'In That Small Space with Just the Two of Us': User Experiences with Cumpa in a Robotic Counseling Center

Chanhee Lee*, Eunki Joung*, Youngji Koh, Esther Kim, Sohwi Son, Sunjung Kwon, Uichin Lee†

*: Equal Contributions
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Mental Health Crisis

Anxiety and depression worldwide increased by

25%

IN THE FIRST YEAR OF THE COVID-19 PANDEMIC

The number of individuals seeking **mental health counseling or therapy** is globally increasing.

Mental Health Crisis

Estimate of Needed Versus Available Mental Health Professionals in 2025

The Substance Abuse and Mental Health Services Administration estimates that by 2025, the U.S. will have shortages of several mental health professionals.
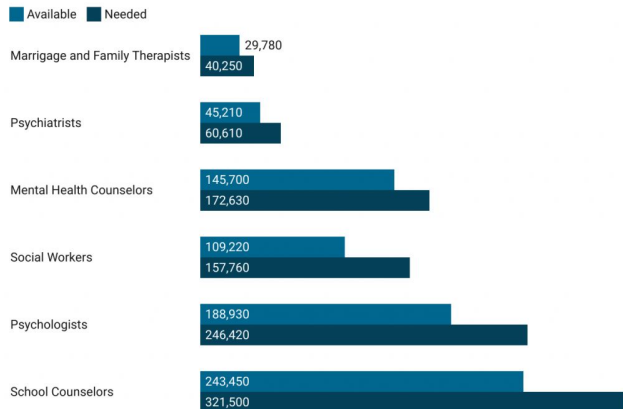
■ Available ■ Needed

Profession	Available	Needed
Marriage and Family Therapists	29,780	40,250
Psychiatrists	45,210	60,610
Mental Health Counselors	145,700	172,630
Social Workers	109,220	157,760
Psychologists	188,930	246,420
School Counselors	243,450	321,500

Chart: Beacon Media + Marketing • Source: Health Resources and Services Administration • Created with Datawrapper

Brown University

443:1 ratio of undergraduates to mental health providers

TOTAL UNDERGRADUATES
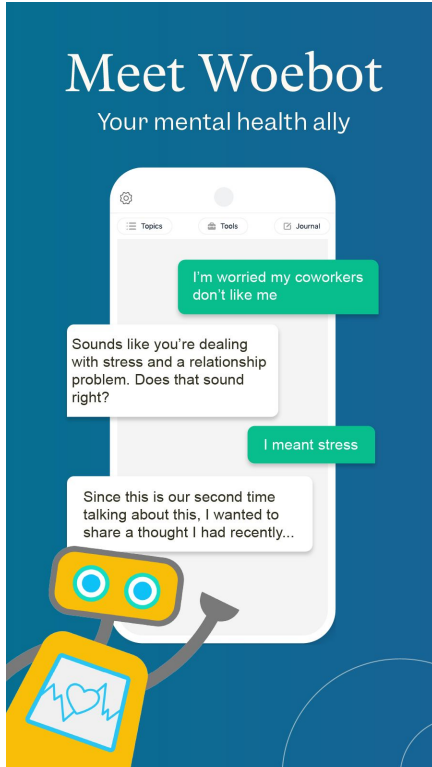6,652

COST PER SESSION
Free

TOTAL PROVIDERS
15

SESSION LIMIT
7 / year

WAIT TIME

Up to **2.5 weeks**

Many counseling centers face resource limitations, leading to **high counselor-to-patient ratios** and **extended wait times.**

Digital Mental Health Interventions

Digital Mental Health Interventions (DMHI) have been developed to increase accessibility of mental healthcare.

User engagement is an important factor that influences **effectiveness** of DMHIs. *(Jin et al, 2025).*

Jin et al, " I Don't Know Why I Should Use This App": Holistic Analysis on User Engagement Challenges in Mobile Mental Health. Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems. 2025.

Social Robots

Jibo

Paro

Justocat

Social robots can offer **accessible and personalized** mental health support.

They can **increase engagement** in mental health interventions.

However, social robots are often **expensive and require maintenance**, making them difficult to be deployed in field.

Motivation for Building a Robotic Counseling Center

"How can we use social robots as DMHIs to enhance accessibility while maintaining high engagement, as if they were used in private spaces?"
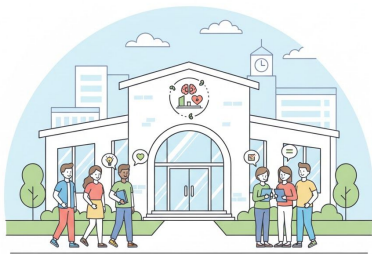
Opportunity

Institutional **placemaking** initiatives

Motivation for Building a Robotic Counseling Center

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Opportunity

Idea

Institutional **placemaking** initiatives

Robotic

Counseling
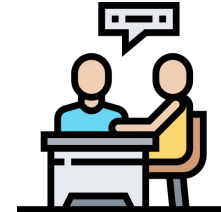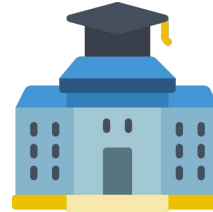
Center

Placemaking and Sense of Place

Place: "Socially and emotionally meaningful construct"

Placemaking: "Process of defining spaces with meaning through relationships and practices"

Relational Perspective: "Place is emerging from social practices rather than from fixed features"
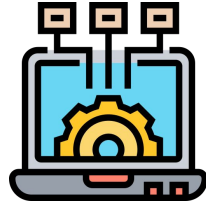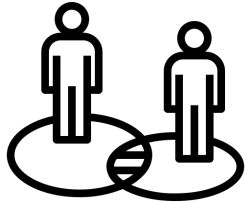
Technology-mediated places must be understood contextually

Placemaking in university counseling center and therapy rooms

Cresswell, T. (2015). Place: An introduction (2nd ed.). Wiley-Blackwell.

Cho, J., Beck, S., & Voida, S. (2022). Topophilia, placemaking, and boundary work: Exploring the psycho-social impact of the COVID-19 work-from-home experience. Proceedings of the ACM on Human-Computer Interaction, 6(GROUP), 1–33. ACM New York, NY, USA.

Research Questions

RQ1   Does the RCC effectively promote users' mental health?

RQ2   How does interaction with the RCC impact users' daily lives and foster a sense of place as a supportive counseling environment?

RQ3   How do the RCC's design and interactions influence user engagement and rapport building?

System Design: Cumpa, the Counseling Robot
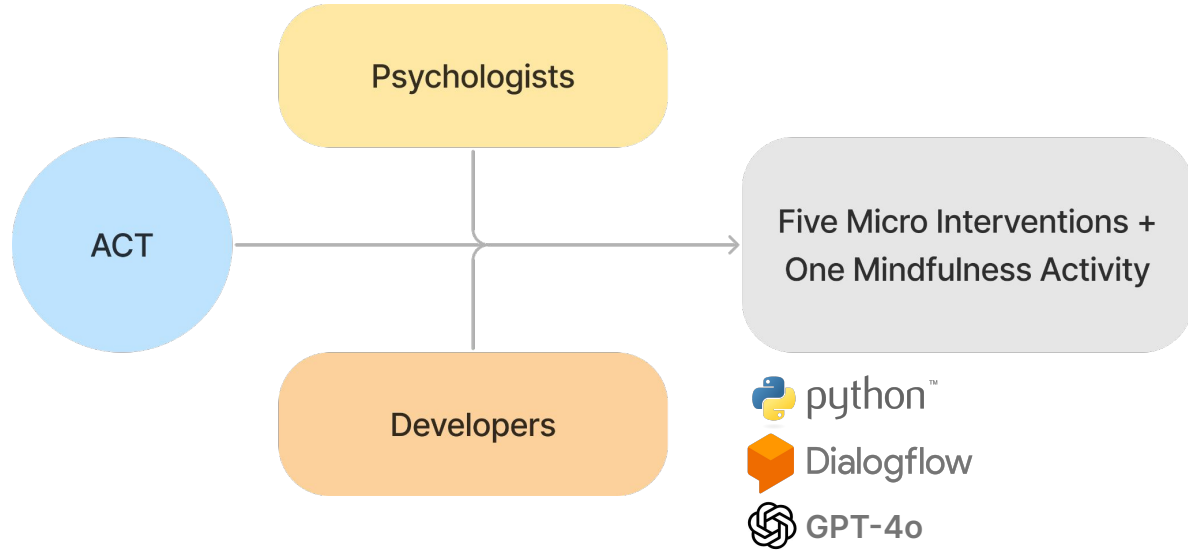
Conversation scenario was designed with **clinical psychologists** based on **ACT (Acceptance-Commitment Therapy)** for self mental health support.
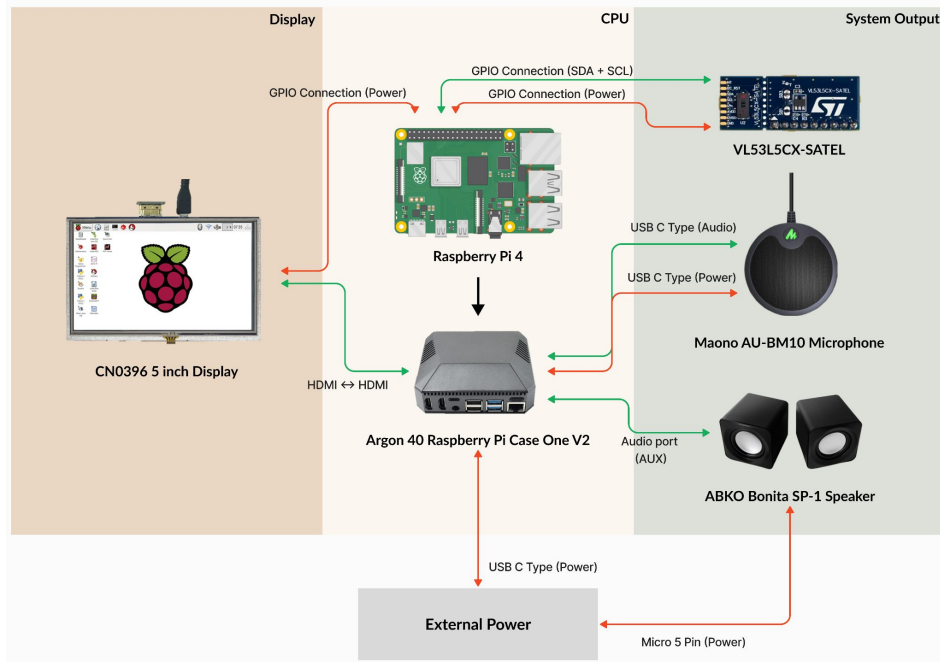
System Design: Cumpa, the Counseling Robot
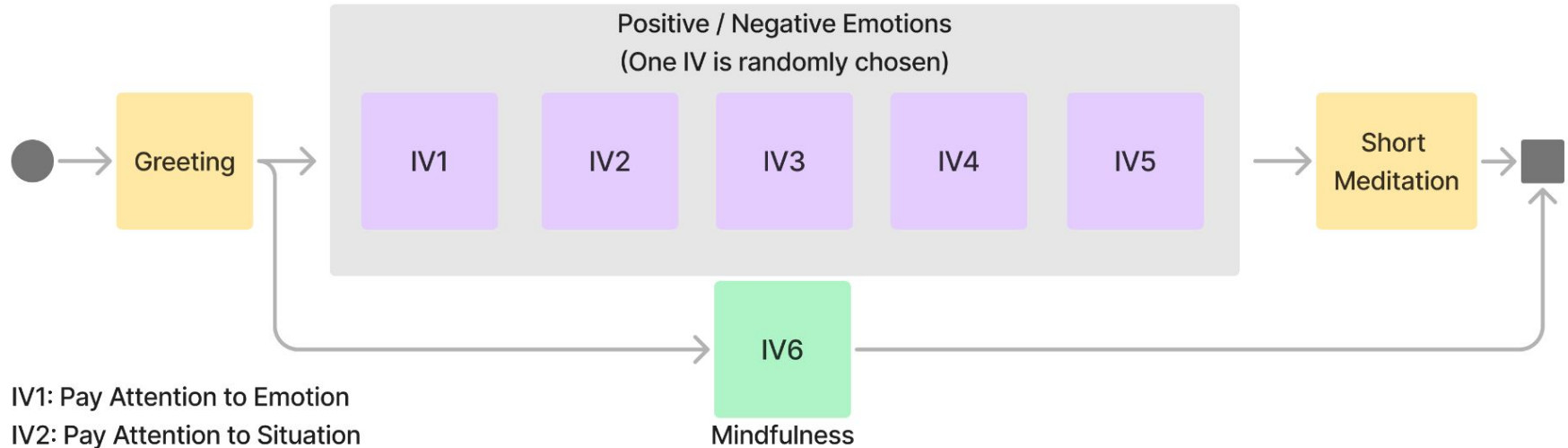
IV1: Pay Attention to Emotion
IV2: Pay Attention to Situation
IV3: Understand Emotion Construction
IV4: Pay Attention to Desire
IV5: Understand Desire Construction
IV6: Mindfulness

System Design: Cumpa, the Counseling Robot

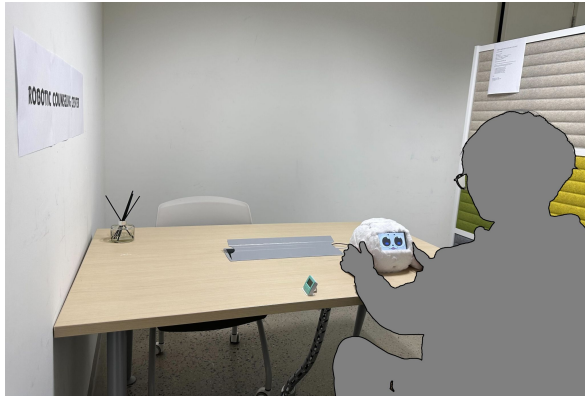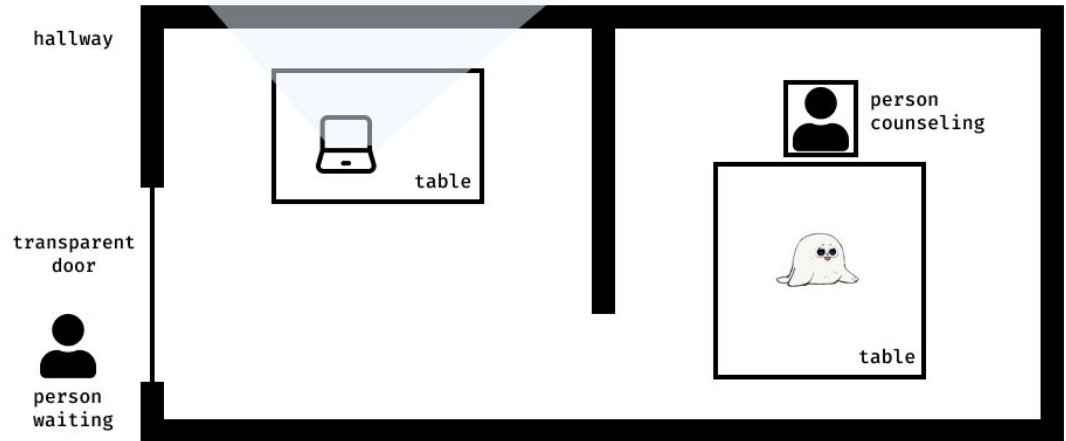## Cumpa's Hardware

Listening

Speaking

Thinking

Sleeping

System Design: Robotic Counseling Center

User Study

Study Participants

Age	19 ~ 33 years old *AVG: 24.6 (SD: 4.4)*
Gender	13 males and 7 females
Occupation	Undergraduate/graduate students and research staff
Inclusion	At least mild depression or anxiety (PHQ-9 >= 5 or GAD-7 >= 5)
Exclusion	Severe depression (PHQ >= 20) or anxiety (GAD-7 >= 15) Diagnosed as or receiving treatment for a mental disorder within a year

Study Process

Participant Recruitment → Orientation & Pre-survey → RCC Sessions (2 weeks) → Post-Survey & Interview → Analysis

20 participants

10:00 ~ 12:00	12:00 ~ 14:00	14:00 ~ 16:00	16:00 ~ 18:00	18:00 ~ 20:00
4 participants	4 participants	4 participants	4 participants	4 participants
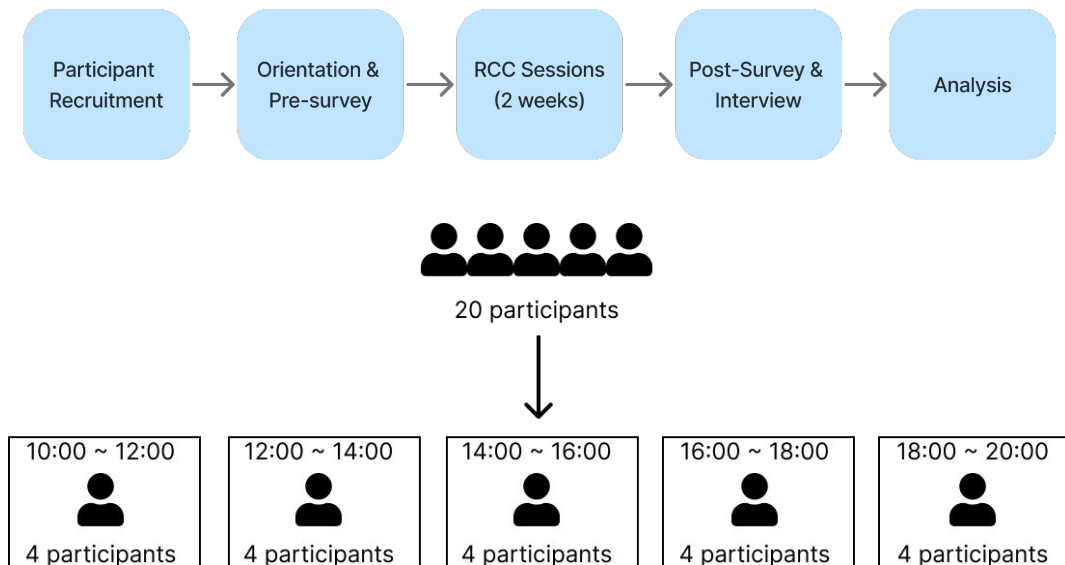
User Study

Semi-Structured Interview

User
experiences

Perceptions of
effectiveness

Immersion levels in
the RCC

Data Collection & Analysis

User Behaviors in Videos

Contact (physically) with Cumpa

Smile or laughter

Observing Cumpa

Observing other things in the room

Signs of disengagement

16

Data Collection & Analysis

Pre-post Questionnaire

Pre-Survey	Post-Survey
Smart Speaker Usage Experience	-
Psychological Counseling Experience	-
Depression	Depression
Anxiety	Anxiety
Stress	Stress
Emotional Awareness	Emotional Awareness
Self-acceptance	Self-acceptance
-	Working Alliance

- Depression: Patient Health Questionnaire-9 (PHQ-9)

- Anxiety: Generalized Anxiety Disorder-7 (GAD-7)

- Stress: Perceived Stress Scale (PSS)

- Emotional Awareness: Trait Meta-Mood Scale (TMMS)

- Self-acceptance: Acceptance and Action Questionnaire-II (AAQ-II)

- Working alliance: Working Alliance Inventory-Short Revised (WAI-SR)

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RQ1: Effectiveness of RCC for Promoting Mental Health

Survey Type	Pre-survey		Post-survey		Pre - Post		t	p-value
	Mean	SD	Mean	SD	Mean	SD		
PHQ-9	7.32	2.67	6.47	3.73	0.85	2.69	1.36	0.19
GAD-7	3.95	2.46	3.79	2.68	0.16	1.57	0.44	0.67
PSS	18.32	3.43	17.11	3.83	1.21	3.14	1.68	0.11
TMMS	19.47	2.89	18.37	3.53	1.10	2.81	1.72	0.10
AAQ-II	31.26	4.99	30.84	4.43	0.42	3.75	0.49	0.63

Expected depression, anxiety, stress to **decrease** and the emotional awareness and self-acceptance to **increase**

Slight decreases in **all** survey scores, no significant differences *(p > 0.05)*

Post survey results may have been affected by:

- **Timing of the period:** Mid-term exam period made 12 participants to be more stressed than the usual

- **Length of the period:** 3 participants said that the intervention period was not long enough

RQ1: Effectiveness of RCC for Promoting Mental Health

Despite the insignificant differences in survey results, participants explained that RCC visits had various **positive impacts** on their **mental health**
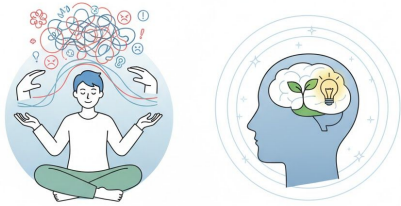
Cumpa helped **managing emotions** and gaining **self-awareness**

"...Before, I only thought about getting rid of stress, but now I recognize stress as natural..." (P6)
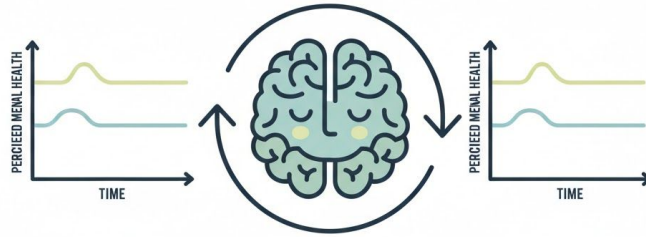
Reflection with Cumpa provided **comfort during stressful times**

"Cumpa gave me the ability to look at my situation more objectively" (P11)
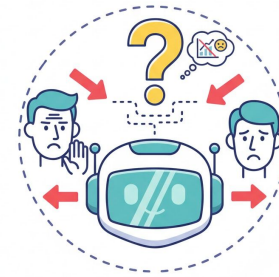
RQ1: Effectiveness of RCC for Promoting Mental Health

Still, some participants were **skeptical** about the **effectiveness of the RCC**

No significant changes to their
perceived mental health conditions

*"It felt like the questions only identified
what was happening, without suggesting
anything to help solve the issues." (P9)*

Questioned the **effectiveness of
robotic counseling** itself

*"The space itself provides some peace of
mind, but I'm not sure if Cumpa is as
effective as a human counselor." (P5)*

RQ1: Willingness to Use the RCC in Real-World Setting

There were **mixed reactions** to participants' willingness to use the RCC in a real-world setting

OCCASIONAL USE   LONG-TERM USE
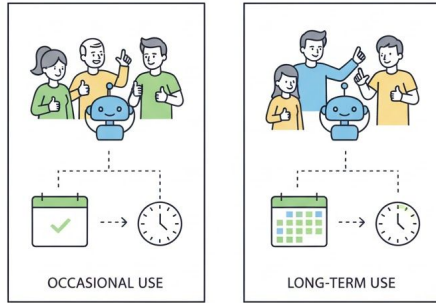
Some were open to **occasional or long-term uses**

"… it might appeal to people looking for light or long-term counseling." (P8)

"If I could drop by any time, I might use it to clear my thoughts." (P10)
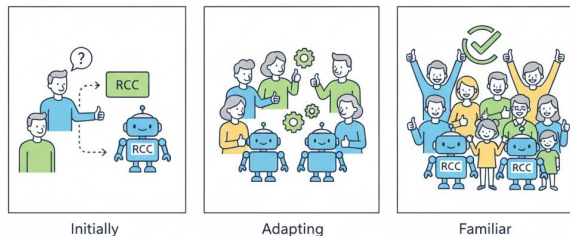
Some preferred **human counselors for serious cases**

"I wonder if relying on Cumpa would be helpful in situations where someone truly needs support" (P8)

RQ2: Impact on Daily Lives

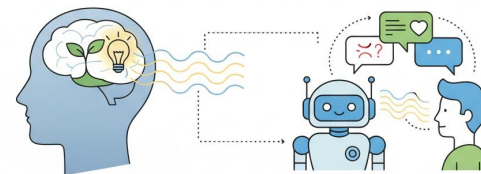**Visiting the RCC regularly** was closely related to participants' **daily lives**

Initially Adapting Familiar

Participants **adapted and grew more familiar** with RCC over time

Reflect on **specific experiences or emotions** from their daily lives

Impact on **daily mindset**, learning from conversation with Cumpa

"At first, I thought I should match my time to go, but after about a week, I got used to it." (P3)

"... When I tried to talk about good things, I realized 'Oh, so these things happened,' and thus I felt good." (P1)

" I sometimes looked around and think, 'What things around me do I usually not pay attention to?" (P4)

RQ2: RCC's Sense of Place as Private Place

Participants expressed a sense of a private place inside the robotic counseling center

RCC felt like a place **just for oneself**

The center gave me a feeling of spaces meant solely for me." (P5)

RCC felt like a place to be alone but still **have someone to interact with**

"RCC doesn't feel like being alone because I'm there to talk, even though the robot isn't a person." (P7)

Concerned with person **waiting outside**

"... but I sometimes worried about what if someone suddenly walked in while I was doing [the session]" (P1)

RQ2: Dedicated Place for Mental Health Care

Participants expressed a sense of a place dedicated to mental health care

Participants felt like RCC had **comfortable and positive atmosphere** for mental health

"There was 30 seconds of music, which gave me time to think. It was very comforting." (P3)

"There was a diffuser that made it feel cozy. So, it felt like the center was welcoming me." (P14)

Some participants said it **didn't feel comfortable or welcoming** due to its confined nature

"I prefer open spaces, but the RCC felt somewhat confined, so it didn't quite provide the same sense of psychological comfort." (P12)

RQ3: User Engagement

Conversation Log Data	Week 1	Week 2	t	p-value
Average Word Count	8.37±3.69	9.43±4.11	-1.07	0.300
Average User Response Duration	6.10±2.76	7.81±3.28	-5.46	**0.001**

Coded Behaviors	Week 1	Week 2	W (186)	p-value
Contact with Cumpa	20.64±35.43	21.83±37.36	1164.00	**0.029**
Smile or Laughter	0.72±2.15	0.15±0.65	182.00	**0.001**
Observing Cumpa	74.90±23.68	76.41±22.99	6181.00	0.286
Observing Other Things	5.43±7.65	4.12±7.18	2139.00	**0.028**
Signs of disengagement	4.99±16.20	7.81±3.28	2003.00	**0.001**

Expected the engagement metrics (word count, response duration, and coded behaviors) to **increase** and signs of disengagement to **decrease**
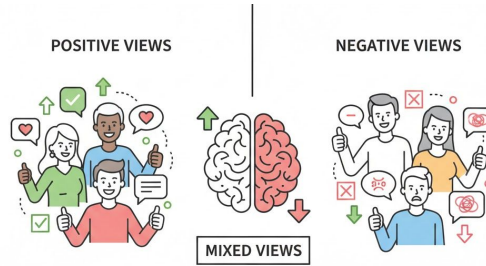
Significant **increases** in response duration, contact with Cumpa, smile or laughter, observing other things in the room, and signs of disengagement

RQ3: Building Rapport with Cumpa in RCC
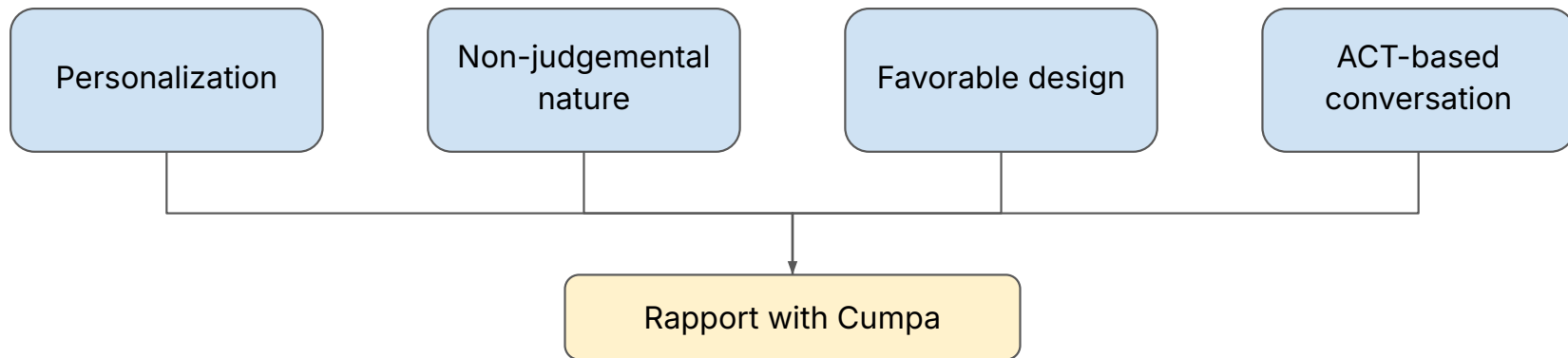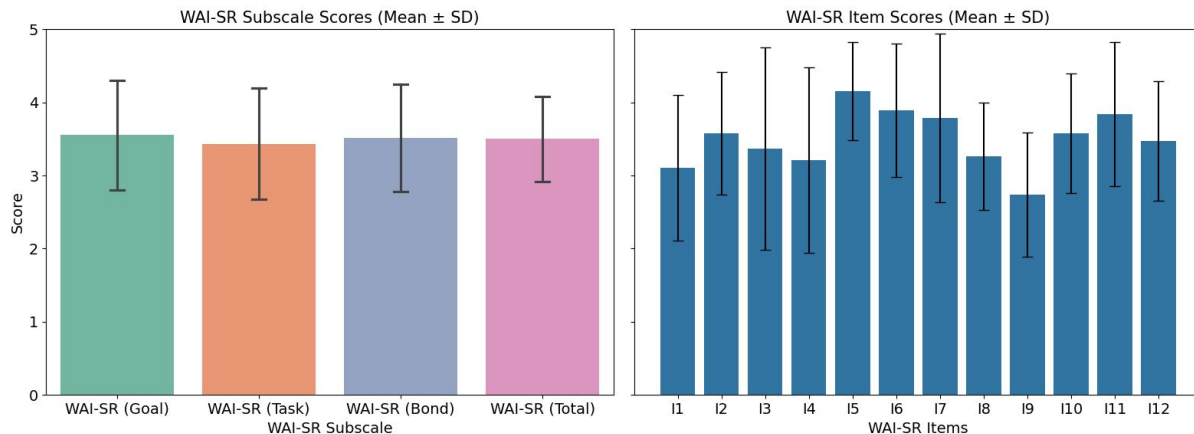
Discussions: Preference, Challenge, and Design Implications
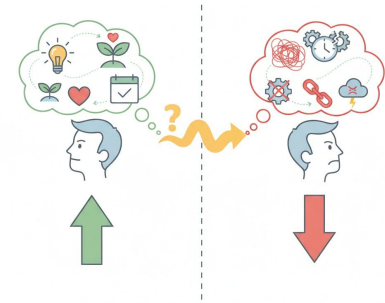
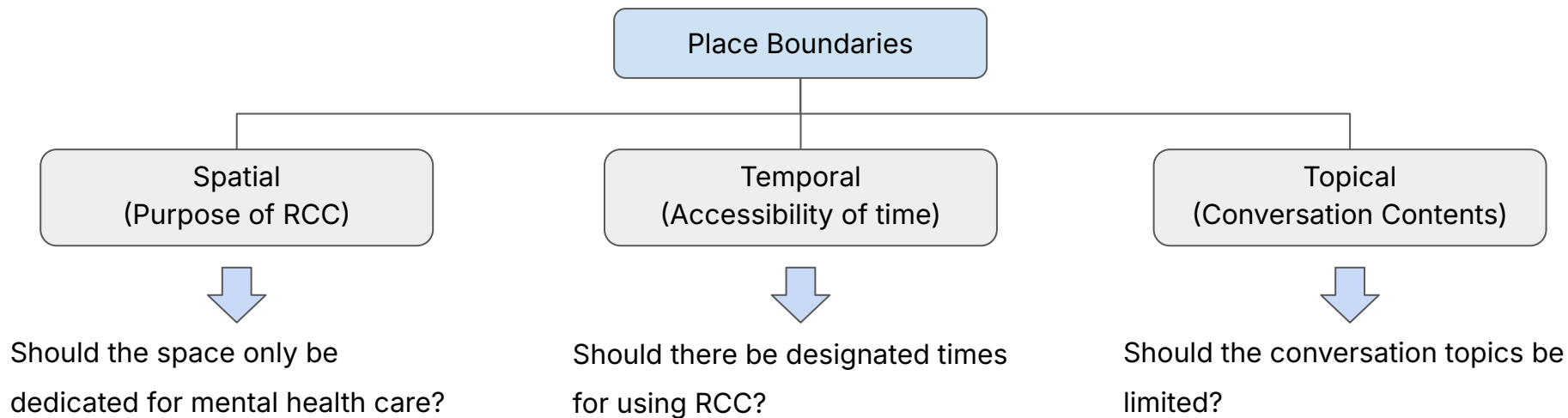**Preferences & Challenges**
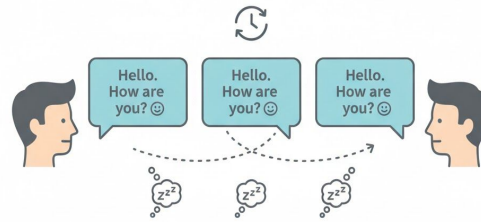
Mixed Views   Repetitiveness   Mismatching Expectations

Design Implications

1. Support appropriate user expectation setting through transparency about RCC's capabilities.

2. Introduce the robotic counselor as a supportive companion rather than a 'counselor.'

3. Design RCC as a connecting bridge between users and counseling centers.

Discussions: Arranging Boundaries for Place-making of RCC

Place Boundaries

Spatial
(Purpose of RCC)

Temporal
(Accessibility of time)

Topical
(Conversation Contents)

Should the space only be
dedicated for mental health care?

Should there be designated times
for using RCC?

Should the conversation topics be
limited?

C. R. Lynch, B. N. Manalo, and `A. Mu˜noz-Viso, "Robotics in place and the places of robotics: productive tensions across human geography and human–robot interaction," AI & SOCIETY, pp. 1–14, 2024.

E. Zerubavel, "Islands of meaning," The production of reality: Essays and readings on social interaction, vol. 5, pp. 11–27, 2011

S. Jeong, L. Aymerich-Franch, S. Alghowinem, R. W. Picard, C. L. Breazeal, and H. W. Park, "A robotic companion for psychological well-being: A long-term investigation of companionship and therapeutic alliance," in Proceedings of the 2023 ACM/IEEE international conference on human- robot interaction, pp. 485–494, 2023.

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Takeaways

- RCC supports self-exploration and enhances engagement of its users
- There were both positive and negative views on real-life usage of the RCC. One main impediment was the repetitiveness of the conversation with Cumpa
- Design implications for designing the RCC: (1) Support appropriate user expectation setting, (2) Introduce RCC as a supportive companion, and (3) Design RCC as a connecting bridge between users and counseling centers

Paper Link

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CSCW 2025

KAIST