

The Myside Bias in Argument Evaluation: A Bayesian Model

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The Myside Bias in Evaluation

One's own prior belief influences one's evaluation of arguments (Stanovich, 2021).

(1) Over/Under-weighting: Reasoners overweight arguments favouring their own prior beliefs and disfavoured views that are opposite to their own (McKenzie, 2004; Stanovich, 2021).

(2) Neutrality: Neutral reasoners tend not to favour either overweighting or underweighting (Taber & Lodge, 2006).

(3) Gradation: reasoners with stronger beliefs show a stronger bias (Stanovich and West, 2008).

Bayesian framework in a nutshell

Belief, argument: propositional random variables B, A

Prior belief: Prior-probability $P(B)$

Argument strength: likelihood ratio $\frac{P(A|\neg B)}{P(A|B)}$

Belief-update: Bayes' Update $\frac{P(B)}{P(B) + \frac{P(A|\neg B)}{P(A|B)} P(\neg B)}$

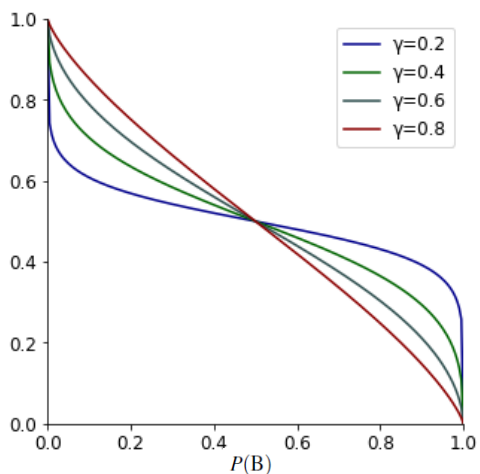


Fig 1. x' as a function of $P(B)$ for $x = \frac{1}{2}$ and different values of γ .

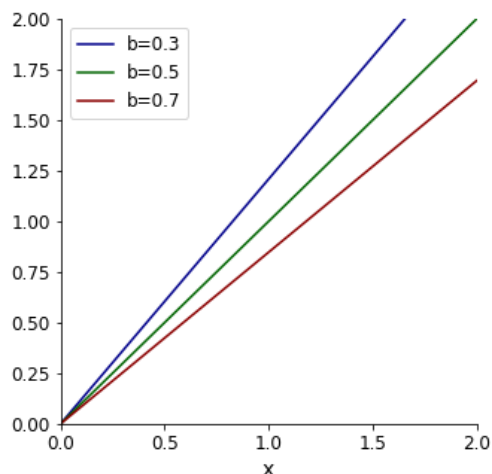


Fig 2. x' as a function of x for fixed γ and different values of $P(B)$.

Our model

(1) Myside-biased agents do not use the (pure) likelihood ratio, but a **perceived likelihood ratio**:

$$x'(x, P(B)) = 2x \frac{P(\neg B)^\gamma}{P(B)^\gamma + P(\neg B)^\gamma}$$

where $x = \frac{P(A|\neg B)}{P(A|B)}$ and $0 < \gamma < 1$.

(2) Myside-biased update:

$$\frac{P(B)}{P(B) + x'(x, P(B)) P(\neg B)}$$

Agents update using **Bayes' rule** and the **perceived likelihood ratio**.

Our Hypothesis

An agent updates its belief based on both:

- the strength of an argument,
- how much its belief coheres with its background beliefs.

Similar ideas in Evans & Over (1996), Evans (2002).

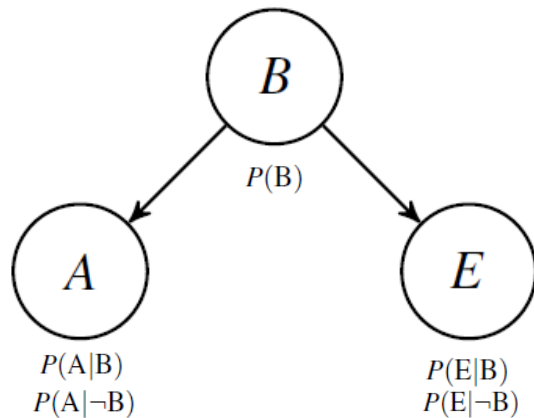


Fig 3. The Bayesian Network for themyside bias.

Justifying the model

Agents consider variables B , A and the **propositional variable** E , which assume either one of the following values:

- value E : «The target belief coheres with background beliefs»,
- value $\neg E$: «The target belief does not cohere with background beliefs».

Objective: Derive themyside-biased update as the posterior probability $P(B|A \cdot E)$.

This can be done if we assume a **dependence** between the prior probability $P(B)$ and the likelihoods $P(E|B)$ and $P(E|\neg B)$.

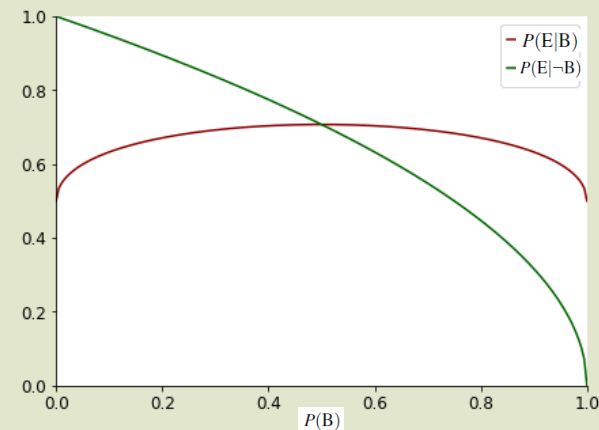


Fig 4. The likelihoods $P(E|B)$, $P(E|\neg B)$ as a function of the prior $P(B)$, for $\gamma = \frac{1}{2}$.

Testable predictions

1. An agent's posterior degree of belief is more extreme than that obtained using Bayes' Theorem.
2. The order in which the arguments are evaluated counts (updating on confirmatory evidence first is advantageous).
3. Reasoners are easily persuaded of their own position, which is harder to change.

Further work

- Test the descriptive adequacy of the model.
- Investigate the influence of epistemic motives, such as coherence, on myside bias and argument evaluation more in general.
- Compare our Bayesian explanation of the myside bias with other explanations.

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