EXPLORING THE DIMENSIONS OF INTERACTIVE AGENT PERSONALITY

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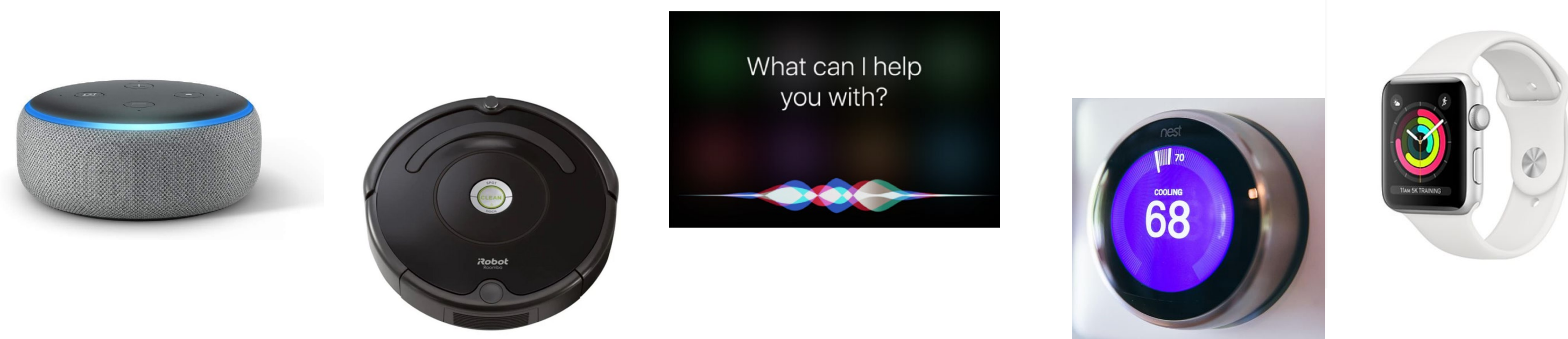Georgia Institute of Technology

Interactive Agents

Working Definition: Interactive agents (IAs) are modern technological tools that perform one or more tasks and interface with their users in a mutual and dynamic way. An IA may or may not have a physical form, and may or may not communicate using natural language.

Examples: Amazon Echo, Apple Siri, Roomba, Samsung Smart Fridge, etc.

Are IAs "Human"?

Social Response Theory and Human-Machine Interaction

- Users often perceive and respond to machines as "social actors" (Moon 2000)
- Computers possessing human-related characteristics (voice-mediated interaction, emotions, etc.) are especially likely to elicit social behaviors (Nass & Moon 2000)

Algorithm Aversion

- Experts and laypeople generally resist using algorithms, even when their performance is superior (Dietvorst et al. 2015; Castelo, Bos, & Lehmann 2019)

Anthropomorphism and Humanness

- Anthropomorphizing products can increase trust due to greater perceptions of mindfulness (Waytz, Heafner, & Epley 2014) and satisfy our social needs (Mourey, Olson & Yoon 2017)
- Ratings of physical, cognitive, and emotional "humanness" are associated with product adoption (Castelo 2019), liking, and perceptions of warmth (Bluvstein et al. 2019)
- The "uncanny valley": Overly human-like robots elicit unease and discomfort (Mori 1970), due to perceptions of experience rather than agency (Gray & Wegner 2012)

Personality Perceptions of Nonhuman Entities

- As we do this to brands, attributing personality traits to technological artefacts is an unavoidable, natural process and becomes a "useful heuristic" in describing consumer behavior (Reeves & Naas 1996)
- Robot-user personality matching: extroverted user preferred an challenging robot, and introverted user preferred an praising robot (Tapus & Mataric, 2007)

Research Question

Do consumers ascribe personality traits to interactive agents?
If so, what is the structure of those traits?

Methods

Study 1A: Item Generation

- 174 undergraduates read formal definition of IAs, then saw eight specific examples
- Asked to write down all the trait adjectives that came to mind for each example
- Resulted in 634 unique items; reduced to 128 items that appeared more than four times
- Addition of 60 items from common personality scales (human, brand, animal) resulted in a comprehensive list of 188 potential traits

Study 1B: Item Purification

- 160 Mturk subjects rated the applicability of each trait to IAs in general (1-7 scale)
- Based on distribution of means, cutoff point of 3.5 was chosen, resulted in 128 traits retained for further examination

Amazon Echo

Amazon Echo is a smart speaker that connects to the voice-mediated assistant, "Alexa". Features of this device includes: voice interaction, music playback, creation of to-do lists, setting alarms, streaming podcasts, providing weather, traffic, and real-time information, and controlling other home smart devices.

Roomba by iRobot

Roomba is a robot vacuum cleaner. Using its onboard navigation sensors, Roomba travels across and cleans the floors within a home. Roomba can move around obstacles, detect dirt levels, and adapt to user preferences over time.

Two Factor Model of IA Personality

Study 2: Identification of Personality Dimensions

- 123 undergraduates presented with two IAs from a set of six (randomly chosen)
- Rated the extent to which each IA is described by each of the 128 traits
- Resulting correlation matrix was reduced using PCA with varimax rotation
- Based on eigenvalues, scree plot, and parallel analysis, a two-factor model was selected
- Subsequent clustering procedure (Nunnally 1978) yielded seven underlying facets

TWO-FACTOR MODEL OF IA PERSONALITY

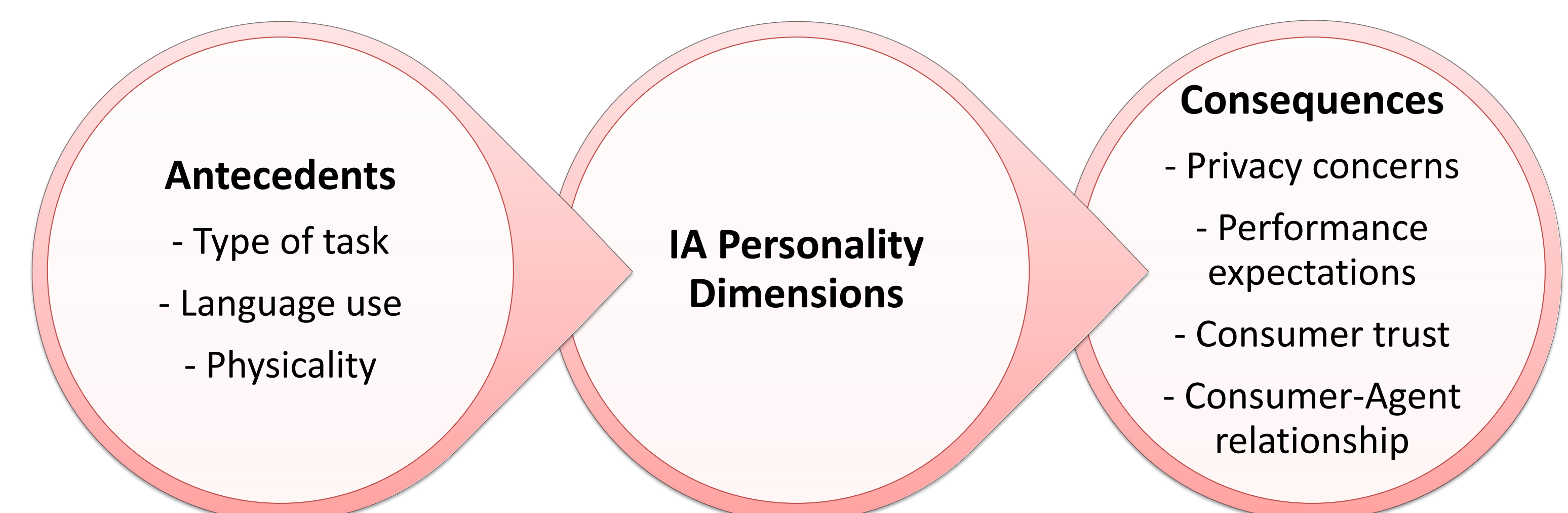| Name	Dimension	Variance Explained	Facet Name	Traits
Friendly	1	46.18%	Genial	Spirited, Charming, Easy-going, Encouraging
			Funny	Funny, Talkative, Sassy
			Playful	Fun, Playful
			Creative	Imaginative, Creative
Reliable	2	11.44%	Attentive	Attentive, Consistent, Timely, Cooperative
			Efficient	Efficient, Effective, Reliable, Practical
			Fast	Accessible, Fast, Up-to-date

Discussion

Conclusions and Implications

- Consumers humanize interactive agents by ascribing stable personality traits
- We offer a parsimonious instrument to capture IA personality structure
- Our instrument is conceptually and empirically distinguishable from others including: warmth and competence (Fiske et al., 2002), human personality (Costa & McCrae, 1992; Goldberg, 1992), brand personality (Aaker, 1997)

Future Research

- Examine scale stability, validity, and reliability of the facets and trait measures
- How are IA traits "constructed" from brand and product characteristics, consumer-level variables, marketing activities, etc.?
- How do IA traits influence specific consumer responses (willingness to share information, performance expectations, trust in IA products, consumer-IA relationship, etc.)?

Antecedents
- Type of task
- Language use
- Physicality

IA Personality Dimensions

Consequences
- Privacy concerns
- Performance expectations
- Consumer trust
- Consumer-Agent relationship

Selected References

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