Active learning is social and social learning is active: a case study of learning words from conversation

Kyle MacDonald

Department of Psychology, Stanford University

Author Note

Readers: Michael C. Frank, Hyowon Gweon, and Anne Fernald

Abstract

Keywords:

Active learning is social and social learning is active: a case study of learning words from conversation

Introduction

Active learning is social

Hypothesis: early active learning behaviors often occur within communicative/social/pedagogical contexts.

There's an interesting distinction between active learning behaviors that directly affect social targets (or are directed towards social targets) such as questions vs. active learning behaviors that might be changed by the presence of a social partner or being in a communicative context such as gaze patterns to the visual world compared to gaze patterns directed towards a social partner to gather information.

Social learning is active

Hypothesis: Social interactions that yield information can productively be construed as active learning.

This analysis explains a range of social behaviors from the micro (eye-movements) to the macro (decisions about conversational partners).

[Some interesting motivating example].

What are the puzzles of self-directed learning?. Much of real-world learning is driven by people's choices of what to learn. in contexts that contain *both* active and passive input. People rarely learn a new concept entirely from information generated by themselves (active learning[1]) or entirely from information received from

[1]Here we focus on deliberate decisions about what to learn, as opposed to other uses of the term "active" learning (e.g., being engaged with learning materials).

the world (passive learning). And yet we do not have a theory about whether different sequences of active/passive input are better for different kinds of learning problems. Consider a teacher introducing a challenging math concept: should she allow students to explore first and then provide instruction, or should she teach first and then let students actively explore?

The potential benefits of active learning have been the focus of much research in education (**???**), machine learning (**???**), and cognitive science (**???**).

In a review of this diverse literature, (**???**) suggest that active learning can be superior to passive learning because it allows people to use their prior experience and current hypotheses to select the most helpful examples (e.g., asking a question about something that is particularly confusing). But is active learning always better than passive learning?

Contexts for rationality is important to distinguish: * rational utility maximizing agents in economics * KandT on higher level cognition are challenges –> behavioral economics, psychological theories of uncertainty * perception literature –> rational models/analysis (perception under noise) –> David Marr: model of the demands of perception in the ecological context * bayesian perception: optimal relevant to environmental demands

Jay –> good person to ask about overview of Noah –> planning model Berkeley folks –> Falk, Jess, Stephan on resource-rational cognitive models [reach out to Todd]

Resource-constrained active learning.

Context-sensitive active learning.

Active learning during conversation.

Part 1: Active learning

What is active learning? And why do we care?

What's missing from current developmental models of active learning?

Part 2: Resource-rational models of cognition

Rational choice theory

Overview of bounded rationality

Bridging levels of analysis

Cost-sensitive AI

Cost-sensitive human learning

Overview of ecological rationality

Review of ecological rational models

Part 3: Active learning during conversation

Why should we care about the conversational context?

What does a converstation look like?

What behaviors are available?

Behavior 1: speaker choice.

Utility analysis.

Ecological opportunity.

Behavior 2: attention (integrating between success and failures).

Utility analysis.

Ecological opportunity.

Behavior 3: questions (why didn't questions get asked in this setting?) –> Markman et al..

Utility analysis.

Ecological opportunity.

Looking ahead

References