

# Reverse appraisal: Appraisals mediate the effect of emotion displays in decision-making in a social dilemma

**Celso M. de Melo**  
USC Institute for Creative Technologies

**Peter Carnevale**  
USC Marshall School of Business

**Stephen Read**  
USC Department of Psychology

**Jonathan Gratch**  
USC Institute for Creative Technologies

## Motivation

- There has been growing interest on the social effects of emotion in decision-making (e.g., Van Kleef, De Dreu, Manstead, 2010)
- In particular, expression of emotion has also been shown to impact cooperation in social dilemmas (Boone & Buck, 2003)
- However, the mechanism underlying such effects is still not well understood
- Similarly to Hareli and Hess (2010), we look at appraisal theories (Ellsworth & Scherer, 2003) to understand what is the information people retrieve from emotion displays to help in their decisions
- We propose that people infer, from emotion displays, how is the counterpart appraising the interaction and, from these inferences, infer about the counterpart's mental state, such as his or her likelihood of cooperation in a social dilemma. We refer to this as *reverse appraisal*.

## Experiment 1

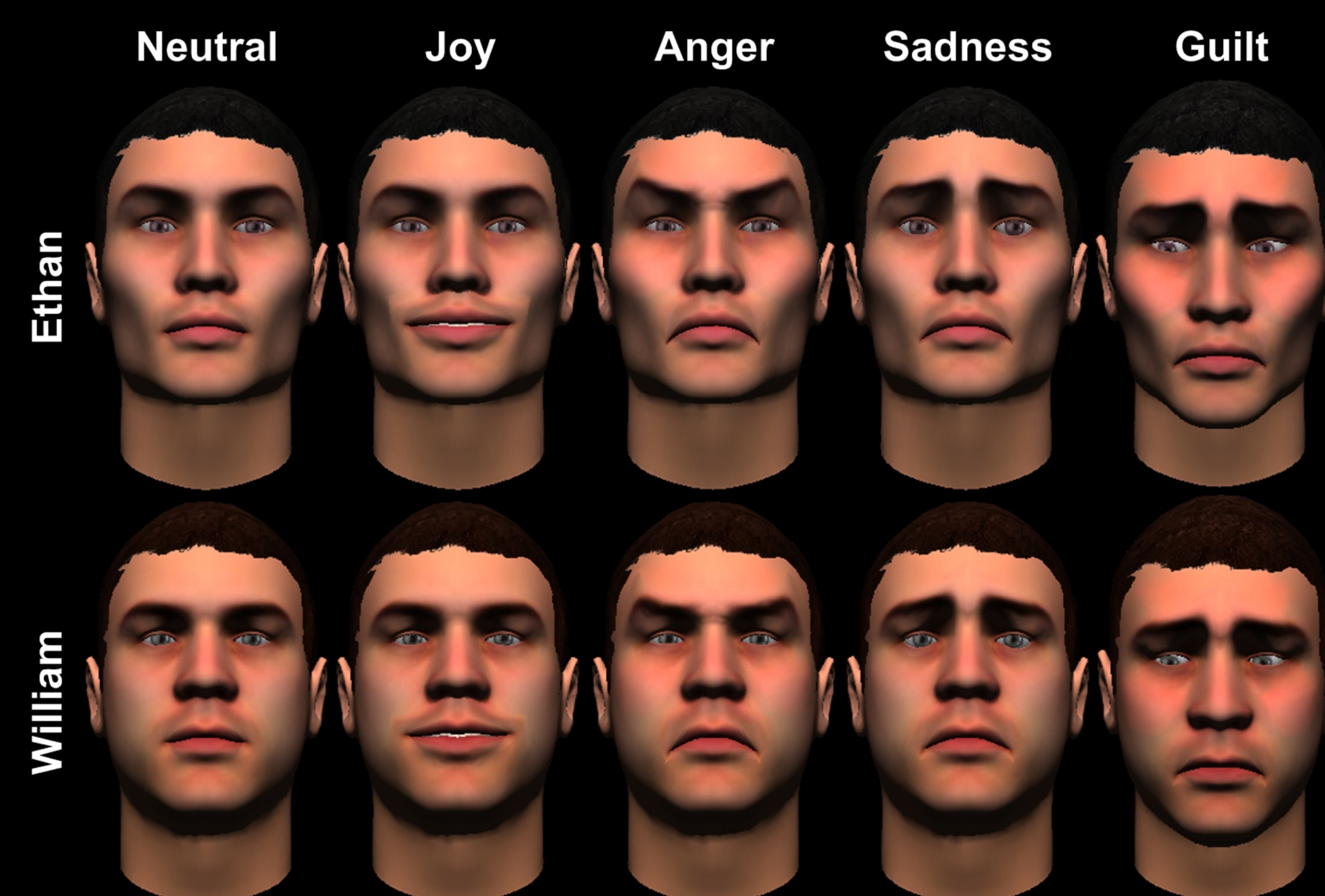
### Scenarios

- Participants imagine playing the prisoner's dilemma with emotional agents
- Each participant is always told the same outcome occurs but, experiences three scenarios with agents that express different emotions

### Decision-Making Task: Prisoner's Dilemma

		Agent	
		Cooperation	Defection
Participant	Cooperation	Agent: 5 pts Participant: 5 pts	Agent: 7 pts Participant: 2 pts
	Defection	Agent: 2 pts Participant: 7 pts	Agent: 4 pts Participant: 4 pts

### Manipulation: Facial displays of emotion with virtual agents



### Conditions: Mixed design

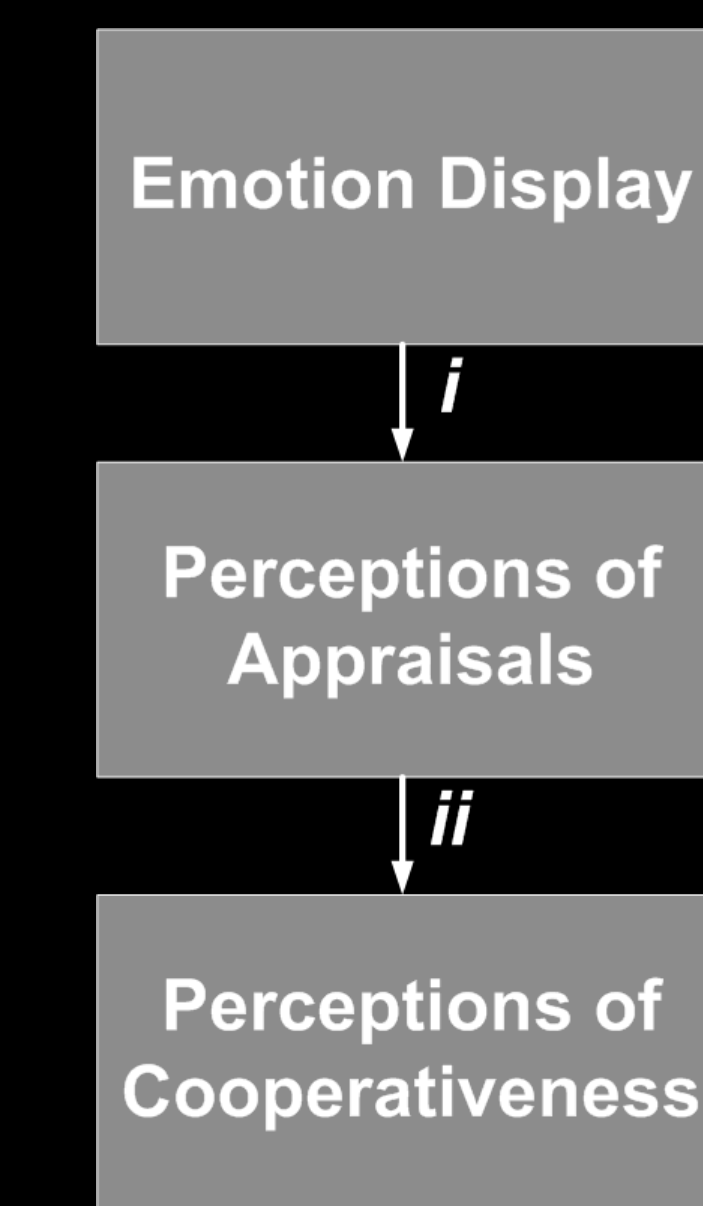
- Outcome (between-participants; CC vs DD vs C<sub>H</sub>D<sub>A</sub> vs D<sub>H</sub>C<sub>A</sub>)
- Emotion (within-participant; Neutral vs Joy vs Anger vs Sad vs Guilt)
- Only subset of combinations is explored

		Agent	
		Cooperation	Defection
Participant	Cooperation	Neutral, Joy	Neutral, Joy, Guilt
	Defection	Neutral, Anger, Sadness	Neutral, Joy, Anger

## Hypotheses

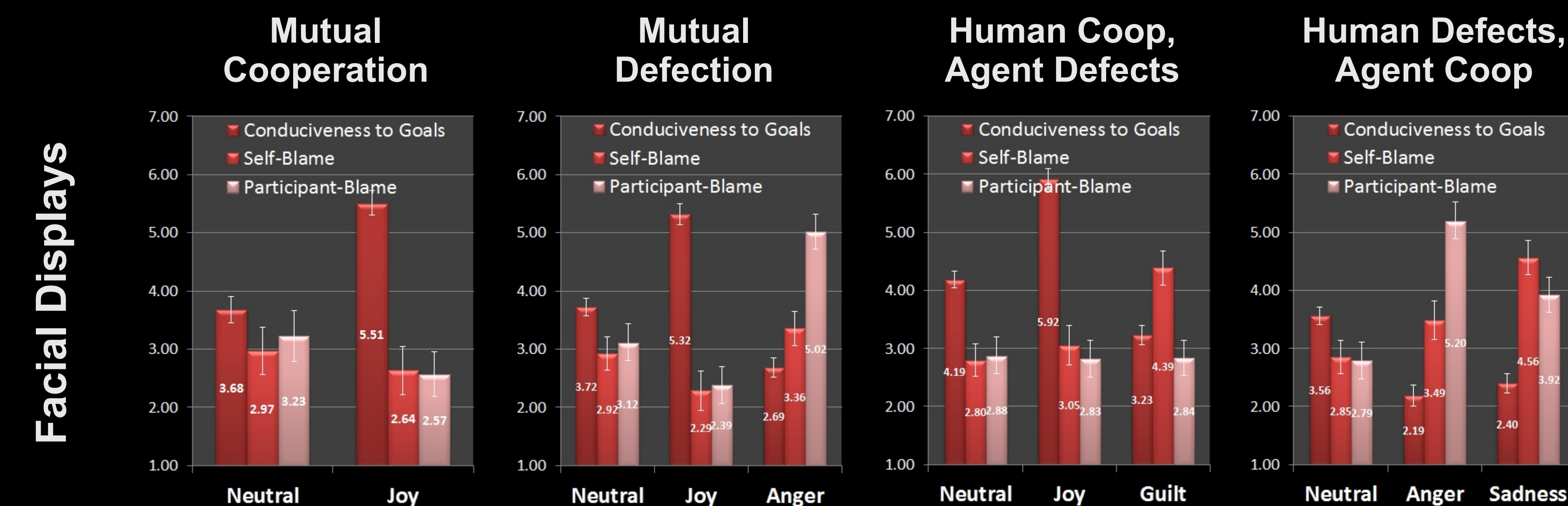
We hypothesize a causal model where emotion displays cause one to assess how the counterpart is appraising the ongoing interaction which, in turn, cause one to assess the counterpart's likelihood of cooperation in a social dilemma. Thus,

- **Hypothesis H1:** Emotion displays affect perceptions of appraisal (Experiment 1)
- **Hypothesis H2:** Emotion displays affect perceptions of cooperativeness (Experiment 1)
- **Hypothesis H3:** Appraisal displays affect perceptions of cooperativeness (Experiment 2)
- **Hypothesis H4:** Perceptions of appraisal mediate the effect of emotion displays on perception of cooperativeness (Experiment 1)



## Results

### Do facial emotions impact perception of how the counterpart is appraising the interaction?

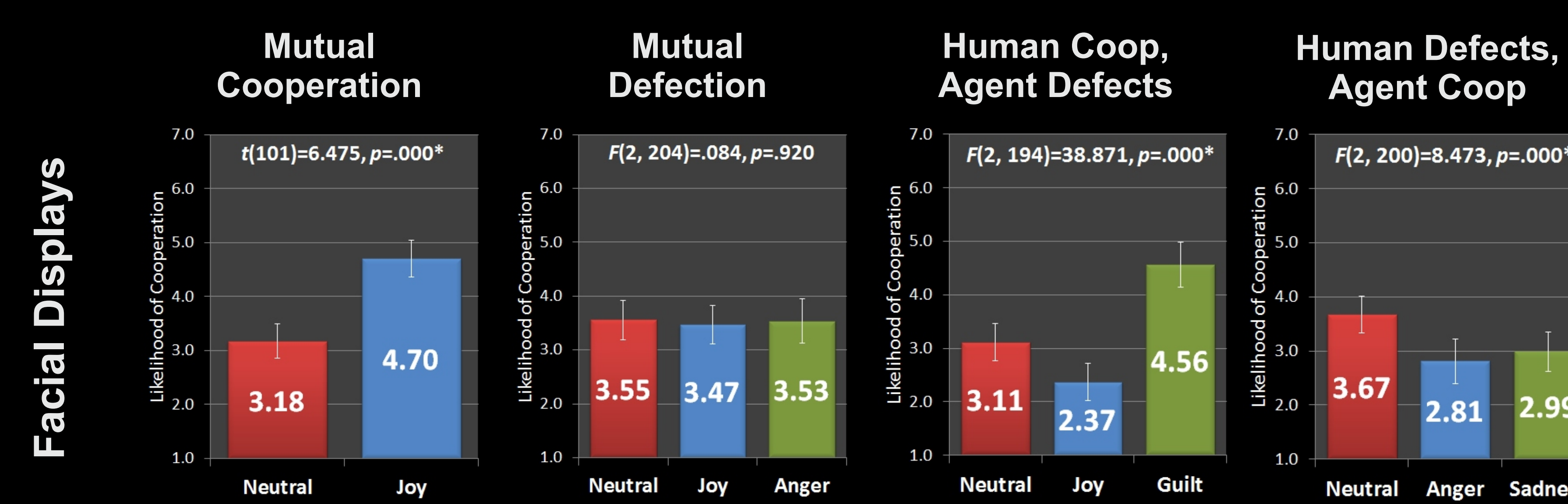


Participants perceived:

- Happy agents to perceive the outcome as conducive
- Sad agents to perceive the outcome as obstructive
- Angry agents to perceive the outcome as obstructive and blame the participant for it
- Guilty agents to perceive the outcome as obstructive and blame themselves for it

Hypothesis H1

### Do facial emotions impact perception of the counterpart's cooperativeness?

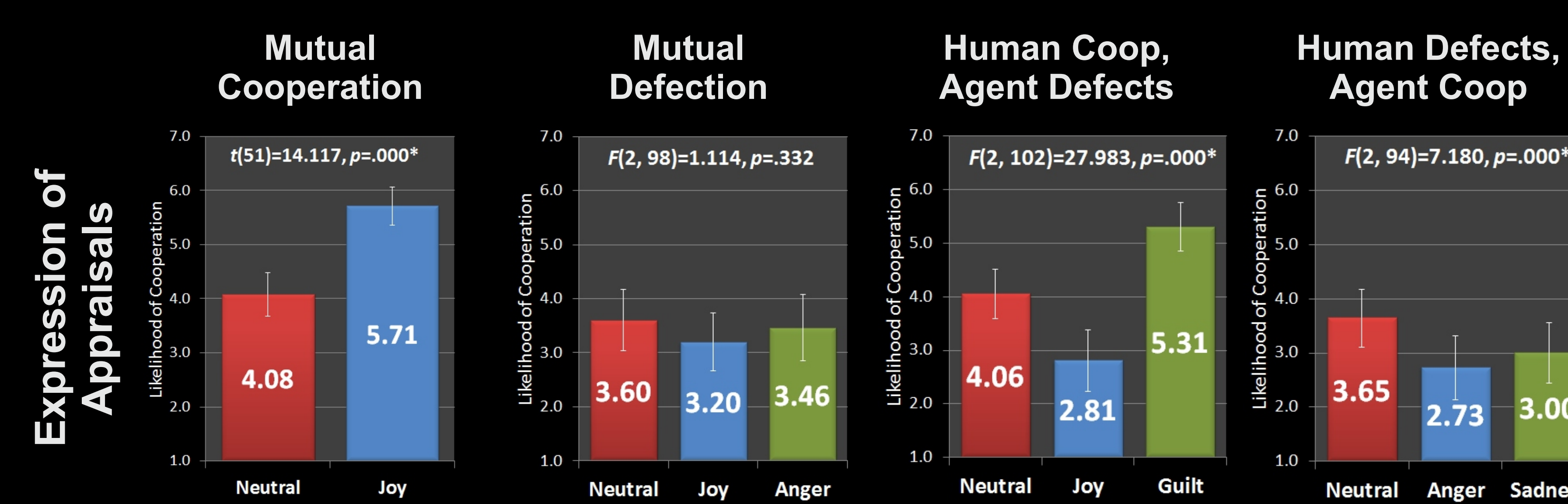


Perception of cooperativeness:

- CC: Happy > Neutral
- DD: No effect
- C<sub>H</sub>D<sub>A</sub>: Guilty > Neutral > Happy
- D<sub>H</sub>C<sub>A</sub>: Neutral > {Anger, Sad}

Hypothesis H2

### Do textual expression of appraisals impact perception of the counterpart's cooperativeness?



Perception of cooperativeness:

- CC: Happy > Neutral
- DD: No effect
- C<sub>H</sub>D<sub>A</sub>: Guilty > Neutral > Happy
- D<sub>H</sub>C<sub>A</sub>: Neutral > {Anger, Sad}
- Same patterns as Experiment 1

Hypothesis H3

## Experiment 2

- Same design as Experiment 1 but different manipulation
- Instead of expressing emotions through face, agents express, through "chat interface", how they are appraising the interaction

### Sample

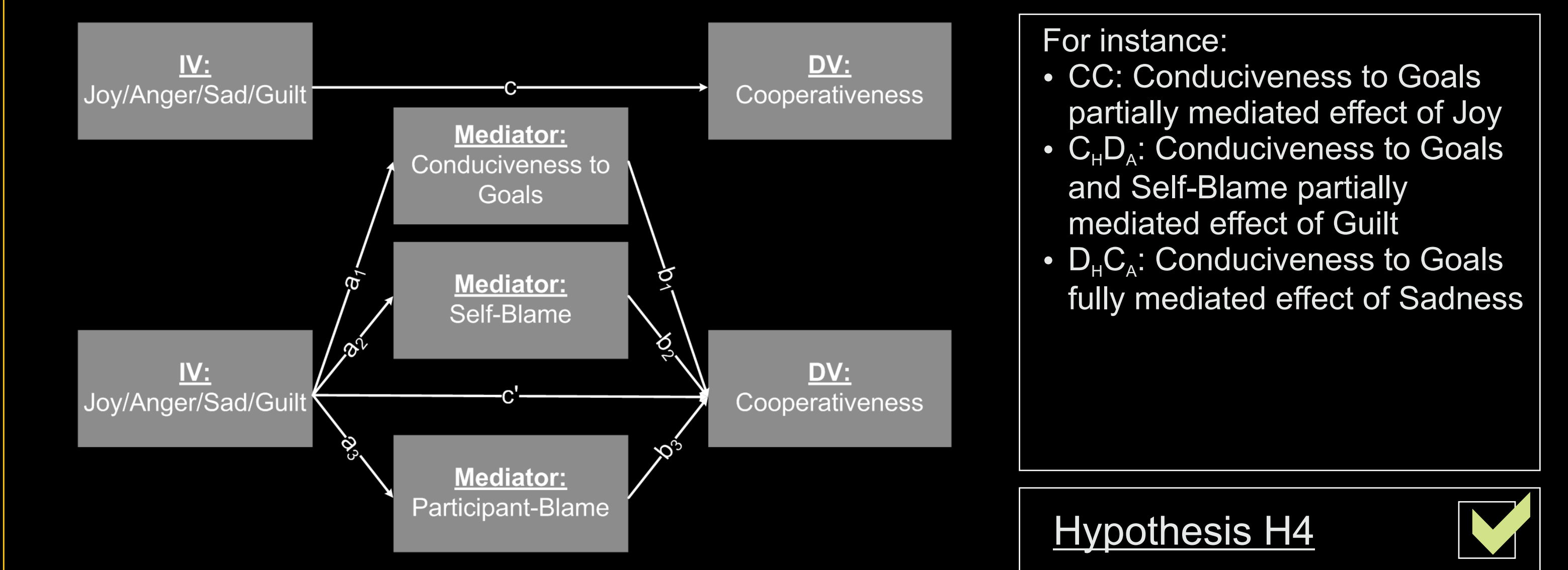
- 202 participants from Amazon Mturk
- 51.0% males; 56.4% between 22 to 34 years
- Most from US (66.3%) and India (22.8%)

### Manipulation: Textual expression of appraisals

Neutral	I neither like, nor dislike this outcome
Joy	I like this outcome
Anger	I do NOT like this outcome and I blame YOU for it
Sadness	I do NOT like this outcome
Guilt	I do NOT like this outcome and I blame MYSELF for it

## Mediation Analysis

- We ran a multiple mediator analysis (Preacher & Hayes, 2008) of perception of appraisals on the effect of emotion displays on perceptions of cooperativeness
- The results confirmed (partial and, sometimes full) mediation



For instance:

- CC: Conductiveness to Goals partially mediated effect of Joy
- C<sub>H</sub>D<sub>A</sub>: Conductiveness to Goals and Self-Blame partially mediated effect of Guilt
- D<sub>H</sub>C<sub>A</sub>: Conductiveness to Goals fully mediated effect of Sadness

Hypothesis H4

## Discussion

- Spencer, Zanna & Fong (2005) argue that to establish a causal model it is necessary to establish each causal link experimentally
- Experiment 1 established that emotion displays cause one to infer how the counterpart is appraising the ongoing interaction (link i)
- Experiment 2 established that perceptions of appraisal cause one to infer how likely is the counterpart to cooperate in the future (link ii)
- Additionally, Experiment 1 also shows that perceptions of appraisal mediate the effect of emotion displays in perceptions of cooperativeness (Preacher & Hayes, 2008)
- We refer to this mechanism as reverse appraisal as it emphasizes that people retrieve information about appraisals, from emotion displays, to make inferences that are relevant for decision-making

### Want to learn more?

- de Melo, Carnevale & Gratch. (In Press). Presence.
- de Melo, Carnevale, Read, Antos & Gratch. (2012). To appear in AAMAS 2012
- de Melo, Carnevale & Gratch. (2011). Proceedings of CogSci 2011
- de Melo, Carnevale, Antos & Gratch. (2011). Proceedings of ACII 2011