



CHI 2024
Surfing the World

Narrating Routines through Game Dynamics: Impact of a Gamified Routine Management App for Autistic Individuals

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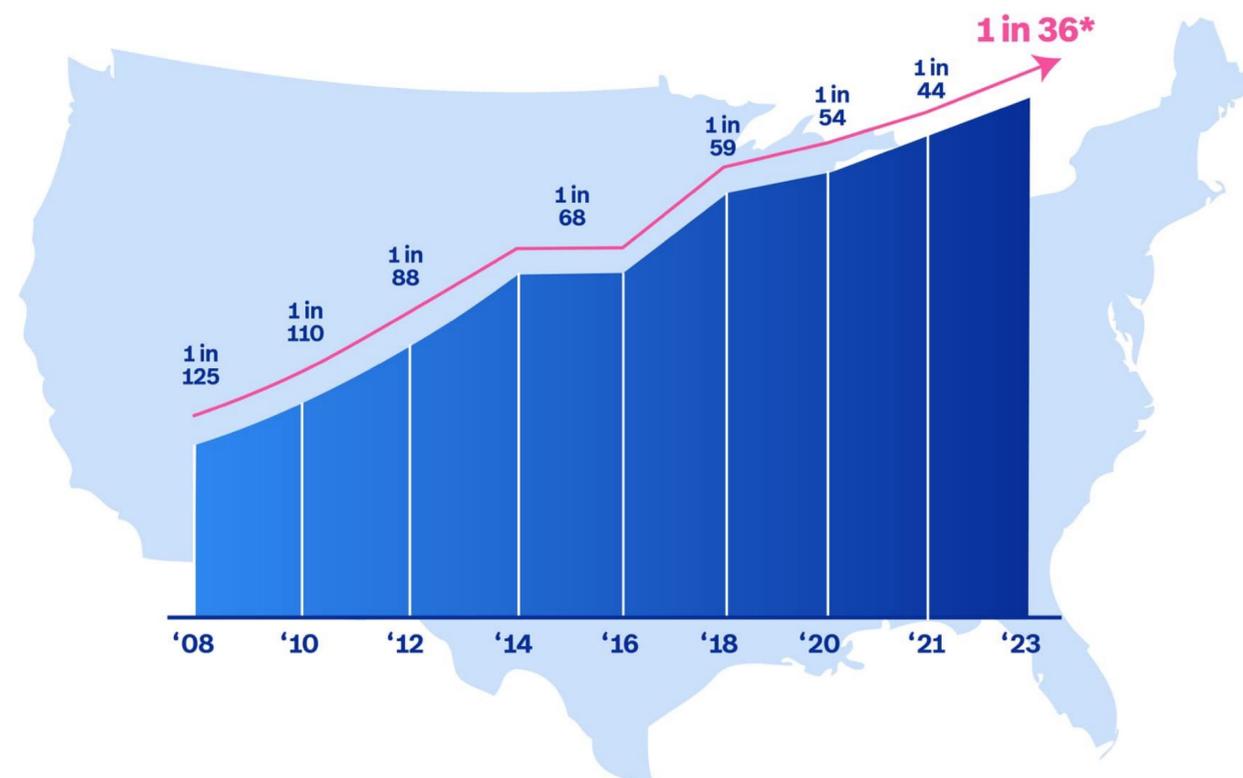
HANYANG UNIVERSITY

KAIST



Research Background

Estimated Autism Prevalence 2023



*Centers for Disease Control and prevention (CDC) prevalence estimates (March 2023)

What about autistic adults?

Increased prevalence in autistic children



Increased number of autistic adults

Lifestyle of the autistic adults are
largely unknown

Less attention given to autistic adults relative to autistic children



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

Autism Stakeholders



5 Autistic adults



5 Autism experts



5 Parents of an autistic individual



Design Goals

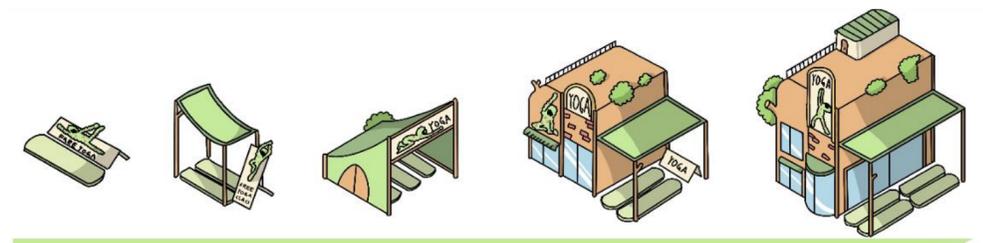
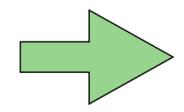
- DG#1** To explore and plan appropriate life rhythms with visual narratives
- DG#2** To explore actionable daily routine planning
- DG#3** To achieve sustainable key daily routine management

RoutineAid

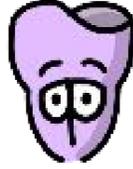



Physical Activity
Village

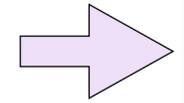
Key Routine Quest:
Walk for more than 30 minutes



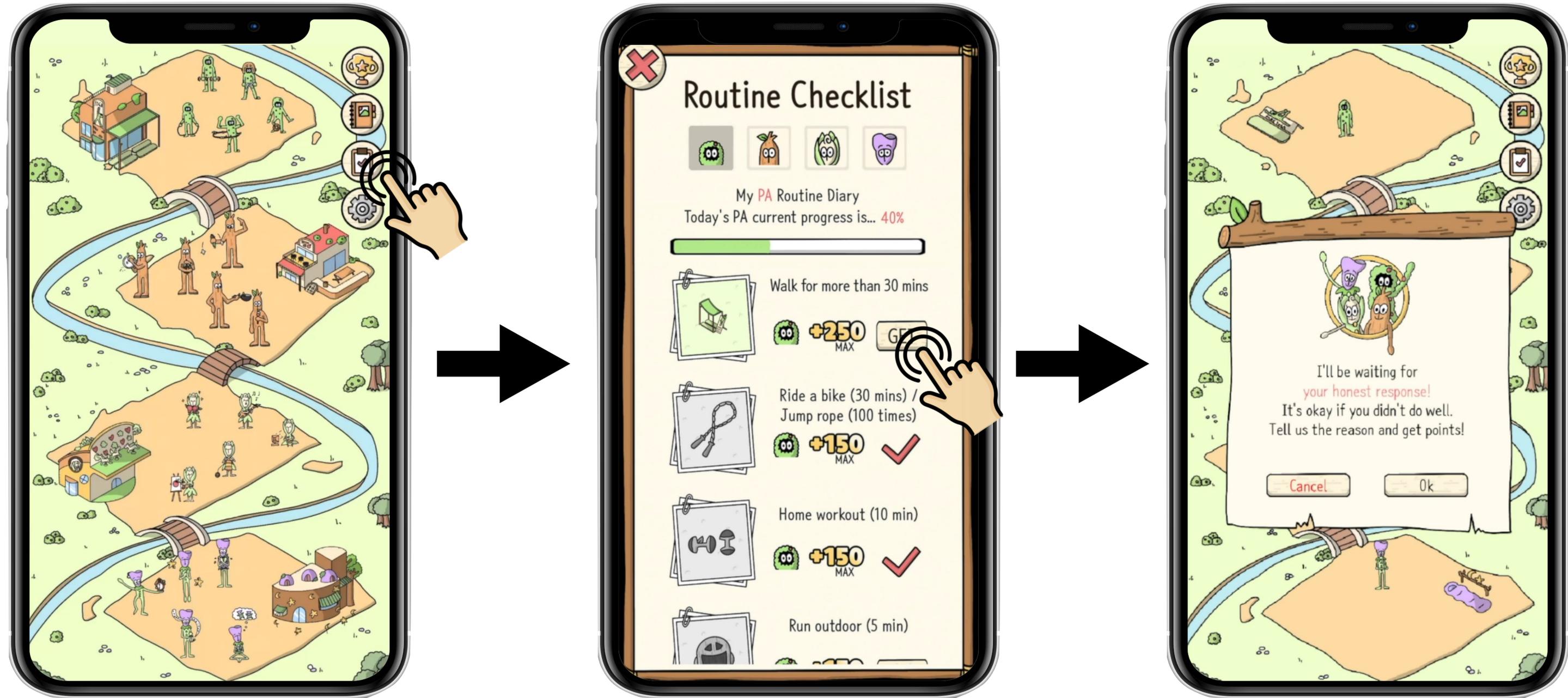
Building upgrade


Sleep
Village

Secondary Routine Quests



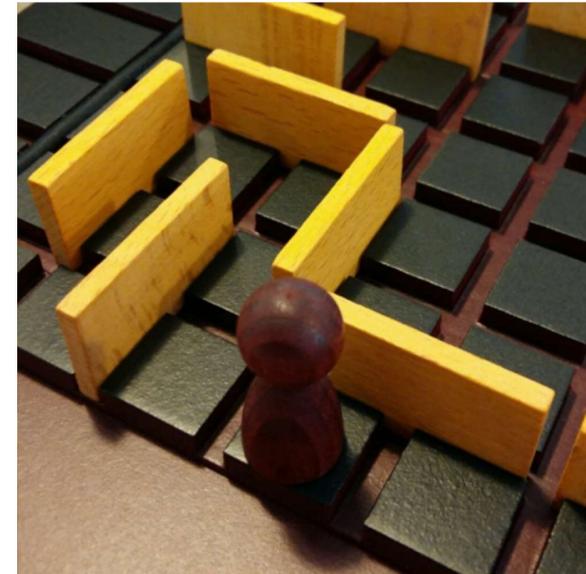
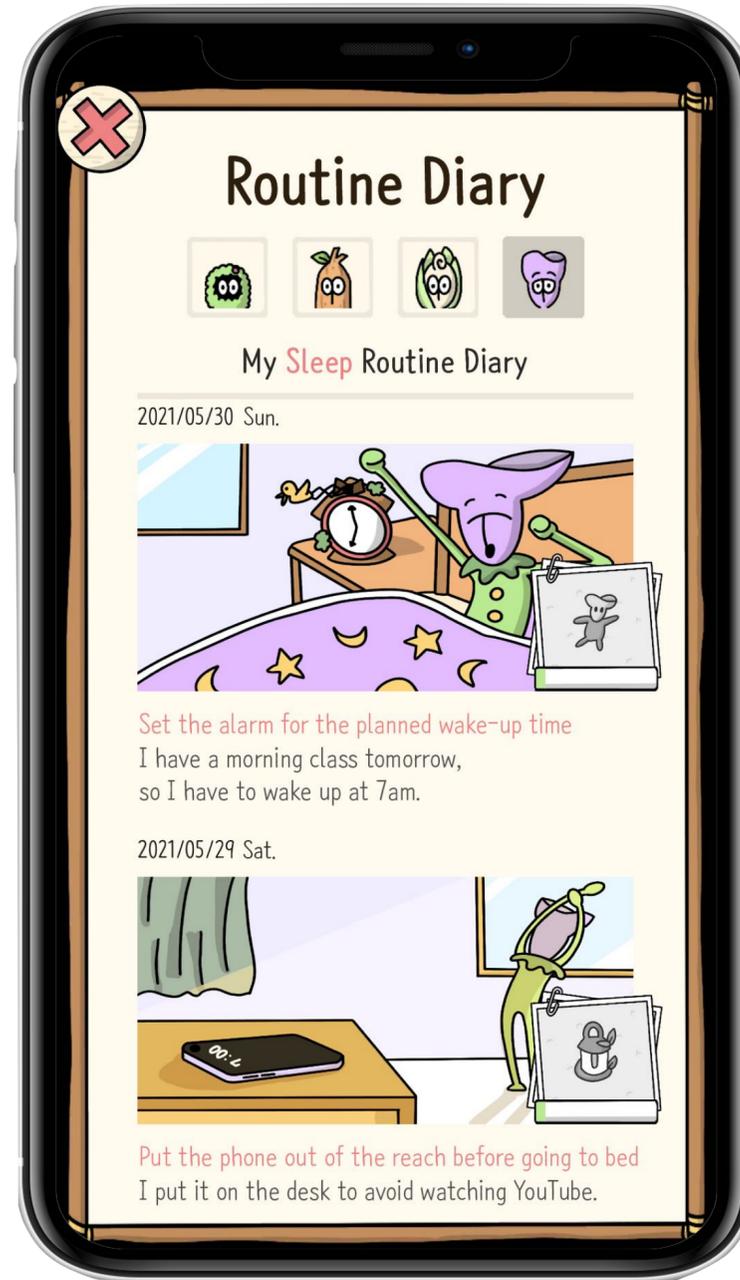
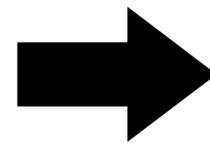
RoutineAid - Routine Checklist



RoutineAid - Routine Diary



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Some images shared through Routine diary

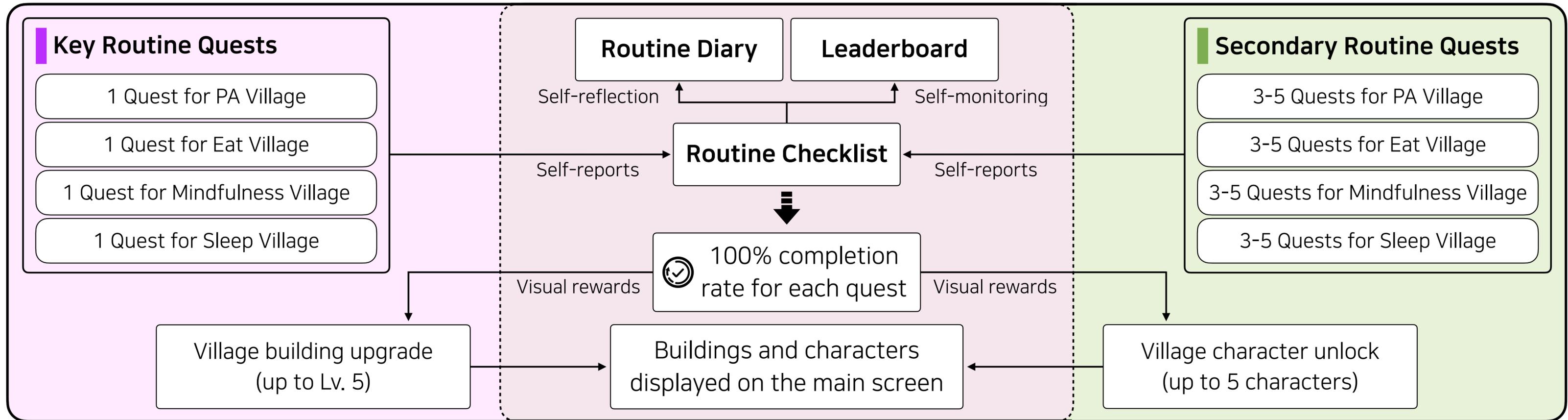
RoutineAid - Routine Diary



“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.”

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

RoutineAid



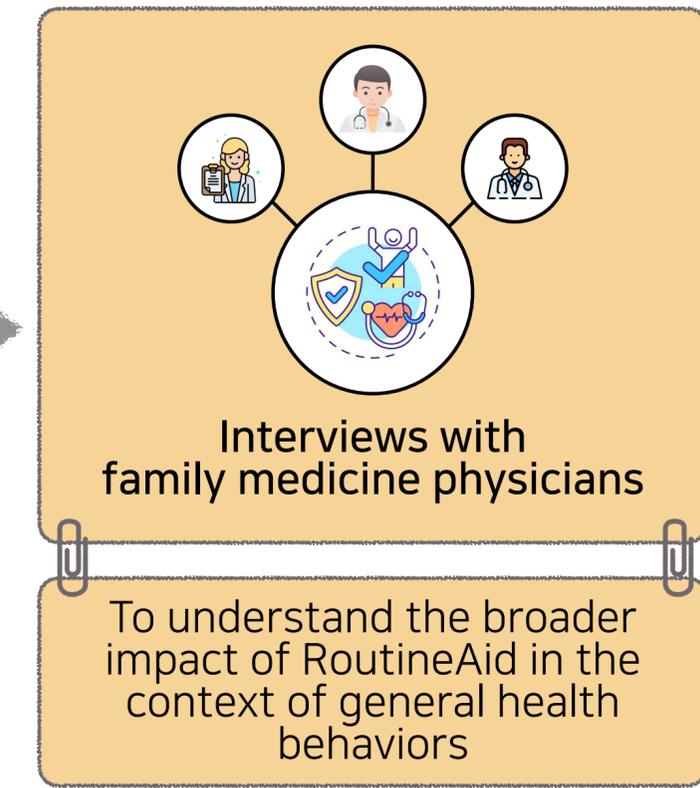
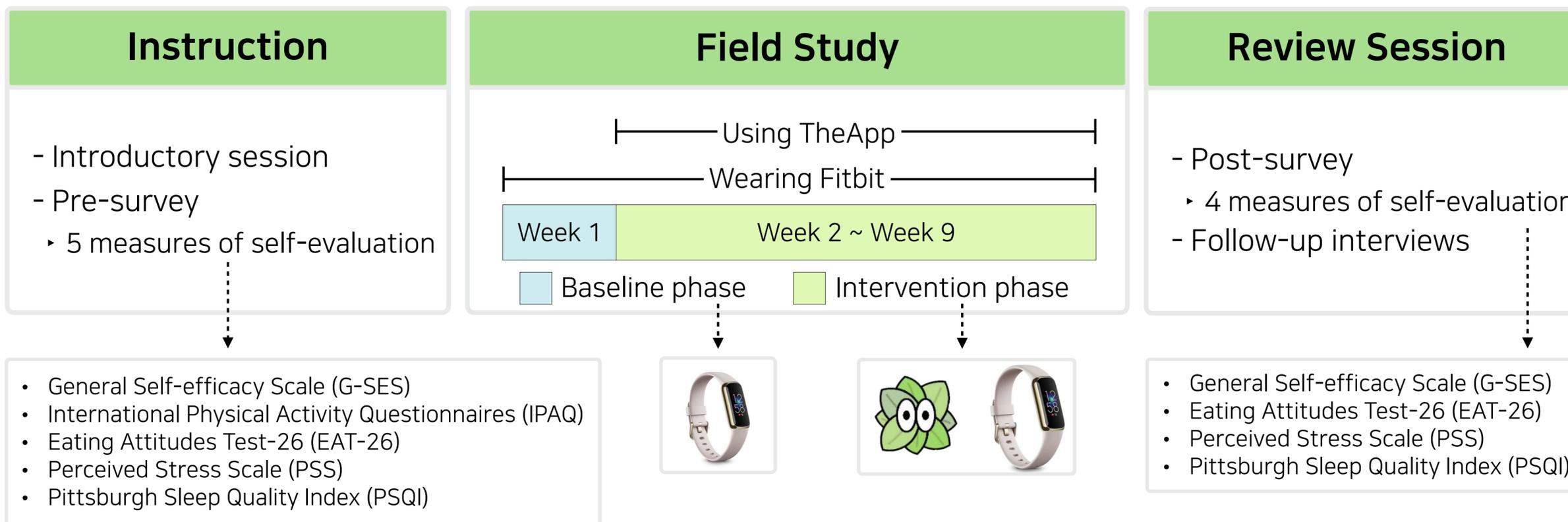
Field Study



20 autistic participants
18-40 years (mean= 28.2)



9 week
deployment



Field Study



 **CHI 23** Design Study



 **CHI 24** Effectiveness Study

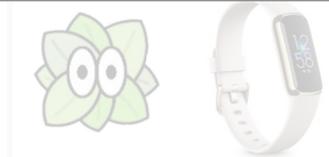
The key contribution of this paper

Extensive validation of RoutineAid by analyzing their app logs in detail and seeing the real-world experience of RoutineAid from autistic adults

Instru

- Introductory
- Pre-survey
 - 5 measures of

- General Self-efficacy Scale (G-SES)
- International Physical Activity Questionnaires (IPAQ)
- Eating Attitudes Test-26 (EAT-26)
- Perceived Stress Scale (PSS)
- Pittsburgh Sleep Quality Index (PSQI)



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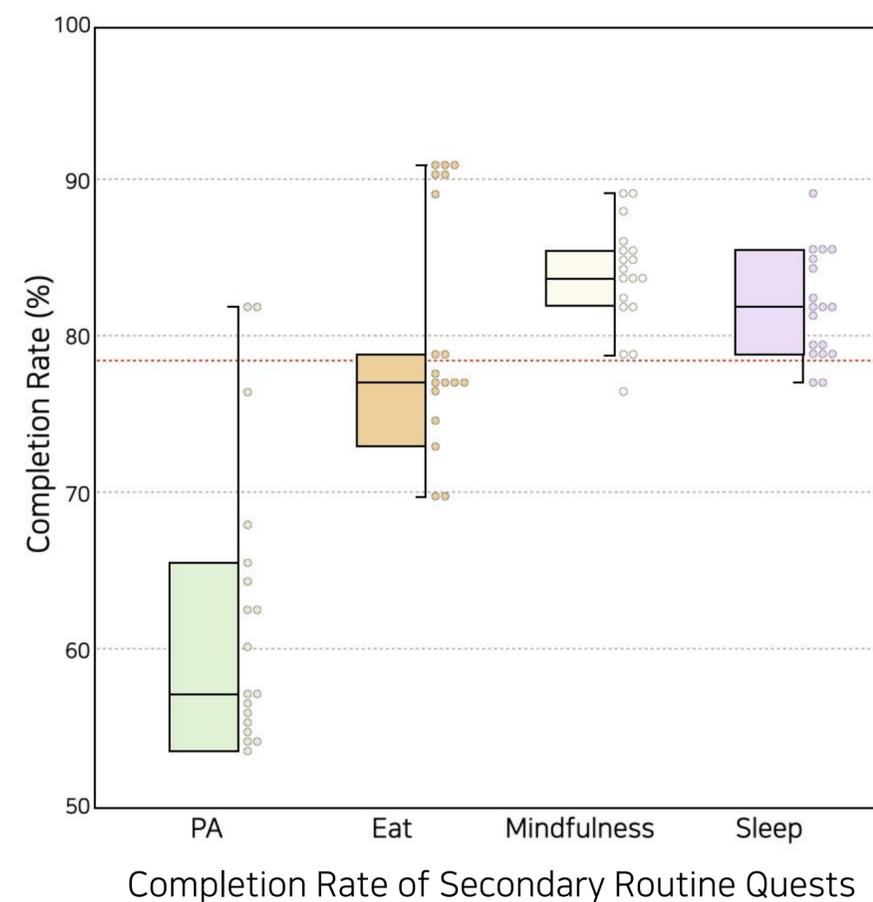
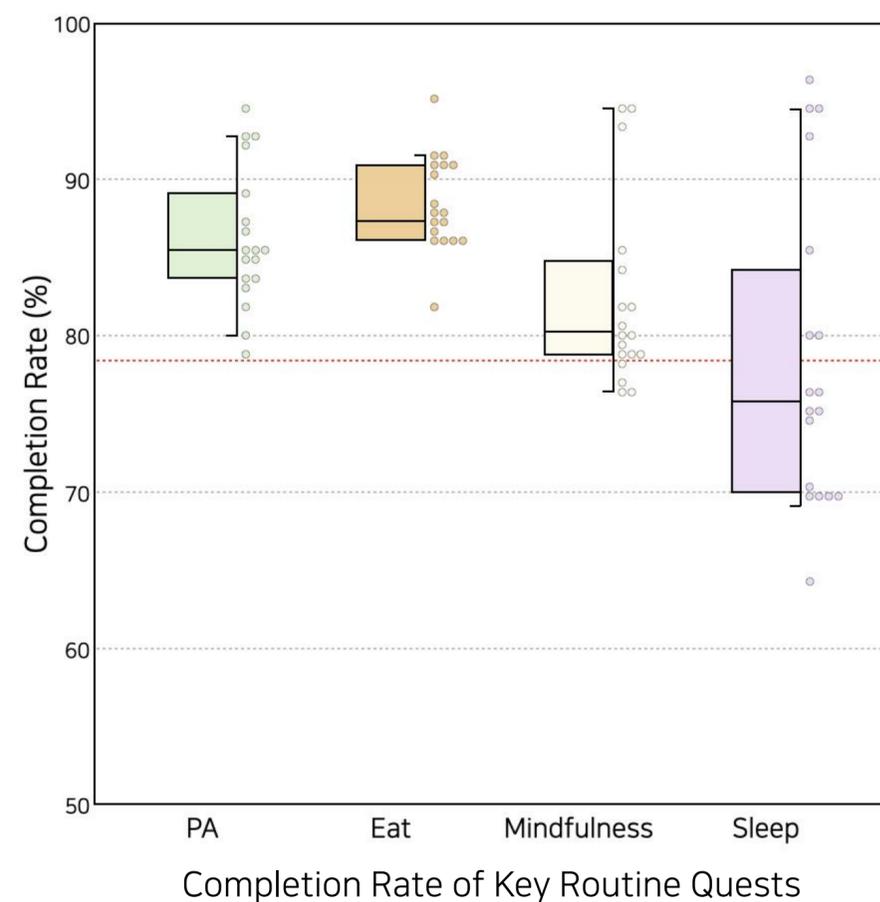


Interviews with
primary physicians

and the broader
RoutineAid in the
general health
behaviors

Finding 1

Participants **promoted their self-efficacy and embedding health behaviors** by using RoutineAid



“I regularly ate meals, but only after logging my food in the app, **I realize how unhealthy my usual choices were.** Once aware, my wife began preparing balanced lunches for me daily. [...] **I engaged in PAs to burn calories and didn't want to sabotage those efforts with bad eating habits**” (P14).



Finding 2

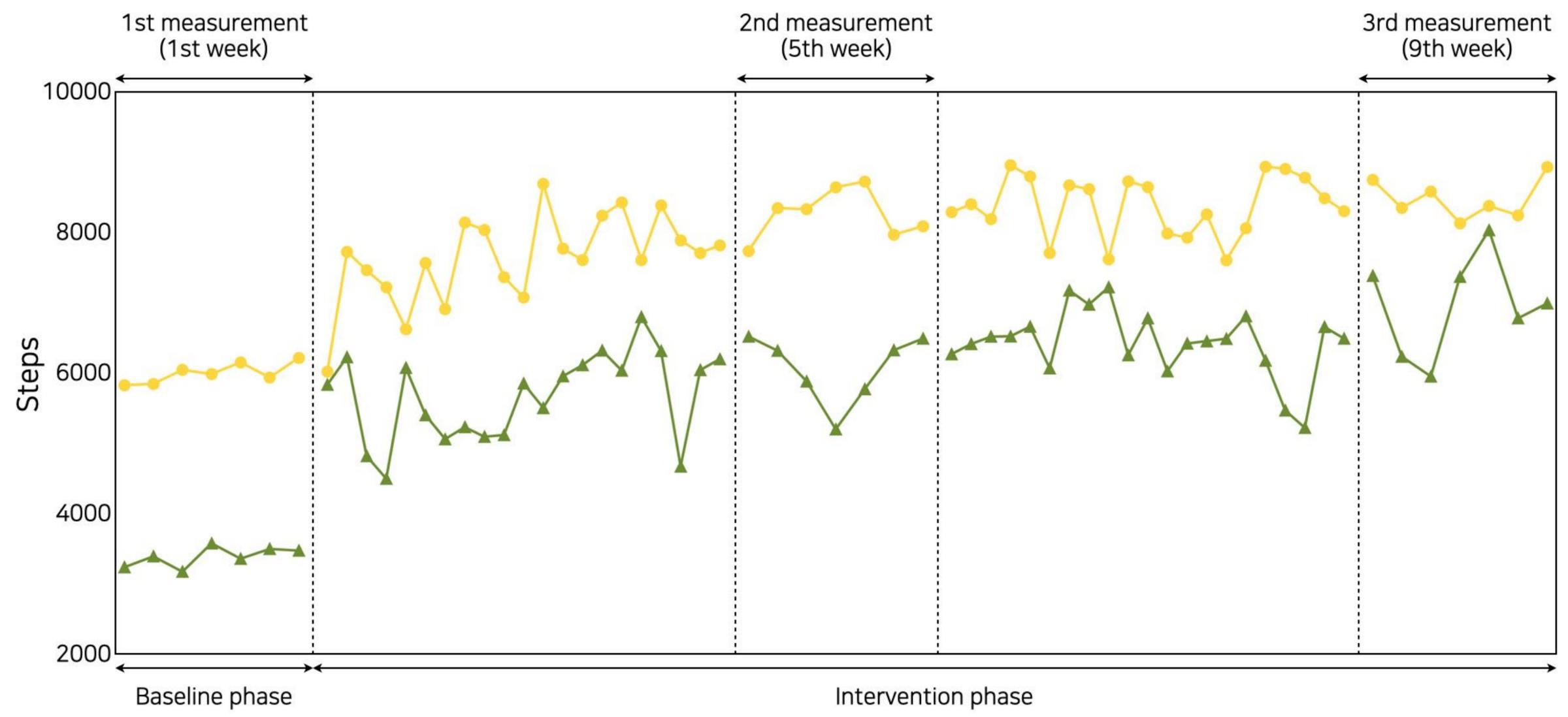


Participants **elevated initial motivation** and **sustained PA involvement with walking-oriented activities**

Pre-survey (IPAQ) for PA intensity categorization

↓ 16 participants

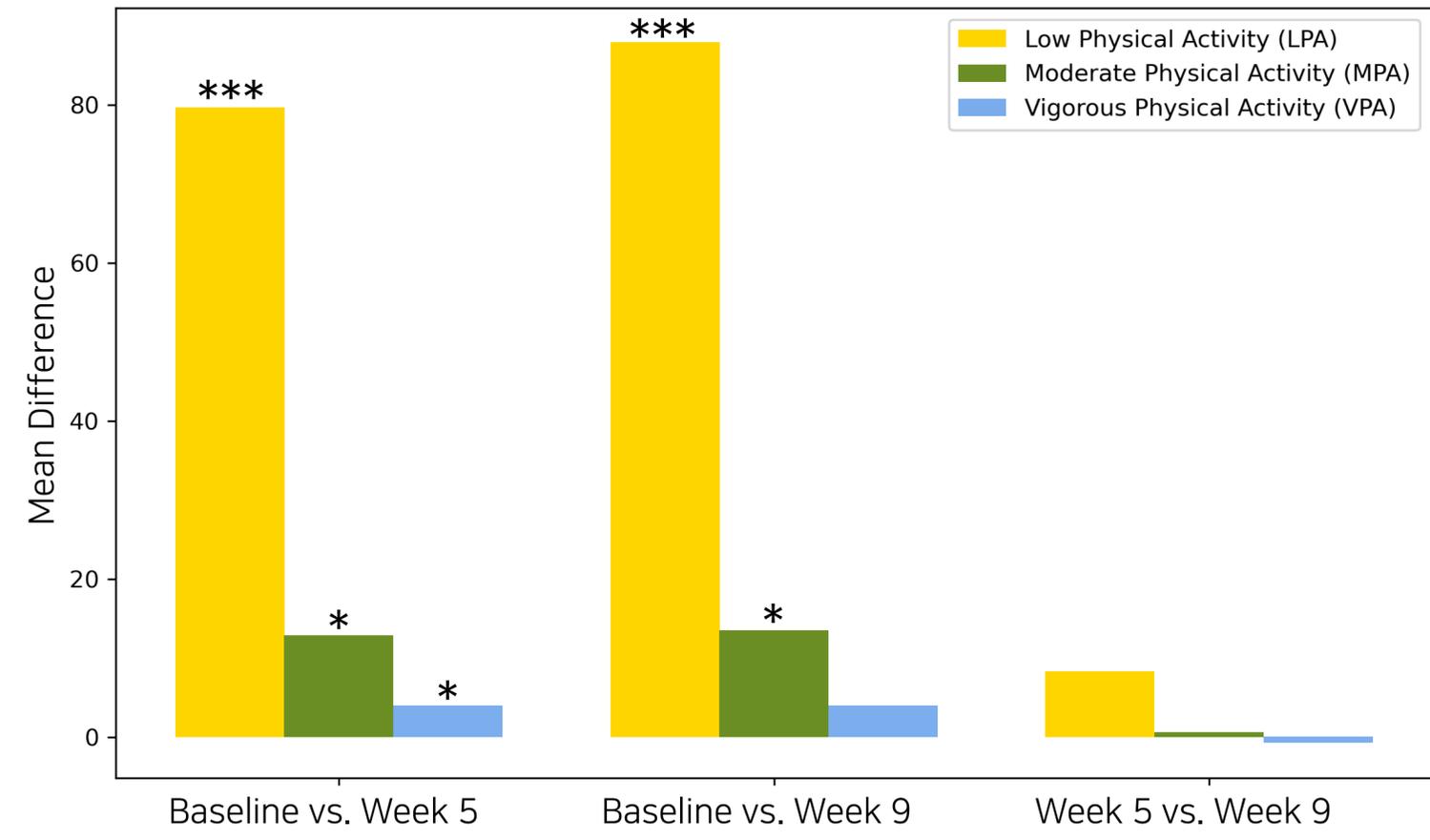
Light Activity Group (LAG): 9
Moderate Activity Group (MAG): 7
Vigorous Activity Group (VAG): 0



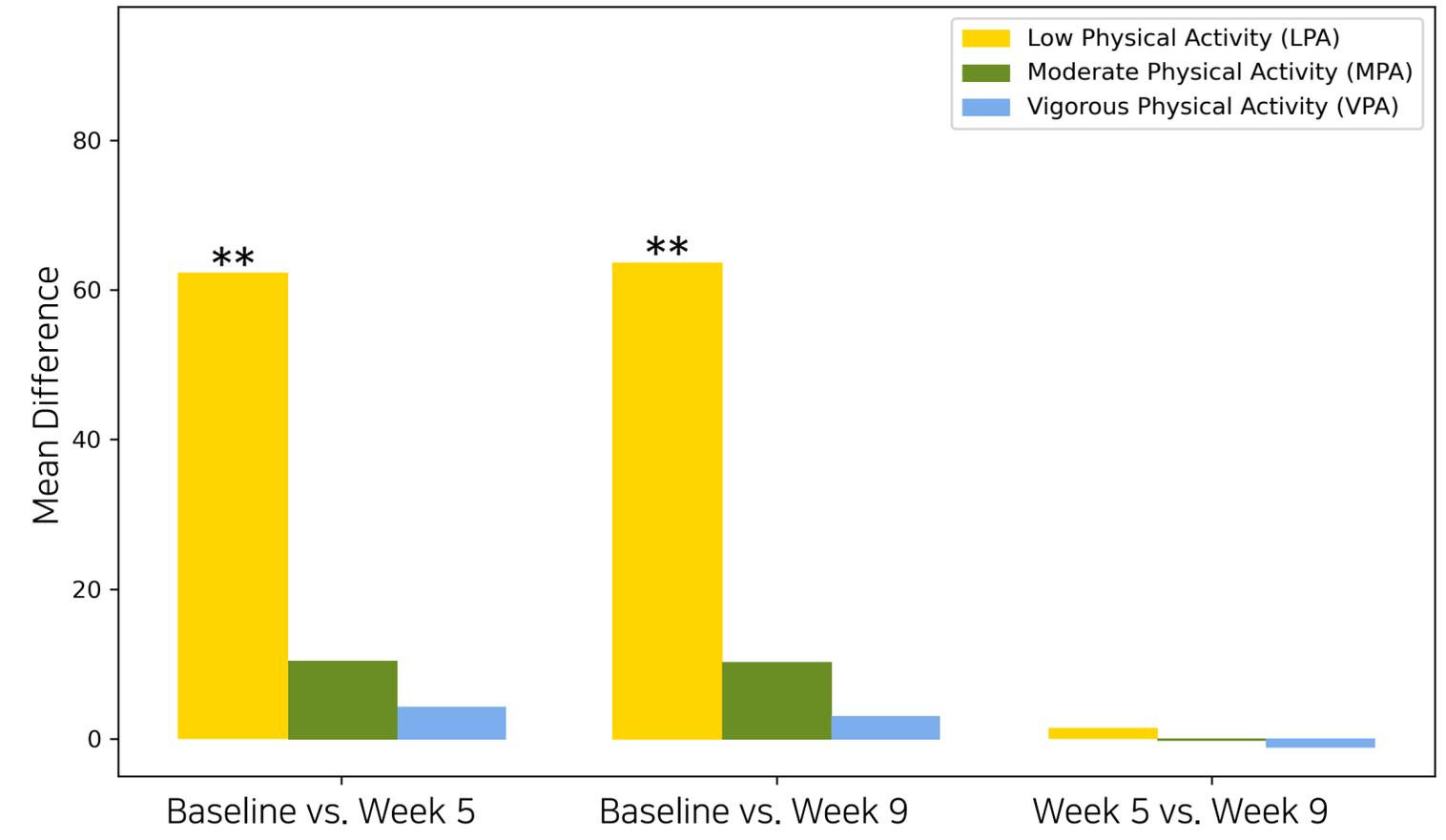
Finding 2

Participants **elevated initial motivation and sustained PA involvement with walking-oriented activities**

Mean Differences in PA Intensity with Significance for Light Activity Group



Mean Differences in PA Intensity with Significance for Moderate Activity Group



In LAG, significant increases in both LPA and MPA were noted from baseline to weeks 5 and 9, while VPA only showed a minor rise at week 5

In MAG, only LPA significantly increased from baseline at weeks 5 and 9, with no significant changes in MPA and VPA

Finding 3

RoutineAid's food logging **improved nutritional changes** and **mealtime behaviors**



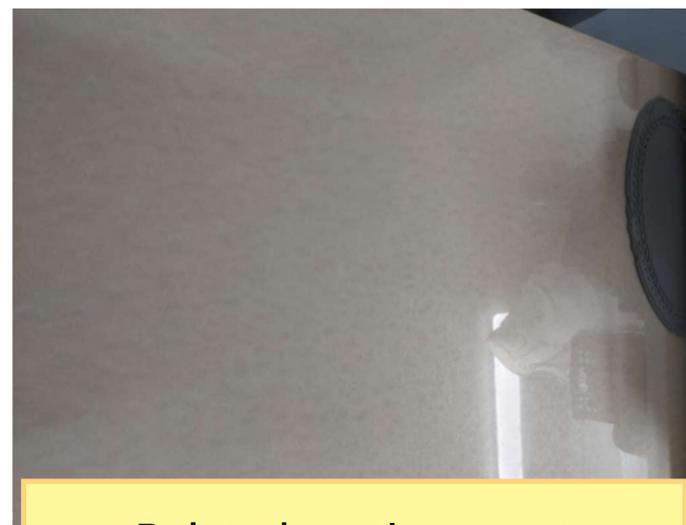
<Related routine quests>

Regular intake of meals
Calculate meal calories



<Related routine quest>

Clean up the tableware



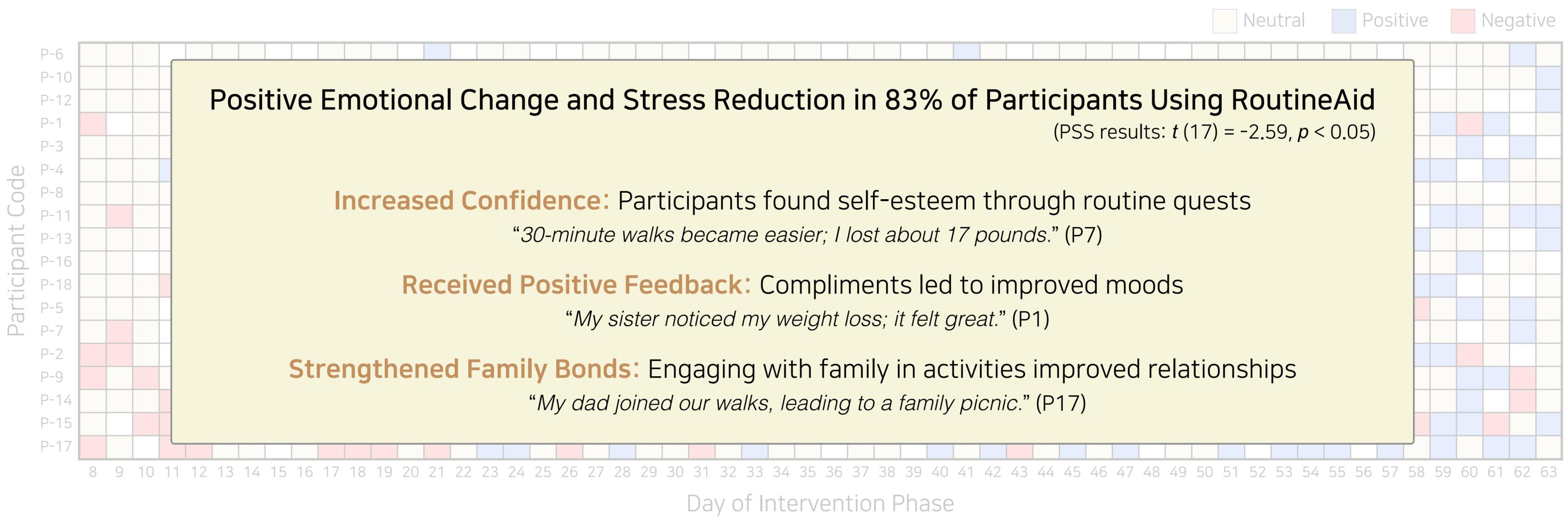
“I’ve always eaten quickly because I have sensitive taste buds. When I was trying to complete the quest, I **realized I spilled a lot when I cleared my seat.** [...] I still eat at the same speed, but now I’m **more careful not to spill my food**” (P15).





Finding 4

Routine diary **enhanced emotional expression** and **positive transition through micro-achievements**





Finding 5

RoutineAid's suggested daytime PAs generally **improved participants' sleep quality**

Positive Outcomes 🌱

Improved Sleep Quality Score ($t(17) = -4.08, p < 0.001$)

Reduced Sleep Latency (from 65 to 39 minutes)

Longer Sleep Duration (from 6.2 to 7.3 hours)

*"[...] as I increased my PA and followed this quest, I noticed a **significant improvement in falling asleep faster and experiencing fewer disturbances** during the night" (P15).*

Challenges 🌱

RoutineAid's impact on sleep was **occasionally mitigated by individual and environmental factors**

*"Increased daytime activity improved my sleep, but noise from **living near a busy road and stress from job applications still affect it**" (P2).*

Design Implications

Findings

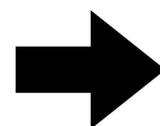
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1

Leveraging interconnectivity of routine components for increased user engagement

2

Calibrating routine quests for improved sustainability

3

Strengthening social connections through Emotional sharing in mind diary

4

Exploring the impact of environmental adjustment on health literacy development

5

Providing more immersive storylines for Sustained engagement

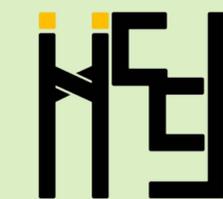
Thank you!

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Paper



Demo

