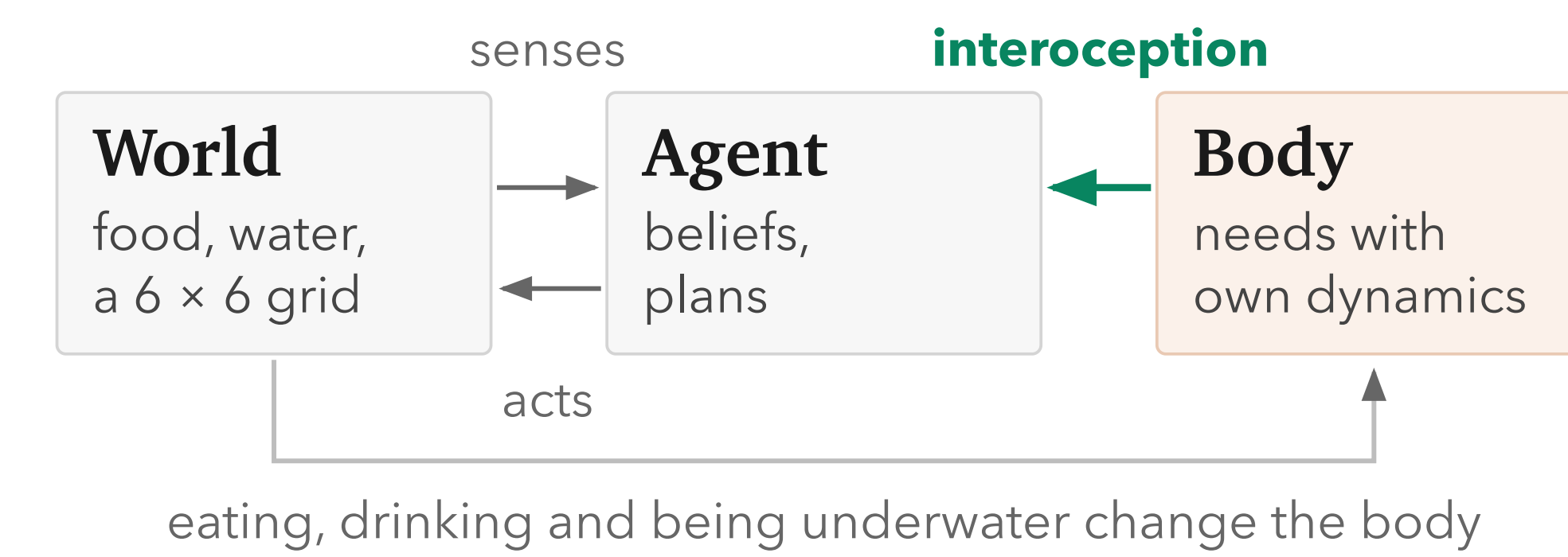


Interoceptive attention as dynamic homeostatic prioritization in a foraging agent



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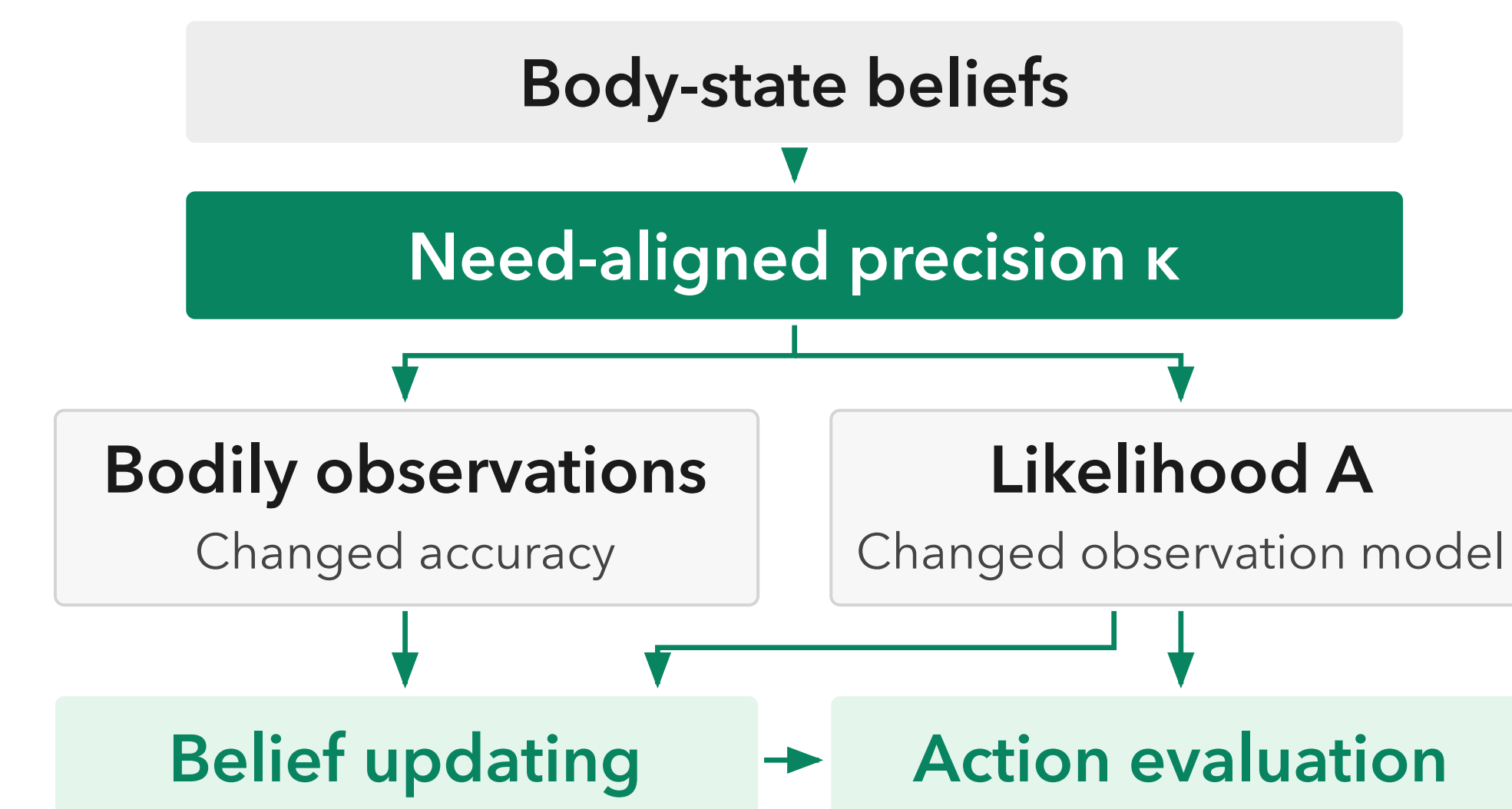
How does one bodily need become a priority while preferences stay fixed?



The agent infers each need from a noisy channel. A **fixed sensing budget** can then follow the most urgent need, with preferences unchanged.

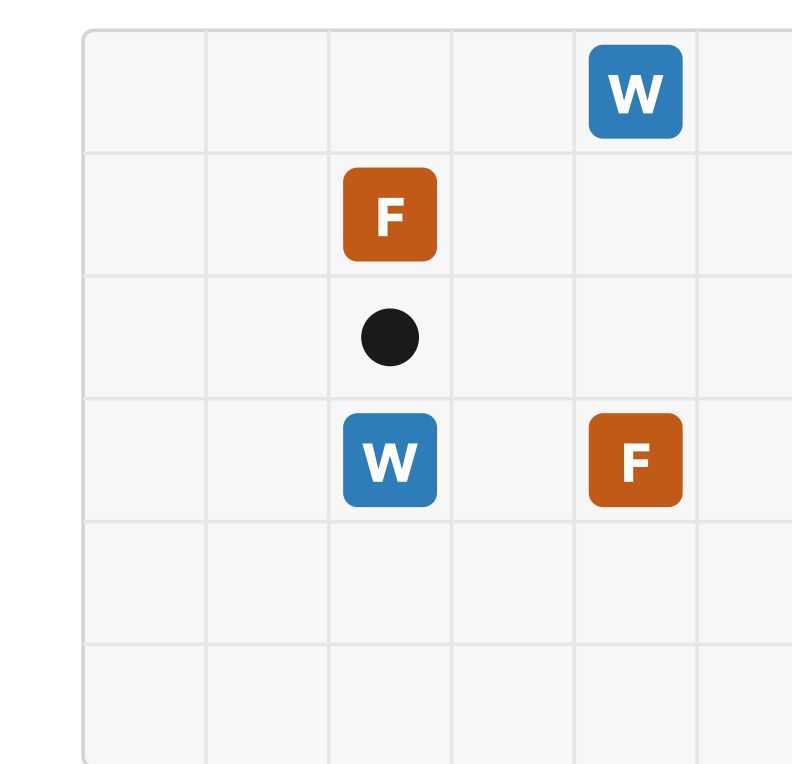
3 Precision shapes sensing and action evaluation

The planner favours predicted observations that match fixed preferences for replete states.



The **same shaped likelihood** estimates the current body state and predicts observations under candidate actions.

1 A forager with four bodily channels



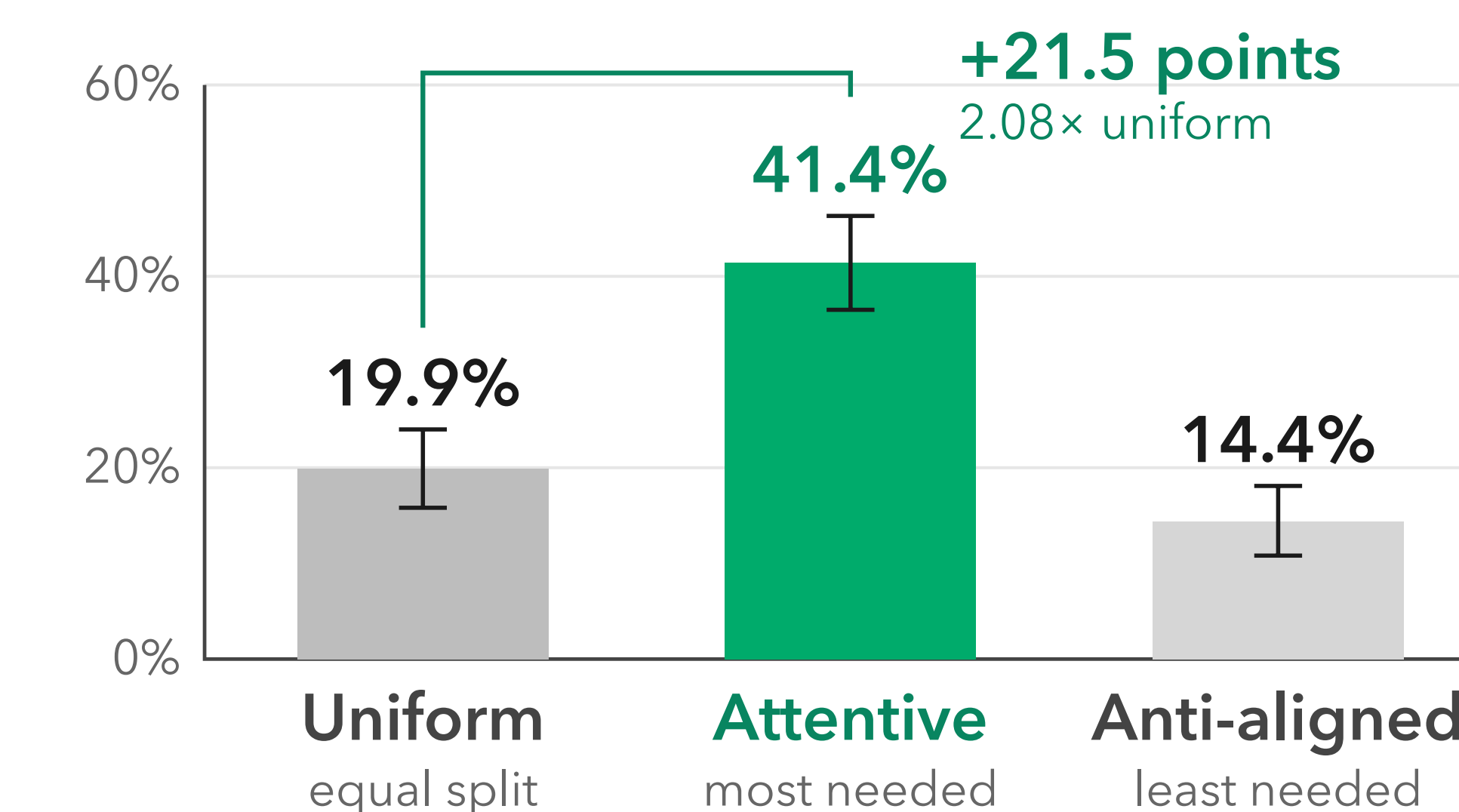
AffectWorld, a 6 × 6 gridworld. Food and water replenish needs, and running out of either is fatal.

Staying on water risks suffocation. A fourth channel is inert.

Held fixed: planner, preferences, priors, body dynamics and the policy horizon ($H = 3$).

4 Survival improves at the same budget

Survival to 60 steps (95% CI), 11 layouts × 32 seeds per agent

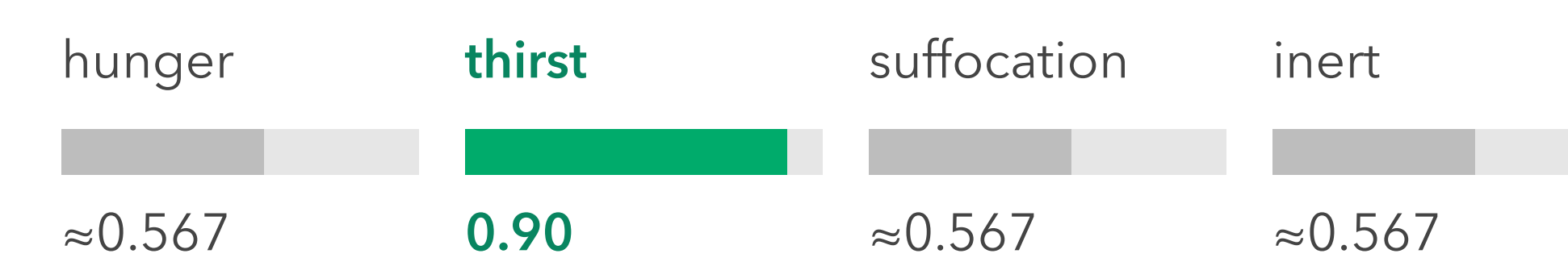


The anti-aligned control uses the **same budget and split** on the least-needed channel. Unevenness alone does not help.

2 Which signal should the agent sharpen?

Precision κ is the probability of a correct bodily observation. One budget, $K = 2.60$, is split over four channels.

Example: thirst has the greatest expected depletion.



The attentive agent picks the channel from its own beliefs at every step. The uniform agent gives **0.65 to each**.

5 Rigid priors: the planner needs the shaped likelihood



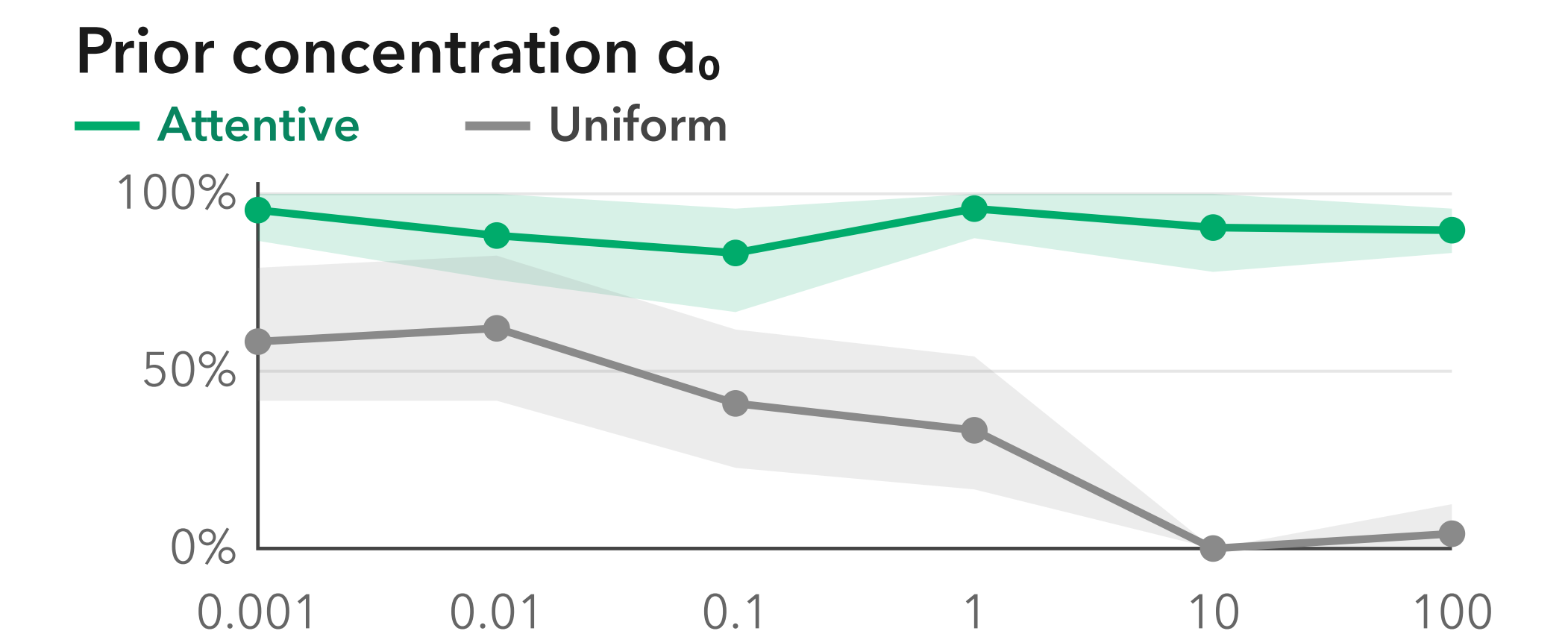
In the ablation only inference uses the shaped likelihood. Under rigid priors ($\alpha_0 = 10$, separate test), survival falls to the uniform level.

A second route to priority

Precision is one route. Our IWA1 2026 paper compares it with reweighting preferences: both can improve survival, but they leave different traces.

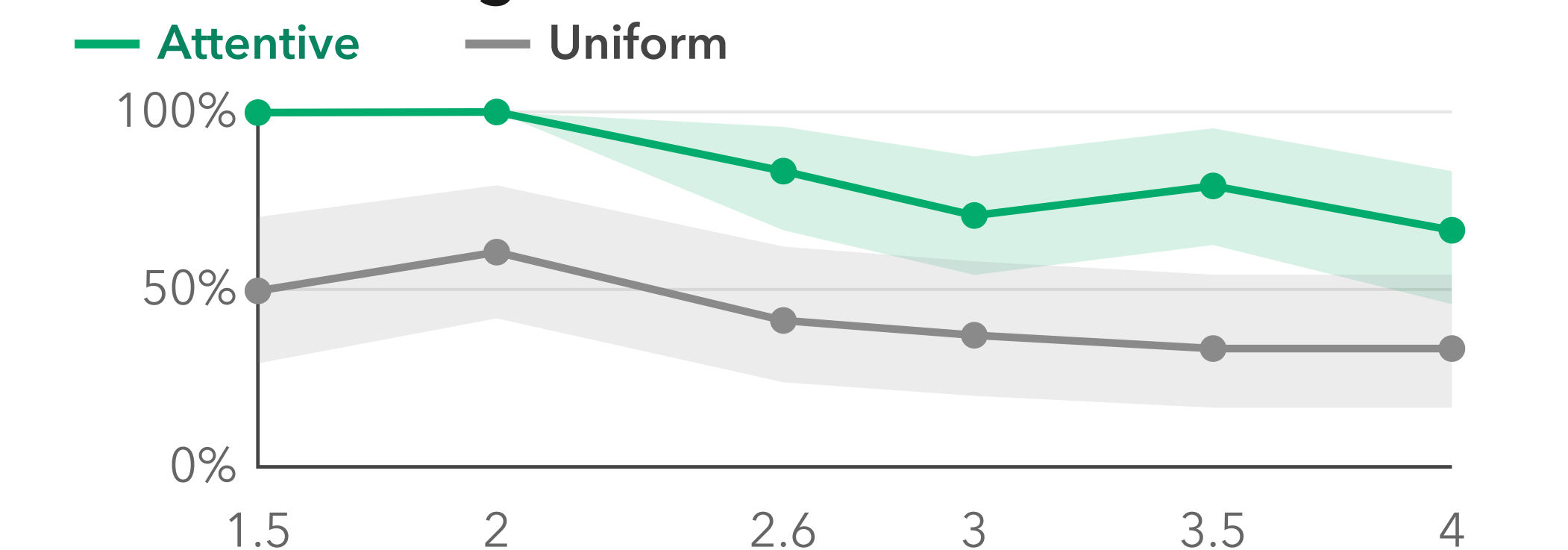
6 The advantage holds across settings

Plateau survival (95% CI), 3 layouts × 8 seeds per cell.



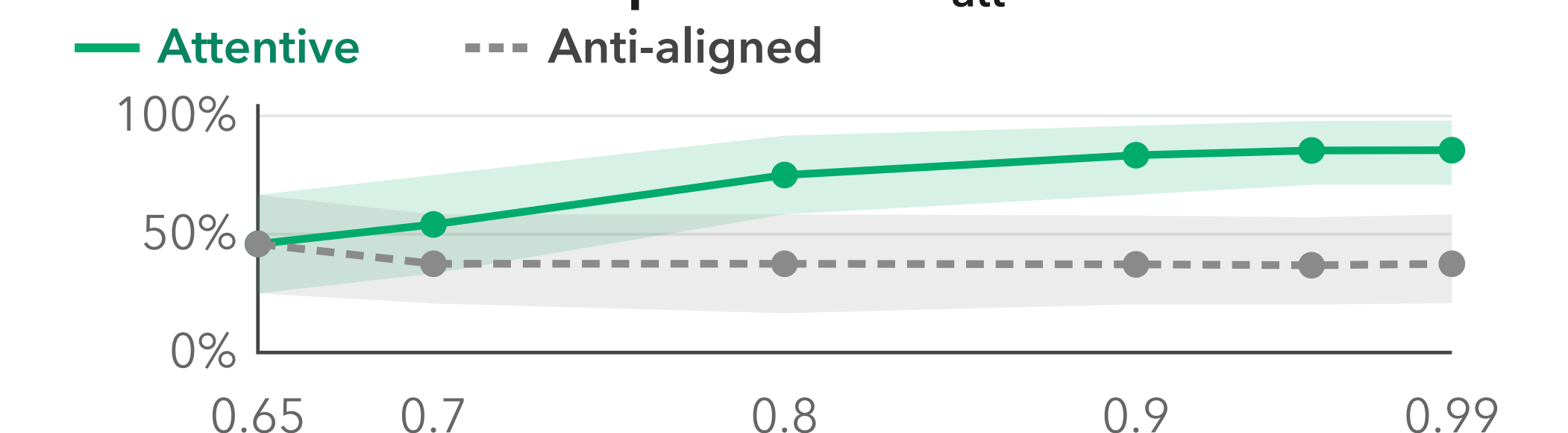
Under rigid priors the uniform agent collapses; the attentive agent does not.

Precision budget K



The attentive agent leads at every tested budget.

Attended-channel precision κ_{att}



At $K = 2.60$, $\kappa_{att} = 0.65$ is the uniform split. The attentive agent pulls away as κ_{att} rises.

Bodily needs can acquire priority without changing preferences.

One sufficient implementation in a discrete gridworld with a pragmatic-only planner. The allocation rule is hand-specified, and sensing accuracy and model precision vary together.

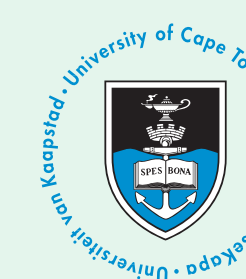
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SAB 2026 and WWIN

Berlin, 19-22 October

WWIN: Monday 19 October, talk 16:10, poster 16:30

SAB talk: Wednesday 21 October, 15:50



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github.com/sgrimby/attention-aif-sab2026-snapshot

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