

## Background

### Social Relevance

- The recent protests, Black Lives Matter movement, and disproportionate impact of COVID-19 on communities of color have all placed heightened focus on disparities and systemic racism, especially in healthcare.

### Nurse/Tech Situation at CHOP

- Reports and comments suggest racial and hierarchical biases may be at work in interactions between nurses and technologists
  - Ex: Technologists and support staff often feel disrespected - their comments and notes on the pediatric patients they are assigned to are dismissed by nurses and other clinicians.
- Most technologists are of color, while most nurses are White
- Nurses are 'higher' in the organizational hierarchy of the hospital compared to technologists

### Human Factors Engineering

- Interdisciplinary science of understanding and designing for optimal human interaction with the environment
- Information Processing Model
  - Implicit bias: an automatic mental shortcut used to process information and make quick judgments after perceiving certain features or stimuli, such as skin color
  - Unconscious responses occur prior to a cognitive examination of all the elements in an environment
- Application in healthcare includes emphasis on **safety**
  - Biases, whether conscious or unconscious, can negatively impact psychological safety
  - Status hierarchies in healthcare can have negative, even deadly, effects on patient safety and care if they hinder interprofessional communication (especially those that go 'against' the chain of command)<sup>2</sup>
  - The position of black workers in a hierarchical or organizational structure impacts their *perception* of discrimination<sup>3</sup>

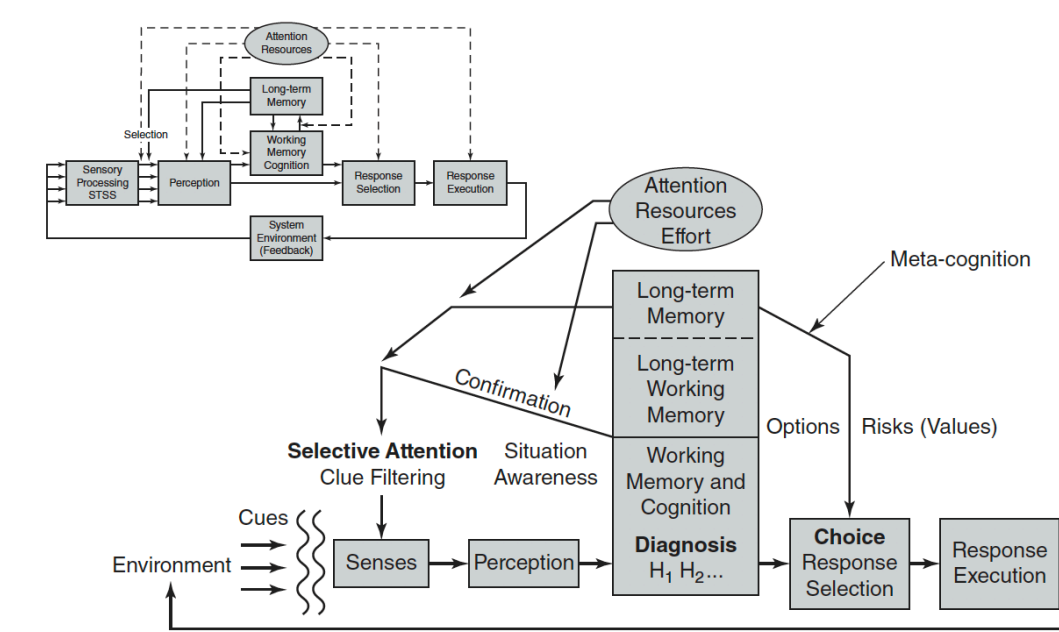


Figure 1: Information Processing Model for Decision Making<sup>1</sup>

### Current Research and Interventions

- Clear consensus in research literature that implicit biases and disparities in healthcare exist
- Current interventions focus on educating people about their unconscious biases through self-reflection and self-awareness, but the efficacy and sustainability of said mitigation efforts are questionable

## Objectives

- Confirm in a validated, quantifiable manner that perceived bias and hierarchy amongst technologists and nurses exist
- Create and utilize an innovative Virtual Reality simulation to better understand implicit biases in social interactions and explore future interventions to reduce impact of bias.

## Methods

### Aim 1: Confirm and quantify perceived discrimination at CHOP

- Administer surveys to technologists and nurses to determine whether they perceive bias towards themselves
  - General Ethnic Discrimination Scale
    - Ten-minute, self-reported survey
    - Measures racial/ethnic discrimination as a type of *stress*
    - Produces data on frequency and appraisal of discriminatory events
  - Everyday Discrimination Scale
    - Nine-item, self-reported survey
    - Measures frequency of day-to-day discrimination
    - Follows up with participant's selecting the perceived *reason* for discrimination
  - Hopkins Symptom Checklist-58
    - 58-item, self-reported symptom inventory
    - Validated measure of psychiatric symptoms
    - Useful in exploring psychiatric impact of discrimination and bias (psychological safety)

## Methods

### Aim 2: Utilize Virtual Reality to understand and mitigate implicit bias

- Facilitate collaboration with Penn Neurology VR Laboratory
- Virtual Reality
  - Employing technology (headsets, hand controllers, sensors, software, etc...) to replicate or create environments and settings<sup>4</sup>
  - Immersive experience relying on control of stimuli and modification of perception<sup>5</sup>
  - Powerful tool with innovative, transdisciplinary applications
    - Procedural training for healthcare workers, exploration of categorizations of self and others
    - Research shows potential in bias reduction and empathy improvement
- Proposed Simulation
  - Participants, Experience
    - Sample cohort of nurses and technologists at CHOP
    - Social interaction in a patient care setting
  - Analysis
    - Measure biased or unbiased responses of participants within the simulation
    - Quantify 'bias' in terms of memory- ability of participants to recall information that was communicated to them regarding the patient
      - Automatic 'shortcuts' in processing stimuli, like race and perceived hierarchy, can determine how well one retains or disregards such information
      - Ex: Other Race Effect
        - Phenomenon marked by better recognition of same-race face than other-race faces<sup>6</sup>
  - Feedback loop
    - Leverage findings to explore further applications of Virtual Reality
      - Create and test various virtual simulations reported in research literature to *reduce* unconscious biases and negative impacts of perceived hierarchy

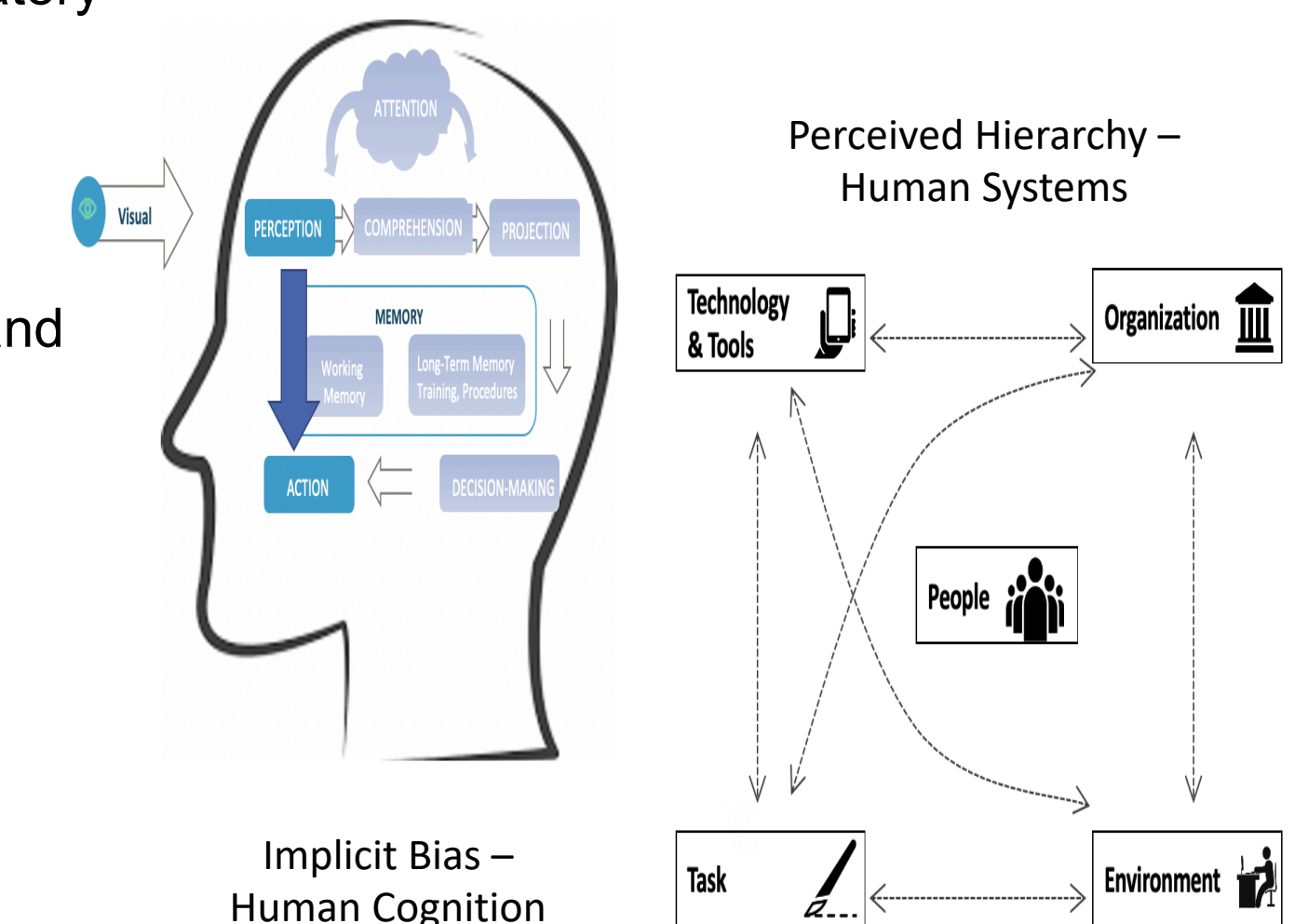


Figure 2: Implicit Bias & Perceived Hierarchy - James Won, PhD

## Future Directions and Importance

### Next Steps

- Administer surveys; collaborate with Penn Neurology VR Lab to create virtual simulation
- Importance
  - Human Factors Engineering offers useful frameworks to understand the human/system interaction, rendering it indispensable to Quality Improvement and patient safety efforts
  - Virtual Reality has not been utilized to its full potential- we hope to see Virtual Reality considered and explored as an innovative tool for research, training, and intervention at CHOP.
  - Implicit and unconscious biases in healthcare function at both individual and systemic levels. Identifying and understanding biases is only the first step- sustained efforts must be made at individual and organizational levels to mitigate them for the sake of psychological and patient safety.

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### References



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