the 2-4-6 task and prejudiced thinking (Wason, 1960).

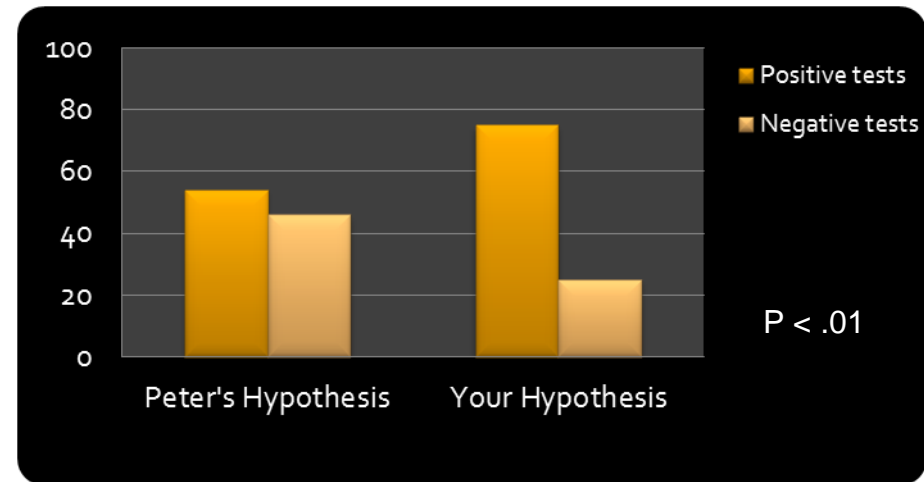
The self representation as lens

Participants:

- Thirty-Two participants
- There were 23 women and 9 men (age range: 20 to 75 years; mean = 51 years).
- No participants had taken courses in the philosophy of science.

Design & Procedure:

- 2x1 (**Your** hypothesis is 'even numbers ascending in twos'; **Peter's** hypothesis is 'even numbers ascending in twos')
- Recording booklet (triples, positive and negative tests and expectancies)
- 20 minutes on average



The Expert lens

Ps. Ten novices and ten Masters

Design: 2x2
(expert lev * normal/random position)

Materials: Dynamic equilibrium
(n = 6)

Procedure: Think aloud
(3 min per position), recorded

Protocol Analysis: Segmentation

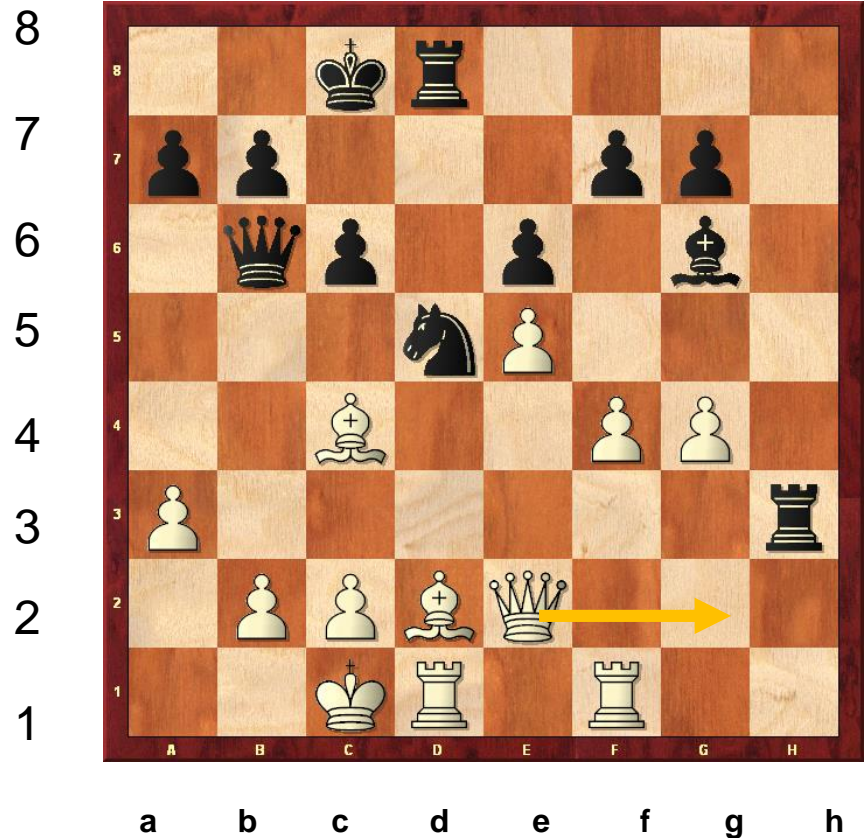


Figure 4: A representation of a chess board middle game, in which it is white to play.

Mapping evidence search and evaluation

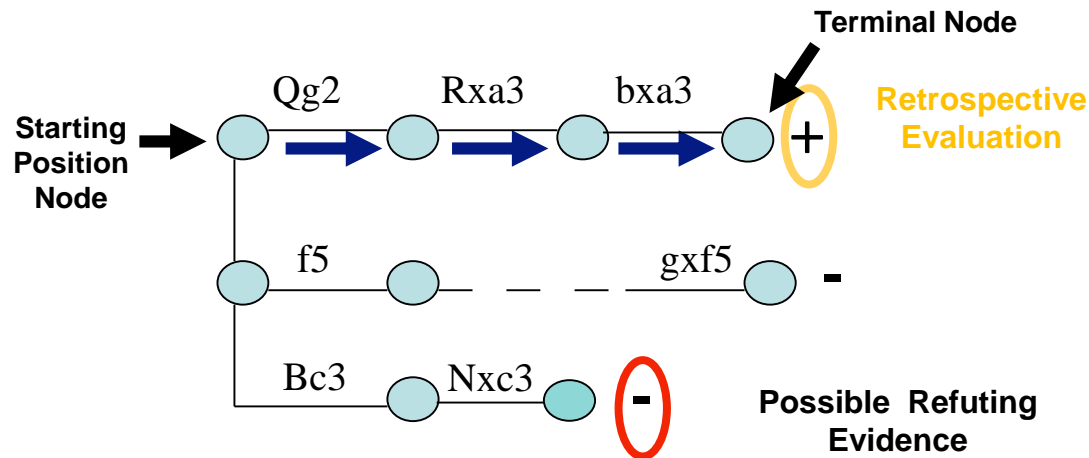


Fig 5: A subsection of a grandmaster's evidence search tree

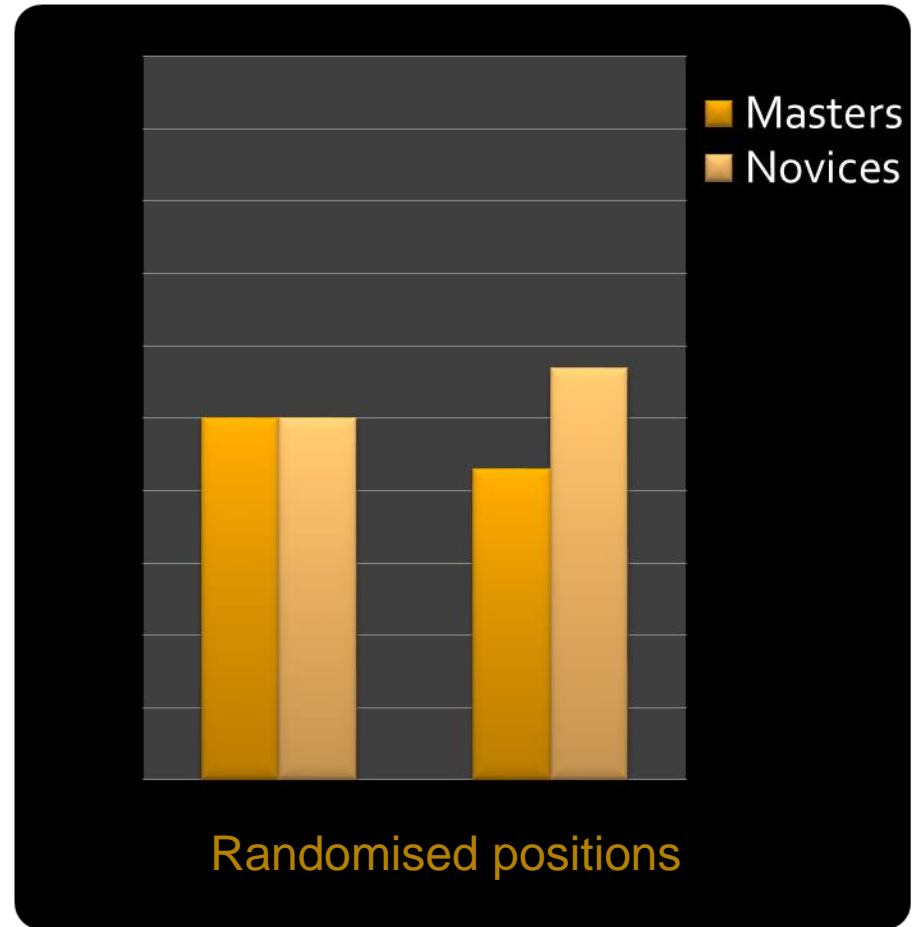
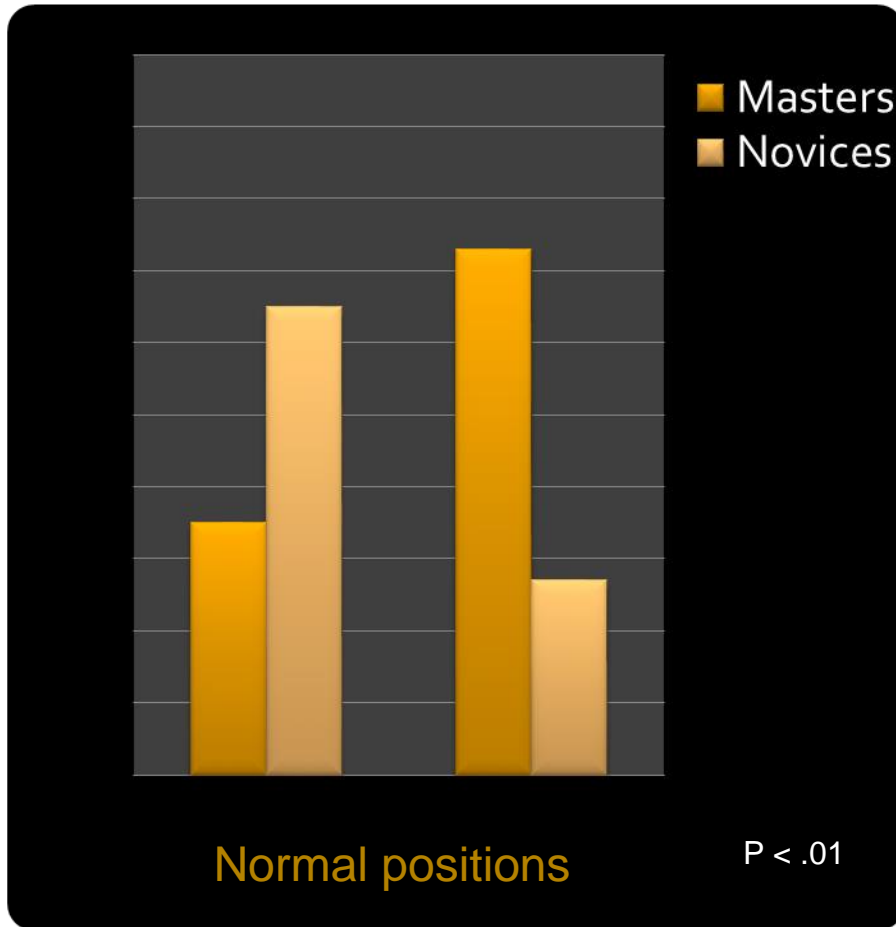
Experts' evaluation of evidence

Table 1: The nine possible hypothesis types based on the subjective and objective evaluations of move sequences

<i>Retrospective evaluation by chess player</i>	<i>Objective evaluation by Fritz</i>		
	Positive (+)	Negative (-)	Neutral (=)
Positive (+)	+/+	+/-	+/=
Negative (-)	-/+	-/-	-/=
Neutral (=)	=/+	=/-	=/=

Key: '+' refers to a positive evaluation, '-' to a negative one, '+/-' means the player's evaluation was positive and the program's evaluation was negative.

Expert knowledge facilitates pattern of objective evidence evaluation



Anchor lenses? Child protection & prior conviction evidence

Evaluating appropriate use re CJA (2003 is problematic, Evidence based evaluation should be extensive, Theoretical framework to explain inconsistencies...

Table 2: The criteria relevant to the disclosure of prior convictions under trial conditions (CJA, 2003; Section 100(3)).

(3) In assessing the probative value of evidence for the purposes of subsection (1)(b) the court must have regard to the following factors (and to any others it considers relevant)—

(c) where—

(ii) it is suggested that the evidence has probative value by reason of similarity between that misconduct and other alleged misconduct.

Studies of prior conviction bias

Prior convictions in real cases

- Kalven & Zeisel (1966)- 27% more often
- Bottoms & Goodman (1994)- child witness corroboration

Limiting instructions and diffusion

- Greene & Dodge (1995)- credibility vs guilty
- Doob & Kirshenbaum (1973)- time for pc

Deliberation and alternative stories

- London & Nunez (2000)
- Pennington & Hastie (1986)

Similarity and dissimilarity of prior conviction

- Wissler & Saks (1985)- murder and auto-theft

Pilot study

- Fifty one participants: 8 men and 43 women
- Mean age 20.64years, range from 19 to 33 years
- Design: 1 x 3 (control, one previous, two previous)
- Materials: Reasoning about a scenario created from a real life case of a child who was killed by a man with two previous convictions for similar offences.
- *On January 2, 2006, David Baxter had been arrested. He had been accused of killing 18-month-old Joanna Connolly. Joanna's skull had been fractured when she received a physical blow to the head. She was the daughter of Susan Connolly, the woman who David Baxter had been seeing.*

Knowledge of previous convictions (one; two; none):

David Baxter had previously served a three year sentence for being physically abusive towards an ex-girlfriend's three year old girl in 2003.

Please answer the following questions:

Q.1 Please tick whether you think:

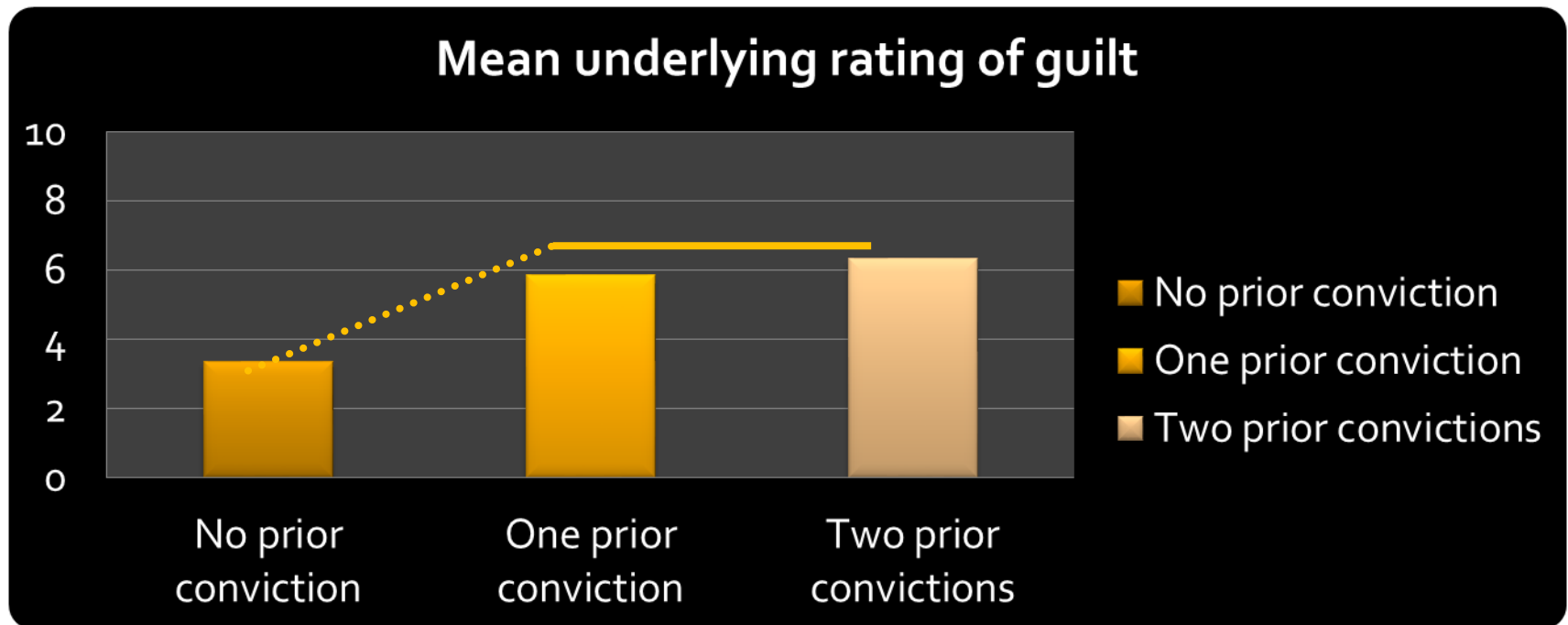
David Baxter is guilty ___

David Baxter is not guilty ___

You cannot decide ___

Q.2 On a scale of 1 to 10, circle the number that you think best reflects how guilty you think David Baxter is...

Prior conviction evidence as mental representation



- *Figure 8:* Mean underlying rating of guilt when one, two, and no prior conviction evidence was disclosed.

PC and forensic evidence

- *Seventy-two participants*, 24 men and 48 women. Age range 18-53years, mean 22.4years
- *Design* 3 x 2 between subjects (left-handedness, right-handedness, no handedness) x (previous conviction, no previous conviction) [6 conditions]
- *Materials*: The same scenario and measures either with or without a previous conviction and sort of handedness:
- *Forensic evidence showed that the blow was delivered by a left-handed person. David Baxter is left-handed*

or

- *Forensic evidence showed that the blow was delivered by a right-handed person. David Baxter is right-handed*

PC and forensic evidence

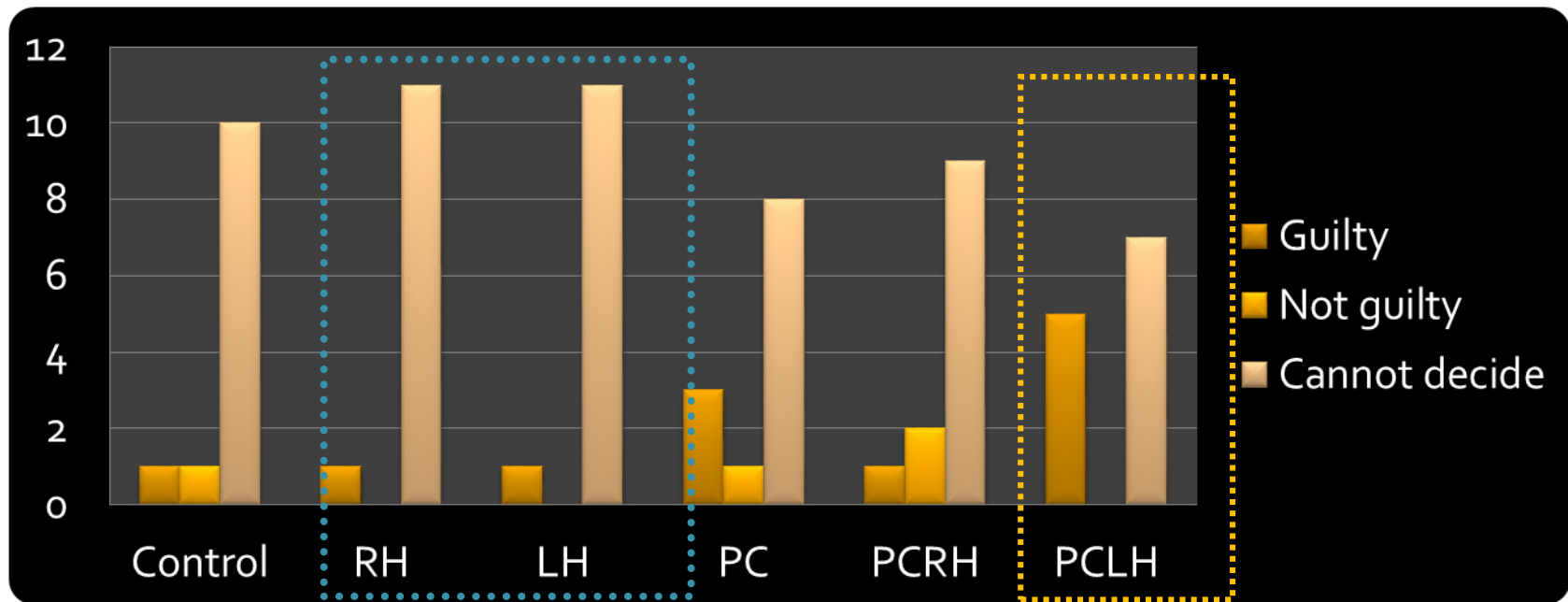


Figure 9: The number of jurors from a jury (n = 12) who chose 'guilty', 'not guilty', or 'cannot decide'.

PC and confirming evidence

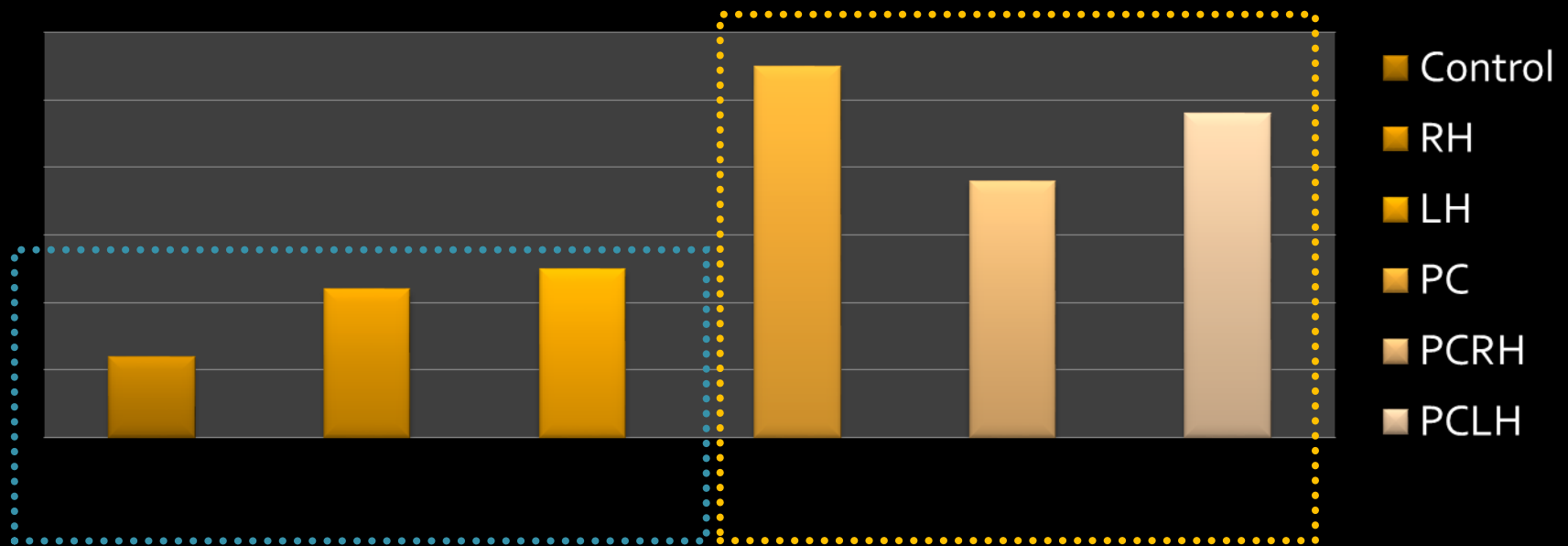


Figure 10: The pattern of positive evidence statements generated in the absence and presence of a similar prior conviction.

Suppression of alternative representations

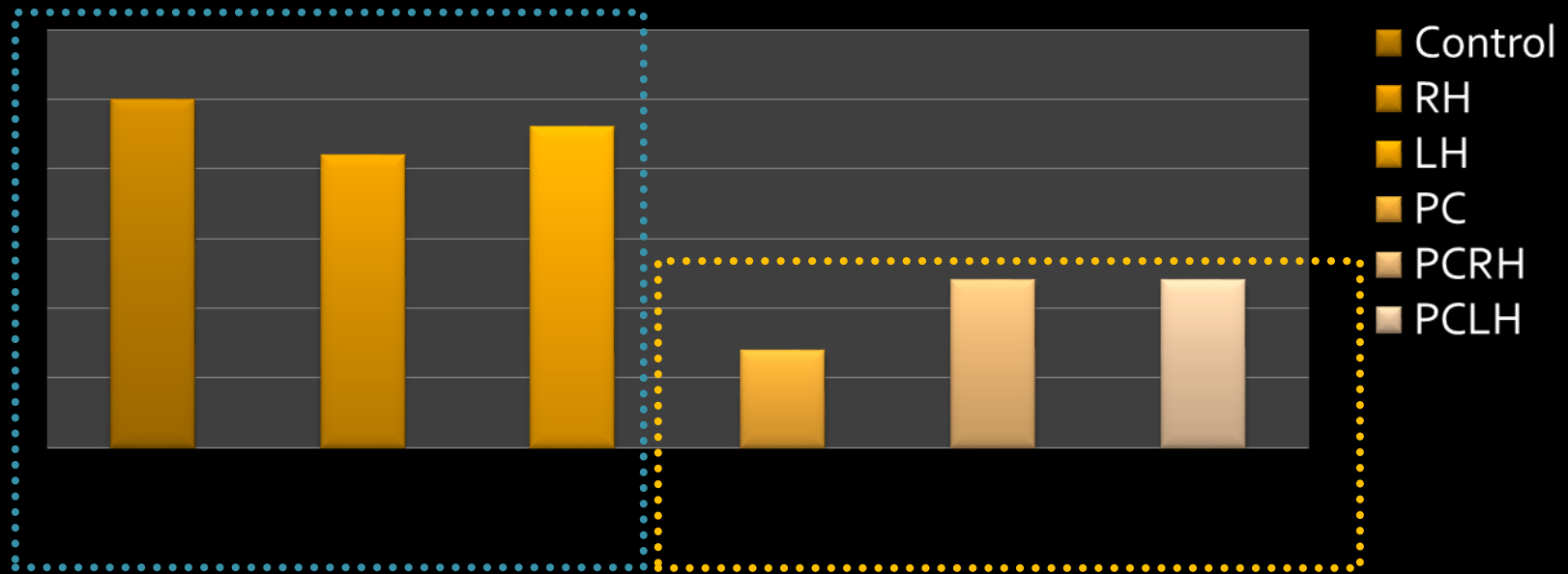


Figure 11: The pattern of alternative possibilities indicative of innocence generated in the absence and presence of a similar prior conviction.

Causes as anchor lenses: Initial data

- In Experiments 1 and 2, they were presented with vignettes describing the actions of two agents and a subsequent outcome affecting a third party in six vignettes, e.g.:

In a tower block Mr. Jones, a contractor, left open an unguarded lift shaft. Mr. Peters knew that this was the case and invited Thomas to step inside. Thomas was badly injured.

Or

In a tower block Mr Peters invited Thomas to step inside an open lift shaft when he knew that the life wasn't there. He was badly injured.

In a tower block Mr. Peters left open an unguarded life shaft, and David stepped inside the shaft but the lift wasn't there. He was badly injured.

- The enabling condition is the unguarded lift (elevator) shaft, which *enables* Peters' invitation to *cause* Thomas' injury.
- On our account, individuals tend to focus on the salient case in which enabler, cause, and outcome co-occur (Frosch, Cowley, & Johnson-Laird, under review).

Causes: Causal and enabling agents

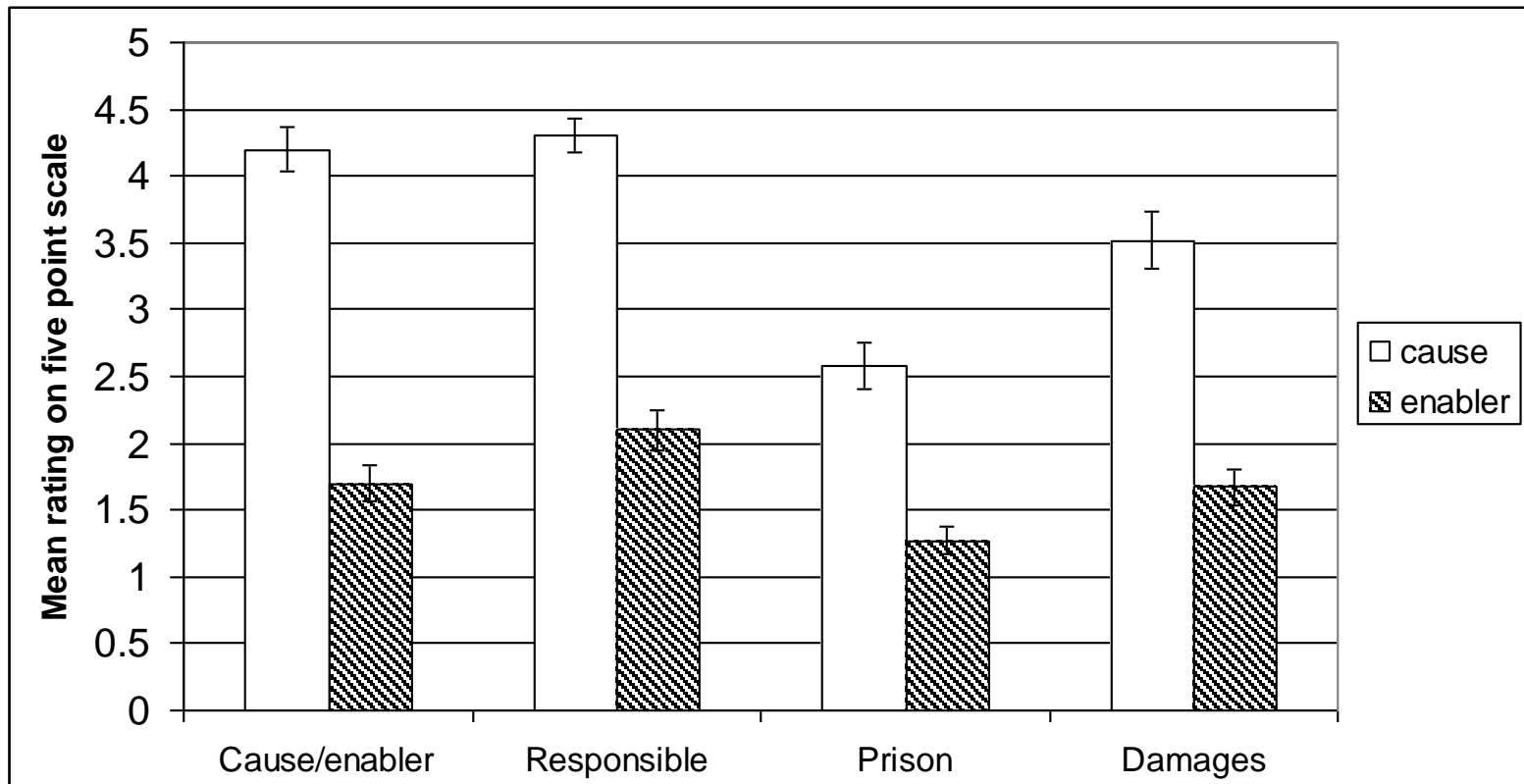
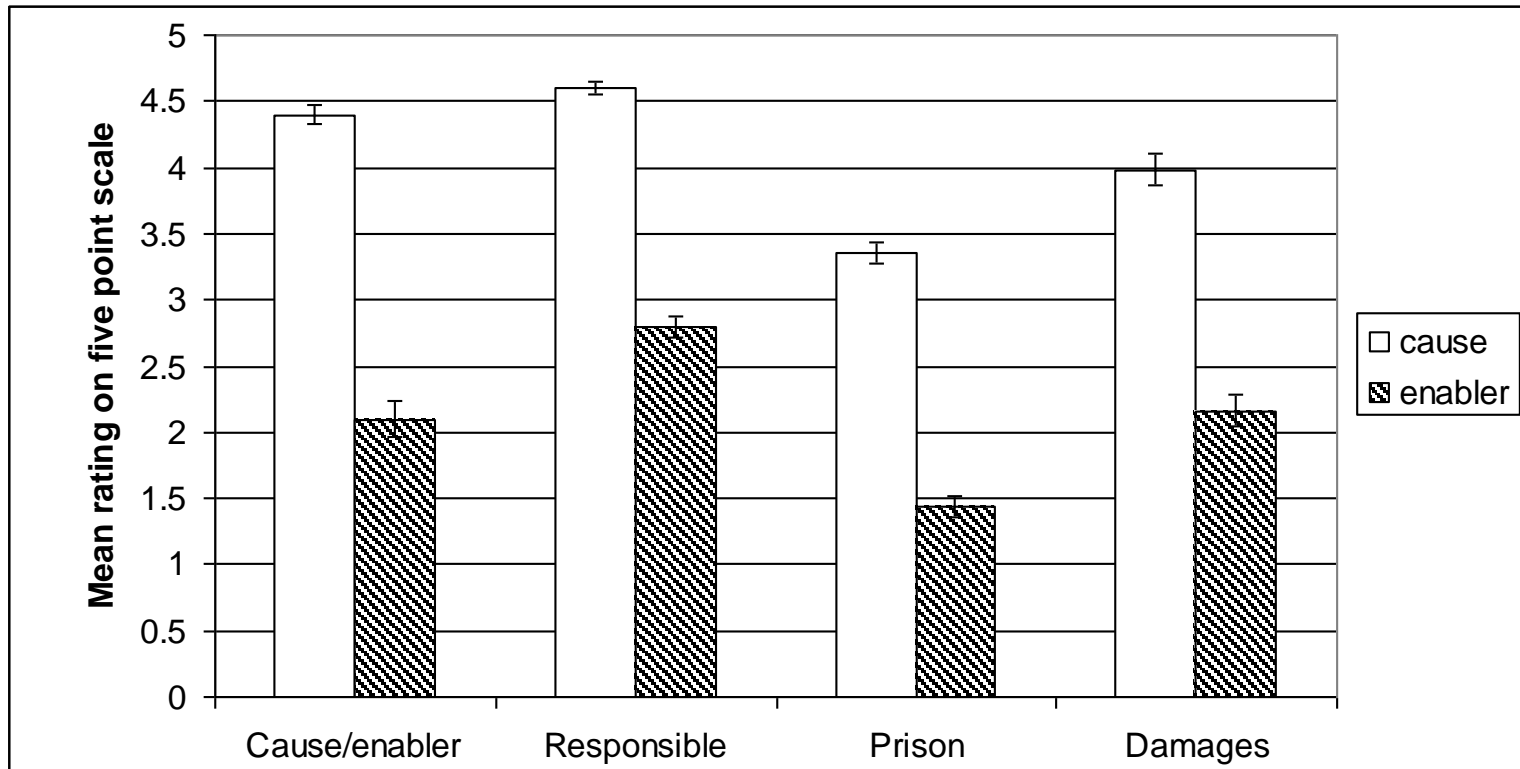


Figure 12: Mean ratings on the four 5-point scales for causes and enablers in Experiment 1. Bars are standard error

Causes: Single agents



- *Figure 13:* Mean ratings on the four 5-point scales for causes and enablers in Experiment 3. Bars are standard error.

Conclusions

- Mental representations guide evidential reasoning, conclusiveness vs evidence value (e.g., Johnson-Laird, 2006; Cowley & Byrne, forthcoming)...
- The impossibility of assigning precise probative value...
- Independence evidence assumptions do not always hold...
- Advocate lenses (self and expert) affect evidence interpretation...
- Anchor lenses can suppress alternative possibility generation...

Future directions

- DNA evidence and mental representation vs quantifiable probative value (experiments in progress)...
- Intentionality and representation in causal reasoning (ESRC proposal in submission), and the cognitive processes involved in victim blaming.
- Layered sequences of experiments to build additional complexity into the experimental framework...
- Group deliberation versus individual deliberation...
- Developing the theory of mental models for legal reasoning...

Thank you

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