HUMAN BEHAVIORAL REPRESENTATIONS WITH REALISTIC PERSONALITY AND CULTURAL CHARACTERISTICS

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Personality, Culture and Emotion in Behavioral Representation: Why Care?

◆ **Training, mission rehearsal, engineering design, and DSS rely on simulation models with Human Behavioral Representations (HBRs)**

◆ **Personality, Culture, and Emotion affect**

  ◆ **friendly force teams, units, organizations**

  ◆ **adversary performance, including asymmetric adversaries**

◆ **Need to put personality, emotion, culture into HBRs**
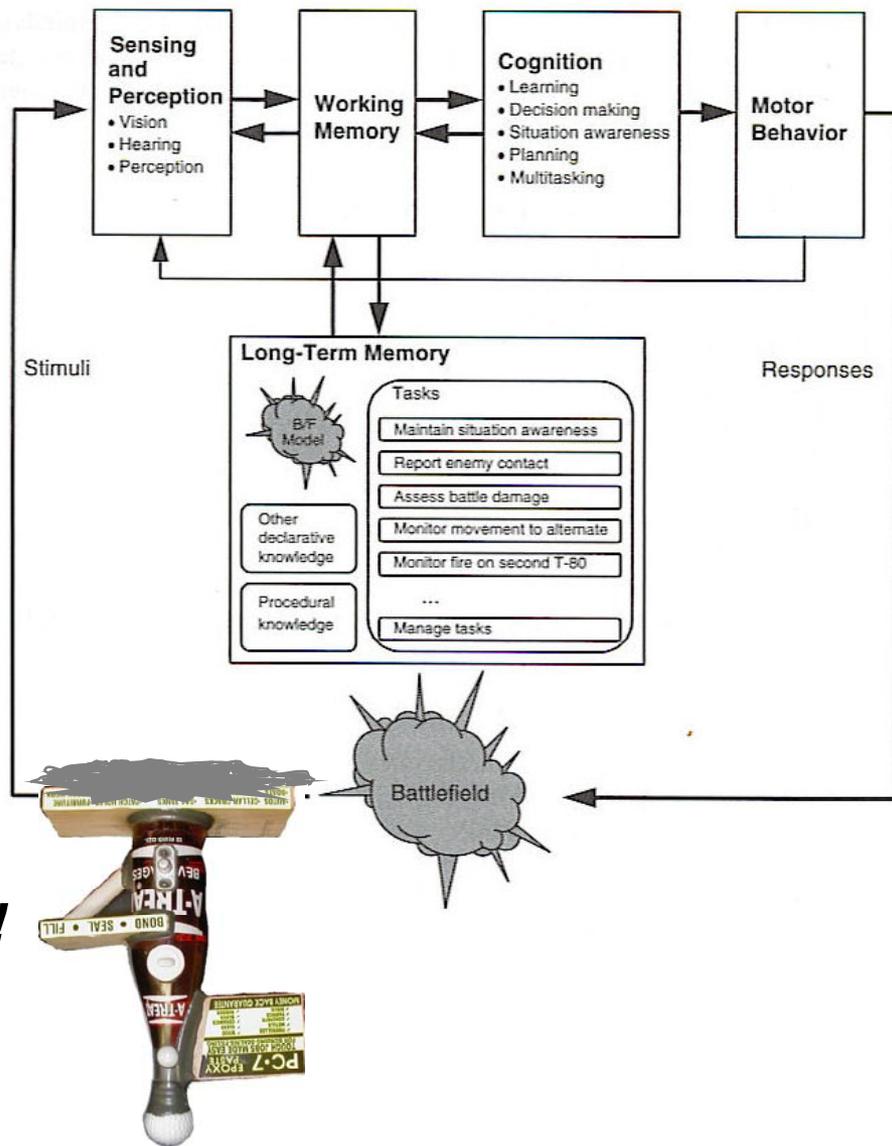
Obstacles to a Common Framework for HBR

◆ **Poor theoretical fit**

◆ **Cognitive theory based on first principles**

◆ **Personality theory based on data models**
  ◆ **'Big 5' Traits**
  ◆ **Neuroticism, Extraversion, and Openness to Experience, Agreeableness, and Conscientiousness**

◆ *Can't just 'glue them together'!*

Creating A Cognitive Theory of Personality

- **Personality modeled as**
  - differential configurations and activation of motives, linked to plans, resources, and beliefs
  - Three level motive control system

- *Level one* **contextually activates individual motives**
  - Individual motive sets are the basis for personality traits

- *Level two* **governs motive sensitivity**
  - **Behavioral *Approach* System (BAS)**
  - **Behavioral *Inhibition* System (BIS)**

- *Level Three* **governs degree of motive-focus**
  - *Disinhibition/Constraint system* **(DCS)**

Cognitively-Focused Personality Model
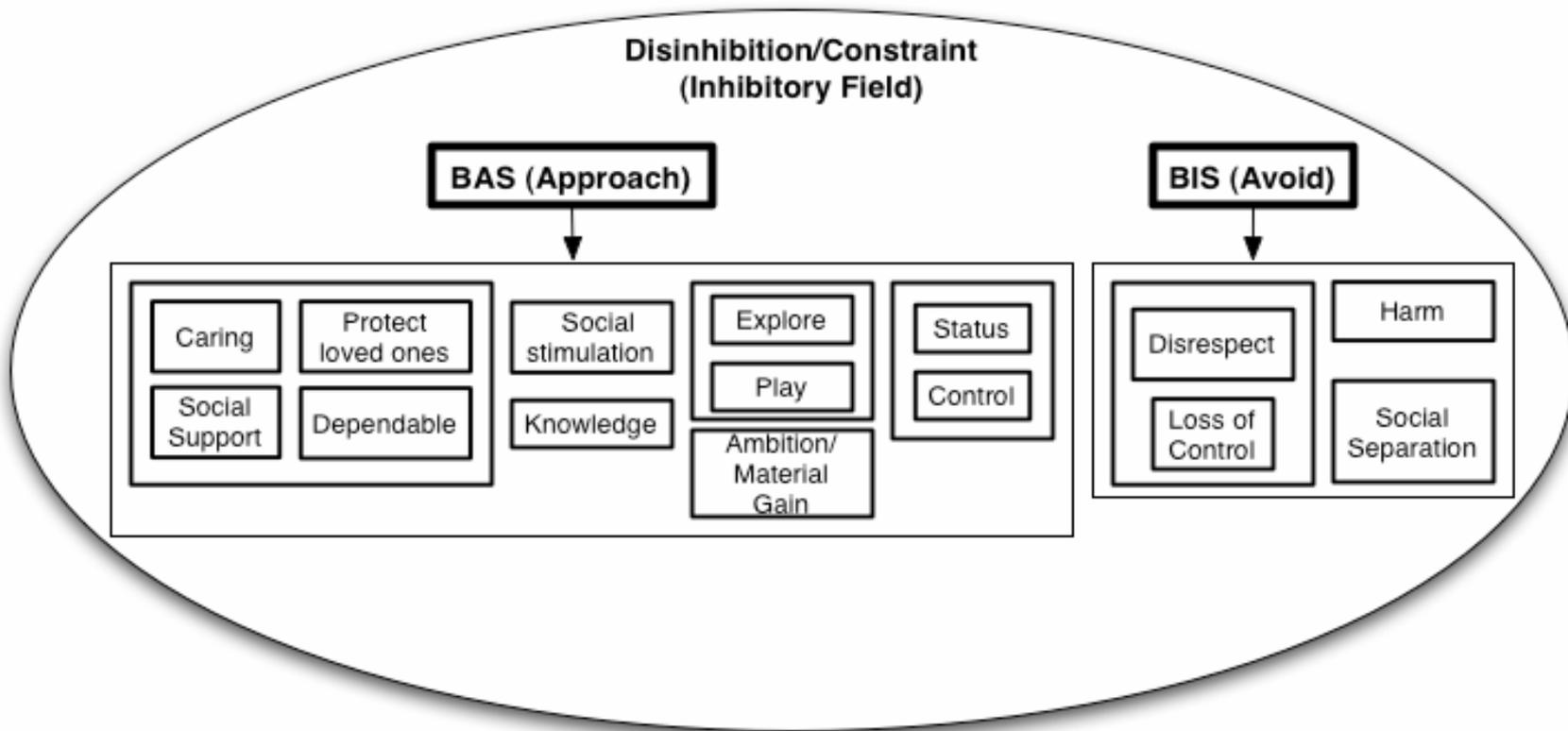
- ***Motives*** **activated in context of social/interactional situation**
- **Motives complement work/purposive** ***goals***
- **Individuals have different predispositions (** ***baseline activations*** **) for motives and different sensitivities for the BIS, BAS, and DCS**
- ***Personal experience*** **and** ***culture*** **provides different basis for situationally activating motives (and, it turns out, emotions)**
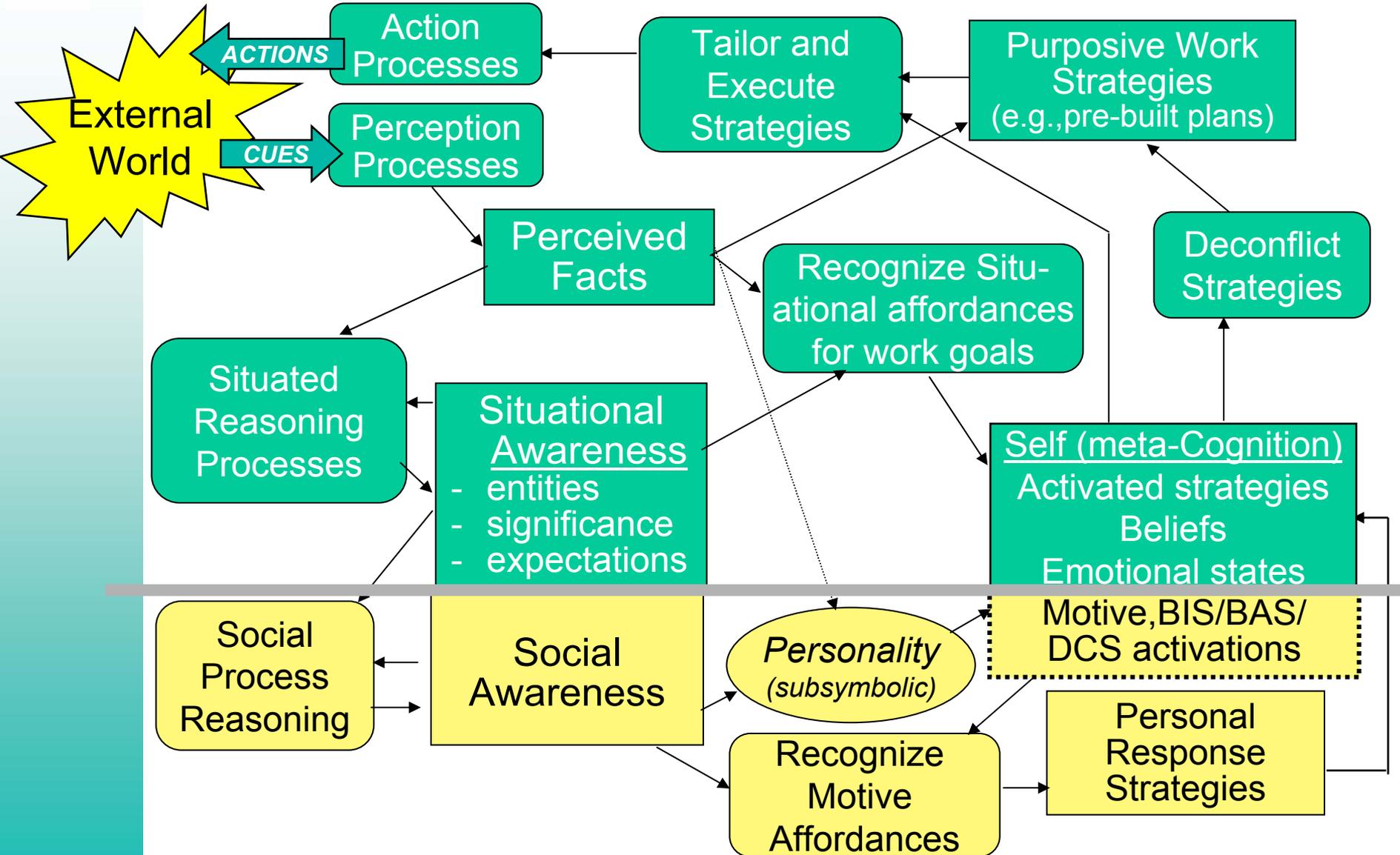
A Personality-Enabled Architecture for Cognition (PAC)

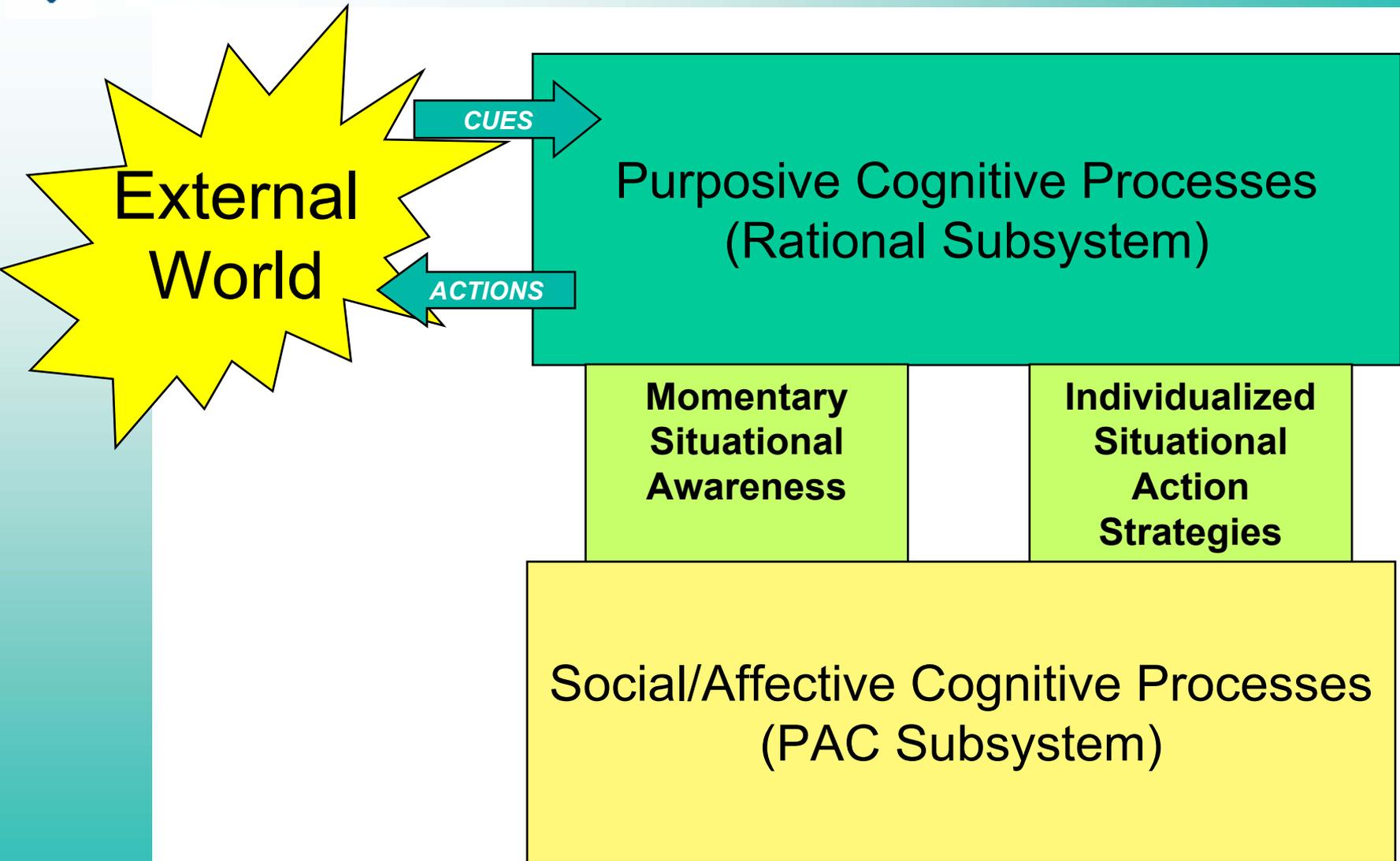- **Current Cognitive Architectures produce bounded rationality**
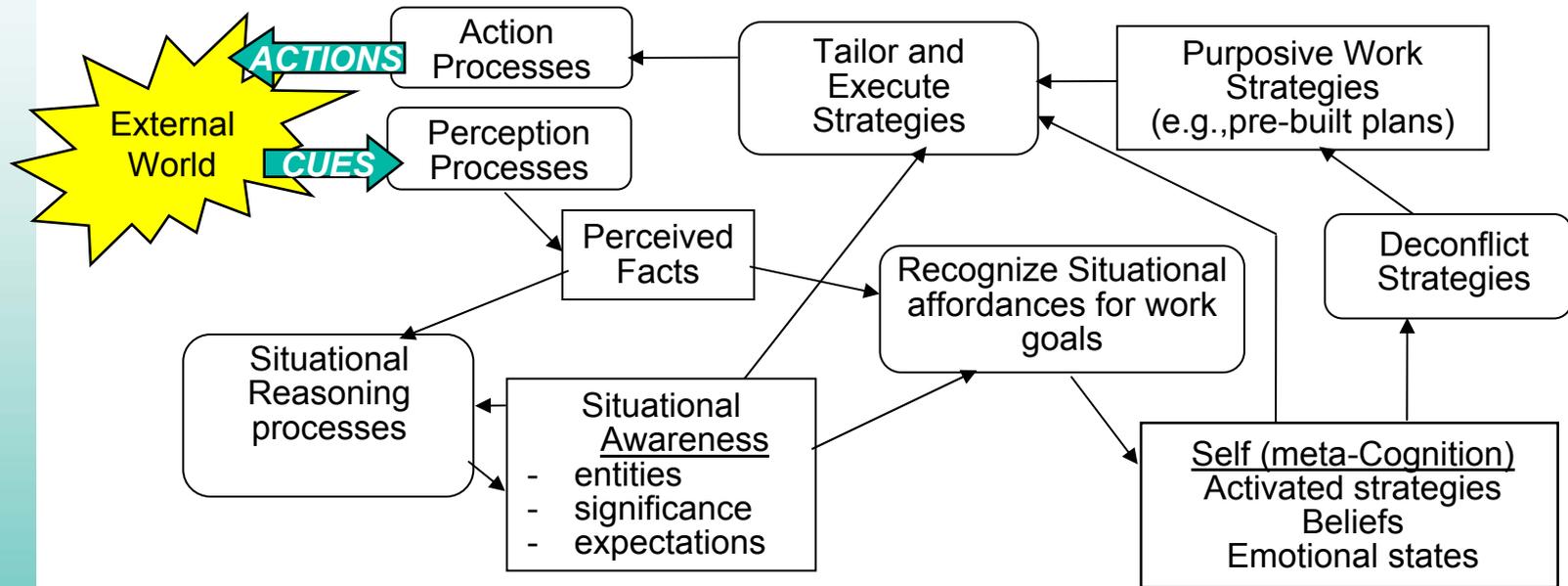
- **Personality, emotion, etc. modeled as "behavioral moderators"**

- **PAC -- cognitive personality theory is the *foundation* for bounded rationality processes**

PAC Conceptual Architecture

Social/Interactional Knowledge Elements and Structures

- **What is the knowledge representation?**
  - **…… *stories structures***

- **Story structures used cross-culturally**
  - **for 'sense making'**
  - **to identify places and define strategies to apply individual motives**
  - **to recount past situations to others and to to oneself (in episodic memory)**

- **Stories structures**
  - ***model of* and *model for* behavior**
  - **body of shared knowledge (within a culture or subculture) on social/interactional processes**
  - **bridge between shared knowledge and individual experiences**
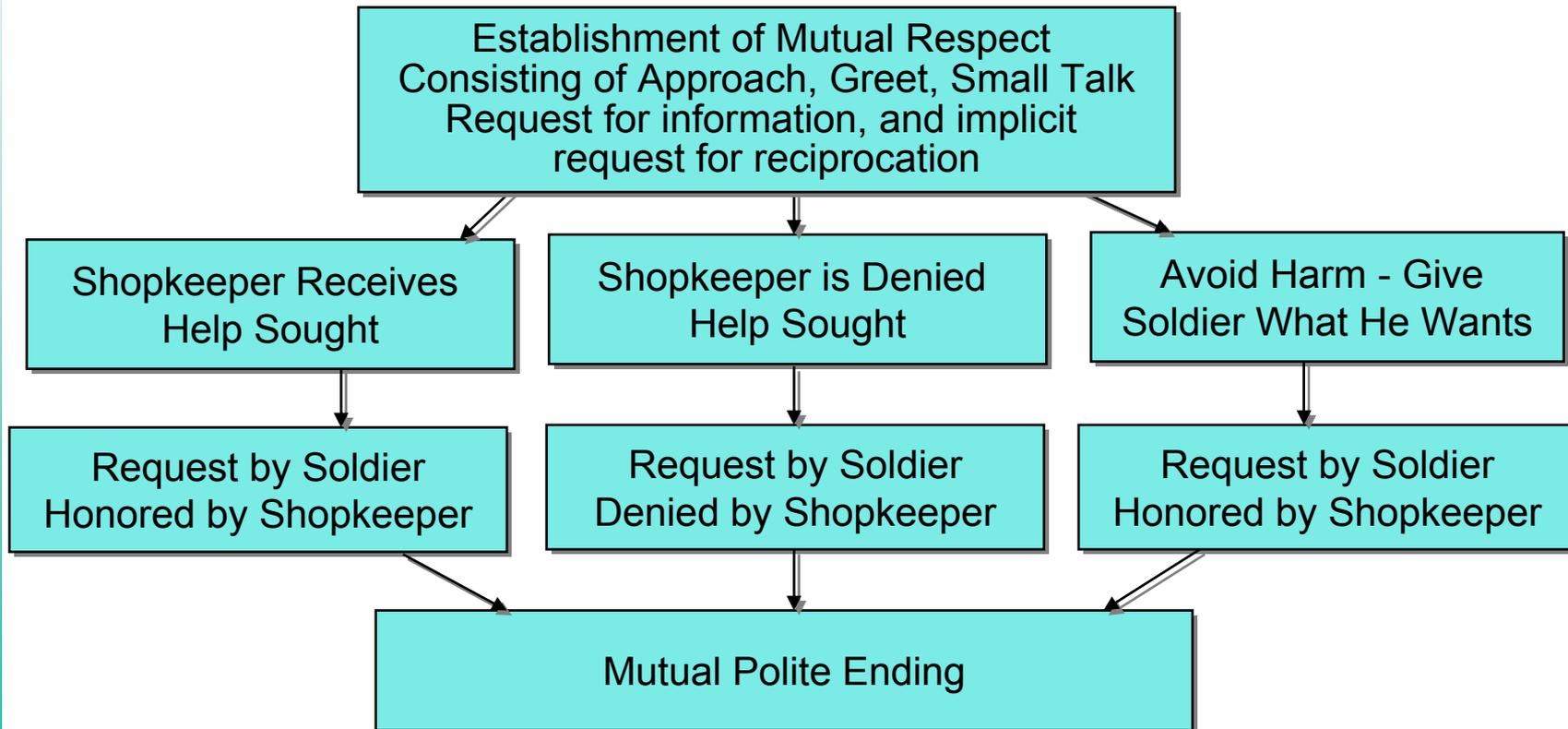
Basic Narrative Element: Action Structure
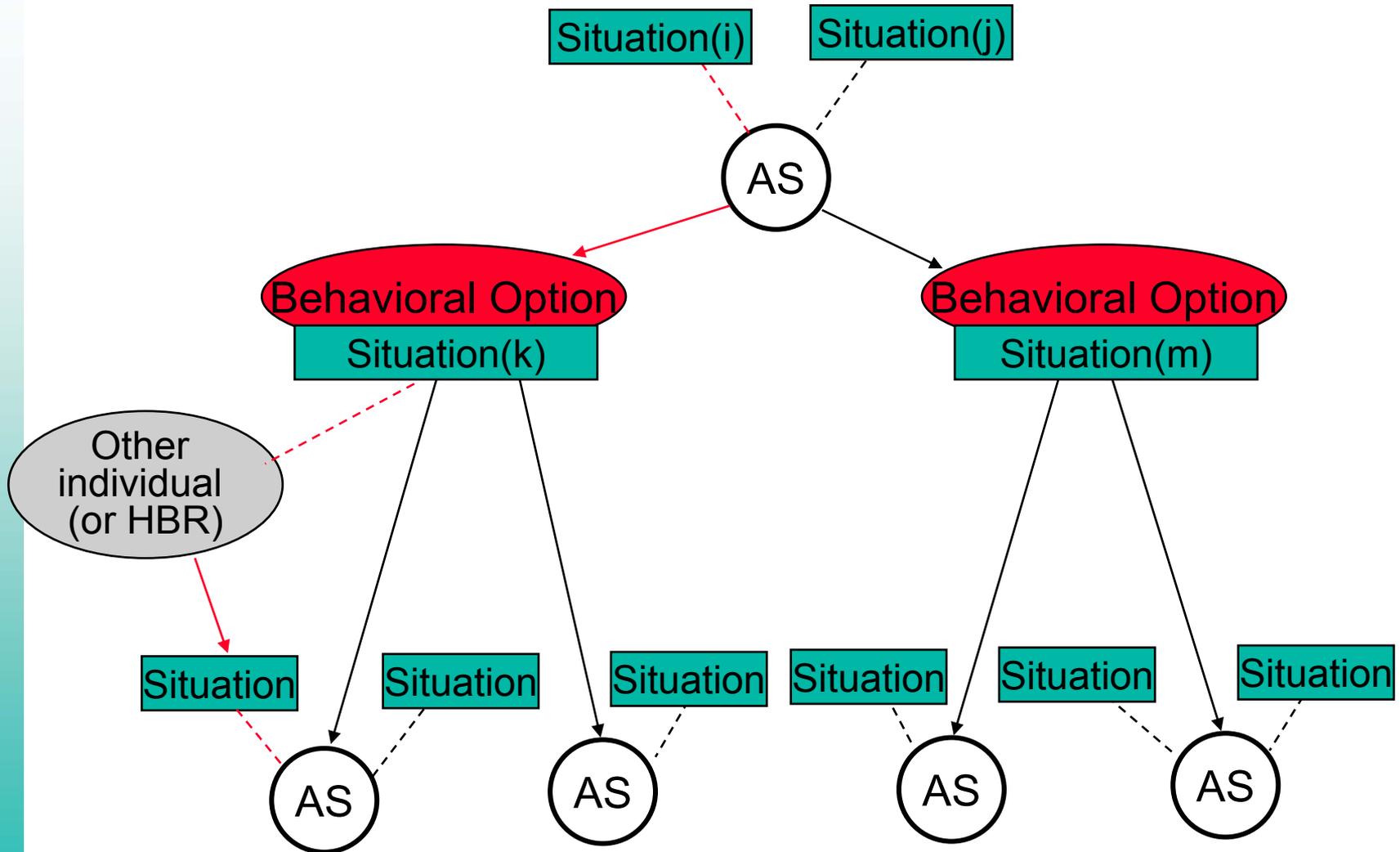
PAC Layer Processing
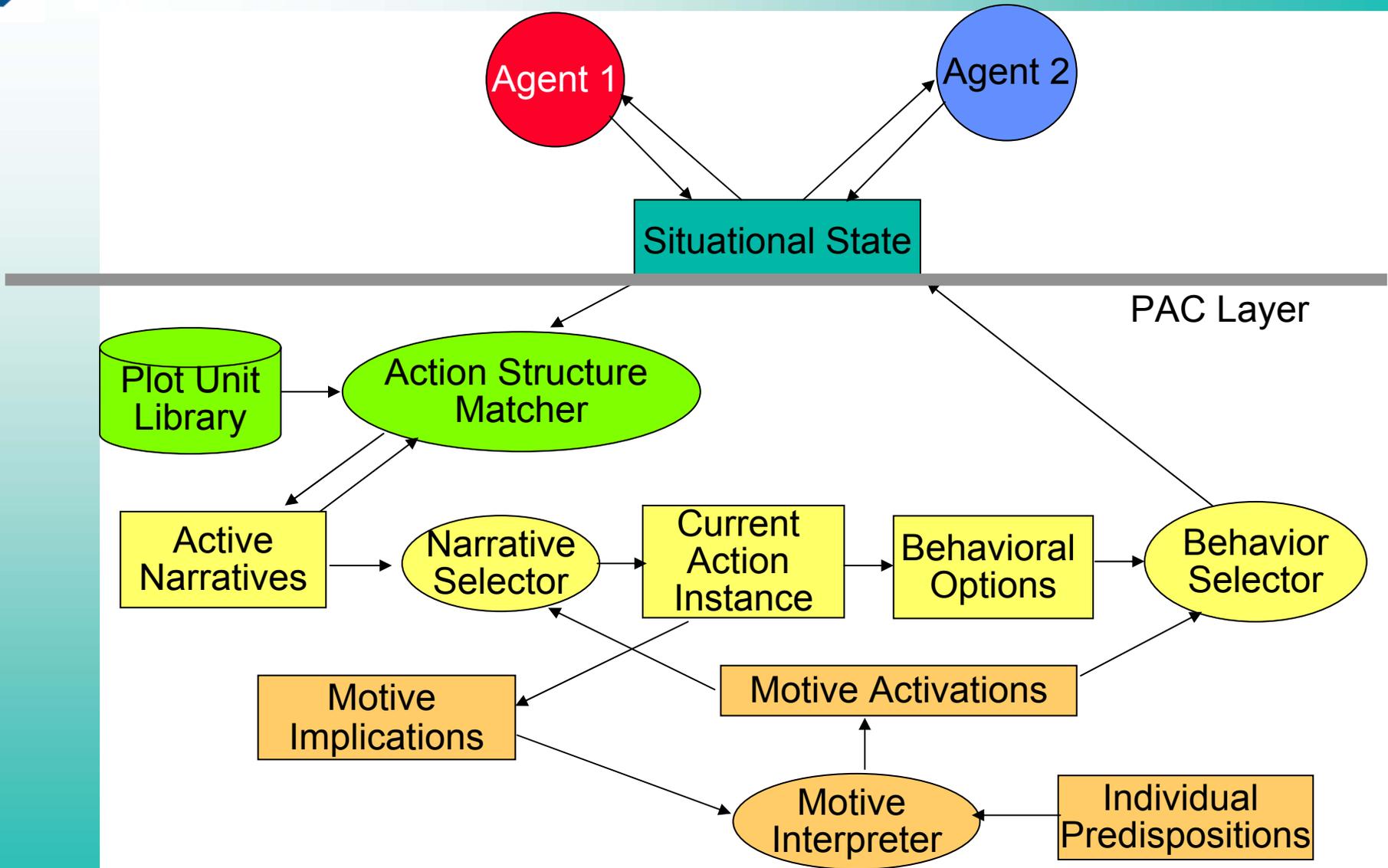
A Simple Example

- **VECTOR cultural training (computer) game**
- **Military patrol seeking information on person of interest from an indigenous shopkeeper**
  - **Can not coerce information (e.g., threaten violence)**
- **Soldier/shopkeeper personalities and emotions key to outcome**

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                 Establishment of Mutual Respect
                 Consisting of Approach, Greet, Small Talk
                 Request for information, and implicit
                 request for reciprocation
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Shopkeeper Receives Help Sought	Shopkeeper is Denied Help Sought	Avoid Harm - Give Soldier What He Wants
Request by Soldier Honored by Shopkeeper	Request by Soldier Denied by Shopkeeper	Request by Soldier Honored by Shopkeeper

Mutual Polite Ending

Test: Same Knowledge + Different Personalities = Different Behaviors?

Shopkeeper	Soldier			
	SO1	SO2	SO3	SO4
Shopkeeper 1	Trade-Pos. Reciprocity	Negative Reciprocity	Negative Reciprocity	Negative Reciprocity
Shopkeeper 2	Trade-Pos. Reciprocity	Negative Reciprocity	Negative Reciprocity	Negative Reciprocity
Shopkeeper 3	Give Info Avoid Harm	Give Info Avoid Harm	Give Info Avoid Harm	Give Info Avoid Harm
Shopkeeper 4	Trade-Pos. Reciprocity	Negative Reciprocity	Negative Reciprocity	Negative Reciprocity

- **Varied only three baseline activation parameters**
  - **Soldier & shopkeeper 3 and 4 have higher "Avoid Harm" baseline**
  - **Soldier & shopkeeper 2, 3, and 4 have higher BIS activation**
  - **Shopkeeper 4 has much higher DCS activation**

Conclusions and Future Directions

- **PAC 'works'**
  - **Can generate individuals with different behavior patterns just by adjusting baseline settings (i.e., parameters)**
- **Current implementation is limited to dyads**
- **Future enhancements**
  - **Emotions**
  - **Hierarchical stories (and multiple simultaneous story threads)**
  - **Tuning and validation to create 'preset' personalities**
  - **Integration with game/simulation environment & example problem**
  - **Integration with existing cognitive architecture(s) as 'rational layer'**
- **Our wish list**
  - **Extensions to create and use episodic memory**
  - **Extensions to multi-party interactions**
  - **… and many others**

Thank you!

Questions?

Motive Interpreter

Individual Motive Sensitivity

M1	M2	M3	M4	M5	M6	M7
.5	.2	.8	.1	.7	.2	.1

Motive Implications

M1	M2	M3	M4	M5	M6	M7
.34	.52	.92	.18	.38	.78	.28

Inputs

BAS
.34

BIS
.52

DCS
.92

Motive Activation Interpreter

M1	M2	M3	M4	M5	M6	M7
.13	.27	.91	.72	.23	.09	.34

Motive Activation Levels

Motive Activation Moderator

Corrected Motive Activation Levels

M1	M2	M3	M4	M5	M6	M7
0	0	.91	.72	0	0	0

Outputs