



# HUMANOID ROBOTS LAUGHING IN RESPONSE TO A JOKE: RESULTS OF A VIDEO-BASED ONLINE SURVEY

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# OVERVIEW

- Motivation
- Technical background
- Design of the online survey
- Demographic data
- Results
- Discussion
- Outlook



Robovie II  
Demovideo

# MOTIVATION

Human laughter (Owren; 2007):

- “helps foster and maintain positive, mutually beneficial relationships among individuals with genuine liking for one another”
- “is predicted to as easily have the opposite role among those who do not.”

Robovie (Kanda, Ishiguro, Ono, Imai, Mase; 2002):

- is an “interactive humanoid robot”
  - “is designed for communication with humans.”
- Would a laughing Robovie appear more social?
- Which kind of laughter fits best to a humanoid robot?

# TECHNICAL BACKGROUND

- No facial expression, but head, eye, and body movement
- 402 female (and 200 male) laughter sounds – extracted from recordings of (Ishi, Ishiguro, Hagita; 2008) – annotated with respect to:
  1. Bout structure (regular expression)
  2. Person ID (including female / male)
  3. Duration (in seconds)
  4. Type (voiced or unvoiced)
  5. Volume level (subjective)
- Java module integrated into Robovie's speech synthesis software framework

# DESIGN OF THE ONLINE SURVEY

- We chose the following five samples:

Laughter 2 📣	Laughter 3 📣	Laughter 4 📣	Laughter 5 📣	Laughter 6 📣
				
1.25 seconds, 6 bouts (?)	1.47 seconds, 7 bouts (?)	1.48 seconds, 8 bouts (?)	1.74 seconds, breath voice	0.9 seconds, 4 bouts (?)

- .. and pitched “Laughter 2” up by 25% →
- Each laughter was combined with one motion per version of Robovie (II & R2):
  - moving head backward to the left
  - lifting arms (“open-hand” gesture)
  - returning to initial position
  - saying “Ariehen!” (unbelievable)

Laughter 1 📣

1.25 seconds, 6 bouts (?)



## DESIGN OF THE STUDY

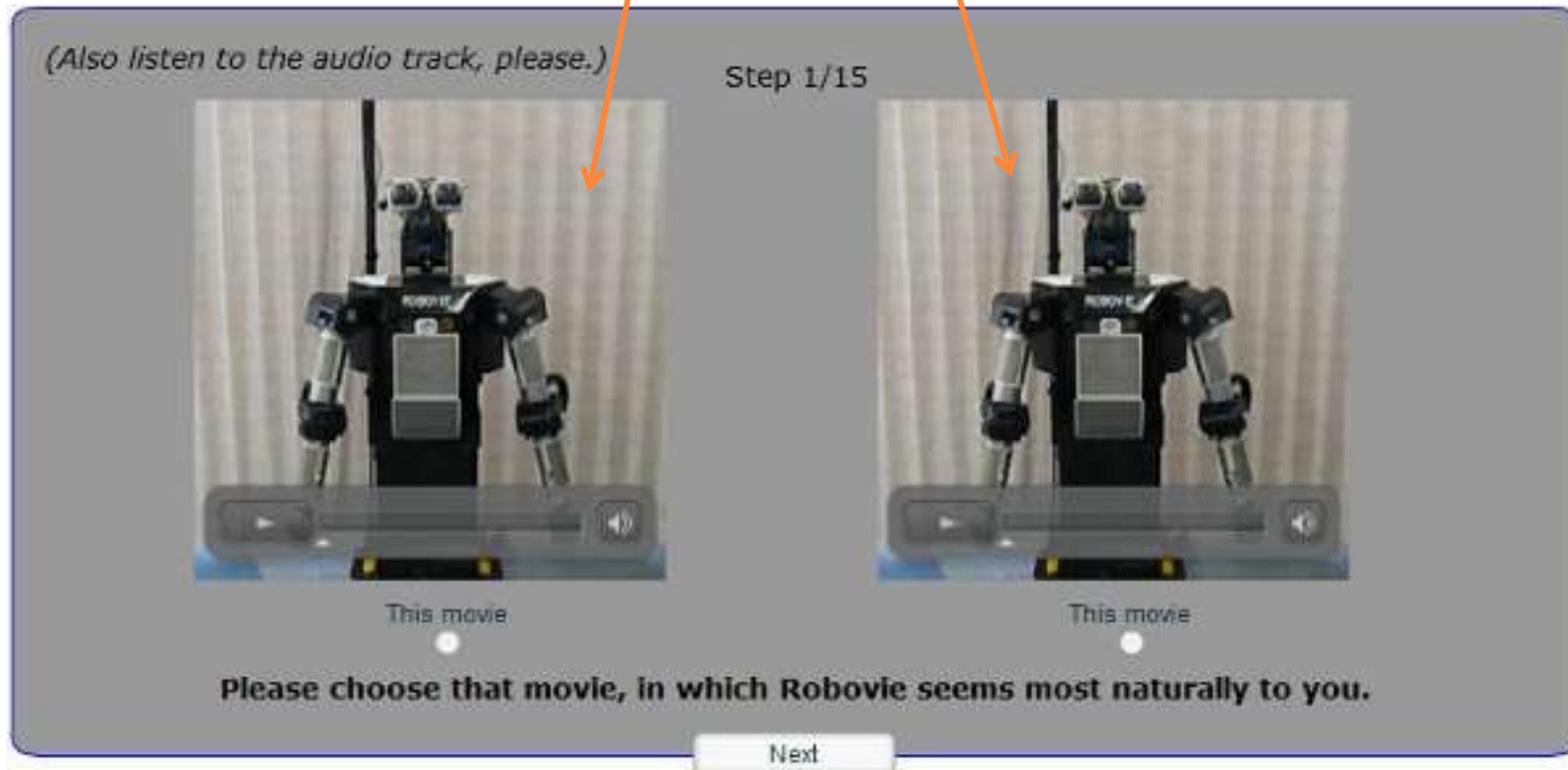
- Instructions provided in Japanese, English and German language online
- Participants should imagine that Robovie (II / R2) laughs in response to a joke:
  - Complete joke known to the participants
  - Last sentence of the joke always played in Japanese at the beginning of each video
- All possible pairings of laughter presented once randomized between participants  
→ 15 pairs per robot
- Instruction:

“Please choose that video,  
in which Robovie seems most naturally to you.”



# DESIGN OF THE STUDY (SCREENSHOT)

For example  
laughter 2 vs. laughter 4



(Forced choice design)

# DEMOGRAPHIC DATA

## Robovie II

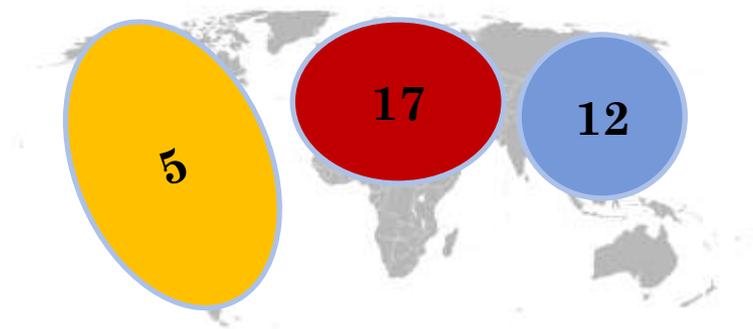
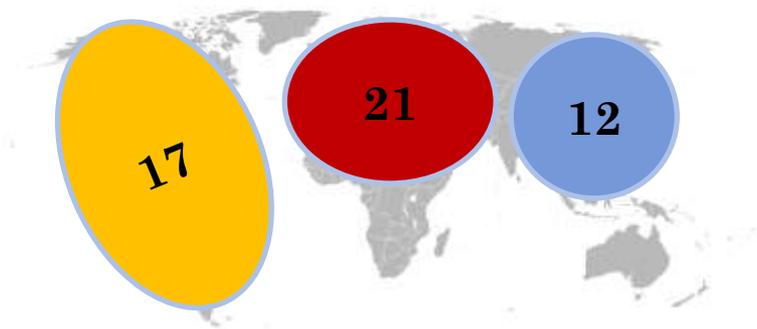


- 50 participants
  - 20 female
  - 30 male

## Robovie R2

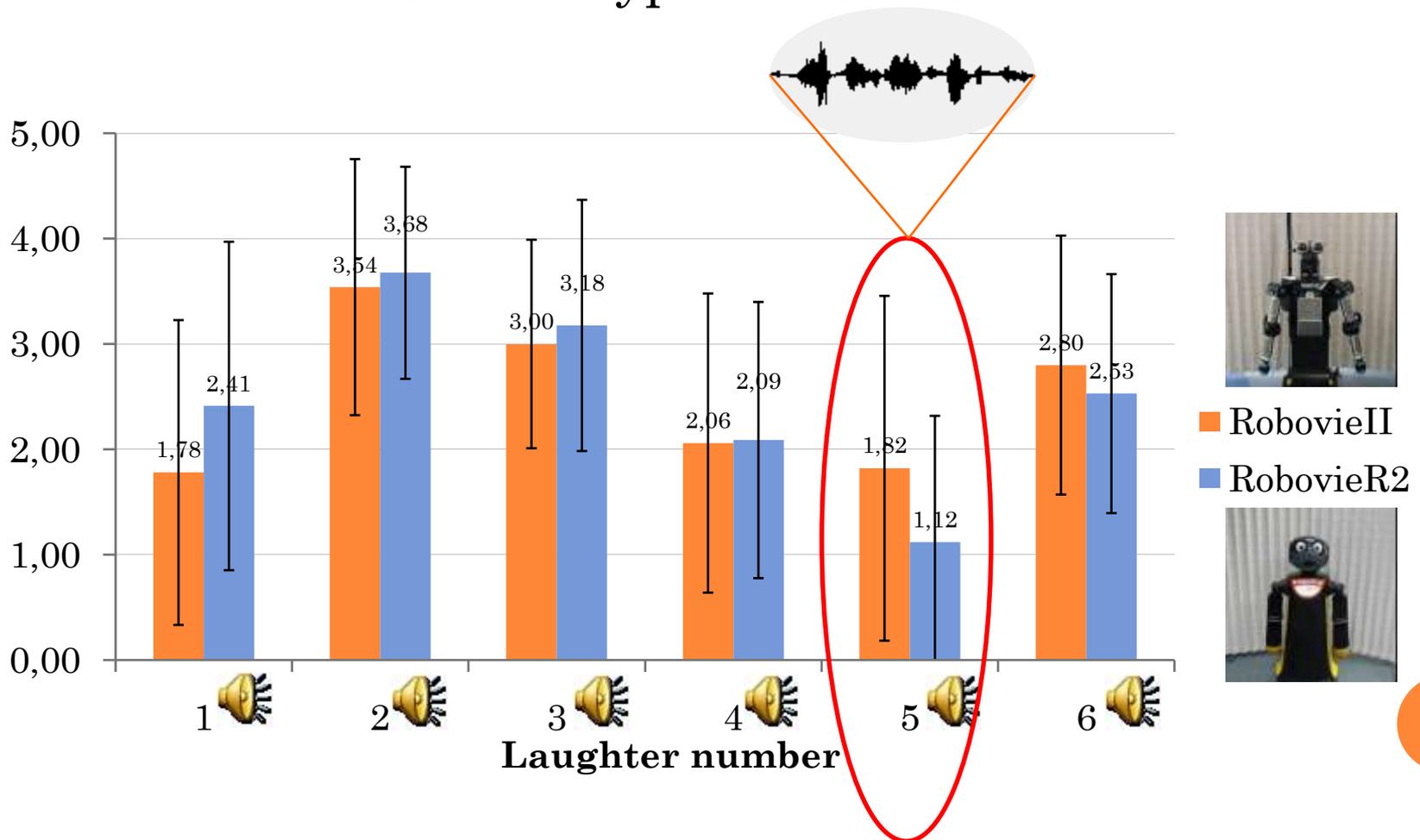


- 34 participants
  - 8 female
  - 25 male



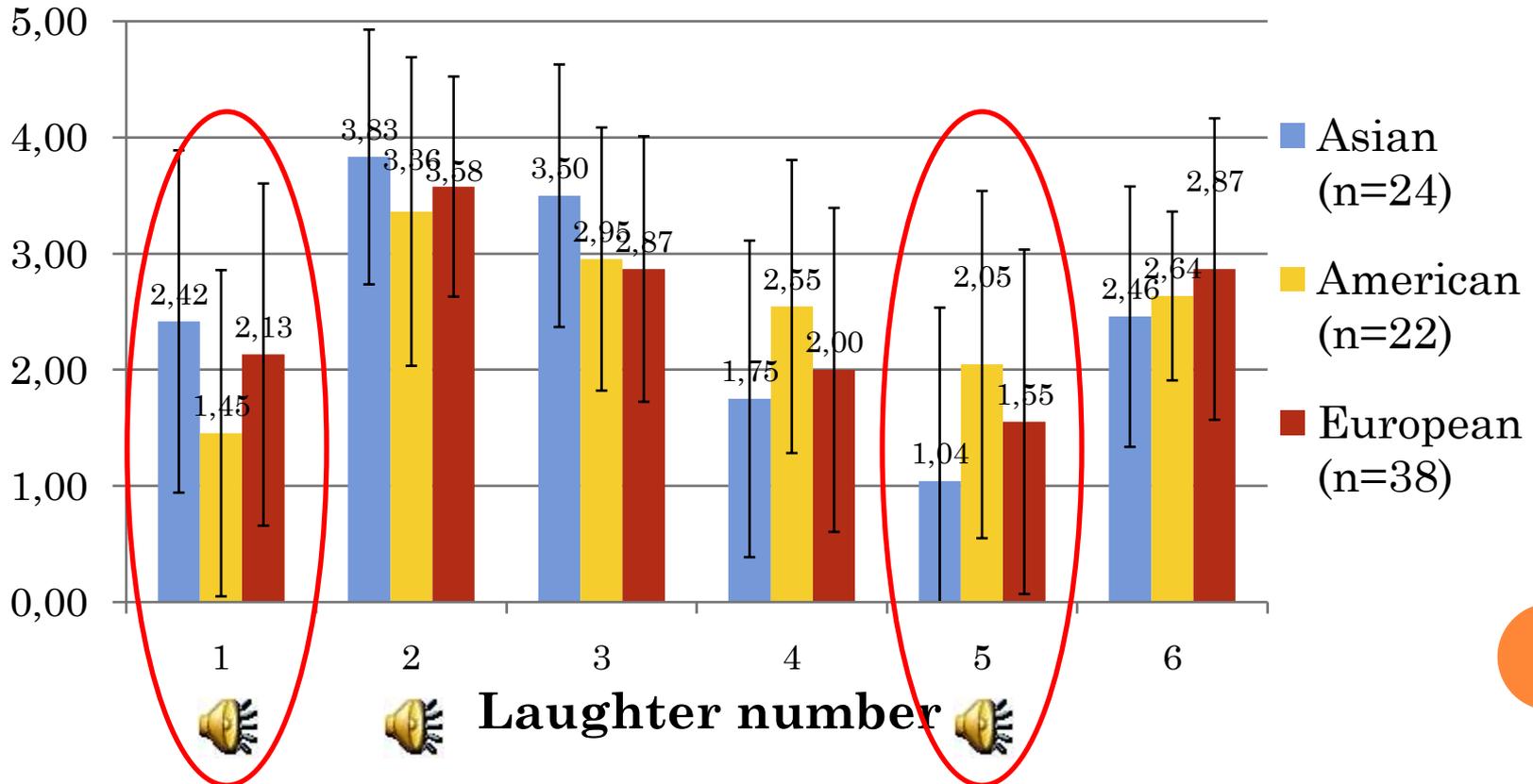
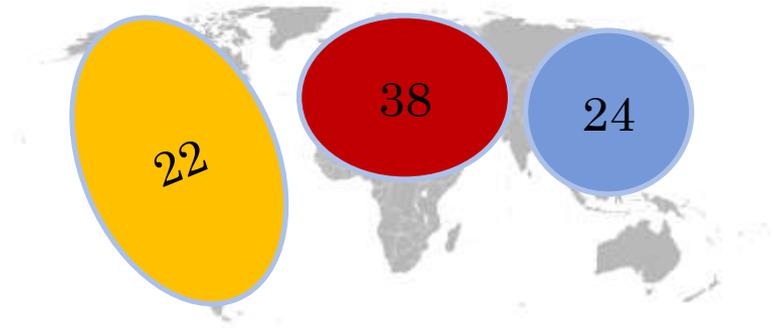
# RESULTS

- Differences between types of robots:



# RESULTS

- Intercultural comparison (regardless of robot type):



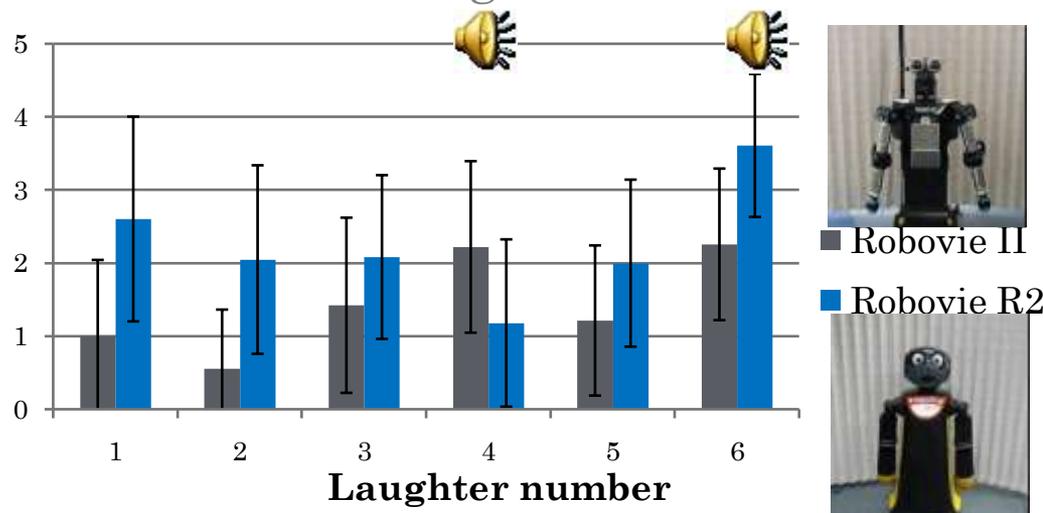
# DISCUSSION

- Robots' laughter not evaluated as differently as expected between robots:
  - Robovie are quite similar to each other?
    - comparing Robovie with Geminoid
    - forced-choice design inappropriate?
      - using different type of experimental design
    - Video-based survey inefficient?
      - testing real-life interaction
- Results limited by situational context:
  - “Reacting to a joke” is a non-serious situation
  - No dynamic human-robot interaction
- Only female laughter presented so far
  - Participants expected male laughter for Robovie II



# DISCUSSION

- Robovies are similar to each other?
  - 36 Japanese high school students
    - 26 male, 10 female, ~17 years old
  - Videos presented with Robovie II and R2 in sequence
  - “How well does this laughter fit to each robot?”



- Preliminary interpretation: No, they are not.

# OUTLOOK



- UGL: Ultimatum Game with Geminoid
  - Can Geminoid produce natural laughter?
  - How do people react, when Geminoid laughs?
- Geminoid as non-neutral experimenter during the Ultimatum Game

