Predicting outcomes following a sequence of binary events:
A belief-updating account of the hot hand belief and gambler’s fallacy

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50 + 50
What’s the difference?
What’s the difference?
What’s the difference?

RED  BLUE  RED  BLUE  BLUE  RED  RED  RED

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<tbody>
<tr>
<td>UP</td>
<td>DOWN</td>
<td>UP</td>
<td>DOWN</td>
<td>DOWN</td>
<td>UP</td>
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[Image of a lottery machine with a sequence of red and blue balls, and a man sitting in a chair with money stacks indicating up and down movements.]
What’s the difference?

RED  BLUE  RED  BLUE  RED

RED  RED  RED

UP  DOWN  UP  DOWN  DOWN  UP  UP  UP
What’s the difference?

Prob(RED) < 50%
What's the difference?

Prob(RED) < 50%

Prob(UP) > 50%
What’s the difference?

X 50

X 50
What’s the difference?

X 50

X 50

???

UP

DOWN

???
Results: Unknown Rate vs. Fixed 50% Rate

Average Probability Participants Assigned to Repetition of Streak by Terminal Streak Length

Length of Streak At End Of Sequence
Error Bars: +/- 1 S.E.
Results: Unknown Rate vs. Fixed 50% Rate

Average Probability Participants Assigned to Repetition of Streak by Terminal Streak Length

Unknown Rate

Length of Streak At End Of Sequence
Error Bars: +/- 1 S.E.
Results: Unknown Rate vs. Fixed 50% Rate

Average Probability Participants Assigned to Repetition of Streak by Terminal Streak Length

**Unknown Rate**

**Fixed 50% Rate**

Error Bars: +/- 1 S.E.
Key Takeaways

Uncertainty about the generator’s base rate is the key driver of hot hand and gambler’s fallacy patterns in predictions about sequences of binary events.
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1. When the base rate is ambiguous, description of the generator doesn’t matter. People update their expectations based on the outcomes they observe.
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1. When the base rate is ambiguous, description of the generator doesn’t matter. People update their expectations based on the outcomes they observe.

2. When the base rate is fixed at 50%, the description of the generator matters. People conservatively update their expectations for an intentional actor, but exhibit a negative recency bias for a random mechanical device.
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2. When the base rate is fixed at 50%, the description of the generator matters. People conservatively update their expectations for an intentional actor, but exhibit a negative recency bias for a random mechanical device.

Surprising: negative recency bias did not increase with streak length.