

# Evaluation report

Bike Buddies  
Province of Overijssel

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## Short description

The goal of the Bike Buddies project is to encourage employees in the province of Overijssel to bike more often to work and by this to improve the accessibility of Overijssel, contribute to a cleaner climate and increase vitality of the employees. Participants - formerly motorists - cycled to work for 5 months using the app Bike buddies. They do this in a team, with a buddy and other colleagues. On the basis of the number of rides recorded and the commuting distance, participants and buddy build up a financial reward. While the bike buddies project started on 28 February 2022, the goal of this pilot was to evaluate the impact of the project on the health of the employees and the motivations of the employees (intrinsic vs extrinsic) to participate in the project and to keep on cycling.

## Type of ITS

App with elements of gamification

## Timeline

- Start of the project: 28 February 2022
- Start of the evaluation
  - January 2022: baseline measurement
  - April 2022: intermediate measurement
  - June 2022: follow-up measurement

## Hypothesis

The pilot was meant to answer 3 research questions:

- What is the effect of cycling on the physical health and mental wellbeing?
- What kind of motivations stimulate employees to participate in the Bike Buddies project and to keep on cycling during and after the project?
- Is there a change in intrinsic motivation during participation?

The hypothesis was that regular cycling to work would improve the health of the participants and as such increase the intrinsic motivation of the participants making the monetary reward over time less important as a motivator.

## Data sources

- Baseline, intermediate and follow-up measurement in health and wellbeing and motivation of 54 participants
- Measurement of health indicators (baseline and intermediate): Cholesterol & glucose, V02Max, blood pressure, BMI and body fat
- Focus groups
- Cycling data (collected via the app) of 438 participants

- This evaluation report was based on the publication: Ruys, K., Kruize, M. (2022) Vitaliteitsonderzoek January-July 2022, Province of Overijssel

## Analysis

### Report of the pilot

To answer the research questions, both quantitative and qualitative research was conducted among former motorists. Test subjects participating in the Vitality Study biked to work for 4.5 months, registered with the app Fietsmaatjes (in English: Bike Buddies). Data was collected at 3 measurement points.

#### T0 - measurement

This baseline measurement took place in January 2022 before the period of registered cycling. Questionnaires were administered and physical measurements were taken on all participants - former drivers. The purpose of this measurement moment was to gain insight into personal characteristics, lifestyle factors, health and well-being at that time and motivation to participate in the Vitality Study.

#### T1 - measurement

This intermediate measurement took place 2.5 months after the start. Focus interviews were conducted with some of the participants. The aim of this measurement was to gain insight into motivators after 2.5 months of participation in the Vitality study and to what extent there had been a change in intrinsic motivation.

#### T2 - measurement

The post-measurement took place after the period of registered cycling, 5 months after the start. Questionnaires were administered and physical measurements taken among all participants in this study. The purpose of this was to gain insight into lifestyle factors, health and well-being after participation in the Vitality Study and motivation to continue cycling. In addition, focus interviews were conducted at this measurement time with the same participants as at the T1 measurement.

Quantitative data were analysed using SPSS.

### Impact

Participants rate their health in the cycling period as significantly better than in the period preceding it (when people still went to work by car). They indicate that cycling makes them feel healthier, fitter and better in their own skin. On the one hand this is caused by physical health, on the other by mental well-being.

By cycling to work, progress was made on various physical body functions. For instance, BMI (body mass index), a measure of weight in relation to height, has decreased significantly. Fat percentage and waist circumference were significantly reduced. Outcomes indicate a positive effect of cycling on body composition and degree of "healthy weight. Cyclists who commute more than 15 kilometres lose more

weight than cyclists who cycle less than 15 kilometres. Cyclists on a standard bicycle have more decrease in fat percentage than cyclists on an electric bicycle. Cycling has a positive effect on resting blood pressure. Both systolic (upper pressure) and diastolic (lower pressure) blood pressure at rest are significantly reduced. Cholesterol values also decreased during the period of registered cycling. Total cholesterol and LDL values ("bad" cholesterol) were significantly lower. There is also a clear improvement in cholesterol HDL ratio value (ratio of 'good' to 'bad' cholesterol). Cycling to work improves endurance. VO2max, a measure of endurance, increased significantly after the period of registered cycling. Cyclists on a standard bicycle make more progression than participants on an electric bicycle. The above positive outcomes with respect to weight, blood pressure, cholesterol and endurance contribute to a reduced risk of developing long-term chronic diseases. These include type 2 diabetes, cardiovascular disease, certain forms of cancer and joint disorders. With regard to lifestyle factors (Exercise, Smoking, Alcohol, Nutrition, Relaxation), the greatest change occurred on the factors 'exercise' and 'relaxation'. Significantly more participants meet the Dutch standard for healthy exercise; this seems to be a logical consequence of taking the bicycle more often.

In addition to improvement in physical health, positive effects were identified in mental well-being. Being "fitter" and "feeling better about yourself" also means: mentally experiencing more relaxation and having energy left over after work. Cycling is experienced as a way to 'clear the head'. A moment of reflection to think things over, give them a place and let new ideas arise. Although cycling has no direct effect on stress experienced at home or at work, it is primarily a way of dealing with stress better. And therefore be able to let go of work more. A positive side effect is that less stress is experienced in traffic. Cycling also gives pleasure and a good feeling: the activity itself, enjoying nature and the pleasure of cycling 'together' with colleagues. This contributes to mental well-being.

Participants are more intrinsically than extrinsically (financial reward) motivated to participate in Bike Buddies. Yet the financial reward is an important incentive especially in the first months. Already after 2.5 months positive effects of cycling are experienced. As a result, intrinsic motivation increases and extrinsic motivation decreases. After participation, almost all participants resolve to continue cycling to work.

It is worth noting that the BITS-survey showed that 85.9% of the respondents indicated health benefits as an (very) important motivator for cycling and 79.6% indicated the relaxing effect (which could contribute to mental health) as (very important).

Apart from the impact on health, also the impact with respect to CO2 reduction can be assessed. This is based on the measurements of 438<sup>1</sup> participating cyclists (former motorists). On average participants cycled 49,9 days over a 5-month period, which equals approximately 2,5 times per week. On average they cycled 11,1 kilometers per day that they cycled to work. On average each participant cycled 553,3 kilometers during the 5-months period, which has resulted in 69 kg of CO2 reduction per participant. For all 438 participants together this equals 30,3 tons of CO2 reduction thanks to cycling.

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<sup>1</sup> 438 people participated in cycling to work programme (Bike Buddies), of which 54 also participated in the Vitality study.

Results	Average per participant	Total all 438 participants
Number of days cycled	49,9	21.856
Distance cycled (kilometres)	553	242.352
Calories used (Kcal)	17.153	7.512.910
Reduction CO2 emission (kg)	69,1	30.294

Participants were selected based on the fact that they used the car to go to work at least 3 days per week. Thanks to this project they cycled on average 2,5 days per week, which leaves 0,5-1,5 days for commuting by car (depending on whether they work 4 or 5 days per week). This means that they have reduced their car trips and thus their CO2 emission with at least 25% and possibly even 50% or more.

### Experiences project managers

Within the app, participants like the registration option the most, visibility of the associated reward and visibility of the total number of registered kilometers. Despite the fact that financial rewards are not seen as a major - and increasingly less important - motivator, participants still look at what has been 'built up'. Insight into one's own presentation versus that of other team members is also appealing to some of the participants.

Some participants want more possibilities to monitor their own progress, for example by connecting a sports watch to the app to register their heart rate. Limited consideration is given to CO2 emissions saved. This value does not say much, even among participants who want to actively contribute to a better environment. The same goes for the number of calories burned. There are doubts about the reliability of these values. The number of streaks is also little looked at. Badges in the trophy cabinet are looked at differently. Some of the participants see this as a fun factor. A point for improvement is that some badges need to be clarified and that more badges are needed to keep stimulating, for example badges for 1.000 and 1.500 bicycle kilometers. Another point for improvement is that participants would like the ability to add multiple routes. For example, when working in multiple locations and/or having external work appointments scheduled. Being able to record bike trips on weekends and/or vacations (to still meet the weekly goal) is also a wish. All in all, the supporting app contributes concretely to the positive experience of Vitality Survey participants. More functionality and continued use are desirable for a lasting effect. Participants are sad to stop using it.

Some comments can be made about this Vitality Study. Things that actually deserve additional research. For example, the period of registered cycling started in winter and ended in summer. Thus, there may be seasonal effects in the pre- and post-measurement. It was mentioned during focus group sessions that people often feel better in summer than in winter. On the other hand, the change of season during the registration period may also influence the motivation to keep cycling. It was indicated by participants that nice weather contributes positively to the motivation to cycle to work. The intention to continue cycling after Fietsmaatjes may also be colored by the period of the year. There were participants who indicated that they intend to continue cycling, but that it might be more difficult to continue this intention in autumn.

It should also be mentioned that the evaluation was conducted after two "Corona years. A long period when many employees worked from home, when gyms and clubs were closed and participants had less structure in physical activity. As a result, many participants possibly started with reduced fitness. The large physical effects, for example in endurance, may be partly explained by this. But that does not detract from the results obtained.

Once again it appears that a campaign like Fietsmaatjes brings structure to exercise. And that is rewarded with positive results.

Something can also be said about the composition of the focus group. From focus discussions a lot of valuable information has been retrieved about motivation to participate in the Vitality research, about motivators that determine taking the bicycle to cycle to work and the motivation to continue this in the future. The focus group proved to be reasonably but not fully representative of the entire study population. Focus group participants are on average slightly older and on average live a bit farther from work, which means they have to bike longer. Everyone was approached to participate in the focus group. About a quarter responded positively to this. The group that talked along may not be representative of the entire group.

## Conclusions

Cycling to work using the Bike Buddies app has a positive effect on physical health and mental well-being. There is a shift in intrinsic motivation to continue cycling. As participants experience the positive effects of cycling more, the financial incentive (extrinsic motivator) becomes less important. The Fietsmaatjes app is a successful tool to increase employee health and well-being and initiate lifestyle change. There was definitely an uptake of cycling and a reduction of 30,3 tons of CO<sub>2</sub> as participants switched their mode of transport. Their participation in the Bike Buddies programme has reduced their commuter car trips and thus their CO<sub>2</sub> emission with at least 25% and possibly even 50% or more.