

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

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HANYANG UNIVERSITY



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SNUH

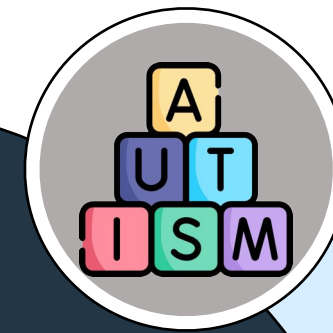
KAIST

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



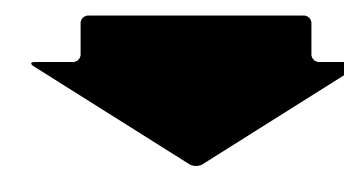
5 Autistic adults



5 Autism experts



5 Parents of an autistic individual



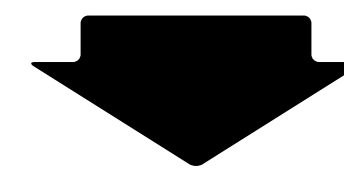
Challenges

- 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

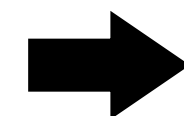
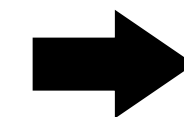
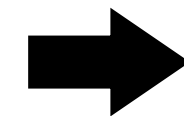
To explore and plan appropriate life rhythms with visual narratives

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

Main screen



Routine Checklist



DG#1

DG#2

DG#3

Transition into RoutineAid Design Elements

Design Goals

DG#1

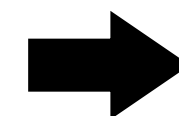
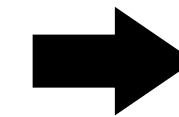
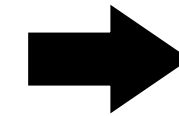
To explore and plan appropriate life rhythms with visual narratives

DG#2

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Functionalities of RoutineAid

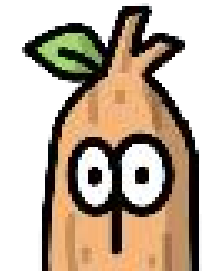
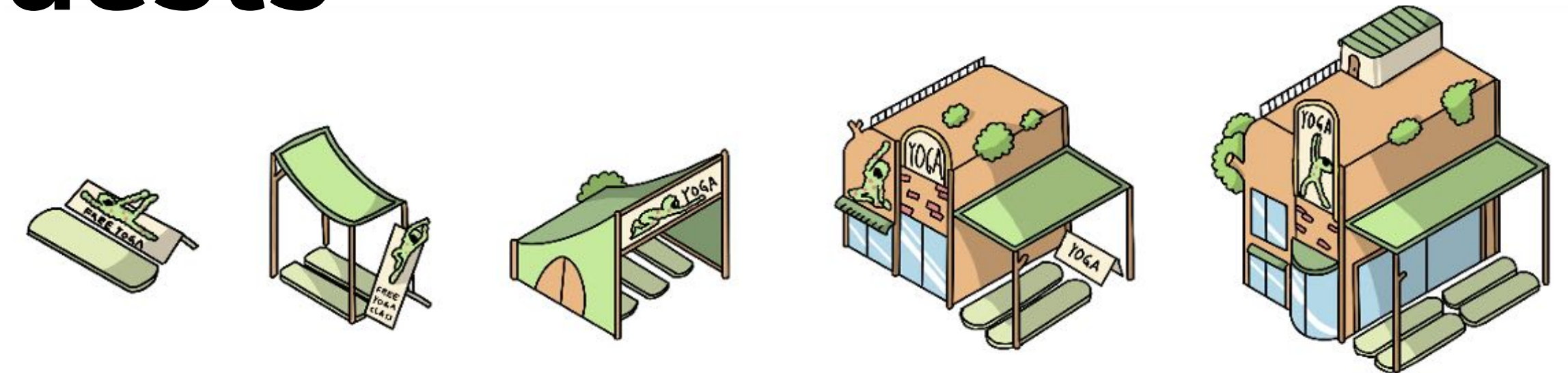
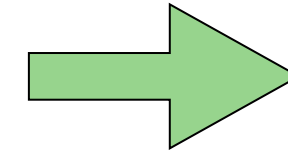
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RoutineAid - Key Routine Quests



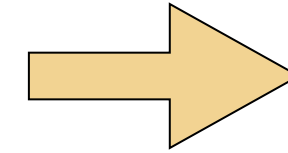
Physical Activity Village

Key Routine Quest:
Walk for more than 30 minutes



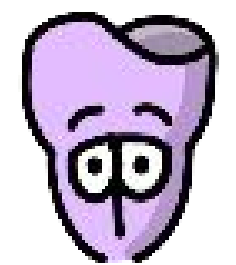
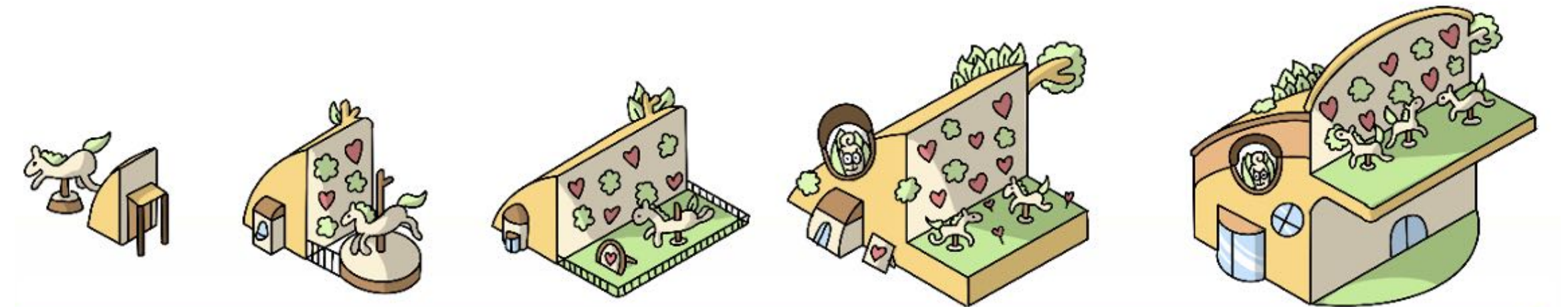
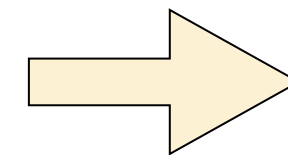
Eat Village

Key Routine Quest:
Regular intake of meals



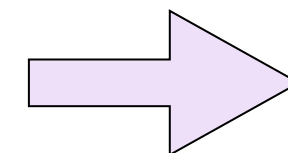
Mindfulness Village

Key Routine Quest:
Write a mind diary



Sleep Village

Key Routine Quest:
Keep a regular sleep schedule

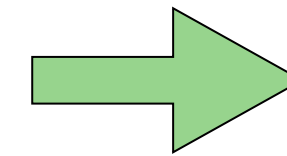


RoutineAid - Secondary Routine Quests

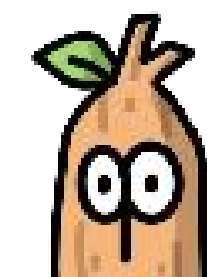


Physical Activity Village

Secondary Routine Quests

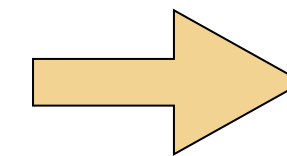


Pre-defined Items



Eat Village

Secondary Routine Quests

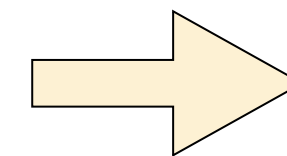


Pre-defined Items

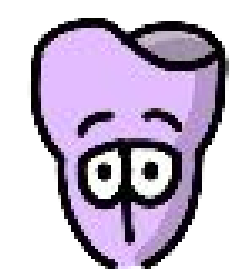


Mindfulness Village

Secondary Routine Quests

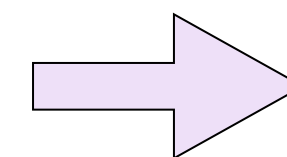


Pre-defined Items



Sleep Village

Secondary Routine Quests



Pre-defined Items

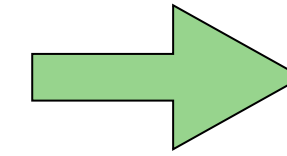


RoutineAid - Secondary Routine Quests



Physical Activity Village

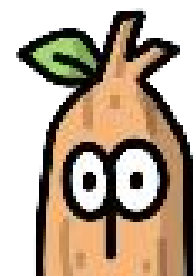
Secondary Routine Quests



Pre-defined Items

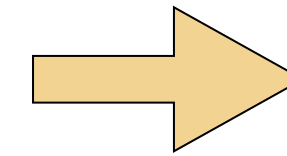


User-generated Items



Eat Village

Secondary Routine Quests



Pre-defined Items

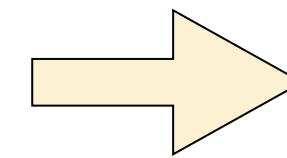


User-generated Items

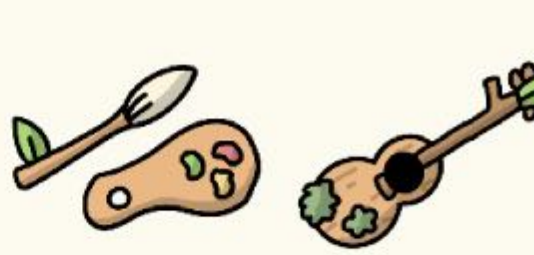


Mindfulness Village

Secondary Routine Quests



Pre-defined Items

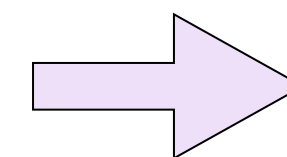


User-generated Items



Sleep Village

Secondary Routine Quests



Pre-defined Items



User-generated Items

Transition into RoutineAid Design Elements

Design Goals

DG#1

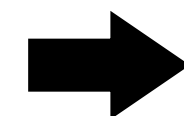
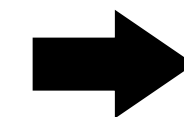
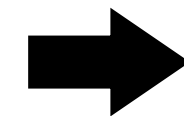
To explore and plan appropriate life rhythms with visual narratives

DG#2

To explore actionable daily routine planning

DG#3

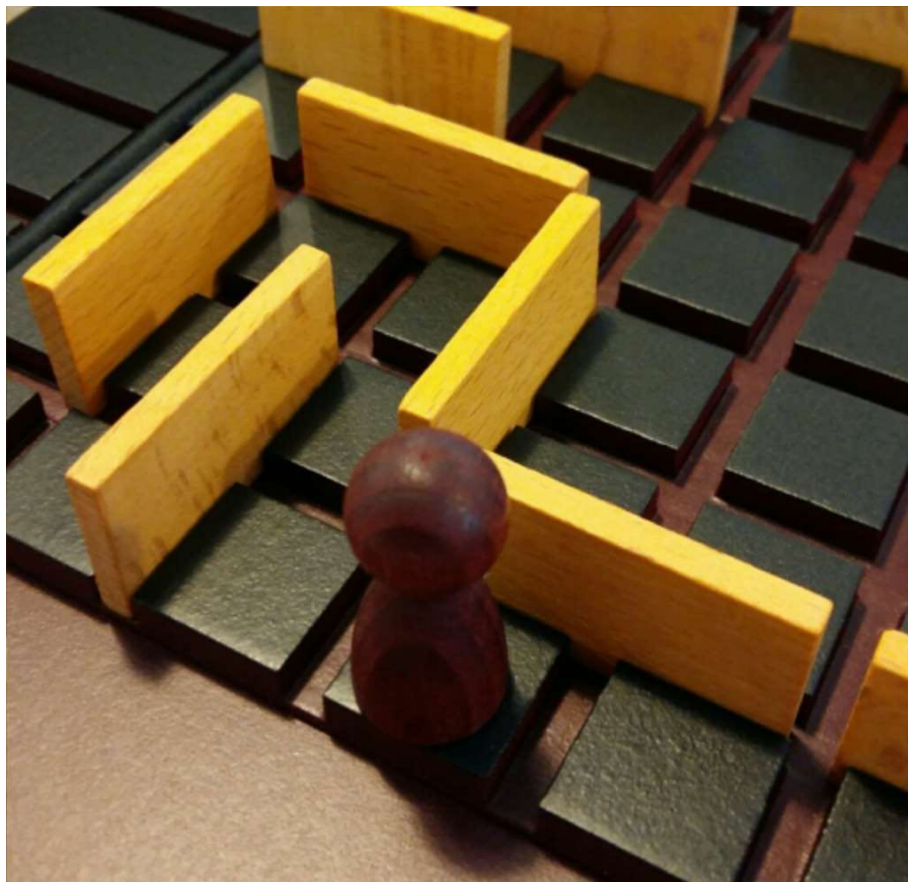
To achieve sustainable key daily routine management



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RoutineAid - Routine Diary



Some images shared through Routine diary

DG#1

DG#2

DG#3

eAid

the quests
the quests

RoutineAid - Routine Diary

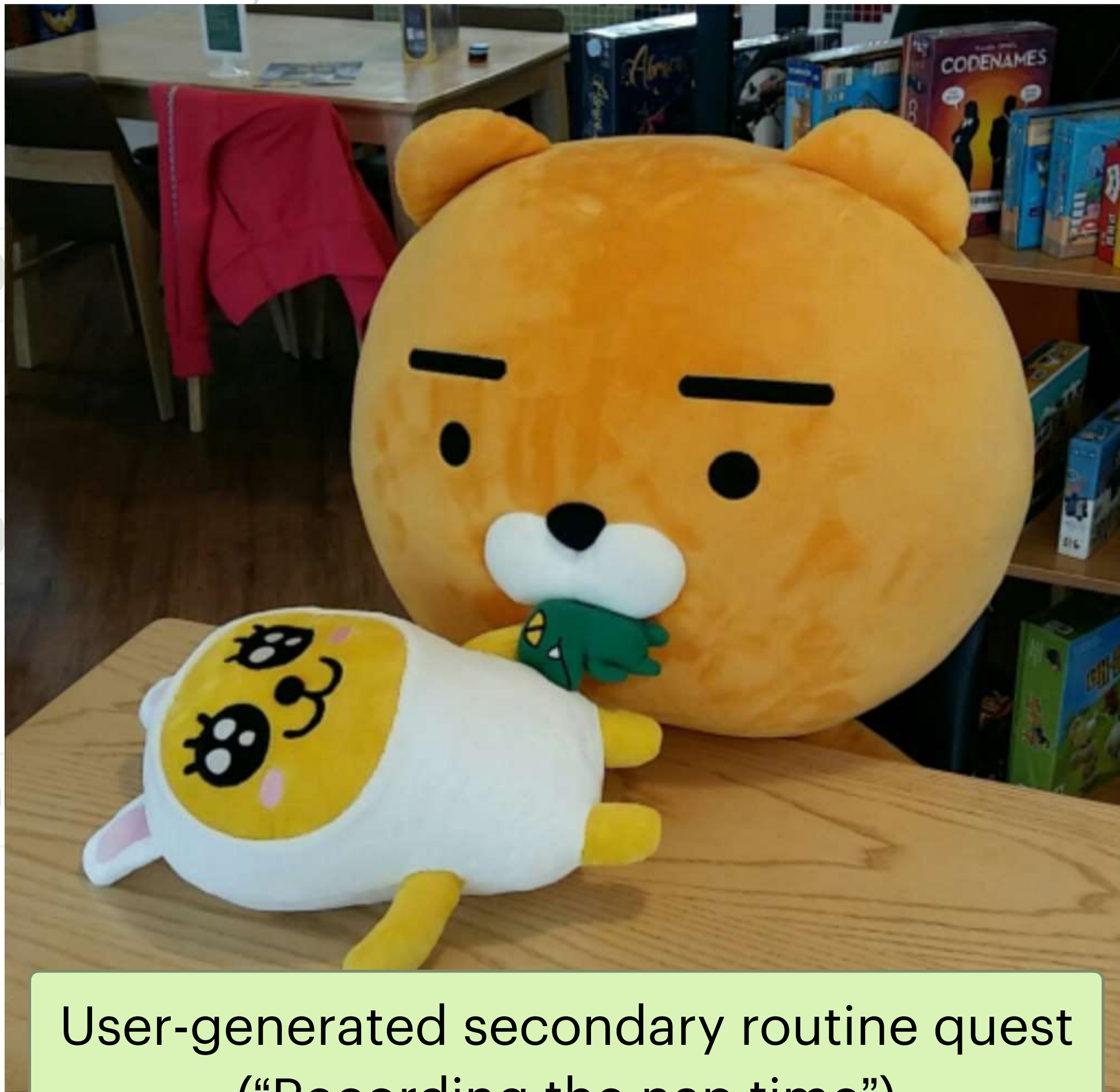


Key routine quest of Mindfulness Village
("Writing a mind diary")

"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



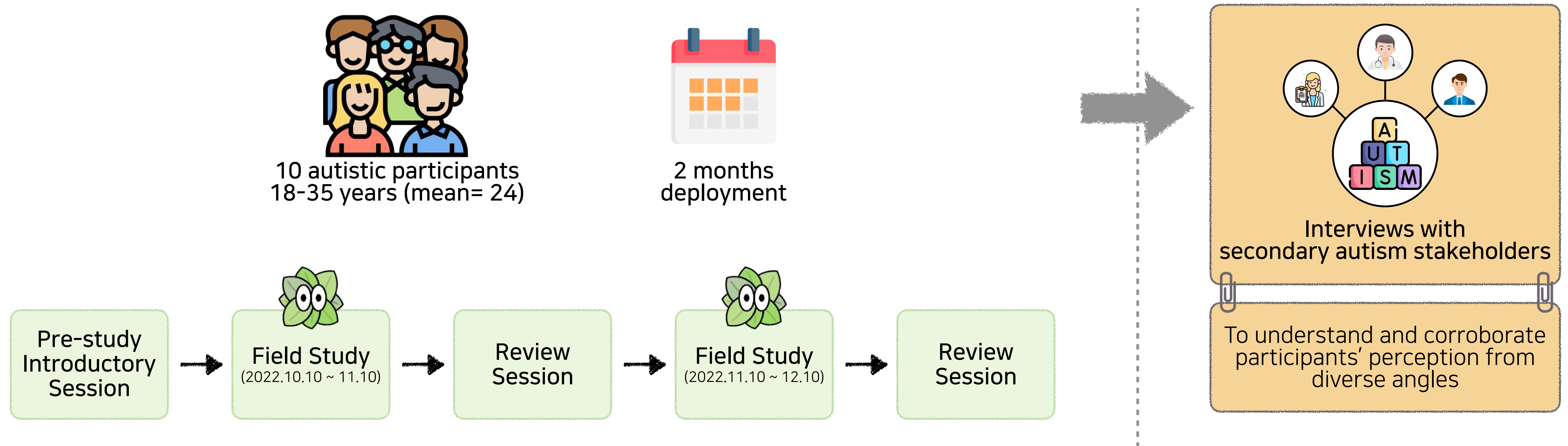
Developing phase

Developed villages
with vibrant visual
and sound effect



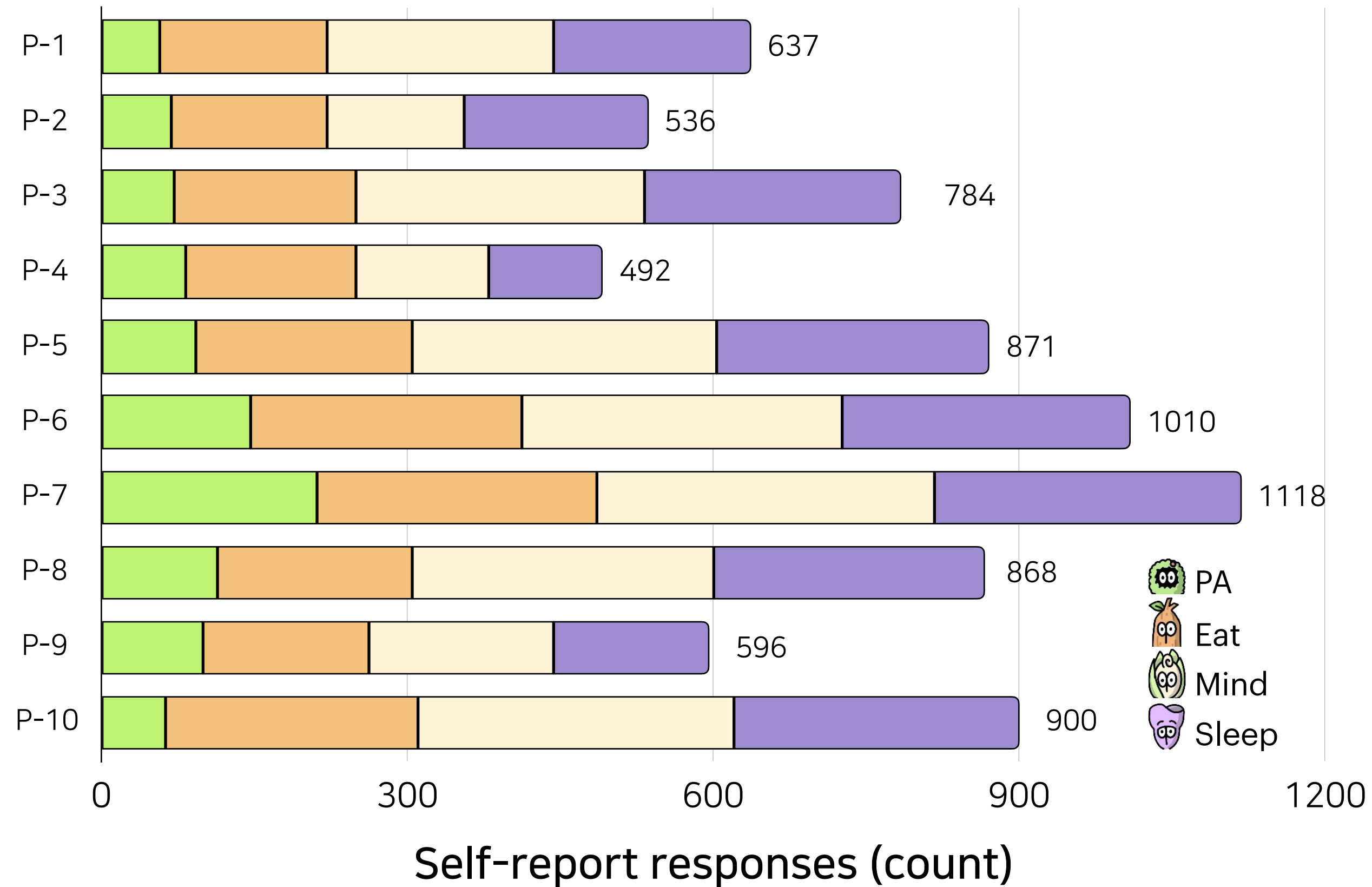
Finalized phase

Field Study



Findings 1

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

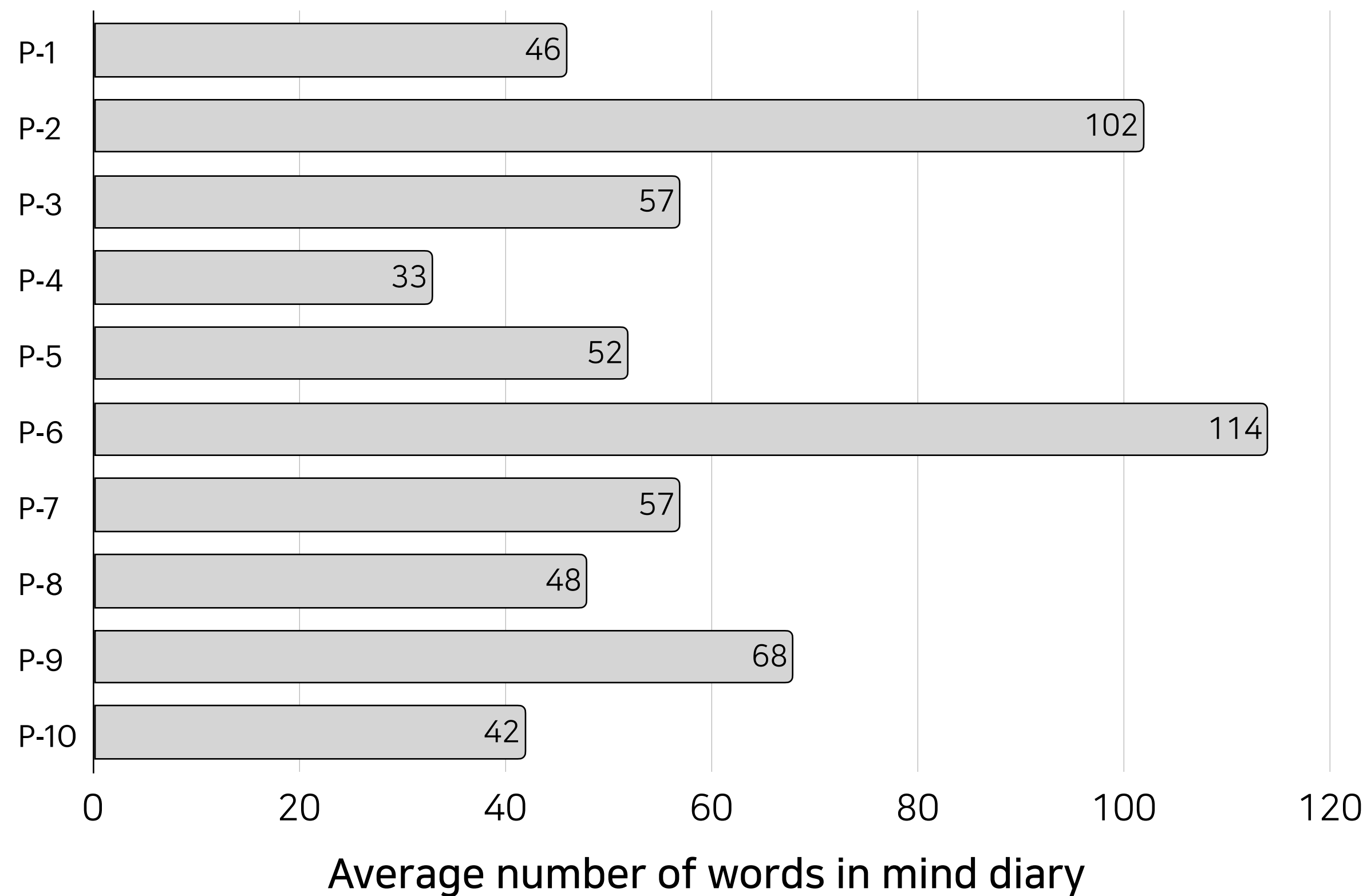


"I often feel like I'm wasting my time without any plans, so I sometimes make a list of future plans vaguely on my cell phone. But it's really hard to carry out. [...] I think **it's good that the app suggests directions in this respect.**"



Findings 2

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

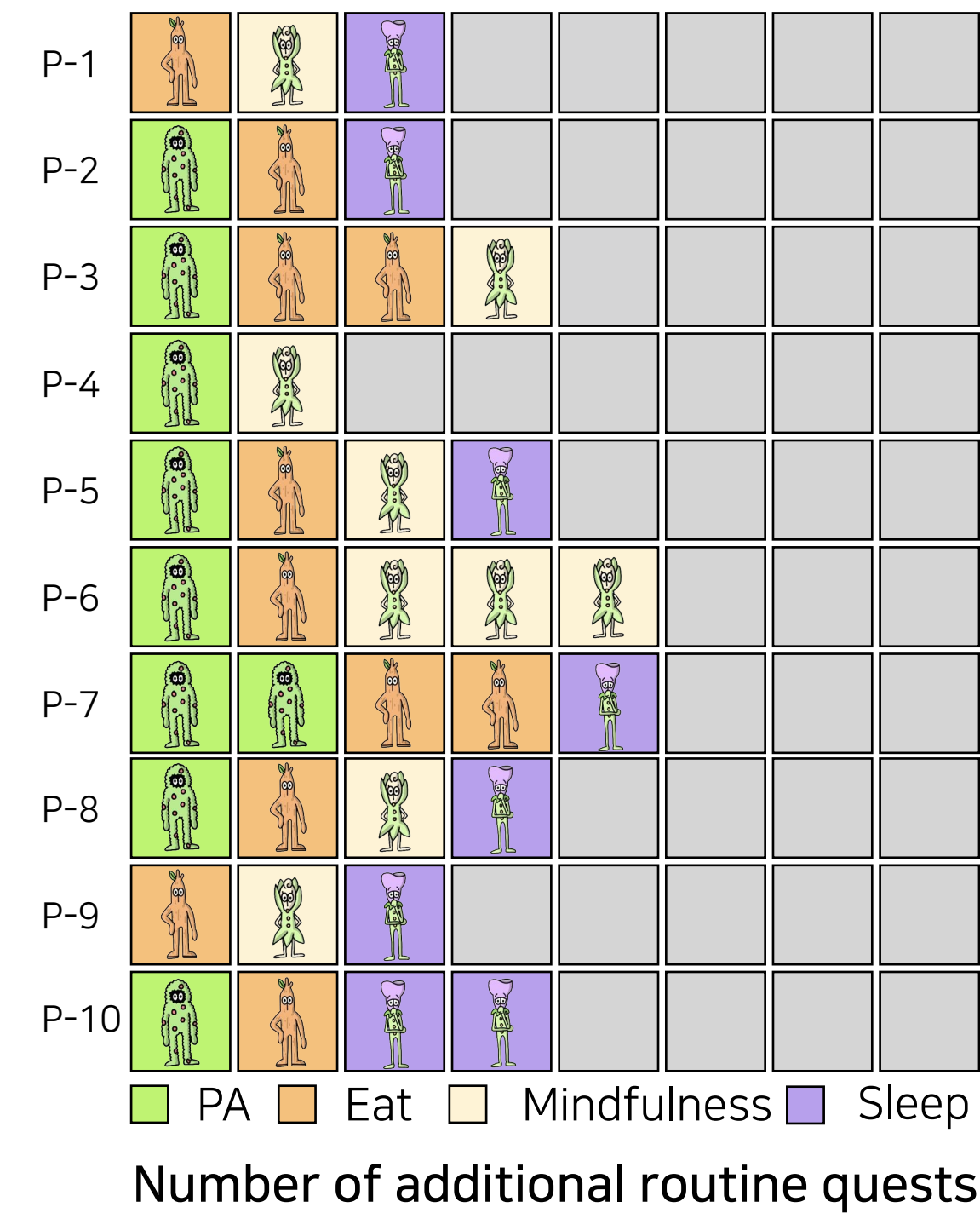


“I think I get angry more often while playing games these days. So I often fight with my sister. I don't write down special stories in my mind diary. Mostly, **[I] write down what I did today, how many times I got angry, and why. [...]** seems like the number of times I got angry decreased by 30%”



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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“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 5



Increased motivation for routine management through **visual changes on the main screen**

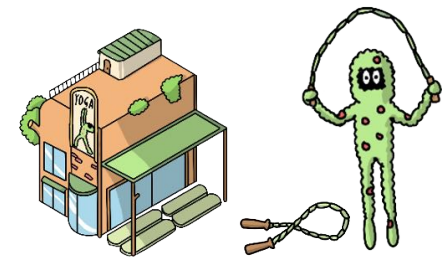


RoutineAid

Complete the routine quests

+50
+100
+200

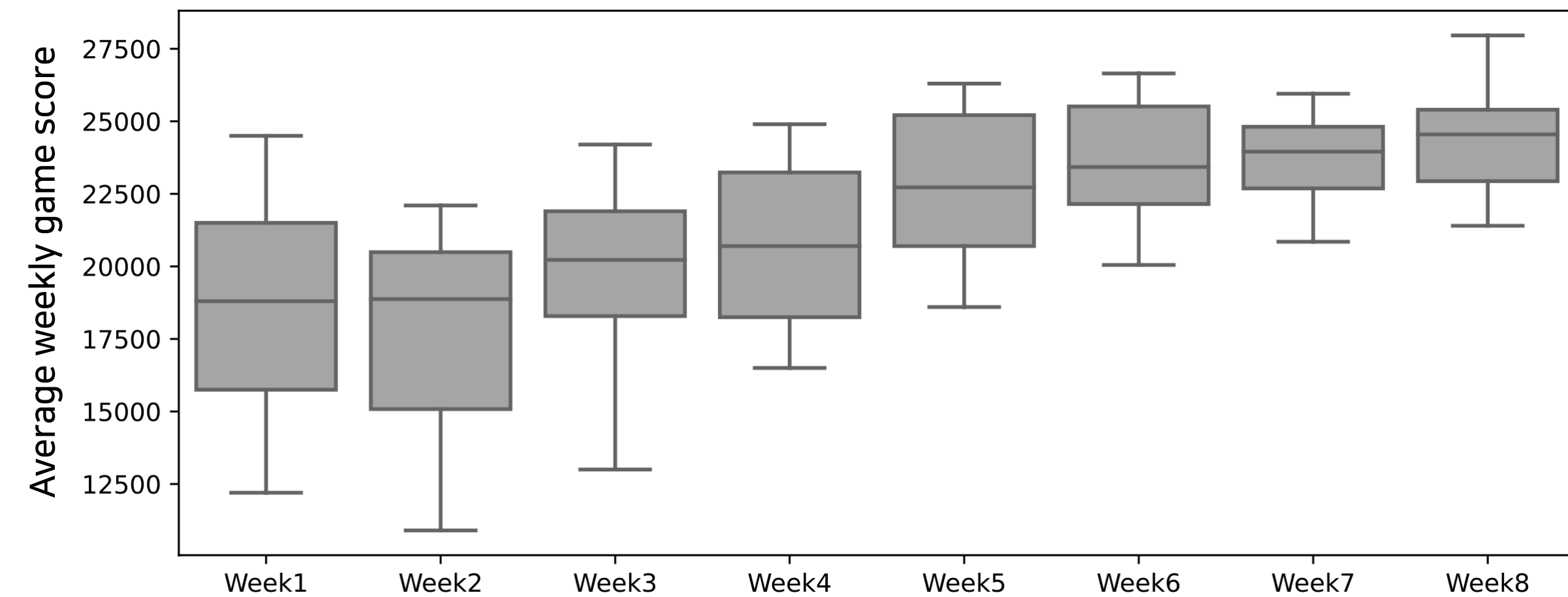
Earn game points



Building upgrade
& Item acquisition

Positive impact of routine management with **visual narrative and gamified elements**

Maintaining daily routines through
Celebratory Interactions



Design Implications

Findings

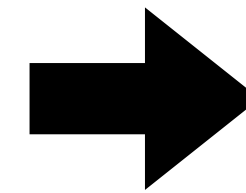
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Participants **strategically used their user-generated secondary routine quests**

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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