

Multiphase optimization strategy to promote hand hygiene during a pandemic: Optimization of the Soapp app



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Preventing COVID-19: Role of Behavior

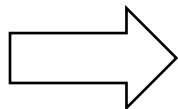
«Protect yourself and others» - But *how*?



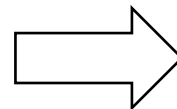
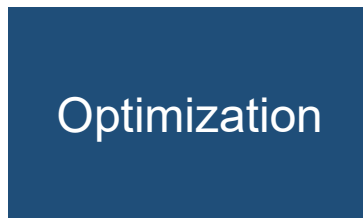
Behavior Change Interventions During a Pandemic

- Very little evidence during a pandemic
- Evidence from non-pandemic times transferrable?
- Contextualized intervention: Multiphase Optimization Strategy (Collins et al., 2014)

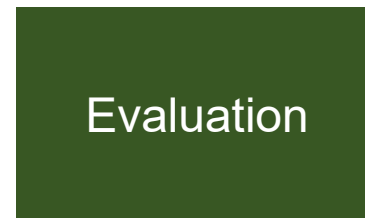
Identify relevant components
and conduct pilot tests



Identify intervention that
meets optimization criteria



Confirm effectiveness of
optimized intervention



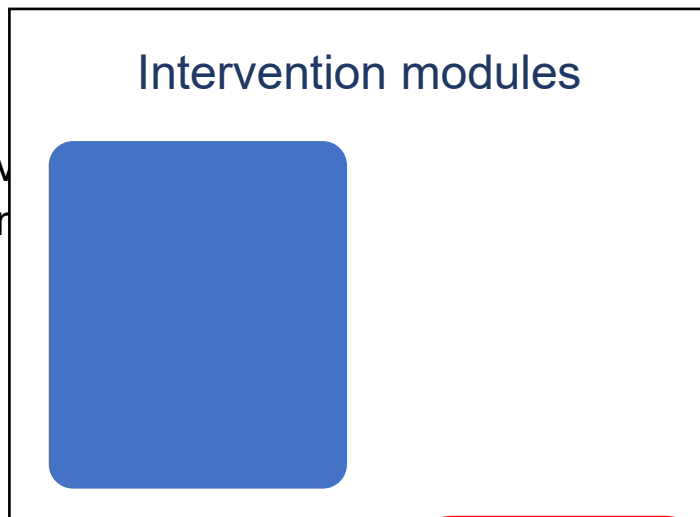


Preparation Phase

Intervention development



- **Theory based**
- Rapid literature review
- Theoretical domain



- **Practice based**
- Focus groups (k=2)
- Mean age= 37, range 26 - 65 years

Habit

Knowledge

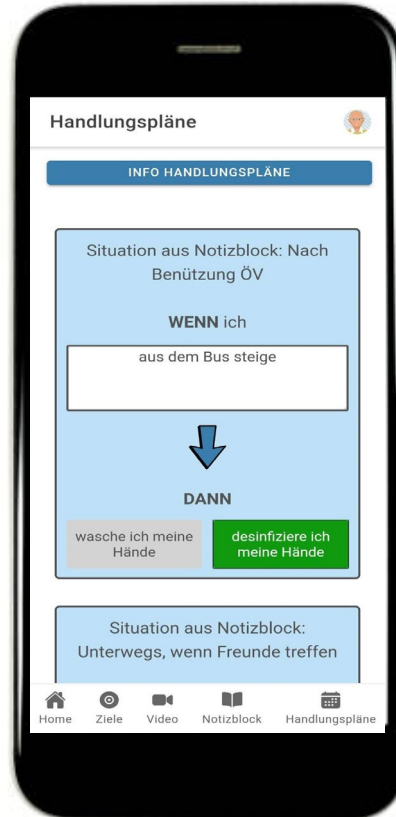
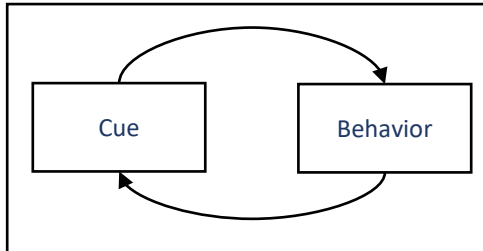
Motivation

Social
influences

Habit module



Action plans



TDF domain	BCT
Knowledge	4.2. Information about antecedents
Memory, attention, decision processes	2.3 Self-monitoring of behavior
Goals	1.4 Action planning 7.1. Prompts/cues
Skills, Goals	8.1 Behavioral practice/ rehearsal 8.3 Habit formation
Behavioral regulation	7.1 Prompts/cues (physical cue)

Motivation module



Pro-Contra list



TDF domain	BCT
Goals	1.1 Goal setting (behavior)
Beliefs about consequences	5.1 Information about health consequences
	5.2 Salience of consequences
	9.2 Pros and cons
	5.2 Salience of consequences
Beliefs about capabilities	1.2 Problem solving
	15.1 Verbal persuasion about capabilities
	15.3 Focus on past success
Reinforcement	10.9 Self-reward



Social norms module



Community room



TDF domain	BCT
Social Influences	2.1 Monitoring of behavior by others without feedback 2.2 Feedback on behavior 6.2 Social comparison 10.4 Social reward 10.5 Social incentive
	5.1 Information about health consequences 6.3 Information about others' approval 9.1 Credible source 10.5 Social incentive 12.1 Restructuring the physical environment

Optimization Phase

Goal:

Identify the most effective and acceptable combination and sequence of the intervention modules

Optimization criteria: Select condition with

- i) largest increase in hand hygiene at key times at follow-up
- ii) highest engagement, satisfaction, and usability

In-depth insights into user experience



Randomized parallel trial

Population & Sample:

Interested adult German speaking general population

M age = 39.9 years (*SD*=15.9)
min. 18 and max 79 years

73% women

Data collection:

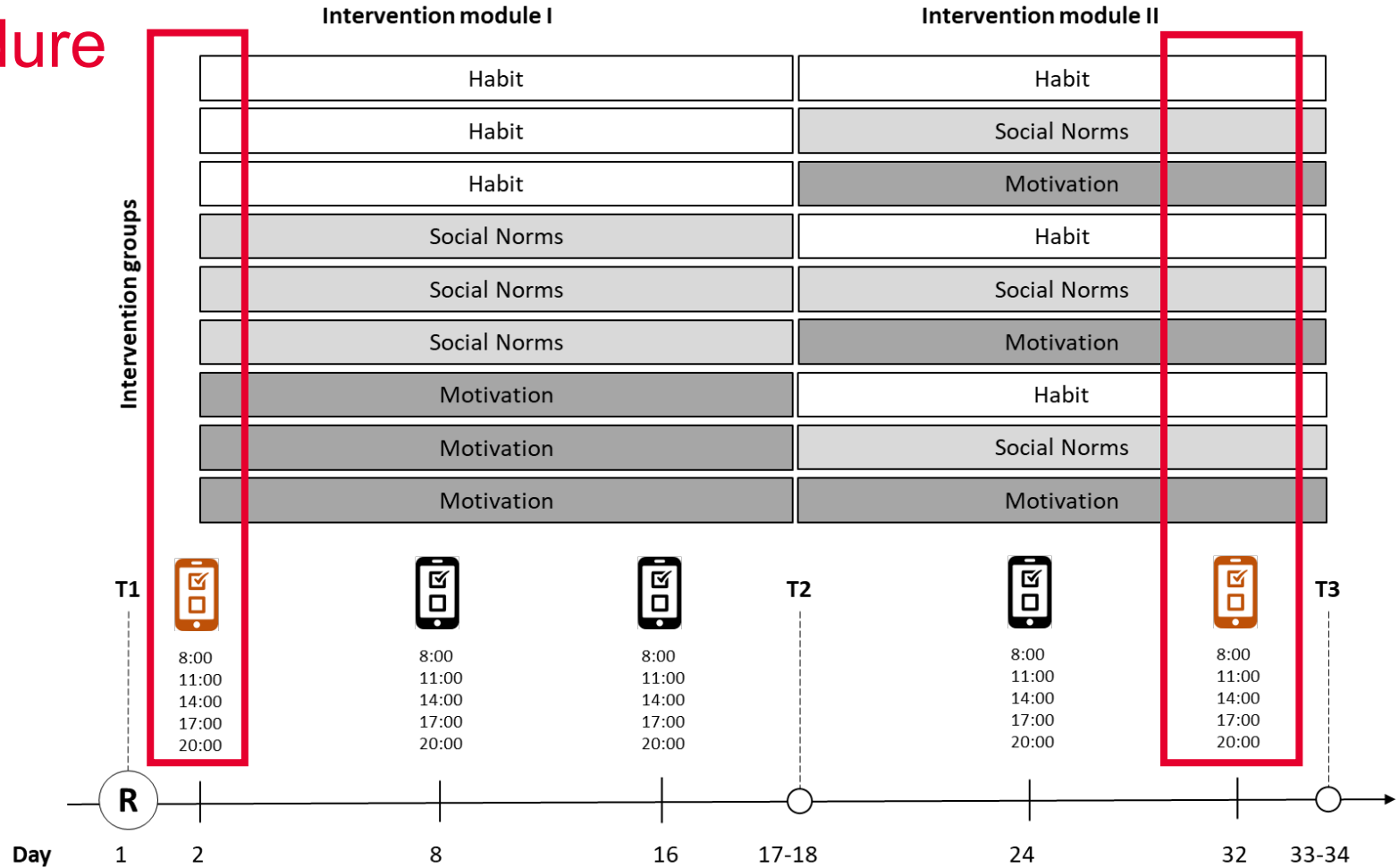
March – August 2021

Number of Participants:

- *Target: N* = 465
- *N* = 232 randomized
- *n* = 190 completed first diary (analyzed)
- *n* = 148 filled in follow-up measure

Qualitative interviews: *N* = 9

Procedure





Primary Outcome: Correct hand hygiene at key times

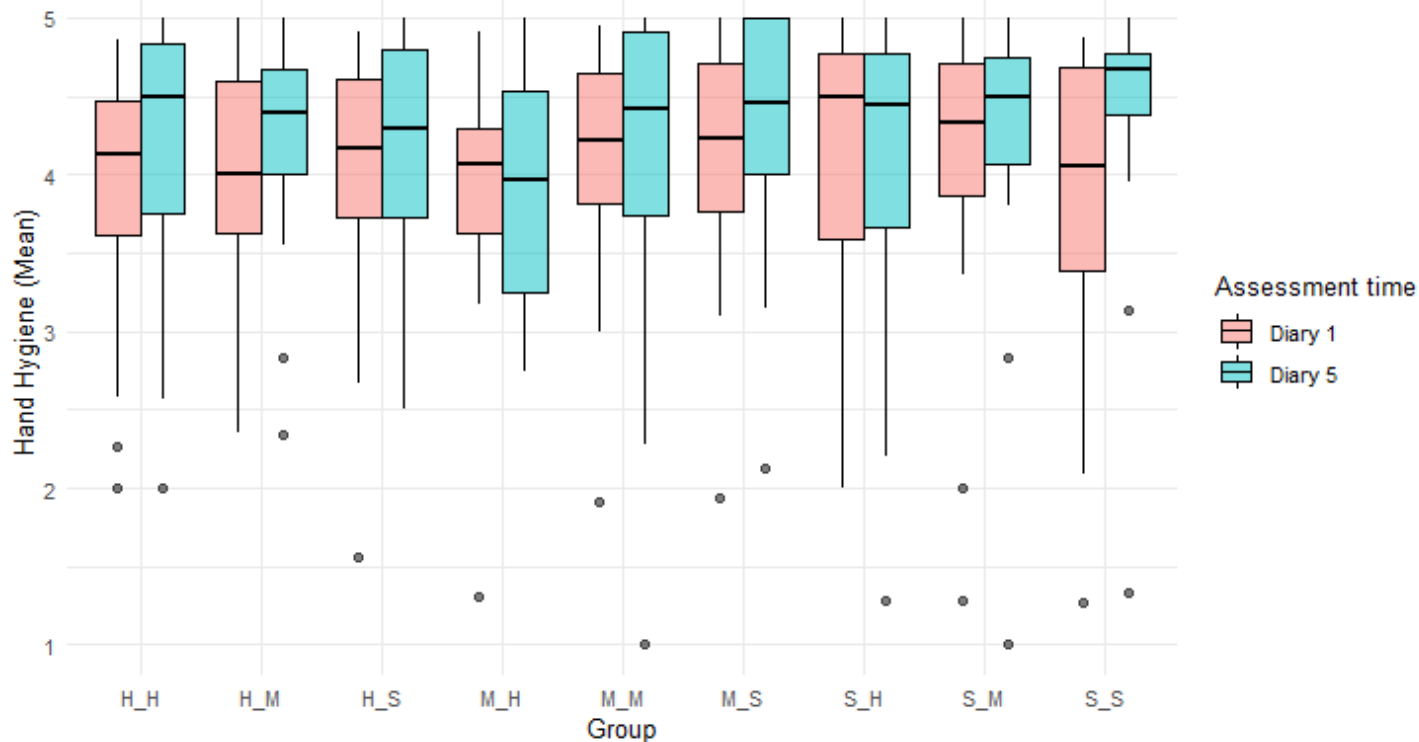


8:00
11:00
14:00
17:00
20:00

Number	Key times	
1	Before preparing the meal or before sitting down at the table	
2	Before eating or before feeding the children	
3	After blowing your nose, sneezing or coughing	
4	Every time you come home	
5	After using public transport	General
6	After visiting sick people or after close contact with material from sick people or with their personal effects	General
7	Before inserting and removing the contact lenses	General
8	After taking off the mask	COVID-19 specific
9	After going to the toilet or accompanying a child to the toilet (including after changing diapers)	General
10	After handling waste	General
11	If you have dirty hands or if they are visibly dirty	General
12	After visiting public places	COVID-19 specific
13	After touching surfaces outside the home or money	COVID-19 specific

How many times did you correctly wash or disinfect your hands? Response: Never (0) - Always (4)

Results



- Significant increase in hand hygiene (medium effect size)
- No group differences in hand hygiene, engagement, satisfaction, and usability



Thematic analysis (selection)

Variety and timing of tasks

Sometimes, it was just quiet, nothing happened. But later, once again it came "today something is happening", yes, I liked that.

Increased awareness of hand hygiene through diary

That was simply my observation of my reaction then - you observe yourself during these four weeks incredibly - I do not know if you have also heard this from other people, but you start watching yourself.

Thematic analysis (selection)

Social comparison

For me, personally, it was too much with the community and otherwise, because others cannot motivate me. Whether someone somehow achieved 100% or 50%, that is actually relatively indifferent to me. And it does not encourage me to become more or less active or whatever.

What did you like most about the app? [Interviewer] That there were more who participated, and you could see how they were doing.

Conclusions

In the context of using the Soapp app, motivated persons can moderately increase their hand hygiene at key times during an ongoing pandemic

Key optimization recommendations

- Habit and motivation modules are preferable over the social module
- A parallel delivery of modules is preferable over a sequential delivery
- Intervention content should be evenly distributed across time

Evaluation
RCT



Reflections

Strengths:

- One of few behavior change intervention trials during an ongoing pandemic
- Ecological momentary hand hygiene assessment

Major challenges:

- Constantly changing pandemic conditions, regulations
- Recruitment
- Time pressure
- MOST is resource- / time-intensive, not flexible

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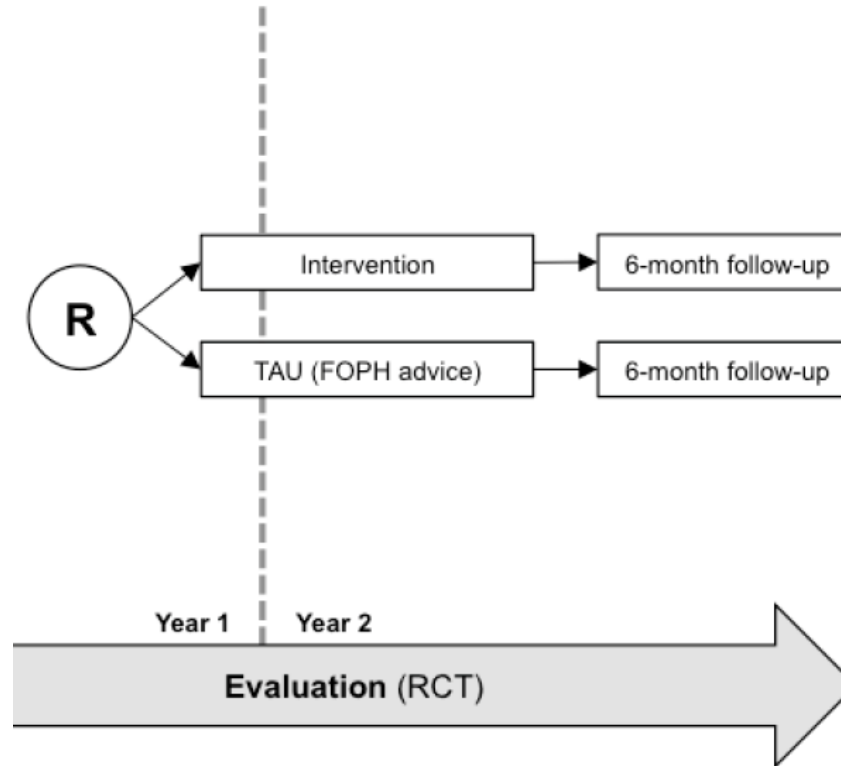


Intervention development and study protocol:

Amrein, M.A., Ruschetti, G.G., Baeder, C., Bamert, M., & Inauen, J. (2022). Mobile intervention to promote correct hand hygiene at key times to prevent COVID-19 in the Swiss adult general population: Study protocol of a multiphase optimisation strategy, *BMJ Open*, 12, e055971. [https://doi.org/ 10.1136/bmjopen-2021-055971](https://doi.org/10.1136/bmjopen-2021-055971)

Appendix

Evaluation phase



Participant flow

