



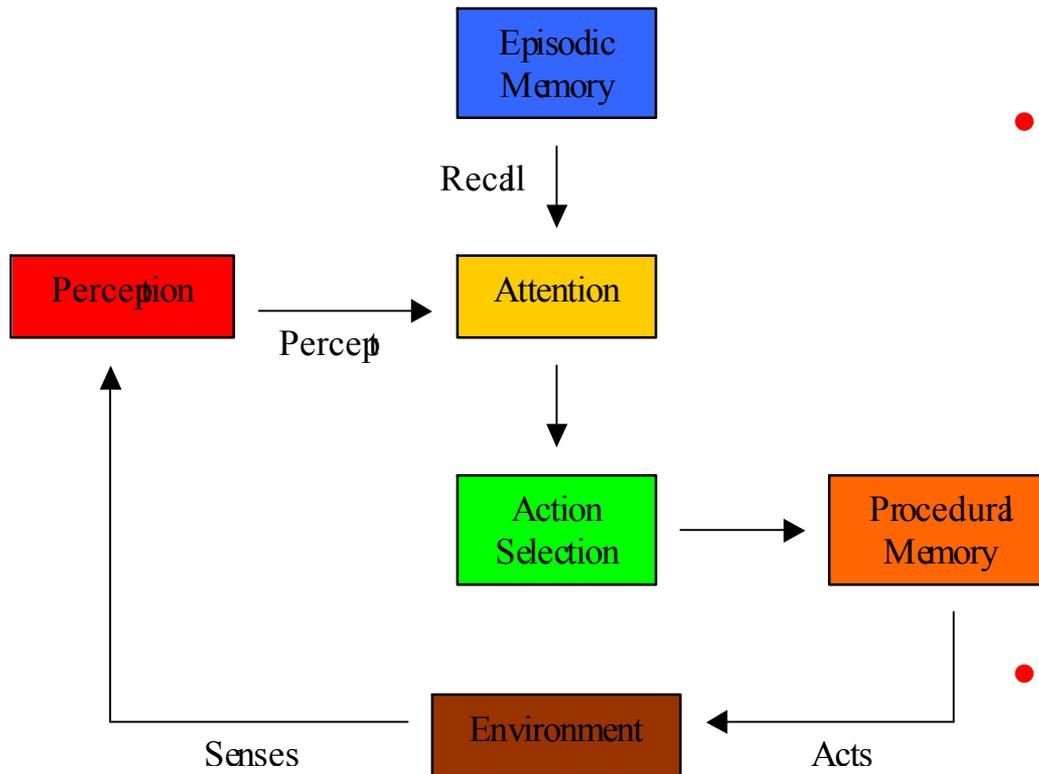
# How Minds Work Deliberation and Volition

**Stan Franklin**

Computer Science Division &  
Institute for Intelligent Systems  
The University of Memphis



# Attention & Action Selection



- **Attention**— process of bringing to consciousness

- **Action selection**— process of choosing what to do next



# Drives, Goals & Intentions

- **Drive** — primary motivator
- **Goal** — restructure the environment or the agent's relation to it
- **Volition** — process of arriving at a goal
- **Intention** — agent's volitional resolve to achieve a goal
- Goals can be in the service of other goals, ultimately of drives



# Actions

- Volitional — high level
- **Informationally** (consciously) **mediated**
- **Automatized**
- Can be
  - External (exogenous)
  - Internal (endogenous)



# Action Selection Processes

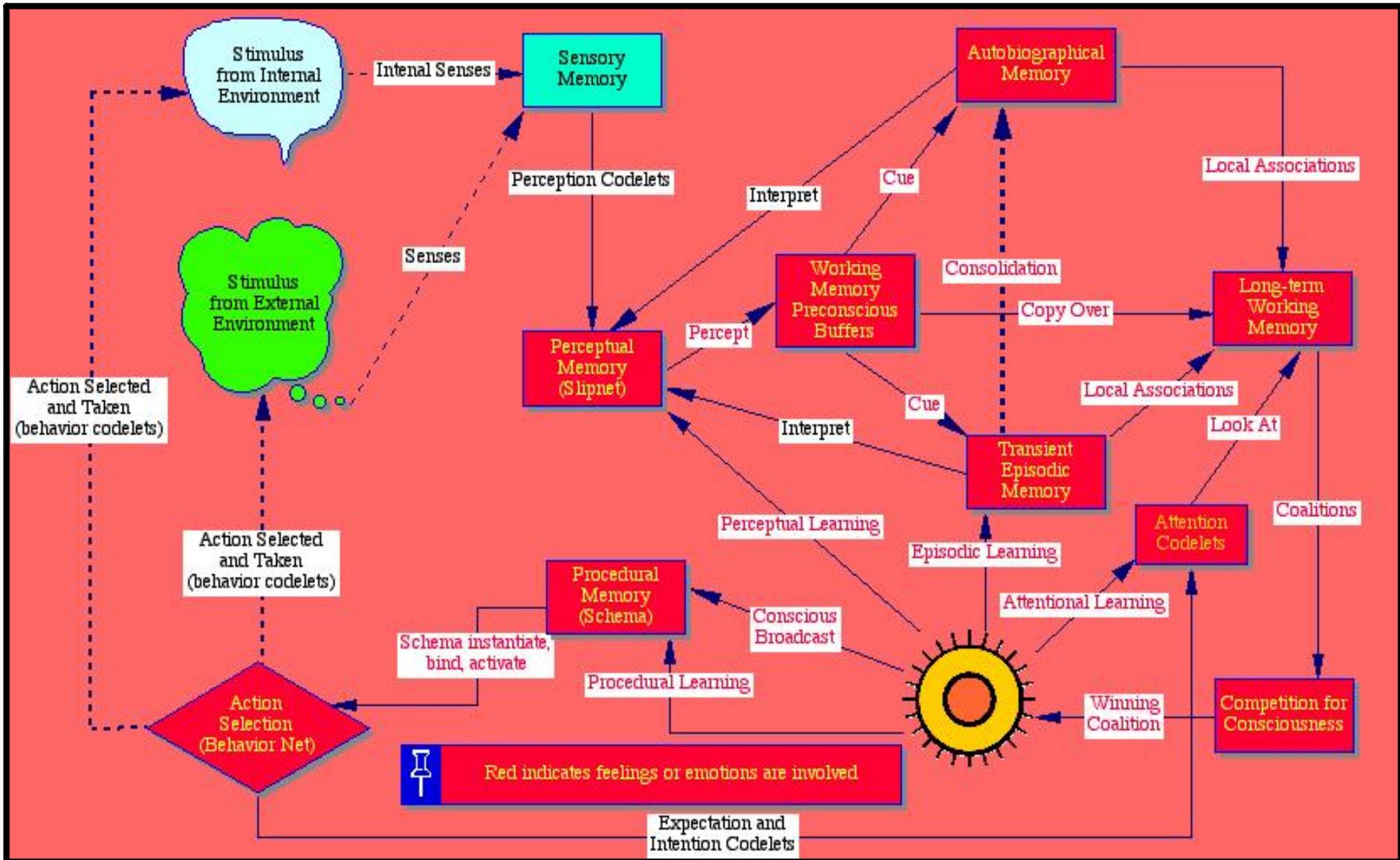
- **Reactive** — direct choice, though perhaps quite complex
- **Deliberative** — options constructed & evaluated, plans created
- **Metacognitive** — thinking about thinking, more strategic



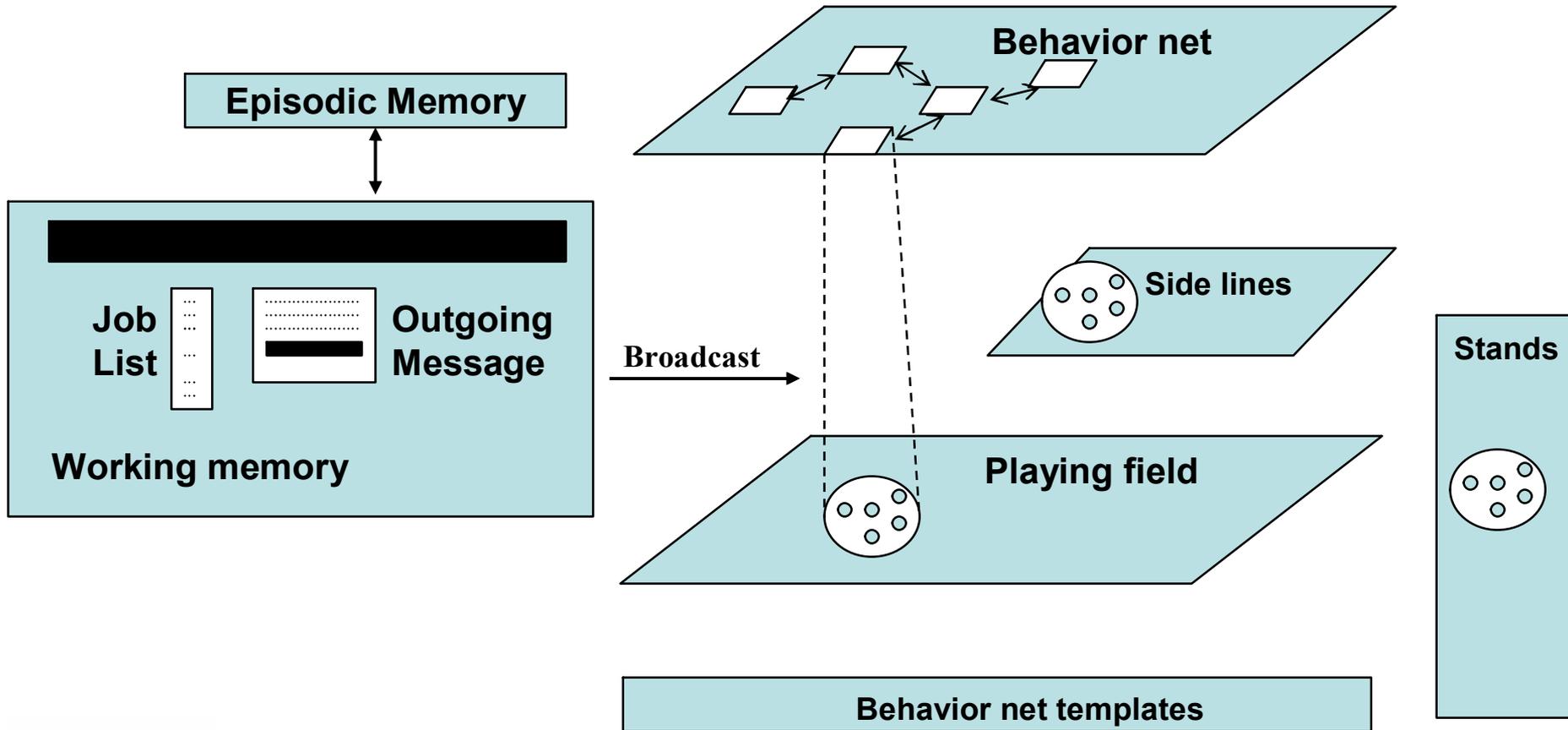
# Cognitive Processes

- Are always cyclic—executing through a continuing sequence of **cognitive cycles**
- May complete during a single cycle—bottom up
- May require a number of cycles to complete—multicyclic—top down





# 'Consciousness' in Action



# Ideomotor Theory

William James (circa 1890) – Bernard Baars (1988)

Voluntary vs non-voluntary action

Theory of voluntary action

- Proposers — propose a course of action
- Objectors — raise objections to such a course of action
- Supporters — lend support to such a course of action
- Timekeeper — handles the timer



# Ideomotor Theory in Action

Idea pops to mind (proposer) — no  
objection (objector) — do it

Objection (objector) — don't do it

Objection then support (supporter) do it

Different proposal — no objection do it

Different proposal — original proposal —  
no objection — do it

Last unopposed proposal is acted upon



# Avoiding Oscillation

- Attention codelet loses activation bringing idea to consciousness
- Timekeeper becomes less patient — sets timer for less time
- Metacognition intervenes when others fail



# Deliberation

- Faced with a goal or problem
- Imagine possible plans or solutions
  - Scenarios
  - Routes
  - Internal virtual reality—Dawkins
- Evaluate them
  - Using reason
  - Using emotions
- Choose among them

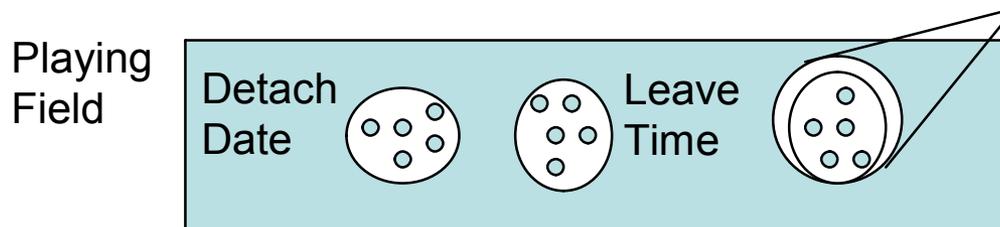
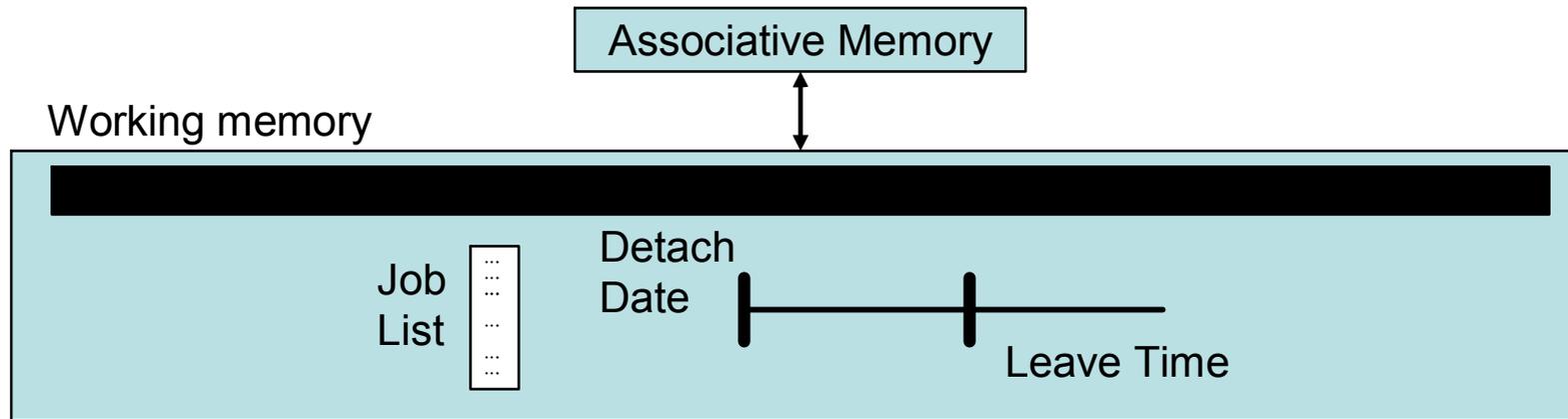


# IDA's Deliberation

- Create scenes
    - May require objects, actors, concepts, relations, frames
    - Organized around events
  - Build scenarios as sequences of scenes
  - Choose between scenarios, discarding some
- Using Barsalou's perceptual symbol systems as a guide



# Deliberation in Action



# Readings

- Franklin, S. 2000. Deliberation and Voluntary Action in 'Conscious' Software Agents. *Neural Network World* 10:505-521.



# Email and Web Addresses

- Stan Franklin
  - [franklin@memphis.edu](mailto:franklin@memphis.edu)
  - [www.cs.memphis.edu/~franklin](http://www.cs.memphis.edu/~franklin)
- “Conscious” Software Research Group
  - [www.csrg.memphis.edu/](http://www.csrg.memphis.edu/)

