

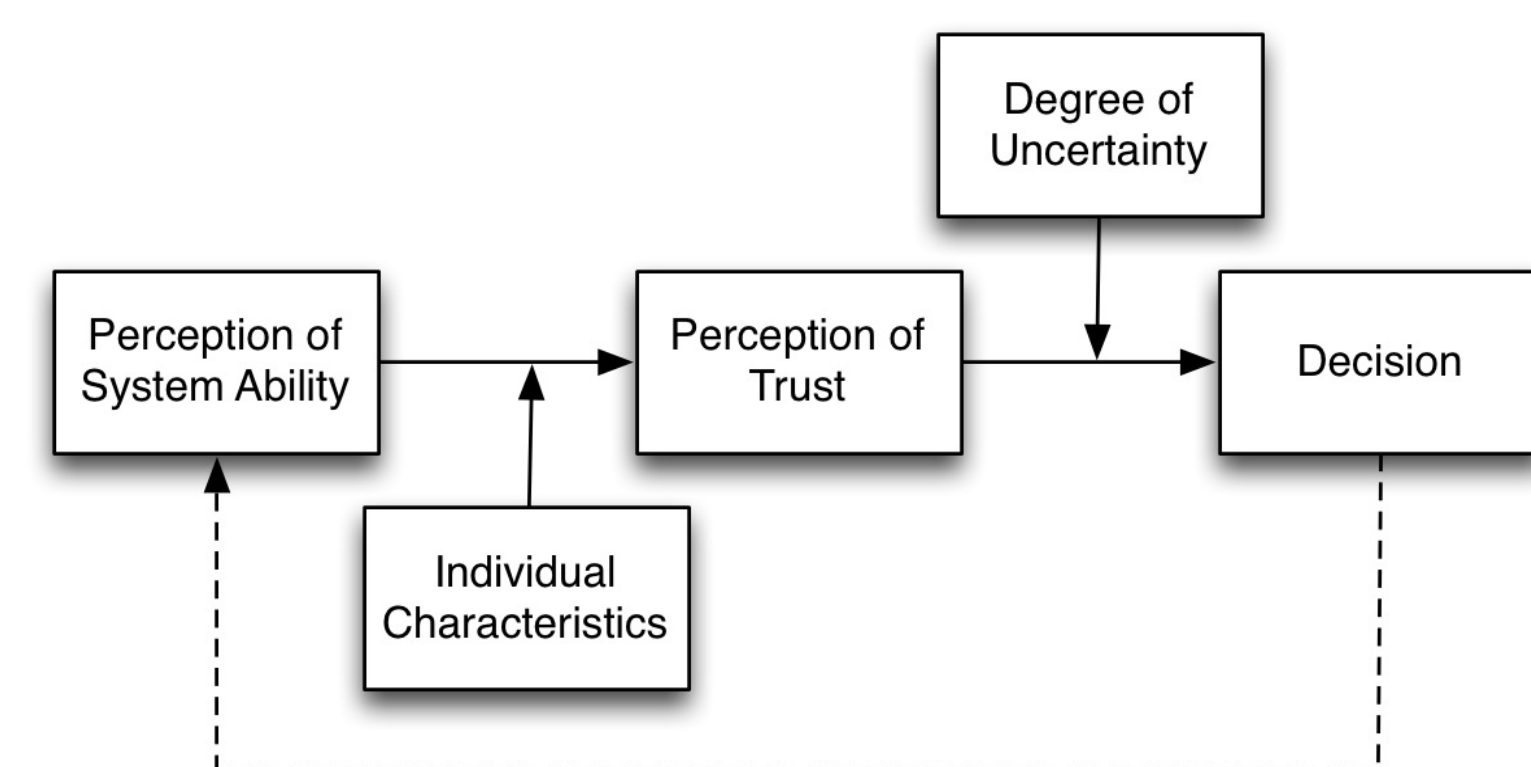
Quantifying Uncertainty

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INTRODUCTION & BACKGROUND

- Automated agents (e.g. Siri, Alexa, Google Now) increasingly help people make decisions
- People process information, make decisions, and choose a course of action differently when working on teams with automated agents
- Understanding how people trust automated agents is important for understanding how to improve interaction
- When making decisions with the help of automated agents, people have a tendency to defer to the computer
- In situations with high uncertainty, some people may overly rely upon computers recommendations even when the computer is incorrect
- Humans are biased to intelligent decision aid recommendations.
- Humans tend to trust one another from the start
- Trust seems to depend on the gravity of a decision, with more consequential outcomes requiring trust to be earned

CONCEPTUAL MODEL & HYPOTHESIS



H1: The perception of expertise is highly correlated to the perception of trust

H2: In decision making tasks involving uncertainty, humans will defer to the automated intelligent decision aid

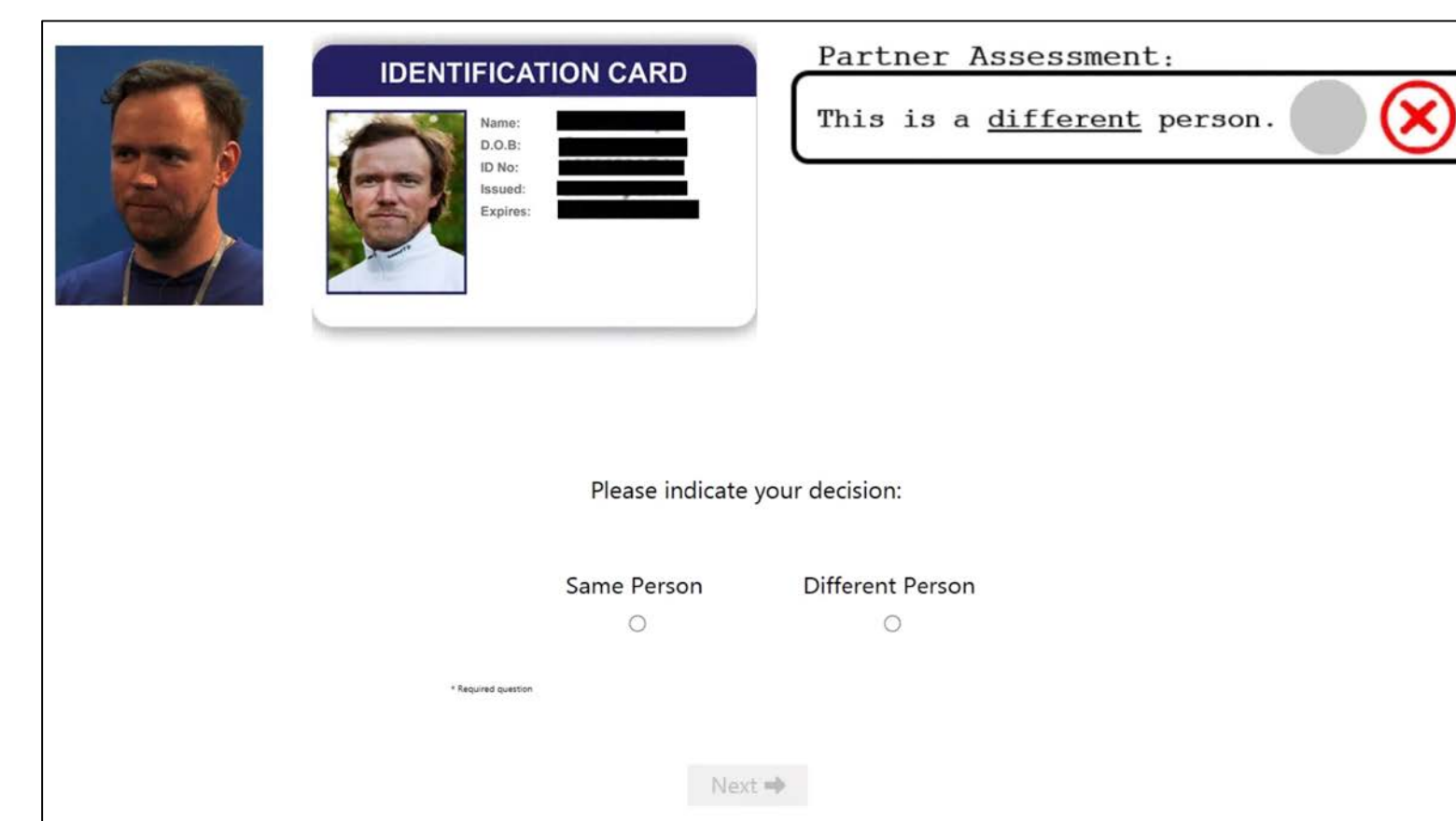
RQ: What is the relationship between an individuals perception of trust and individual personality characteristics

STUDY DEVELOPMENT

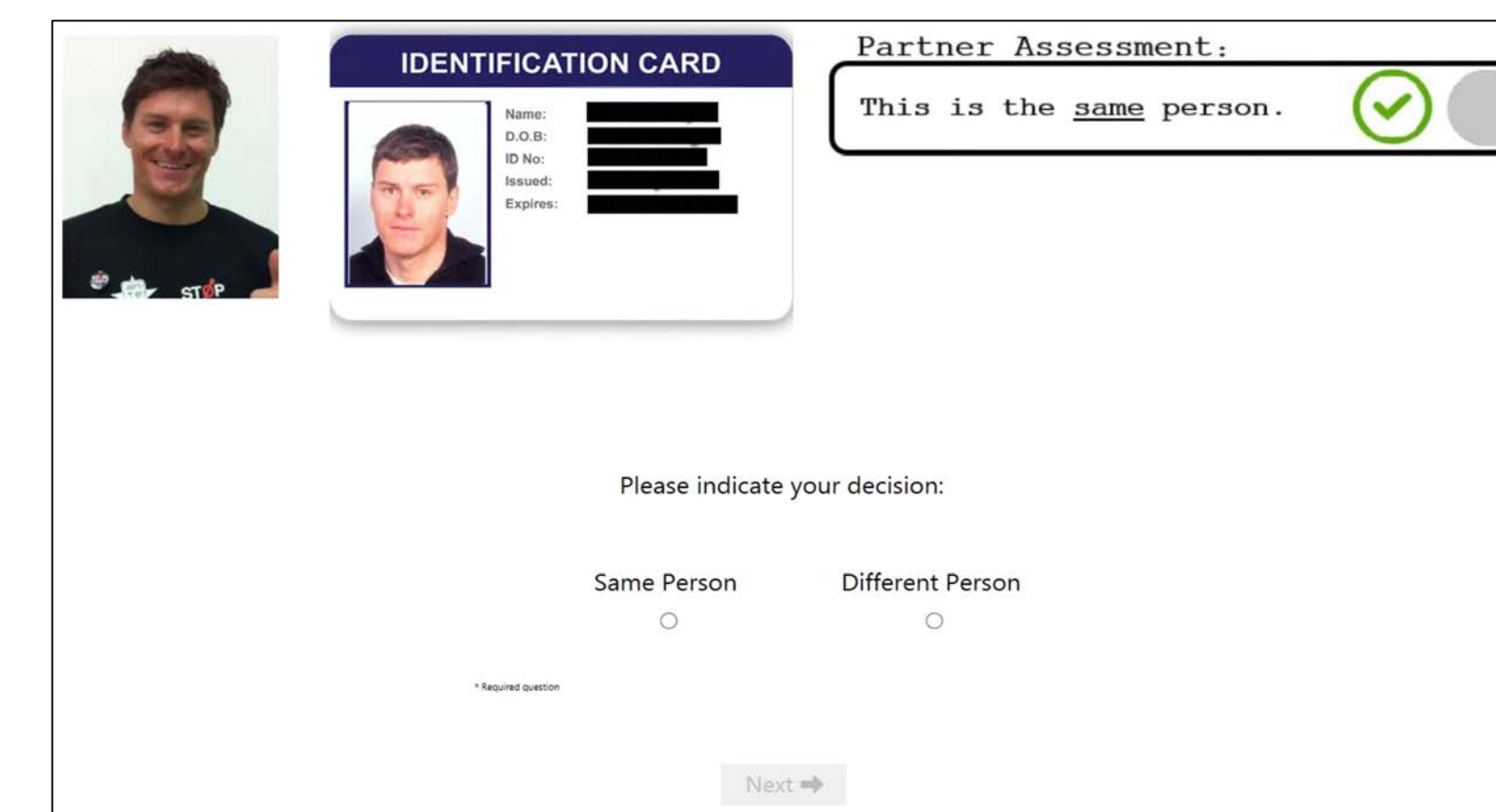
- Image Pairs
- 400 images (200 pairs)
 - Pre-test determined if individuals thought the images pairs were the same or different people

- Confidence Measure
- Five item Likert-type scale (not-confident to extremely confident)
 - The top 8 image pairs highest in confidence and the 8 image pairs lowest in confidence were selected

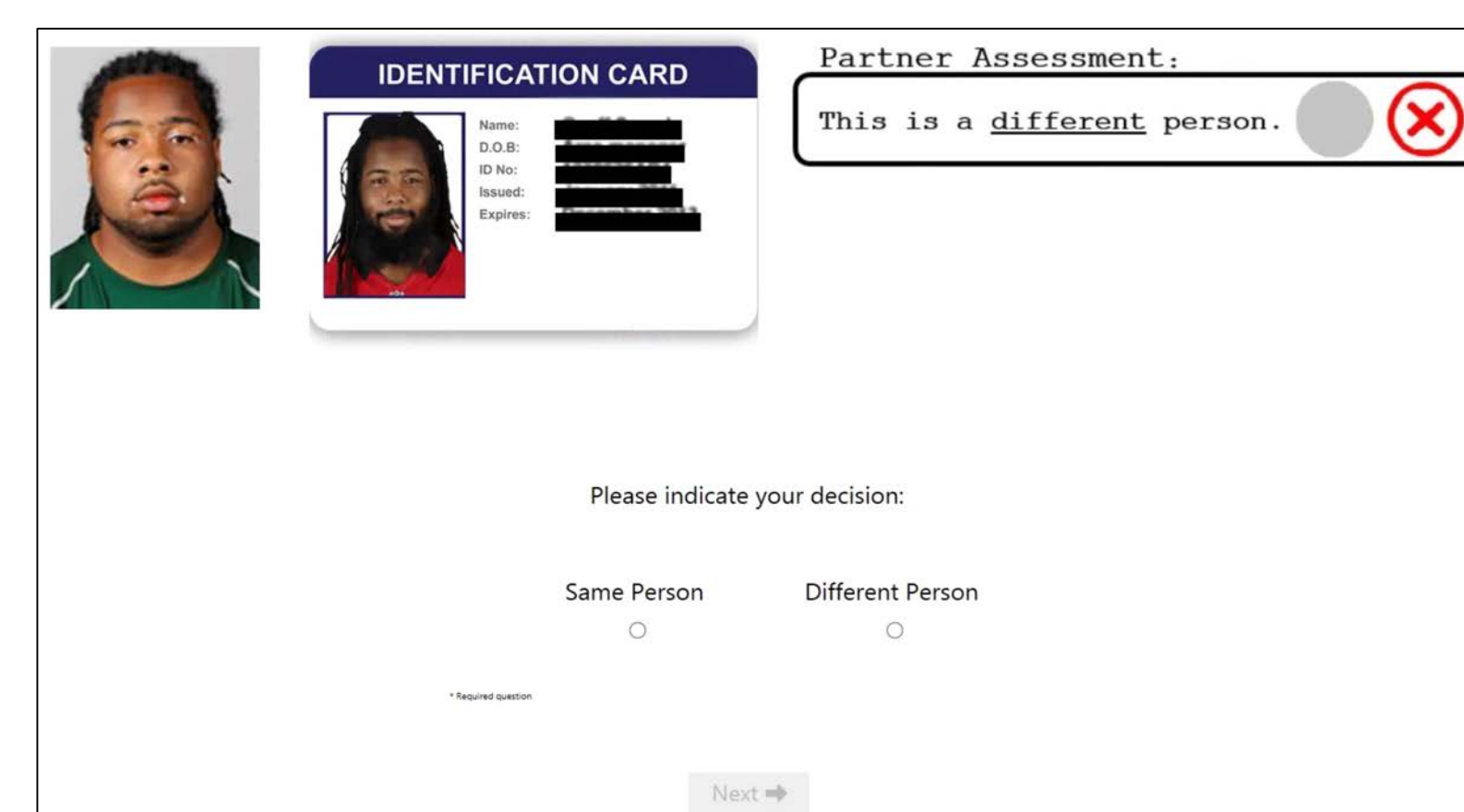
EXPERIMENT DESIGN



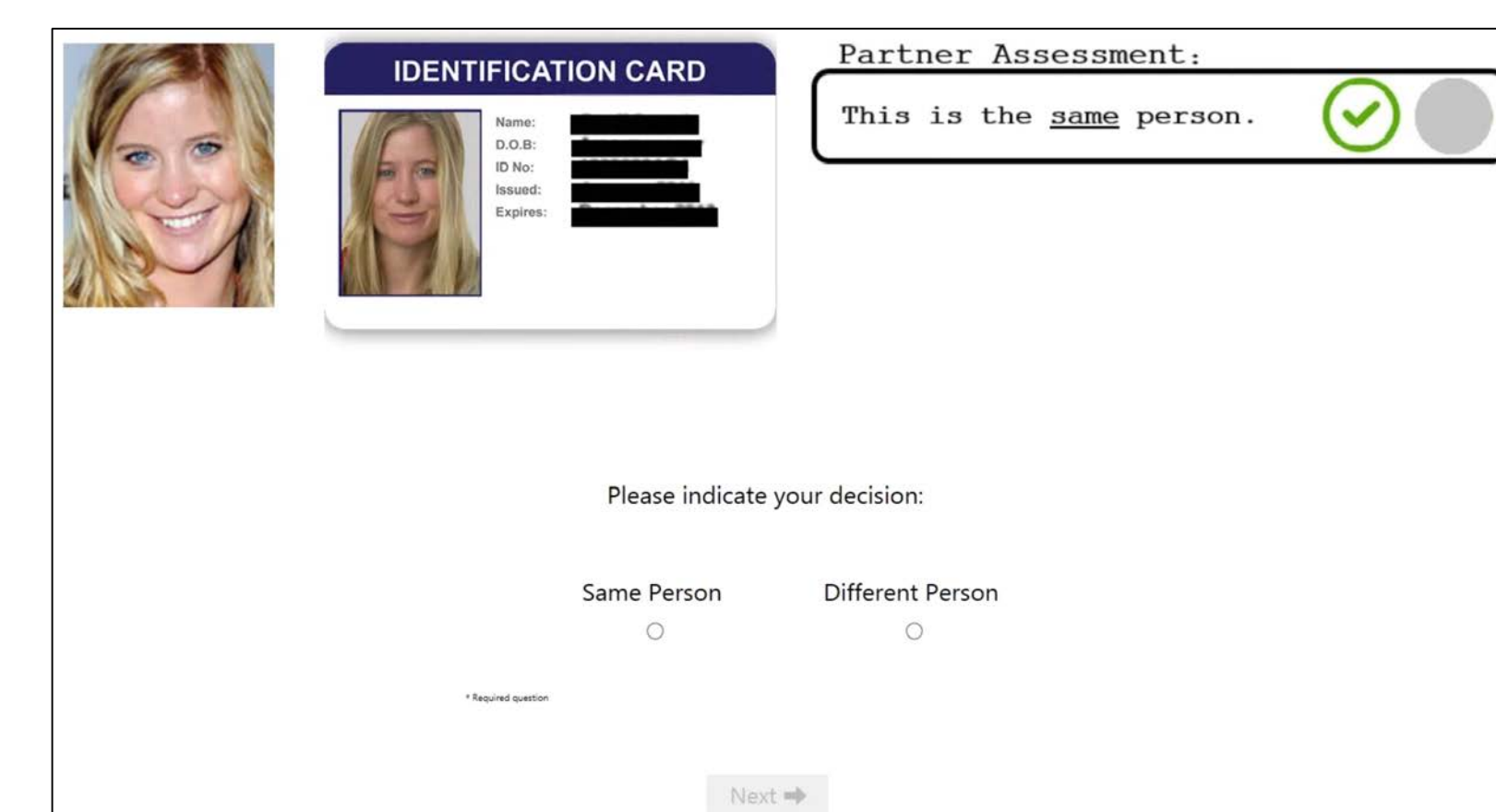
Round 2 - Stimulus 1



Round 7 - Stimulus 3



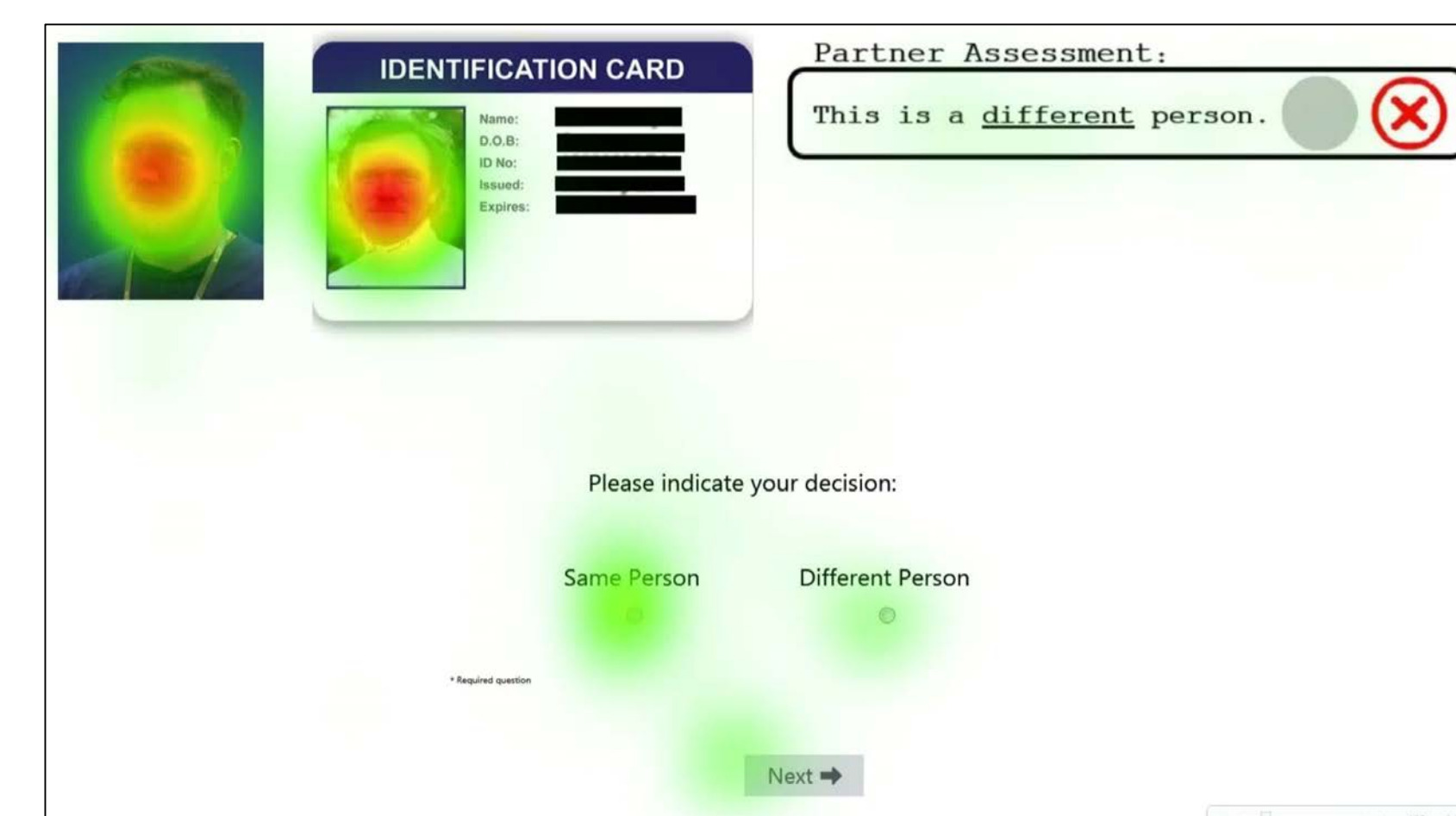
Round 2 - Stimulus 2



Round 7 - Stimulus 4

Round	1	2	3	4	5	6	7	8
Partner Message	Same	Different	Same	Different	Different	Same	Different	Same
Uncertainty	Low	High	High	High	Low	Low	Low	High
Condition								

ANALYSIS & RESULTS



Eye-tracking Heat Map



Extrovert & Introvert Trust over Time

	Pilot Decisions		With Agent Decisions		Chi-Square	p-value
	Different Person	Same Person	Different Person	Same Person		
Stimulus 1	16	16	46	18	4.46	p < .05
Stimulus 2	16	16	54	10	12.76	p < .001
Stimulus 3	18	14	22	42	4.2	p < .05

Decisions With and Without Agent Support in Conditions of High Uncertainty

METHODOLOGY

- Participants
- Participants were recruited through the College of Business SONA Research System
 - Sample included 31 males and 33 females
- Procedure
- Participants briefed and informed consent obtained
 - Tobii eye-tracking calibration was conducted
 - Participants exposed to 25 image pairs over the course of 8 rounds
 - Trust and expertise assessment conducted after each round
 - After study participants were thanked and debriefed

RESULTS

- Hypothesis 1 received support.
- A factor analysis on ratings of trustworthiness and expertise indicated excellent internal consistency (Cronbach's alpha .94 and .95)
 - A significant correlation between trust in the system and expertise was found. $N=64$, $R_1=.855$, $R_2=.884$, $R_3=.831$, $R_4=.874$, $R_5=.840$, $R_6=.823$, $R_7=.887$, $R_8=.860$
- Hypothesis 2 received support.
- Analysis of the three stimuli rated as most uncertain in group without agent and conducted a X2 test to compare against group with agent
 - The decision made by participants moved significantly in direction of agents recommendation

KEY REFERENCES

- Derrick, D. C., & Ligon, G. S. (2014). The Affective Outcomes of Using Influence Tactics in Embodied Conversational Agents. *Computers in Human Behavior*, 33(1), 39-48.
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An Integrative Model of Organizational Trust. *The Academy of Management Review*, 20(3), 709.
- Muir, B. M. (1987). Trust between humans and machines, and the design of decision aids. *International Journal of Man-Machine Studies*, 27(5-6), 527-539.

(See handout for additional references)

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