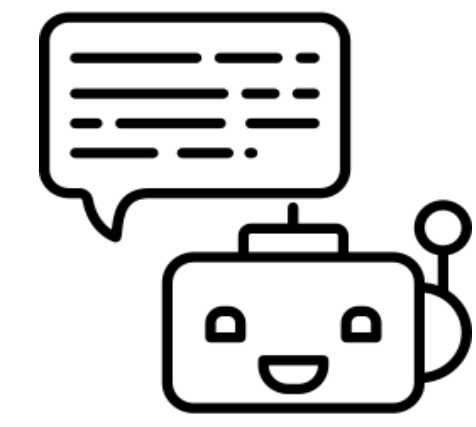# STUDYING THE ANTHROPOMORPHIC VISUAL CUES IN CONVERSATIONAL AGENTS
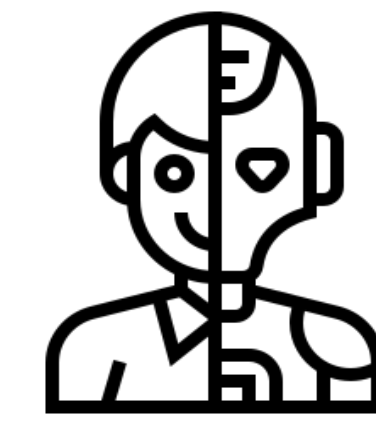
Author: Emilija Zlatkutė (e.zlatkute@student.tudelft.nl)
Supervisors: Ujwal Gadiraju, Jie Yang, Sihang Qiu

TUDelft

1. DEFINITIONS

Conversational Agents (CAs) - software that interacts with users in a natural human language [1, 2].

Anthropomorphism - assigning human-like attributes or traits to non-human agents or objects [2, 3].

2. BACKGROUND

- In CAs, anthropomorphism can be expressed trough different types of cues, such as *human identity*, *verbal cues*, and *non-verbal cues* [3].

- Results of previous research done on the effect of anthropomorphism in CAs on users have been conflicting and there is a general lack of research on the design of CAs [4].

3. RESEARCH QUESTION

- To what extent can a conversational agent with different levels of anthropomorphic visual cues improve the satisfaction and trust of the users?

4. METHOD AND PROCESS

- **Visual cues (independent variables)**: emojis and profile image of 4 different anthropomorphism levels (*Figure 1*).

- **Experiment groups**: 4 (none vs low vs medium vs high level anthropomorphism picture) x 2 (emojis vs no emojis) = 8.

- **Participants**: 120 (37% females, 62% males).
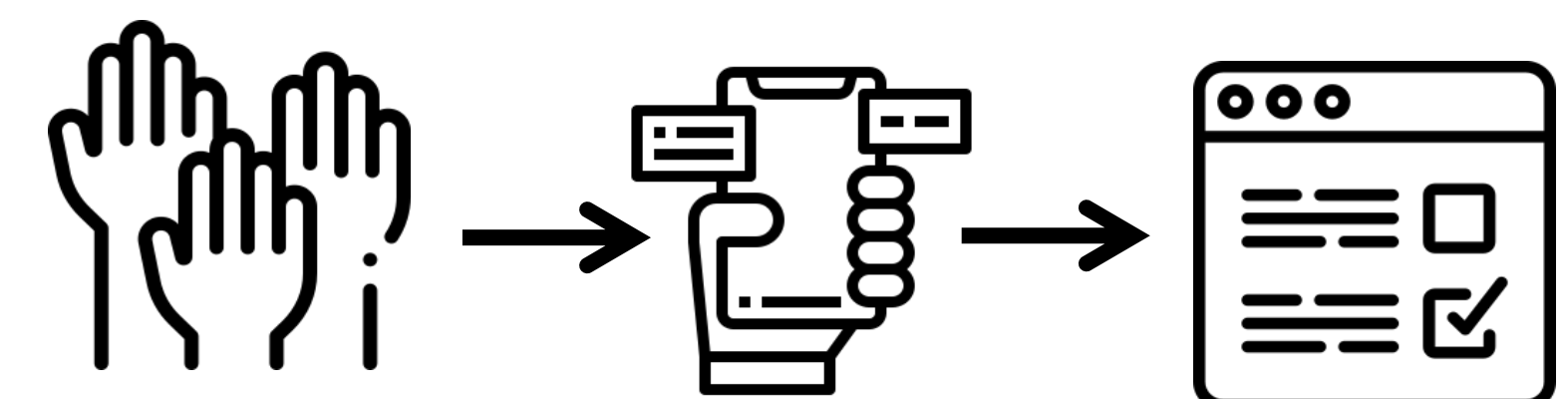
Participants are recruited via *Prolific.co* → Participants have a conversation with the CA via Telegram (*Figure 2*) → Participants fill in a survey about their satisfaction and trust levels
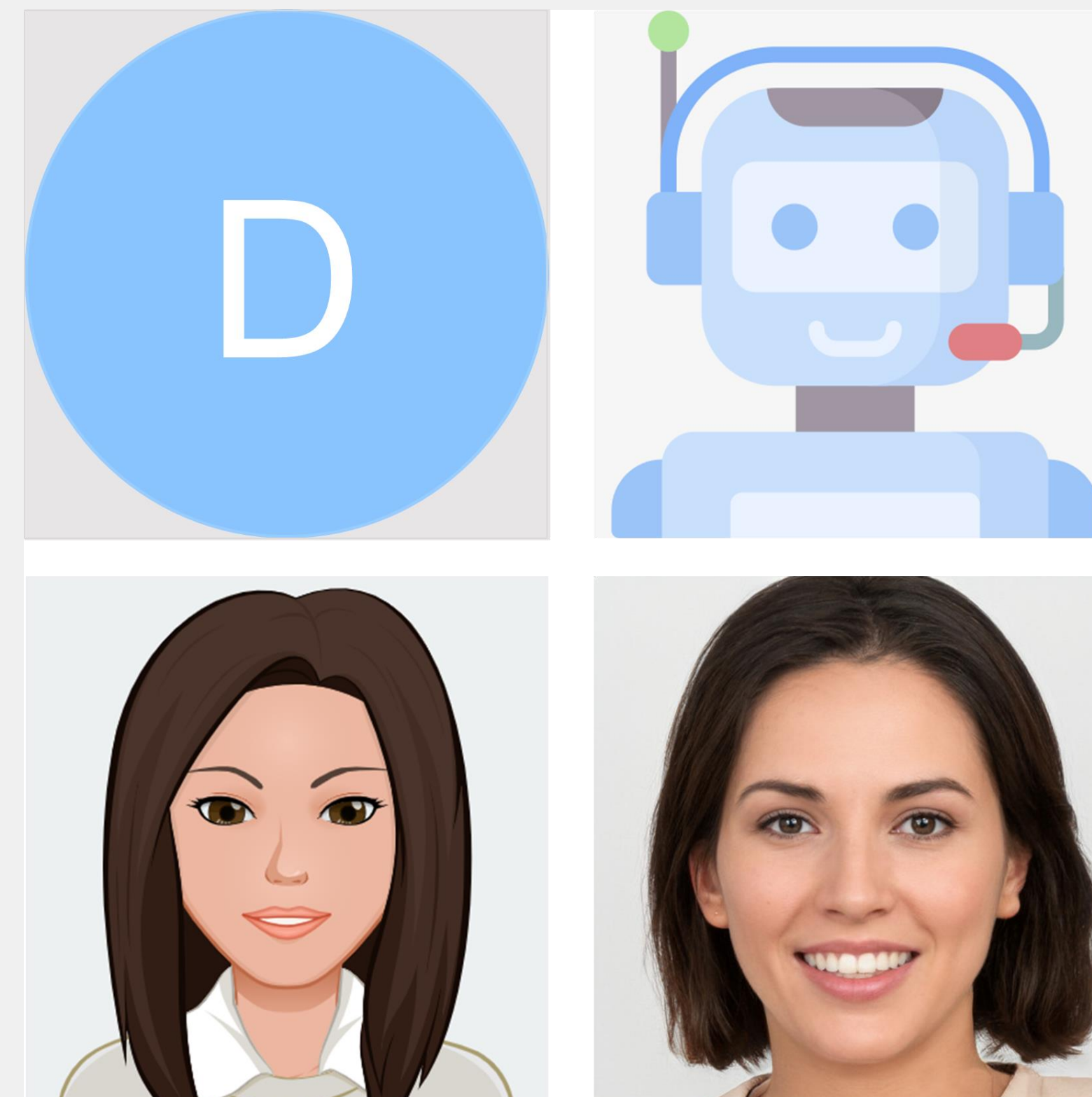

Figure 1: Levels of profile image anthropomorphism. From left to right: none, low, medium, high.
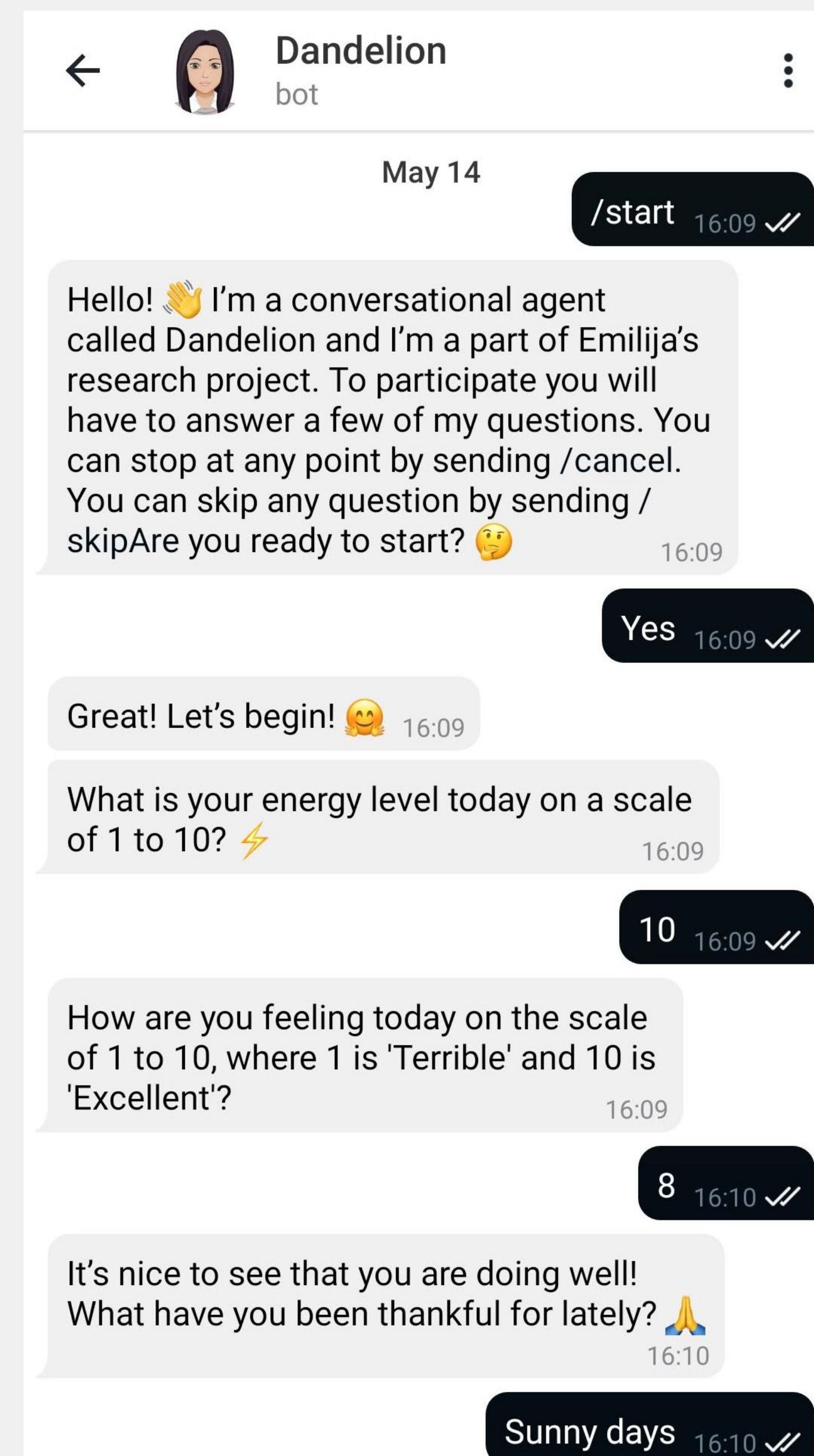

Figure 2: Conversational agent used in the experiment (emojis + medium level anthropomorphism picture).

5. RESULTS

Condition	Satisfaction		Trust	
	Mean	SD	Mean	SD
PN	6.12	0.74	5.30	0.84
PL	5.63	0.87	5.24	0.64
PM	5.64	0.74	5.05	0.72
PH	5.87	0.92	5.29	0.79
EN	5.97	0.64	5.04	0.53
EL	5.75	0.73	5.04	1.16
EM	6.15	0.74	5.27	0.81
EH	5.60	0.83	4.95	1.32

Table 1: Means and standard deviations (SD) of the dependent variables in all experimental conditions.

Emoji state: P = Plain (no emojis), E = With emojis; Profile image anthropomorphism: N = No image, L = Low, M = Medium, H = High.

Visual cue	Satisfaction	Trust
	p-value	*p*-value
Anthropomorphism	0.27	0.997
Emojis	0.71	0.37
Anthropomorphism : Emojis	0.23	0.62

Table 2: p-values of all visual cues for all dependent variables.

6. CONCLUSIONS

- Conversational agents that employ emojis or a profile image of any level of anthropomorphism do not provide a significantly higher satisfaction to the users nor they increase their trust.

- Combining the two visual cues does not achieve such effects either.

7. FUTURE WORK

- Improve the conducted experiment by increasing the sample size.

- Research the relationship between the amount of exposure to a visual cue and the perceived anthropomorphism as well as its effects on users.

8. REFERENCES

[1] S. Diederich, "Designing Anthropomorphic Enterprise Conversational Agents," *Bus Inf Syst Eng*, p. 17, 2020.

[2] A.-M. Seeger, J. Pfeiffer, and A. Heinzl, "When Do We Need a Human? Anthropomorphic Design and Trustworthiness of Conversational Agents," 2017, Accessed: Apr. 19, 2021. [Online]. Available: https://core.ac.uk/reader/30137359

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