

ACII 2023

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# EXPLORING CHATGPT'S EMPATHIC ABILITIES

Boston, 2023-09-11

# 01

**MOTIVATION  
& BACKGROUND**

# 02

**STUDY 1:  
UNDERSTANDING  
& EXPRESSING  
EMOTIONS**

# 03

**STUDY 2:  
EXPRESSING  
EMPATHY**

# 04

**STUDY 3:  
EMPATHIC  
PERSONALITY**

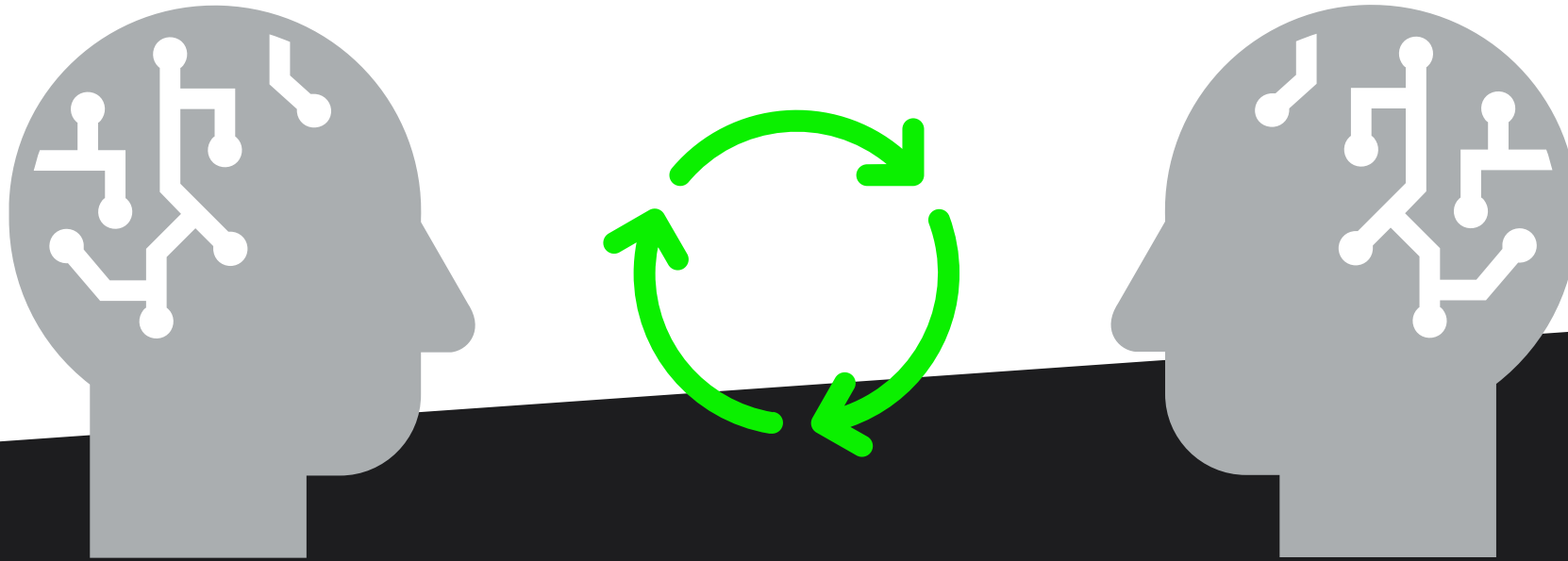
# 05

**CONCLUSIONS  
& FUTURE WORK**

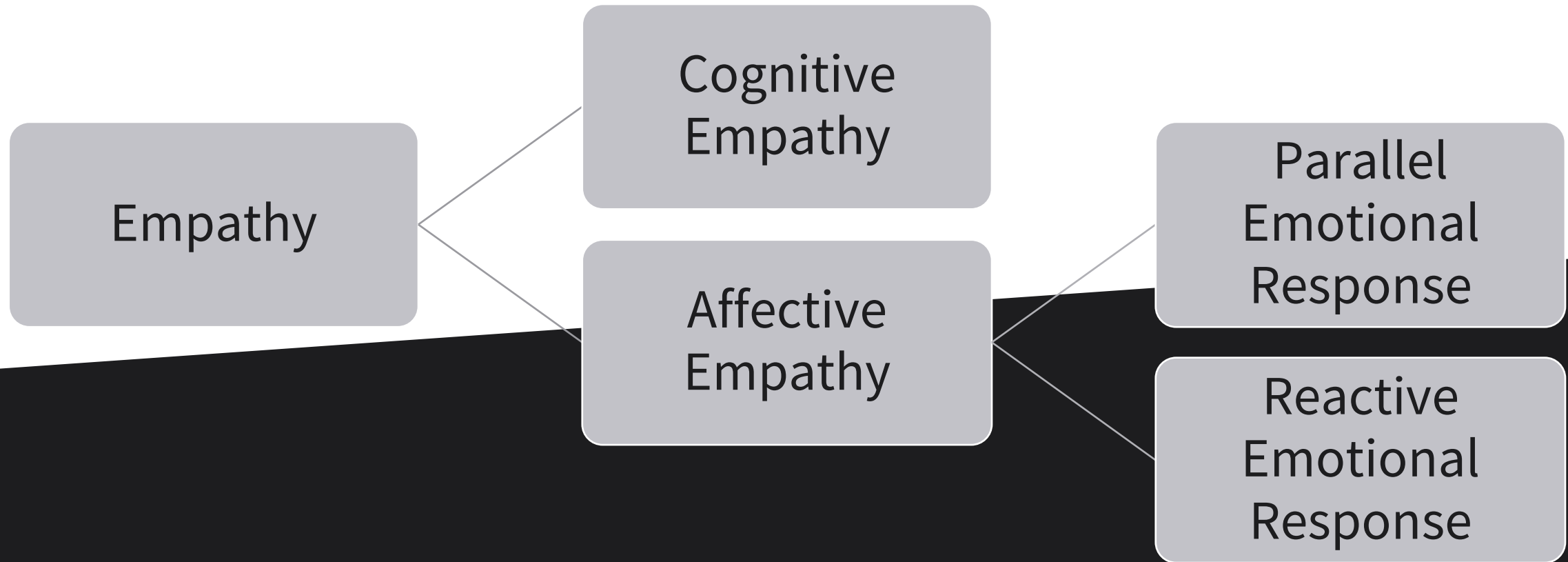
# 01

## **MOTIVATION & BACKGROUND**

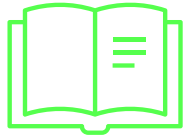
# WHAT IS EMPATHY?



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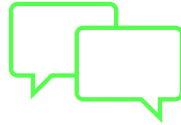


# TYPICAL USE CASES FOR CHATBOTS



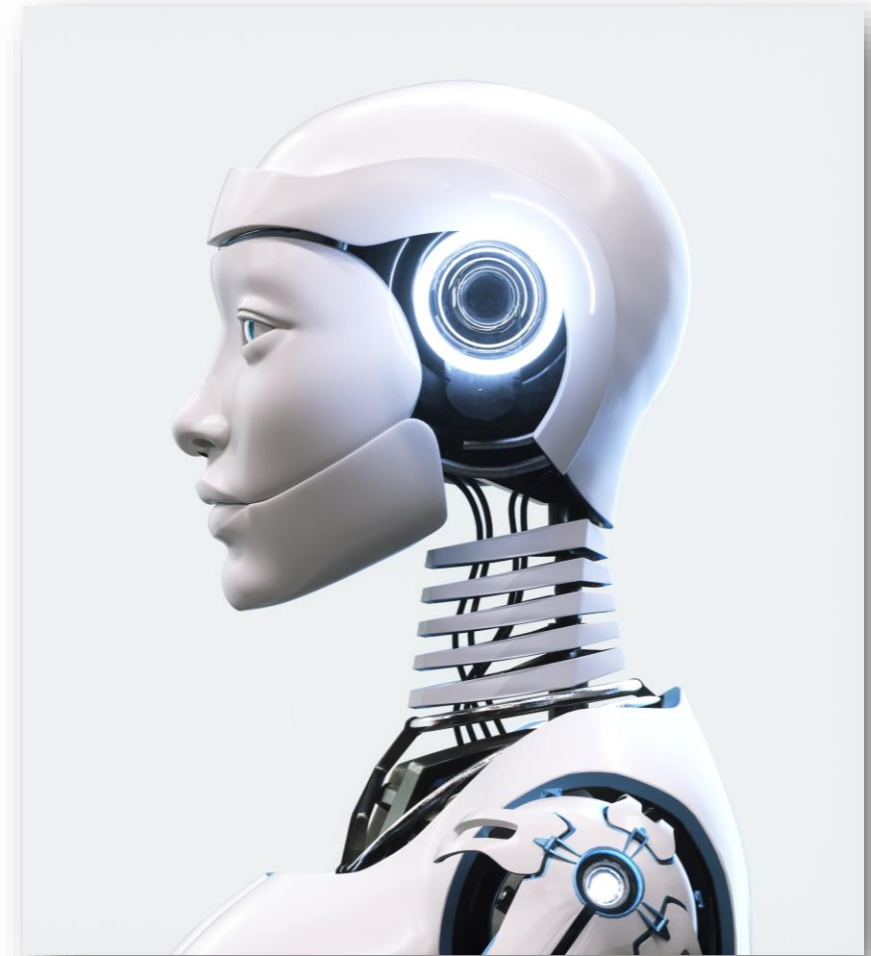
Learning  
Support

Chat  
Companion



Medical  
Advice

Customer  
Support



# WHY DO WE NEED EMPATHIC CHATBOTS?



Improving User  
Experience & Acceptance



Building  
Trust



Enhance  
Engagement

# RELATED WORK

- GPT-3 showed a high psychopathy score → lack of empathy (Li et al., 2022)
- No standardized or valid methods for measuring empathy in chatbots (Yalçın et al., 2019)

A/B tests

Level of  
empathy by  
human rating

Feature-level

System-level

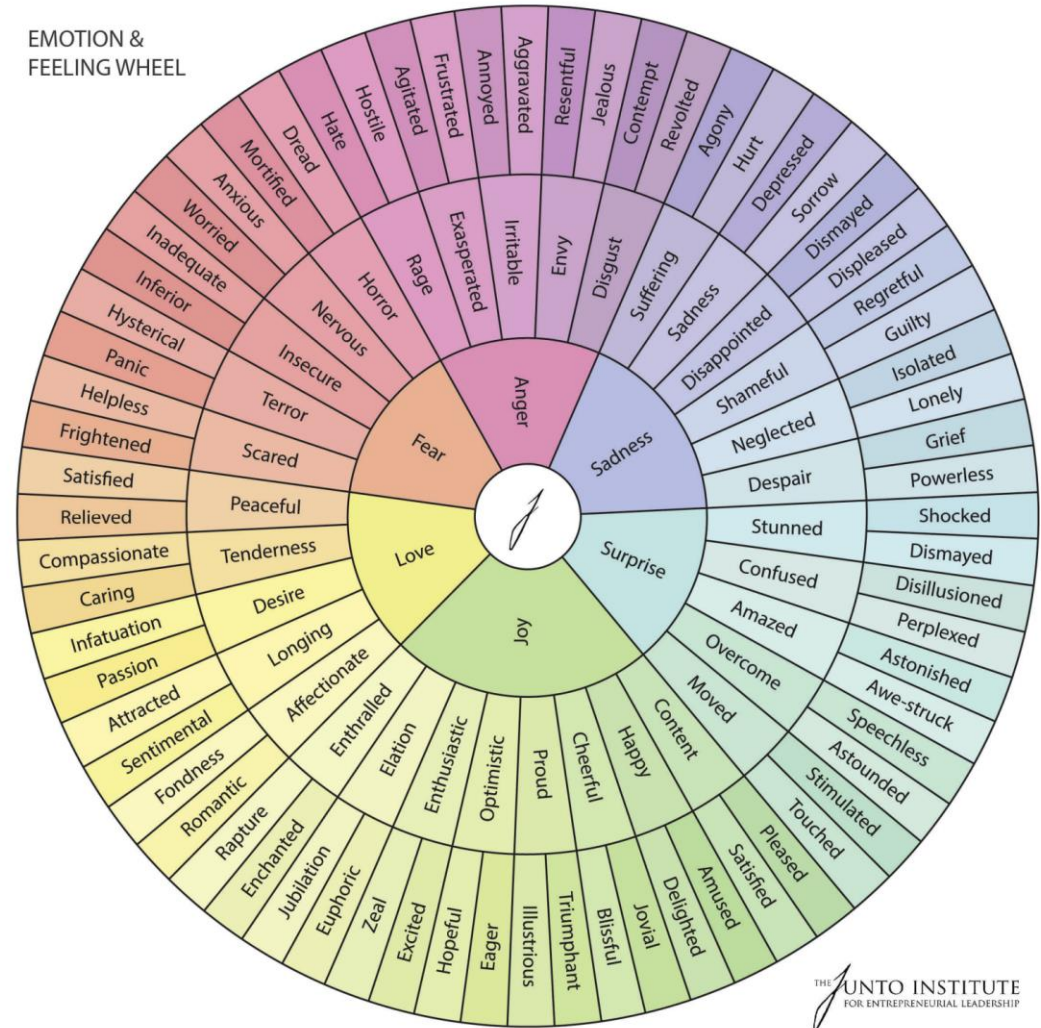


# 02

## **STUDY 1: UNDERSTANDING & EXPRESSING EMOTIONS**

# EXPERIMENTAL SETUP: DATASET CREATION

- 1) Picking neutral sentences covering different types of conversations
- 2) Let ChatGPT reformulate all items into a set of basic emotions
  - Joy
  - Love
  - Fear
  - Surprise
  - Sadness
  - Anger
- 3) Manually label the generated sentences to determine the accuracy of the model



# EMOTION EXAMPLES

## Initial prompt

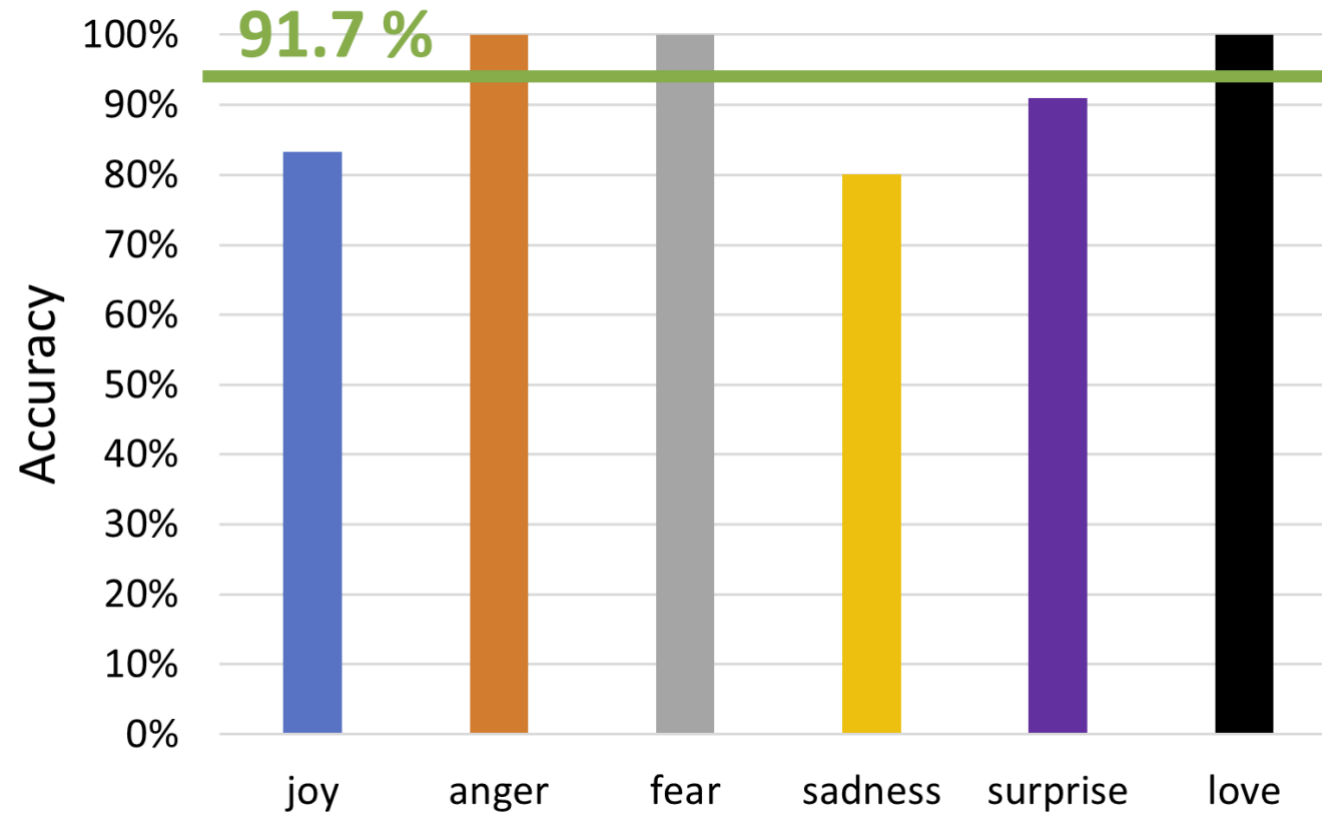
“We are celebrating my grandmother’s 80<sup>th</sup> birthday today.”

“I can’t believe we’re supposed to be celebrating my grandmother’s 80<sup>th</sup> birthday today - I am absolutely furious about it! There’s so much to do, so many people to deal with, and it’s just one more thing that I have to manage.” **Anger**

“Hooray! Today is my grandmother’s 80<sup>th</sup> birthday, and we are absolutely thrilled to be celebrating!” **Joy**

“I am filled with fear at the thought of celebrating my grandmother’s 80<sup>th</sup> birthday today, as I worry about the possibility of something going wrong or unexpected events taking place.” **Fear**

# DOES CHATGPT KNOW WHICH EMOTION IT IS EXPRESSING? RESULTS



# 03

**STUDY 2: EXPRESSING EMPATHY**

**PARALLEL EMOTIONAL RESPONSE**

# PARALLEL EMOTIONAL RESPONSES

## Data collection:

- 20,327 EmpathicDialogues prompts (Rashkin et al., 2019)

## Data evaluation:

- Emotion classification model with the following labels:
  - Joy
  - Fear
  - Surprise
  - Sadness
  - Anger

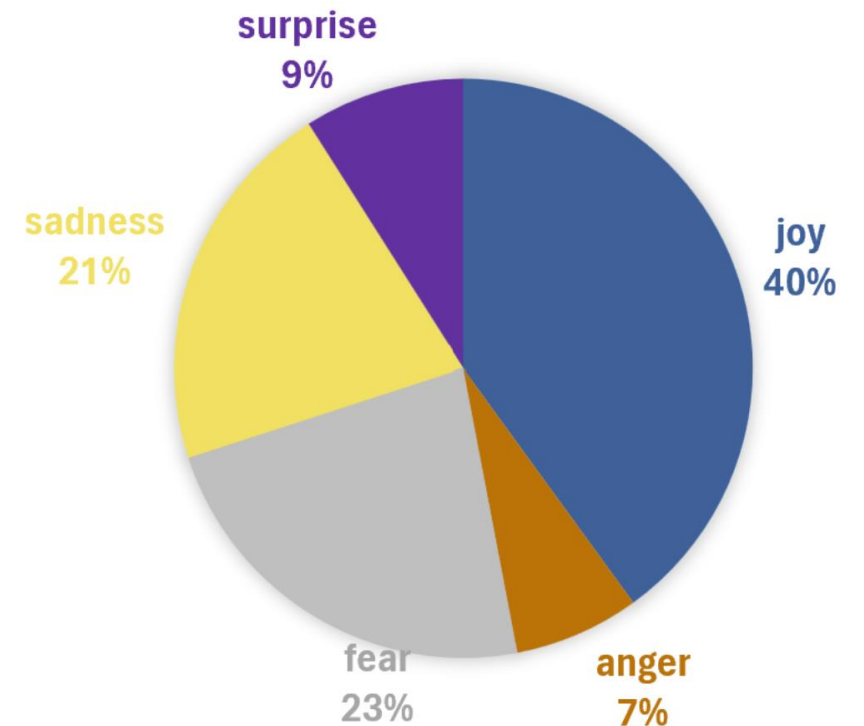


# DOES CHATGPT KNOW WHICH EMOTION IT IS EXPRESSING?

## PARALLEL EMOTIONAL RESPONSE

Emotional Response (ChatGPT)

		joy	anger	fear	sadness	surprise
Initial Emotion (Human)	joy	96,1%	0,7%	1,3%	1,5%	0,3%
	anger	57,6%	18,1%	10,6%	13,2%	0,6%
	fear	37,4%	1,3%	54,8%	6,2%	0,3%
	sadness	44,5%	1,3%	4,7%	49,2%	0,3%
	surprise	72,9%	1,2%	7,4%	3,5%	15,1%



# 04

**STUDY 3:**

**EMPATHIC PERSONALITY**



# EXPERIMENTAL SETUP

- Interpersonal Reactivity Index (Davis, 1980)
- Toronto Empathy Questionnaire (Sprengh et al., 2009)
- Perth Empathy Scale (Brett et al., 2022)
- Empathy Quotient (Baron-Cohen et al., 2004)
- Autism-Spectrum Quotient (Baron-Cohen et al., 2001)

# EXPERIMENTAL SETUP



Empathy  
Questions



Prompts for  
ChatGPT



ChatGPT's  
Responses

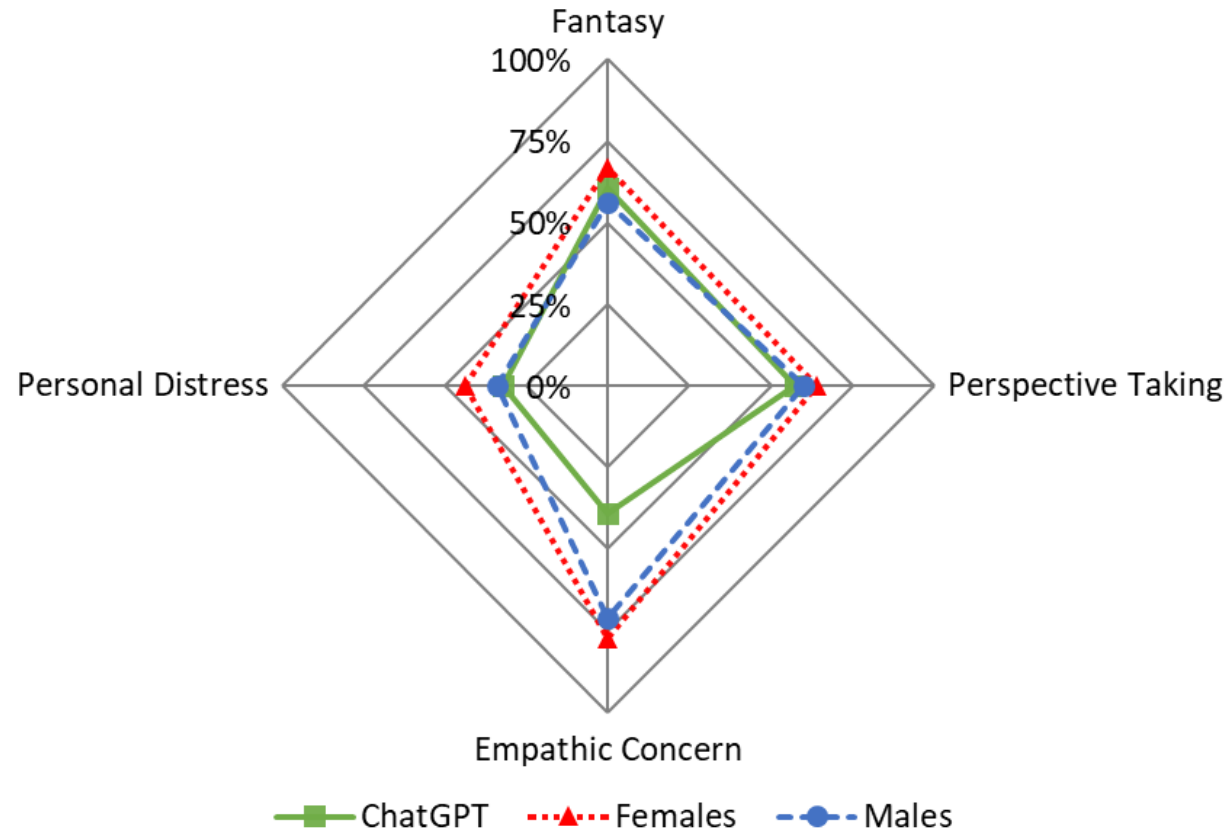


Questionnaire's  
Total Score



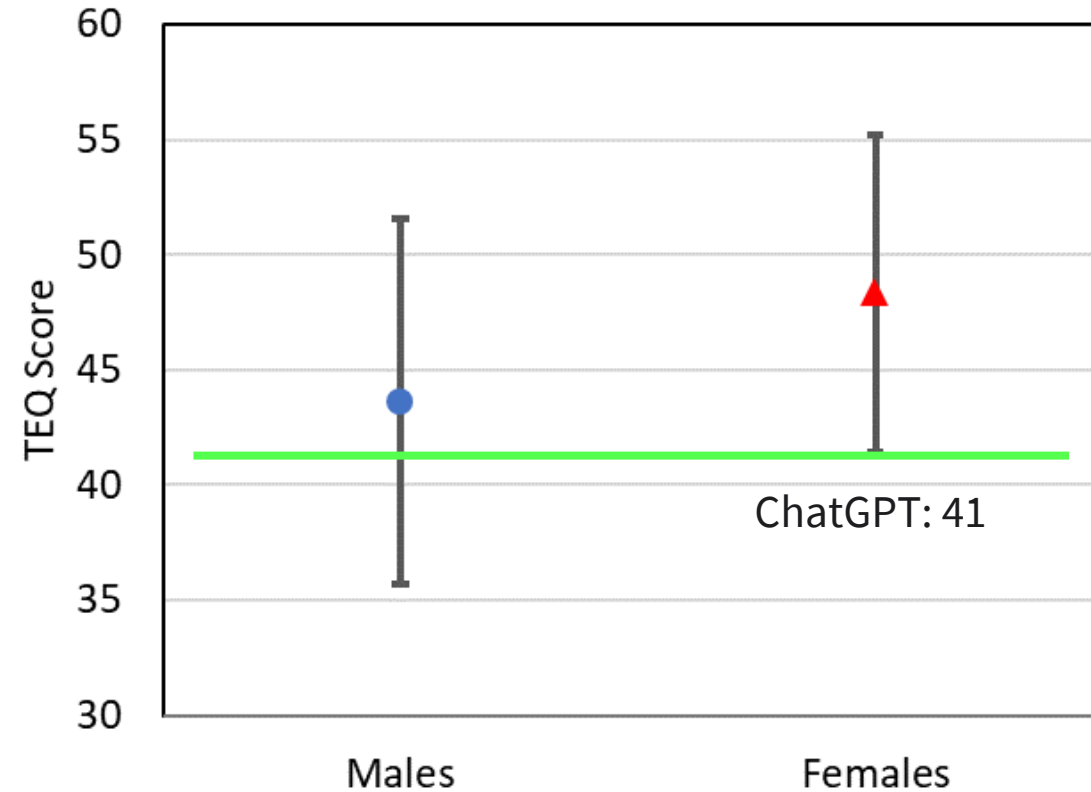
# RESULTS

## - Interpersonal Reactivity Index -



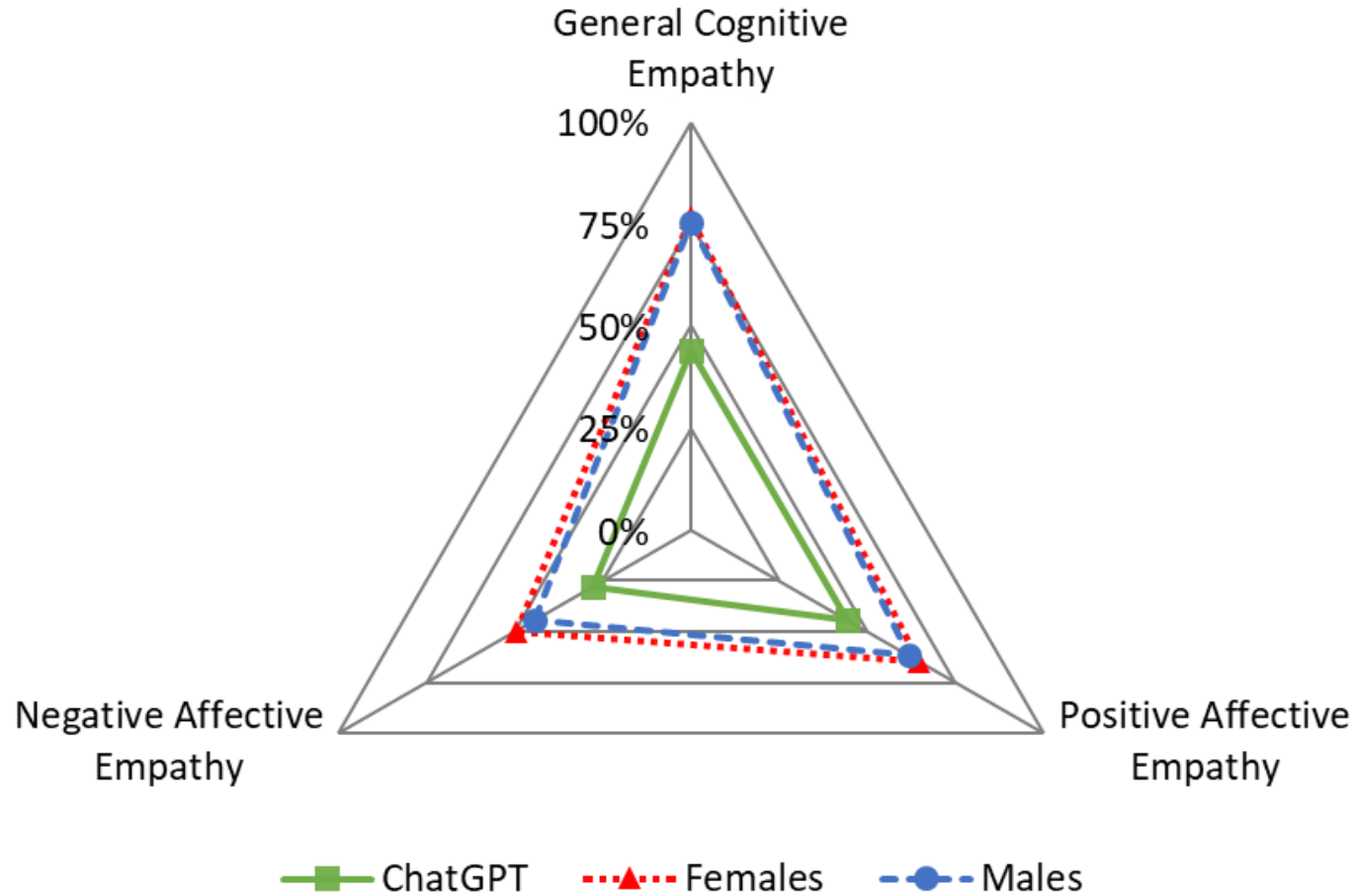
# RESULTS

## - Toronto Empathy Questionnaire -



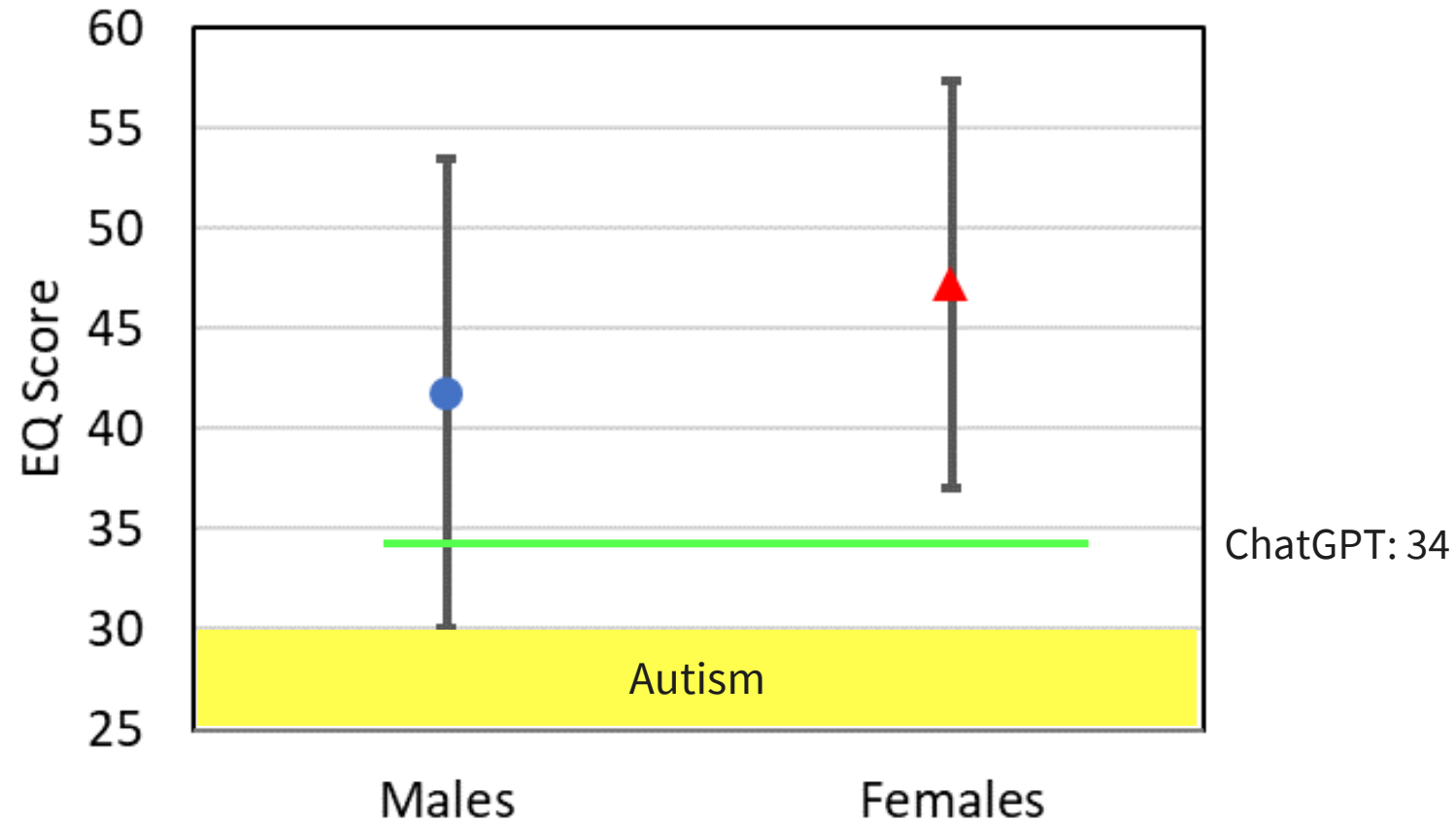
# RESULTS

## - Perth Empathy Scale -



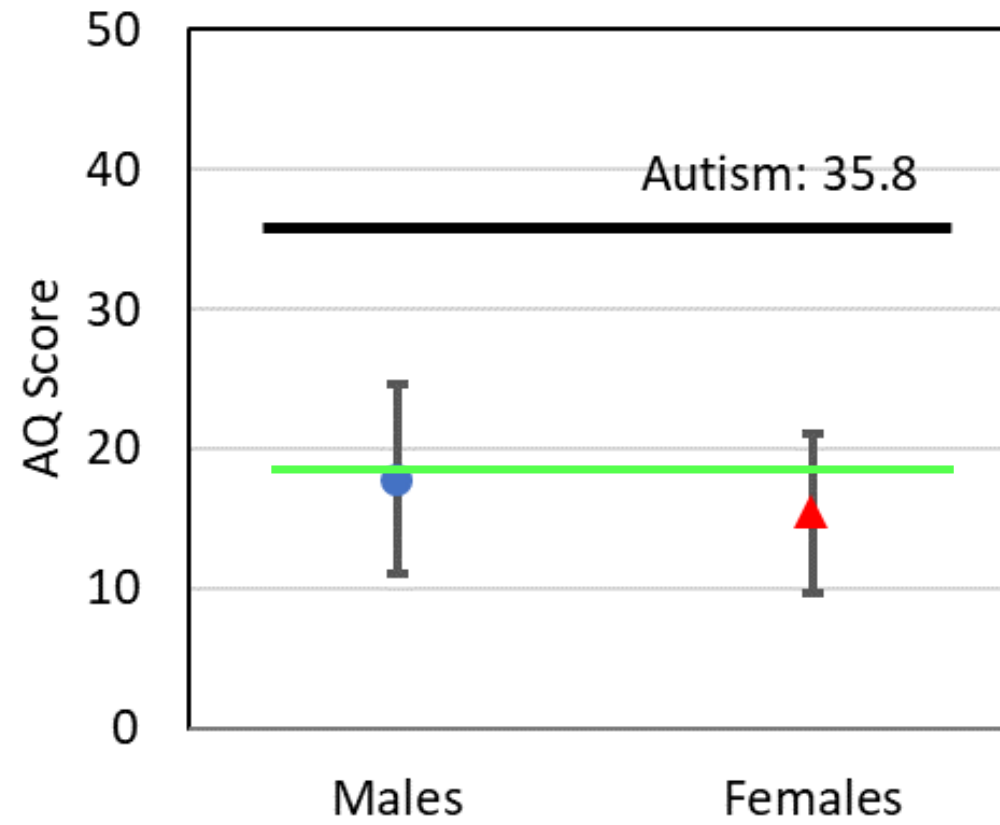
# RESULTS

## - Empathy Quotient -



# RESULTS

## - Autism-Spectrum Quotient -



ChatGPT: 19

# 05

## **SUMMARY & CONCLUSIONS**



# CONCLUSIONS



⇒ Ability to express emotions



⇒ Ability to show empathic responses



⇒ Less empathic than humans but more empathic than autistic people

# FUTURE DIRECTIONS

Comparison with further chatbots

Increased number of emotions

Reactive emotional responding

Multilingual studies

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# THANK YOU

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