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HOCHSCHULE DARMSTADT  
UNIVERSITY OF APPLIED SCIENCES

# Coffee to Go & Self-Regulated Behavioral Change

Anna Keller, Daniel Hanß, Charis Eisen  
Darmstadt University of Applied Sciences  
System Innovation for Sustainable Development

## Coffee To Go & Self-Regulated Behavioral Change

1. Psychological Research in the Project „System Innovation for Sustainable Development“
2. Coffee to Go
3. Model of Behavioral Change
4. Current State
5. Future Directions



# System Innovation for Sustainable Development (s:ne)

Goal: Incorporation of knowledge and methodology from various fields to facilitate changes in the direction of sustainable development

- Collaboration of researchers, organizations, civil society and policy makers to tackle recent challenges
- Development of solutions by combining technological innovations, insights from citizen surveys, improved infrastructure, cultural change and supporting institutions
- Promotion and assessment of behavioral change

## Psychological Research in s:ne

- Analyses of citizens' actual behaviors and driving factors
- Tests of s:ne solutions
- Evaluation of (potential) behavioral changes
- Communication- & intervention studies
- Empirical examination of cultural change

Team: Daniel Hanß, Anna Keller, Charis Eisen, (left to right)  
Jana Köhler, Nathalie Wendorff, Sascha Orawski

Learn more: <https://buergerpanel.h-da.de>



## Coffee to Go



Average consumption in Darmstadt:  
34 TGC/inhab/year

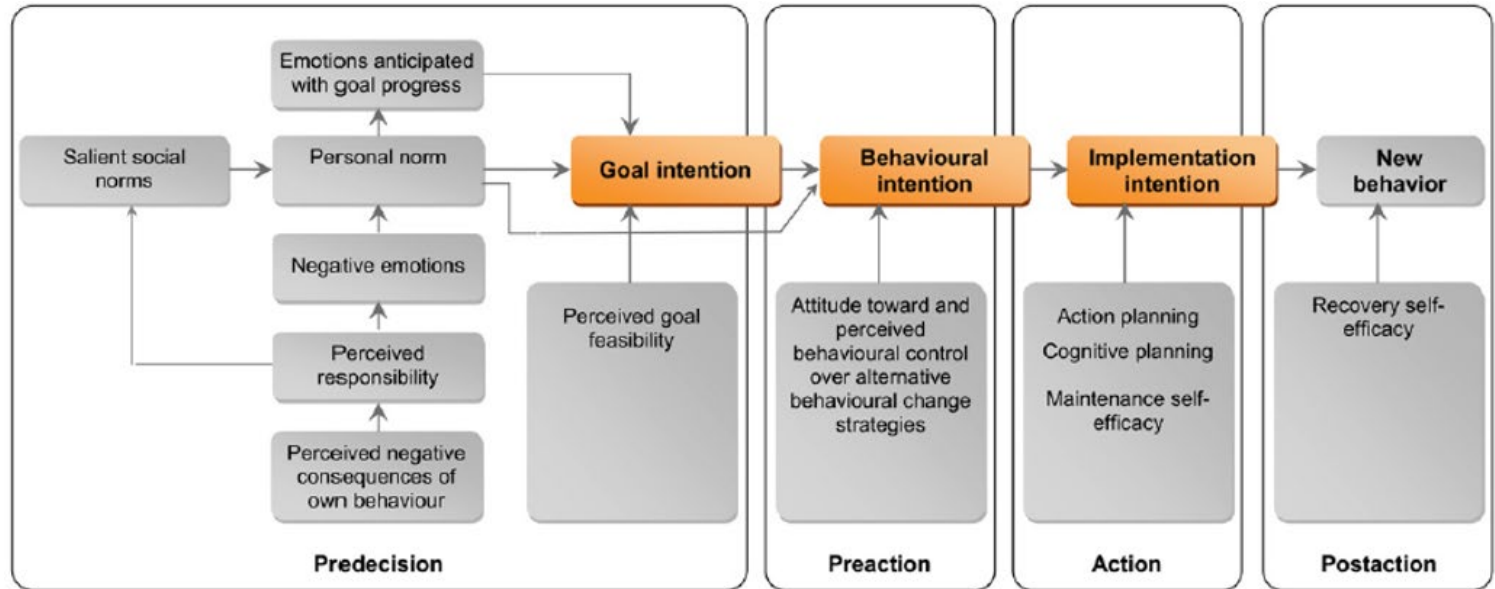
Disposable Coffee To Go Cups (TGC) cause problems like consumption of resources, emissions, waste and pollution

learn more: <https://www.duh.de/becherheld-problem/>

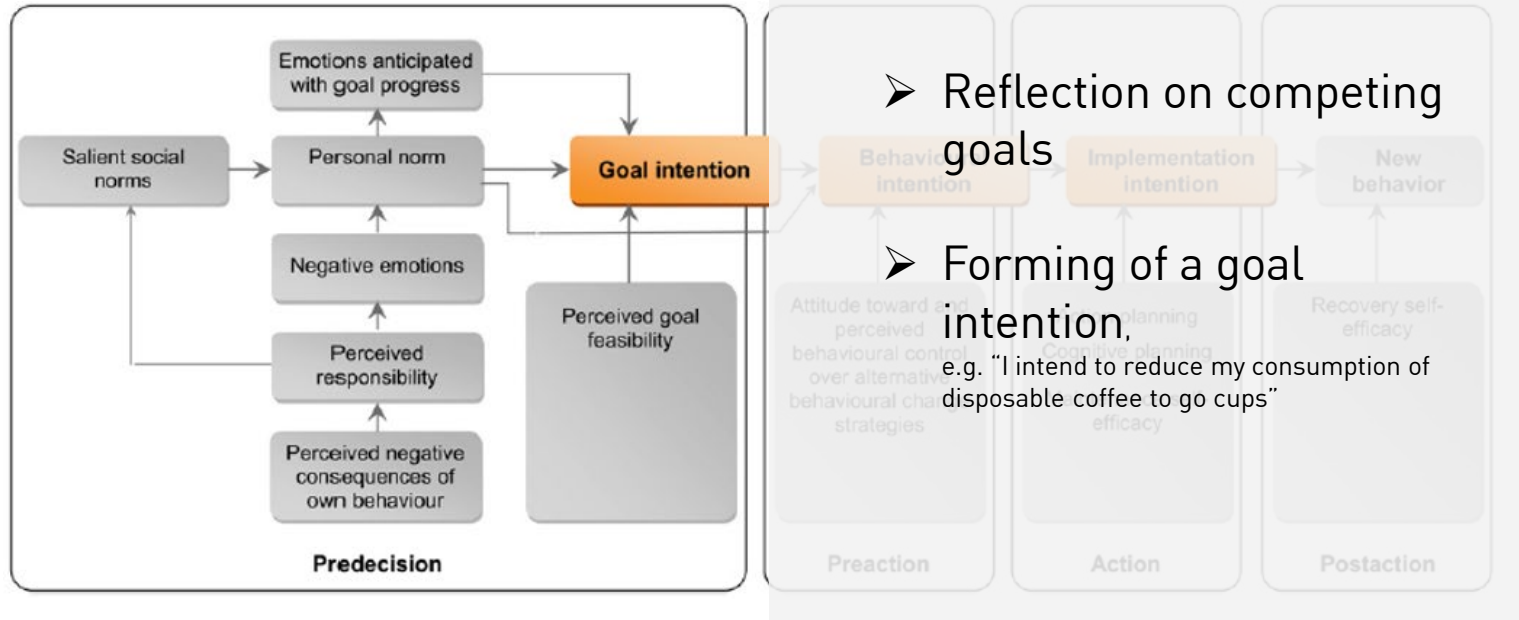
s:ne → search for a more sustainable solution for Darmstadt

- Scientific evaluation of the processes underlying people's motivation to change their consumption of TGC (behavioral change)
- Analyses of potential target groups and acceptance of behavioral alternatives

## Stage Model of Self-regulated Behavioral Change (SSBC) Bamberg, 2013

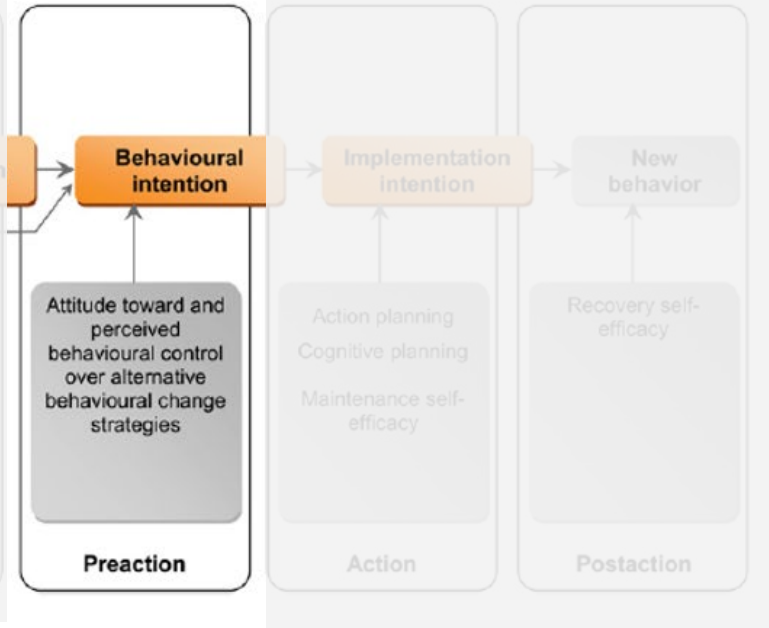


## Stage Model of Self-regulated Behavioral Change (SSBC) Bamberg, 2013



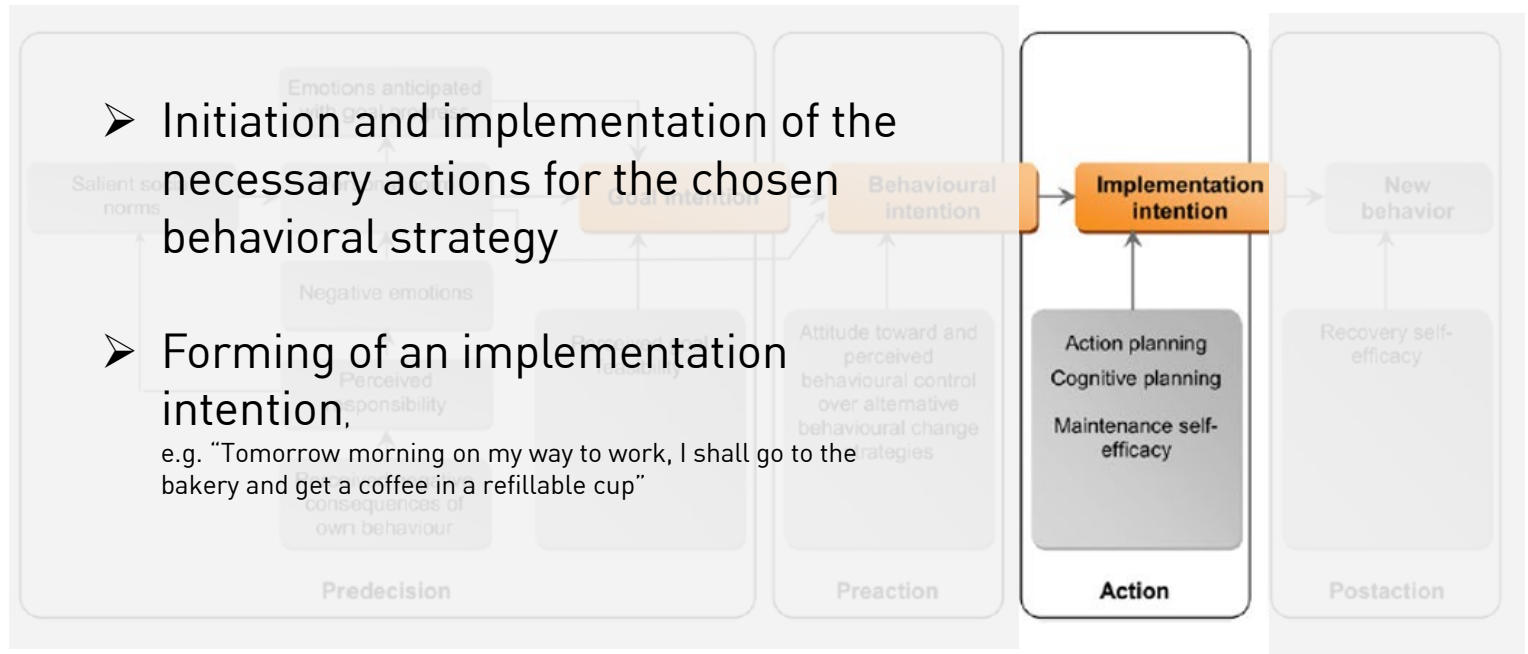
## Stage Model of Self-regulated Behavioral Change (SSBC) Bamberg, 2013

- Selection of the most suitable behavioral strategy to achieve the desired goal
  - Deliberate weighting of pros and cons
  - Perceived difficulty
- Forming of a behavioral intention,  
e.g. "I intend to use refillable cups"

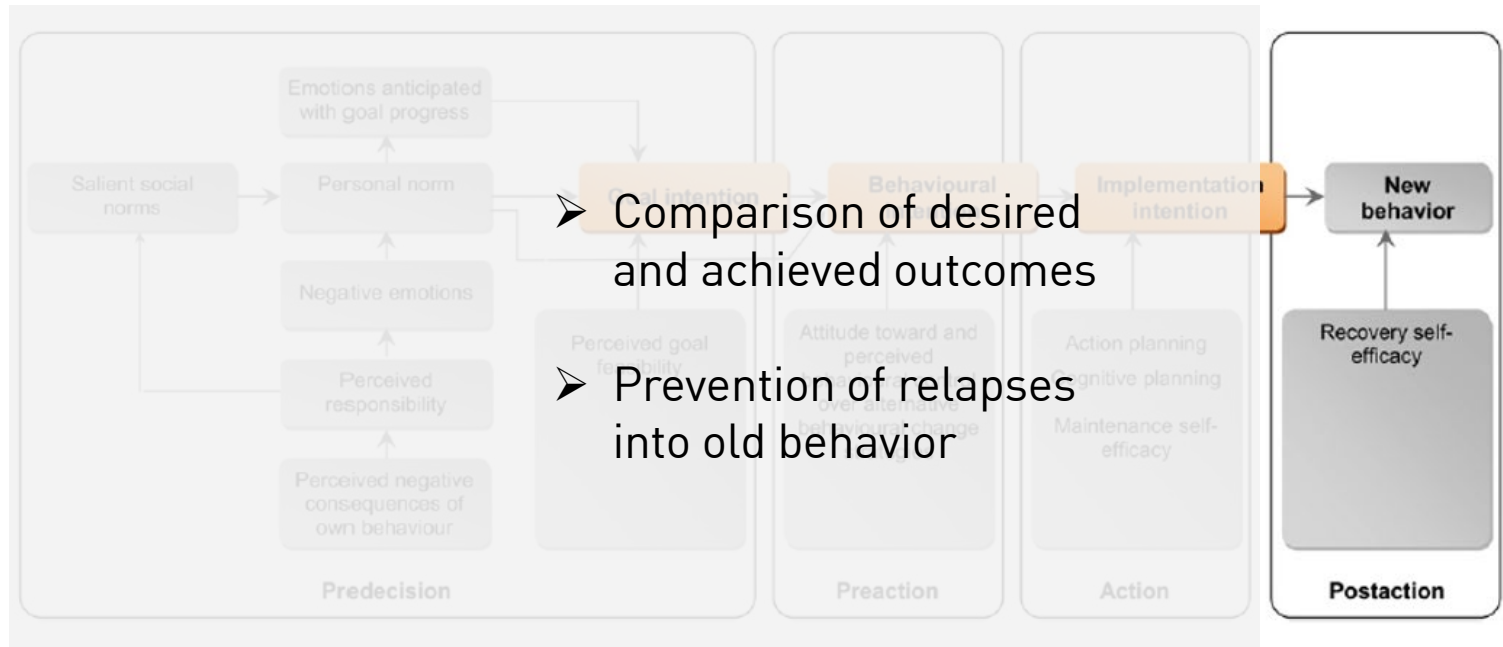


## Stage Model of Self-regulated Behavioral Change (SSBC) Bamberg, 2013

- Initiation and implementation of the necessary actions for the chosen behavioral strategy
- Forming of an implementation intention,  
e.g. "Tomorrow morning on my way to work, I shall go to the bakery and get a coffee in a refillable cup"



## Stage Model of Self-regulated Behavioral Change (SSBC) Bamberg, 2013



# Stage Model of Self-regulated Behavioral Change (SSBC)

Bamberg, 2013

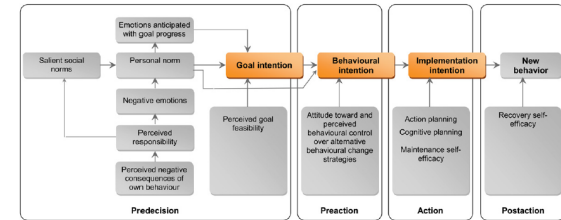


Fig. 1. The stage model of self-regulated behavioral change.

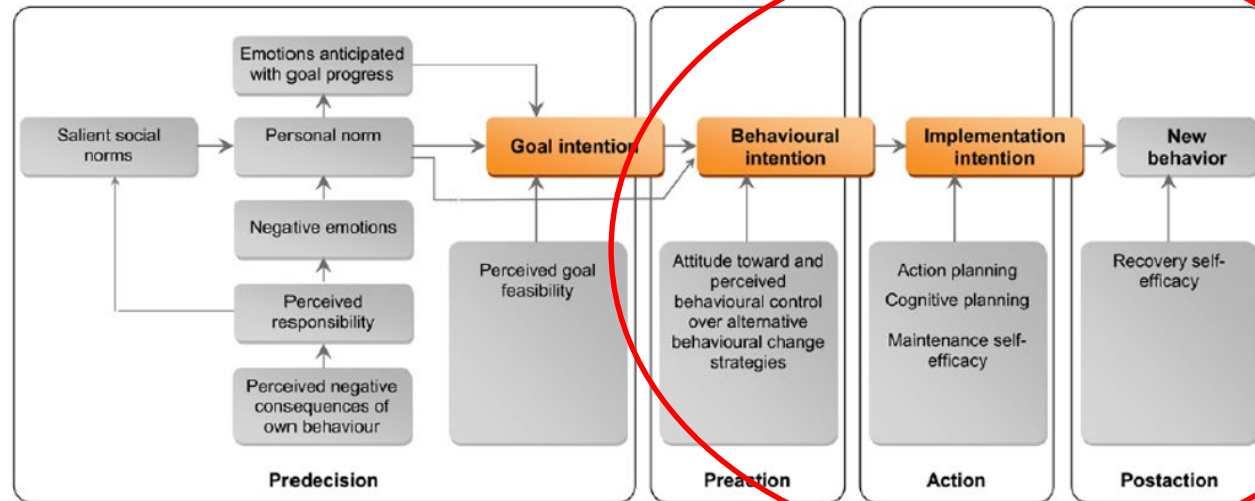
- So far approx. 15 published studies (on mobility, meat consumption, travel behavior)
- No detailed examination of the individual stages
- No examination of a behavior with small risks and many external factors to consider

→ Does this model apply to the processes underlying people's motivation to reduce their disposable TGC consumption?

## Method: Questionnaire

- Socio-demographic variables
- Self-reported consumption
- Stage Assessment & SSBC Items:

For 3 behavioral alternatives



## Method: Questionnaire

3 behavioral alternatives:

- 1) Using a refundable cup system
- 2) Reducing take-away beverage consumption
- 3) Bringing one's own cup

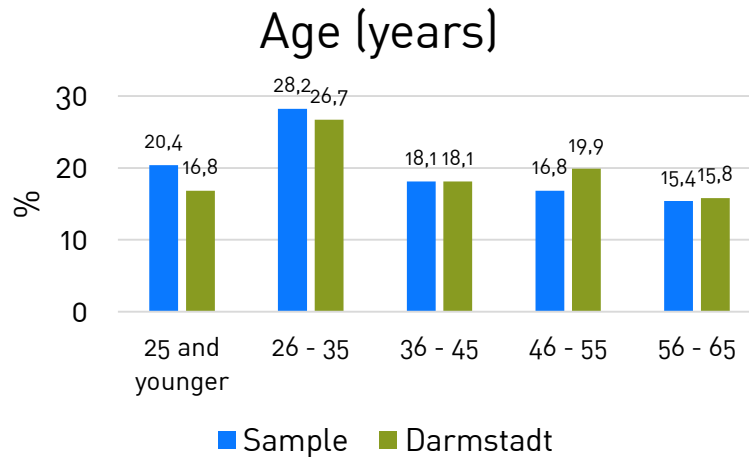
Additional questions concerning the refundable cup system:

- desired deposit amount
- preferences for cup qualities

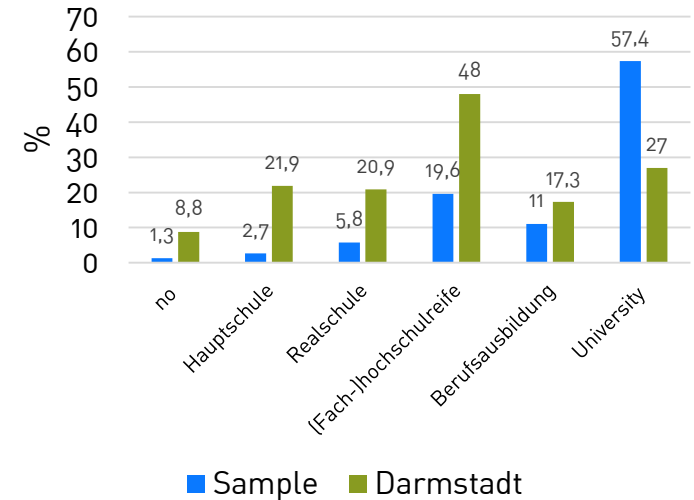
## Sample

Exclusion of people who selected „Since I don't drink coffee, tea, or similar drinks outside of home, and do not plan to do so in the future, this question does not apply to me.“

$N = 573$ , 56% female

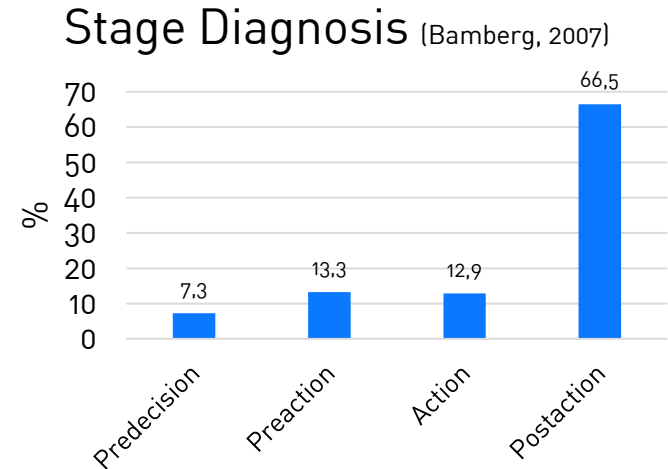
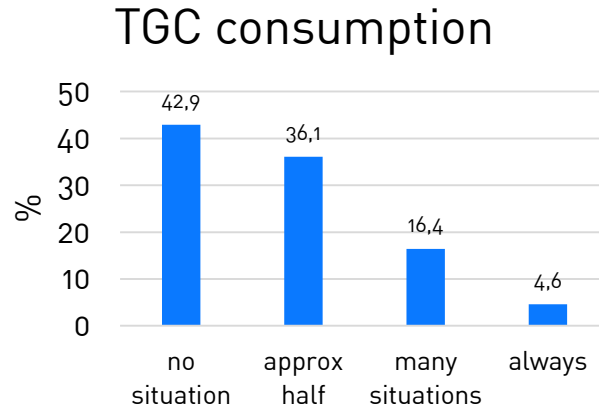


## Educational Attainment



# Results: TGC consumption & stage diagnosis

„Think of all the situations in the last three months when you had coffee, tea, or similar drinks outside of home. How often did you use disposable TGC?“

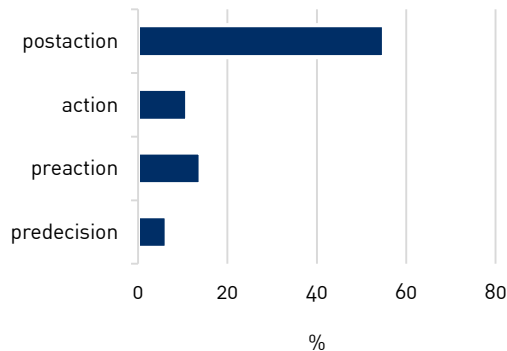


TGC per month:  $M = 2.48$ ,  $SD = 3.05$

## Consumption and stage diagnosis by age group

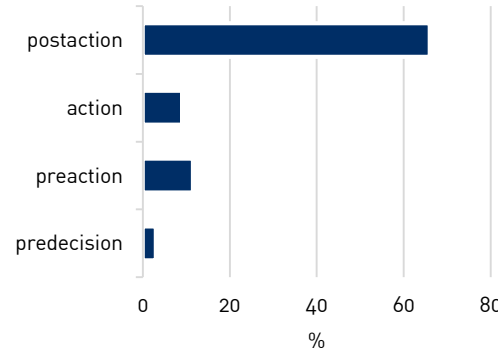
### Younger than 35 years

- Smallest amount of hot beverages per day (2-3)
- Biggest TGC consumption (5-6 per month)



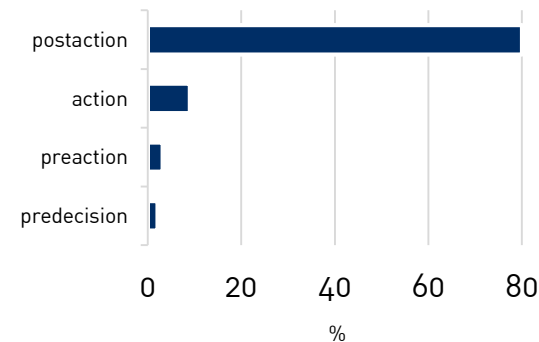
### 36-55 years

- Biggest amount of hot beverages per day (4)
- Moderate TGC consumption (4 per month)

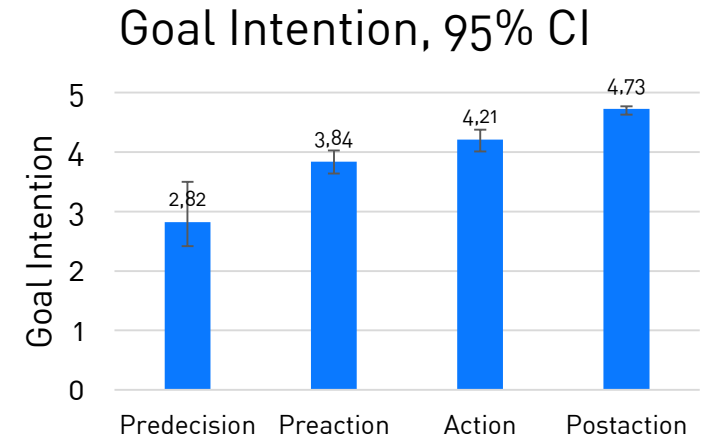
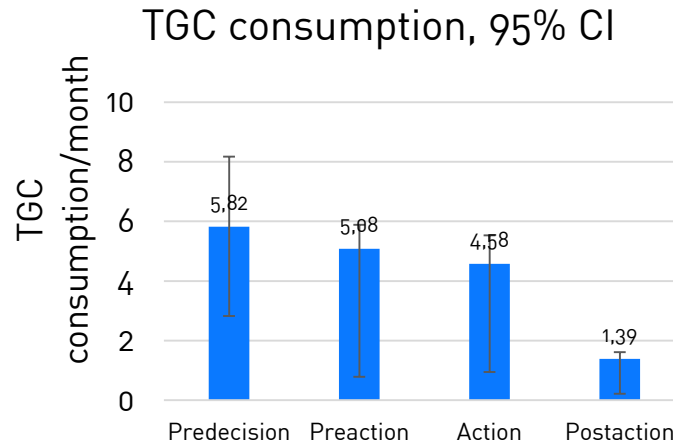


### Older than 65 years

- Average amount of hot beverages per day (3-5)
- Smallest TGC consumption (2 per month)



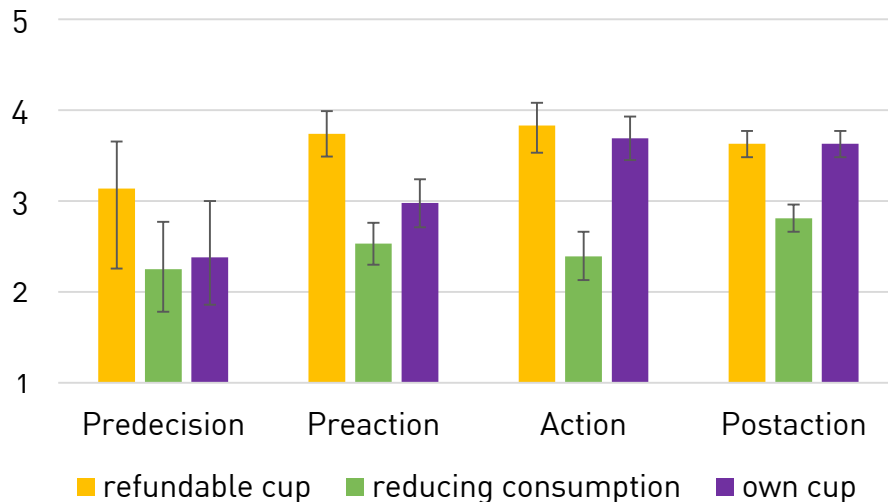
# Results: Comparisons between stages



2 items,  $\alpha = .84$ , (1 = completely disagree, 5 = completely agree):  
„I intend to use fewer or no to-go-cups in the future..“  
„I will try to reduce my to-go-cup consumption or to keep it low.“

# Results: comparisons between stages

Behavioral Intention, 95% CI



2 items,  $\alpha = .87/.83/.85$ , (1 = completely disagree, 5 = completely agree):

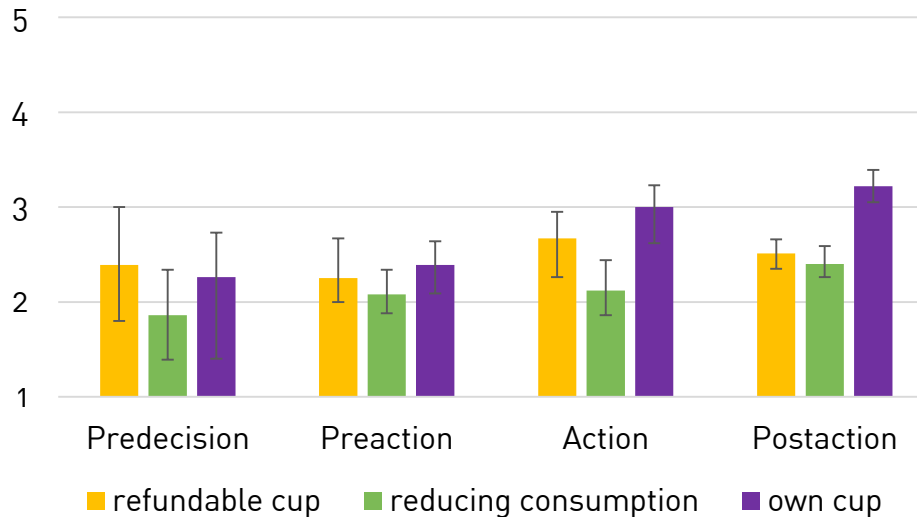
„I intend to use a refundable cup system in the future./ I intend to (continue to) avoid drinking coffee, tea, or similar drinks outside of my home./ I intend to use my own cup in the future.“

„I will make an effort to make more use of a refundable cup system in the future/ to reduce or keep low my consumption of coffee, tea, and similar drinks outside of my home/ to use my own cup to drink coffee, tea, or similar beverages outside of my home.“

differences between the stages were significant only for the alternative „bringing one's own cup“

# Results: comparisons between stages

Implementation Intention, 95% CI

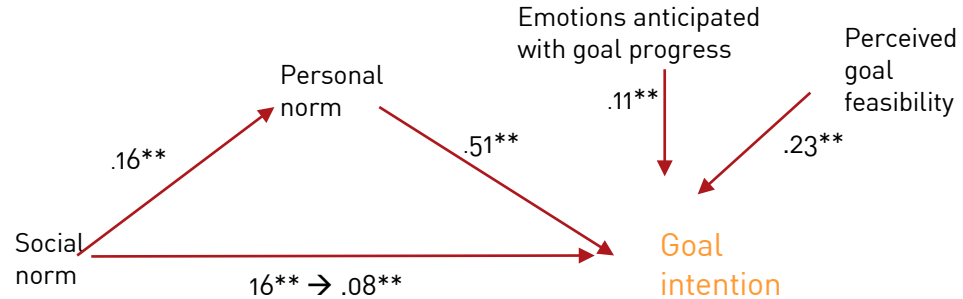
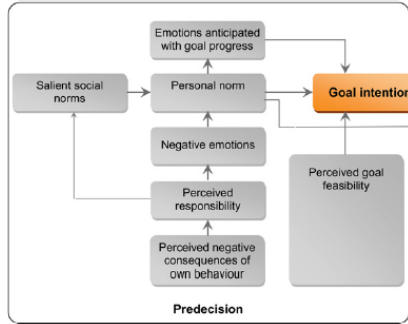


1 item, (1 = completely disagree, 5 = completely agree):

„I already have a specific plan of when and how I would be able to use a refundable cup /how I can replace my coffee- and tea consumption outside of my home/ when I could use my own cup to have coffee, tea, or similar drinks outside of my home.“

differences between the stages were significant only for the alternative „bringing one's own cup“

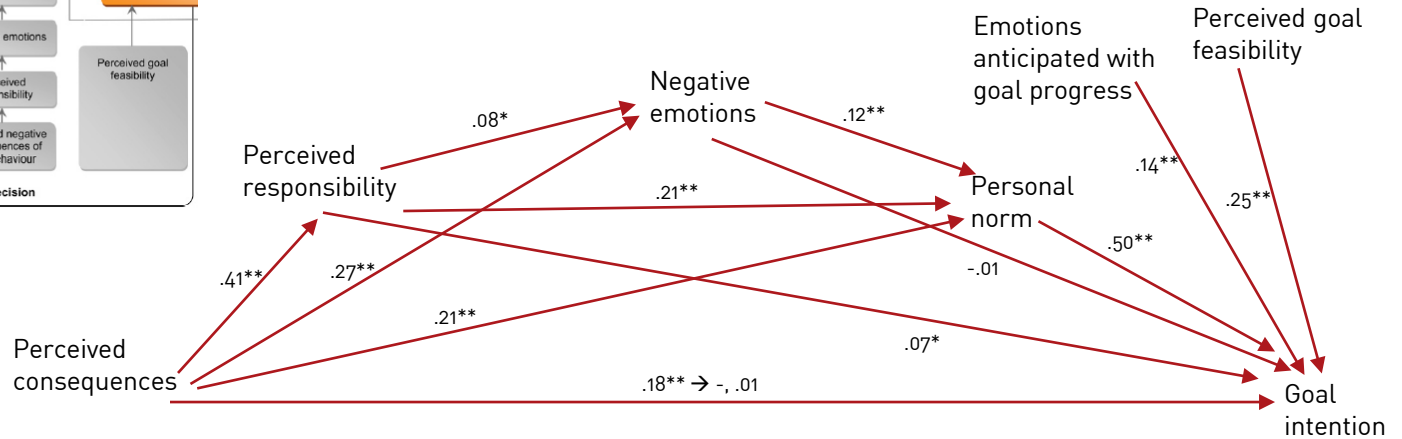
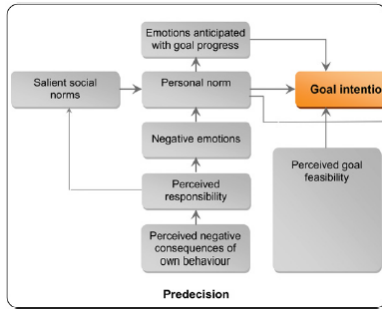
# Results: predecision stage



Indirect Effect CI (.04, .13), 5000 Bootstrap Samples

Notes:  
 \*\* < .01  
 \* < .05

# Results: predecision stage



Indirect Effect CI (.13, .26), 5000 Bootstrap Samples

Notes:  
 \*\* = .01  
 \* = .05

## Results: Preaction stage

DV: Behavioral Intention	IVs	Variance (all models are significant)
refundable cup system	PBC <b>.53</b> Attitude .28 GI <b>-.08</b>	$R^2 = 47\%$
reducing consumption	PBC <b>.59</b> Attitude .28 GI .04	$R^2 = 51\%$
own cup	PBC <b>.57</b> Attitude <b>.20</b> GI <b>.07</b>	$R^2 = 48\%$

Bold = significant at  $p < .05$

## Results: Action stage

DV: Implementaion Intention	IVs	Variance (all models are significant)
refundable cup system	<b>BI .41</b> <b>PA .20</b>	R <sup>2</sup> = 30%
reducing consumption	<b>BI .62</b> PA .06	R <sup>2</sup> = 43%
own cup	<b>BI .71</b> <b>PA .09</b>	R <sup>2</sup> = 59%

Bold = significant at p < .05

→ Can the SSBC model explain the processes underlying people's motivation to reduce their disposable TGC consumption?



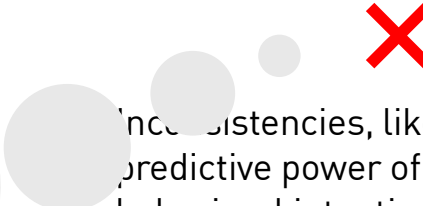
- Predictors explained relatively large amount of variance in each of the stages
- Expected mediations were found for predecision stage
- Predictors were similar for the three behavioral alternatives
- Stage comparisons support the model



- Inconsistencies, like the weak predictive power of goal intention on behavioral intention and the small influence of planning ability
- Not all stage comparisons were significant
- Inacceptable model fit

→ Can the SSBC model explain the processes underlying people's motivation to reduce their disposable TGC consumption?

Goal intention and planning ability might be of reduced importance in this context because many external factors may play a role; self-regulation might not fit to the context

- 
- Inconsistencies, like the weak predictive power of goal intention on behavioral intention and the small influence of planning ability
  - Not all stage comparisons were significant
  - Inacceptable model fit

## → Can the SSBC model explain the processes underlying people's motivation to reduce their disposable TGC consumption?



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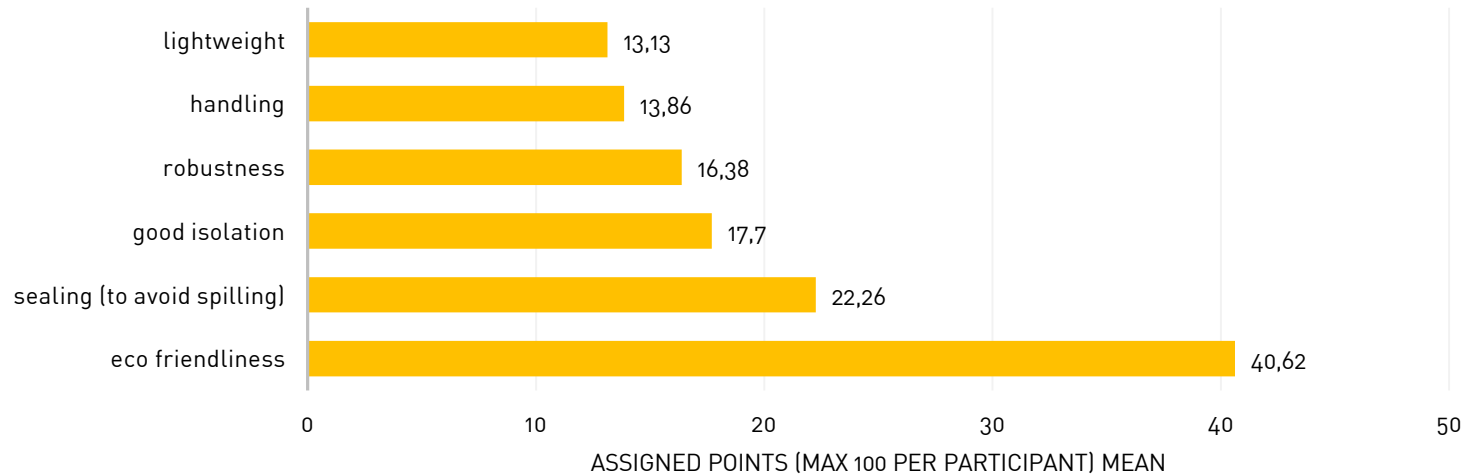


- Inconsistencies, like the weak predictive power of goal intention on behavioral intention and the small influence of planning ability
- Not all stage comparisons were significant
- Inacceptable model fit

The data support the assumption that behavioral change can be described in a stage model. However, especially the preaction and action stages seem to be underdeveloped. Further exploration of the role of external influences might benefit stage modelling of similar contexts.

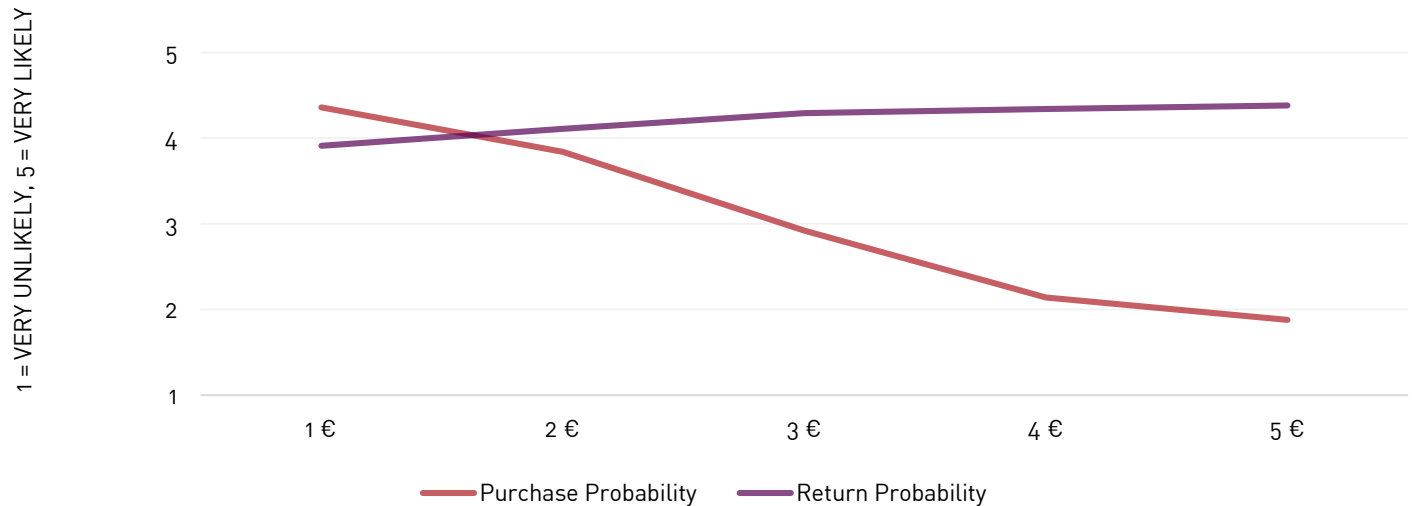
## Additional Findings: refundable cup system

How important are the following attributes of a refundable cup for you?



## Additional Findings: refundable cup system

### PURCHASE/RETURN PROBABILITIES FOR CUPS WITH VARYING DEPOSIT AMOUNTS



## Current State

- Awareness for the TGC problem has risen
  - Shops indicated that they would be interested in a refundable cup system
  - A cup was developed based on our results & life cycle analyses
- A refundable cup system will be introduced soon

Learn more:

<https://impact.h-da.de/index.php?id=812>

<https://www.faz.net/aktuell/rhein-main/kommentar-zu-darmstaedter-system-gegen-einwegbecher-15895174.html>

<https://www.sueddeutsche.de/news/wissen/umwelt---darmstadt-mehrwegsystem-fuer-kafeebecher-soll-muell-verringern-dpa.urn-newsml-dpa-com-20090101-181116-99-843362>



## Future Directions

- Further data analyses
- Communication strategy based on the SSBC?
  - Tailored information to support behavioral change (Klöckner, 2015; Steg & Vlek, 2009)

Stage	Content
Predecision	<ul style="list-style-type: none"><li>• Information on the problem of TGC</li><li>• Confirmation of personal responsibility</li><li>• Highlight existing social norms</li><li>• Examples to show feasibility of the three alternatives</li></ul>
Preaction	<ul style="list-style-type: none"><li>• Showing behavioral alternatives</li><li>• Highlighting advantages of behavioral alternatives</li><li>• Explanations about resolving disadvantages</li></ul>
Action	<ul style="list-style-type: none"><li>• Help to realize new behavior in daily life</li></ul>
Postaction	<ul style="list-style-type: none"><li>• Positive feedback on behavioral change</li><li>• Advices to make new behavior a habit</li></ul>



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**Thank you for your attention!**

Questions, comments?

→ mail to [buengerpanel@h-da.de](mailto:buengerpanel@h-da.de)

## References

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## Stage diagnosis items

Stage	Item for self-diagnosis
Predecision denial	When I drink coffee, tea, or similar drinks outside of my home, I often use to-go-cups. I am content with this situation and see no reason to change it.
Predecision inhibition	When I drink coffee, tea, or similar drinks outside of my home, I often use to-go-cups. I would like to use fewer to-go-cups, but I don't think that's possible.
Preaction	When I drink coffee, tea, or similar drinks outside of my home, I often use to-go-cups. I would like to use fewer to-go-cups, but I don't have a concrete idea of how to reach that goal yet.
Action	When I drink coffee, tea, or similar drinks outside of my home, I often use to-go-cups. I would like to use fewer to-go-cups, and I know how to reach that goal, but have not started implementing this into my everyday life.
Postaction	I drink coffee, tea, or similar drinks outside of home, but I already use few or no to-go-cups and want to maintain that in the future.
Captive	Since I don't drink coffee, tea, or similar drinks outside of home, and do not plan to do so in the future, this question does not apply to me.

Alternative behavior	Description
Introduction to behavior alternatives	<p>There are multiple ways of reducing how many to-go-cups one uses in everyday life. In the following section, we will describe three possible alternative behaviors. Please read each of the descriptions carefully and answer the corresponding questions.</p>
Refundable cup system	<p>Darmstadt is currently planning on introducing a refundable cup system within the city area and bordering communities. The system will include a reusable cup that you can obtain at partner business – for example, the bakeries, cafés, and cafeterias in and around town – for a refundable token. Later, you can then take back the cup to the same or a different partner business to get it filled up again or to receive back your token.</p> <p>Please answer the following questions assuming that the described refundable cup system is already in place in [omitted for blind review] and is available at every place offering coffee, tea, or similar drinks.</p>
Reduction of consumption	<p>Another strategy of reducing the consumption of coffee-to-go-cups is to drink fewer cups of coffee, tea, or similar drinks outside of home. Instead, one could have these drinks at home or at your destination of travel, or replace the coffee with similar drinks or snacks that are easier to transport.</p>
Own cup	<p>A third possibility by which one can reduce how many to-go-cups one uses, would be to bring a cup from home. By doing so, one could take some coffee or tea from home or work. Some cafés also offer to fill up cups that you bring with you.</p>