

Designing Neuro-affirming Human-AI Interactions for Coping with Negative Self-talk for Autistic Adults

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Negative self-talk (NST)

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“I’m no good”

“I’m so disappointed in myself”



Negative self-talk (NST)

These thoughts are **repetitive, intrusive, and lead to rumination.**



Negative self-talk (NST)

Rumination or NST is a significant predictor of

- **anxiety**
- **depression**
- **physiological distress**



Compared to non-autistic peers, autistic individuals

- engage in **more negative repetitive thinking**



Compared to non-autistic peers, autistic individuals

- engage in **more negative repetitive thinking**
- are statistically **more likely to have co-occurring conditions**



Traditional therapy might not always be effective

Challenges in articulating
feelings and thoughts



Cost



Limited number of practitioners
specialized in autism

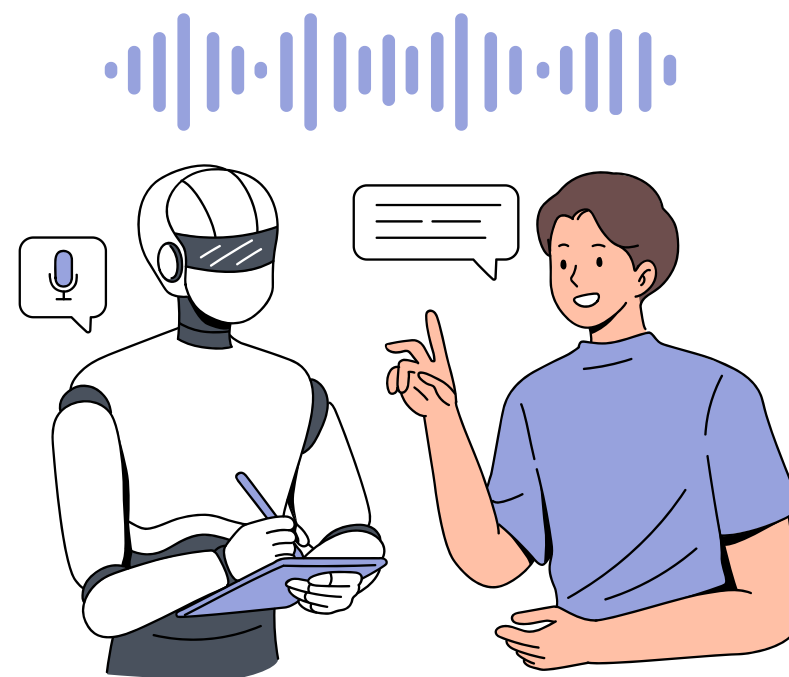


Many autistic individuals are using LLMs to receive support with day-to-day tasks.

Interpersonal communication



Talking buddy



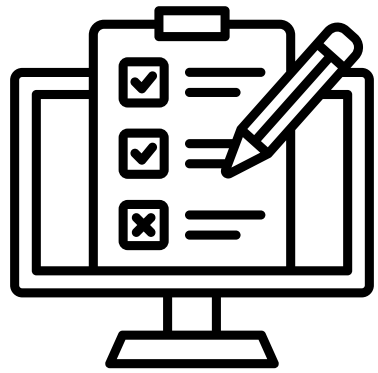
Seeking mental health guidance



Research Goals

1. Understand autistic individuals' experiences with NST and their coping strategies
2. Explore how autistic individuals envision LLMs helping them cope with NST and evaluate practitioners' perspectives on these envisioned supports
3. Explore how autistic individuals initiate a conversation with LLMs about their NST and practitioners' views of LLM responses

Survey study



With 200 autistic adults experiencing NST, who were recruited through SPARK (Simons Foundation Powering Autism Research for Knowledge).

Survey study

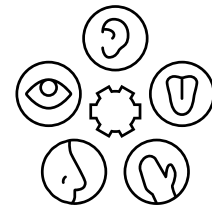
We asked autistic participants (n= 200) about

1. Experiences with NST and their coping mechanisms
2. Envisioned support from AI for coping with NST
3. Interaction preferences (conversation structure, tone, and modality)
4. Concerns about using AI in the mental health context
5. Participants' prompts to LLM about their NST

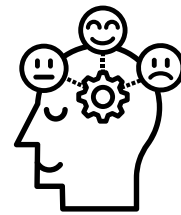
Practitioner Evaluation



Interviews with practitioners who work closely with autistic individuals



Occupational therapist (OT)



Cognitive Behavioral Therapist (CBT), specialized in
Acceptance and Commitment Therapy (ACT)



Community-Based Support Services Provider (CSS)

Practitioner Evaluation

Interview sessions focused on evaluating:

- Participants' envisions and preferences for AI for support in coping with NST
- Practitioners' perspectives on AI's potential to support their current therapeutic practices
- Responses of LLMs (ChatGPT and Claude) to participants' prompts

Experiences with NST

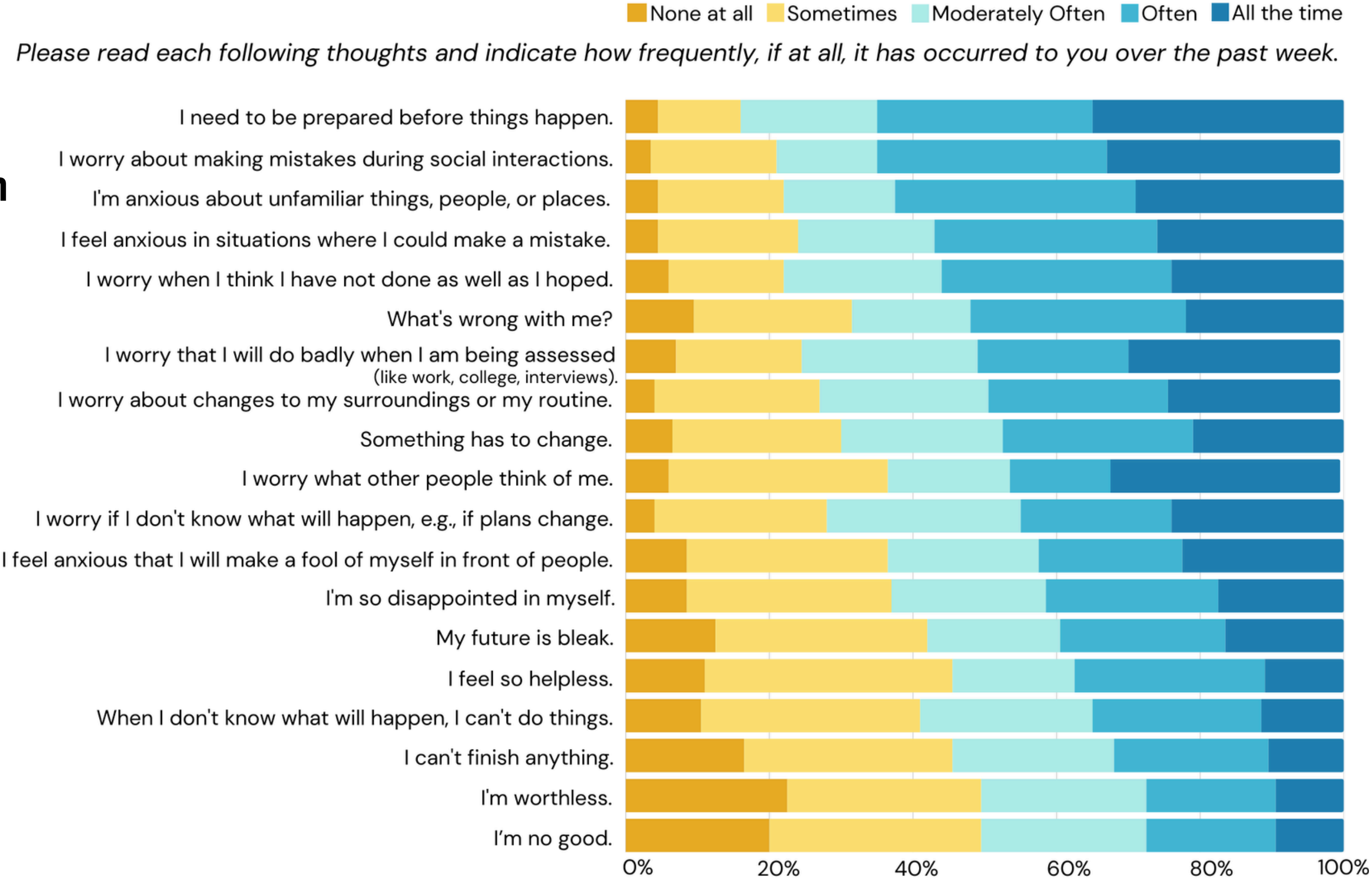
We measured how often participants experience NST using two validated psychological scales:

- Negative Automatic Thought Questionnaire (ATQ-N)
- Anxiety Scale for Autism-Adults (ASA-A)

Experiences with NST

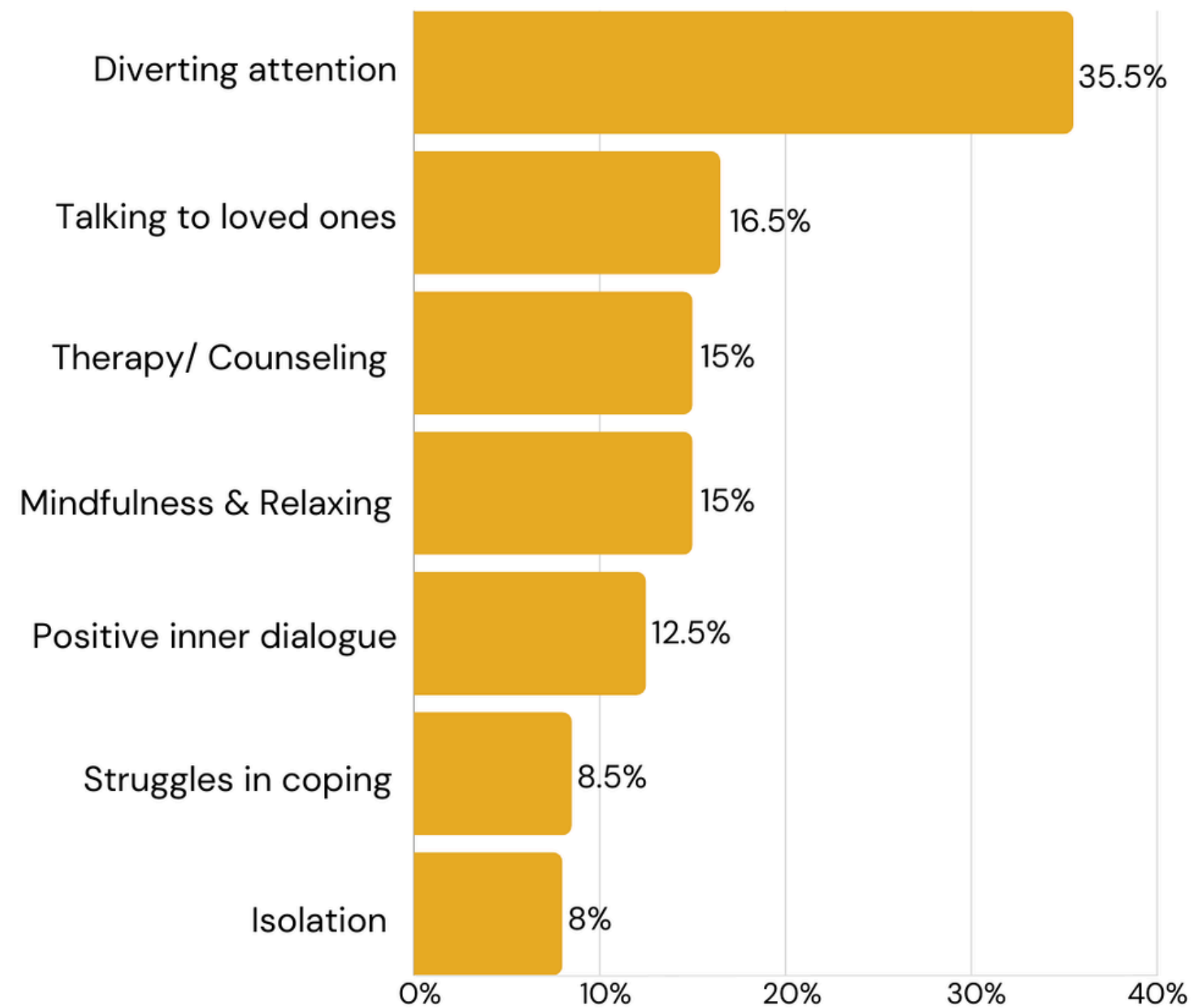
On average, participants experience NST **more than moderately often** (Mean: 3.25/5).

Please read each following thoughts and indicate how frequently, if at all, it has occurred to you over the past week.



ATQ-N: Netemeyer, 2002; Anxiety Scale for Autism-Adults (ASA-A): Rodgers et al., 2020

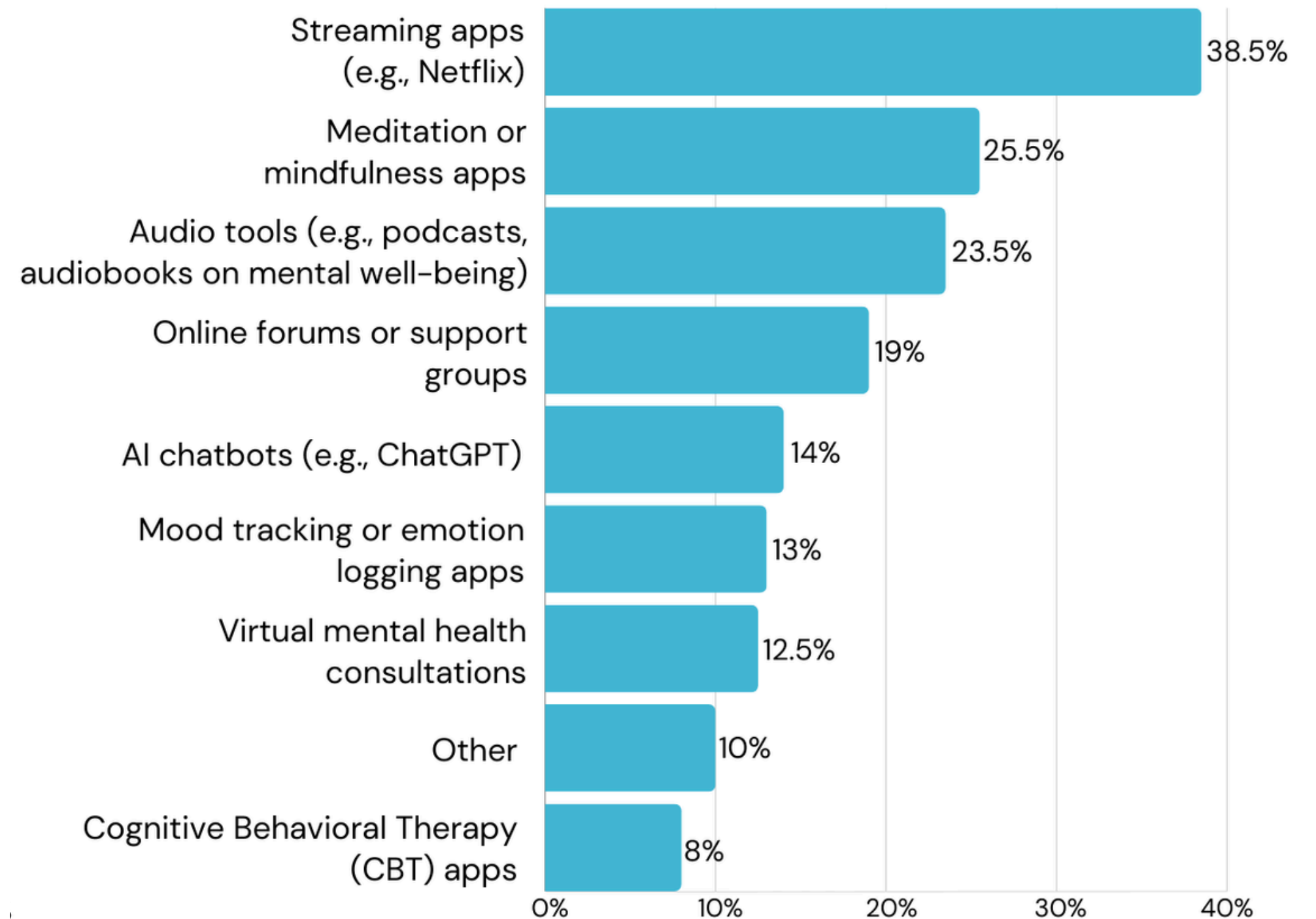
Coping strategies



The most common coping strategies among participants are **distractions, talking to friends/ family or therapists, and mindfulness practices.**

Coping strategies

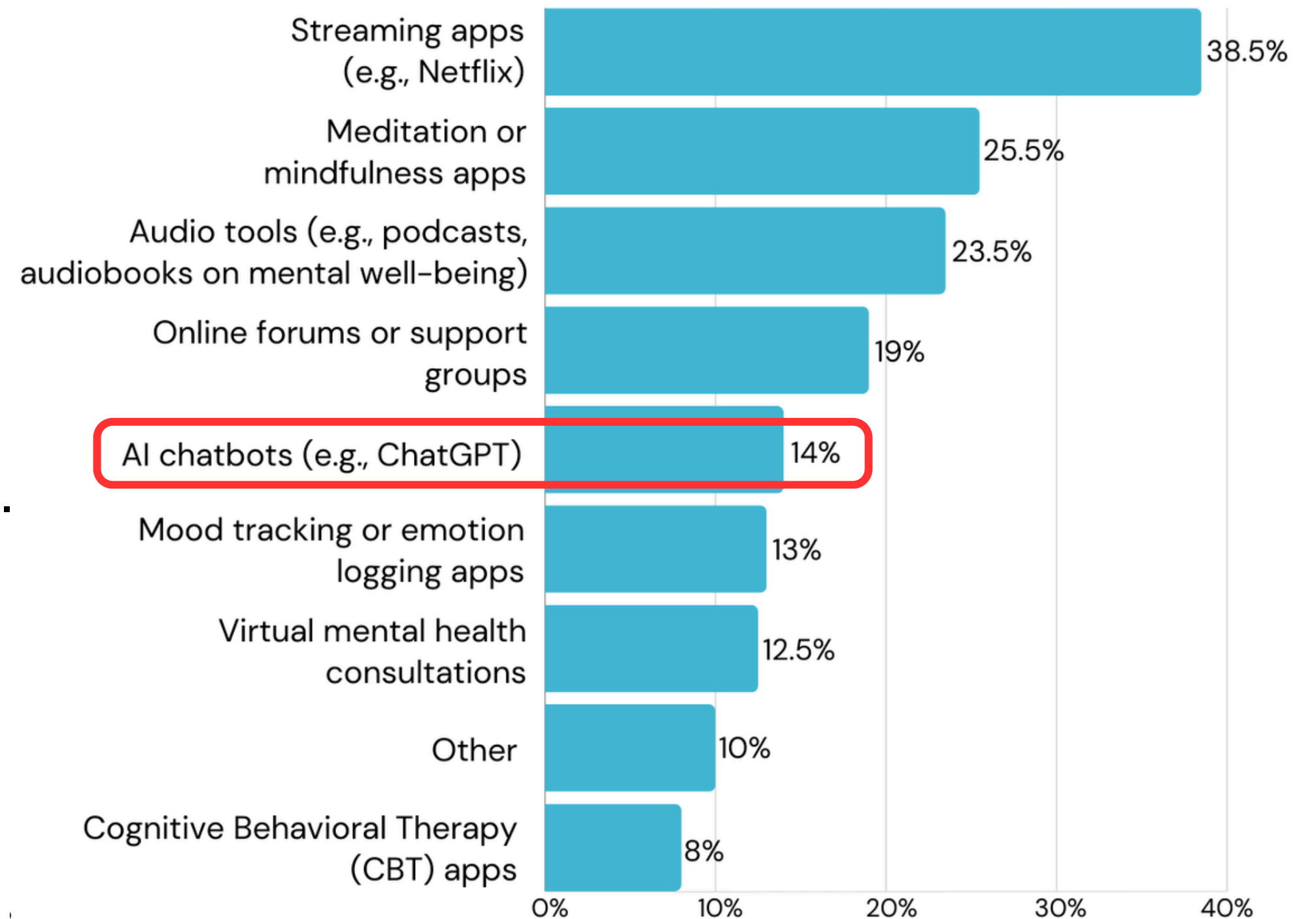
Participants use technologies like **streaming services, meditation/mindfulness apps, and audio tools** to help cope with NST.



Coping strategies

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14% of participants mentioned using AI chatbots.

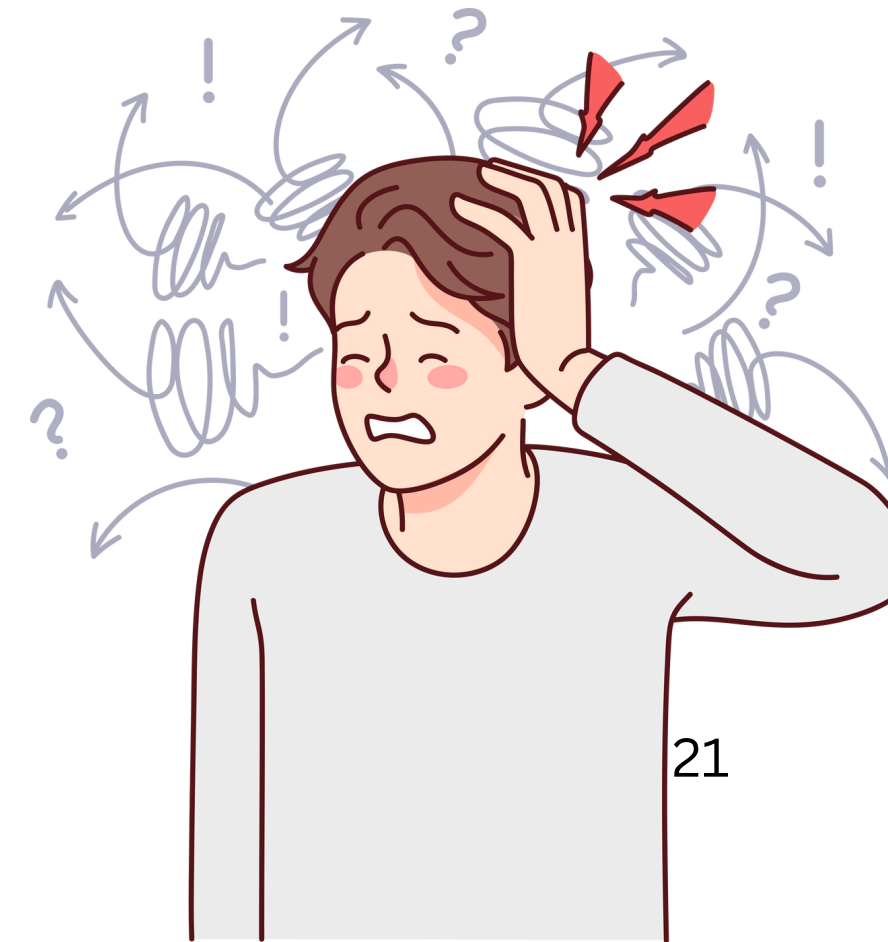


Coping strategies

Many participants do not have coping mechanisms that actually work.

“Nothing works”

“I don't know how to cope”



Experiences with NST

How much do participants **want to talk to** someone when they experience NST?

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How much do participants **want to talk to** someone when they experience NST?

Over 60% of our participants want to talk to someone about these thoughts.

However, among this group, 80% report not having anyone to talk to.

Experiences with NST

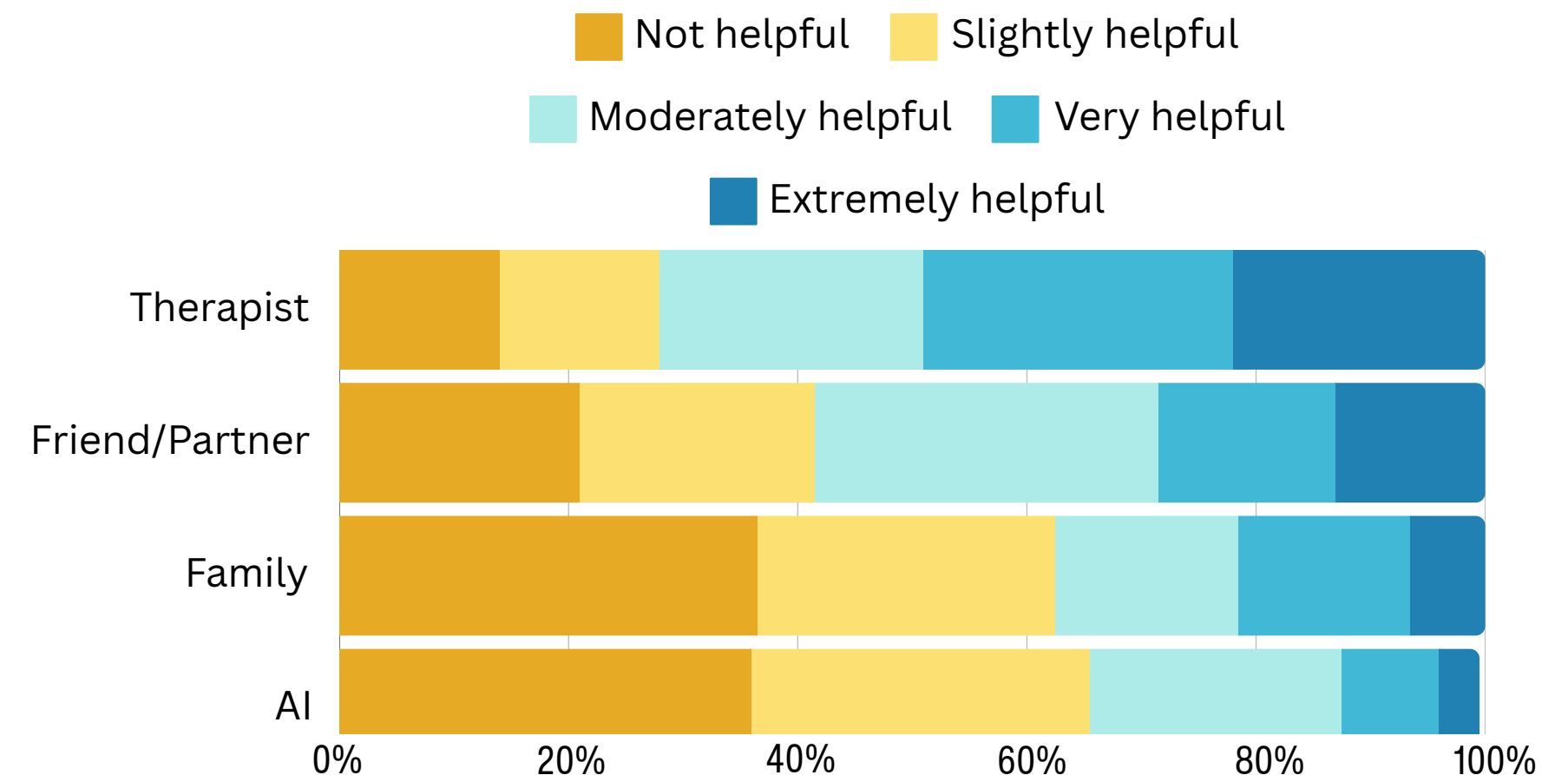
A recent Pew Research Center survey (2024) shows that people prefer to discuss their mental health with mostly a **close friend** (57%), followed by an **immediate family member** (52%) and a **therapist** (50%).

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A recent Pew Research Center survey (2024) shows that people prefer to discuss their mental health with mostly a **close friend** (57%), followed by an **immediate family member** (52%) and a **therapist** (50%).

Our participants **find it more helpful to talk to a therapist** rather than to a close friend.

Moreover, 37% of participants who have no one to talk to about their NST find talking to AI helpful.



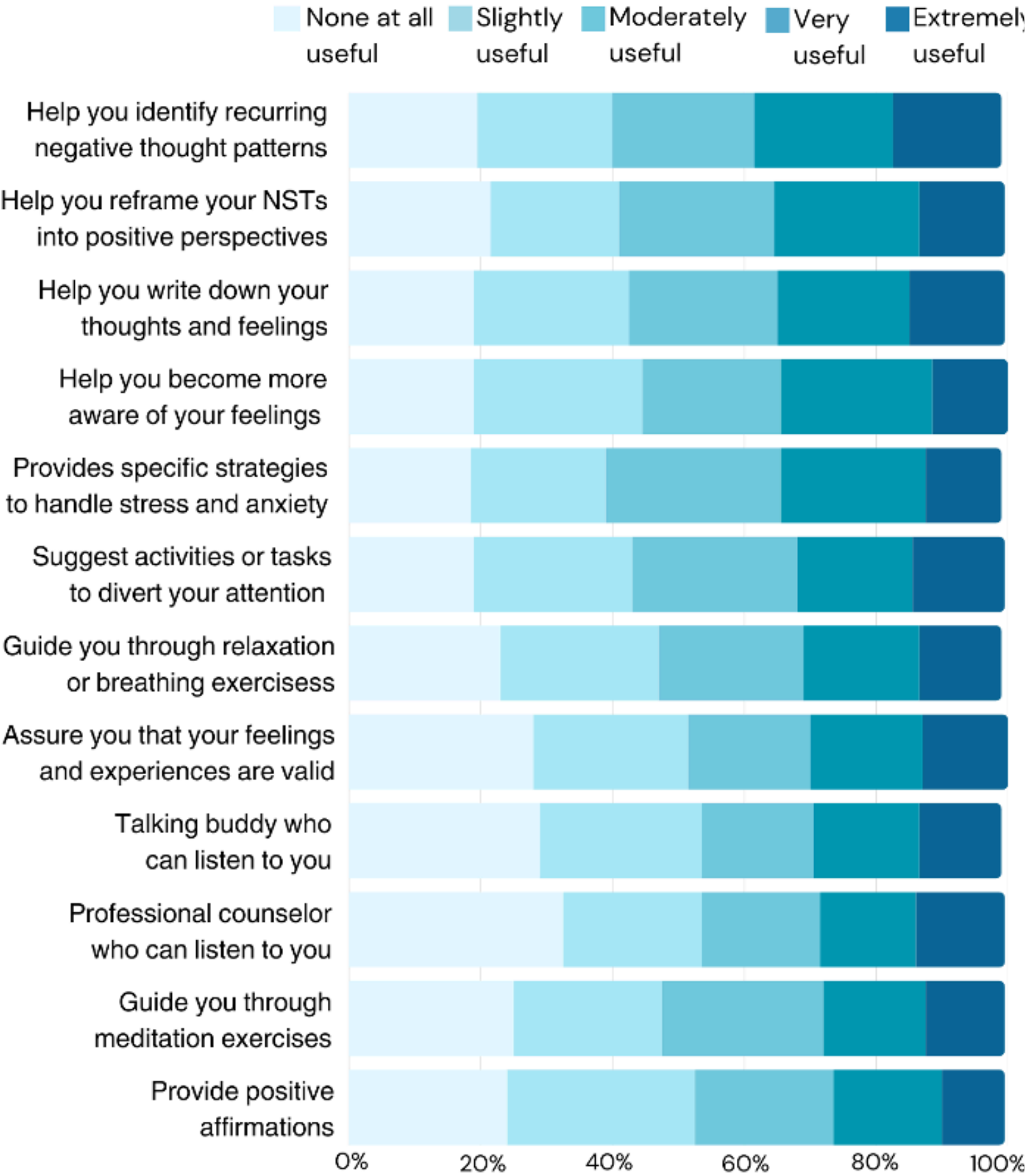
Envisioned support from AI

We asked participants

If AI could provide the following support mechanisms regarding the thought that affects you the most, how useful would you find each type of support?

Envisioned support from AI

Participants find AI useful for **identifying and reframing NSTs**, assisting with journaling, and providing **strategies to manage stress and anxiety**.

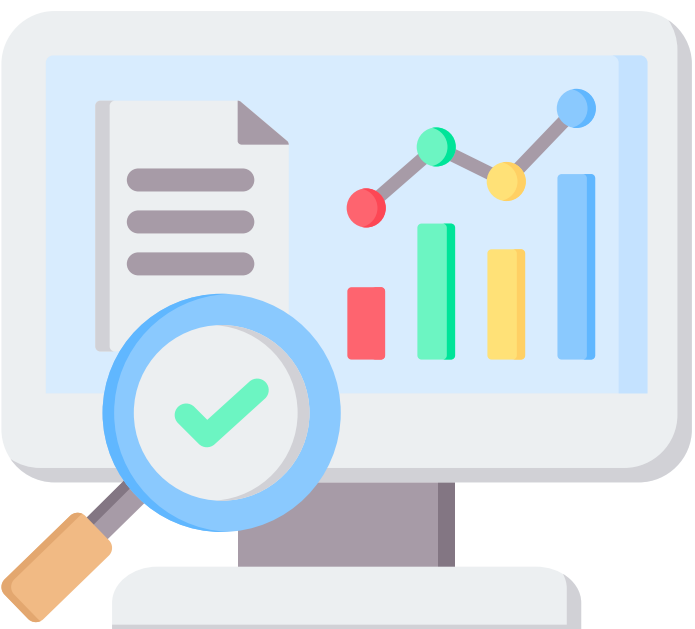


Envisioned support from AI

AI as a **visualization/ analytical tool** to better understand their NST

“Log information about events and thought patterns to help me find patterns, and based on those patterns, suggest behavior strategies I could try”.

“Offering neutral observations on how often a specific thought is reported ('you've expressed this intrusive negative thought Y amount of times in the past 14 days')”.



Envisioned support from AI

AI as a **conversational partner** to better understand & express their thoughts and feelings.

*“Helping figure out what emotion it is. It may help to bring it up
and talk about it with others easily if I know what to call it.”*



Envisioned support from AI

AI as an **additional support system during and between therapy sessions**

“Send a note to my therapist about when or how often something is happening.”

“Attaching a name to those feelings would help to express them effectively to my therapist.”

“It can guide through some techniques learned in therapy like CBT practices or color therapy.”



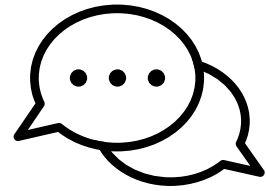
Envisioned support from AI

AI provides **personalized positive affirmations** and **reassurances**

“Telling me that everything will be ok, this storm shall pass and the sun will shine again.”

*“It is going to get better; these challenges are temporary.
You have got this!”*

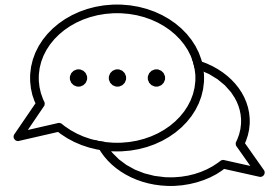
Interaction Preferences



Conversation structure

Participants prefer AI to engage using **lists of suggestions**, **continuous dialogue**, and **targeted questions**.

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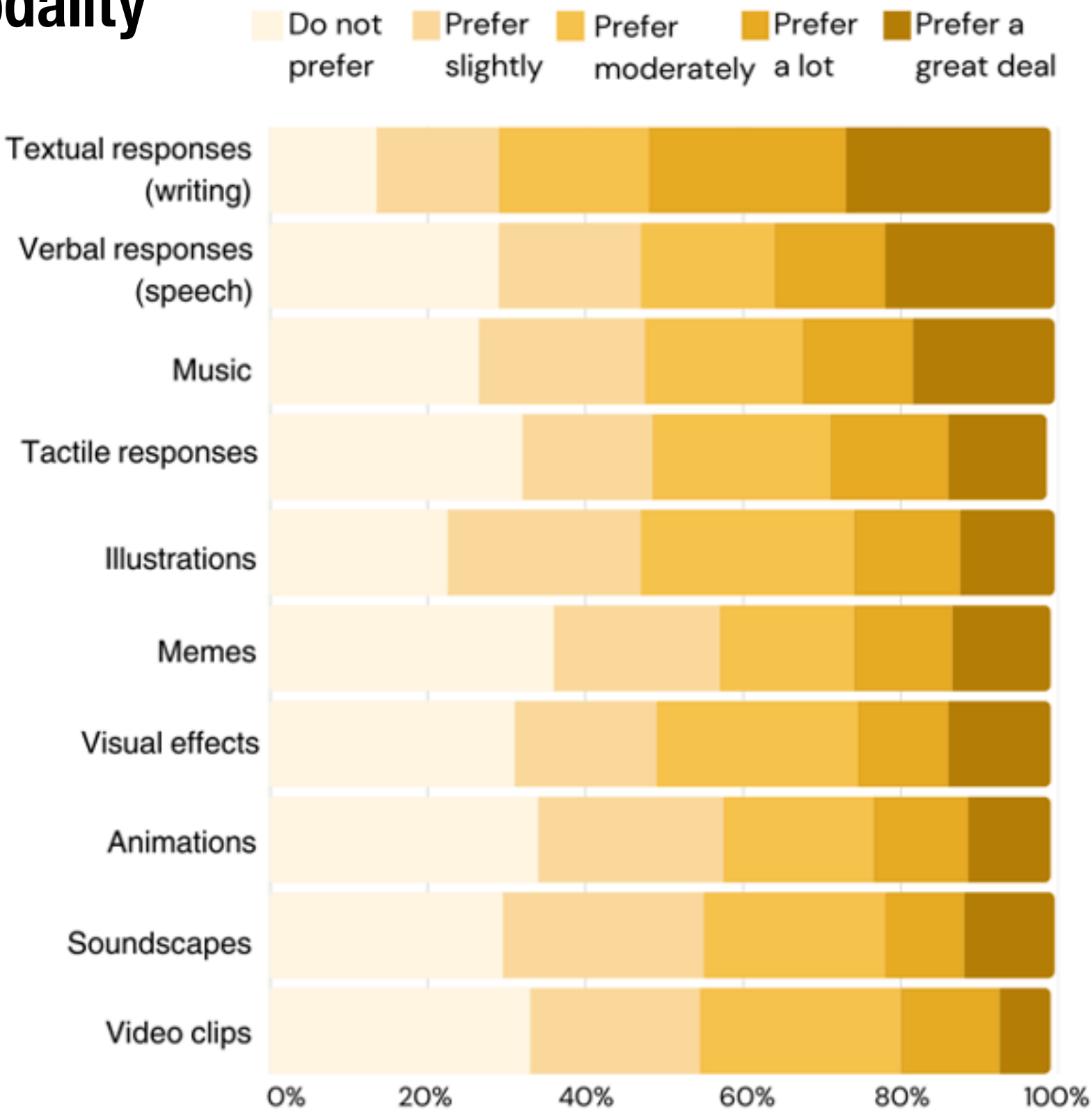


Tone

Participants prefer **factual**, **empathetic**, and **friendly** tones from AI but not **funny**.

Interaction Preferences

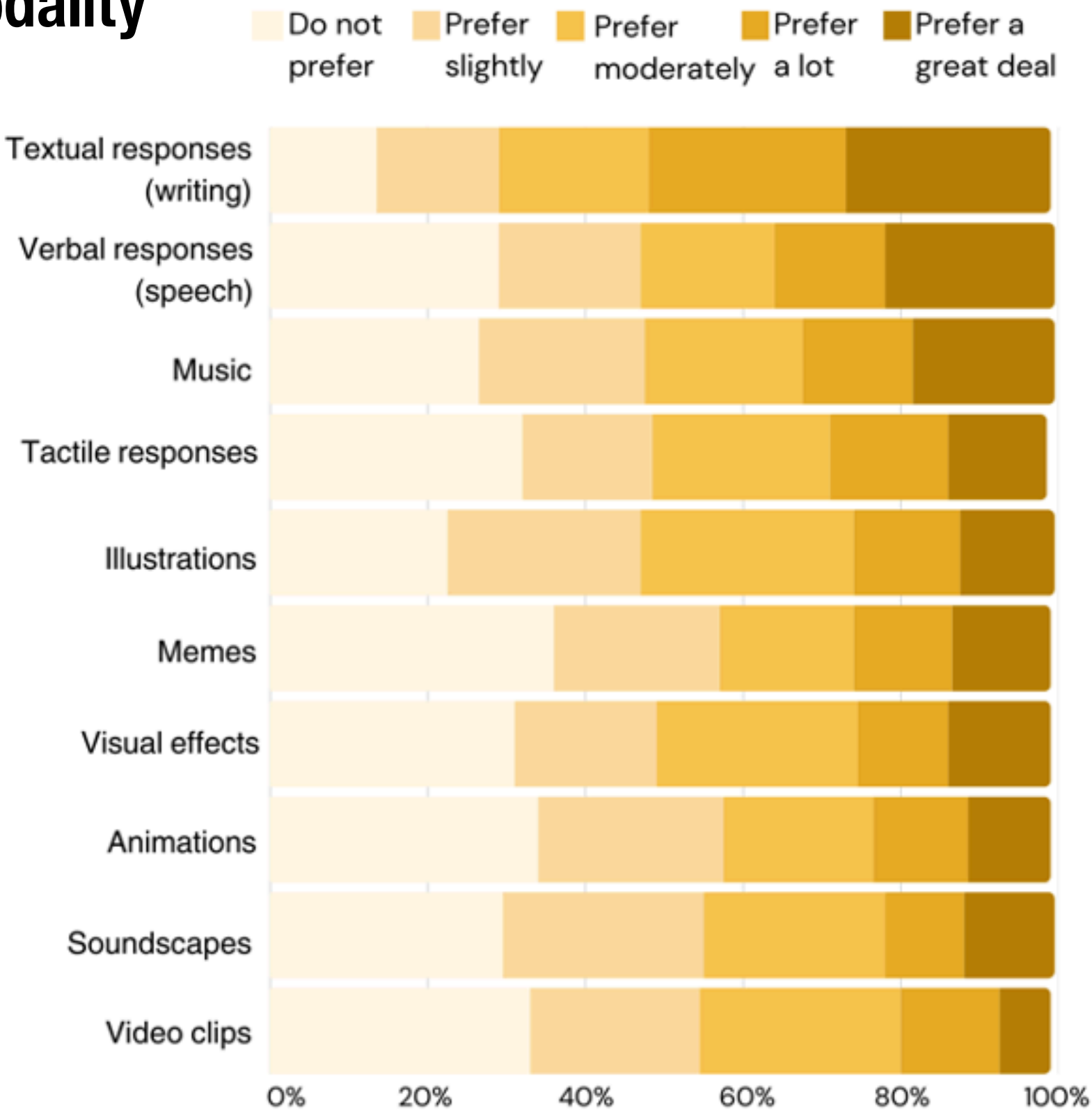
Modality



While textual interaction was most preferred, many participants expressed interest in **speech, music, tactile responses, and visual effects.**

Interaction Preferences

Modality

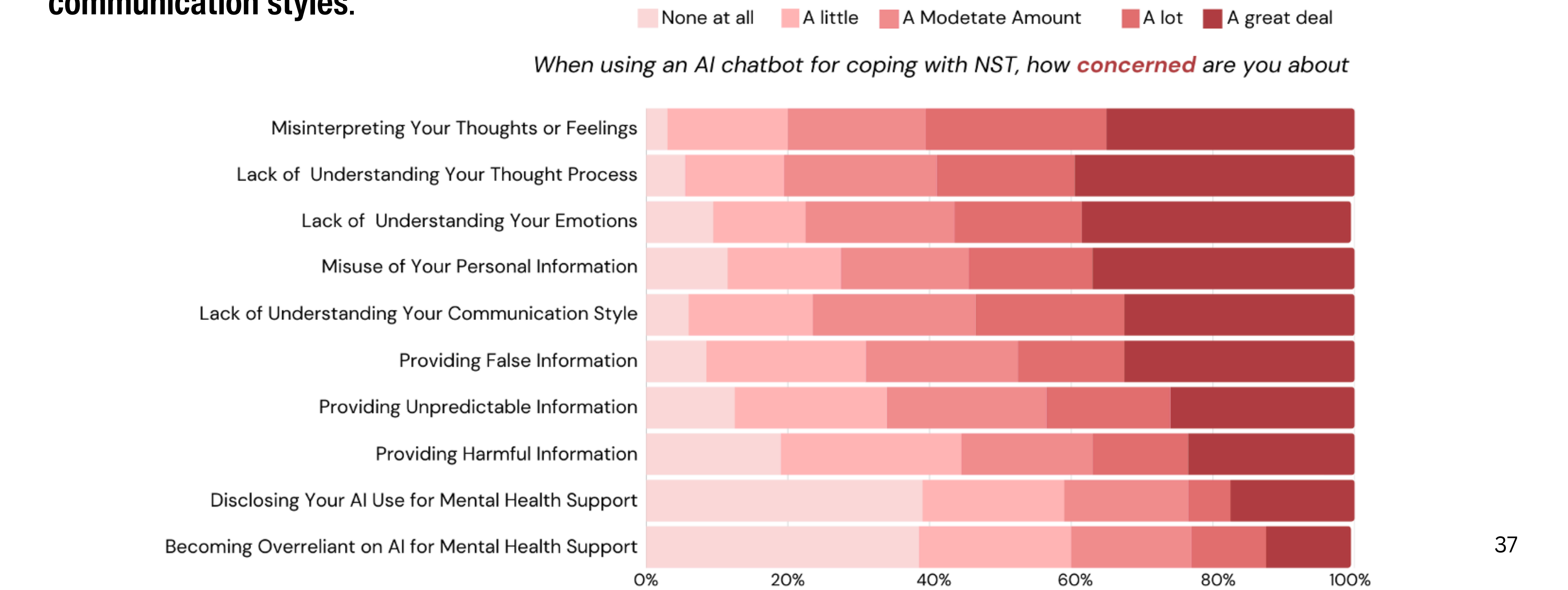


“I really like the idea of the AI being able to respond with music, especially with music that may feel like or relate to how you're feeling.”

“I greatly prefer textual -- as I do when talking to people -- but the idea of some soundscapes or music would be nice. Speech as part of a guided meditation would be nice too.””

Concerns

Participants are concerned that AI might **misunderstand or fail to understand their thoughts, emotions, and communication styles.**



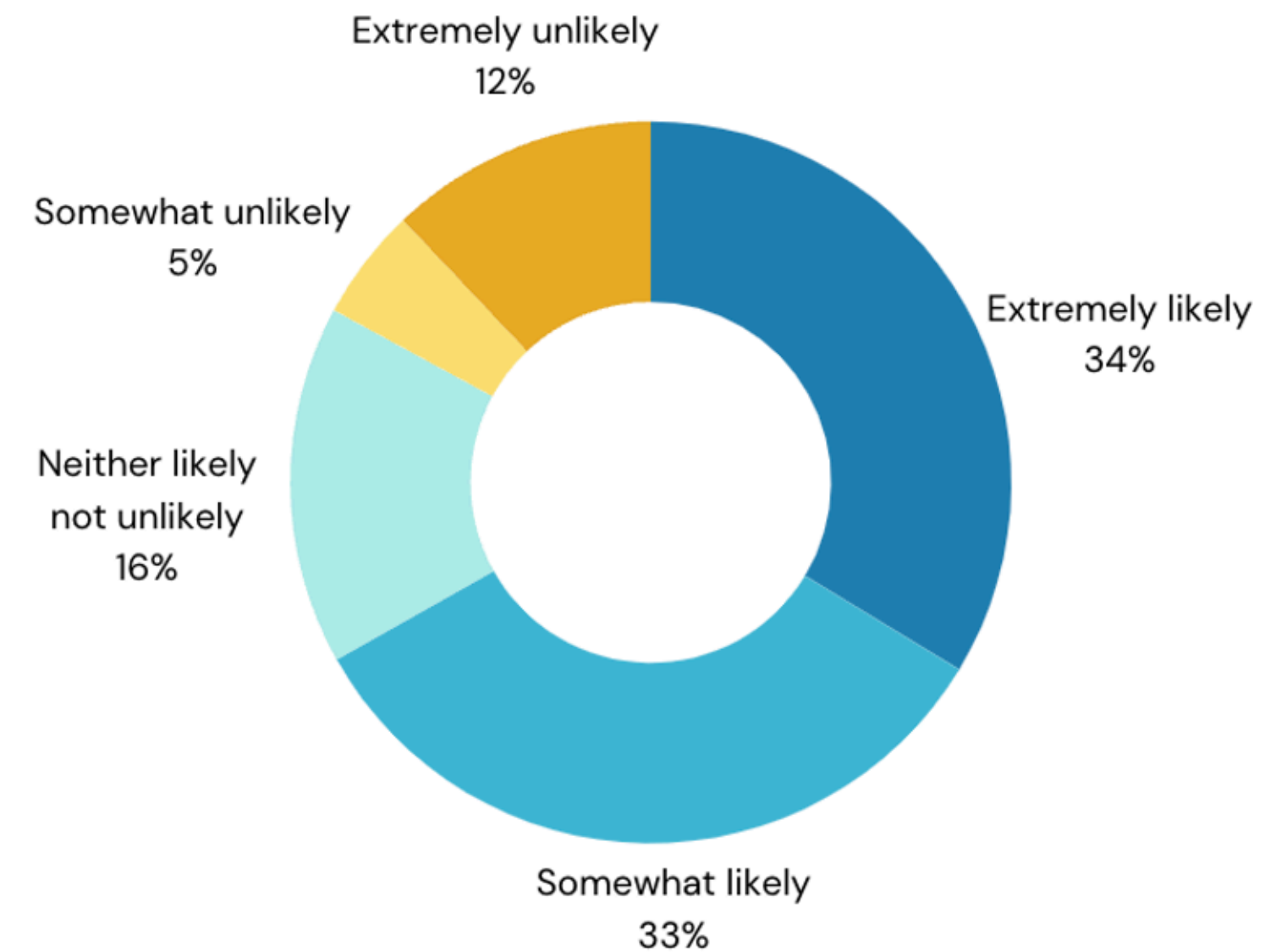
We asked participants

If an AI tool has all the characteristics you prefer, how likely would you use this tool to help you with this thought?

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67% of participants are willing to use AI for coping with NST if it can provide their preferences.



Practitioners' view on participants' visions

Participants' preferences are aligned with practitioners' current therapeutic practices.



**CBT/ACT
Practitioner**

“Tracking thoughts and linking them to behaviors is a core component of CBT. AI can help with this process by automating the identification and thought patterns.”

Practitioners' view on participants' visions

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**OT
Practitioner**

“Affirmations and positive self-talk phrases that resonate with them are a key part of our every session.”

Practitioners' view on participants' visions

AI has a potential as a **complementary tool for therapeutic progress.**

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**OT
Practitioner**

“AI can act as a built-in support system to help continue to support throughout the week whether through positive self-talk or reminders of what was covered in sessions. It might even act like a cheat sheet, helping clients continue practicing what they learned before the next session.”

Practitioners' view on participants' visions

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**CBT/ACT
Practitioner**

For the challenges with completing homeworks,
“Technology could significantly increase engagement, whether it is by monitoring or practicing new skills.”

Practitioner's evaluation of LLM responses

Practitioners feedback on LLM responses revealed key issues.

- Vague and Abstract Expressions
- Long List of Choices and Jargon-Heavy Expressions
- Lack of actionable guidance

Practitioner's evaluation of LLM responses

Vague and Abstract Expressions



P18

Hey, I am struggling with hope. I don't see a way out of my problems.



ChatGPT

I'm really sorry to hear that you're feeling this way, but I'm glad you're reaching out. Sometimes, when problems seem overwhelming, it can be hard to see a way out. If you're comfortable sharing more, I'm here to listen and help in any way I can. Even in the darkest moments, small steps forward are possible, and you don't have to face it alone.

Practitioner's evaluation of LLM responses

Long List of Choices and Jargon-Heavy Expressions



P57

Can you please help me with being anxious about unfamiliar things?



Claude

I understand that feeling anxious about unfamiliar things can be challenging. Here are some strategies that may help you manage this anxiety:

- **Gradual exposure:** Start with small, manageable steps to expose yourself to new experiences. This can help build confidence over time.
- **Reframe your thoughts:** Try to view unfamiliar situations as opportunities for growth rather than threats.
- **Practice relaxation techniques:** Deep breathing, meditation, or **progressive muscle relaxation** can help calm your nerves.
- **Educate yourself:** Learning more about the unfamiliar situation can help reduce uncertainty and anxiety.
- **Develop a support system:** Share your feelings with trusted friends or family members who can offer encouragement.
- **Visualize Success:** Imagine yourself successfully navigating the unfamiliar situation.
- ...

Practitioner's evaluation of LLM responses

Lack of actionable guidance

P

P101

I am struggling and need help



ChatGPT

I'm sorry to hear that you're struggling. How can I support you right now? Whether it's something specific or just needing to talk things through, I'm here for you.

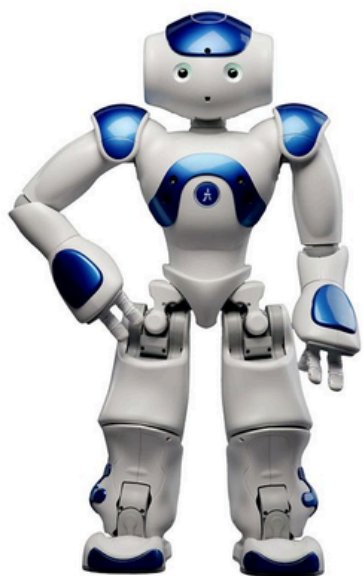
Our next step is conducting a **focus group** study.

The goal of this study is to understand **how to design a multimodal AI tool** that supports autistic individuals by learning from their perspectives and incorporating them throughout the design process.

Our next step is conducting a **focus group** study.

Potential modalities:

- Illustrations
- NAO robot
- Wearables (weighted blankets, vests)
- Soundscape/ Music-making



Multimodality experts



Philart Jeon
VT ISE



Sunwook Kim
VT ISE



Sol Lim
VT ISE

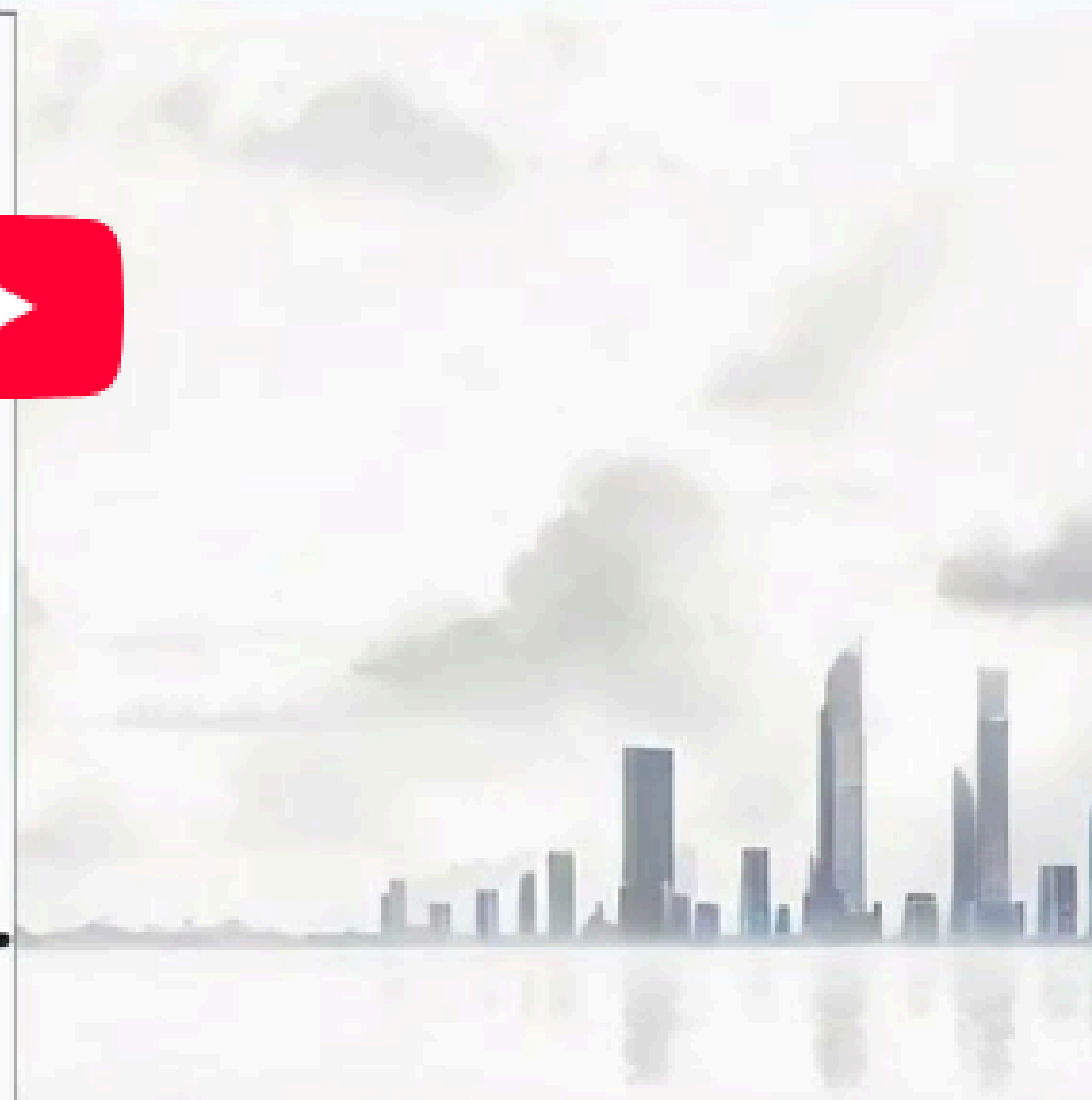
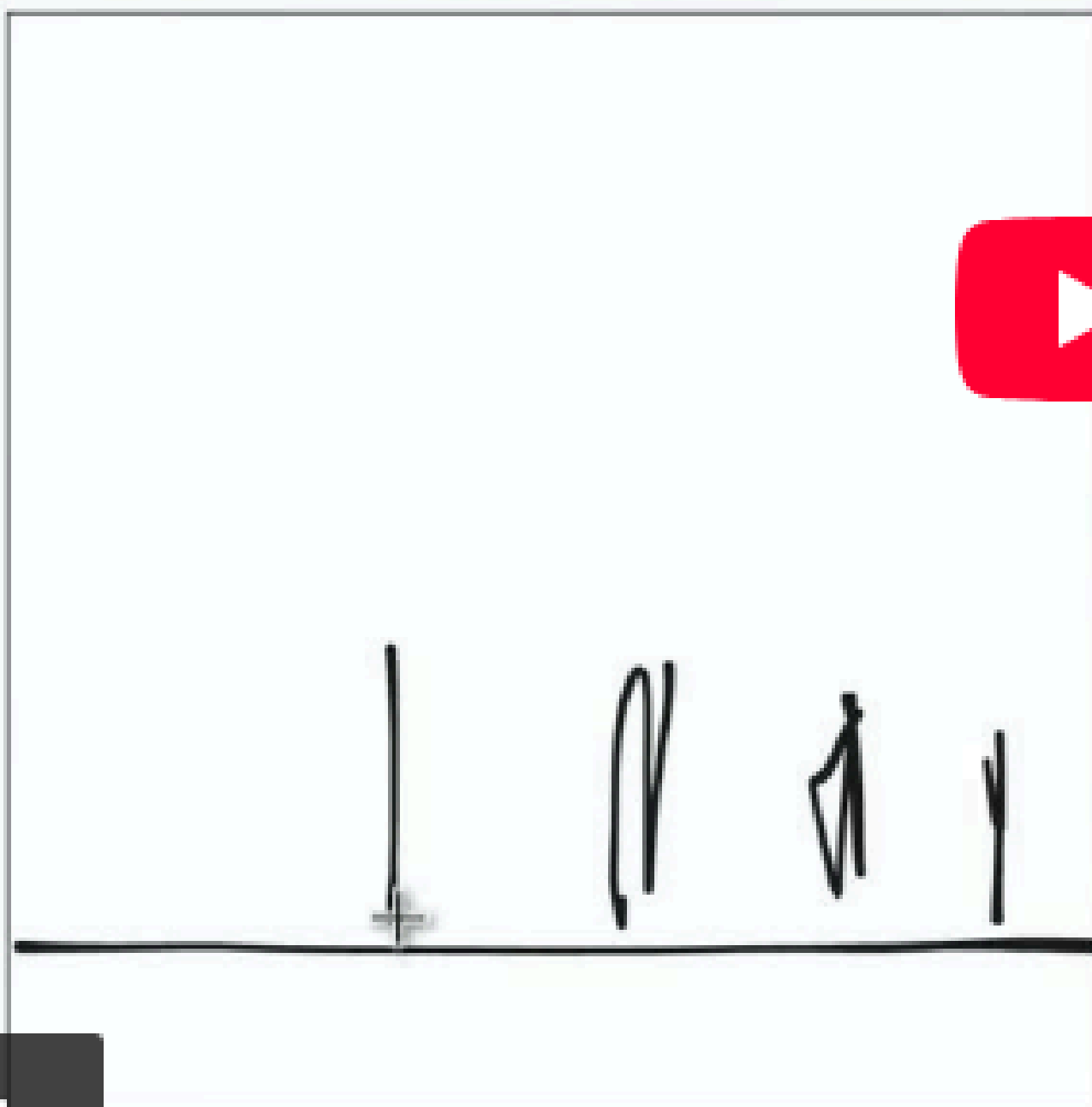


WHC Proposal Concept Demo



Share

User: I can't see a happy future for myself
System: Let's bring awareness to the present.
Would you mind expressing your current
emotions through a drawing?



Watch on  YouTube

If you are interested in participating in our focus group study, please scan this QR code to complete a short survey.

