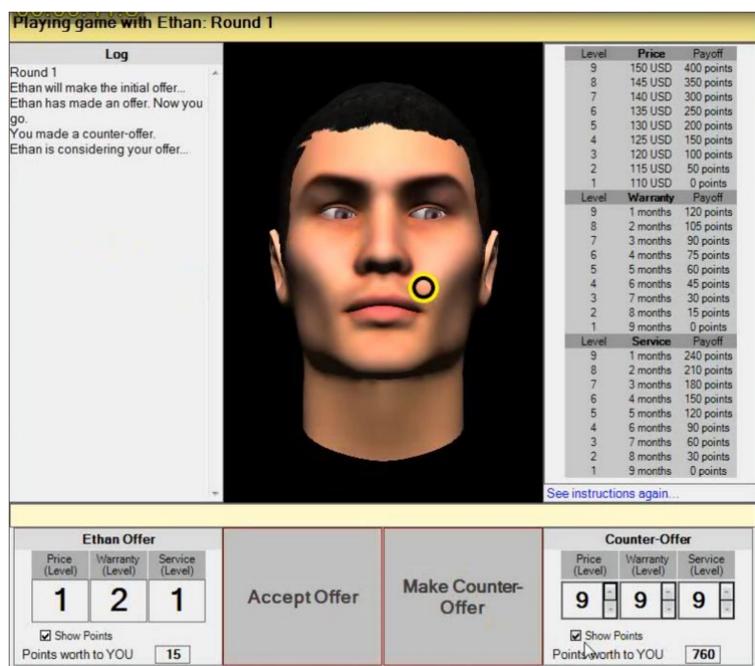


S&T Campaign: Human Sciences Human Behavior Human Variability

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Research Objective

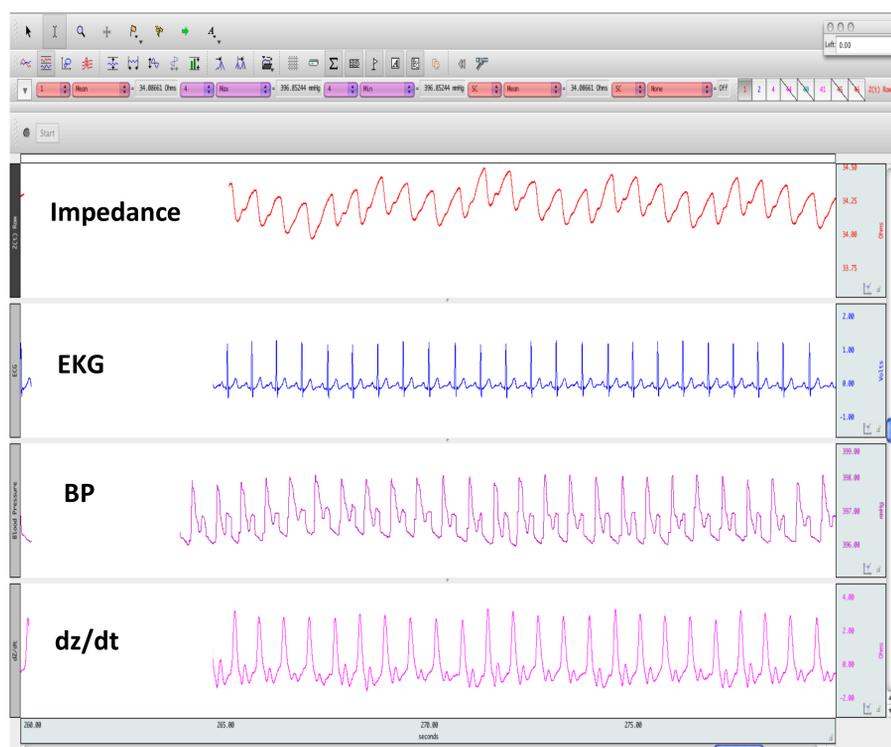
- Determine how affective, cultural, and/or social cues cause behavior and/or physiological changes in people
- Extend limitations of traditional experimental psychological science by using ecologically valid yet controlled virtual humans and environments



Virtual Human Decision Making Study User Interface

Challenges

- Determining how to characterize and represent simultaneous measures of participant non-verbal (facial, vocals) and physiological state
- Real-time analysis of cardiovascular measures in response to events in virtual world



Cardiovascular measures of blood flow used to infer neuroendocrine processes of sympathetic nervous system

ARL Facilities and Capabilities Available to Support Collaborative Research

- Cardiovascular Psychophysiology Lab (NICO100C for impedance cardiography; CNAP for continuous blood pressure)
- USC ICT Virtual Human Toolkit
- Tobii 300X eye tracker

Preliminary Findings:

- Virtual humans that show inconsistent facial expressions relative to their behavior in a decision making game cause cardiovascular patterns reflective of a threat motivational state (Khooshabeh et al., 2013; 2015)
- Cultural cue of accent is more potent than virtual human facial appearance at causing changes in decision making (Khooshabeh et al., 2014)

Complementary Expertise / Facilities / Capabilities Sought in Collaboration

- Signal processing expertise to integrate across multi-modal channels
- Sensor development to support ambulatory impedance cardiography and blood pressure
- Proxy measures of blood flow that are highly related to biopsychosocial model measures
- For culture research, access to populations that are not available in USA

References:

P. Khooshabeh, C. M. de Melo, C. B. Volkman, J. Gratch, J. J. Blascovich, and P. Carnevale, "Negotiation strategies with incongruent facial expressions of emotion cause cardiovascular threat," in *Cognitive Science Society*, Berlin, Germany, 2013.

P. Khooshabeh, M. Dehghani, A. Nazarian, and J. Gratch, "The cultural influence model: when accented natural language spoken by virtual characters matters," *AI and Society*, Oct. 2014.