Modeling well-learned idiosyncratic non-optimal micro strategies
Set Up

Memory Game
- DEMO available on Google Play Store;
- ‘4 Button Expert’

3 highly trained individuals
- 19-24 y/o females
- Learning the game over months

Predictive ACT-R Model
- Based on SGOMS

Related studies
- Gray and Boehm-Davis (2000)
- Shiffrin and Cousineau (2004)
The Game was designed following the SGOMS hierarchy.

Participants learned each level fully before moving to the next.

For our study we developed the Game as a mobile app. The following slides demonstrate how the game works.
The Conditions: Known Methods
The Conditions: Two Split
The Conditions: Three Split
The Conditions: Unit Tasks First Method
The Conditions: Planning Unit First Method
West et al. (2018) Results

N&F Averages and Model Fit/Predictions

Conditions
- Known Method
- Model fit
- 2 Split
- Model fit
- 3 Split
- Model prediction
- UT first
- Model prediction
- PU first
- Model prediction

Time (ms)

- Player
- Motor
- Vision
- Productions
West et al. (2018) Results
West et al. (2018) Results

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Player | Motor | Vision | Productions
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- PU first
- Model prediction

Time (ms)

![Bar chart showing N&F averages and model fit/predictions with time in milliseconds on the x-axis and conditions on the y-axis, with bars representing different models and conditions.]
Player 1a Average Results

Player 1a Averages and Model Fit/Predictions

Conditions

- Known Method
- Model fit
- 2 Split
- Model fit
- 3 Split
- Model prediction
- UT first
- Model prediction
- PU first
- Model prediction

Time (ms)

- Player
- Motor
- Vision
- Productions
Player 1b Average Results

Player 1b Averages and Model Fit/Predictions

Conditions
- Known Method
- Model fit
- 2 Split
- Model fit
- 3 Split
- Model prediction
- UT first
- Model prediction
- PU first
- Model prediction

Time (ms)

- Player
- Motor
- Vision
- Productions
Player 1a and 1b Distribution Results
Player 2 Average Results

Player 2 Averages and Model Fit/Predictions

- Known Method
- Model fit
- 2 Split
- Model fit
- 3 Split
- Model prediction
- UT first
- Model prediction
- PU first
- Model prediction

Time (ms)

- Player
- Motor
- Vision
- Productions
Player 2 Distribution Results
Player 3 Average Results

Player 3 Averages and Model Fit/Predictions

- Known Method
- Model fit
- 2 Split
- Model fit
- 3 Split
- Model prediction
- UT first
- Model prediction
- PJ first
- Model prediction

<table>
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<th>Player</th>
<th>Motor</th>
<th>Vision</th>
<th>Productions</th>
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Legend:
- Player
- Motor
- Vision
- Productions
Player 3 Distribution Results

[Graph showing data distributions for Player 3]
The data story

Known Methods Condition

◦ Very consistent despite being embedded in a complex task
The data story

Two and Three Split Conditions

- Consistent with Schneider & Anderson (2011), Hick’s “law” was not supported for our data. However, Player 3 takes longer. Some guessing occurs.
The data story

Unit Task First Condition
◦ Players made different tradeoffs
The data story

Planning Unit Condition

- Planning units are cognitively penetrable. Big source of individual differences. Hard to hold in the head
Thank You