

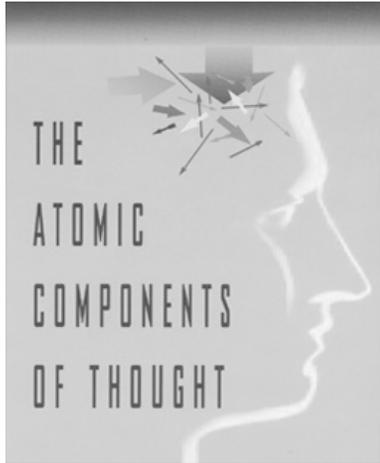
# Introduction to ACT-R 5.0

## ACT-R Post Graduate Summer School 2001

Coolfont Resort

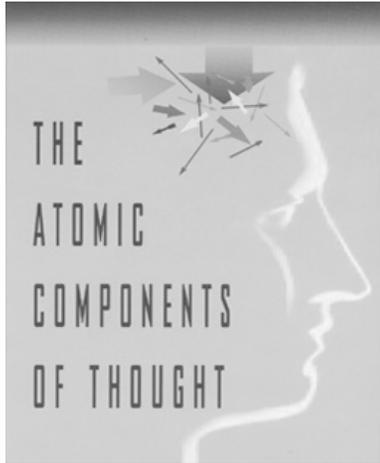
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ACT-R Home Page: <http://act.psy.cmu.edu>



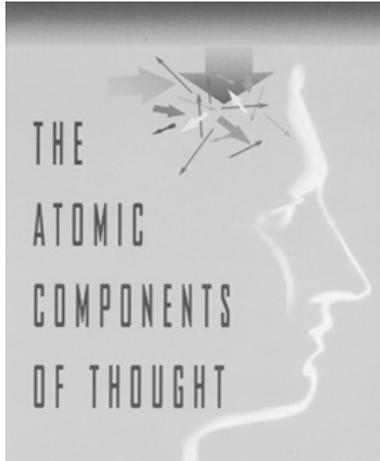
## Goals of Conference

0. Let ACT-R community talk.  
Find out what the real issues are.
1. Inform community on ACT-R 5.0.
2. Get community feedback on 5.0.
3. Talk more generally about future of ACT-R.
4. General Tensions:
  - a. Move from brand-name but to what?
  - b. Tool-Theory
  - c. Diversity versus Uniformity
  - d. Cumulative Progress versus Scientific Revolution
  - e. Centralized support & instruction versus what?



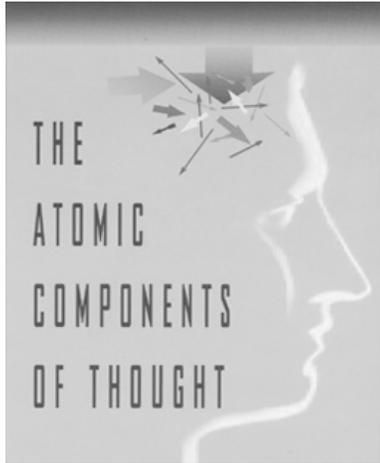
## Motivations for a Cognitive Architecture

1. **Philosophy:** Provide a unified understanding of the mind.
2. **Psychology:** Account for experimental data.
3. **Education:** Provide cognitive models for intelligent tutoring systems and other learning environments.
4. **Human Computer Interaction:** Evaluate artifacts and help in their design.
5. **Computer Generated Forces:** Provide cognitive agents to inhabit training environments and games.
6. **Neuroscience:** Provide a framework for interpreting data from brain imaging.

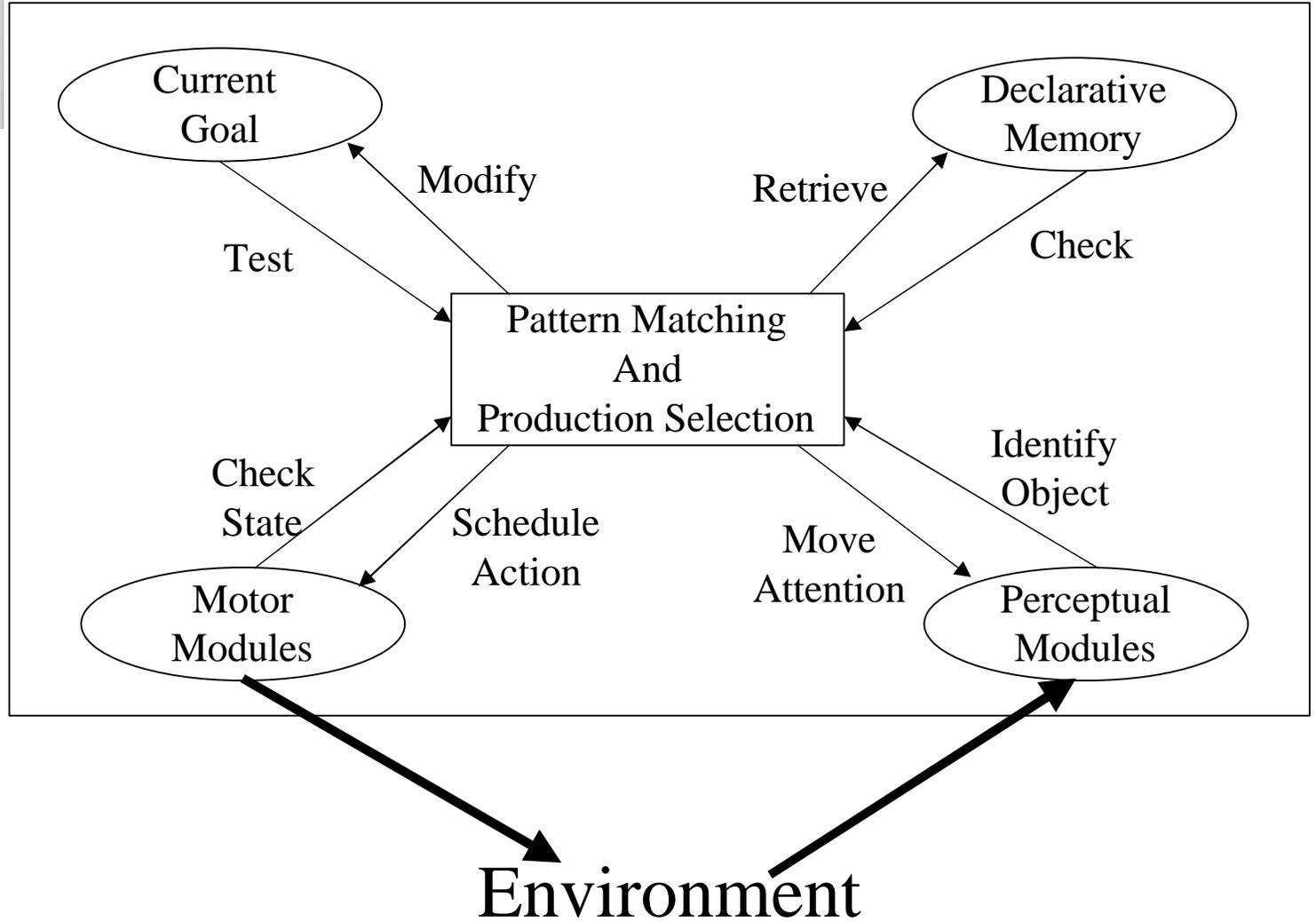


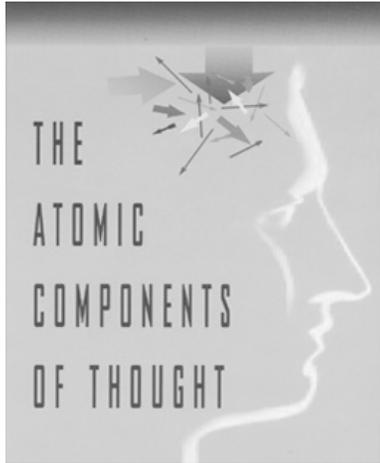
## These Goals for Cognitive Architectures Require

1. Integration, not just of different aspects of higher level cognition but of cognition, perception, and action.
2. Systems that run in real time.
3. Robust behavior in the face of error, the unexpected, and the unknown.
4. Parameter-free predictions of behavior.
5. Complete learning.



# ACT-R 5.0

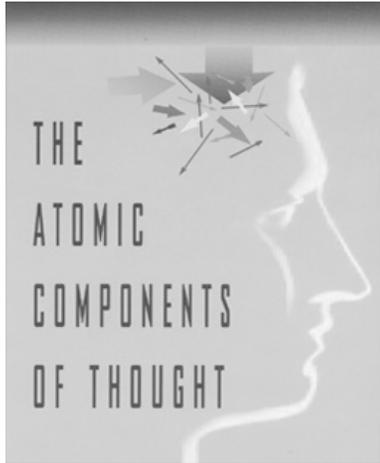




## ACT-R 5.0 differs from ACT-R 4.0 in

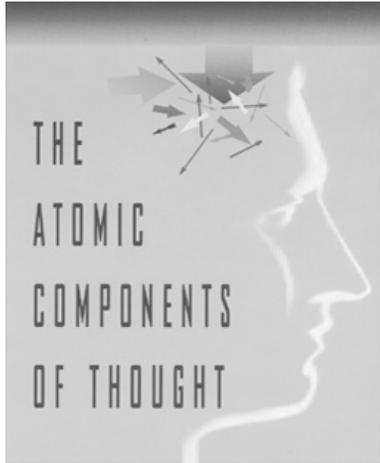
1. Thorough integration with perceptual-motor.
2. Parameter simplification and settling on fixed parameter values.
3. Production learning mechanism that supports learning from instruction.
4. “Buffer” conception of information flow--somewhat akin to Baddeley’s working memory.
5. There is a clear mapping of components onto brain areas.

Note: Your 4.0 models should continue to work well in 5.0 with minimal adjustment. The code may require substantial adjustment to be in the spirit of 5.0, but what worked previously should continue to work and for the same reasons. This is cumulative progress.



## ACT-R 5.0 Cleans Up Some of the Mess in 4.0

1. Awkwardness of multiple productions being tried in a cycle.
2. Difficulties in switching attention and responding to interruptions.
3. The broken  $q$  parameter
4. The non-functioning associative strength mechanism.
5. The awkwardness of a noiseless threshold.
6. Ad hoc calls to RPM
7. Smooth generalization of the optimized learning formula.



## If you build it, will they come?

### Motivations

1. Cleaner, simpler.
2. Closer to the goal of running out of the box with fixed parameters and all mechanisms on.
3. Better suited to modeling dynamic, interactive tasks.
4. A working production learning mechanism with an emerging connection to instruction.
5. Mapping onto the brain.
6. Community momentum.

Note: ACT-R 5.0 is probably beta to ACT-R 6.0.