

RoutineAid: Externalizing Key Design Elements to Support Daily Routines of Individuals with Autism

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Research Background

COVID-19 outbreak

Disrupted daily routines elicited emotional and behavioral challenges



The current regular care system for autistic people is **insufficient** to meet the needs of autism communities



Government agencies supported **only 28% of people with severe disabilities** and **only 1% in low-income countries**



Formative Study - Identified Challenges

Autism Stakeholders



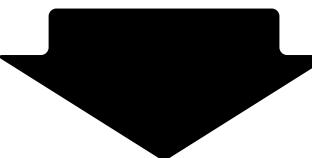
5 Autistic adults



5 Autism experts



5 Parents of an autistic individual



Challenges

C#1

Anxiety amplified due to a broken routine

C#2

Difficulty in elaborating tasks to form healthy daily routines

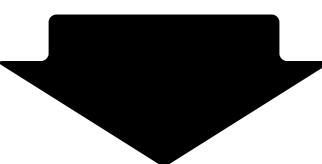
C#3

Lack of comprehensive management and support for key daily routines

Formative Study - Design Goals

Challenges

- C#1** Anxiety amplified due to a broken routine
- C#2** Difficulty in elaborating tasks to form healthy daily routines
- C#3** Lack of comprehensive management and support for key daily routines



Design Goals

- DG#1** To explore and plan appropriate life rhythms with visual narratives
- DG#2** To explore actionable daily routine planning
- DG#3** To achieve sustainable key daily routine management

Transition into RoutineAid Design Elements

Design Goals

DG#1

To explore and plan appropriate life rhythms with visual narratives

DG#2

To explore actionable daily routine planning

DG#3

To achieve sustainable key daily routine management

Functionalities of RoutineAid

- Main screen (villages and items)
- Routine checklist
- 4 key routine quests
- 12 pre-defined secondary routine quests
- User-generated secondary routine quests
- Routine diary
- Leaderboard

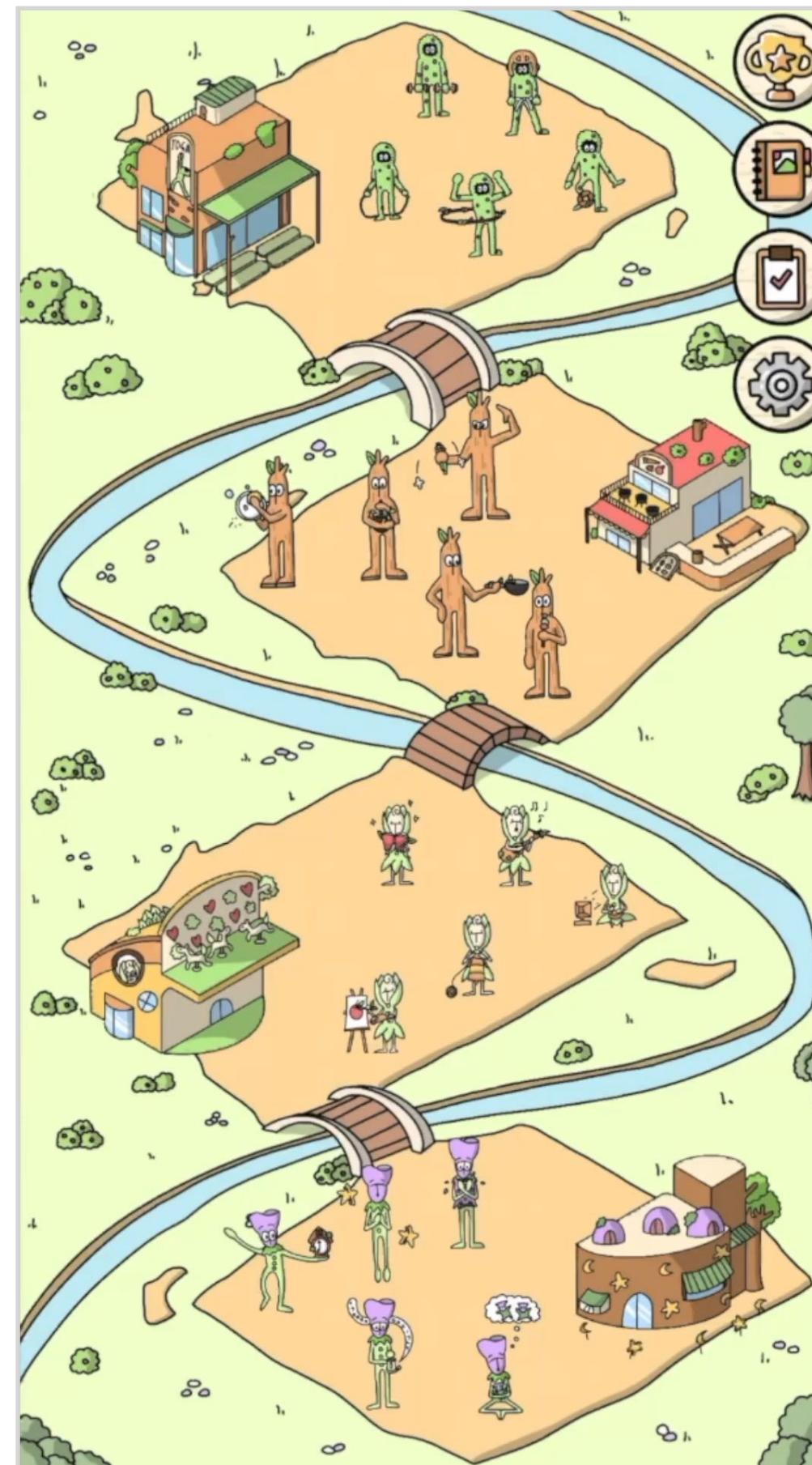
RoutineAid - Main Screen & Routine Checklist

DG#1

DG#2

DG#3

Main screen



Routine Checklist



Transition into RoutineAid Design Elements

Design Goals

DG#1

To explore and plan appropriate life rhythms with visual narratives

DG#2

To explore actionable daily routine planning

DG#3

To achieve sustainable key daily routine management

Functionalities of RoutineAid

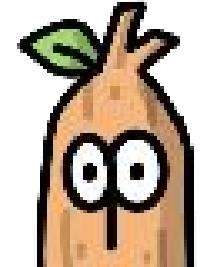
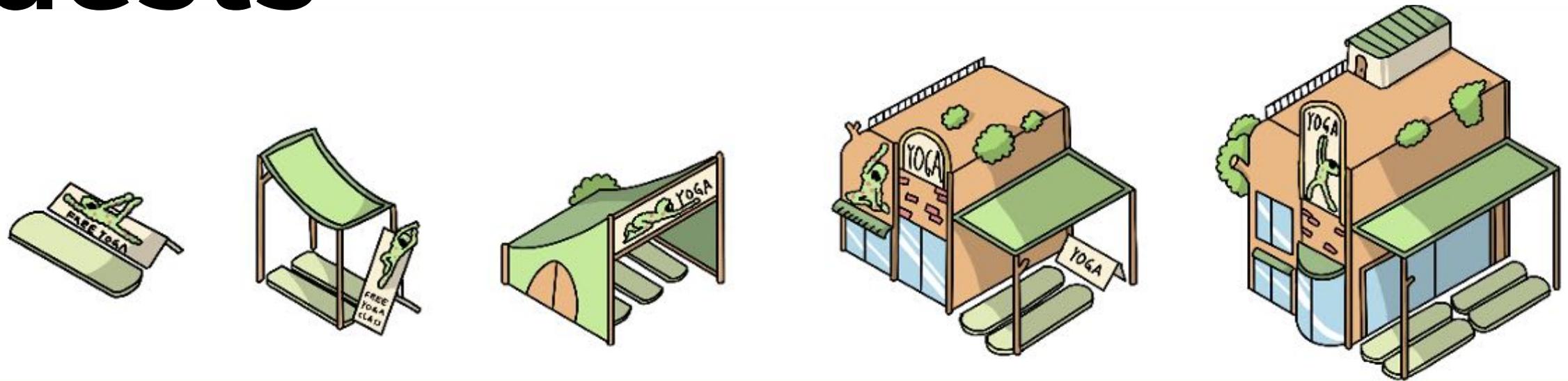
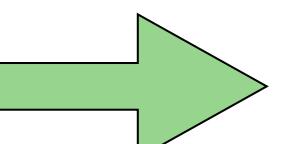
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RoutineAid - Key Routine Quests



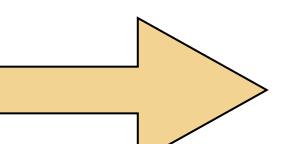
Physical Activity Village

Key Routine Quest:
Walk for more than 30 minutes



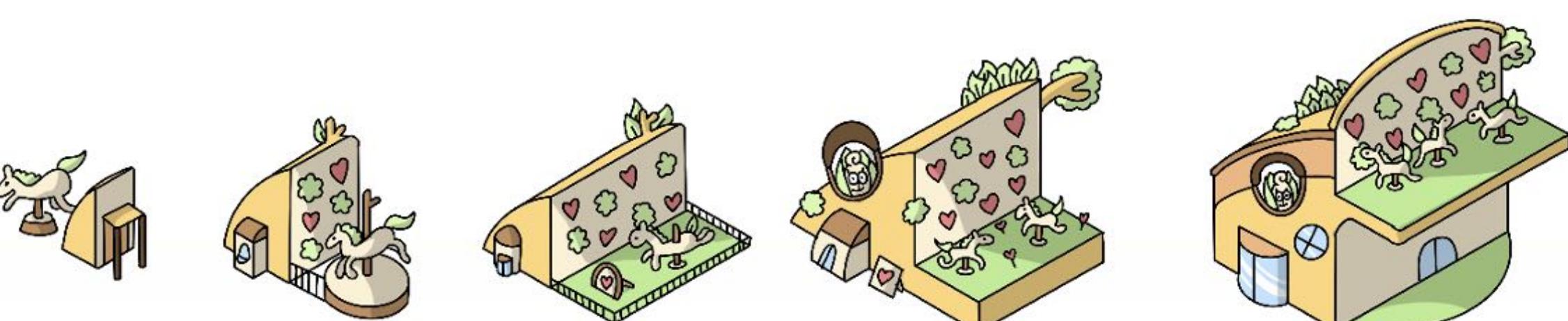
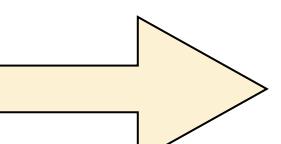
Eat Village

Key Routine Quest:
Regular intake of meals



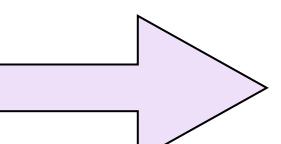
Mindfulness Village

Key Routine Quest:
Write a mind diary



Sleep Village

Key Routine Quest:
Keep a regular sleep schedule

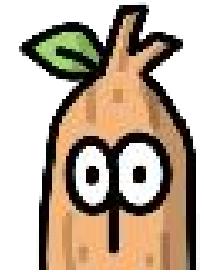
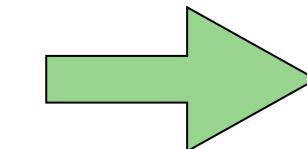


RoutineAid - Secondary Routine Quests



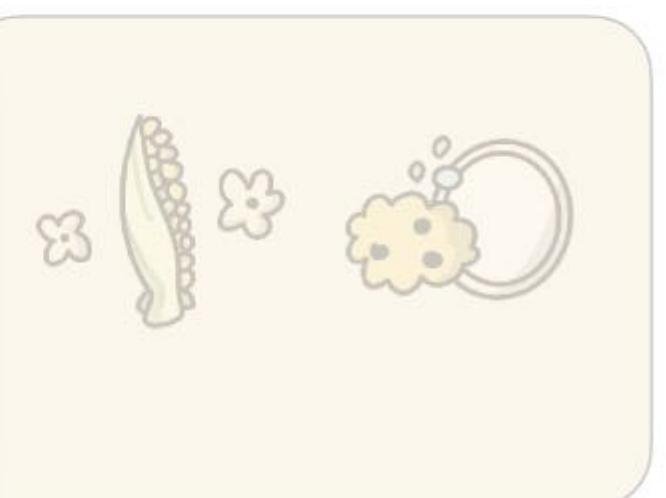
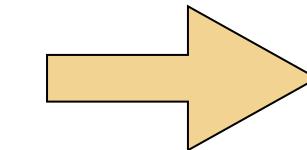
Physical Activity Village

Secondary Routine Quests



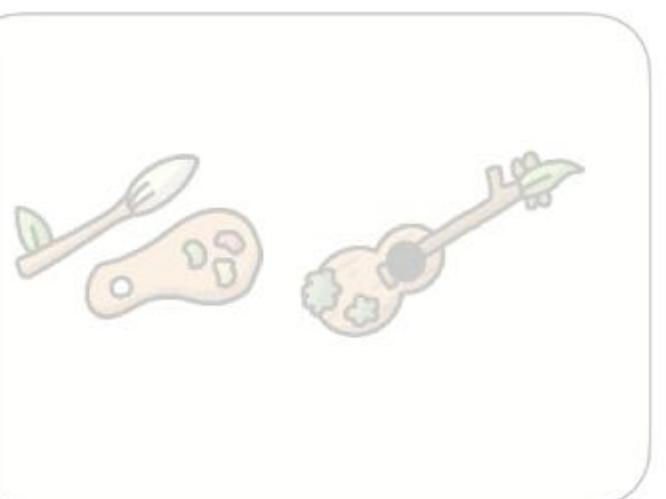
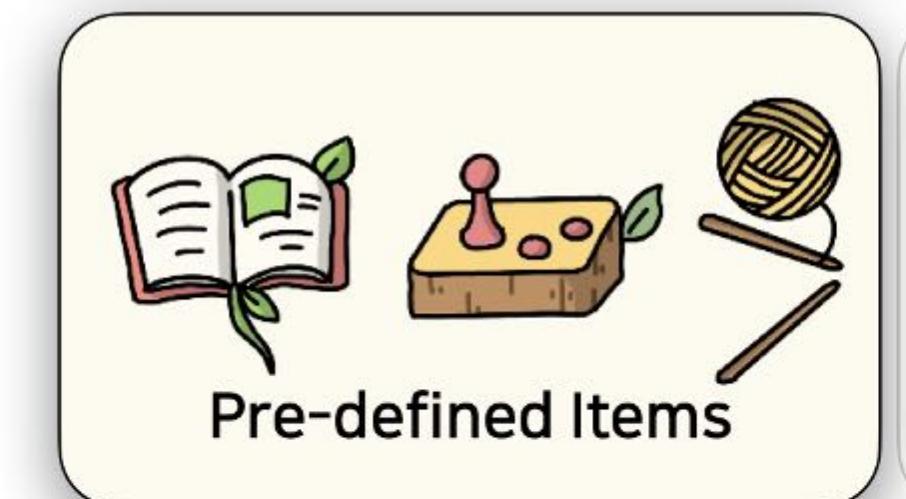
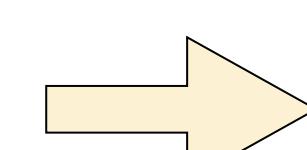
Eat Village

Secondary Routine Quests



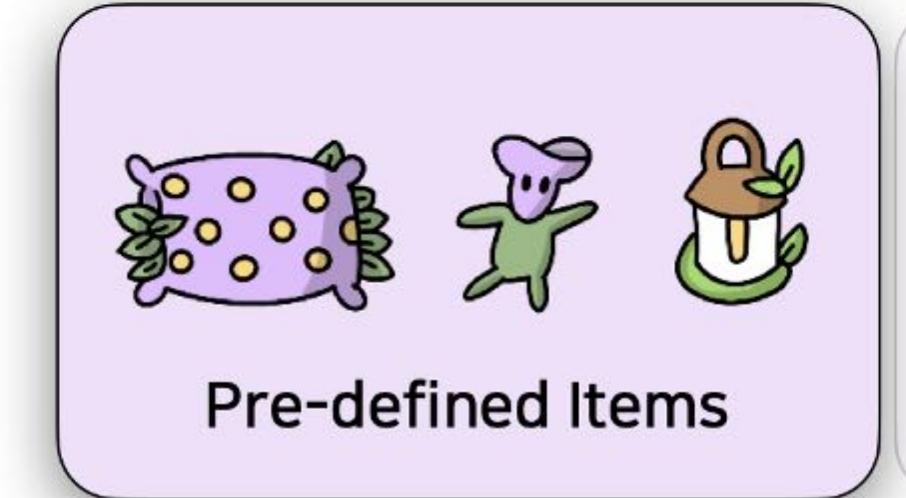
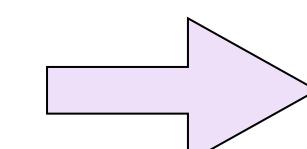
Mindfulness Village

Secondary Routine Quests



Sleep Village

Secondary Routine Quests

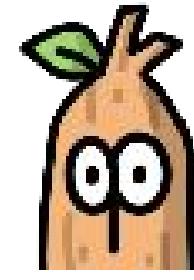
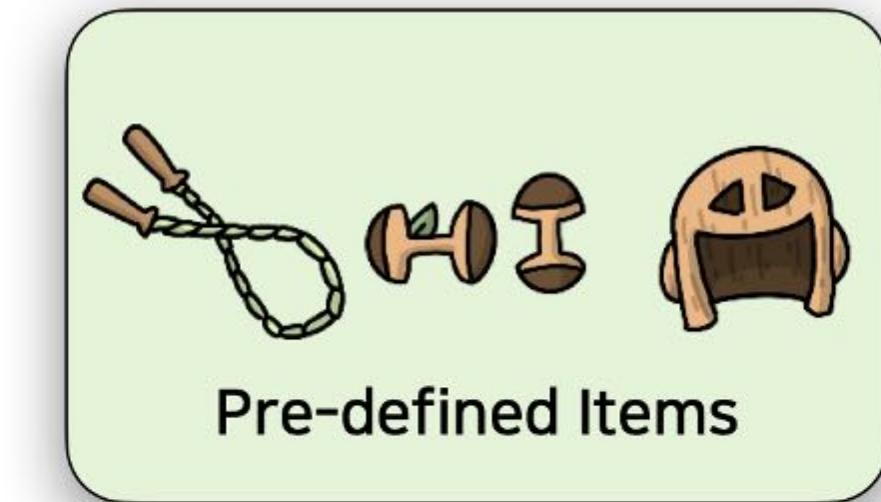
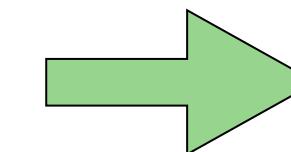


RoutineAid - Secondary Routine Quests



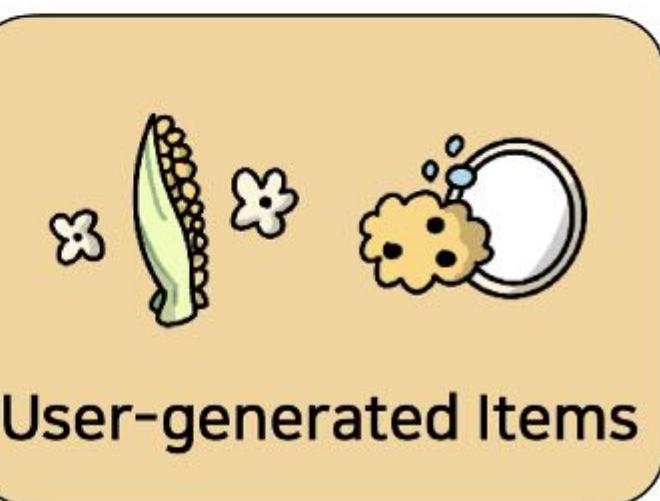
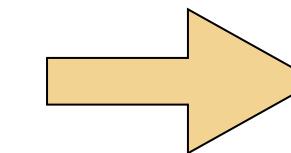
Physical Activity Village

Secondary Routine Quests



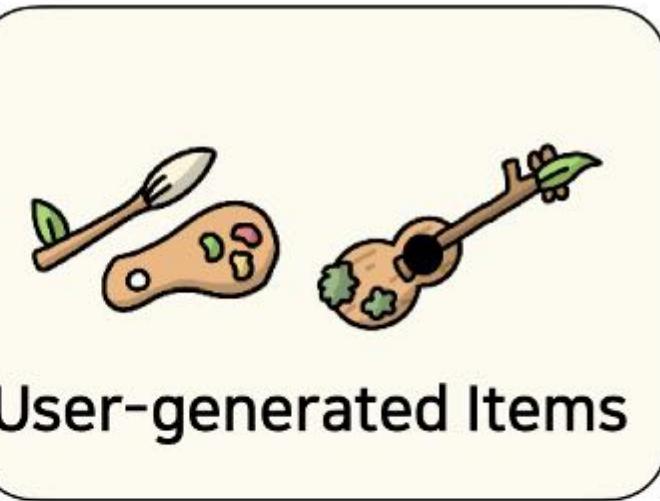
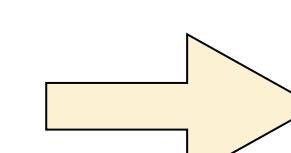
Eat Village

Secondary Routine Quests



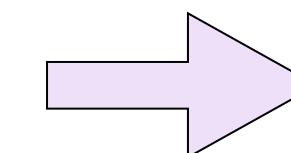
Mindfulness Village

Secondary Routine Quests



Sleep Village

Secondary Routine Quests



Transition into RoutineAid Design Elements

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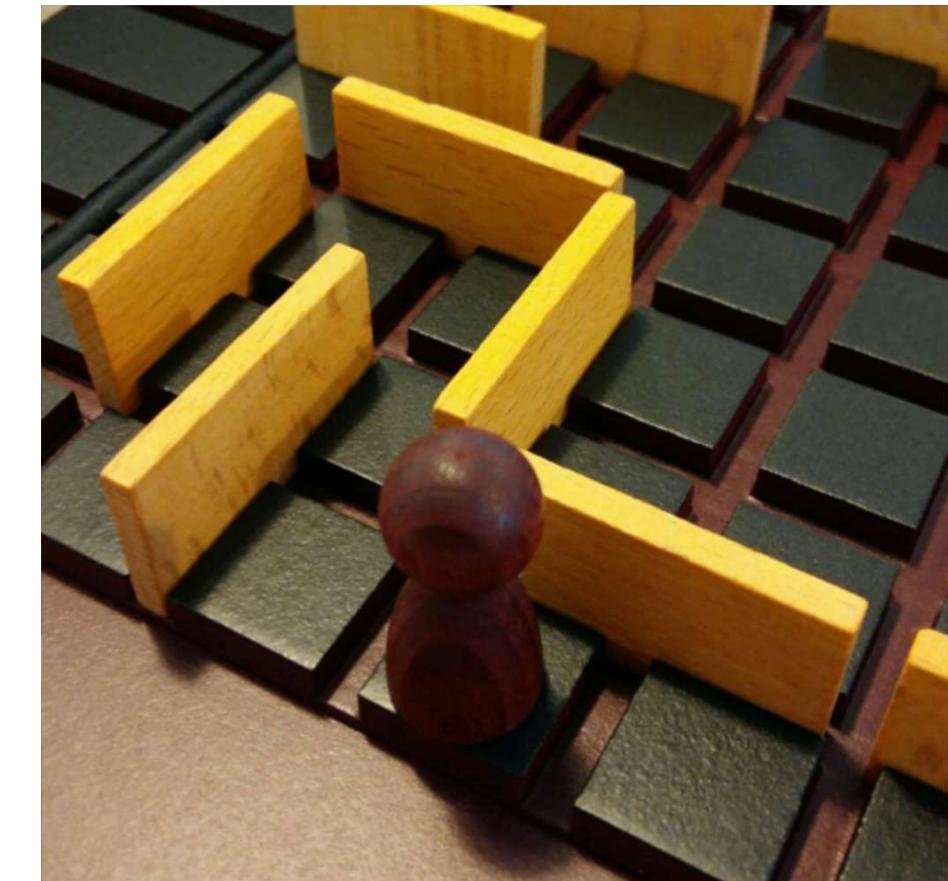
RoutineAid - Routine Diary

DG#1

DG#2

DG#3

Routine Diary



Some images shared through Routine diary

RoutineAid - Routine Diary



DG#

DG#

DG#

Key routine quest of Mindfulness Village
("Writing a mind diary")



eAid

“Today, I played Quoridor game with my brother. While we were tidying up after the game, the things left behind felt exactly like what's in my head lately, so I took a picture. [...] It feels like facing a dead end, but I want to believe that there is a way out.”



Some shared images in Routine diary

RoutineAid - Routine Diary



User-generated secondary routine quest
("Recording the nap time")

“As planned, I took a one-hour nap (12:15pm - 13:15pm) and sat down at my desk right away. I’m satisfied!”

(This participant wanted to reduce his nap time, so recorded his nap time with a cute image of similar composition.)

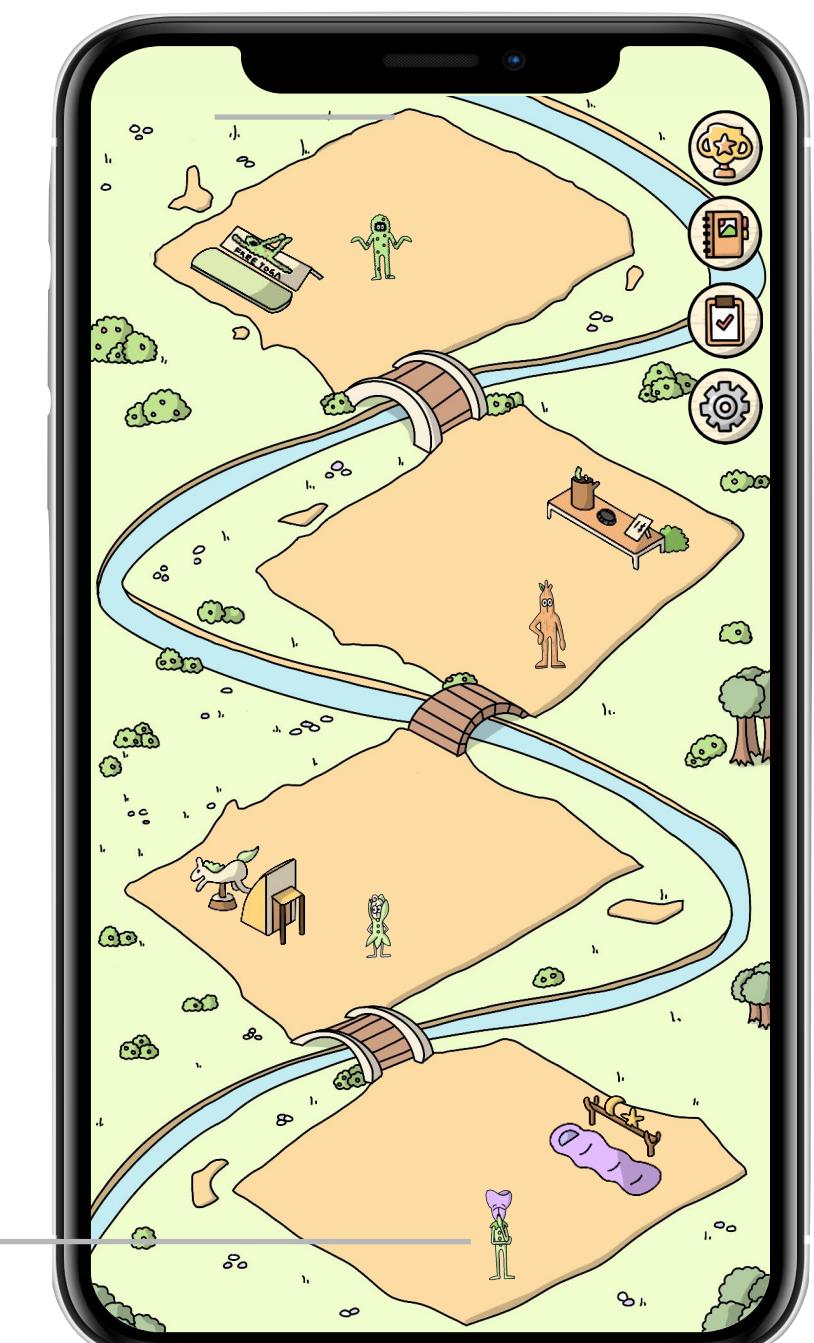


Some shared images in Routine diary

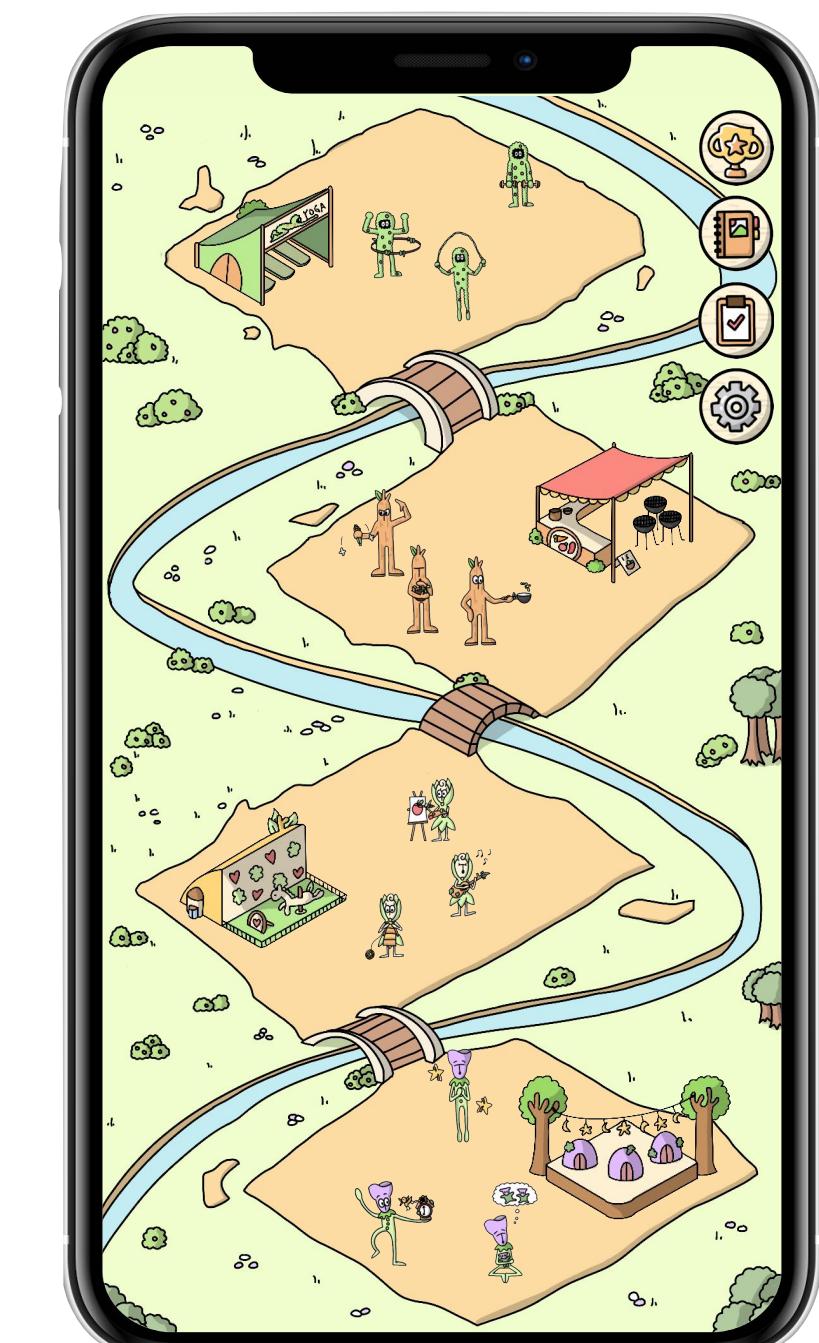
RoutineAid - Progress Levels

Default villages with buildings (Level 1) and characters without items

animated characters

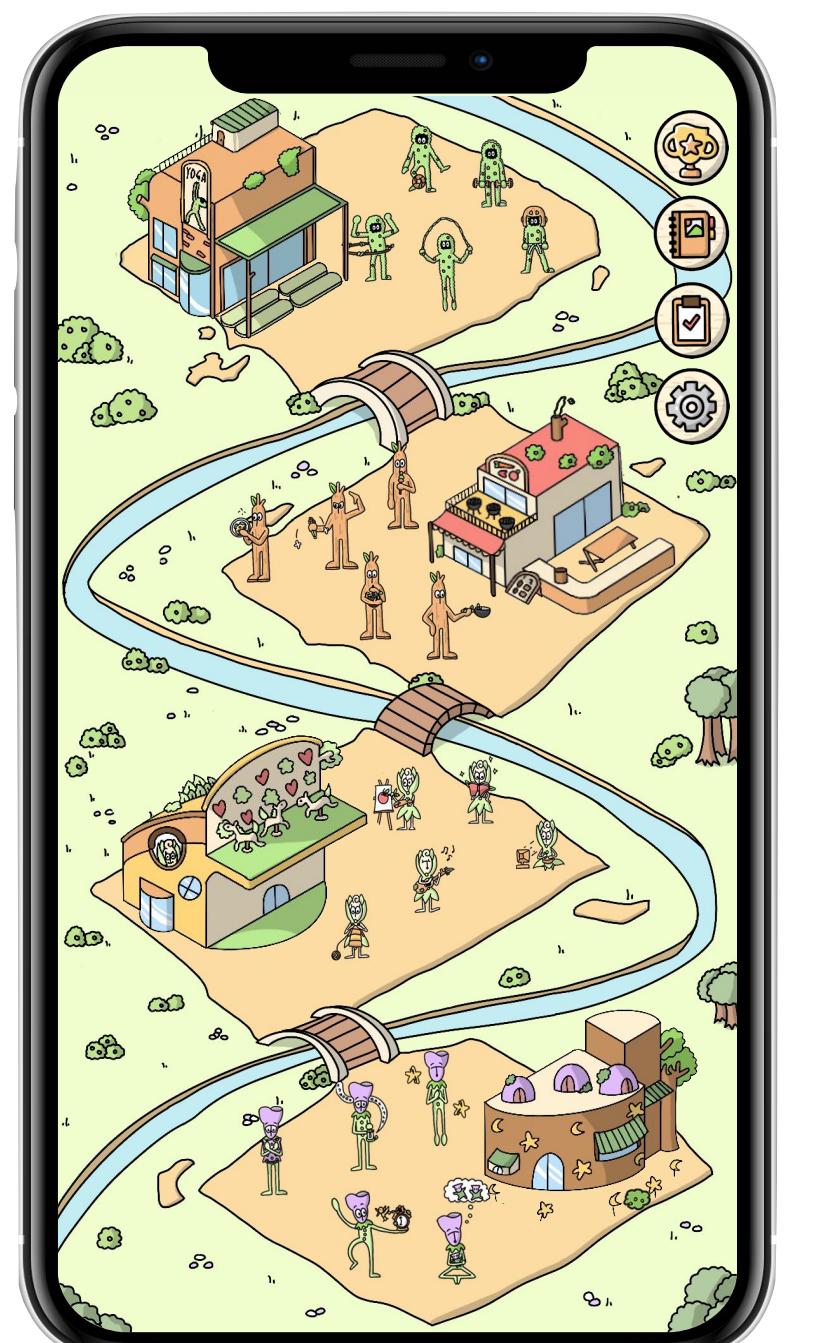


Initial phase



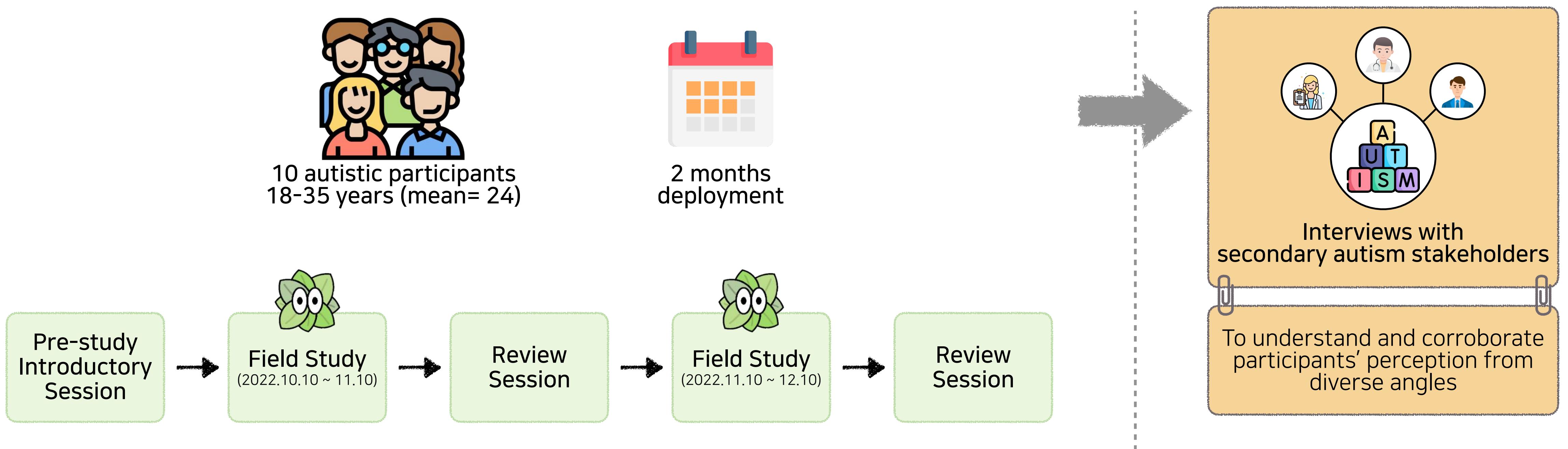
Developing phase

Developed villages with vibrant visual and sound effect



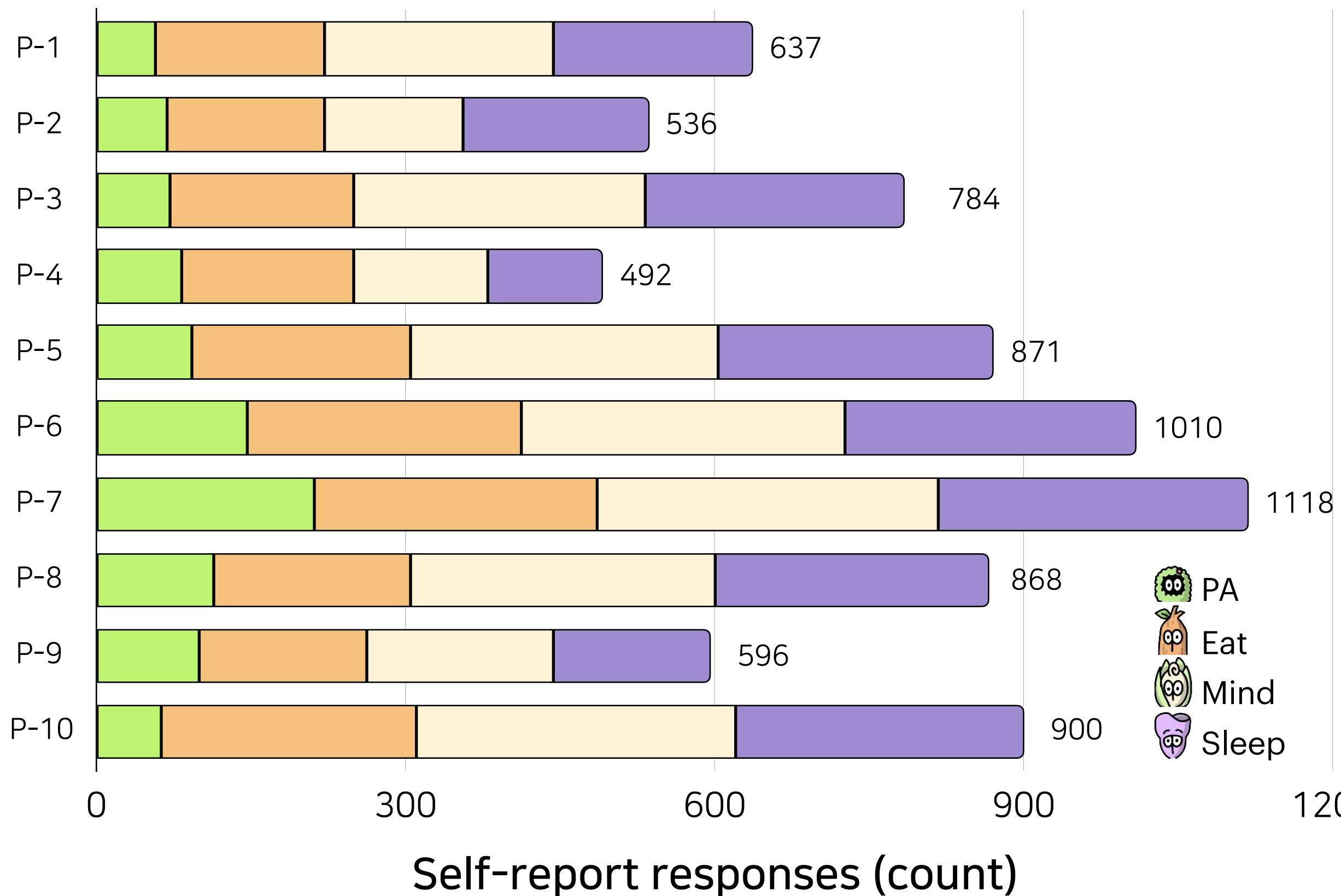
Finalized phase

Field Study



Findings 1

RoutineAid's **self-reporting** encouraged participants to **comprehensively self-aware of themselves**



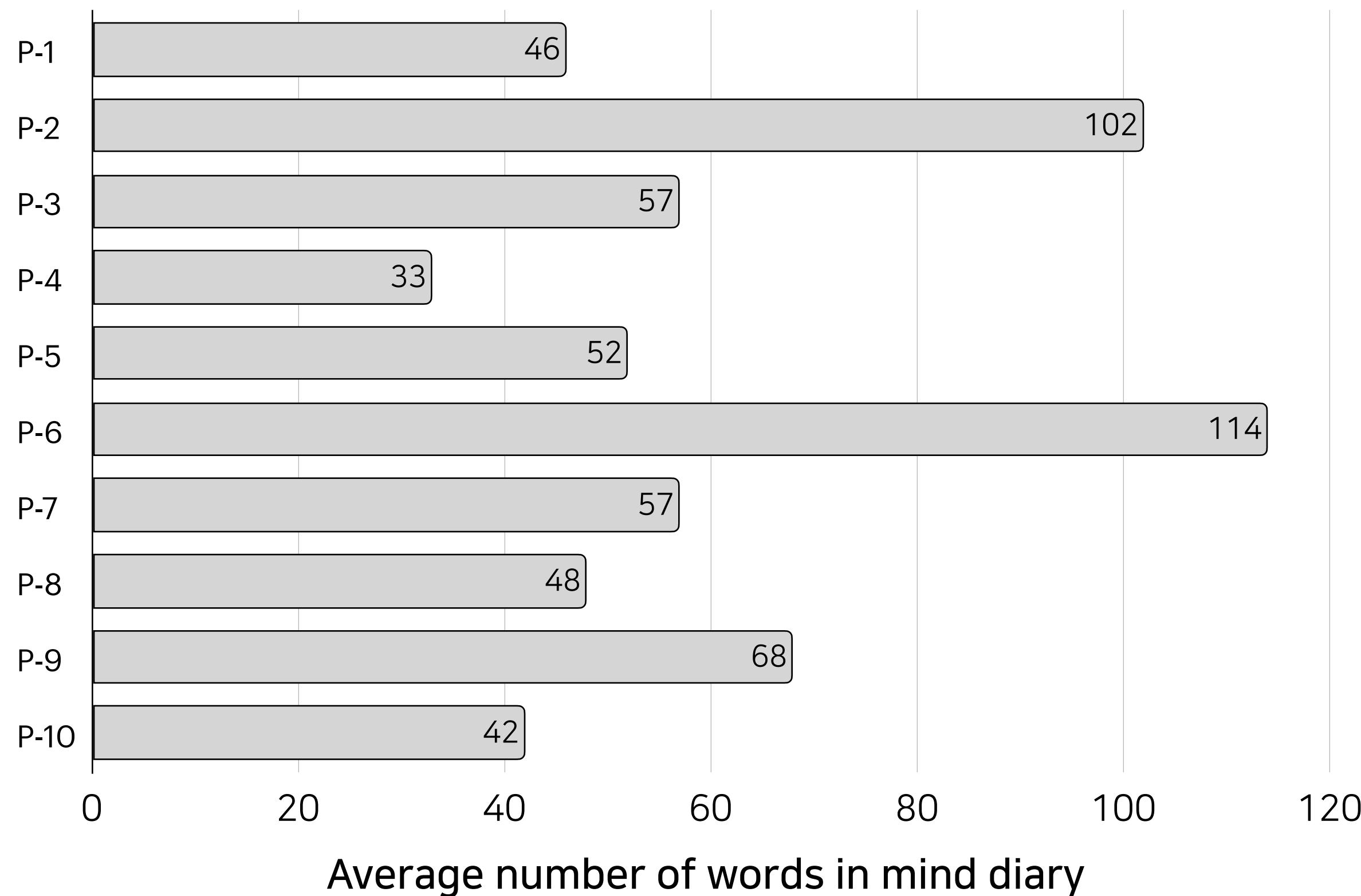
“I often feel like I'm wasting my time without any plans, so I sometimes make a list of future plans vaguely on my cell phone. But it's really hard to carry out. [...] I think **it's good that the app suggests directions in this respect.**”



PA
Eat
Mind
Sleep

Findings 2

RoutineAid's **mind diary** encouraged participants to **organize thoughts and express personal feelings**

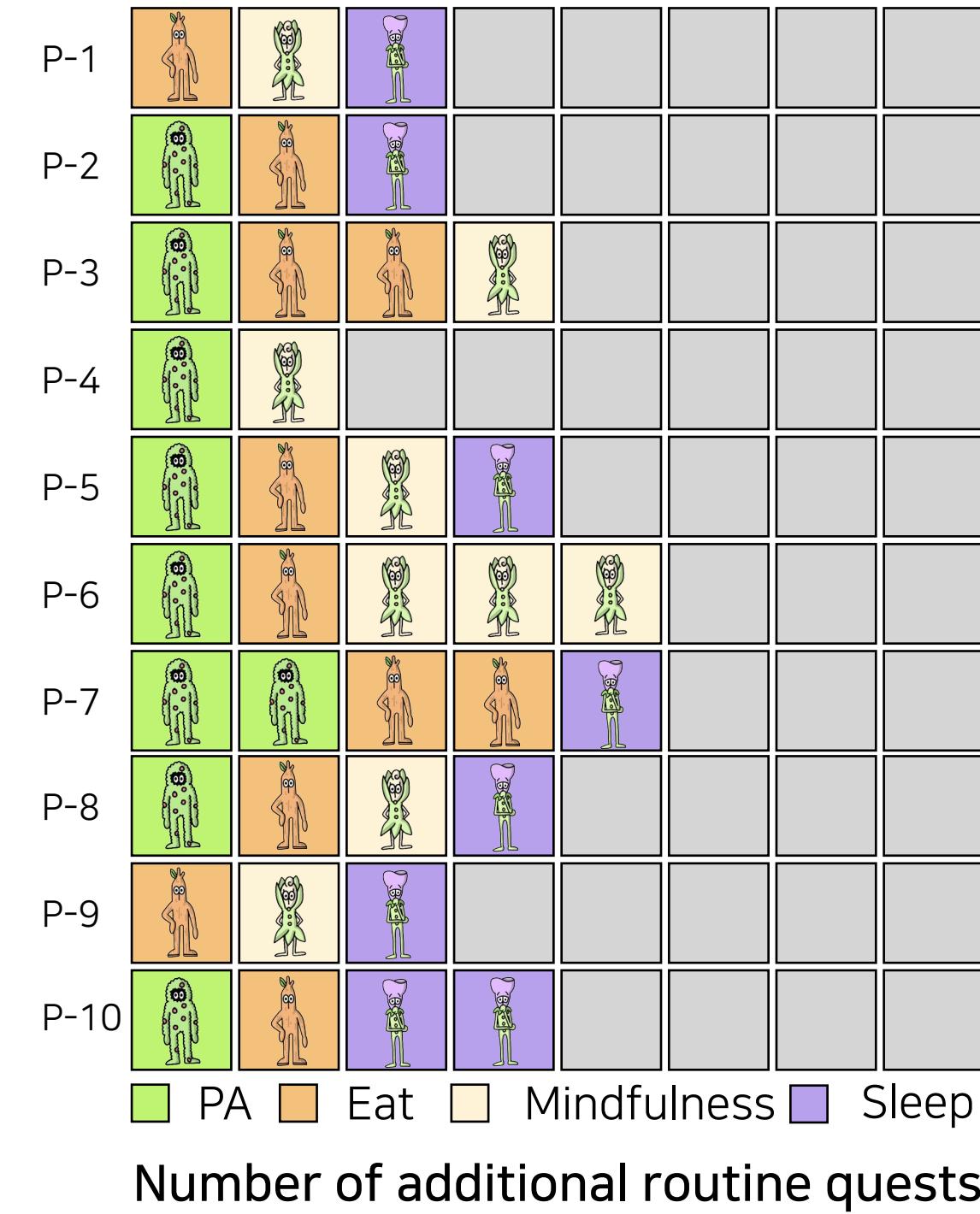


“I think I get angry more often while playing games these days. So I often fight with my sister. I don't write down special stories in my mind diary. Mostly, [I] **write down what I did today, how many times I got angry, and why.** [...] seems like the number of times I got angry decreased by 30%”



Findings 3 & 4

Participants **strategically used** their user-generated secondary routine quests



“I've been trying to cut back on my smartphone usage, and I've done it a little bit. **Instead, I was more into** Nintendo Switch. [...] **so I added** this as my routine quest.”



Participants **elaborated** routine for **effective micro-planning**

Go boxing every weekday (except on exam days) (P-10)

Listen to ASMR ‘Just Talking’ to fall asleep (P-5)

Use stairs twice a day to the 15th floor (P-3)

Drink mocha frappe only 3 times a week (P-2)

Eat 2 blocks of tofu a day (P-1)

“Were there any participants who didn't write down **the time or number of exercise times**? I wrote it down because I thought it was **basic information** [...]”



Findings 3 & 4



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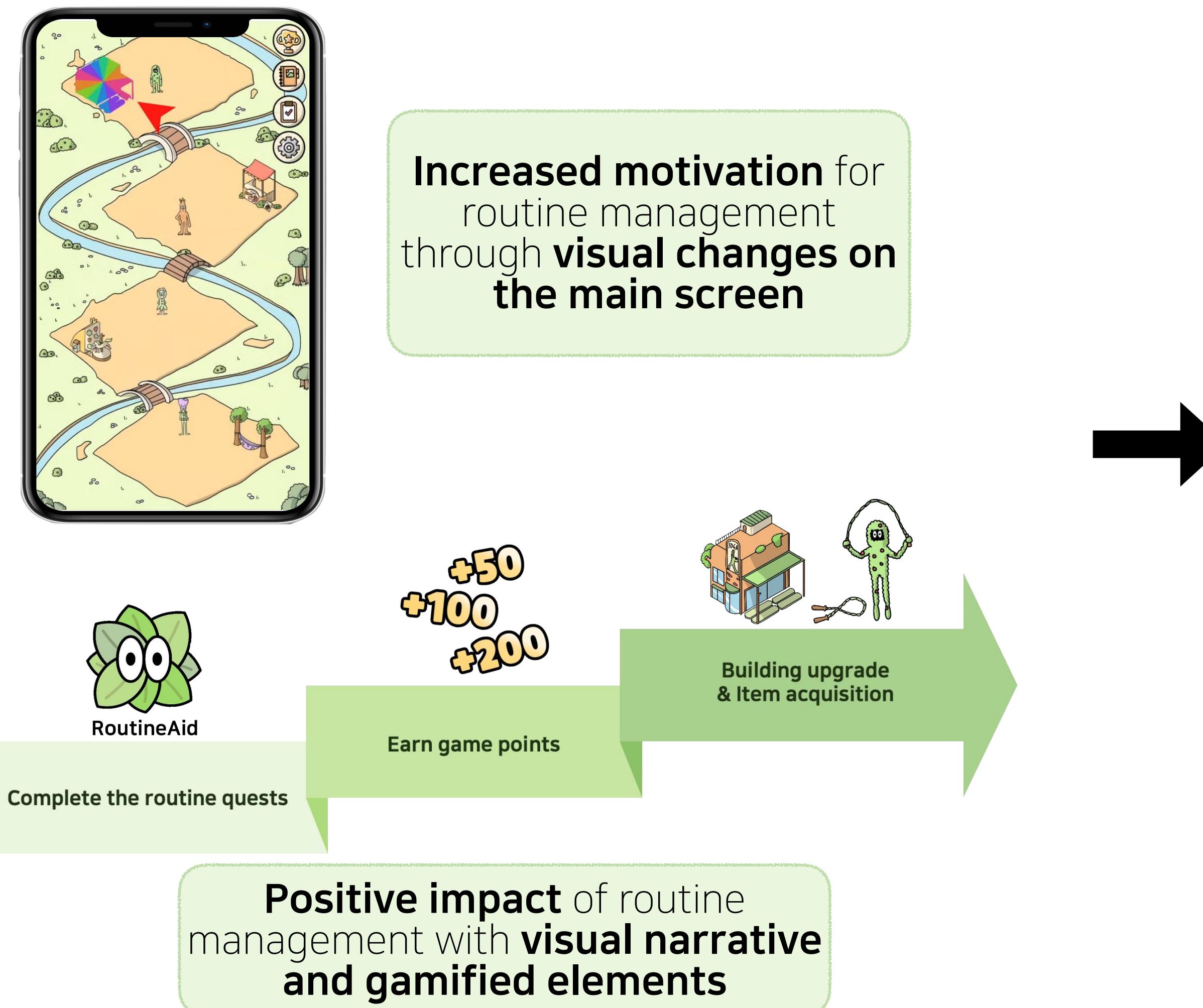
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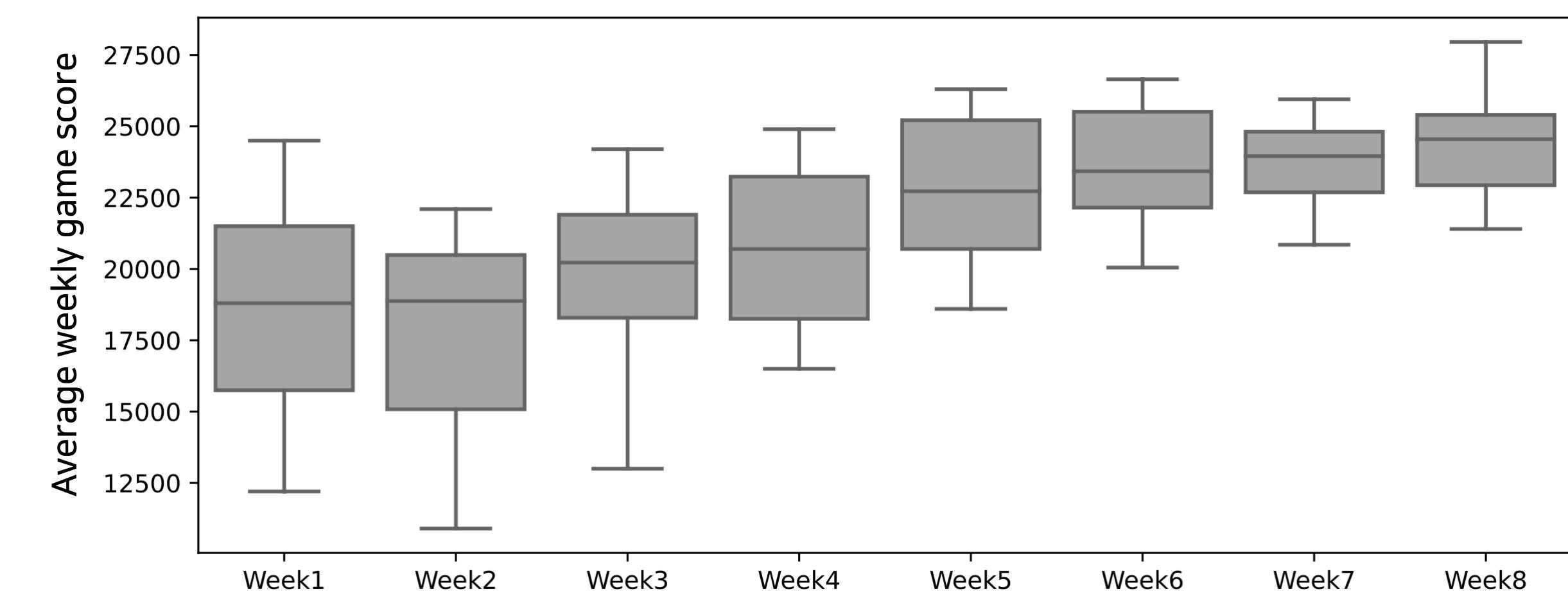
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Findings 5



Maintaining daily routines through **Celebratory Interactions**



Design Implications

Findings

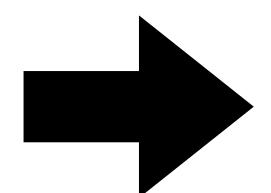
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RoutineAid's **mind diary** encouraged participants to **organize thoughts and express personal feelings**

Participants **strategically used their user-generated secondary routine quests**

Participants **elaborated routine for effective micro-planning**

Maintaining daily routines through **Celebratory Interactions**



- 1 Providing routine quests adaptive to a user's context, progress & preferences
- 2 Balancing self-directed behaviors and experts' regular interventions
- 3 Leveraging visual elements of the main screen to trigger enhanced user engagement
- 4 Beyond a rank-focused leaderboard
- 5 Visual support considering loss aversion
- 6 Possible data uses in clinical setting & data privacy concerns

Thank you!

RoutineAid

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