

# Health Behavior Change: From Mechanisms to Action

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ETH Zurich, 16 March 2022

# Overview

1. The role of human behavior in health and well-being
2. From mechanisms to action
  - The principles
  - Two examples: Healthy diet, hand hygiene
3. Conclusions

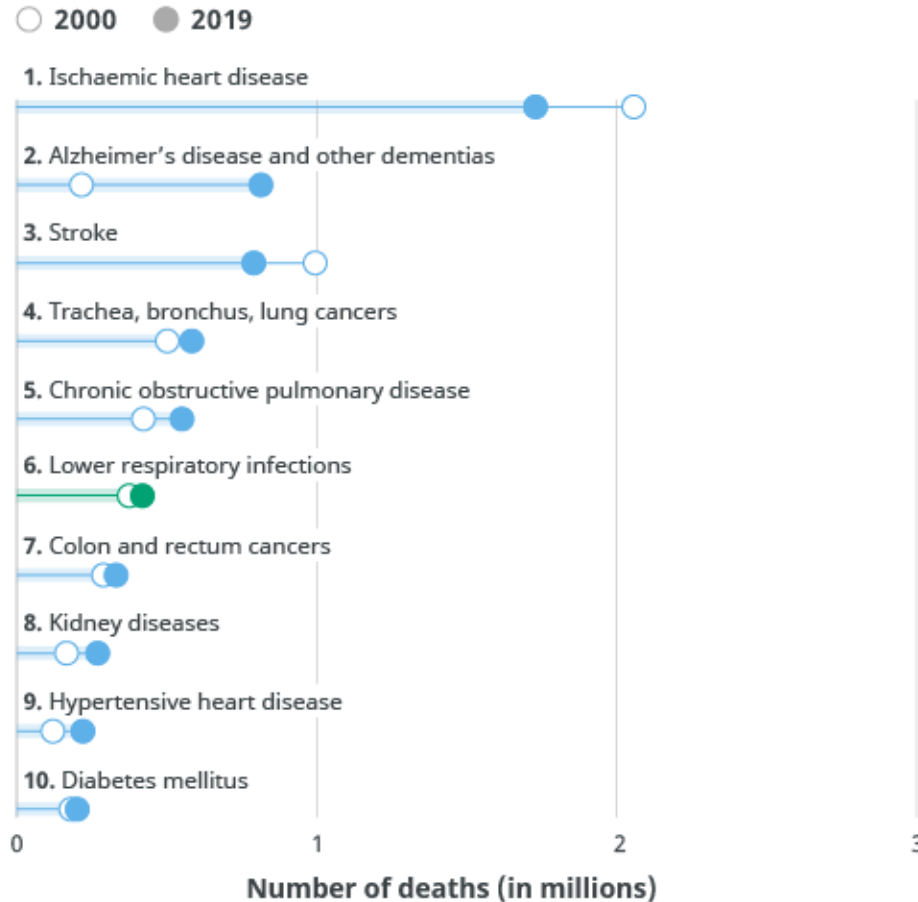
# Learning Outcomes

After this lecture you will be able to...

- describe the role of behavior in health and well-being
- explain the principles of theory-based behavior change
- name a few mechanisms of action to change health behavior

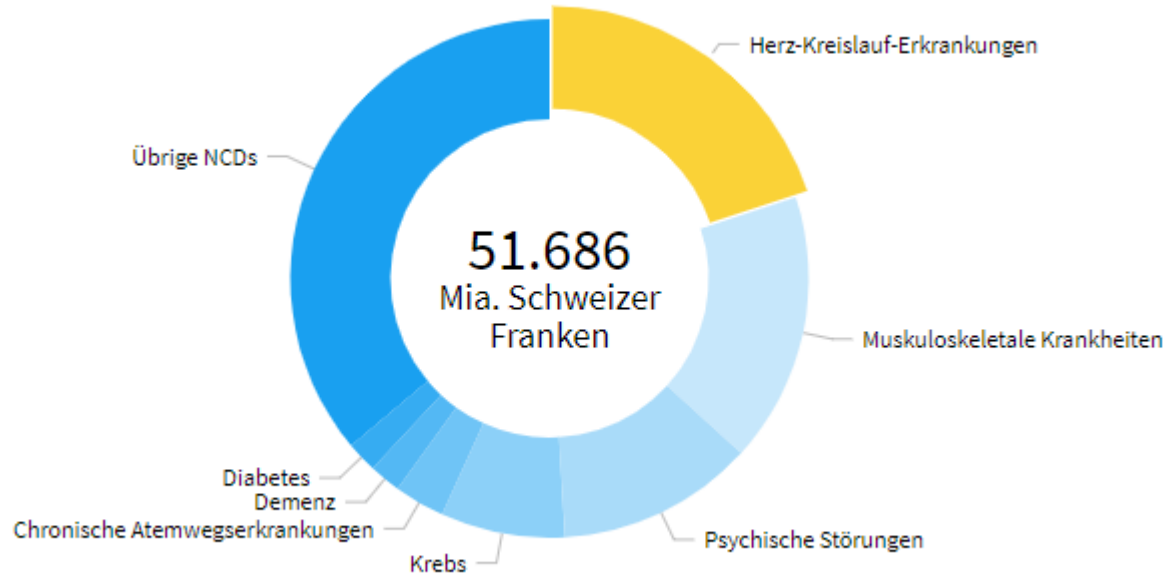
# Leading causes of death

## Leading causes of death in high-income countries



Source: WHO Global Health Estimates

# Chronic Disease Healthcare costs: Switzerland



© Obsan 2020

<https://www.obsan.admin.ch/de/indikatoren/MonAM/volkswirtschaftliche-kosten-von-ncds>

# Behavior is Key in Health and Well-Being

- > 40% of deaths attributable to personal decisions (Keeney, 2008)
- Protective effect: not smoking, being physically active, moderate alcohol consumption, fruit & vegetable consumption (e.g. Khaw et al., 2008)

## THE KEY LIFESTYLE RISKS FOR CHRONIC DISEASE



**TOBACCO  
USE**



**POOR  
NUTRITION**

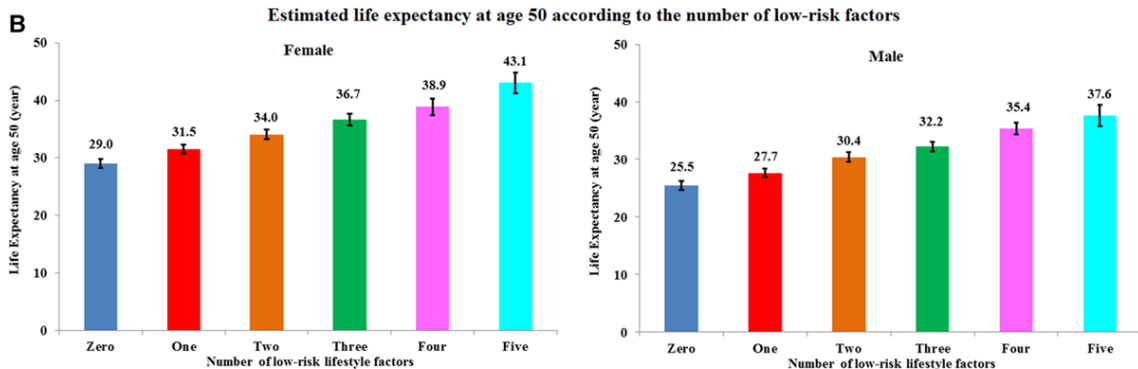
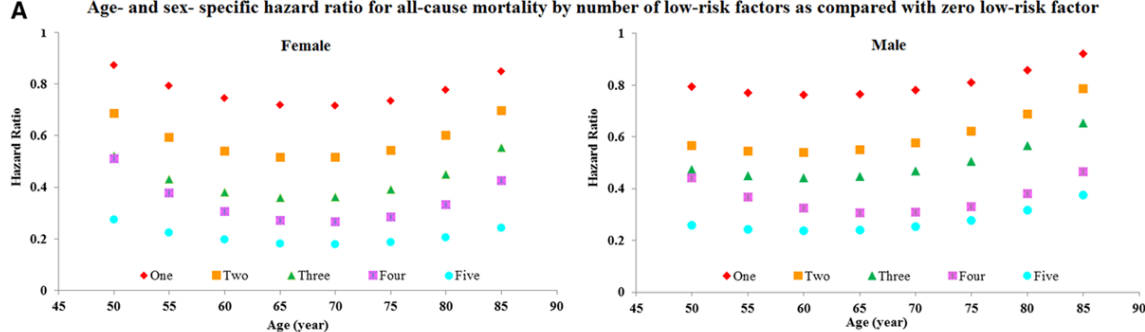


**PHYSICAL  
INACTIVITY**

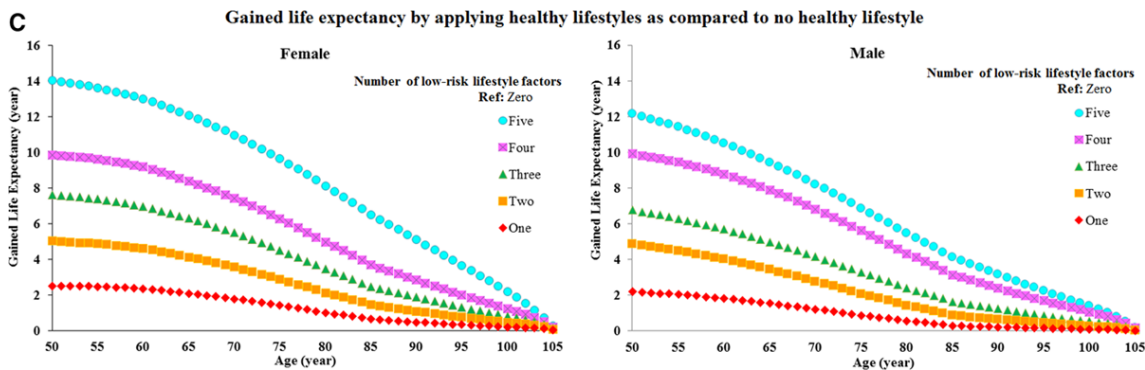


**EXCESSIVE  
ALCOHOL USE**

<https://www.cdc.gov/chronicdisease/resources/infographi/c/chronic-diseases.htm>



Dose-response



# Beyond chronic disease



Photo by [Mauro Sbicego](#) on [Unsplash](#)



Nau.ch (29. April 2020)

“If the huge health benefits of these few lifestyle habits were put into a pill, it would be declared a spectacular breakthrough in the field of medicine.”

(Bandura, 2001, p. 16)



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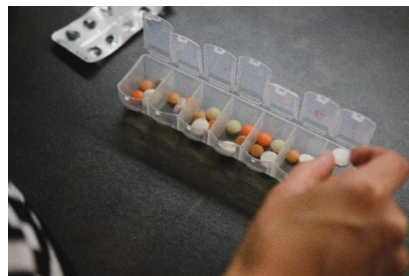


Photo by [Laurynas Mereckas](#) on [Unsplash](#)



Photo by [National Cancer Institute](#) on [Unsplash](#)



# Why do some people behave more healthily than others?



<https://www.menti.com/yukt9jqcbz>

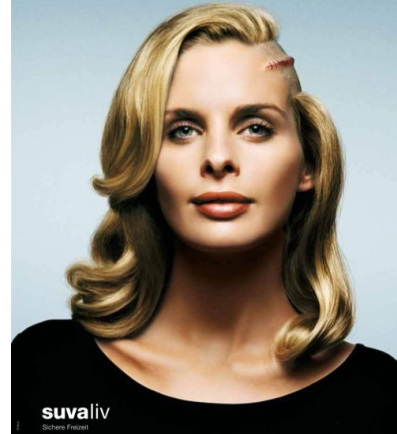
# How can we change health behavior?

## Using common sense



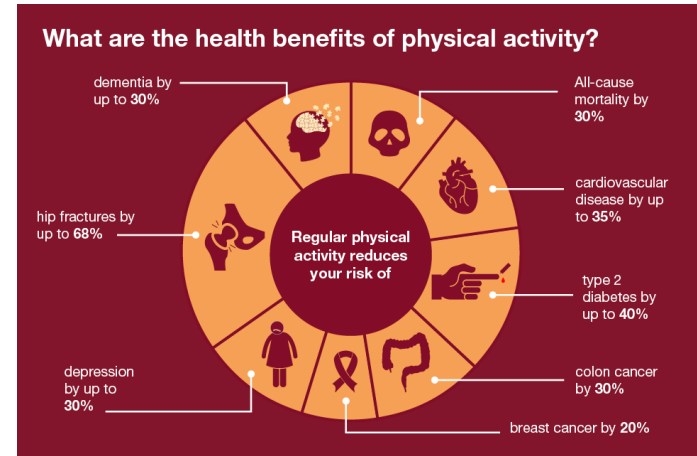
ber-forum e.v.

Keinen Velohelm zu tragen,  
kann Ihre Frisur ruinieren.



suvaliv  
Schön Friseur

<https://www.suva.ch/de-CH/material/Plakate/keinen-velohelm-zu-tragen-kann-ihre-frisur-ruinieren-77161d2643326433>



<https://www.gov.uk/government/publications/health-matters-stopping-smoking-what-works/health-matters-stopping-smoking-what-works>

# How can we change health behavior?

## Using psychological science

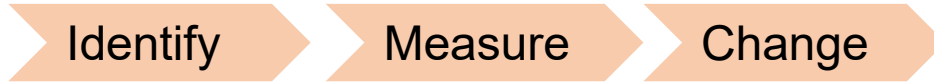
*Health psychology* is the aggregate of the specific educational, scientific, and professional contributions of the **discipline of psychology to the promotion and maintenance of health, the prevention and treatment of illness**, and the identification of etiologic and diagnostic correlates of health, illness, and related dysfunction. (Matarazzo, 1980, p. 815)



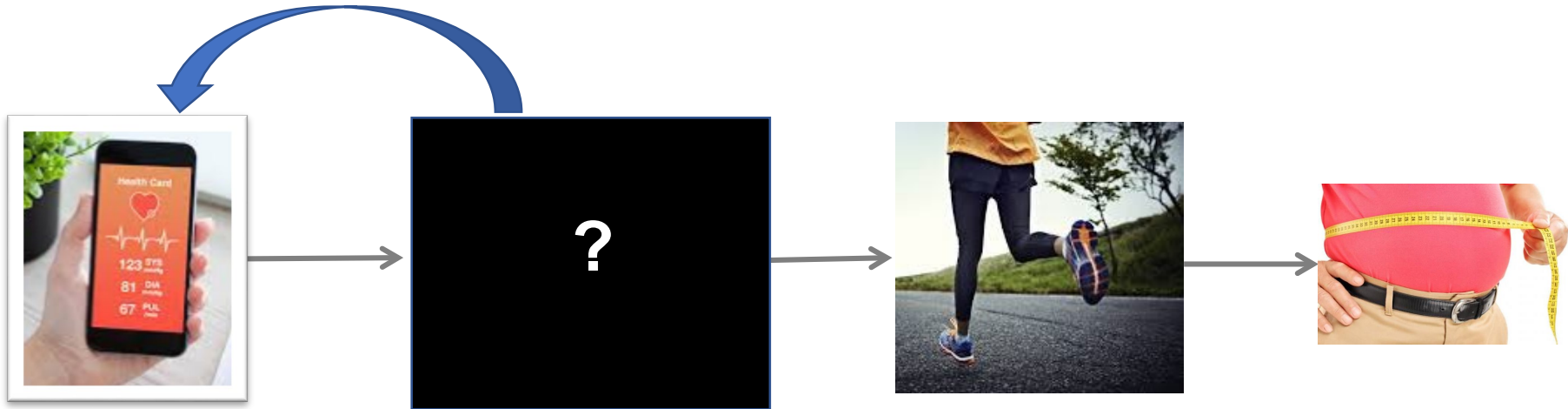
<https://ehps.net/>

<https://healthpsychology.ch/>

# From mechanisms to action



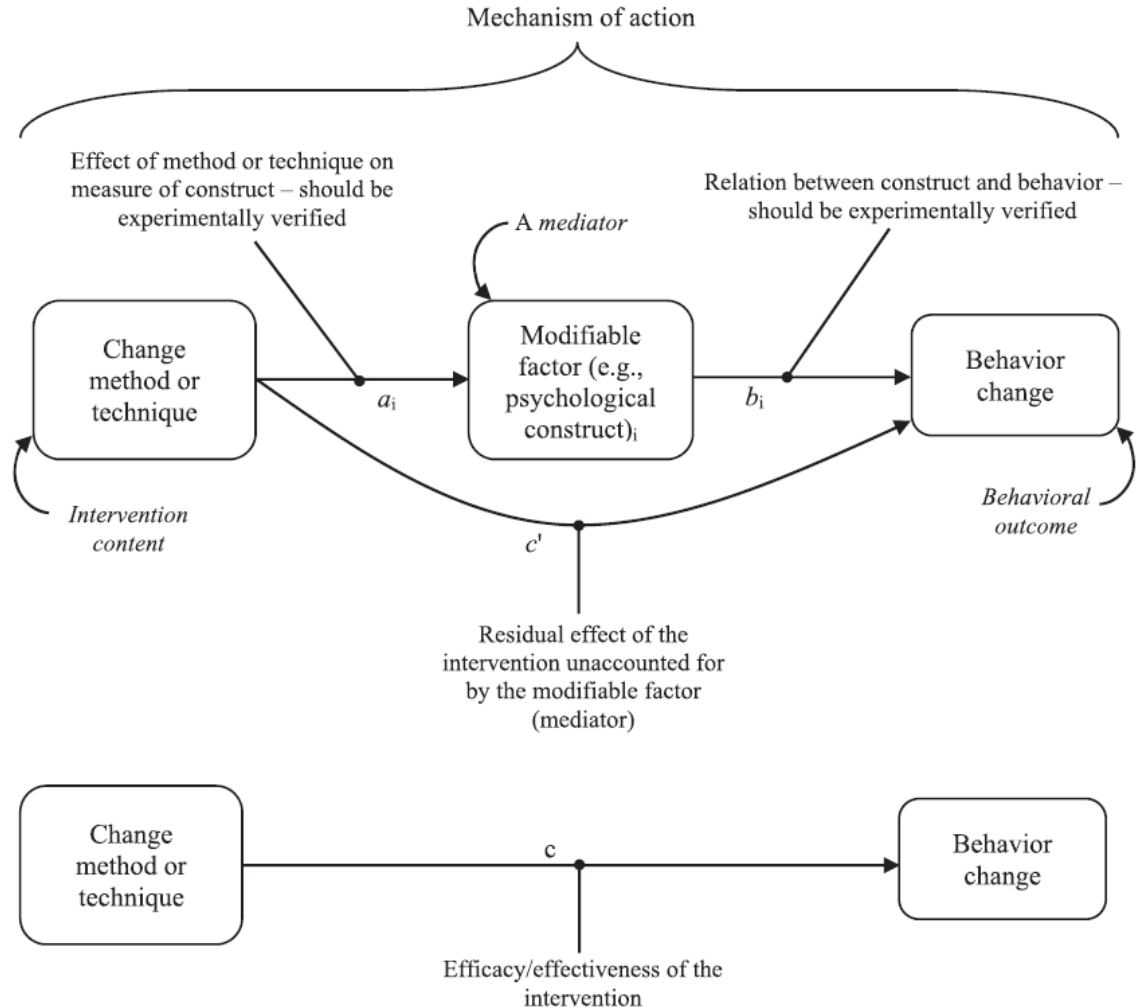
(Davidson et al., 2020)



# From mechanisms to action

**Mechanism of action**  
«the processes through which a behaviour change technique affects behaviour»  
(Michie et al., 2018, p. 502)

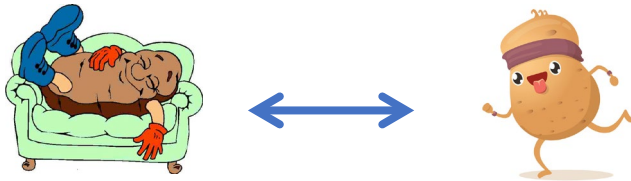
Hagger et al. (2020, p. 202; based on Hagger, 2019)



# From mechanisms to action

## Explaining health behavior

### Continuum theories

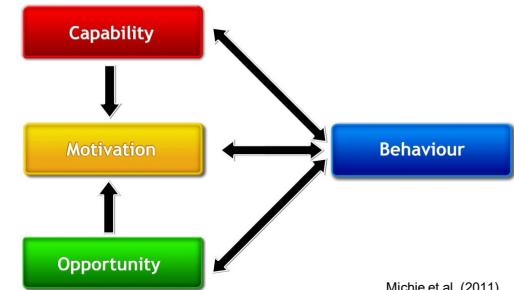


### Stage theories



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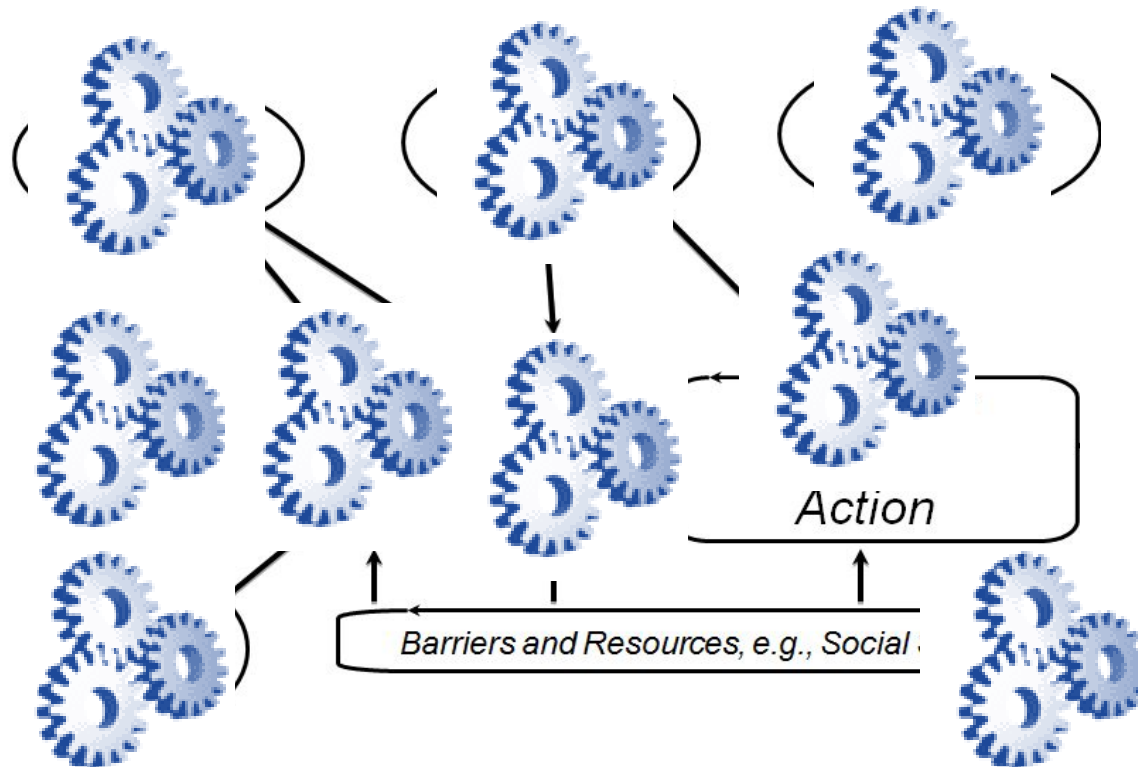
### Frameworks



Michie et al. (2011)

# From mechanisms to action

## Explaining health behavior



Health Action Process Approach  
(Schwarzer, 2008)

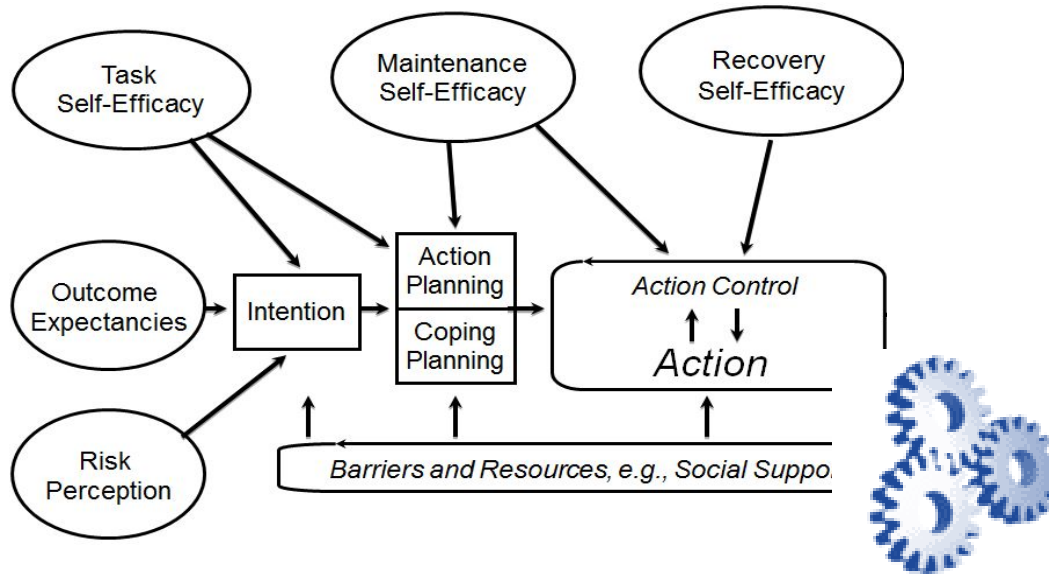
# Empirical examples

- Healthy diet: Promoting healthy eating using social support
- Hand hygiene: Optimizing behavior change interventions based on identifying their active ingredients



# Promoting healthy eating using social support

(Berli et al., 2020; Inauen et al., 2017)



Identify, Measure

Health Action Process Approach (Schwarzer, 2008)

# Can smartphone-based support groups promote healthy eating?

Change



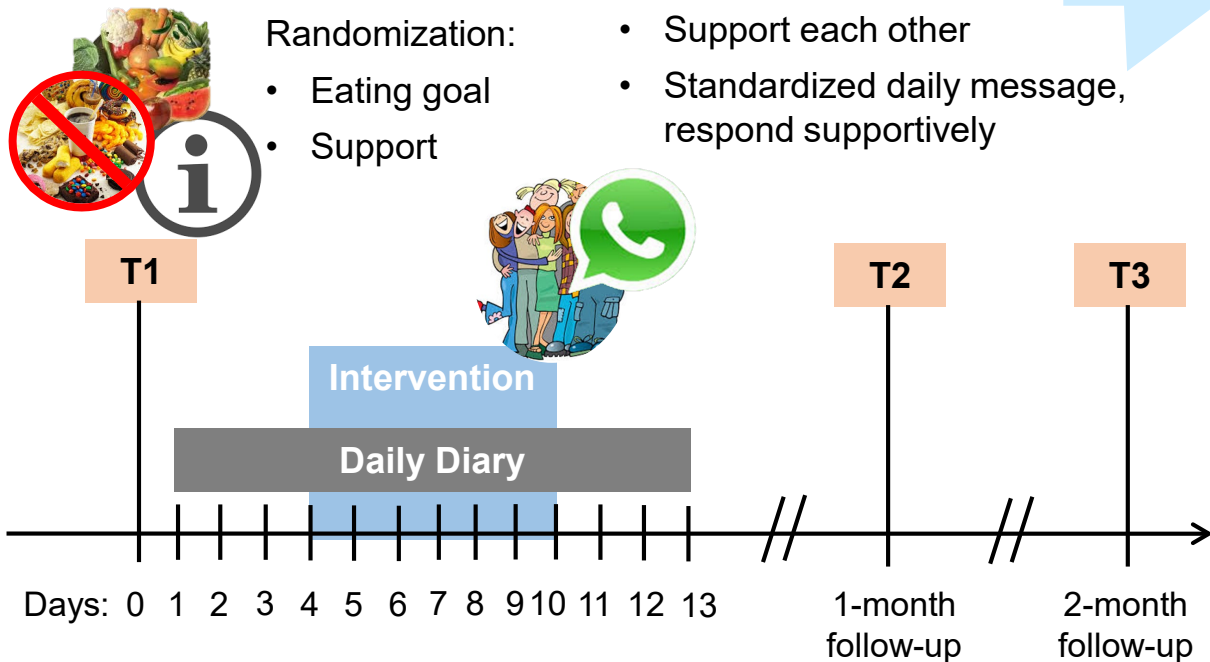
Inauen et al. (2017)

# 2 x 2 Study Design

	Social Support	Information Only
Goal: Increase Fruits & Vegetables	 	 
Goal: Decrease Unhealthy Snacks	 	 

Inauen et al.,  
(2017)

# Procedure



Randomization:

- Eating goal
- Support

- Support each other
- Standardized daily message, respond supportively

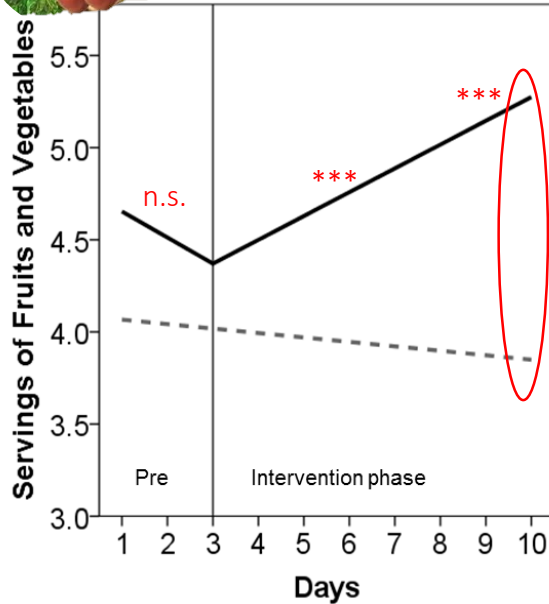
“Hey guys, how's it going for you on the second day?  
Wishing you lots of success with consuming fewer snacks!”

Inauen et al. (2017)

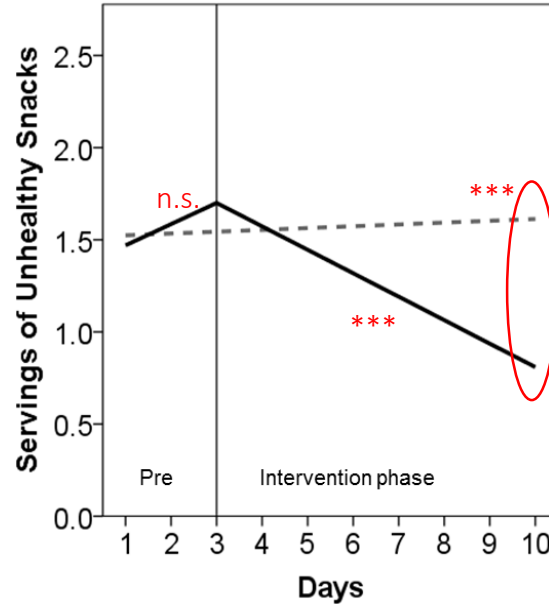
# Intervention effects on healthy eating



Fruits and Vegetables  
(servings per day)  
F&V Goal Group ( $n = 97$ )



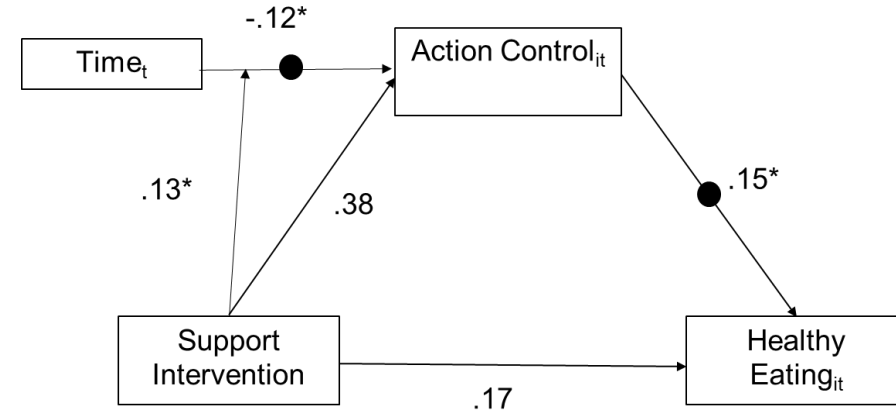
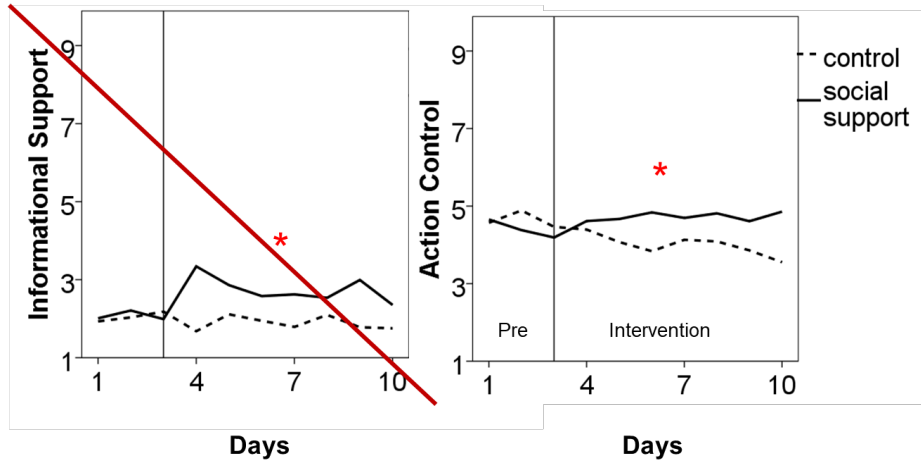
Unhealthy Snacks  
(servings per day)  
Snack Goal Group ( $n = 106$ )



-- Control  
— Social Support

Inauen et al. (2017)

# Mechanisms



## Indirect effect:

Day 1:  $B < -0.01$ ,  $SE = 0.07$ ,  $p = 0.948$   
 Increase:  $B = 0.02$ ,  $SE = 0.01$ ,  $p = .033$

# Empirical examples

- Healthy diet: Promoting healthy eating using social support
- Hand hygiene: Optimizing behavior change interventions based on identifying their active ingredients

# Promoting hand hygiene



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Swiss Agency for Development  
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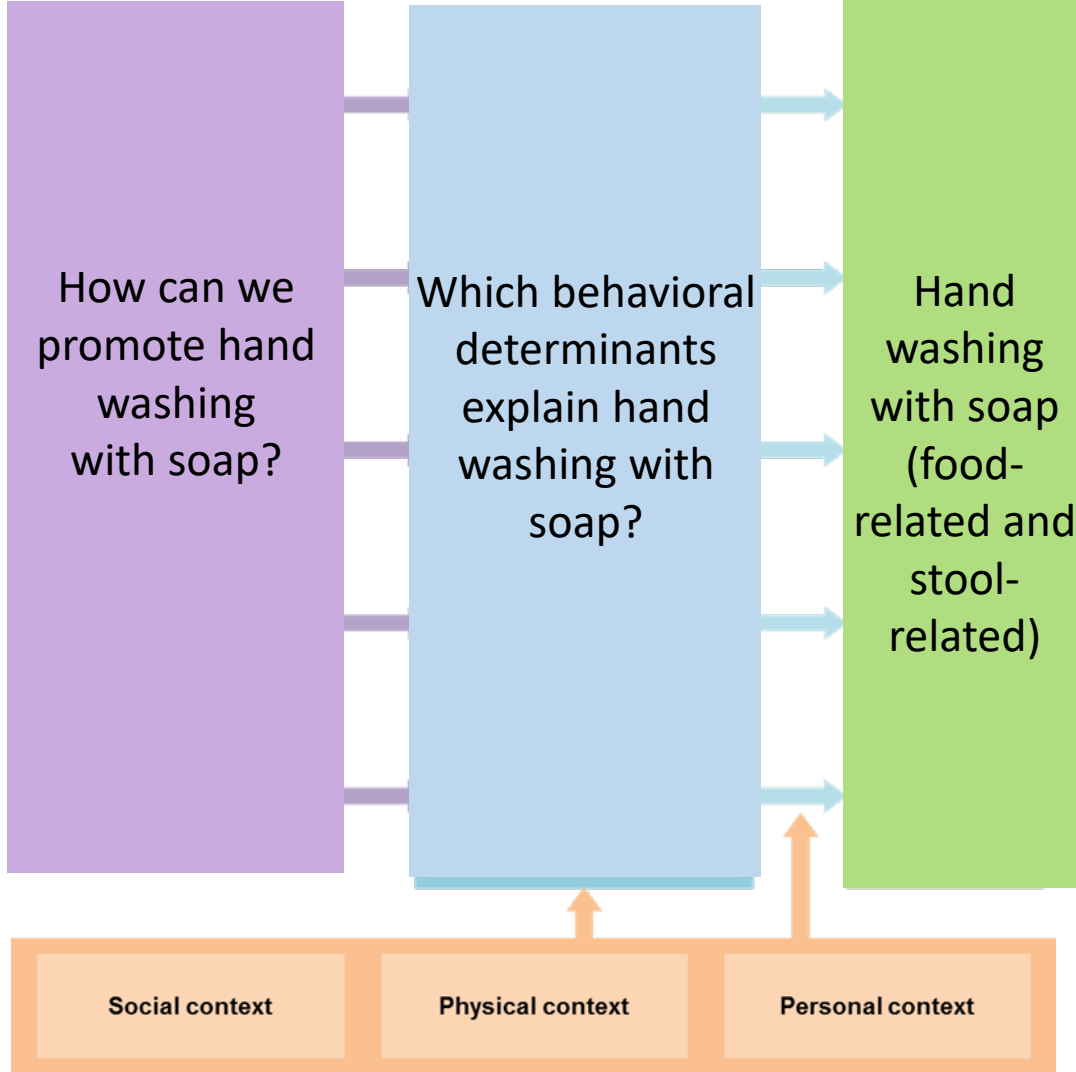
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- 1.8 million diarrhea-related infant deaths in low- and middle-income countries (Walker, 2013)
- Consistent handwashing with soap can reduce diarrhea (Borghi et al., 2002, Curtis et al., 2003, Freeman et al., 2014, Prüss-Ustün et al., 2014)







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Identify, Measure

Friedrich et al. (2018)

RANAS Approach  
(Mosler, 2012)

# Research Questions



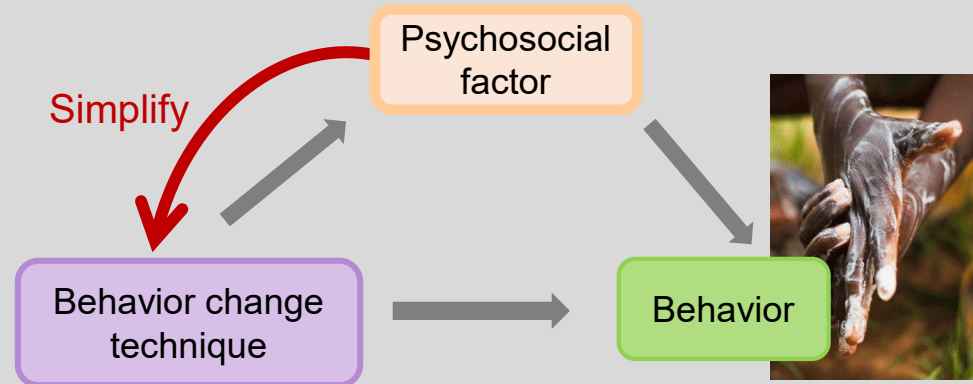
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- 1) Can an intervention based on the RANAS approach effectively promote food-related and stool-related hand washing?
- 2) What are the active ingredients of the intervention?



Inauen et al. (2020)

# Study Design

$N = 448$   
caregivers

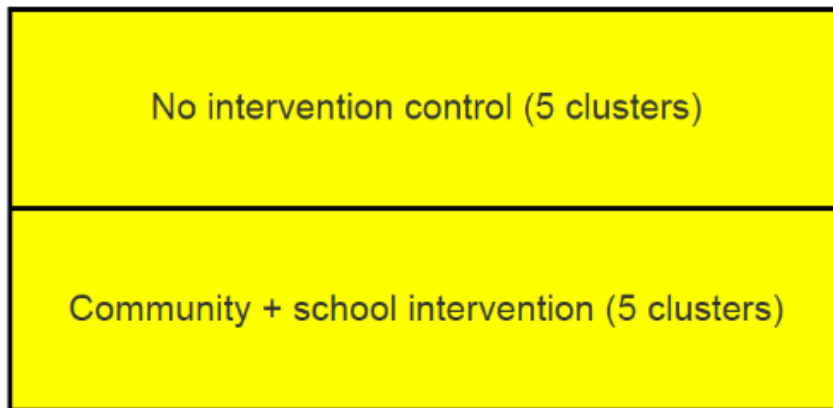


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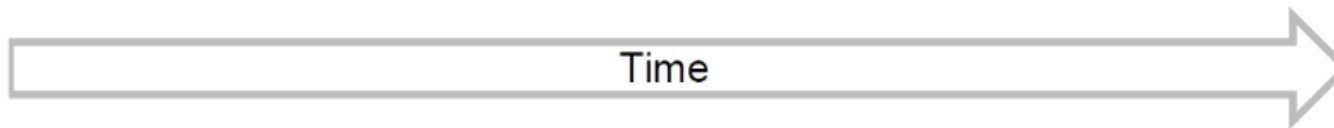
$N = 406$   
caregivers (91%)

BASELINE SURVEY



FOLLOW-UP SURVEY

Change



Inauen et al. (2020)

# Structured behavioral observation



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Inauen et al. (2020)

# Structured face-to-face interviews



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Inauen et al. (2020)



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# Household Interventions

## Prompt building of infrastructure

- Self-efficacy
- Remembering



Inauen et al. (2020)



# Household Interventions

## Experiment & Guided Practice

→ Self-efficacy

→ Affective attitude  
(disgust)



Inauen et al. (2020)





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# Household Interventions

## Planning task

- Action planning
- Remembering
- Commitment



Inauen et al. (2020)



# Household Interventions Self-Monitoring Calendar

→ Action control



Inauen et al. (2020)

# Household Interventions

## Public Commitment



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→ Descriptive norm

→ Commitment

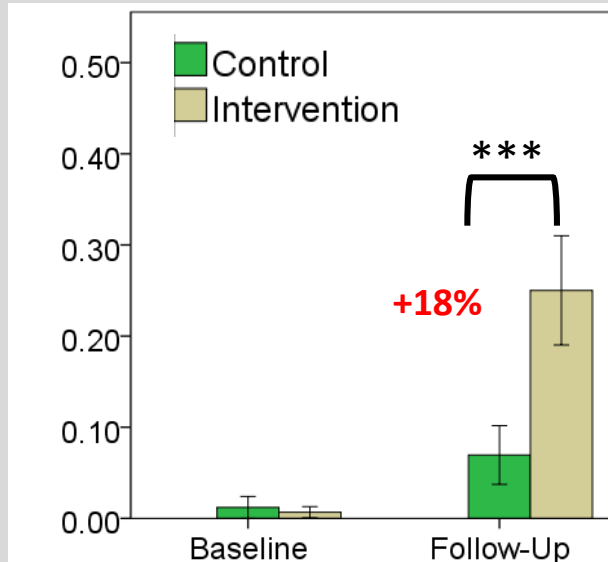


Inauen et al. (2020)

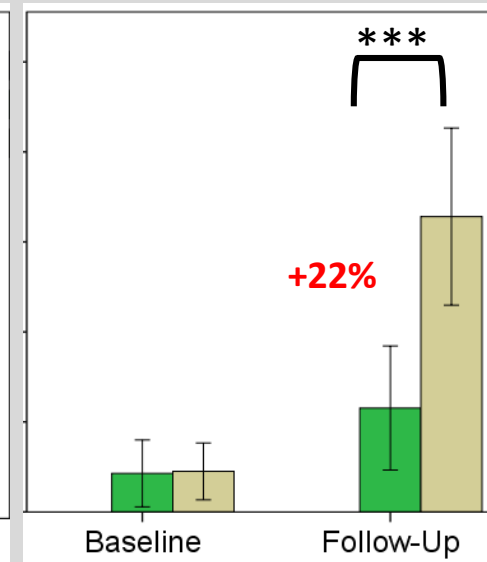


# Behavior Change Effects

Observed **food-related** hand washing with soap

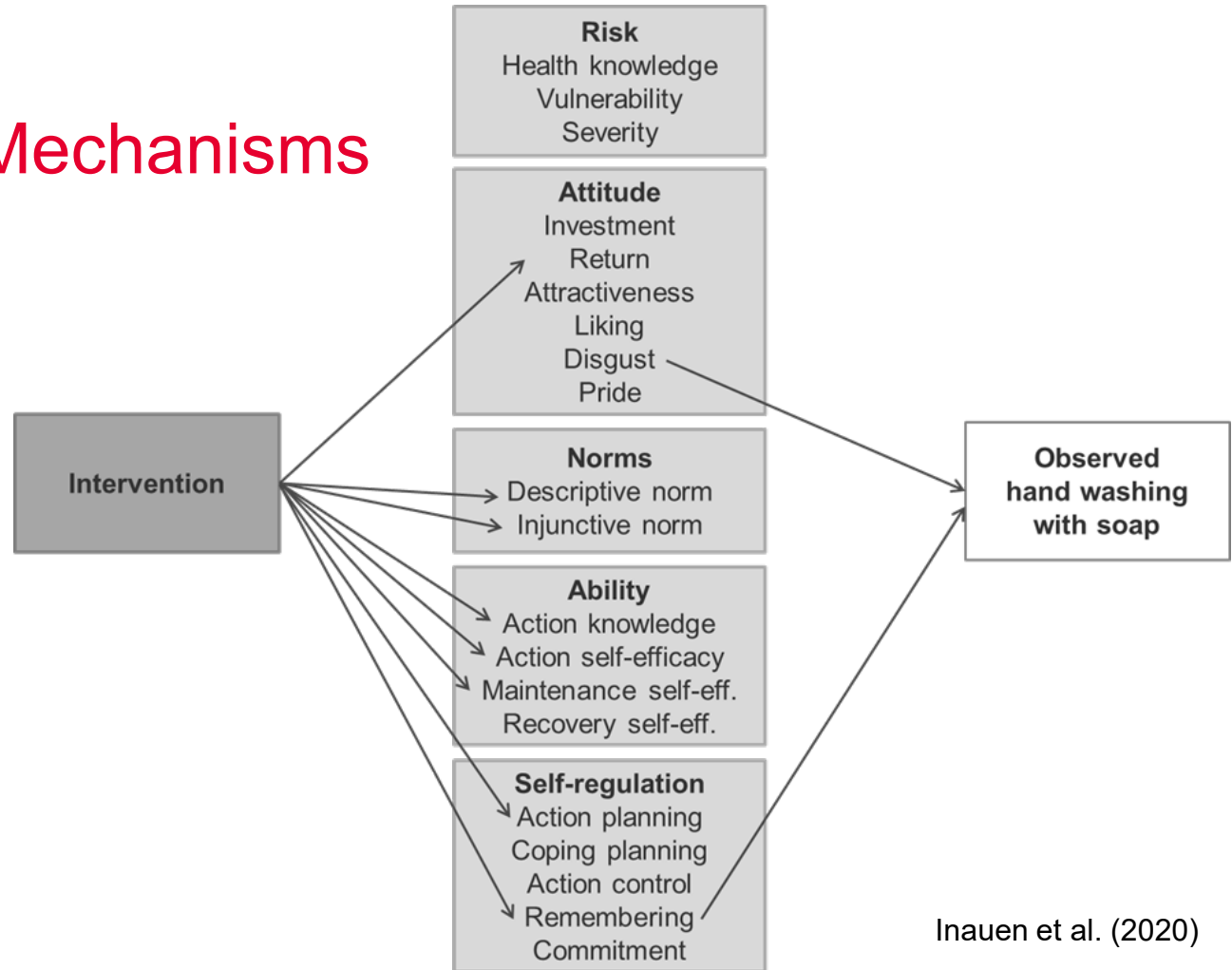


Observed **stool-related** hand washing with soap



Inauen et al. (2020)

# Intervention Mechanisms



# Summary



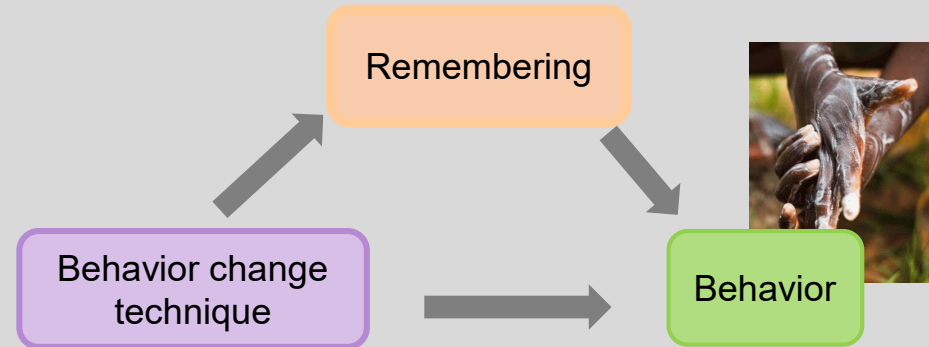
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- Theory-based intervention: 22% improved observed handwashing with soap compared to controls
- Intervention changed psychosocial factors, which was related to observed handwashing
- The mechanism of action was remembering



Inauen et al. (2020)

# Identifying active intervention ingredients



Reminders and infrastructure increase **remembering**

→ Necessary component



Guided practice to increase **self-efficacy**

→ Less relevant component that might be removed



Inauen et al. (2020)

# Empirical examples

- Healthy diet – *Sometimes it's not the mechanism you assumed*
- Hand hygiene – *Investigating mechanisms allows optimizing interventions*

Are behavior change effects lasting?

# Behavior change maintenance

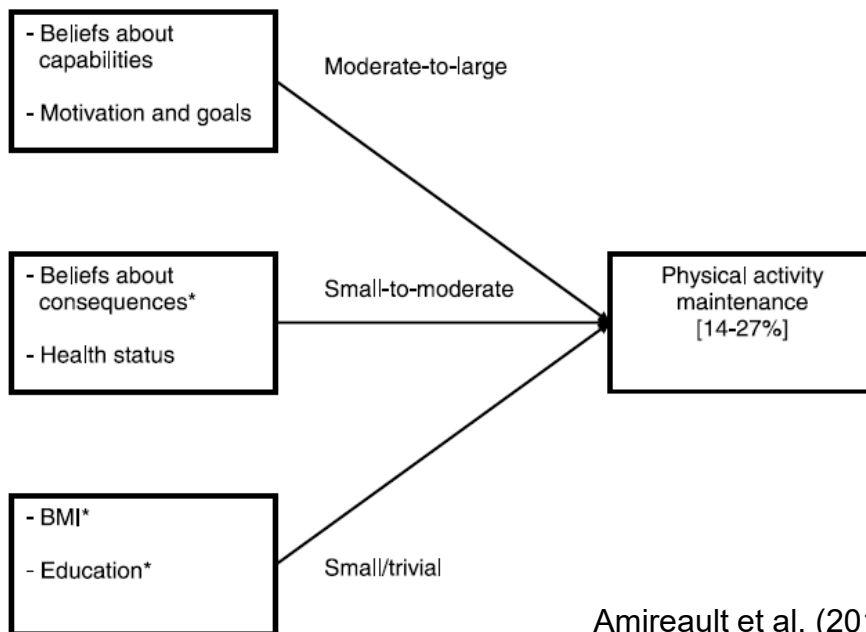
- 40% weight regain 1 year after lifestyle interventions (Barté et al., 2010)
- Modest maintenance of physical activity interventions (Amireault et al., 2013; Grimmer et al., 2019; Howlett et al., 2019)
- No lasting effects for sedentary interventions (Howlett et al., 2019)

## Mechanisms?



# Behavior change maintenance

## Mechanisms



Amireault et al. (2013)

- Motives (e.g. satisfaction)
- Self-regulation (e.g. coping with relapse)
- Habits
- Resources (e.g. memory)
- Context (e.g. social support)

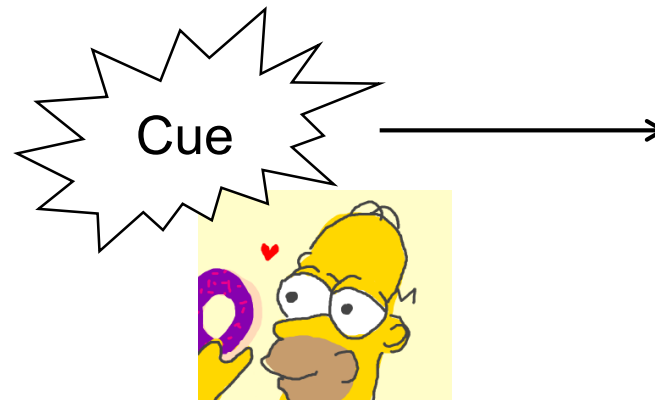
Kwasnicka et al. (2016)

# Habit

What the general public thinks it is



What science thinks it is



# Habit



Habit intervention promotes behavioral maintenance (Beeken et al., 2017)

# COVID-19: The role of habit



<https://www.bag.admin.ch/bag/de/home/krankheiten/ausbrueche-epidemien-pandemien/aktuelle-ausbrueche-epidemien/novel-cov/so-schuetzen-wir-uns.html>

# The Role of Habit

## BECCCS: Behavior Change in Context to Contain the Spread of SARS-CoV-2

### Aim

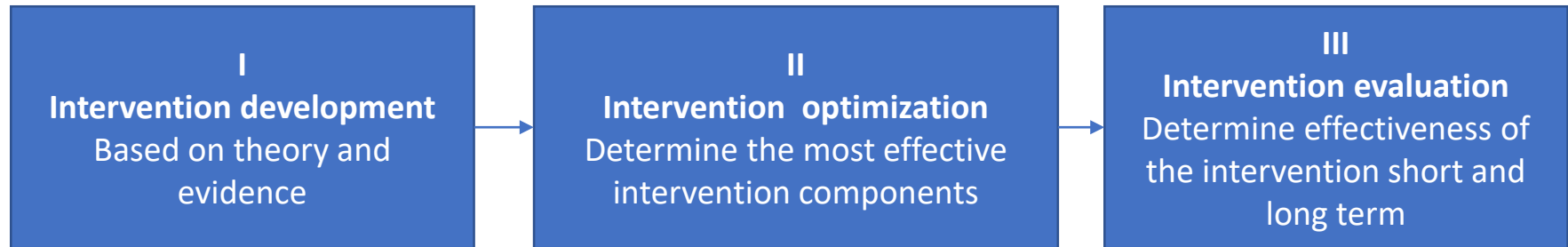
Develop and test a theory- and evidence-based smartphone application to **promote infection prevention behavior**

[https://www.gpv.psy.unibe.ch/forschung/becccs/becccs\\_interventionsevaluation/index\\_ger.html](https://www.gpv.psy.unibe.ch/forschung/becccs/becccs_interventionsevaluation/index_ger.html)



# Multi Phase Optimization Strategy (MOST)

Collins et al. (2014)



# Soapp

## Promoting habit: Examples

### Implementation intentions

← Übung 4

Hier siehst du das Beispiel von Laura:

Handlungspläne

Zuhause ankommen

Schuhe ausziehen

↓

Mantel aufhängen

↓

Hände waschen    Hände desinfizieren

← Übung 7

Möchtest du es ausprobieren? Suche dir Bilder (können auch humorvoll sein) und bringe sie dort an, wo sie dich an deinen Handlungsplan erinnern (z.B. bei der Garderobe, in der Küche etc.). Hier siehst du einige Beispiele für geeignete Bilder, die du bei Bedarf gerade herunterladen kannst. Wir senden dir gleich eine Mail mit Links zu diesen Bildern gesendet, damit du sie gleich herunterladen und ausdrucken kannst.



Cues

# From mechanisms to action

## Conclusions & open questions

- Theory-based development and evaluation of interventions → Enables learning
- Are theory-based interventions more effective?
  - not more effective (Dalgetty et al., 2019; Prestwich et al., 2014)
  - more effective / reliable (Bishop et al., 2015; McEwan et al., 2018; Webb et al., 2010)
- Scalability? → Leveraging digital technology, using behavioral science for effective policy design (Wiedemann & Inauen, in prep)



# Take Home Messages

- Behavior is key in health and well-being
- Understanding the mechanisms of human behavior leads to more stringent, reliable (and effective) behavior change interventions
- Beyond risk perception: There are many mechanisms of action to change health behavior change

# Health Behavior Change: From Mechanisms to Action

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