ÉTUDES URBAINES

Rapport de recherche

n°9

Dimitri Marincek
Patrick Rérat
Virginie Lurkin

Avec la collaboration de
Emmanuel Ravalet

The potential of cargo bikes

Diffusion, uses, effects, and willingness for delivery

E4S Enterprise for Society

UNIL | Université de Lausanne
HEC Lausanne

UNIL | Université de Lausanne
Observatoire universitaire du vélo et des mobilités actives

UNIL | Université de Lausanne
Institut de géographie et durabilité

We would like to thank the Enterprise for Society Center (E4S) which brings together IMD, EPFL and Unil, for the opportunity and the trust placed in us to carry out this mandate.

We also thank all those who helped to distribute the surveys and who took time to respond:

For the cargo bike user survey, PRO VELO, Association Transports et Environnement, Tandem, Obst & Gemüse.

For the delivery preferences survey, we thank HEC-LABEX and especially Anina Eggenberger for their support.

Lastly, we would like to thank the members of the project's monitoring committee: Arnaud Nicolay, Luca Fontana, Julien Meillard.

La série *Etudes urbaines* publie des rapports issus de recherches menées au sein de l'Institut de géographie et durabilité de l'Université de Lausanne. L'objectif est de rendre publics et accessibles des résultats de projets traitant de l'urbain sous ses différentes facettes.

Observatoire universitaire du vélo et des mobilités actives | OUVEMA
Institut de géographie et durabilité | IGD
Faculté des géosciences et de l'environnement | FGSE
Universtité de Lausanne | UNIL
Quartier Mouline - Bâtiment Géopolis
CH-1015 Lausanne
www.unil.ch/igd

La série *Etudes urbaines* est placée sous la responsabilité de Prof. Patrick Rérat,
Contact : Patrick.Rerat@unil.ch
Site web : www.unil.ch/igd/etudes-urbaines

ISSN 2624-8271 (Online)
Crédit photo de la couverture : © Patrick Rérat, Bâle, 2022

The potential of cargo bikes
Diffusion, uses, effects, and willingness for delivery

Cargo bikes are two- or three-wheeled bicycles with a load capacity that facilitates transporting bulky objects or children. In the last few years, cargo bike sales have been booming in cities in Switzerland, with an increase of +184% between 2019 and 2021, exceeding 4000 units sold.

This project aimed to study the potential of cargo bicycles, both for personal transport, and for the commercial delivery of goods. To do so, two online surveys were developed.

Firstly, a national survey of around 1000 cargo bike users (the largest thus far), whose respondents included 3/4 of cargo bike owners, as well as 1/4 of shared cargo bike users. We found that cargo bikes have strong effects on reducing car trips, but that this practice remains fragile due to the cycling environment.

Secondly, a survey of the online delivery preferences of over 2000 students on the UNIL-EPFL campus. Our results suggest that delivery by cargo bike appeals more to a young generation of students, who are willing to make efforts for sustainable delivery (pay, wait, or move), but less to older generations and those who are already frequent online shoppers.

Mots clés : cycling, cargo bikes, modal shift, online shopping, delivery

CONTENTS

1. INTRODUCTION

1.1. CONTEXT

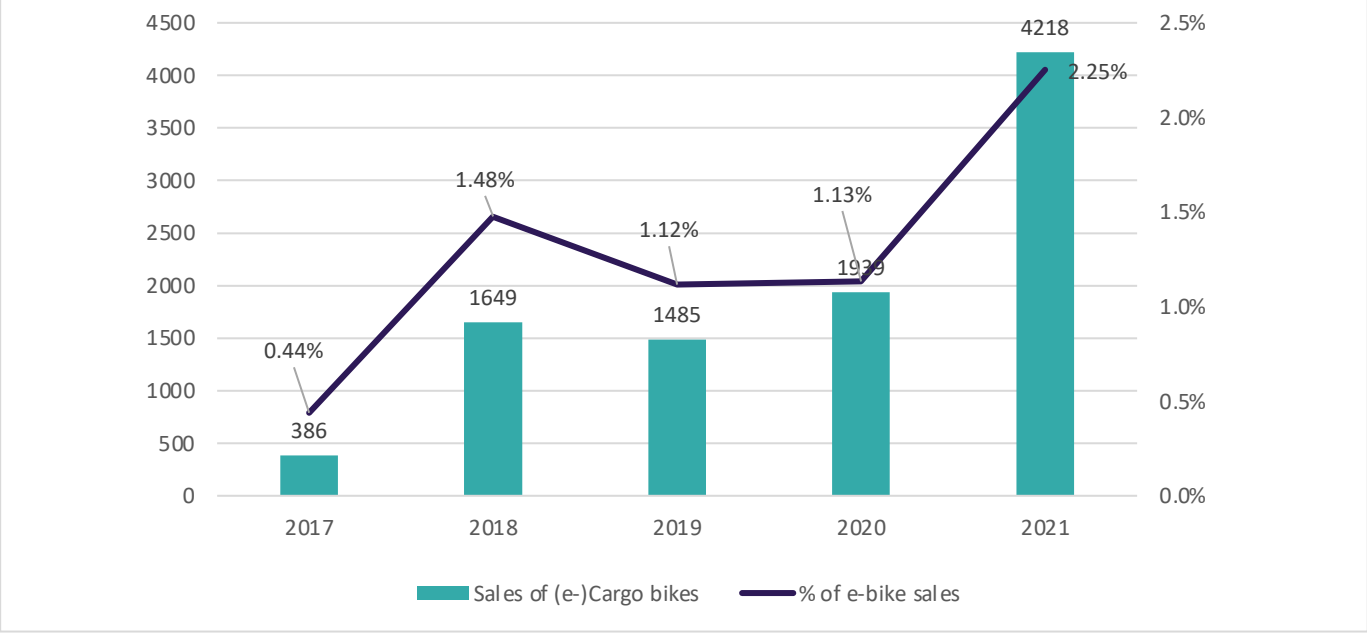
CONTEXT I

- **Cargo bikes are bicycles equipped with an extra loading capacity** to enable the transport of goods or people
  - Most of them are e-cargo bikes with an electrical assistance, which makes it easier to pedal
  - They provide a more efficient, sustainable, and fun alternative to cars in cities
- Cargo bike can be used for **two purposes**
  - for personal transport (either as proprietary vehicles or shared within a fleet)
  - for commercial transport (e.g. delivery services)

Figure 1: Cargo bikes for commercial transport (left) and personal transport (right). Source: DHL and Dimitri Marincek.

CONTEXT II

- **Sales of electrically-assisted[1] cargo bikes have increased strongly** in Switzerland
  - +184% between 2019 and 2021
  - From just 386 to 4218 units in four years (or 2.25% of all electrically-assisted bikes)



[1]Note: no data is available for non-assisted cargo bike sales.

1.2. RESEARCH PROJECT

RESEARCH PROJECT

- This research project was submitted to the **HEC Research Fund 2021** under the name « e-Cargo bicycles for urban deliveries: Insights into users' preferences ».

- It is funded by the **Enterprise for Society Center (E4S)** which is a collaboration between the Faculty of Business and Economics of the University of Lausanne (HEC Lausanne), the International Institute for Management Development (IMD) and the Swiss Federal Institute of Technology Lausanne (EPFL).

- The following people conducted the project (left to right)
  - Dimitri Marincek (Dr.) worked on the project
  - Prof. Virginie Lurkin (HEC DO) and Prof. Patrick Rérat (IGD) supervised the project
  - Emmanuel Ravalet (Dr.) analyzed the data for the second part of the project (delivery survey)




OBJECTIVES

Aim of the project

- This project aimed to study the potential of cargo bicycles, both for **personal transport**, and for the **commercial delivery of goods**. This will help to formulate recommendations for public policies for developing the use of cargo bikes further.

Questioning

1. **Personal transport**: Cargo bike users

- *Who adopts cargo bikes, and for which reasons?*
- *How are cargo bikes currently used?*
- *Which effects do they have on other mobility practices?*

2. **Commercial transport**: Delivery preferences

- *Do people prefer to be delivered by cargo bikes?*

DESIGN OF THE RESEARCH

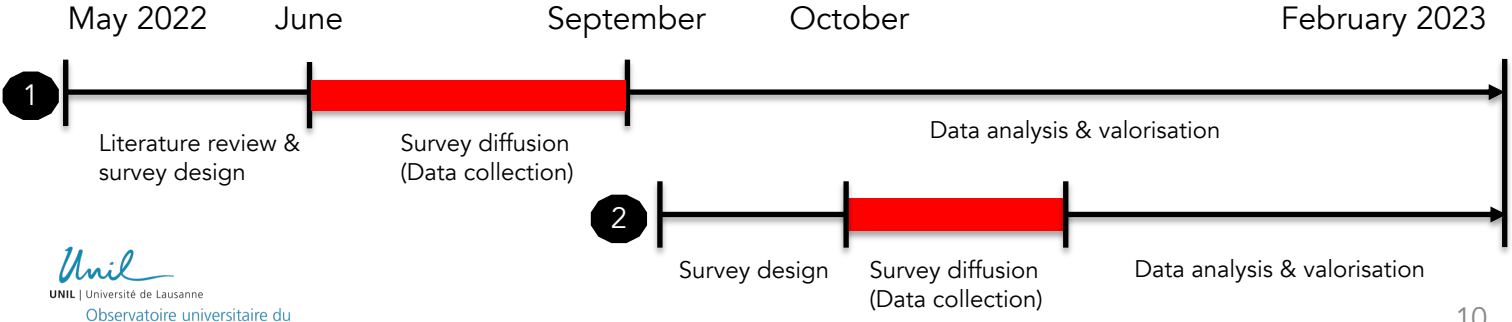
Two surveys were developed: (1) a cargo bike user survey and (2) a delivery preferences survey

1 Cargo bike user survey

- Survey of cargo bike users and owners across Switzerland
- Focus on cargo bike adoption, use, experiences, and effects
- Project coordinators : Dimitri Marincek, Patrick Rérat, Virginie Lurkin

2 Delivery preferences survey

- Survey of students and faculty on UNIL/EPFL Campus
- Focus on online shopping behaviours and sustainable delivery preferences
- Project coordinators: Emmanuel Ravalet, Dimitri Marincek, Patrick Rérat, Virginie Lurkin



2. CARGO BIKE USER SURVEY

2.1. QUESTIONING AND METHODS

RESEARCH QUESTIONS

(1) Diffusion of cargo bikes

- Who are cargo bike users, and what is their profile and access to cargo bikes (ownership vs shared) ?
- What are the motivations for adopting/using a cargo bike?
- What are the experiences, difficulties, and the barriers which affect them?

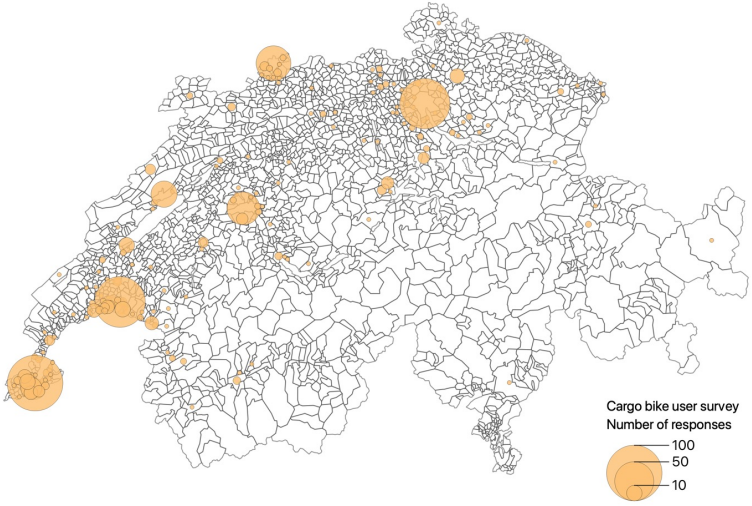
(2) Modal shift effects of cargo bikes

- For which reasons and trips are cargo bikes used (frequency, distance, duration, purpose) ?
- Which relationship to other transport modes do cargo bikes have (substitution, synergy)?

METHODOLOGY

Nationwide online survey among cargo bike users in Switzerland (French & German)

- 13th of June – 18th September 2022
- **Diffusion** of the survey through:
  - Online newsletters: OUVEMA research group, Velojournal (cycling journal)
  - Cycling advocacy groups: PRO VELO regional sections, ATE/VCS regional sections
  - Social network posts: Twitter / LinkedIn / Facebook
  - Carvelo2go cargo bike sharing service
  - Bicycle shops: Tandem (Lausanne, Vevey), Obst & Gemüse (Basel)
- N = 955 valid respondents
  - **French-speaking regions overrepresented** (60.5%) compared to German-speaking (39.5%).

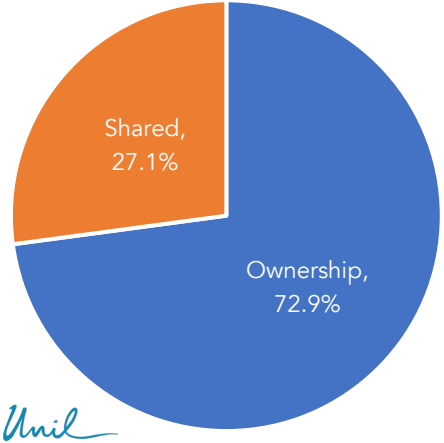


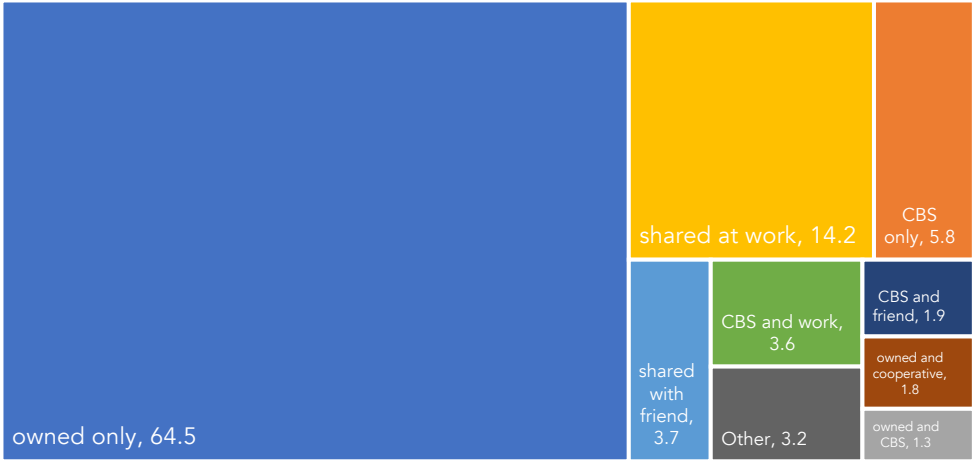
2.2. ACCESS TO CARGO BIKES

TYPES OF ACCESS TO A CARGO BIKE

There are two ways to access a cargo bike: **ownership or shared use**

- **72.9% of the respondents are "Owners"** who purchased their cargo bike
- The remaining **27.1% are "Sharers"** who only have access to shared cargo-bikes, through different means:
  - CBS or cargo-bike sharing services (e.g. Carvelo2go, Donkey Republic)
  - Sharing with friends/relatives
  - Sharing at work with colleagues
  - Sharing in a neighbourhood association
- But, as shown on the right, 21.3% combine different modes of access (e.g. ownership and CBS)





MODELS AND PURCHASE INFORMATION (OWNERS)

The **diffusion of cargo bikes** in the population is still in its early stages

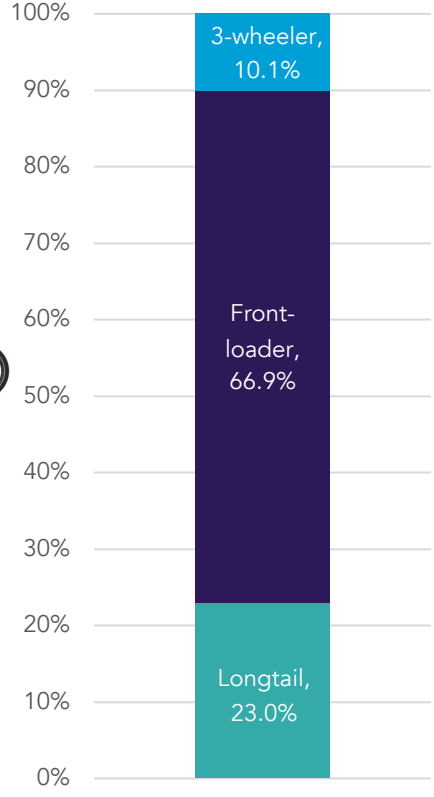
- 78% of cargo bikes were purchased in the last 4 years
- 84% purchased new, 16% used
- Purchase subsidy obtained by 35% of owners (mostly in French-speaking regions)

There are 3 main cargo bike **models**:

- Front-loader (67%) = 2 wheeler with loading box in front
- Longtail (23%) = bicycle with extended rear rack
- 3-wheeler (10%)

Electrical assistance is the norm

- 88% are e-cargo bikes (78% pedelec, 10% speed-pedelec) vs 12% unassisted models



2.3. USER PROFILE AND VEHICLES

USER PROFILE

Cargo bike users are **"early adopters"** with specific socio-demographic characteristics

- Young adults aged 30-49 years (76%)
- 66% men (but cargo bikes are usually shared with other household members)
- Mostly families with children (68%)
- Professionally active: 93% employed
- High socio-economic status: 80% university graduates, high household income (50% over 9K/month)
- Living in urban & suburban municipalities (88.7%)

Two groups of users can be distinguished

"Owners"

- Families (77%), of which 93% carry children by cargo
- Cargo bike shared within household (79%)
- Higher income (structure effect: families tend to have the highest income)

Vs

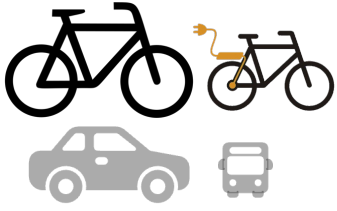
"Sharers"

- Younger (20-29) & older (>60) age groups
- Non-family households (61%)
- Lower income (structure effect due to fewer family households)
- More urban/suburban (92%) (CBS tend to be located in cities)

VEHICLES IN THE HOUSEHOLD

Cargo bike users are a **population of cyclists** who own few motorised vehicles & public transport passes

- High bicycle ownership (88%) + e-bike[1] & speed-pedelec[2] ownership (30% + 11%)
- Low car ownership (48%)
- High share of car-sharing passes (43%) to compensate for lack of car
- Low rate of public transport passes (27%)



Owners and sharers have access to different vehicles in their households and individually

"Owners"

- Own more cars (54%)
- Own more e-bikes (33% + 12%), bicycles (90%)
- Household effect (more families)

Vs

"Sharers"

- Mostly car-free (72%)
- Have more carsharing passes (54%)
- Have more public transport passes (34%)

[1] E-bikes with pedalling assistance until 25 km/h (pedelec)
[2] E-bikes with pedalling assistance until 45 km/h

2.4. MOTIVATIONS

MOTIVATIONS

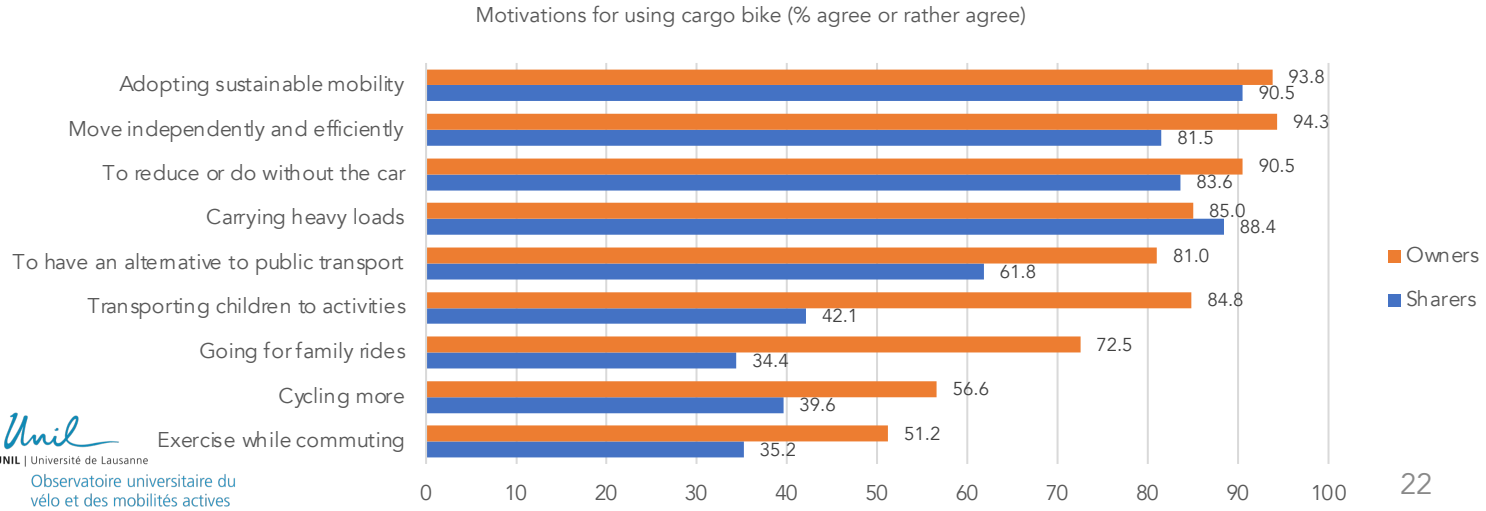
Sustainability and reducing car use are the main reasons for using cargo bikes

However, **motivations vary strongly** between owners and sharers

- Owners are more motivated by moving independently, reducing car use, having an alternative to public transport, transporting children & going for bike rides, cycling & exercising, suggesting ***daily travel needs***
- Sharers are more motivated by transporting heavy / bulky loads, suggesting an ***occasional use***

These motivations can be summarized into **three transversal dimensions** :

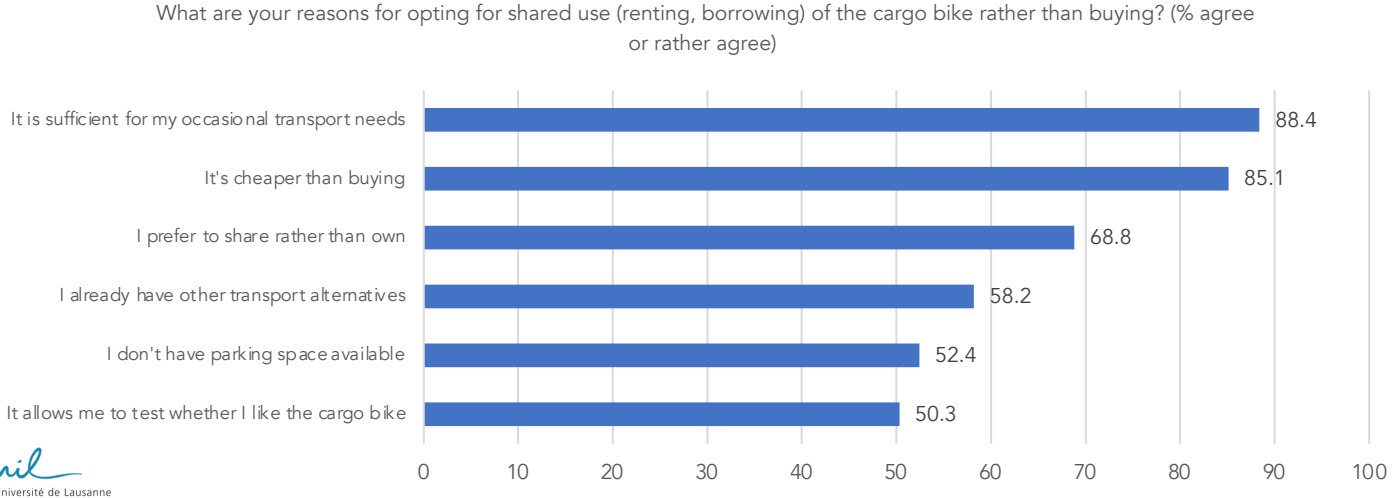
1) carrying children, 2) staying active, 3) reducing car use



MOTIVATIONS FOR CARGO-BIKE SHARING

The motivations for using cargo-bike sharing CBS rather than ownership are mainly a lack of a regular need to transport goods, a lower price, and preference for sharing.

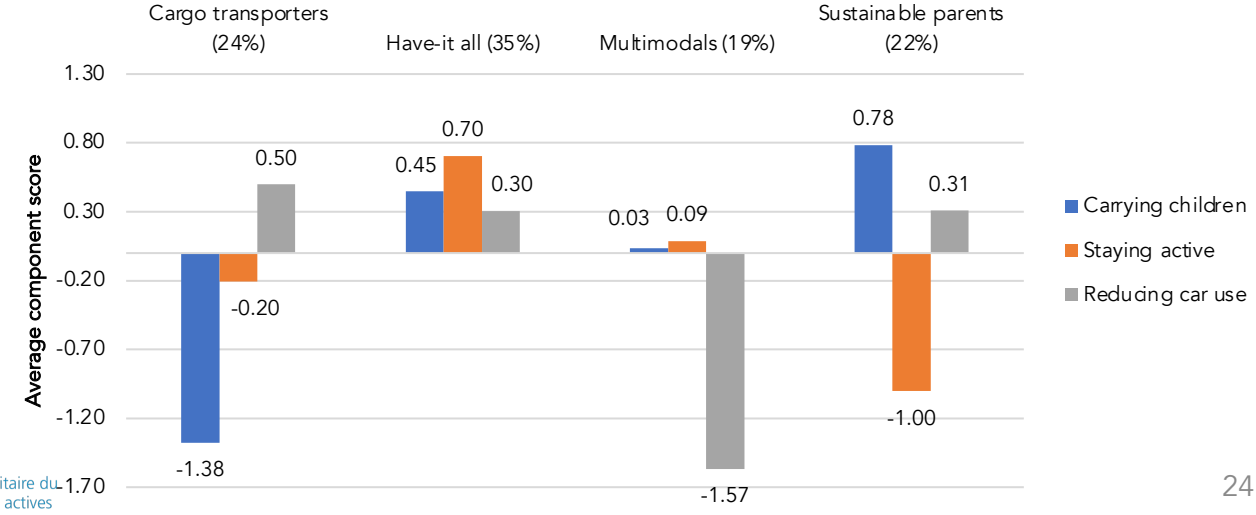
Other reasons include already **having other transport options**, lack of parking space, and the opportunity to test cargo bikes



TYPOLOGY OF CARGO BIKE USERS

Based on 3 dimensions of motivations (carrying children; staying active; reducing car use), **four groups of cargo bike users** can be distinguished:

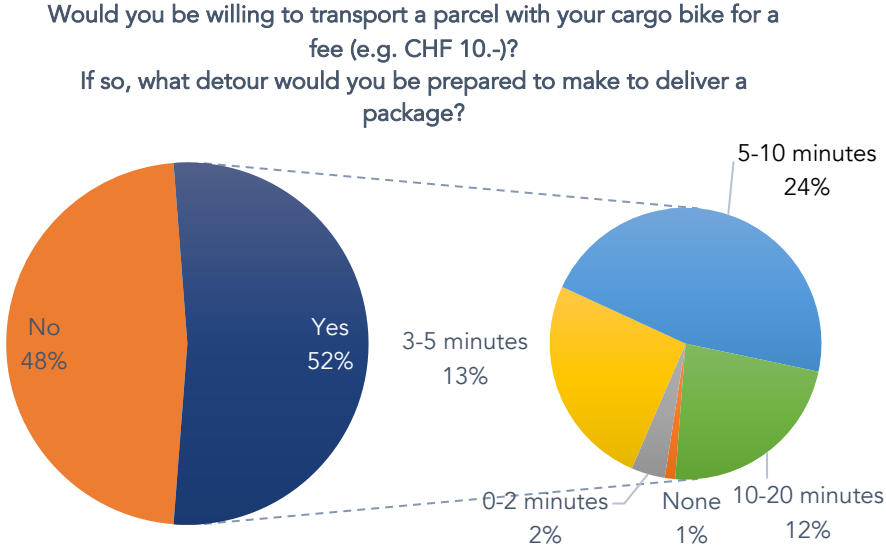
- **"Cargo transporters"** are young car-free adults who are motivated by using shared cargo bikes to avoid driving for transporting bulky items, but don't need to carry children
- **"Have-it all"** are cargo bike owners who are motivated by all 3 dimensions: to stay active, transport children and replace car trips
- **"Multimodals"** are a mix of cargo bike owners and sharers who want an additional transport option, but are not willing to give up using their car
- **"Sustainable parents"** are cargo bike owners who mainly wish to transport children but don't need additional exercise because they are already cycling regularly



WILLINGNESS TO USE CARGO BIKE FOR CROWD-SHIPPING

Half of cargo bike owners would be willing to carry parcels for other people, for a monetary fee (i.e. **crowd-shipping**).

Among them, the majority would be ready to **make a detour** over 5 minutes to their habitual trip.

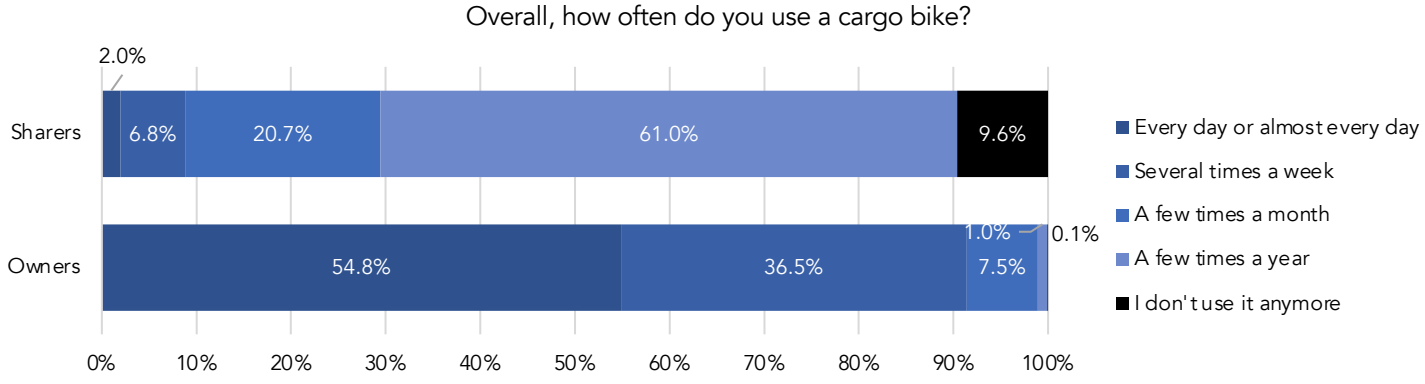


2.5. USES

FREQUENCY OF USE

Frequency of cargo bike use differs strongly between owners (who can access them anytime) and sharers (who need to plan trips).

- Almost all owners cycle several times per week or every day (91%)
- Meanwhile, 6 in 10 sharers only use the cargo bike a few times per year

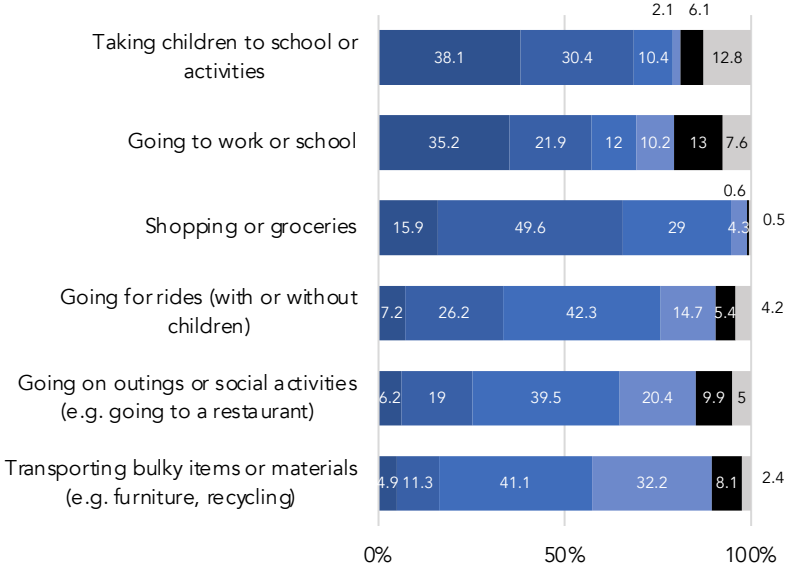


REASONS FOR TRAVEL

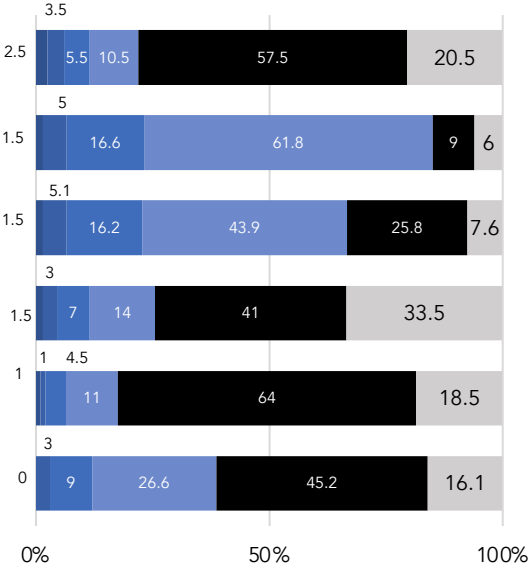
Cargo bike owners cycle regularly for a variety of reasons including taking children to school and shopping or groceries, as well as commuting to work.

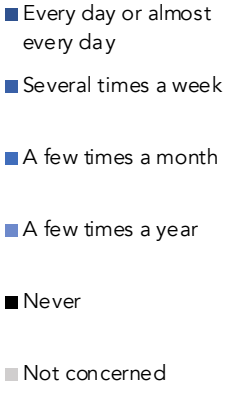
Meanwhile, **shared cargo bike users cycle less regularly and for specific reasons** like transporting bulky items.

Do you use the cargo bike for these trips? (Owners)



Do you use the cargo bike for these trips? (sharers)



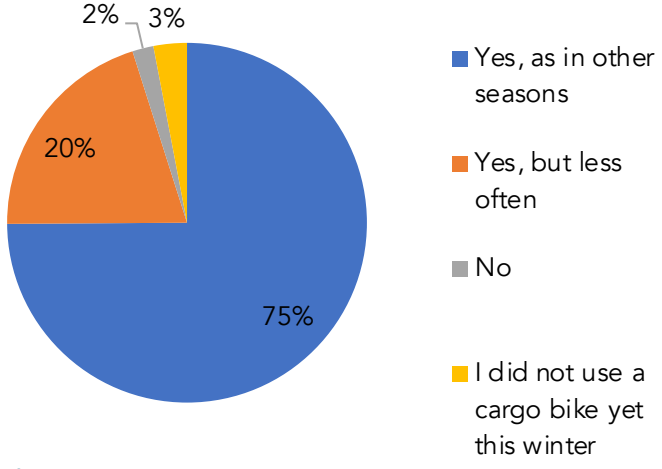


SEASONALITY

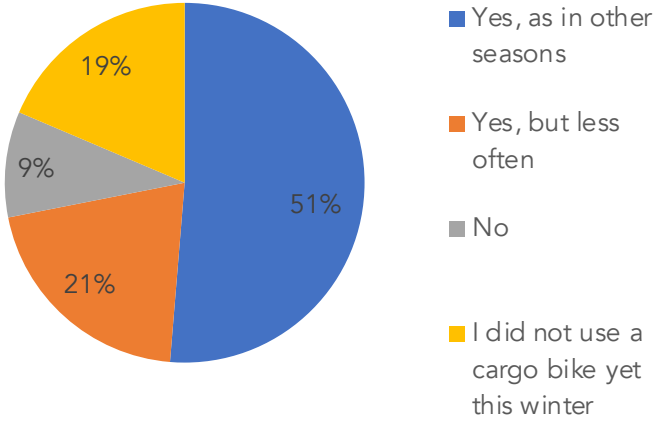
Cargo bikes are mostly used year-round

- However, owners continue using them in winter more than sharers (75% vs 51%)
- 1 in 5 cycle less often in winter
- Only few stop using them in winter, or have not used them in winter since their purchase

Do you still use the cargo bike in winter? (owned)



Do you still use the cargo bike in winter? (shared)



2.6. EXPERIENCES AND BARRIERS

EXPERIENCES OF CARGO BIKING

Barriers to cargo bike adoption include perceived safety, insufficient cycling infrastructure and parking, and handling difficulties, especially for shared users

Safety & cycling infrastructure

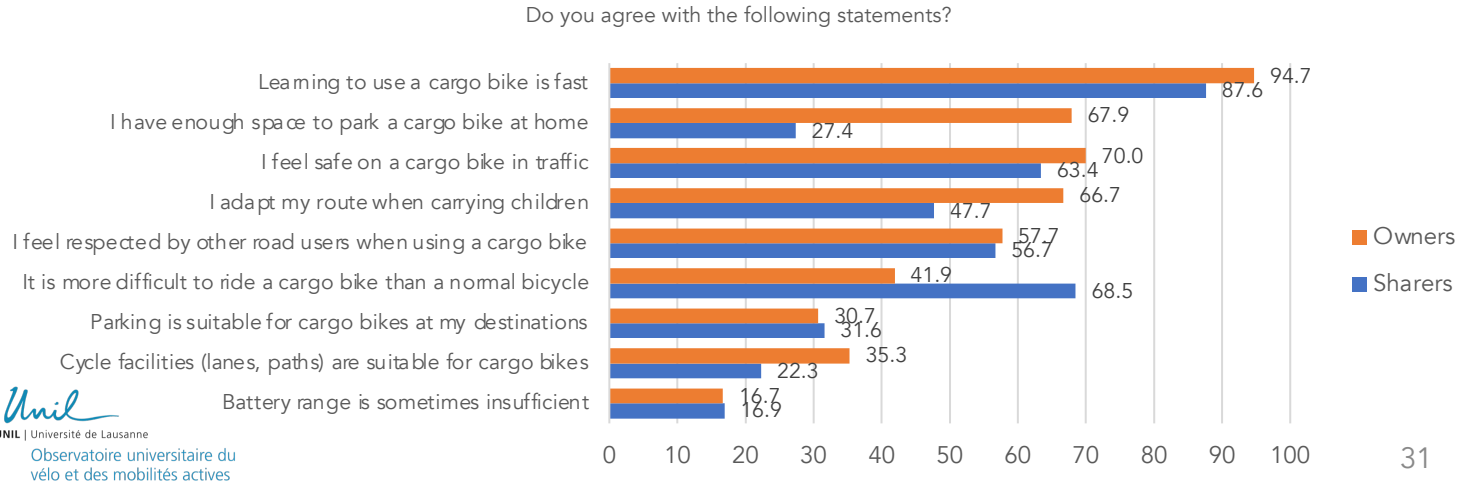
- Low perceived safety in traffic (68%) and feeling of respect by other road users (57%)
- 67% of owners change their route when carrying children
- Dissatisfaction with cycling infrastructure (lanes & paths) higher for shared users and owners of larger models

Parking

- Fewer shared users have space to park at home than owners (27% vs 68%) → barrier to ownership?

Handling

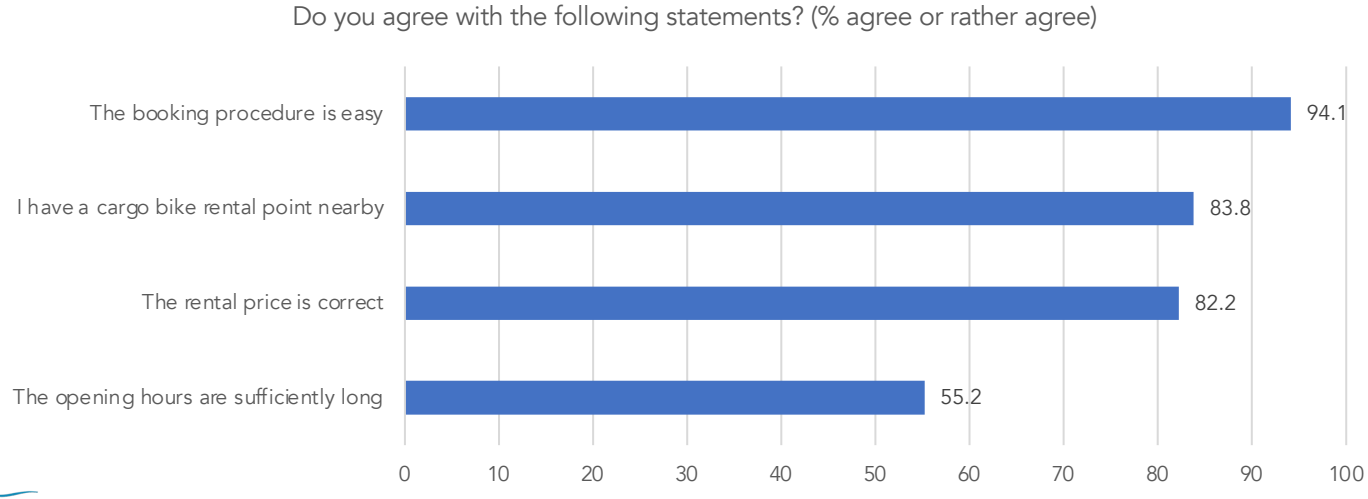
- 69% of shared users find it more difficult to ride a cargo bike than a bicycle (larger models, less time to practice)



EXPERIENCES OF CBS

The main **barrier to using cargo bike sharing services** are short opening hours, due to the host system specific to the largest Swiss operator, Carvelo2go, where cargo bikes are hosted by local shops. This is a limitation for evening trips (e.g. social activities).

Positive experiences include proximity to rental points, price, and the ease of the booking procedure.



2.7. MODAL SHIFT EFFECTS

MODAL SHIFTS

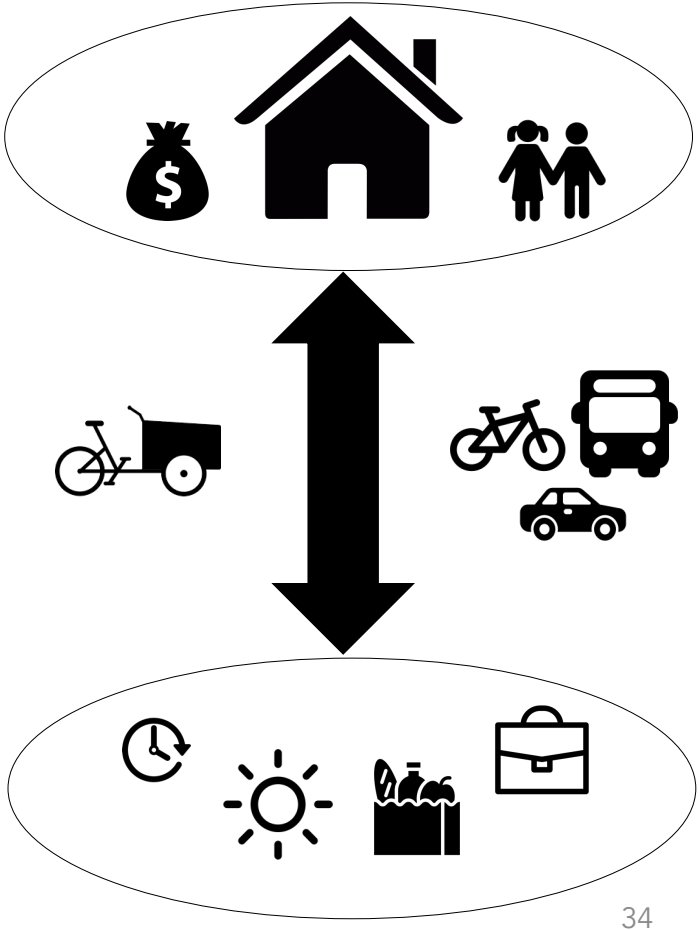
For this section, only **cargo bike owners** were considered (n=696)

We approached the modal shift effects of cargo bikes in **3 ways**:

1. The profile and vehicle ownership of cargo bike owners → **who adopts them and why?**

2. The substitution of trips by other transport modes → **which trips are replaced in the short-term?**

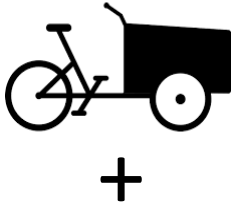
3. The renunciation effect on the ownership of other transport modes → **what are the long-term effects for the household?**

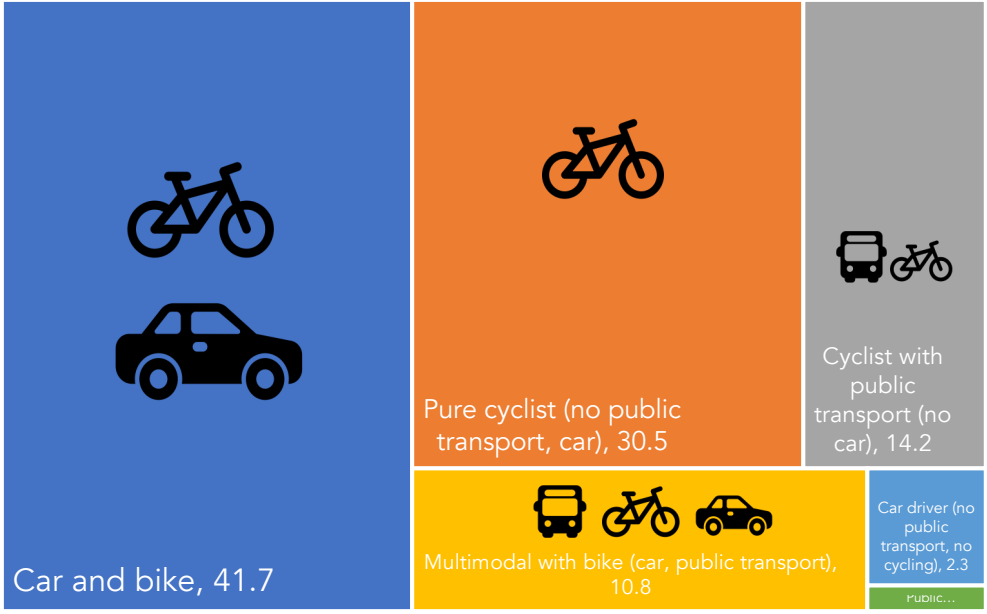


MOBILITY PORTFOLIO OF CARGO BIKE OWNERS

Cargo bikes fit within a **mobility portfolio** consisting of vehicles and transport passes.

- 4 in 10 owners have access to a car and bike (or e-bike)
- 3 in 10 are pure cyclists without cars nor public transport passes
- 14% combine cycling with public transport
- 11% are multimodals with access to both cars, public transport, and cycling

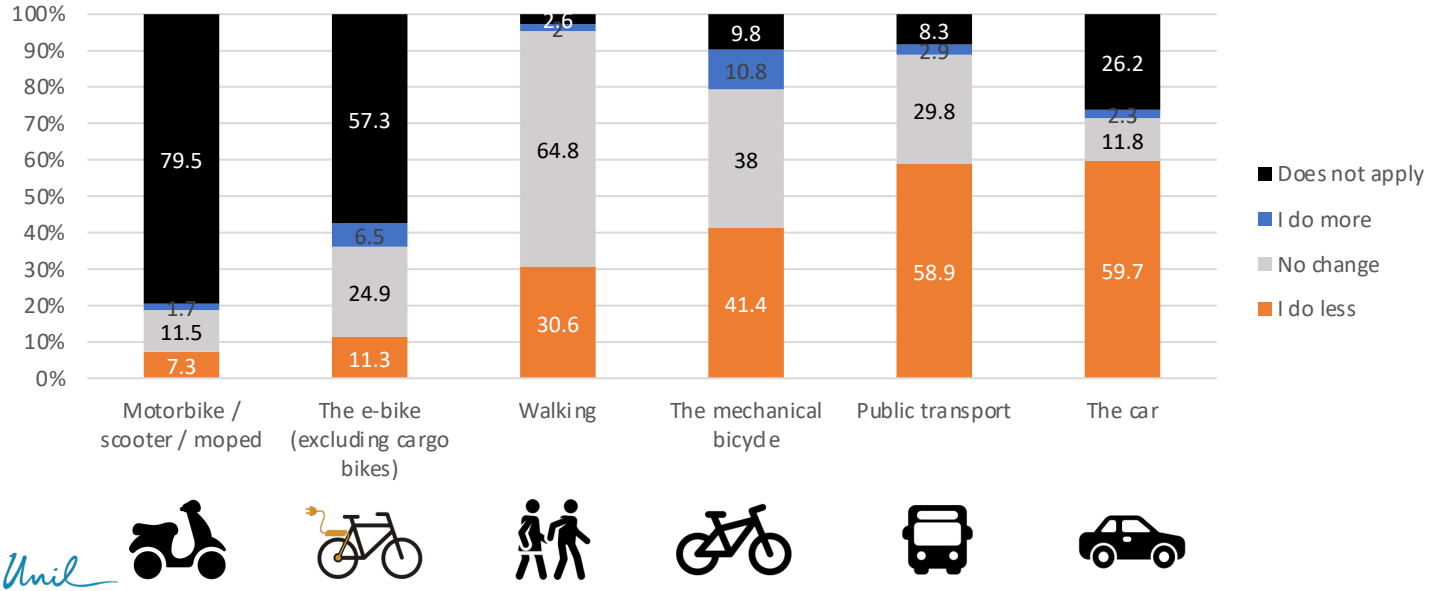




SUBSTITUTION EFFECT

Using cargo bikes mainly leads owners to **substitute (reduce) car trips** (either privately owned or shared) or **public transport trips**, making it a competitive mode for intra-urban trips.

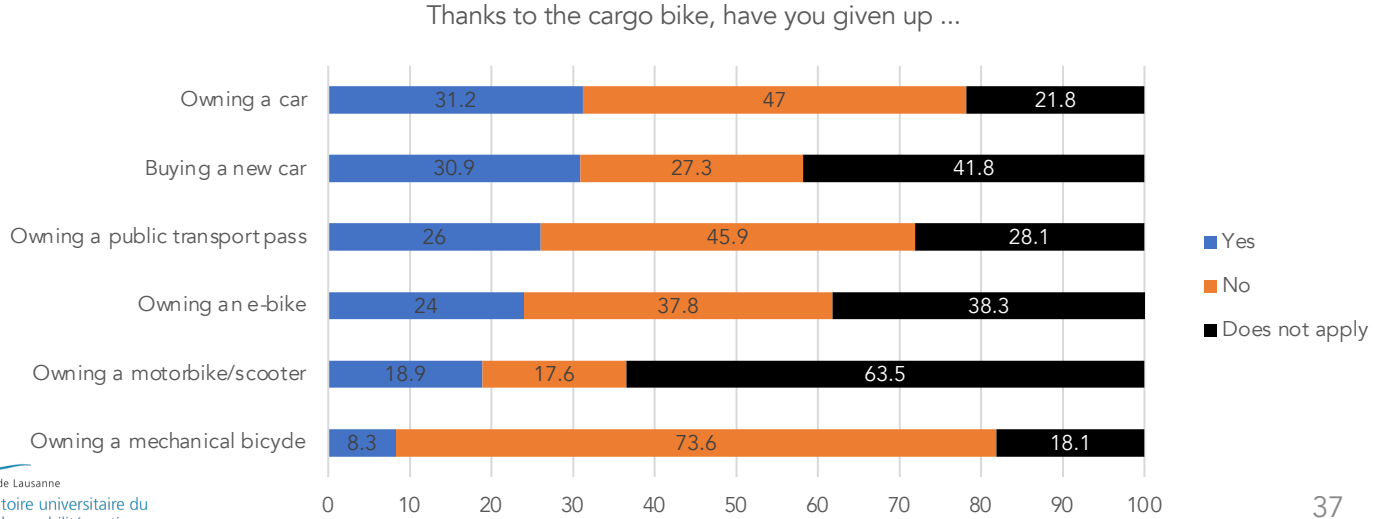
- Although cargo biking leads to transferring conventional **cycling** or e-biking trips, it also increases the overall volume of cycling.
- 1 in 3 owners replace **walking** trips, suggesting cargo bikes are useful for short-range proximity trips.



RENUNCIATION EFFECT

Adopting cargo bikes leads to **giving up owning a car, or buying a car**, for 1 in 3 owners. This is a very strong result given the short time period and difficulty of such a change.

- 1 in 4 also gave up **owning a public transport pass**, a less difficult decision
- The same proportion gave up **owning an e-bike or a motorcycle**, vehicles which provide a similar performance to the cargo bike
- Most cargo bike users did not give up **owning a conventional bicycle**, suggesting that it has a different role than the cargo bike (e.g. for individual trips, or sports cycling).



TYPOLOGY OF MODAL SHIFTS FROM CAR TO CARGO BIKE

Based on whether they gave up owning a car, substituted car trips, and currently own cars in their household, users can be segmented into **five groups representing modal shifts from the car to the cargo bike**.

1. Those who **give up the car** (25%) use the cargo bike to fully renounce car ownership and live car-free.
2. Those who **give up a second car or are planning to give up their car** 6%) have the intention to give up owning a car, but currently still own one in their household.
3. Those who **reduce car trips** (38%) after adopting a cargo bike, but do not give up car ownership.
4. Those who **do not change** (10%) their car habits after adopting cargo bikes.
5. Those who are **already car-free** (21%) before adopting the cargo bike and do not need to renounce cars in the first place.

BARRIERS TO GIVING UP THE CAR FOR THE CARGO BIKE

The following factors represent **barriers to giving up car ownership** after adopting the the cargo bike.

Profile/household characteristics

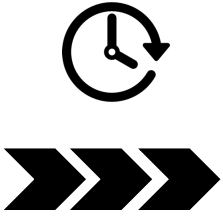
- Living with children → constraints of family trips
- Full-time employment → tight work schedule
- Higher income → car ownership
- Rural residential location → longer distances

Vehicle ownership

- Not having access to public transport passes & car sharing → lack of alternatives to car
- Owning motor two-wheelers, e-bikes → may reduce cargo bike use, or alternatively, be related to income?

Cargo bike use

- Daily frequency of use
- Continued winter use
- → higher intensity of use may be related to time constraints



Length of cargo bike ownership

- Recent purchase (<2 years) → giving up car ownership as a long-term process

2.8. CONCLUSIONS

CONCLUSIONS

Cargo bikes are **diffusing rapidly** and have great potential

- As an owned vehicle, to increase cycling for specific phases of life, especially during the parenting phase
- As a shared service, for occasional trips like bulky items or to test out cargo bikes

BUT, cargo bike practice is still **fragile**

- Perceived safety when riding in traffic remains an issue, similar to other cyclists
- Current cycling infrastructure is not sufficiently adapted to larger models (front-loaders and 3-wheelers) which make up the bulk of shared fleets
- Insufficient parking space for a cargo bike at home represents a barrier to purchasing a cargo bike for shared users
- Handling can be difficult, especially for shared users and those using larger models

Owning a cargo bike has an important **modal shift effect** on other transport modes in the household

- In the short-term, it helps to reduce car trips, and complement public transport and walking in urban areas
- But also, in the long-term, it allows people to give up owning a car and live car-free, or to continue living without a car

3. DELIVERY PREFERENCES

Photo: dringdring.ch

3.1. QUESTIONING AND METHODS

RESEARCH QUESTIONS

Online delivery preferences

- How is online shopping practised ? (frequency of orders, average amounts, types of delivery, differences between food and non-food products)
- What are the motivations for online shopping ?

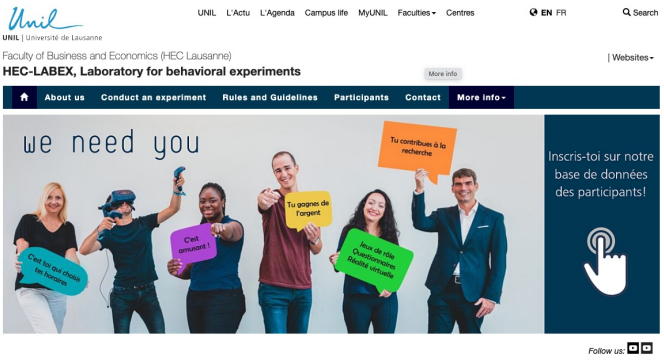
Interest in cargo bike delivery

- Do people have a preference for being delivered by more sustainable modes, such as cargo bikes, or electric trucks?
- What is their willingness to "pay more", "wait more" or "travel more" for a delivery made with electric trucks or e-cargo bikes?

METHODOLOGY

Online survey among students and staff on Campus of UNIL / EPFL

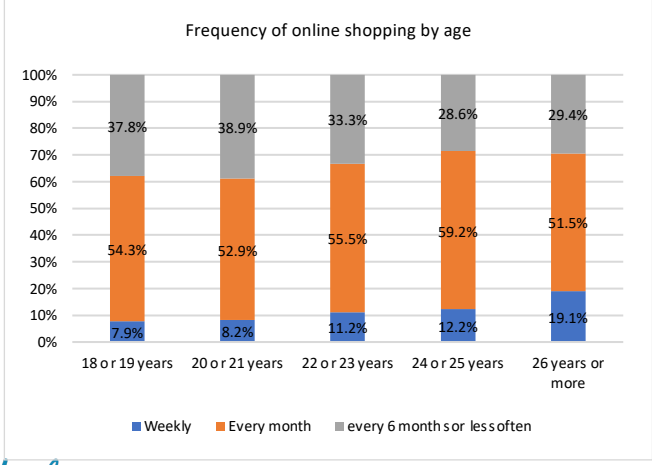
- November 4th – 18th 2022
- Diffusion through **HEC-LABEX** Laboratory for behavioral experiments
  - Survey link sent to database of 7000 people open to participating to research
  - Remunerated by lottery draw
- **N=2453 respondents**
  - Young adults (55.7% aged 18-21)
  - 90% Students, 10% Staff & Faculty
  - 60% women, 35% men, 5% other
  - → not representative of general population

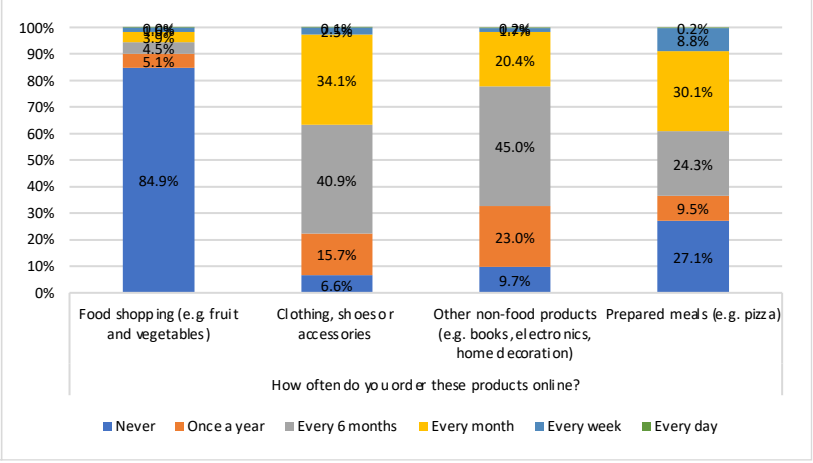


3.2. ONLINE SHOPPING HABITS

ONLINE SHOPPING BEHAVIOUR

- 54% of monthly online shoppers, 10% weekly, 35% unfrequent (every 6 month or less)
  - Frequency increases with age, household composition (couples and families)
  - No differences in frequency for gender nor income or spatial location
- The most ordered items are clothing and non-food products (e.g. books) (over 90%)
  - Prepared foods are ordered by 3 in 4 respondents (but 40% every month)
  - Groceries as the least frequently ordered items (only 20%)
  - Food orders & groceries are more common in urban areas and for younger respondents
- The delivery budget increases with income, age, and for families





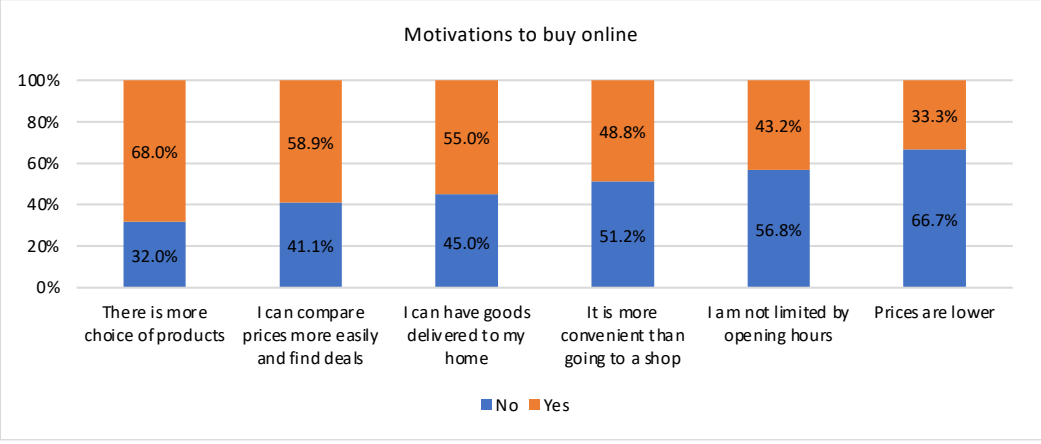
MOTIVATIONS FOR ONLINE DELIVERY

Greater diversity of products is the main reason for ordering online (70% agree), followed by:

- Comparing price (59%)
- Possibility of home delivery (55%)
- Less important are practicality, opening hours, or lower price

Motivations for online shopping differ slightly between users

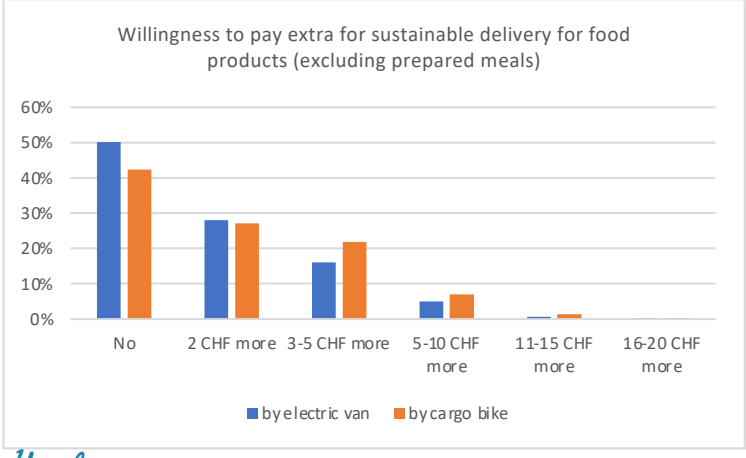
- Men value greater diversity of products and comparing price more
- Older respondents (>26) also value price comparison more
- People with higher incomes value home delivery more

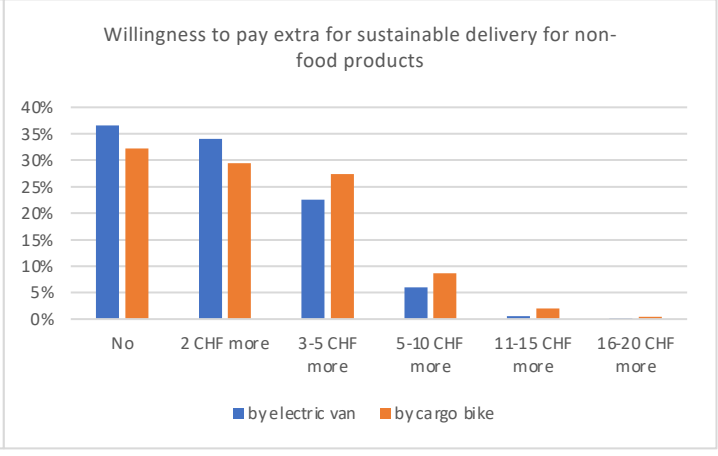


3.3. WILLINGNESS TO MAKE EFFORTS FOR SUSTAINABLE DELIVERY

WILLINGNESS TO PAY (WTP) FOR SUSTAINABLE DELIVERY

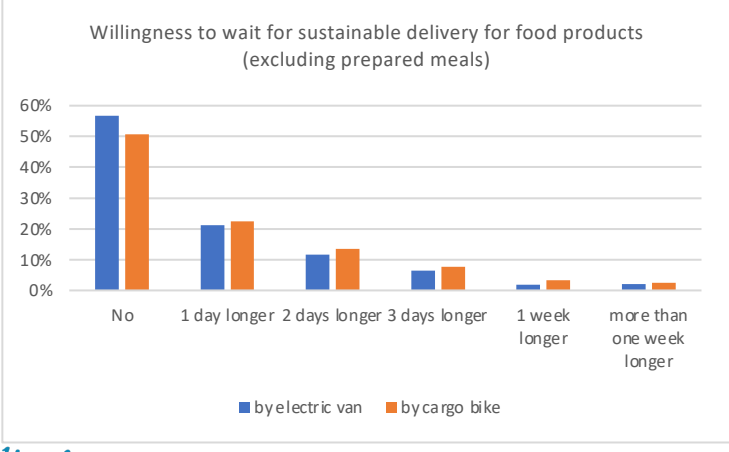
- Higher WTP for delivery by e-cargo bike than by electric truck
- For food products, respondents are less willing to pay a supplement
  - 50% are not willing to pay more for delivery by electric truck vs 42% for e-cargo bike
  - 1/4 are willing to pay 2 CHF more, 1/5 to pay 3-5 CHF more
- For non-food products, respondents are more willing to pay
  - 7 in 10 are willing to pay
  - 1/3 to pay 2 CHF more, 1/4 to pay 3-5 CHF more
- WTP decreases with age, for men, and lower incomes

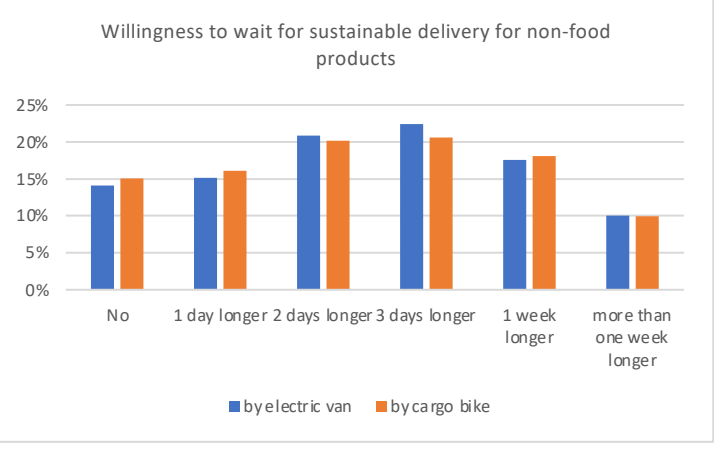




WILLINGNESS TO WAIT (WTW)

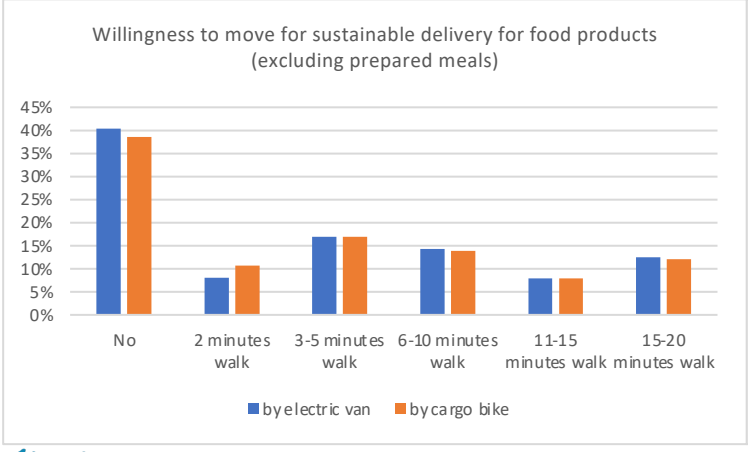
- Respondents are unwilling to wait longer for delivering food products → sanitary reasons
- For non-food products, respondents are more willing to wait
  - Only 14% are not willing to wait, but 1/4 ready to wait over one week
  - No difference between e-cargo / electric truck
- WTW decreases with
  - Age, male gender, ordering online frequently, higher basket price, delivery at home
- WTW increases with
  - Income, lower residential density, delivery at pick-up point

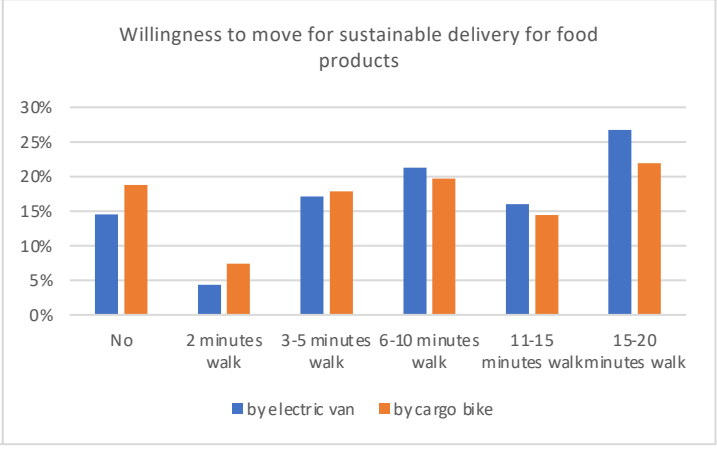




WILLINGNESS TO MOVE (WTM)

- 4/10 respondents are unwilling to move to get their food products delivered → too heavy?
- For non-food products, respondents are very willing to walk to a destination:
  - Interestingly, willingness to move is higher for delivery by electric truck than by e-cargo bike
  - Majority are willing to walk more than 5 minutes (and ¼ over 15 minutes)
- WTM decreases with
  - age, male gender, ordering online frequently, home delivery
- WTW increases with
  - Already using delivery at pick-up point





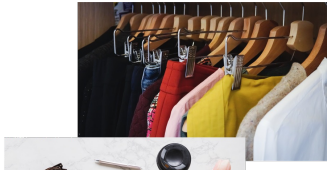
COMBINED WILLINGNESS FOR SUSTAINABLE DELIVERY BY E-CARGO

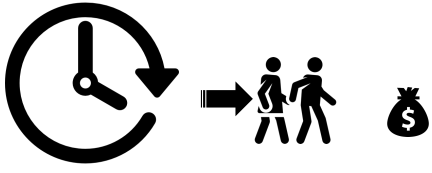
For food products

- 62% are ready to move
- 16% are not ready to move, but ready to pay 2 CHF
- 3% are not ready to move nor pay, but ready to wait
- 19% are not willing to move, pay or wait

For non-food products

- 85% are ready to wait
- 6% are not ready to wait but ready to move
- 1.5% are ready to pay, but not to wait or move
- 7% are not willing to move, pay or wait





3.4. CONCLUSIONS

CONCLUSIONS

For sustainable delivery of **food**, people are willing to pay more, or to move, rather than to wait. For **non-food** products, people are ready to wait longer.

Delivery by **electrically-assisted cargo bike** is preferred to electric truck, except when it comes to having to move to a pickup point for food products (concerns about refrigeration, carrying capacity?)

Which groups are **(un)willing to make compromises** for such a sustainable delivery?

- Young students are the most motivated by making efforts, but this willingness decreases with age (from 24 years onwards)
- Women are more willing to make an effort than men
- Lower income groups are less willing not only to pay, but also wait or move
- Frequent online shoppers are less willing (→ limited behaviour change potential)
- Those who are motivated by lower prices are less willing to pay more
- Those who are motivated by home delivery are less willing to move

Derniers numéros

Série *Études urbaines*

N°1 - 2018. Un campus en mouvement. Les pratiques de mobilité des étudiant·e·s et du personnel de l'Université de Lausanne. *Gianluigi Giacomel, Antonio Martin et Patrick Rérat*

N°2 - 2018. Les comptages vélos dans les villes suisses. *Daniel Baehler, Dimitri Marincek et Patrick Rérat*

N°3 - 2018. "C'est la liberté !" Étude des cours de vélo pour adultes en Suisse. *Marie Mundler et Patrick Rérat*

N°4 - 2019. Quand l'écologie entre en ville / When ecology goes to town. Colloque international / International Workshop. *Joëlle Salomon Cavin et Chloé Bouvier (conception)*

N°5 - 2020. La pratique du vélo à assistance électrique à Lausanne. *Dimitri Marincek, Emmanuel Ravalet et Patrick Rérat*

N°6 - 2022. Evaluation des aménagements cyclables liés à la crise sanitaire: le cas de Lausanne. *Aurélie Schmassmann et Patrick Rérat*

N°7 - 2022. Le vélo en période de pandémie. Évolution des pratiques et effets des «coronapistes» à Genève et Lausanne. *Patrick Rérat, Lucas Haldimann et Hannah Widmer*

N°8 - 2023. Quels sont les effets d'un nouvel aménagement cyclable? L'exemple du boulevard de Pérolles à Fribourg. *Aurélie Schmassmann et Patrick Rérat*

UNIL | Université de Lausanne
Institut de géographie et durabilité

ISSN 2624-8271 (Online)