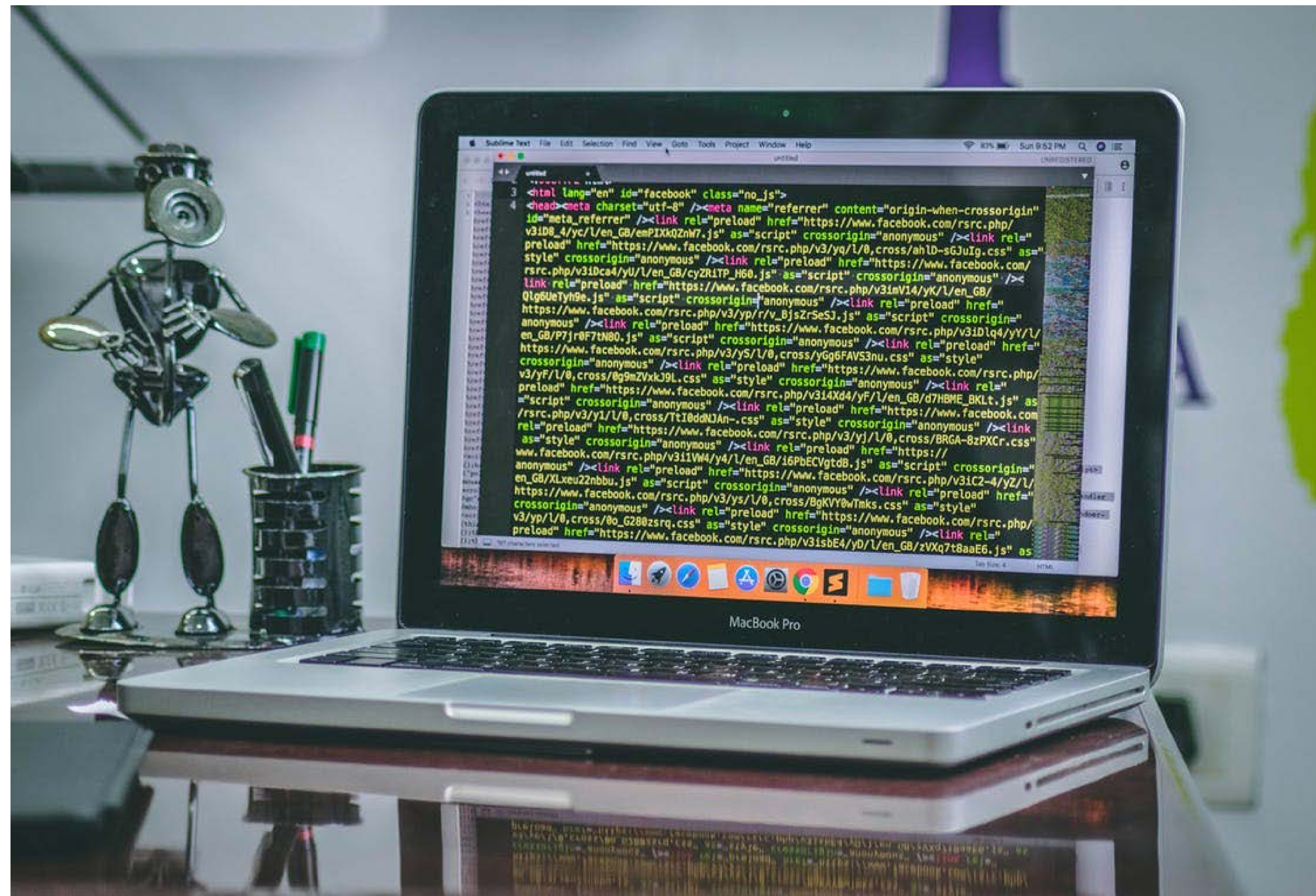# Traversing Uncanny Valleys? Young Adults' Feelings About Chatting with "Bots"

Dr. Michelle Drouin, Logan Thacker, Miriam Greidanus Romaneli, Hannah Nissley, Robyn White, and David Ryan Polgar

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Methods

Procedure:

Participants were **348 undergraduates** recruited from a pool of introductory psychology students. In this study, participants engaged in **15-minute chats with confederates** (who were blind to the study objectives), and were randomly assigned by Qualtrics to one of three conditions:

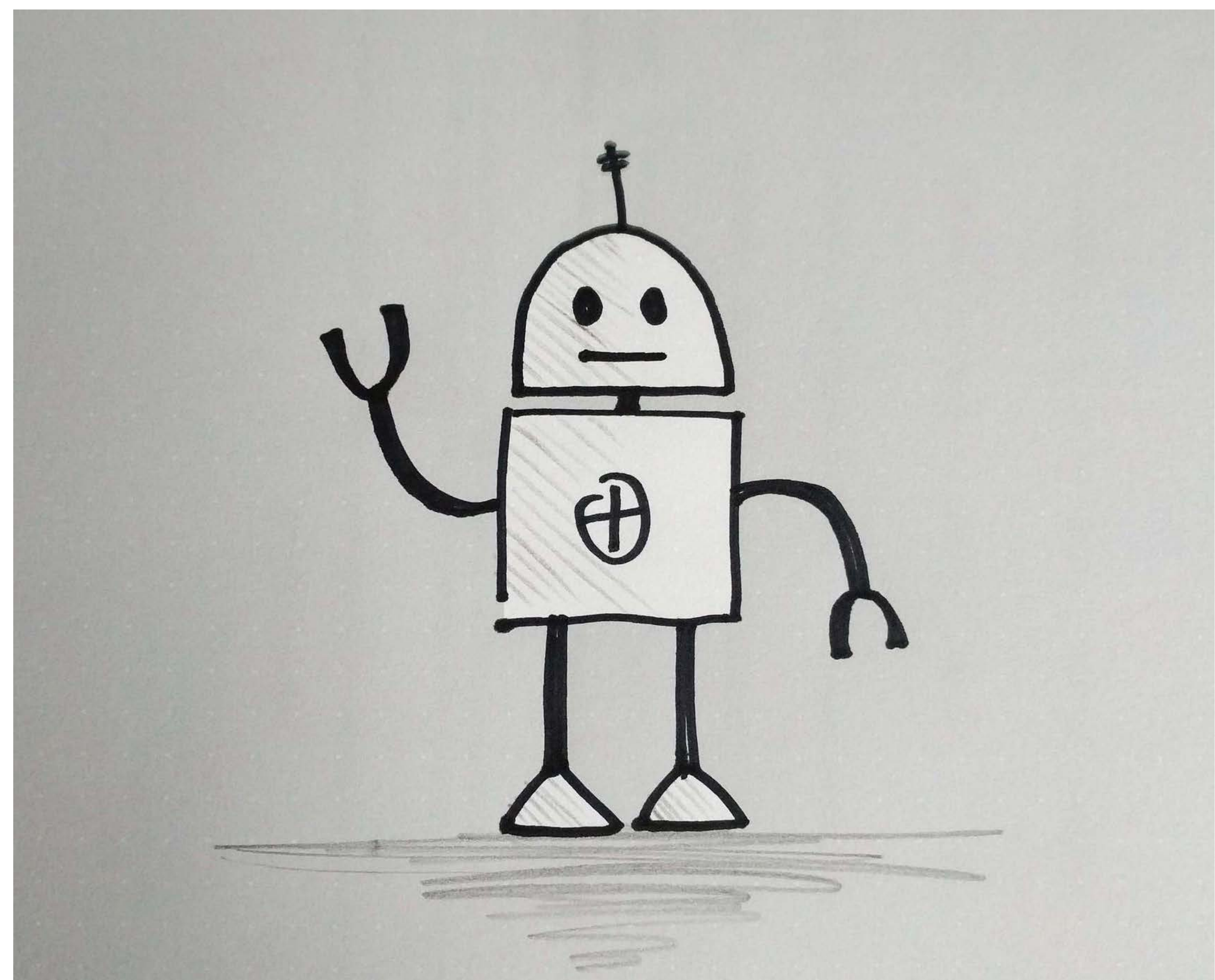**Condition 1:** The participant was told that they were talking to **another human**.
Condition 2: The participant was told before the chat that they were talking to a **chat bot** that was intended to emulate a human.
Condition 3: The participant was told **after the chat that they were talking to a chat bot** that was intended to emulate a human.

During these chats, the confederates and participants engaged in the **Fast Friends Protocol**. The confederates had no knowledge of the conditions or the purpose of the study. After engaging in the chat, the participants completed the Positive and Negative Affect Schedule, or **PANAS**, scale (Watson, Clark, & Tellegen, 1988). Participants were also asked **whether they would like to speak to their chat partner again**. Following their participation, all participants were debriefed.

Measures

Positive and negative affect schedule (PANAS) Scale: For this scale, there were 10 items correlating to positive affect (e.g. "inspired") and 10 items correlating to negative affect (e.g. "distressed"). Participants were asked to rate the extent to which they experienced certain emotions when chatting with their partner. We then used a one way ANOVA to compare the participants' feelings towards their partner when they thought they were talking to a human verses when they thought they were talking to a bot both before the chat and after the chat.

Background

An increasing number of interactions are being monitored or navigated by bots (computerized applications programmed to perform interactive tasks online). These bots are being used by businesses to interact with customers who are navigating their websites; chatbots are even being piloted for e-therapy. According to Mindshare (2017), more than half of individuals expressed an openness to interacting with bots to connect with a brand; however, they also indicated that it would be uncomfortable if the bot started becoming too personal. This observation aligns with Uncanny Valley Theory, which suggests that when computers are too like people, individuals experience negative emotions like uneasiness and disgust (Howard, 2017).

Fast Friends Procedure (Aron et al., 1997)

1. Given the choice of anyone in the world, whom would you want as a dinner guest?
2. When did you last sing to yourself? To someone else?
3. For what in your life do you feel most grateful?
4. If a crystal ball could tell you the truth about yourself, your life, the future, or anything else, what would you want to know?
5. What is your most treasured memory?
6. What roles do love and affection play in your life?
7. How do you feel about your relationship with your mother?
8. Share with your partner an embarrassing moment in your life.
9. If you were to die this evening with no opportunity to communicate with anyone, what would you most regret not having told someone? Why haven't you told them yet?
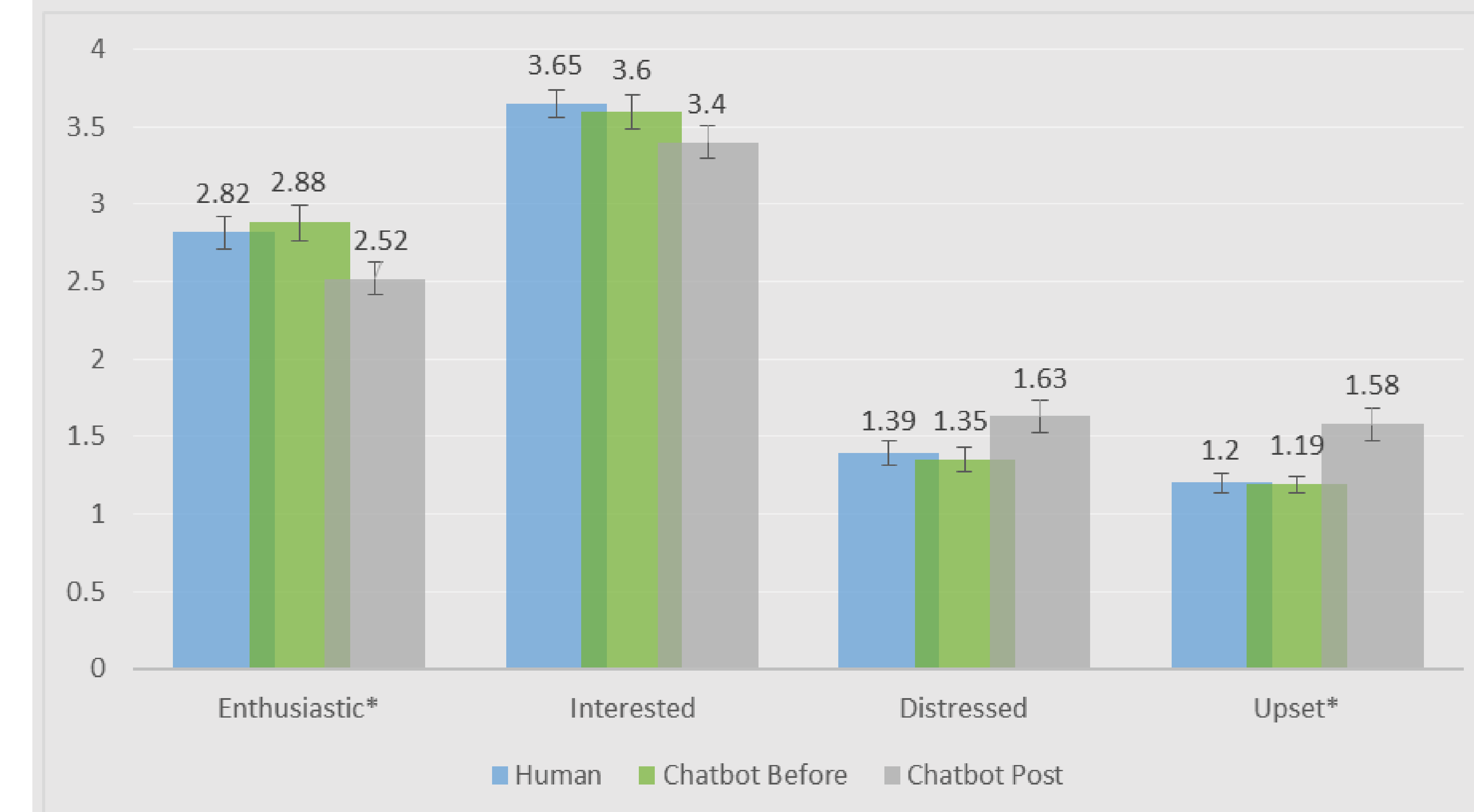
Results

Participants reported similar positive and negative reactions after believing that they interacted with humans and being told beforehand that they would Interact with a bot. However, when told afterwards that their interaction partner was a bot, participants displayed more negative emotions and less positive emotions than in the other conditions.

A one-way ANOVA revealed a significant effect of the experimental condition on certain dimensions of the PANAS, as participants in Condition 3 were less enthusiastic ($F = 3.036$, $p = .049$) and more upset ($F = 8.624$, $p = <.01$) than those in Conditions 1 and 2 (*Figure 1*).

Participants in Condition 3 were also significantly less likely to chat again with their conversation partner than in the other conditions ($F(2, 187) = 9.61$, $p < .001$).

Figure 1: Positive and Negative Affect by Chat Partner Type

	Enthusiastic*	Interested	Distressed	Upset*
Human	2.82	3.65	1.39	1.2
Chatbot Before	2.88	3.6	1.35	1.19
Chatbot Post	2.52	3.4	1.63	1.58

Note. Human $N = 127$, Chatbot Before $N = 114$, Chatbot Post $N = 107$. * $p < .05$

Conclusions and Implications

Participants who were told post-chat that they had interacted with a bot displayed more negative emotionality, indicating a negative effect from the perceived deception. However, this did not indicate that their experiences with bots were completely negative. Since those who believed from the beginning that they would chat with a bot did not display the same negative emotions, these results suggest an optimistic perspective in human-bot communication. Through openness about the increasingly widespread presence of artificial intelligence agents and bots in online communication, it is possible to promote an environment and interactions in which human users are experiencing mostly positive emotional effects.