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Chunking and Team Pattern Recognition

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Long Term Goals

- Investigate performance of self-synchronizing teams
- Understand how teams collaborate on a shared surface in situations characterized by high stakes, uncertainty and time pressure

Objective

- Validate Model:

Team Recognition Primed Decision-Making

- Empirical investigation for validity of:
 - **Pattern Sharing of Cognitive Chunks**
- Sharing Representation
 - **Items vs. Chunks**
 - **Time Pressure**

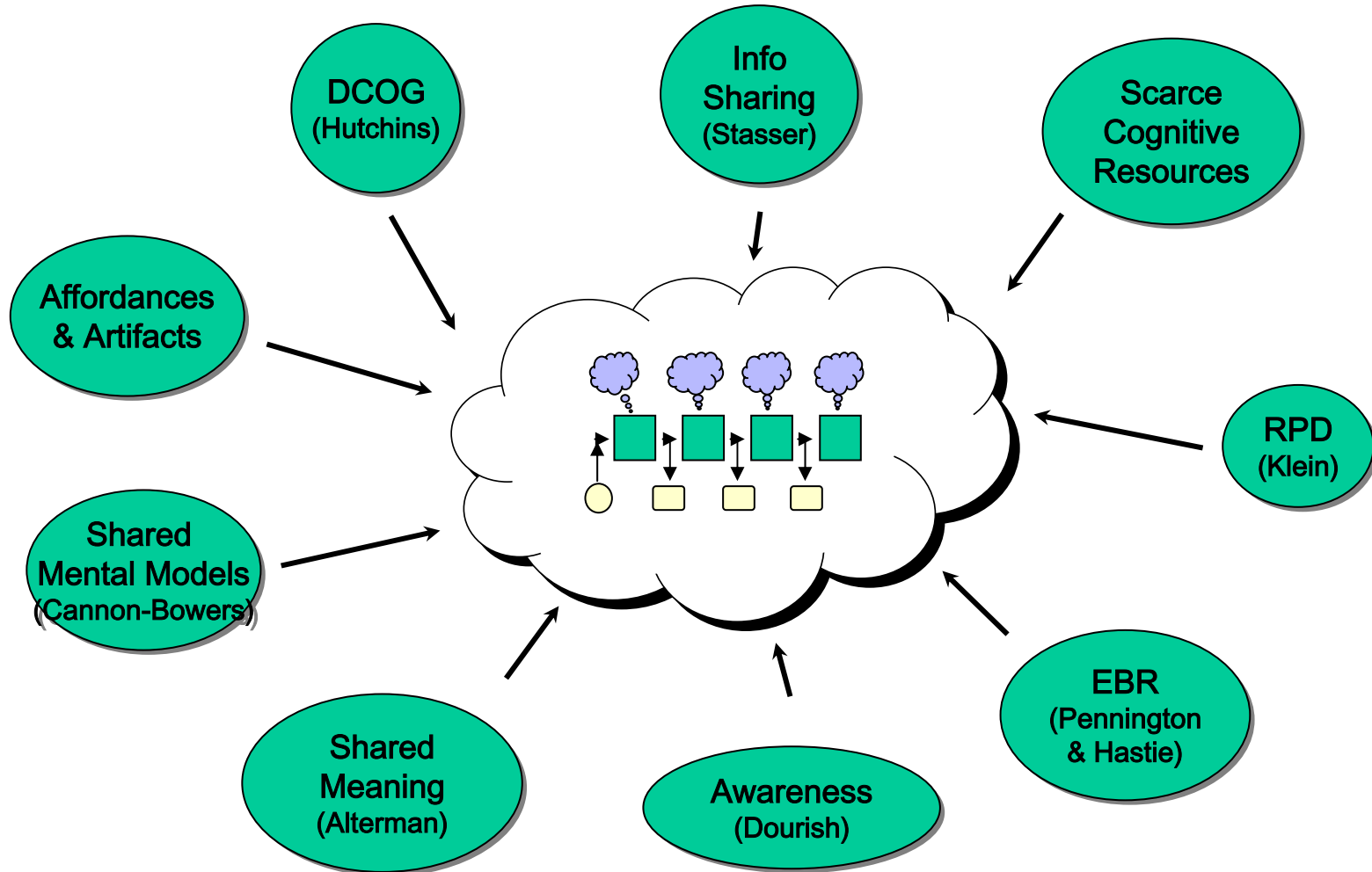
Sharing of Patterns

- Discrete “item” sharing gives higher performance
- Cognitive “chunk” sharing yielded higher task performance, **even under time pressure**

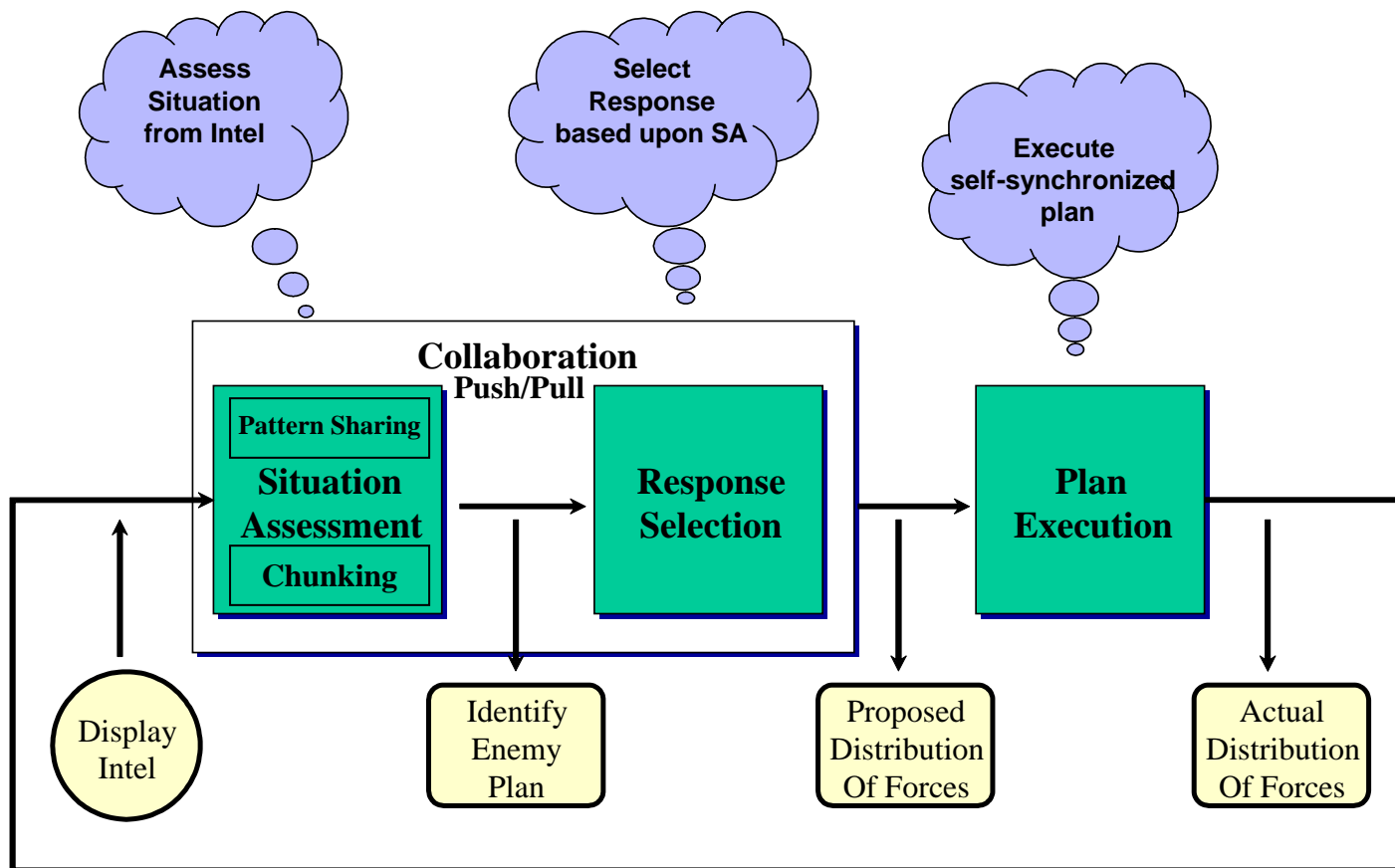
Cognitive Limitations

- **Perception**
- **Attention**
- **Memory**

Cognitive Map



Research Model



Team Recognition Primed Decision Making

Hypotheses

- H1: The average outcome quality of the groups supported with a stimulating structure for sharing patterns will be greater than the average decision quality of the groups without.
- H2: Among groups supported with a stimulating structure for sharing patterns, the average sharing correctness will be greater for groups using a “chunk” sharing tool.
- H3: Among groups supported with a stimulating structure for sharing patterns, the average sharing time will be less for groups using a “chunk” sharing tool.

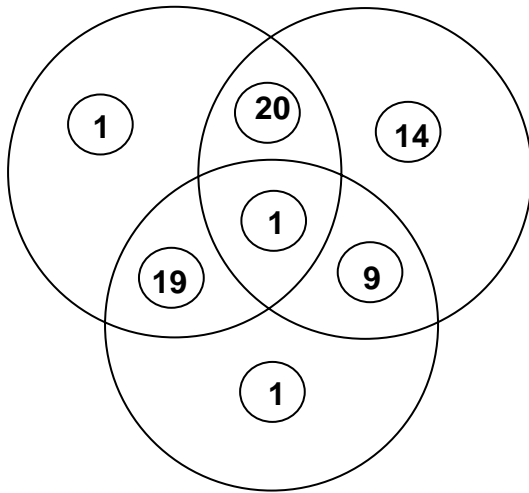
Methods

- Subjects: 71 3-person teams
- Cooperative 3-Player Game
- Rewards:
 - **speed**
 - **accuracy**

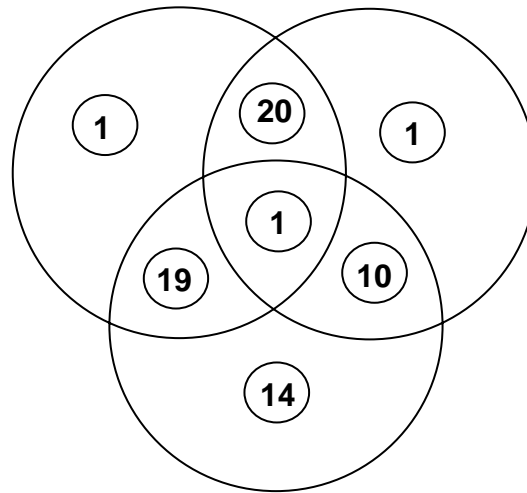
Decision Game

- Each player has 7 Tokens (numbered 1-7)
- Opponent has asymmetric force
 - Patterns: Definitive, Equivocal, Uncertain
- Team places tokens so total \geq opponent
- Incentive
 - For total points
 - For time of play
- Play is interactive

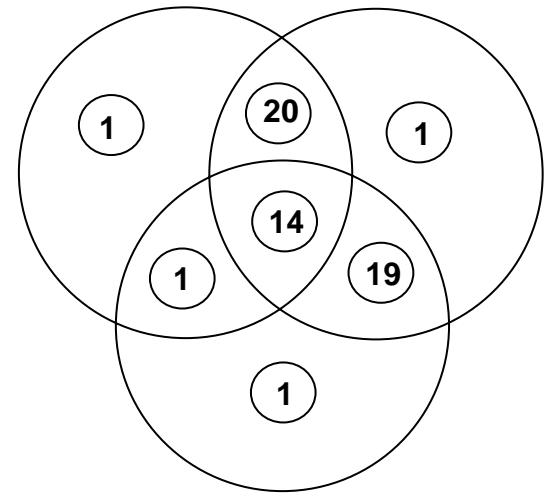
Patterns



9



10



14

Chunk Labels

Pattern Items

Java
Sockets
SQL
RMI
Multicast

Pattern Item Indication with Confidence

Revealed Intel


14


Confidence Level

Submit


0 25 50 75 100

Java Applet Window

BEGIN 

BEGIN 

Current Game: 3

Player: 

1 2 3 4 5 6 7

Indicate the Enemy Pattern

Next ->

Total Points: -14

Dec 17, 1:00PM

Pattern Chunks

Pattern Chunk Indication with Confidence

Revealed Intel

Confidence Level: 14

Submit

0 25 50 75 100

Java Applet Window

BEGIN (Yellow)

BEGIN (Green)

Current Game: 0

Player: (Grey)

Total Points: 0

Dec 17, 1:00PM

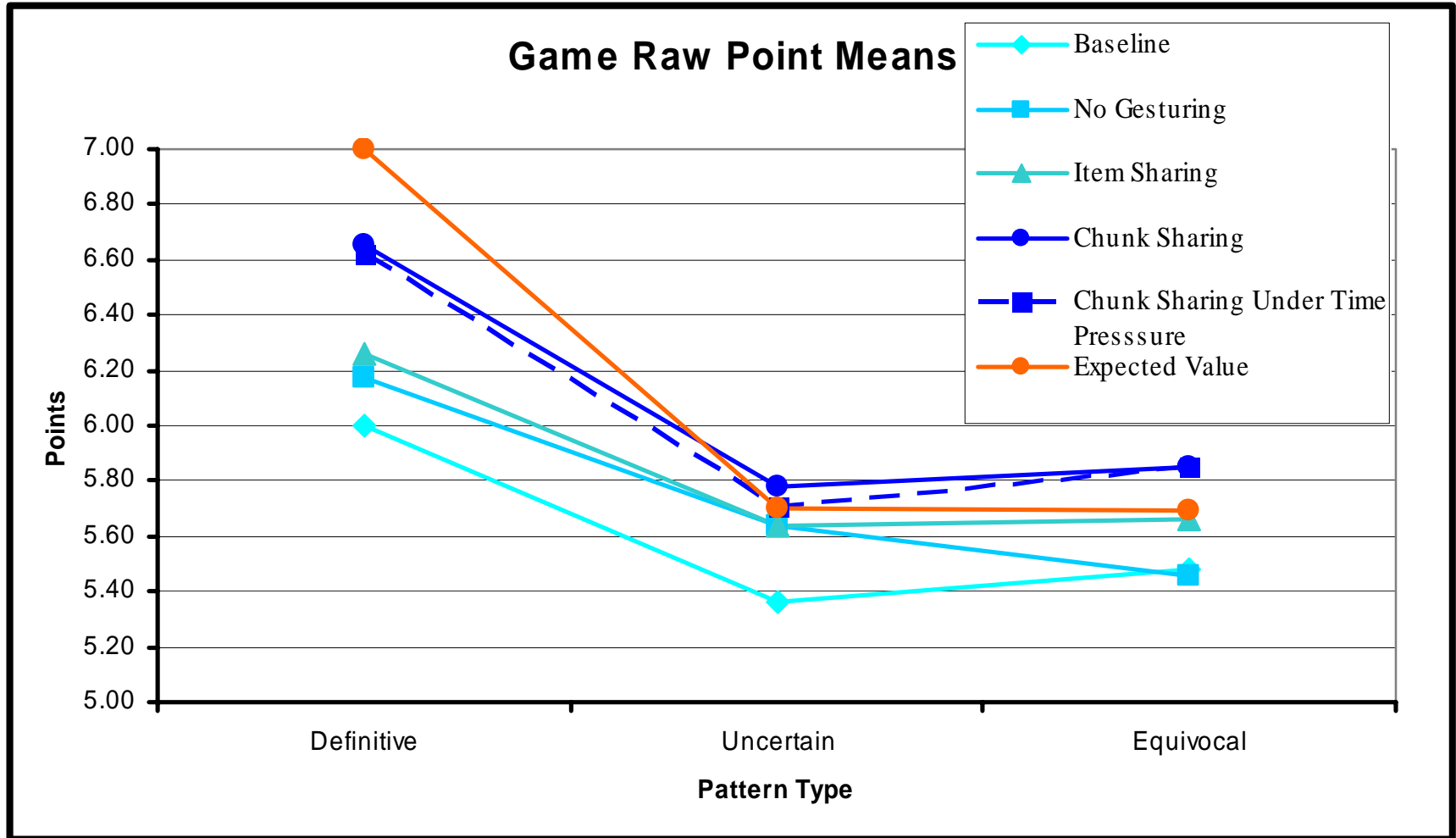
Indicate the Enemy Pattern

Next ->

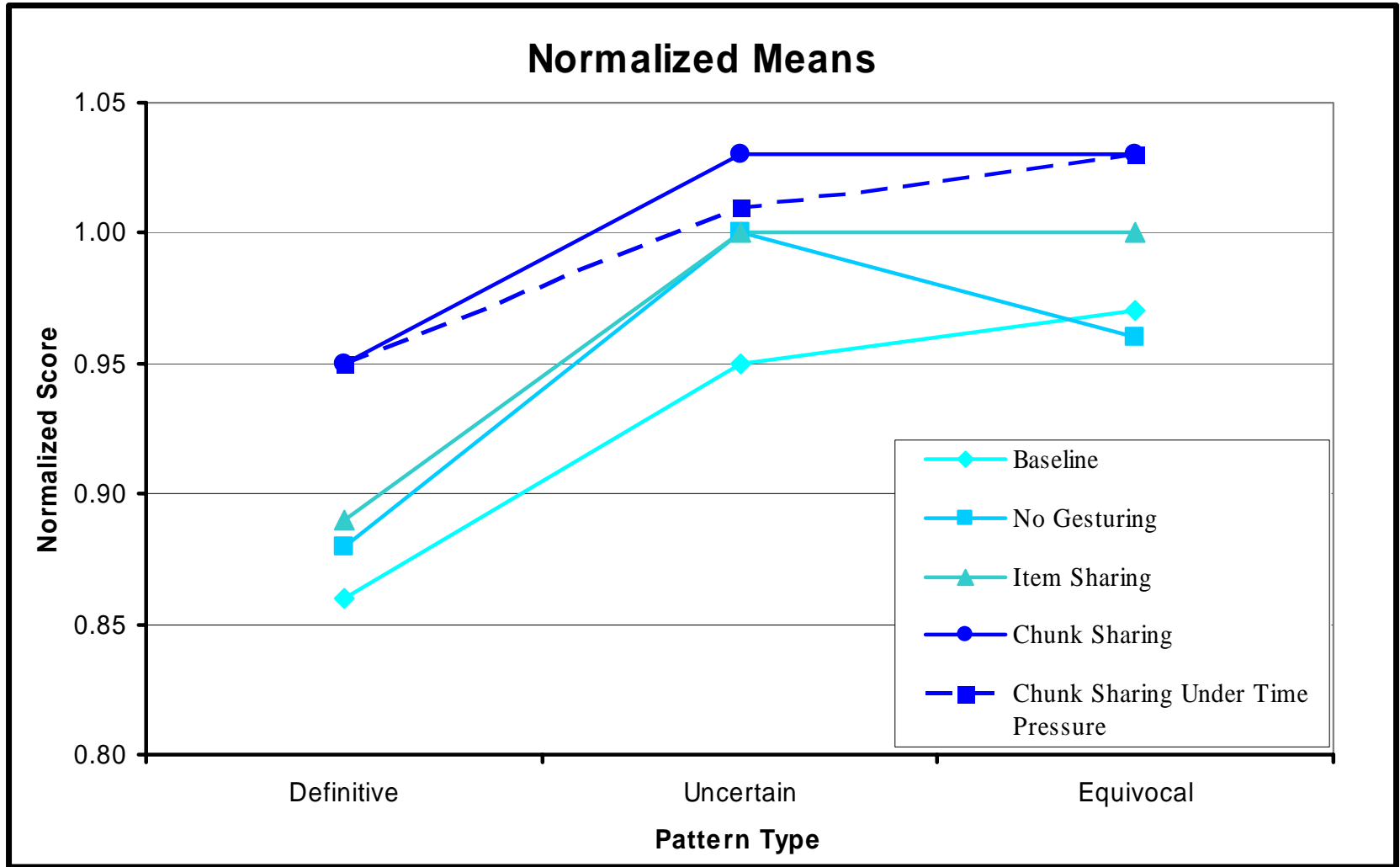
Research Measures

- Outcome Measures:
 - *Quality*
 - *Speed*
- Process Measures:
 - *Pattern Recognition (Confidence)*
 - *Pattern Sharing*
 - *Collaboration*
 - *collisions, bumps, leaders, structures*

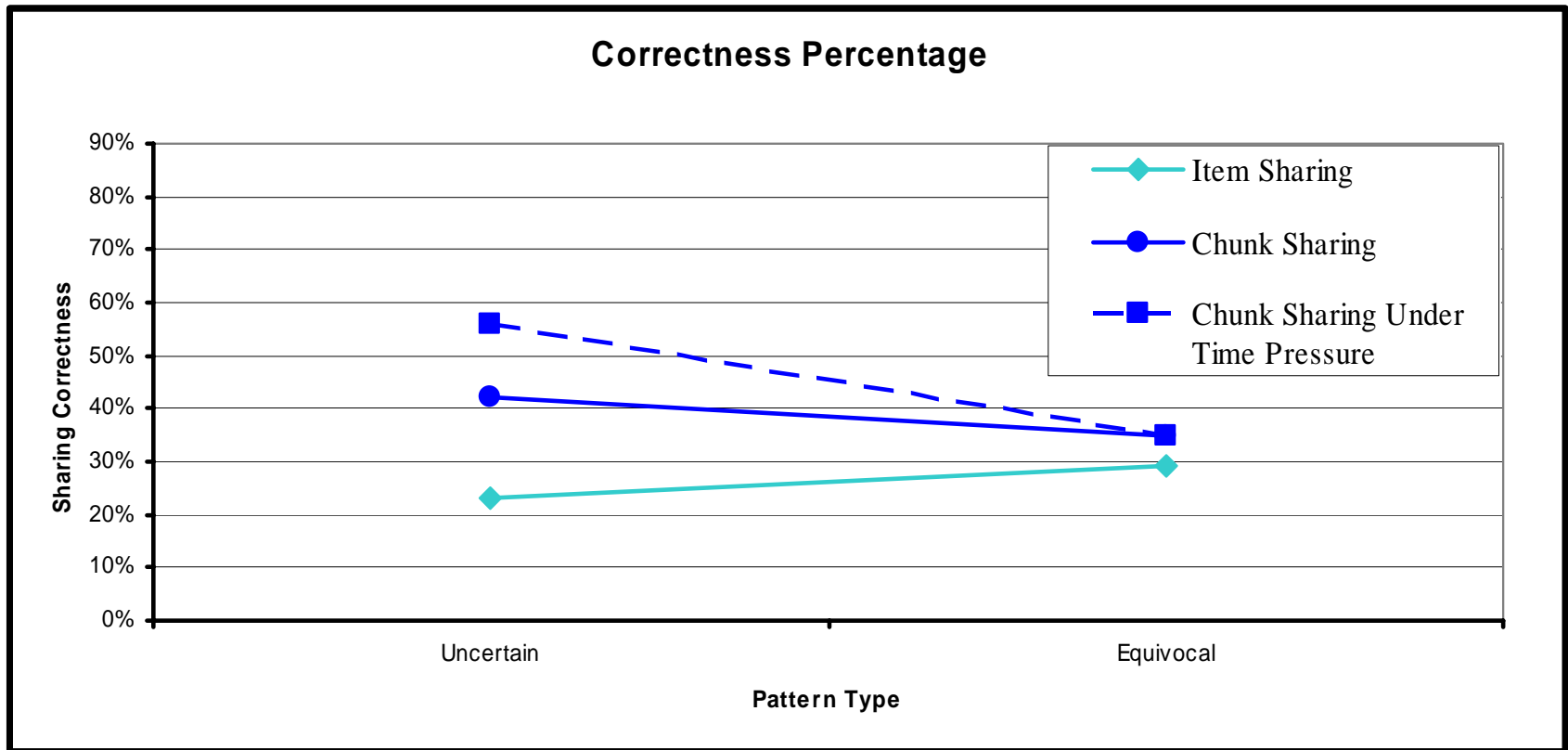
Raw Scores



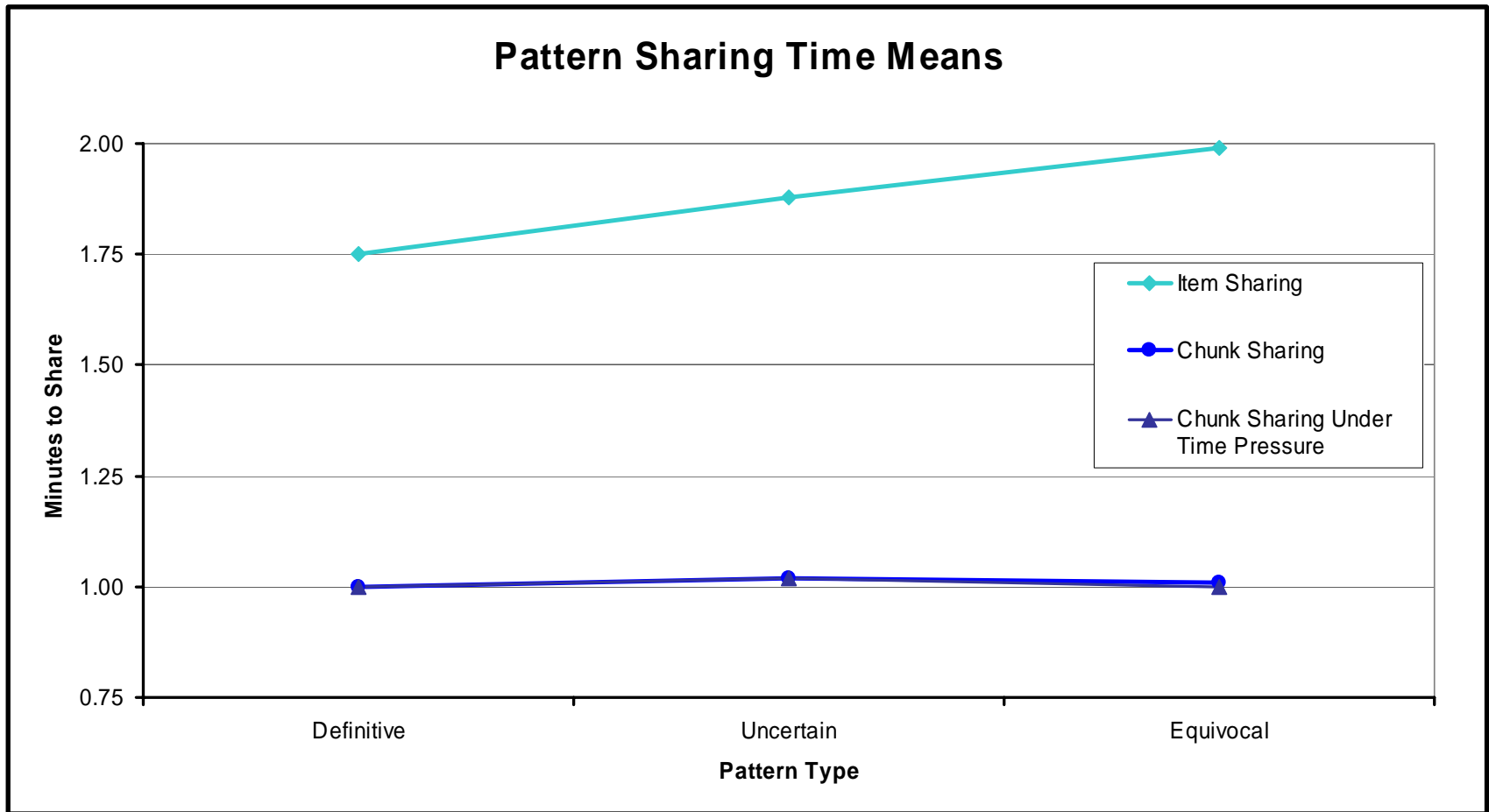
Normalized Scores



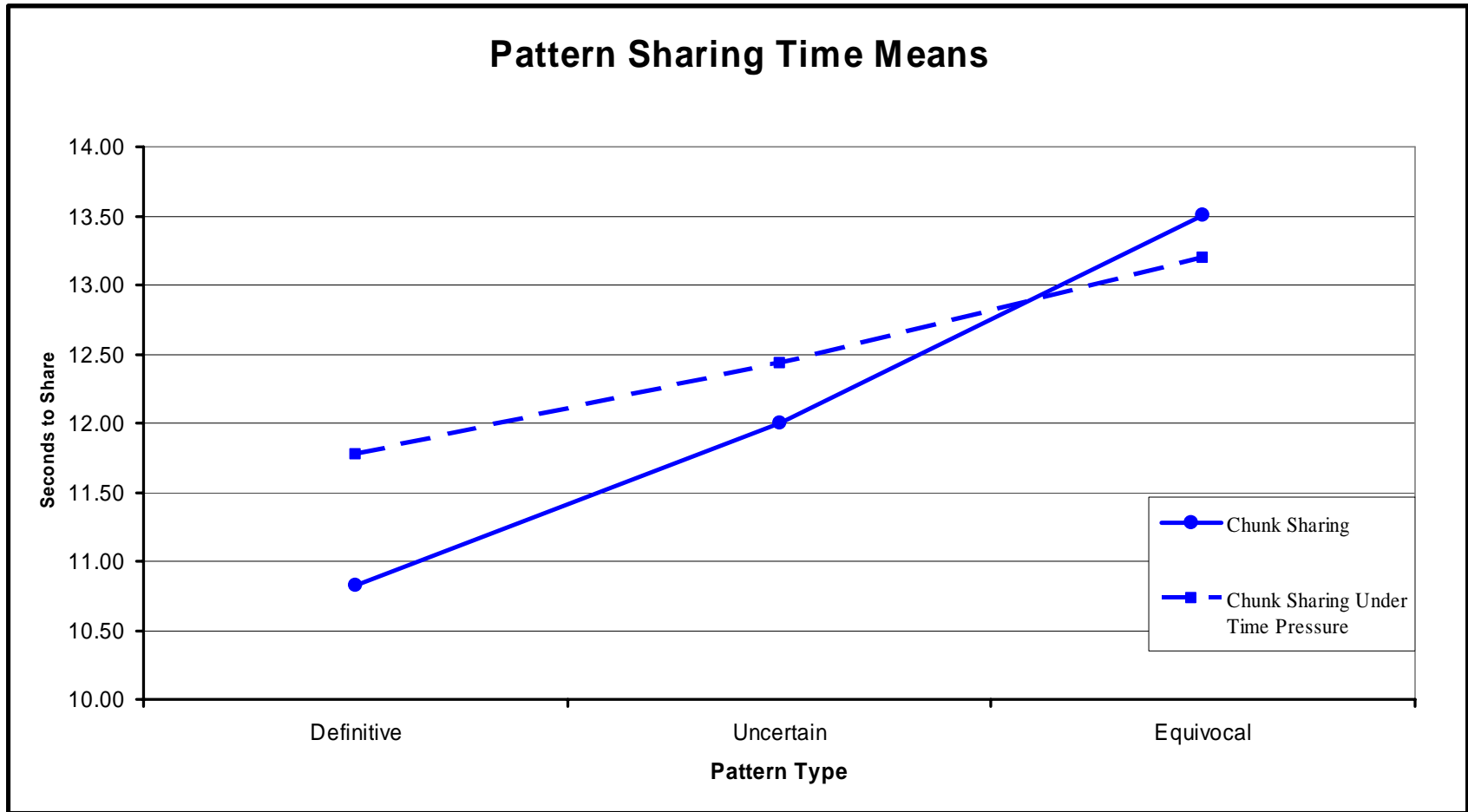
Sharing Correctness



Pattern Sharing Time

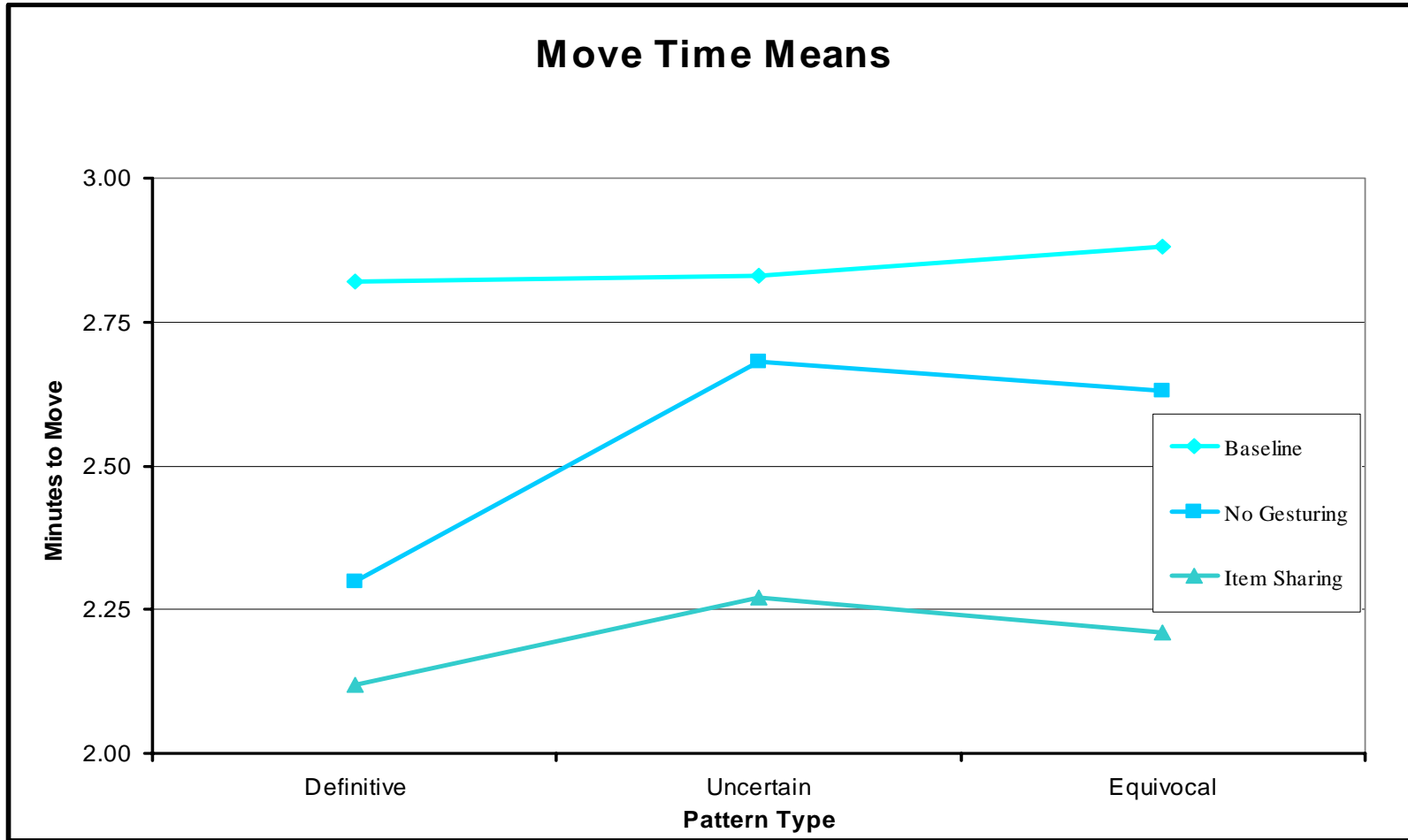


Pattern Sharing Time (Seconds)



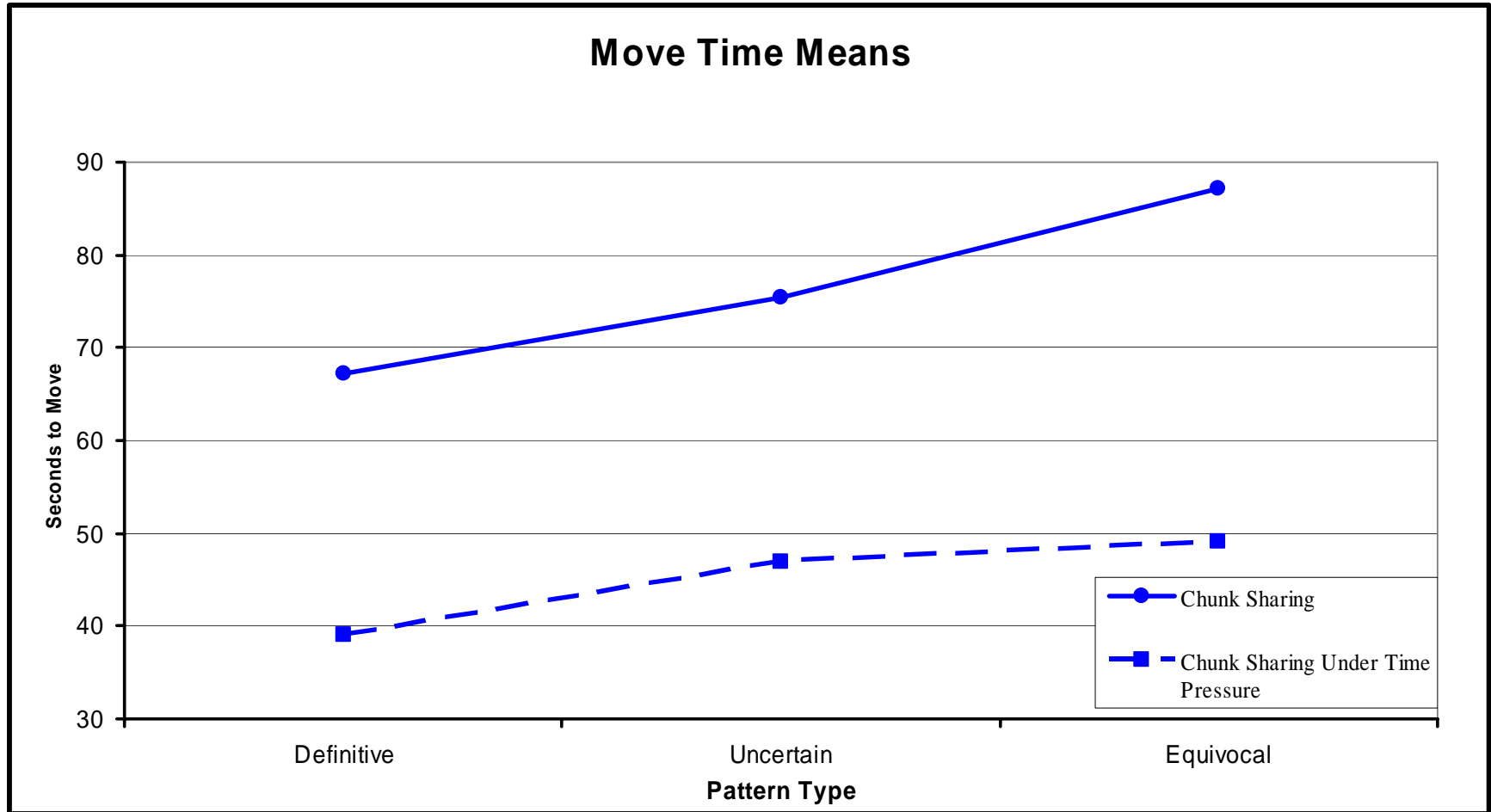
No time pressure when sharing...

Move Time



No time pressure when moving...

Move Time (Seconds)



Time pressure when moving...

Conclusions

- Team Recognition Primed Decision Making Model Appears to be Validated

- Sharing of Pattern **Chunks** Improves Performance
 - Cognitive Alignment
 - Ultra Thin tool