AI Self-Talk: Internal Speech Enhances Multitask Learning and Generalization
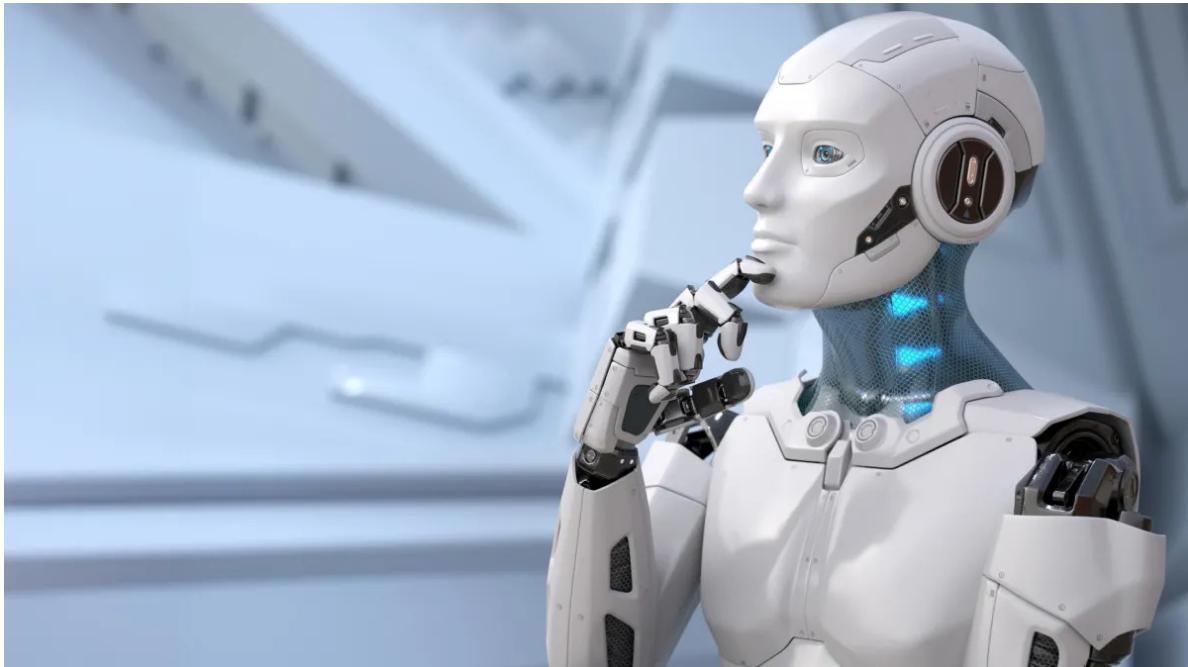
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Figure 1: AI Self-Talk

Researchers at the Okinawa Institute of Science and Technology (OIST) found that AI systems learn faster and generalize better when trained to produce internal speech during task

execution. Jeffrey Queißer and Jun Tani built a stacked recurrent neural network paired with multiple working memory modules, trained by minimizing free energy and executing tasks through active inference (a framework where the model acts to confirm its own predictions). They added self-directed "mumbling" targets that told the system to talk to itself a set number of times during each task. The model was tested on temporal pattern manipulation: reversing sequences, recreating patterns, and switching between goals specified in language. Systems using two working memory slots plus inner speech consistently outperformed those using memory alone. The biggest gains appeared in multitasking and multi-step problems, where inner speech drove the stacked RNN to develop a temporal hierarchy that separated content encoding from control dynamics.

The practical value is data efficiency. The combined system generalizes across novel task configurations with sparse data, sidestepping the large datasets typically required. This makes it a lightweight alternative for building AI that can switch tasks and handle unfamiliar problems. The researchers' stated goal is "content-agnostic information processing," the ability to apply learned skills beyond exact training scenarios using general rules. For robotics and autonomous agents operating in noisy real-world environments, where training data is expensive to collect, this approach could cut development costs.

The finding also reframes where capability comes from. Performance gains here were driven by training procedures, specifically how the model interacts with itself during learning, not by scaling architecture. That distinction matters as the field debates whether bigger models or smarter training is the better path forward.

Sources:

- ScienceDaily: AI that talks to itself learns faster and smarter
- OIST: AI learns better when it talks to itself
- Queißer, J.F. & Tani, J. (2026). Working Memory and Self-Directed Inner Speech Enhance Multitask Generalization in Active Inference. Neural Computation, 38(1), 28-70