The Science of Learning

NOVA LLI

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Notes from Session 1: Why We Learn

Introduction:

- Learning is interesting.

- Learning is important.

- Learning is misunderstood.

Quiz:

Answer the following questions about Predictive Processing Theory. If you don't think you know anything about it, make as good a guess as you can.

1. According to PPT, learning is A. **A way to predict the immediate future.** B. **A result of confirmation of predictions.** C. **A result of failed predictions.** D. **A way to anticipate errors.**	**4. What is the source of predictions according to PPT?** A. **Sensory data** B. **Internal models** C. **Internal errors** D. **Perceptions**
2. In PPT, feedback is provided by A. **Sensory data** B. **Prior knowledge** C. **Predictions**	**5. PPT primarily explains conscious, deliberate learning.** A. **True** B. **False**
3. According to PPT, learning is an effort to minimize surprise. A. **True** B. **False**	**6. Which statement is true according to PPT?** A. **Predictions speed up perception.** B. **Predictions slow down perception.** C. **Predictions are unrelated to perception.**

Today's Session:

Definition:

- Learning is a process in which experience leads to long-term change in knowledge, beliefs, behaviors, or attitudes

Topic:
Predictive processing theory

Goals:

- Understand the basics of the theory
- Apply the theory to your own learning/teaching

Predictive Processing Theory:

Unconscious Learning	Internal Models	Predictions	Error Checks	Model Updates

1. Our brains maintain internal models of how the world works based on our experiences.

2. The brain constantly generates predictions about what is likely to happen next from those models.

3. The brain constantly compares incoming sensory data to its predictions to check for errors.

4. The brain constantly updates its models to reduce prediction errors.

Discussion:

Understanding

- Exploration
- Prior knowledge
- Why we learn?

Examples

- Surprised by something unexpected

Parallels

- Rings a bell?

Applications

- Prediction
- Surprise

Looking Ahead:

Why start with unconscious learning?

- Mainstream research
- Natural and inevitable
- Foundation
    - Hacking the system
    - Prior learning
    - Feedback