Mental Models

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MSR

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Problem

- C2 is decision making under uncertainty
- How do people …
  - reason about probabilities?
  - manage limited resources?
  - fool others and get fooled?

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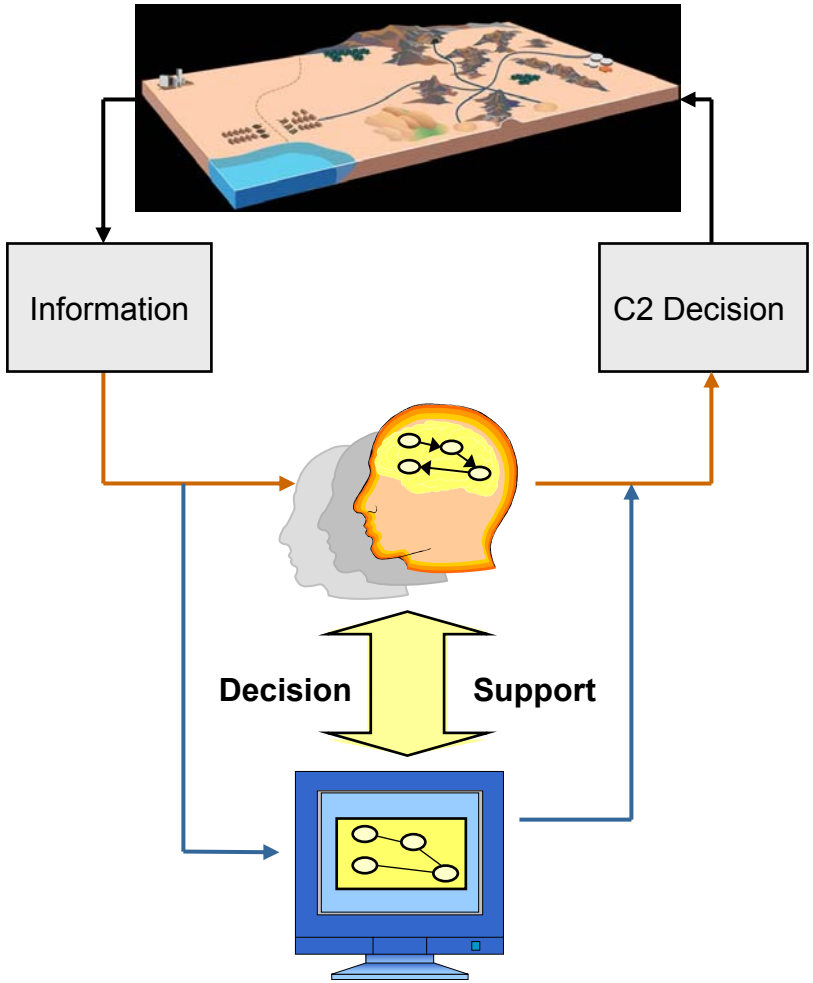
Background



USAF SAB (1998)

"... tailoring to the user's mental model … will need to be developed to maintain parity with the improved input and manipulation technologies of the JBI."

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Objective

- Develop mathematical models of …
- Cognitive performance in “games”
- That simulate the challenges of C2.

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Activities

- **Microworld - T.R.A.C.S.***
  - A probabilistic card game
- **Experiments on humans**
  - How do people play the game?
- **Simulations with agents**
  - How well do people play the game?

*Tool for Research on Adaptive Cognitive Strategies

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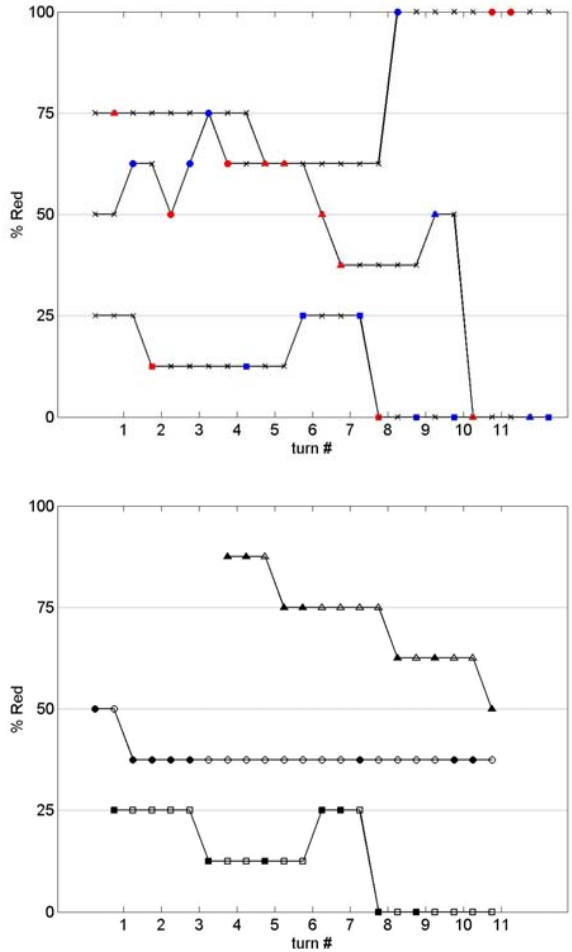
Highlight



Dilemma: Dynamic Deck

The actual odds change as the deck is depleted.

Behavior: Baseline Bias

People remain anchored to baseline (initial) odds.

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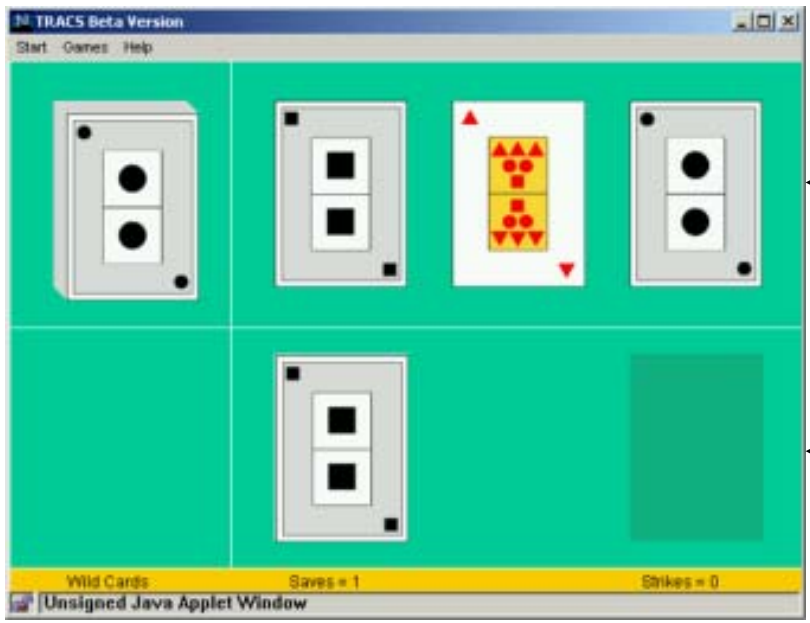
Demonstration

Straight TRACS: The Basic Game



the deck
(for dealing)

the field
(for turning)

the stacks
(for scoring)

How do people internalize frequencies and revise expectations (probabilities)?

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Impacts

- Mathematical models of
- Cognitive strengths and bounds
- To guide design of decision support systems

&

- Simulate human behavior in C2 applications

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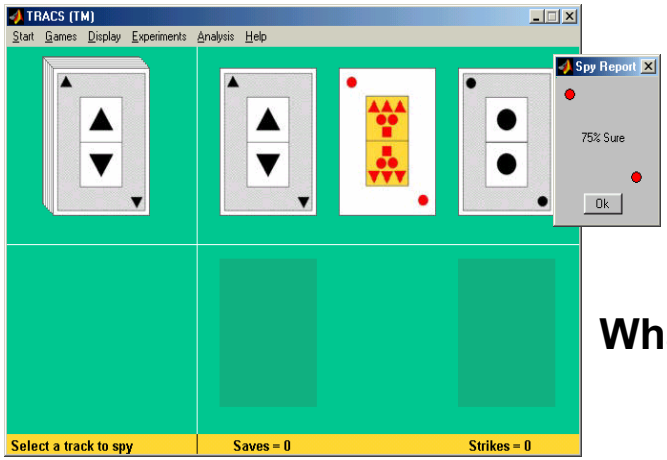
Future Plans

Spy TRACS: The Fusion Game



You think a track is probably (60%) Blue.
But, a spy says it is probably (75%) Red.
Now what do you think (% Blue or Red)?

What if spy said it was probably (75%) Blue?

How do people aggregate information from diverse sources of intelligence?

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