

Development & evaluation of behavior change campaigns to increase consumption of fluoride-free water in rural Ethiopia

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Dental & skeletal fluorosis

- WHO guideline: 1.5 mg/l
- Rift Valley surface- & groundwater contaminated with 2-30 mg/l
- Medical treatment difficult & ineffective → prevention
- physical, social and psychological impacts



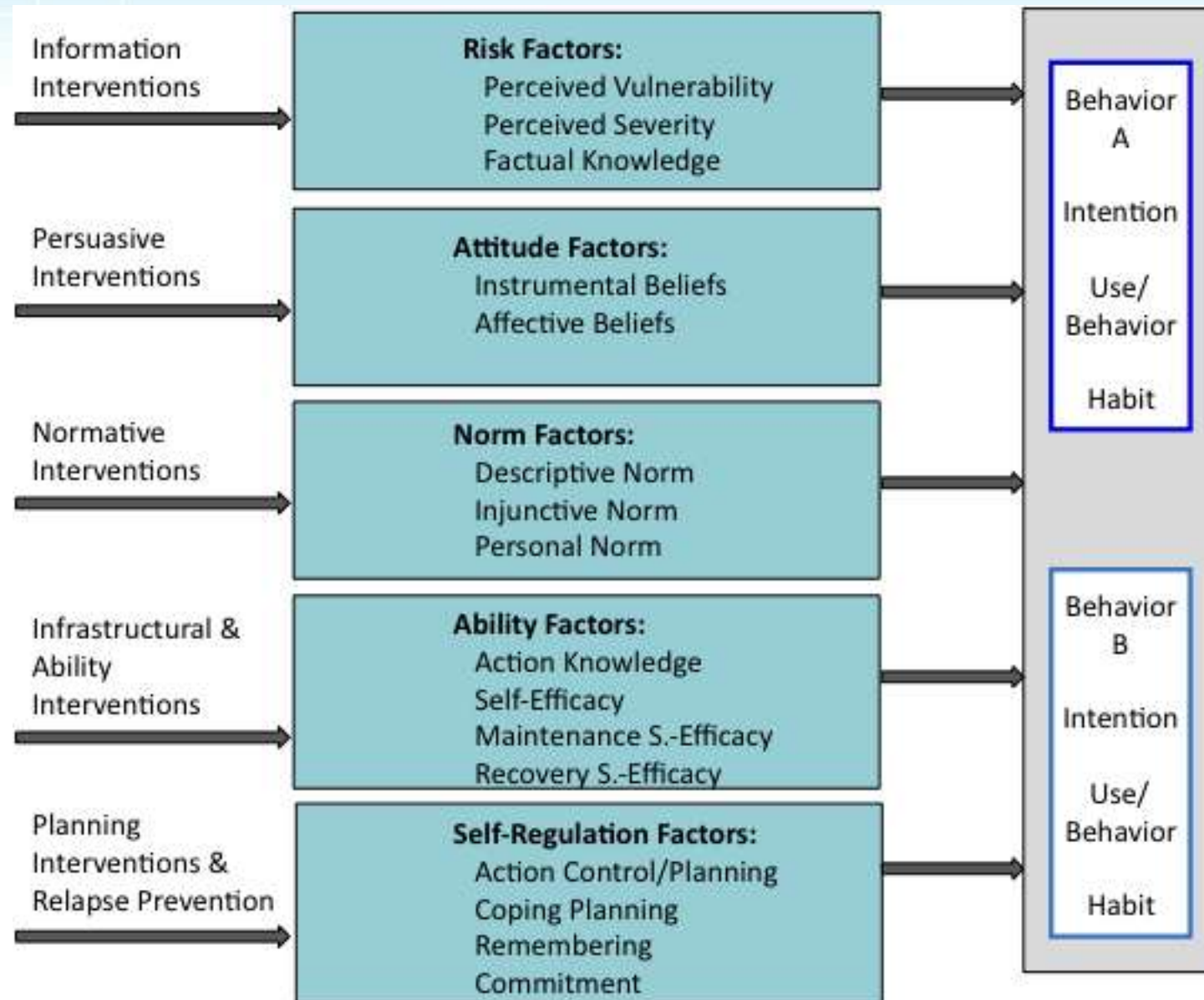
Community-based fluoride-removal option

based on the *Nakuru technique*

- Bone char (charred animal bones)
- Contact precipitation (Ca PO_4 pellets)



The RANAS-Model: Risk, Attitudes, Norms, Ability and Self-regulation



Method

- Study area: 1 village, Weyo Gabriel
- Face-to-face interviews → high illiteracy rate
- Standardized questionnaires
- Translation into Amharic and Oromic
- Training of interviewers (prior to every survey)
- Pretest of questionnaire



Study 1

- Community filter
- Sample size N = 180

Research questions

- Which psychological factors influence the usage of the filter?
- Which of these influencing factors do still have potential to be changed?
- H1: Evidence-based interventions are more effective in changing behavior

		2 months		2 months		2 months		6 months	
Area 1	Panel 1: Sept.10	Intervention	Panel 2: Dec. 10	Intervention	Panel 3: March.11	Intervention	Panel 4: June 11		Panel 5: Dec 11
Area 2									
Area 3									

Interventions to increase community filter usage

General recommendations

Promotion manuals (NGO approach)
→ mostly recommended

→ Awareness creation
→ risk perception



Perceived vulnerability

Evidence-based

Baseline survey (research)

→ highest intervention potential
→ influence + potential to increase



Perceived costs

Intervention design

Persuasion campaign with promoters/health workers doing household visits

→ Training of 10 promoters



Goal:

- decrease perceived costs of filtered water
- increase perceived vulnerability of getting fluorosis

→ increase consumption of filtered water

Persuasion on perceived costs

Higher price = better quality

- Examples with common things (red teff vs. white teff, oil vs. butter)

Personal water budget

- Promoter calculates water consumption of family
- How much water do they need from community filter?
- How much money does it cost?

Intervention sheet on perceived costs

I would like to talk to you about the costs of treated water and find out together with you how much money you would have to spend if you decide to consume filtered water from the Community filter.

Persuasion: costly = better quality

Imagine you grow to different types of teff, the red and the white teff. You take the teff to the market.

- For how much would you sell 1 sack of red teff?
- And for how much would you sell 1 sack of white teff?
- So white teff is much more expensive than red teff?
- Why is it more expensive?
- So you think white teff is better quality teff than red teff? Even though it is both teff?

→ So, it is logical, that white teff is more expensive than red teff, because it's quality is a lot better?

Imagine you cook wat. So you can use butter or oil for cooking wat.

- Which one is better of taste? Butter or oil?
- Which one is better for your health? Butter or oil?
- Which one is more expensive? Butter or oil?
- So at the end, which one is better quality? Butter or oil?

→ So, it is logical that butter is much more expensive than oil, because it is healthier and it's quality is a lot better?

The same it is with water in Weyo Gabriel. There are different water sources. All of the sources contain a lot of fluoride, which is very dangerous for your health. Still you have to pay money for water at any water source. The community filter offers fluoride treated water, which is very good for your health because it prevents you from getting fluorosis. If you compare now for example the Community filter water with water from Shibre or Mesken Sefer water point.

- Which is better for your health?
- Which has better quality?
- Which is more expensive?

→ Even if both are water their price is different (like red and white teff or butter and oil). But it is logical that community filter water is more expensive than untreated water, because it is much healthier and it's quality is a lot better?

Personal water budget for the household

→ Take the **budget sheet** and fill it out with the family!

Personal water budget sheet

How many family members are living in your household? _____ people
How many children of yours are under 13 years? _____ children

Where do you normally fetch water (if you do not fetch at the Community filter)? _____

How much does the water cost at this water point? _____ Birr per _____ liters

	How many cups does one child drink per day?	How many cups does one adult drink per day?	How many jugs do you use for cooking per day (including food, coffee, shai)?
cups/jugs			
liters	0.2	0.2	1
Total liters			
Total per day	Sum of total drinking and cooking: _____ liters		
Total per week	Above multiplied by 7 days: _____ liters		
Total jerrycans per week	Above divided by 20 liters: _____ jerrycans of 20 L		
Total expense per week	Above multiplied by 0.50 Birr: _____ Birr		

So if you want that your family only consumes filtered water you have to buy: _____ jerrycans of 20 liters per week at the Community Filter.

This will cost you _____ Birr per week.

That is only _____ Birr more than if you consume fluoride contaminated water.

All other water you need, for your cattle, animals, for washing and cleaning you don't have to buy at the Community Filter, you can buy untreated water, which is cheaper.

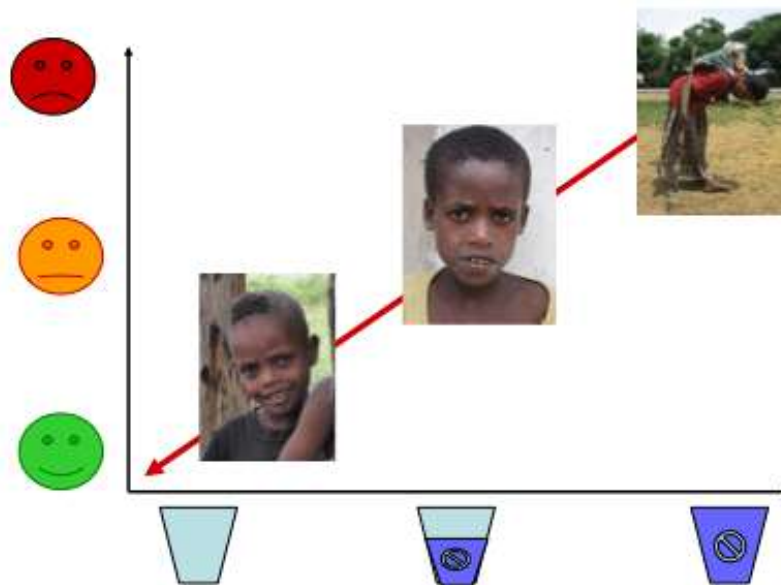
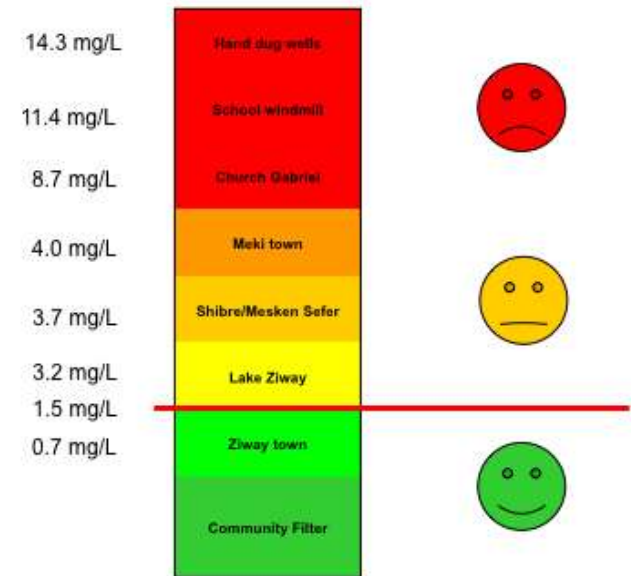
Persuasion on children's vulnerability

1) Current water source contaminated

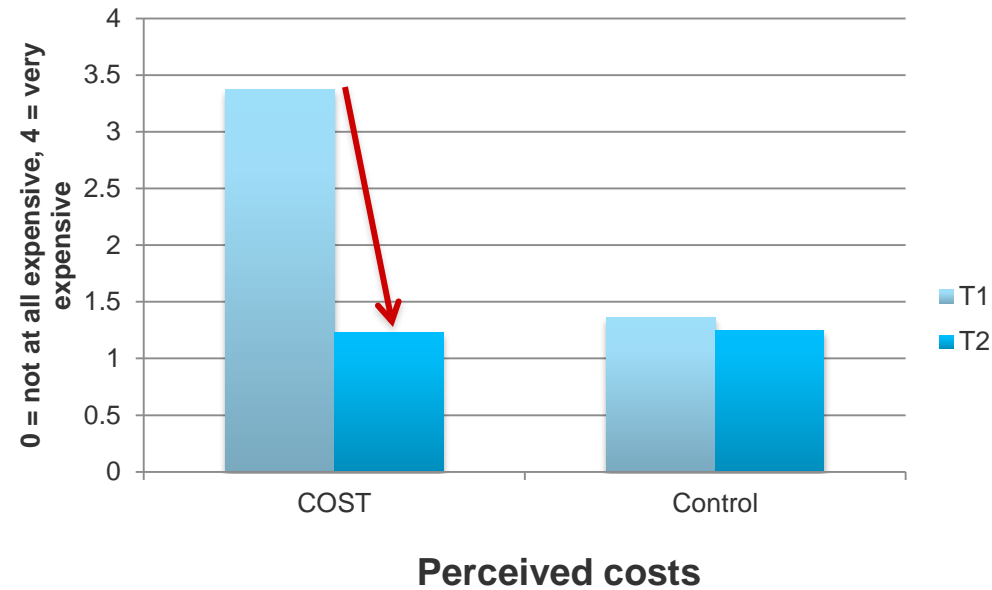
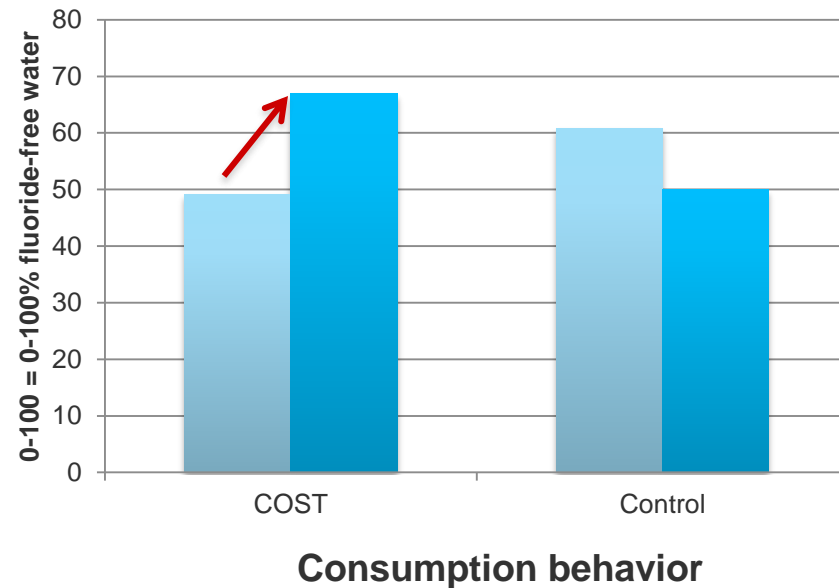
2) Personal risk information for all children

→ Individualized undeniable messages!

3) What can you do?

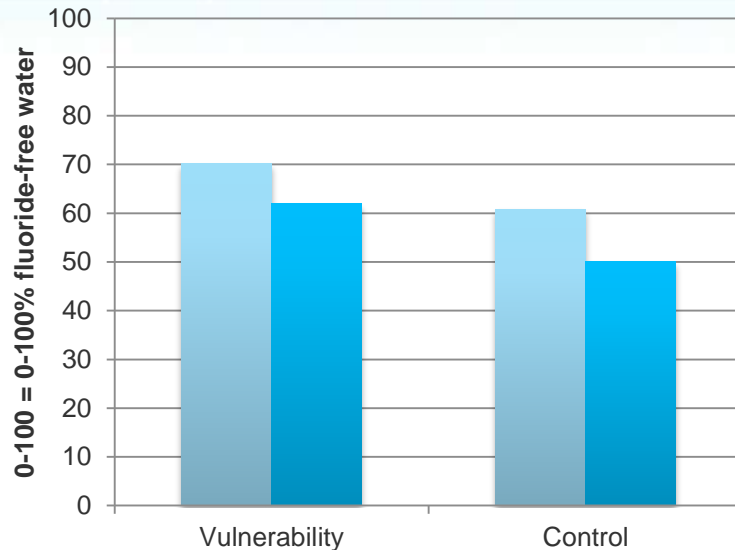


Results: Evaluation of evidence-based cost persuasion

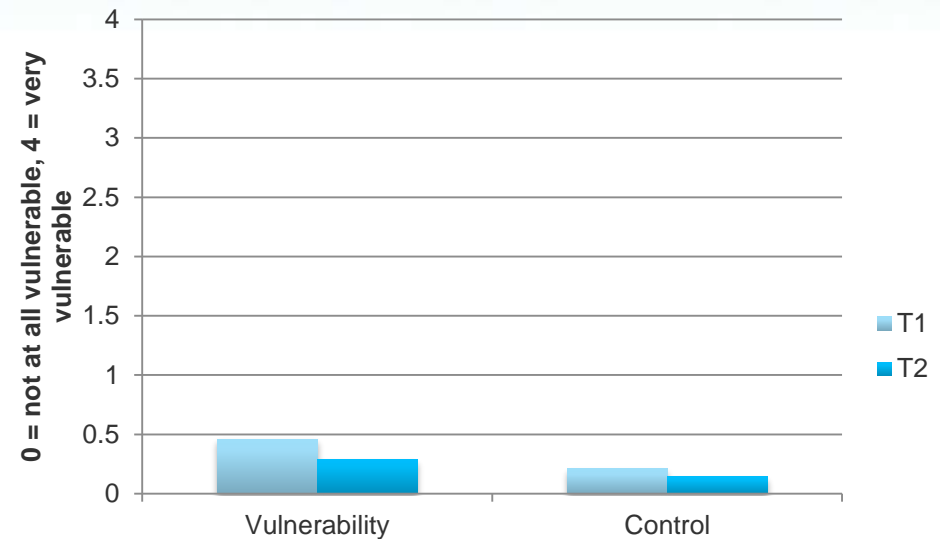


Comparison	Compared groups		<i>M (SD) Group A</i>	<i>M (SD) Group B</i>	<i>U</i>	<i>p^a</i>	<i>r^b</i>
	Group A	Group B					
Δ BEH	Cost Persuasion	Control group	.18 (.43)	-.14 (.46)	1782.5	.001	.32
Δ COST	Cost Persuasion	Control group	-.267 (.31)	-.101 (.43)	953	.047	.19

Results: Evaluation vulnerability persuasion



Consumption behavior



Perceived Vulnerability

Comparison	Compared groups		<i>M (SD) Group A</i>	<i>M (SD) Group B</i>	<i>U</i>	<i>p^a</i>	<i>r^b</i>
	Group A	Group B					
ΔBEH	Vuln Persuasion	Control group	-.033 (.48)	-.14 (.46)	1174.5	.56	.055
ΔVUL	Vuln Persuasion	Control group	-.177 (.55)	-.101 (.43)	864	.108	.153

Conclusions of Study 1

1. With persuasion campaigns, behavior can be changed without changing objective barriers (e.g. actual price)
2. Evidence-based interventions more effective than interventions based on general recommendations

Huber, A.C., Tobias, R., & Mosler, H.-J. (in revision). Evidence-based tailoring of behavior change campaigns: increasing fluoride-free water consumption in rural Ethiopia. *Applied Psychology: Health and Wellbeing*.

Study 2

- Community filter (N = 180)
- 2nd intervention phase

RO plant



		2 months		2 months		2 months		6 months	
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Research questions

- Which psychological factors influence the preference of the in-village community filter or the alternative source?
- Does the implemented intervention influence people's preference?

Personalized photo reminder

3 days promotion at the community filter

→ Give incentive for new users

→ Increase remembering & commitment towards the community filter



Bishaan Dhugaatii fi nyaata bilcheesuuf Bishaan Calaltuu fiiloraayidii
Uummattaan Yero Hundaa haa fayadamnuu!

ለመጠጥ እና ምግብ ለማብሰል ሁል ጊዜ ከጋራ የፍሎራይድ ማጣሪያ ውሃ እንጠቀም!

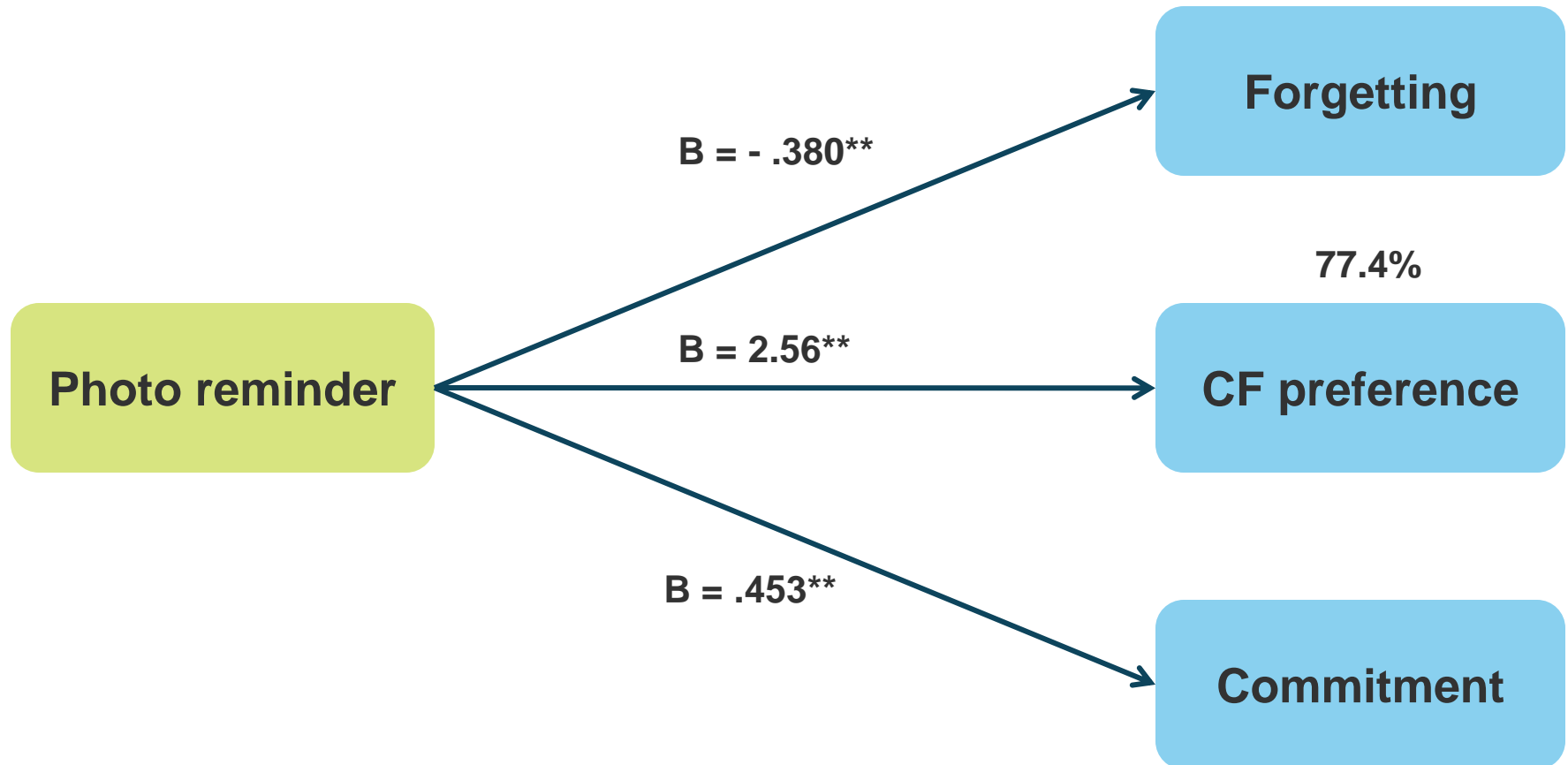


Study 2: Which psychological factor predicts the preference?

Factor block	Factor	<i>B</i>	<i>SE B</i>	<i>Exp (B)</i>	<i>p</i>	<i>CI (95%) for Exp (B)</i>
Risk factors	Vulnerability	-3.844	1.943	0.021	0.048	(0, .964)
	Severity	-1.212	3.95	0.298	0.759	(0, 658.0)
	Knowledge	-1.282	2.818	0.278	0.649	(0, 69.56)
Attitude factors	Overall affect	3.614	2.97	37.132	0.224	(.11, 12537)
	Taste	5.049	2.018	155.889	0.012	(2.98, 8137.9)
	Perceived costs	-2.757	1.211	0.063	0.023	(0, .681)
	Perceived distance	2.218	2.181	9.188	0.309	(.13, 660.7)
	Effort	-7.008	2.967	0.001	0.018	(0, .303)
Norm factors	Descriptive norm	3.986	3.051	53.841	0.191	(.14, 21296.1)
	Injunctive norm	-0.525	2.157	0.592	0.808	(0, 40.59)
Ability factors	Self-efficacy	-3.235	2.705	0.039	0.232	(0, 7.89)
Self-regulation factors	Planning	4.173	3.058	64.94	0.172	(.16, 26010.9)
	Forgetting	-0.173	1.245	0.841	0.89	(.01, 9.66)
	Commitment	3.021	3.15	20.52	0.337	(.04, 9843.52)
Constant		-8.304	4.514	---	0.066	--

Note: Nagelkerke $R^2 = .692$, LR- $c^2 = 73.62$ with $df=14$ ($p=.000$), $n = 120$. A forced entry method was used for the calculation.

Does the photo reminder bind people to the CF and does it influence the targeted factors?



Conclusion of Study 2

1. Perceived distance, costs and effort highly influence the preference between two mitigation options
2. Personalized prompts/reminders bind people to an option and increase remembering and commitment towards that option

Huber, A.C., & Mosler, H.-J. (2012) Determining the differential preferences of users of two fluoride-free water options in rural Ethiopia. *Journal of Public Health*, doi: 10.1007/s10389-012-0537-4.

Implications & conclusions

 **Baseline surveys are important**

For evidence-based

- **Designing of interventions**
- **Implementing of interventions**

 **Understanding preferences between options is important**

- **For ensuring sustainable use of an implemented option**

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