

# Nudging residents to increase active commuting: a field experiment with Bergen City Bike

Field research proposal

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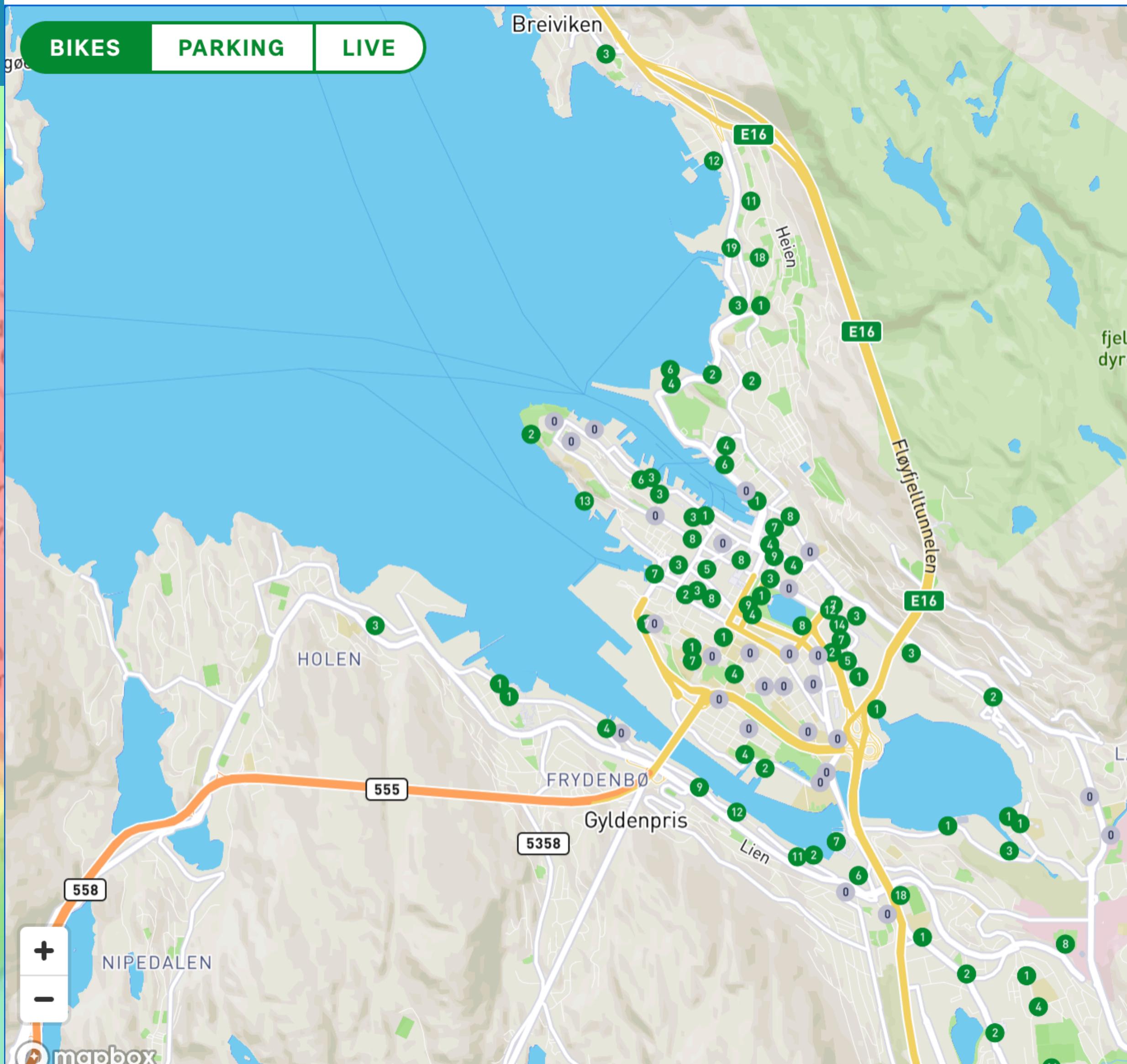
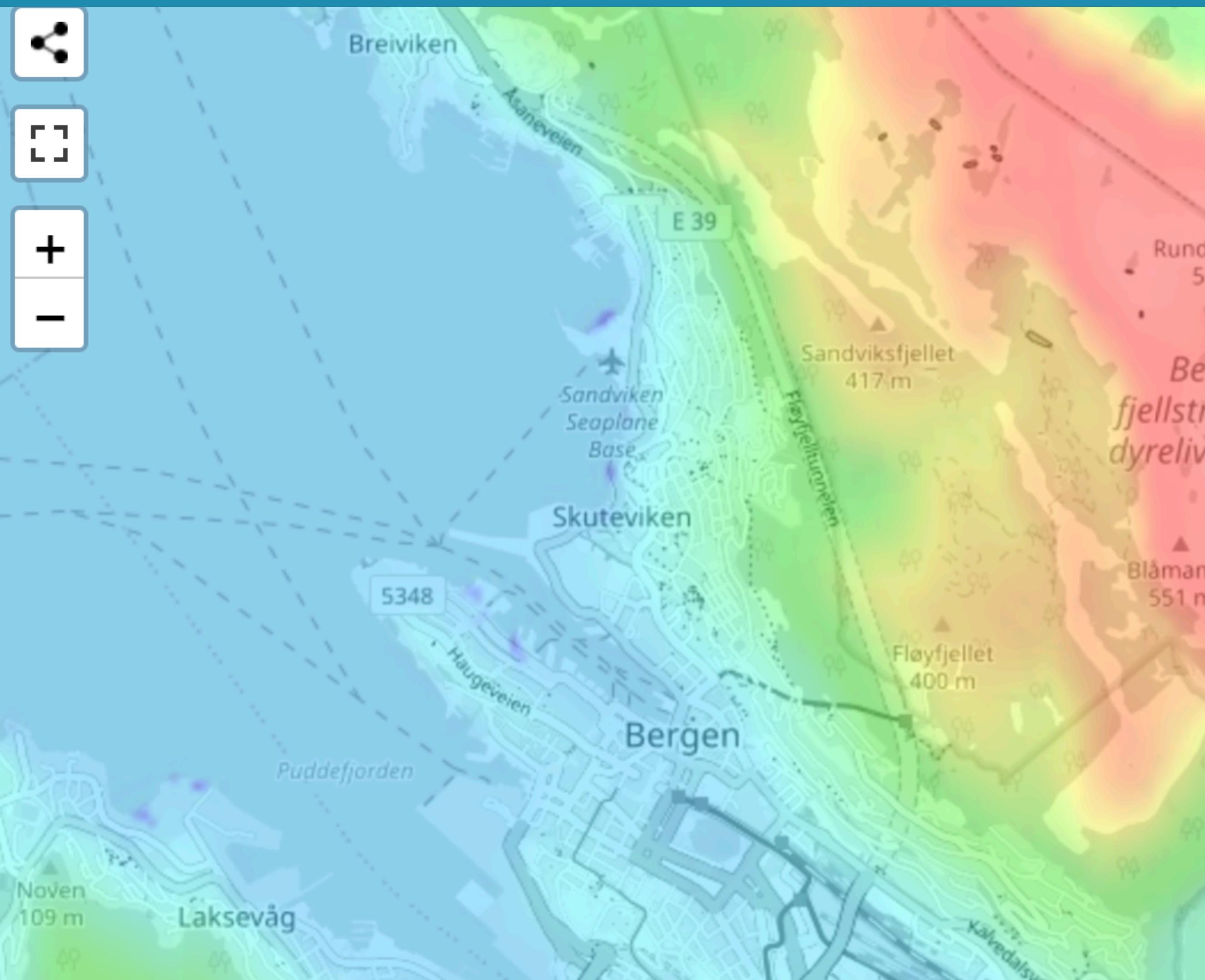


**Cycling in Norway**

**Suitable context for nudging intervention**

- A relatively low % bicycle share of daily trips among the Active Cities project countries: more than 5 times lower than the world's benchmark of the Netherlands, less than neighbouring Denmark (almost three times) and Sweden (two times)
- In 5th place in bikes per person (61%), behind in the ranking relative to the Netherlands (99%), Denmark (81%), Germany (75%), and Sweden (64%)

## Winter cycling (early March)



# Existing interest: surveying from the City Bike Oslo on winter rides (17th March)

**Have the winter city bike**

What kind of trips have you used a winter city bike for? (Possible to check off for \* more)

- On tour
- Home
- Other
- Have fun
- Meeting friends and acquaintances
- Right
- School
- Between appointments
- Exercise

What was important to you regarding city cycling in the winter? (Possible to check \* off for more)

- Maintenance of the bicycles
- Which stations are open
- Taken
- Weather conditions
- Rental period
- Proximity to free bicycle

How often have you used a city bike this winter? \*

- 5 or more days a week
- 3-4 days a week
- 1-2 days a week
- A few days a month
- Less often

What has been the main motivation for using a city bike this winter? (Possible to \* check off for more)

- Save time
- Save Money
- Be outdoors
- Eco-friendly travel
- Exercise
- Other

Has the city bike replaced other forms of transport this winter? (Possible to check \* off for more)

- In the
- Yes, collectively
- Yes, car
- Yes, times
- Yes, electric scooter
- Yes, own bike

Which means of transport has the city bicycle replaced to the greatest extent? \* (Only possible to answer one)

- The city bike has not replaced other means of transport
- Collectively
- Was
- Times
- Electric scooter
- Own bicycle

**Table 1. Operationalization table**

Type	Variable	Indicator	Data type	Source
Dependent variable	Bike rides	Average time on bike spent by each user (sum of time of every ride divided by the number of	Continuous	(Open) data for all rides from Bergen Bysekkel with the connection to users'
Secondary dependent variable	Intension to commute by bike	Changes in desire to choose a bike as a means of transportation	Categorical (discrete)	Pre- and post-intervention surveying/interviewing
Experimental independent variable	Nudging	Gamified sustainability framing	Categorical (Binary)	Control vs. experiment group

Figure 1. Nudging context

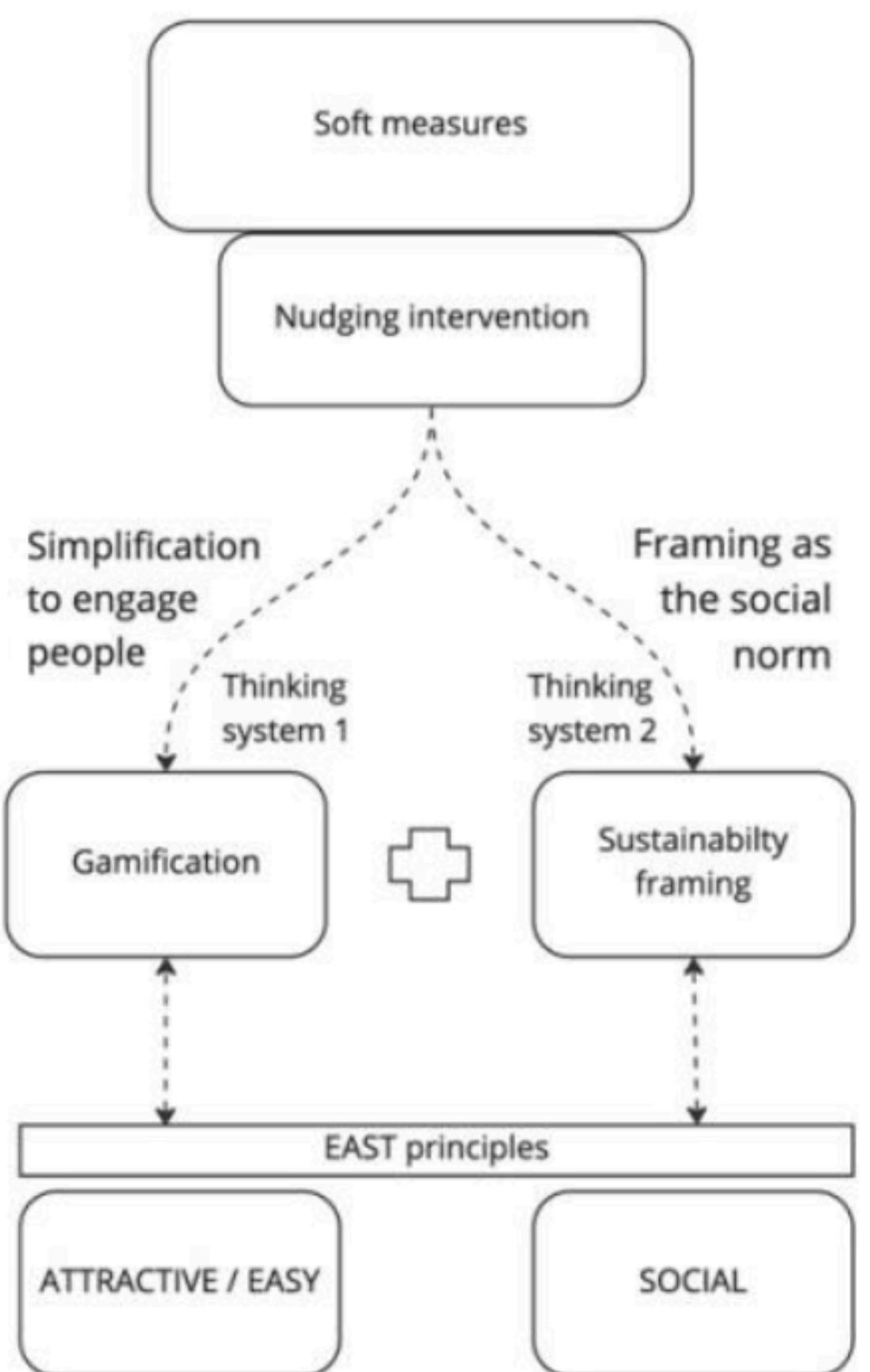
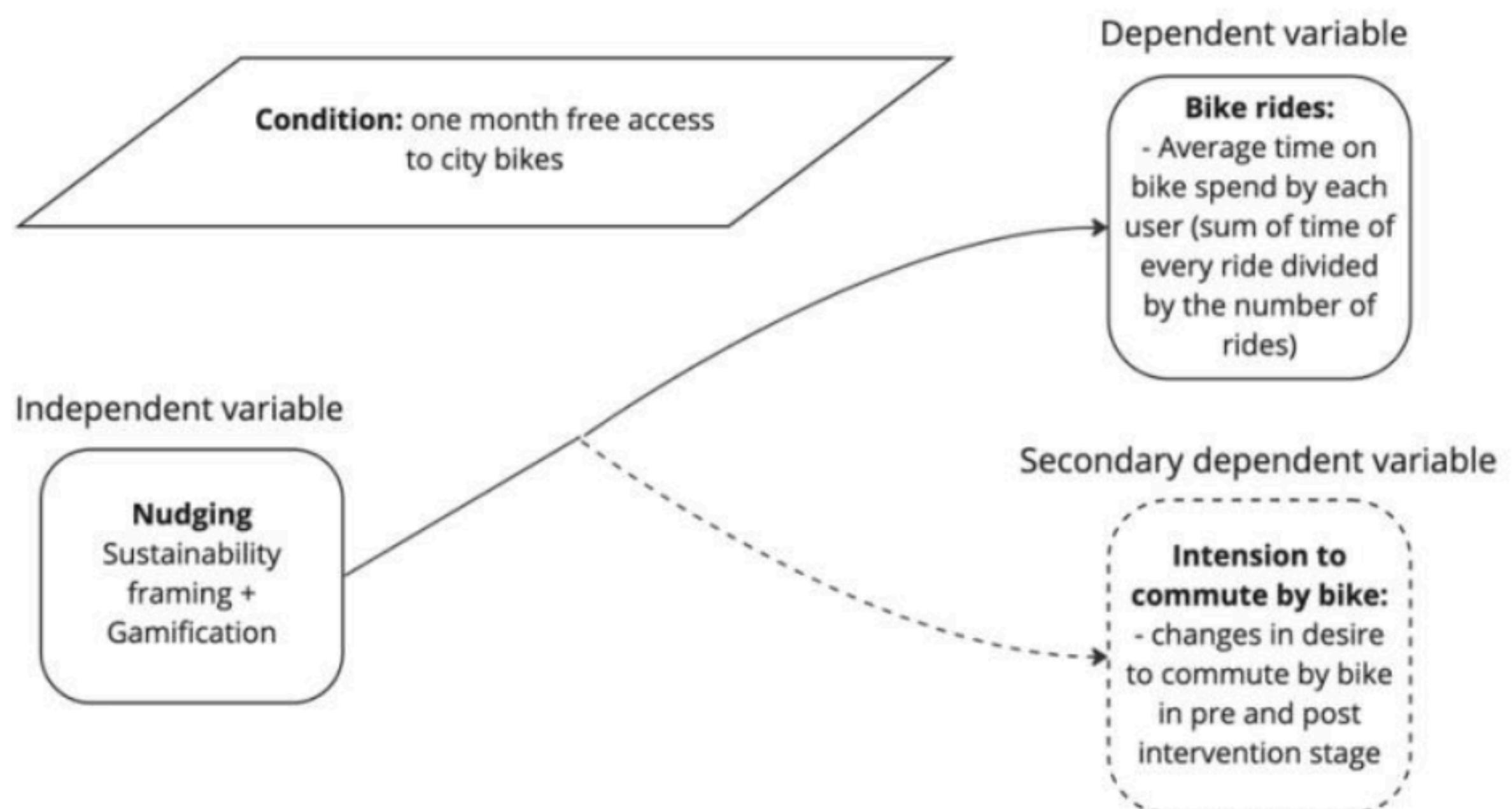


Figure 2. Variables relations



## Relevance & novelty

**Q1** Does the proposed nudging treatment lead to changes in average time spent on bike per user?

**Q2** Does the proposed nudging treatment influence the intention to commute by bike?

This field experiment **aims** to test the effectiveness of two nudging techniques, framing, and gamification, combined into one intervention on changing transportation behaviour towards greater use of cycling as one of the most sustainable forms of active mobility

## Research design — 1

### Sustainability framing:

- sustainable labelling proved to encourage increased usage of public transportation (Netherlands)
- future framing can achieve anchoring effect by comparing to other modes of transportation

### Gamification:

- digital tools (i.e.: badges, challenges) can encourage greener travel choices
- game-style incentives showed positive psychological effect promoting public transportation (Denmark) and effectiveness in promoting walking (Austria)

## Research design — 2

**Methodological framework:** quasi-experiment. **Method:** case-control study

- Recruiting participants: focus groups, volunteers, awareness campaigns

**Principle:** non-probability sampling, target wide audience, 200 participants in each group

- Preparing intervention:
  - enrolment questionnaire with 3 main and 4 secondary categories for all (Survey 0)
  - pre-intervention surveying for each group (Survey 1)

**Limitations:** not fully representative sample, not a real-life scenario (free bikes) —> limits for generalization

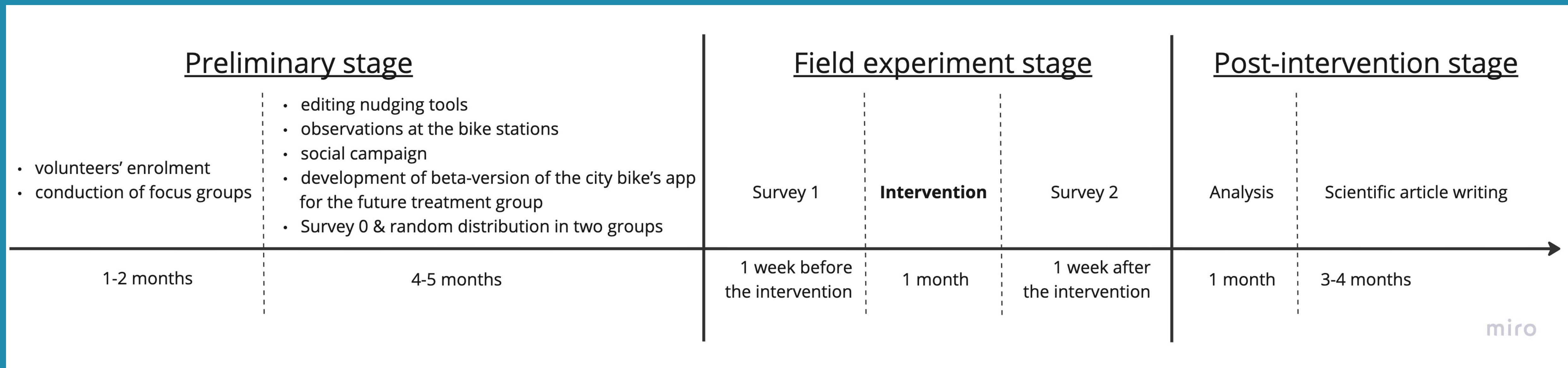
## Citizen engagement to improve the research design

**Focus groups:** understanding travel behaviour and sustainability perception

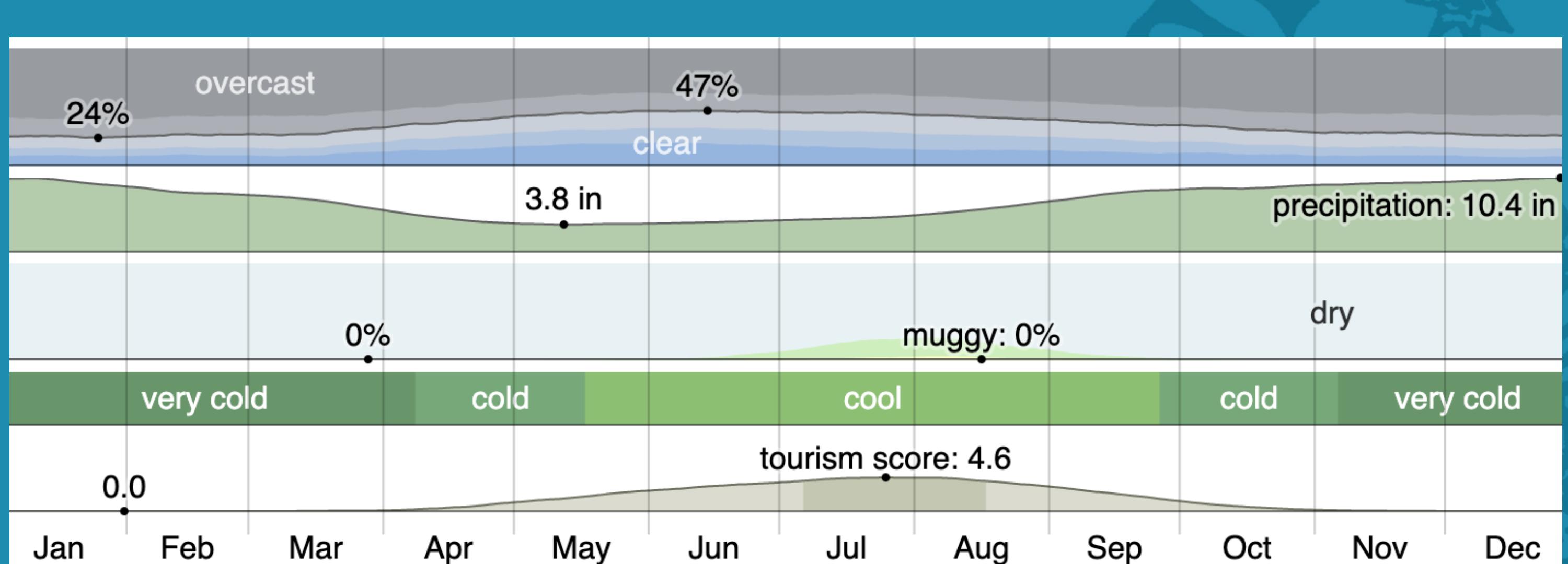
**Deliberative polling:** measuring the impact of informing —> creating a base for deliberative urban space

**Citizens' science practices:** volunteer observations next to stations —> establishing elements of tactical urbanism and co-creational schemes

## Timeline (total time: around one year)



P.S. It's preferable to conduct intervention not in the summer months



# Testing the intervention

## Preliminary analysis

- K-sample Anderson-Darling test
- 2-sample t-test + Cohen's d  
Optional: Bonferroni analysis

## Primary analysis:

**Linear regression analysis / Ordinary least squares regression (OLS)**

Dummy coding: treatment will be coded as 1, and its absence as 0

$$\gamma_i = \beta_0 + \beta_1 x_1 + \varepsilon$$

## Secondary dependent variable: Logistic regression

## Changing conditions:

- Different levels of treatment or more treatment groups:  
One-way analysis of variance (ANOVA) or Kruskal-Wallis Test
- New independent variable(s):  
Two-way analysis of variance (ANOVA) or Multiple regression analysis

## Additional analysis:

- Look for changes in the dynamics of bike usage per day — has nudging effect changed over time?
- Evaluate participants' engagement — was there any psychological effect over time?
- Look if there is any correlation between patterns of travel behaviour and bike commuting — compare pre & post test surveys
- Compare differences in intentions to renew the subscription
- Try to identify potential spillover effects

## Research Contributions

Regardless of the direct results, it will:

- Activate citizens to cycle as a way to move around the city
- Establish elements of tactical urbanism
- Build basis for deliberative space and future co-creation schemes
- Stimulate integrative thinking to tackle wicked and complex urban problems
- Promote overall physical activity levels
- Create foundations for multimodal hubs
- Improve urban governance

