

Adaptive Distortions of Confidence Under Different Environments and Internal Constraints

概要

Confidence is dynamic, not a static readout. Across models, metacognitive sensitivity arises from interactions between decision policies and environmental statistics. Distributional shifts reconfigure criteria, distorting confidence at matched accuracy. A general account ties metacognitive precision to system–environment coupling.

特徴

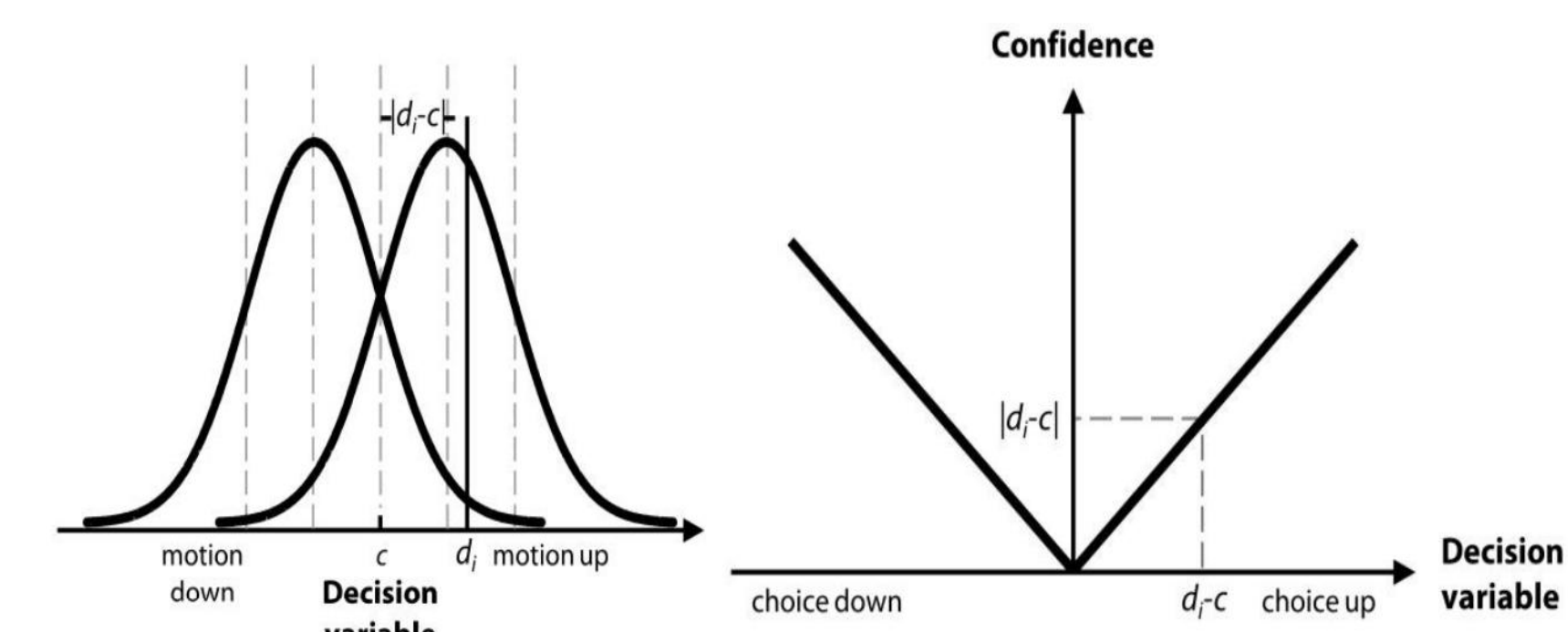
- Confidence reports are behavioral responses used to measure metacognitive abilities. They can be determined through pure statistical perspectives of signal distributions.
- We hypothesize that confidence judgments are adaptively and systematically shaped by structured interactions between environmental priors and internal noise, as evidenced by the joint influence of sampling frequency and evidence variance on Type-1 decision criteria and the recalibration of Type-2 confidence, not only in perceptual tasks but also across higher-order cognition.
- We proved the above hypothesis and raised a simple theoretical model for calculation.

今後の展開

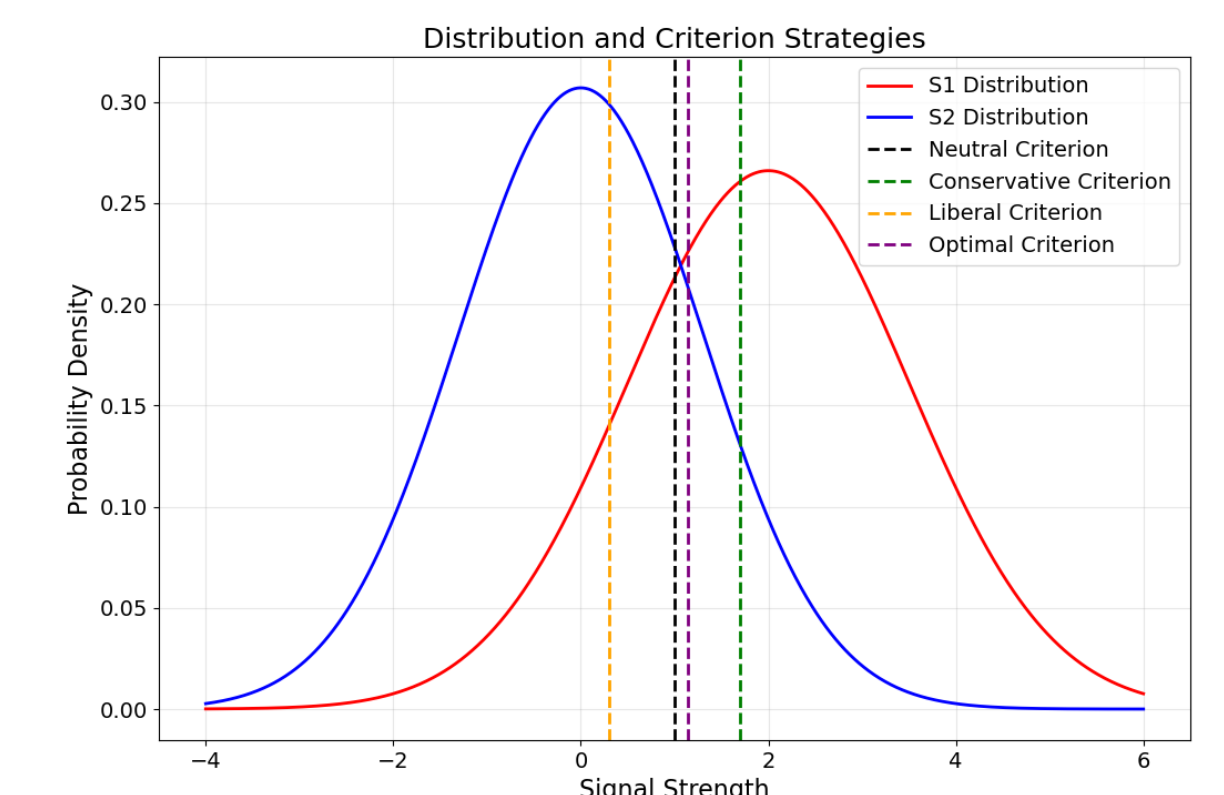
- Arranging behavioral experiments among multiple levels of complexity, aiming to locate evidence of the above findings; investigating the confidence judgment mechanism under dynamical environments.

テーマ「社会課題と向き合う科学技術の最前線」との関連

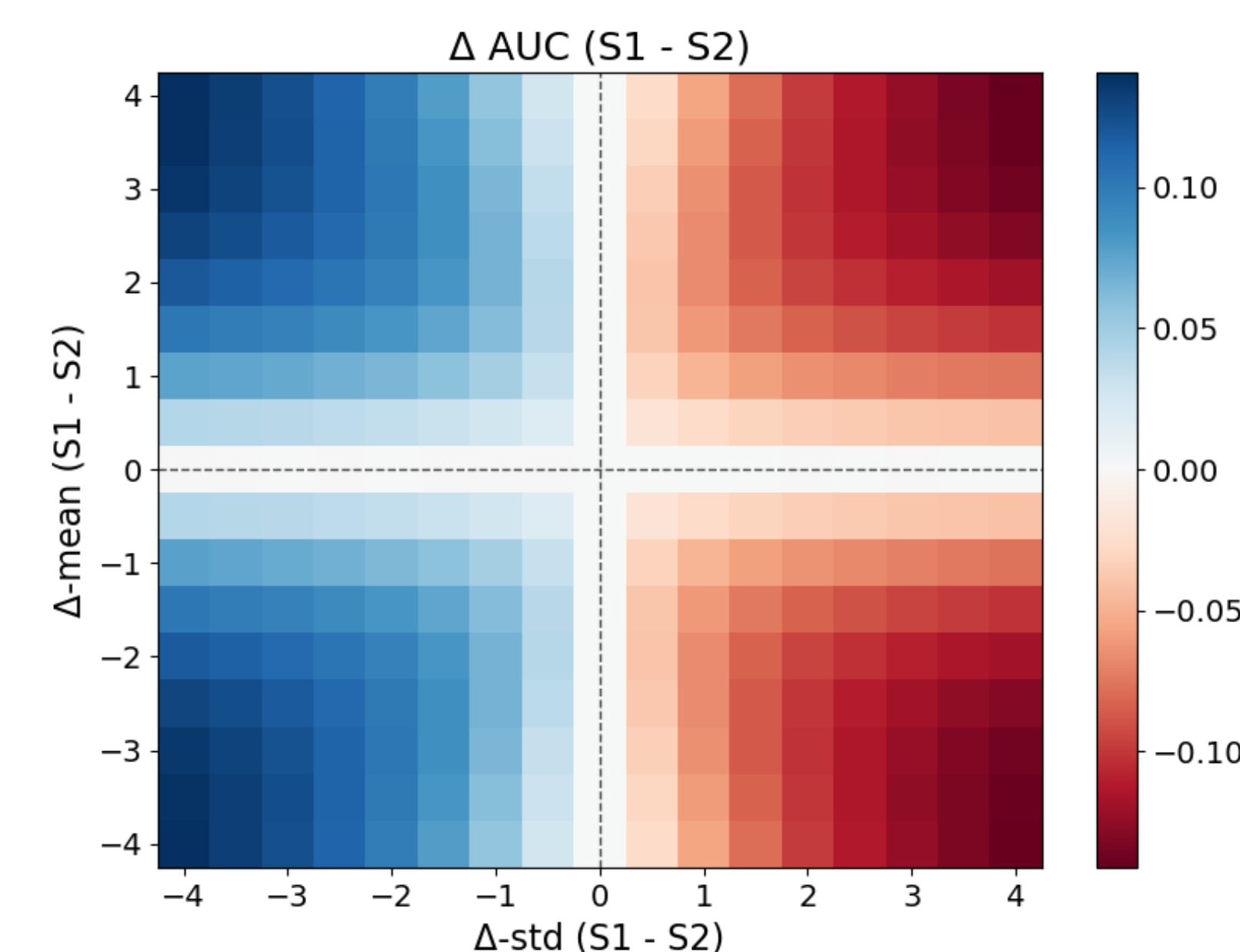
- Revealing how confidence adapts to shifting environments, our metacognition work calibrates decisions under uncertainty. This helps us better understand the decision-making systems we use when confronting not only cognition but also social issues.



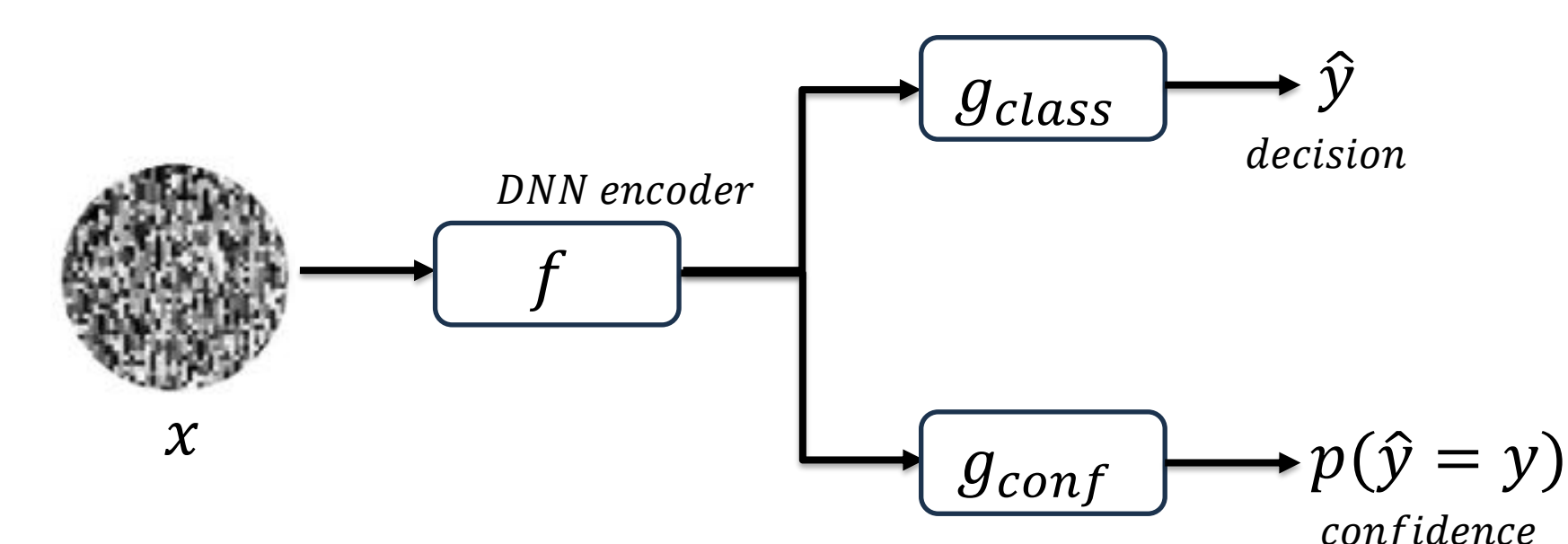
Traditional signal detection theory model illustrating confidence as a static readout of internal evidence strength.
Source: Hebart, et al (2014)



Dynamical decision criterion shifting among distribution differences



Two dynamical controllable parameters indicates basic manipulation from distribution to type-2 confidence rating



Demonstration of a neural network simulation architecture towards a dynamical environments