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**Urban
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Abstracts book

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Fast & Furious: Extreme events and non-Gaussian velocities in urban car traffic

Moritz Piepel (Chair of Network Dynamics, TUD Dresden University of Technology), Angelika Hirrle (Chair of Traffic Process Automation, TUD Dresden University of Technology), Marc Timme (Chair of Network Dynamics, TUD Dresden University of Technology) and Malte Schröder (Chair of Network Dynamics, TUD Dresden University of Technology).

Abstract

Sharing road infrastructure with cars is a major deterrent for cyclists, especially in urban areas with narrow roads and the ongoing trend towards larger cars. Modeling interactions between cars and cyclists is crucial to understand the impact of car traffic on cyclist mode and route choice. However, information on the behavior of drivers in urban traffic is sparse. The majority of traffic models and observations focus on traffic dynamics on highways, implicitly assuming Gaussian velocity distributions typically observed time-aggregated measurements.

Here, we present statistics of individual velocity measurements in urban car traffic based on 145 induction loop detectors throughout the city of Dresden (Germany), analyzing over 340 million vehicle velocities in total. We find that velocity distributions in urban traffic are non-Gaussian with frequent extreme velocities, independent of the local speed limit. Gaussian distributions significantly underestimate the frequency of extreme velocities – and their potential conse-

quences. For example, the speeding violations observed in the data would be valued in fines of about 800 million Euros annually, more than 300 times the actual fines collected in Dresden. The observed velocity statistics are supported by records of speeding violations in the city of Cologne.

Our findings shed a new light on urban traffic modeling and may have implications for road safety regulations, the design of road infrastructure, and speed limits to ensure safe urban mobility.

Prefiguring children's right to the cycling city

Jonne Silonsaari (University of Amsterdam).

Abstract

Urban development and social norms concerning childhood and youth are leading many cities to a situation where streets are no longer places for children and young people. From this social justice viewpoint, youth cycling remains a largely neglected research topic. Only a fraction of studies has analyzed the socio-political and governance contexts where youth velomobilities are negotiated and constructed. If research concentrates only on the benefits and the effectiveness of cycling lessons, awareness raising campaigns and behaviour change initiatives, it neglects the power-laden governance frameworks, discourses and experiences that shape these initiatives the first place. This wider socio-political framing is crucial for understanding the young generations' right to the cycling city.

These research gaps have been addressed in my recent research unravelling the politics young people's cycling in different countries. I argue that children and young people's (velo)mobility justice necessitates novel collaboration among diverse actors. First, I describe what kinds of innovative initiatives co-created among municipal governments

and local civic actors can produce projects that address the struggles that children, youth and families from different backgrounds are facing when aiming to become urban cyclists. Second, and contingently, I explain why local initiatives, grassroots organizations and social movements need to be better integrated in cycling policy and planning. Third, I present findings from a survey and interviews conducted among cycling activists in 9 European countries involved in Kidical Mass demonstrations, Bike buses, School streets and other initiatives that are politicizing children's right to urban cycling and prefiguring more bike and youth friendly urban futures.

Assessing the influence of bike lane allocation on network traffic performance using microsimulation

Ellen Fulton (Institute for Transport Planning and Systems, ETH Zurich), Ying-Chuan Ni (Institute for Transport Planning and Systems, ETH Zurich) and Anastasios Kouvelas (Institute for Transport Planning and Systems, ETH Zurich).

Abstract

To foster a sustainable urban transport system, allocating road space to slow modes, e.g., bicycles, pedelecs, scooters, and cargo-bikes, etc., is considered an effective strategy to reduce car usage. However, the concern of car traffic congestion caused by the reduced capacity available for drivers hinders the policy-making process toward a cycling-friendly environment. In this work, we first assess the impact of a large-scale bike lane allocation plan on network traffic performance for the city of Zurich using a microscopic traffic simulation approach. The traffic signal control scheme for such a bimodal network with heavy car and bicycle traffic volumes is discussed and implemented. In addition, through simulating different scenarios, we showcase the required modal shift that can prevent the network

from severe traffic breakdown. By investigating the bi-modal traffic performance and their interaction in such a network, the analyzed outcomes also facilitate the development of macroscopic traffic flow models which can be applied to bi-modal urban traffic management strategies, such as perimeter control and route guidance.

Teaching and Learning through Cycling: Stories from Amsterdam

Robert Patrick (University of Saskatchewan) and Ehab Diab (University of Saskatchewan).

Abstract

This is early research exploring the potential of the bicycle to promote the scholarship of teaching and learning. Recent field school experience of the researcher in Germany and The Netherlands has motivated this research topic. Reflecting on the success of these field schools, the common mode of transportation for the students, and the instructors, was the bicycle. Our reliance on the bicycle as our principle mode of transportation offered convenience of mobility, outdoor exercise, group comradery as well as ready access to points of interest. Beyond these more obvious benefits, what contributions might the bicycle offer in regards to the scholarship of teaching and learning? What unanticipated benefits may bicycle mobility offer to enhance our collective learning? This research asks the question: What are the potential benefits and limitation of cycling to enhance the scholarship of teaching and learning. To help answer this question, a survey questionnaire was distributed amongst two Canadian field school student groups in Amsterdam (2023 and 2024). The results speak to the opportunities for cycling to enhance the student experience while also contributing to the scholarship of teaching and learning. This research seeks to extend the knowledge base of outdoor teaching

and learning. The potential impact of this research will open opportunities to recognize and adopt cycling as a more common mode of transportation for field-based learning. The impact of this research will be particularly relevant for urban planning and design disciplines as well as the natural sciences, climate change science and sustainability studies. A further impact of this research is the advancement of the United Nations Sustainable Development Goals (SDGs). The uptake of the bicycle as the main mode of active transportation opens new opportunities for low-carbon emission teaching and learning while advancing the SDGs in a real-world, outdoor environment.

Green Infrastructure and Cycling Behaviour: A Discrete Choice Experiment in Trieste

Chiara Ricchetti (University of Trieste), Lucia Rotaris (University of Trieste) and Mariangela Scorrano (University of Trieste).

Abstract

Greenhouse gas emissions cause global warming threatening urban areas. The car-based transport sector is a major contributor, affecting urban quality of life and human health. Implementing strategies to promote active mobility and cycling can be an effective solution. The aim of our study is to investigate the likelihood of students to choose cycling as a mode of transport to get to university, specifically focusing on the role of linear green infrastructure along cycle routes. We conducted an online survey including a discrete choice experiment between April and June 2023 with 2,131 students at the University of Trieste (Italy). We estimated fixed parameter logit models. According to our results, the willingness to use a bike sharing service increases if the service is convenient and affordable, while it is not significantly affected by the presence of bike racks, charging stations for electric bi-

cycles, and trees along cycle routes. With regard to the willingness to use private bicycle, instead, we found that it is significantly positively influenced by the presence of linear green infrastructure along cycle routes and by the availability of secured bicycle racks and electric bicycle charging points. Our findings are promising and contribute to the current European debate on how effectively promote cycling while maintaining the quality of urban life. Our study focuses on university students only, however, young people are the most promising segment of the population for bicycling due to their better physical fitness and lack of economic independence required to own or afford a car. Our research offers valuable insights for urban design and provides practical guidelines to promote cycling mobility and develop more resilient and environmentally friendly cities.

Institutional logics for urban mobility choices amongst Nigerian urban residents and African diaspora in Netherlands

Inah Okon (Urban Cycling Institute) and Meredith Glaser (Urban Cycling Institute).

Abstract

A key feature of cities around the world is that their material and institutional forms are closely linked to past decisions on mobility provision and use. This is why various modes of mobility including cycling and walking co-exist to spin a web of travel patterns within a city and between its centre and periphery. The theme of this research emerged to map and compare the historically developed institutional logics for urban mobility among residents in Calabar, Nigeria and the African diaspora in Amsterdam, Netherlands. The study will adopt Fuenfschilling and Truffer's approach to map institutional logics consisting of a discourse analysis of urban decision-making processes around the provision of urban mobil-

ity infrastructures. Three secondary data sources available in each urban region including, historical records of public inquiries about urban mobility, local and regional newspaper articles, and publicly available grey literature will be reviewed. Primary data will include oral interview of pre-determined questions on urban actors (both planners and residents) in Nigeria and the African diaspora in Netherlands. This will focus on urban decision-making processes around the provision of urban mobility infrastructures in terms of affordability, availability, accessibility, and acceptance. Analysis of key informant interview data will be done thematically by identifying clusters of comments on key topics. The results will include systematic overview of the various degrees at which different modes of mobility are institutionalized within and across these two countries and under what mobility conditions are research participants (or urban residents) willing to transition into cycling and walking. A model of mobility transition based on variables from affordability, availability, accessibility, and acceptance will be estimated using logistic regression analysis. Expected results are with a view to developing an urban mobility policy that guarantees smart mobility options (especially for Nigeria, Africa) that are safe, efficient, affordable, inclusive and environmentally sustainable.

The obduracy of road infrastructure: an analysis of cycling at intersections

Dimitri Marincek (University of Lausanne, OUVEMA), Cinzia Zanetti (University of Lausanne, OUVEMA), Christian Kaiser (University of Lausanne, OUVEMA) and Patrick Rérat (University of Lausanne, OUVEMA).

Abstract

This paper addresses the relationship between individuals and infrastructure and the need to adapt the latter to active mobilities (Latham and Wood, 2015; Spotswood et al.,

2015; Nurse and Dunning, 2023). The concept of “obduracy” (Gössling et al., 2016) refers to the resistance to change of an infrastructure originally conceived for a particular function (here, motorized traffic) when adapting it to demands (i.e., cycling) which were originally not considered (Hom-mels, 2005). Within this theoretical framework we focus on intersections which are particularly accident-prone for cyclists and where insecurity and ambiguity of the infrastructure leads to adaptation strategies considered as inappropriate or transgressive (e.g., cycling on the sidewalk or running a red light) (Ihlström et al., 2021). This paper focuses on two types of intersections and the measures taken to reduce their obduracy. Firstly, roundabouts, for which a behaviour recommendation is issued: cyclists should position themselves in the middle of the carriageway to be visible and avoid overtaking. Secondly, signalized intersections equipped with a sign authorizing cyclists to turn right during a red light if there is no oncoming traffic, a new rule introduced in 2021. To understand how these measures (recommendations or a new rule) affect cyclists' behaviour and experiences, we combine two methods: direct observations and intercept surveys conducted in Lausanne, Switzerland. Our results are structured in four dimensions: 1) frequency of cyclists' behaviour in intersections (use or non-use of the recommendation or rule); 2) characteristics that explain differences in behaviour; 3) motivations and barriers (why some people use or don't use rules/recommendations); 4) role of infrastructure configurations in promoting or inhibiting certain behaviours. This presentation will discuss the results of an ongoing project (data collection is planned in May/June, analysis between June and September) and the limits of measures that do not address the materiality of intersections.

Linked Cycle + Public Transport policy modelling to fit the carbon reduction agenda

Crispin Cooper (Cardiff University), Paul Haggart (Cardiff University) and Kani Hinshelwood (Trainline.com).

Abstract

The TrafRed aggregate model of UK land transport was developed in 2023 for Green Alliance and the Foundation for Integrated Transport. We took an agile approach to modelling, allowing policy stakeholders to experiment with their own model scenarios for reducing car miles driven in the UK, based on interventions in multiple travel modes. The exercise was useful not only in developing policy recommendations but also for uncovering research gaps. The findings for cycling were twofold. Firstly, at the aggregate level, we could not find strong evidence for the impact of cycling interventions on car mode share. Secondly, in the broader context, the majority of UK land transport emissions arise from trips in the 15-25 mile distance band. These trips are likely too long to switch to cycling in most cases. One relevant policy question is therefore how to better support cycling as an access/egress mode for public transport trips, enabling longer trips. The related modelling question is how best to model the impact of cycling interventions on public transport use. This is one focus of ongoing work with the same funders and Trainline.com. Mainstream UK rail models do not incorporate these effects. Devising a better classification of person and trip types is likely to be important.

Some open source tools for cycle modelling

Crispin Cooper (Cardiff University), James Parrott (Software Developer), Alain Chiaradia (Hong Kong University) and Robin Lovelace (University of Leeds).

Abstract

An update on open source tools available for cycle modelling. 1. Hills deter cyclists! But

the usual approach of adding digital elevation network (DEM) to road network data creates large overestimations of elevation change, where roads traverse steep terrain. Seeing my own models fail to correctly predict any cycling on part of our National Cycling Network, I developed the Bayesian Drape tool to fix this problem.

2. Motorized traffic deters cyclists (and pedestrians)! If only there were a quick way to turn a road centreline model into a side-of-road model, so we could distinguish situations where cyclists must share a road with motorized traffic, versus situations where they must cross that flow. Sidewalker does this for you.

3. Transport does not exist in a vacuum! Building better cycle networks requires working together with urban designers. The sDNA software has been used for nearly 10 years now to build cycle models in Geographic Information Systems, but those designers prefer to use CAD software. The latest update brings support for the RhinoCAD/Grasshopper platform now popular with architects and urban designers. I invite you to use and enjoy these tools to make better models.

Safety perceptions and e-cycling: The role of the road environment and implications in mobility

Panagiotis G. Tzouras (National Technical University of Athens).

Abstract

In dense urban environments, where congestion is a fundamental problem, the adoption of sustainable transport schemes is now imperative to mitigate greenhouse gas emissions, and air or noise pollution and decrease energy consumption. Among the sustainable mobility modes, e-bikes have earned significant popularity. They have emerged as a viable solution for cities seek-

ing to shift away from car dominance. Yet, the complexity of the urban road environments, described by the cross-section design and the static (e.g., equipment, marking, etc) and moving objects (e.g., vehicles, pedestrians), creates safety concerns that impact the utility of e-bikes. Indeed, perceived safety acts as an intermediate parameter; it is influenced by the road environment while affecting travel behavior, i.e., mode and route choice. The Value-of-Safety (VoS), which refers to the additional distance a user is willing to exchange to avoid an unsafe path, has some interesting implications in shaping the predominant mobility culture in a city. Agent-based simulation experiments, which were run in the car-dominated central areas of Athens, Greece, revealed that the implementation of dedicated cycle lanes increases the mean accessibility and the share of e-bike trips. Simultaneously, traffic-calming networks can balance safety perceptions ensuring equitable conditions and a smooth travel experience for both car drivers and e-cyclists. Another application showed that the efficiency of an e-cargo bike logistic service is affected by spatial and temporal differences in perceived safety. In certain urban areas, the determination of optimal paths for e-bikes was proved to be extremely sensitive to the road environment. This once more results in prolonged distances and delivery times, thus undermining the comparative advantage of these services: flexibility.

BikeAlytics - Floating BIKE Data for Transport Analytics

Thomas Wischer (Graz University of Technology) and Martin Fellendorf (Graz University of Technology).

Abstract

We present a methodology to identify bicycle trajectories from anonymized floating phone data (FPD). The FPD was supplemented by

GPS tracks which were collected separately for the same trips. The GPS tracks were used as training data for map-matching the FPD onto a network graph. The necessary database of almost 5000 trips was collected in Graz by 96 voluntary participants in 2022. Half of the recorded trips were made by bicycle. After a rule-based data cleaning (removing outliers and short stops), the GPS tracks of all bicycle trips were map-matched to the bicycle network of Graz using the Leuven map-matching algorithm (Meert, 2018). The map-matched GPS tracks serve as verified training data. The bicycle network was extracted from the Austrian “Graph Integration Platform”. The corresponding FPD was pre-processed by generating trajectories from a series of sightings. Daily trajectories were split into stationary and moving segments. Stationary segments are considered as activity locations. Moving segments of all modes were map-matched to the bicycle network by proximity to cycling infrastructure and shortest-path calculations. Finally, the bicycle trips were identified using vehicle speed and speed variation as classifiers. The model parameters were calibrated using the GPS training data (map-matching) and stationary cross-sectional counts (travel mode classification). The method was applied to the full dataset of anonymized FPD with a penetration rate of about 40% of the population of Graz. Using region-specific weighting factors, edge volumes of the entire bicycle network in the city of Graz were calculated. Empirical stationary cross-sectional data and assigned edge volumes match reasonably and will be presented. In future, neural networks will be applied to improve the travel mode classification. Furthermore, the map-matching algorithm will consider additional features of the bicycle network which are crucial for cycling route choice (cycling path, path quality, intersection delay).

Bridging the Transportation Gap: Empowering Communities in Jinja City Through Sustainable Mobility Solutions

Hellen Kakungulu (Cycling out of Poverty-Uganda) and Marieke Elisabeth Pilippus De Wild (Cycling out of Poverty-Uganda).

Abstract

Introduction: Cycling Out of Poverty (CooP)-Uganda is a non-profit organization with a vision of improving on livelihood of African families by making bicycles and other mobility aids such as wheelchairs available and accessible for everyone. Through its flagship initiatives of Bike4School, Bike4Care and Bike4Work, the organisation is dedicated to addressing transportation barriers encountered by communities while accessing essential services such as education, healthcare, work, and Income in Jinja city Uganda.

Methods: CooP’s data collection process involves a robust mixed methods technique that incorporates both qualitative and quantitative methodologies. We rigorously collect baseline and impact data from project beneficiaries (students, Village Health volunteers and small-scale entrepreneurs), including vital metrics like travel distance, commute duration, and mode of transportation used. Rigorous vetting, route mapping procedures are utilized to ensure data accuracy. Monitoring tracks bicycle usage, while periodic collection of impact data assesses changes in travel time, healthcare accessibility, and academic performance. This comprehensive methodology enables us to assess the project’s effectiveness in improving mobility, healthcare access, and educational outcomes. We verify the impact of our initiatives on beneficiary communities through in-depth data analysis, reinforcing the significance of our programs in Jinja city.

Results: Preliminary findings show significant improvement in access to education, healthcare, and economic opportunities in Jinja city. Through Bike4School, students’

commuting time to school have significantly reduced by 62%, resulting in improved school attendance of 72% and academic performance of 80%. Bike4Care has improved timely healthcare delivery and increased patient satisfaction in villages, while Bike4-Work has enabled small scale entrepreneurs to increase and sustain on their daily incomes. The projects have contributed to environmental conservation efforts by promoting cycling as a sustainable mode of transport.

Conclusion: Coop's initiatives demonstrate that a bicycle makes a difference in the livelihood of individuals and communities in Jinja City.

Fair Recommendations for Cyclists

Bernhard Wieser (STS@TU Graz), Anna Schreuer (STS@TU Graz), Simone Kopeinik (Know-Center) and Dominik Kowald (Know-Center).

Abstract

The research objective of our contribution is to discuss fairness as a design principle of computational route choice algorithms for cycling. We address several dimensions of this issue (cf. Sonboli et al. 2022). At first, we analyse, how existing recommender systems operationalise user needs and the extent to which respective algorithms consider diversity amongst cyclists in relation to gender, age, riding style and purpose.

Existing recommender systems focus almost entirely on infrastructure parameters (traffic density, road surface and gradient) to accommodate user preferences. Cyclists, however, also consider points-of-interest (POIs) when making their choices over which particular route to take. Accordingly, AI-based recommender systems are currently under development that allow the integration of POIs into route choice recommendations. Yet, how fair are the recommendations of machine learning algorithms in relation to

the diversified needs and heterogeneous preferences of cyclists?

Beyond this issue, we seek to shed light on the implications of advanced recommender systems for those offering POIs to cyclists. This is especially relevant for recreational cycling and cycling tourism where route recommendations affect the economic opportunities of cafes, restaurants, hotels, repair shops, museums and hosts of cultural events.

The fairness principles we address concern the ways in which conflicting interests can be balanced (cf. Kearns & Roth 2020). Such considerations are not only relevant in relation to the diversity of cyclists and their specific needs, but also in relation to those who offer services for them.

With our contribution, we seek to add to the fairness discussion in cycling research and make its findings relevant for the design of route choice algorithms.

A physical microscopic bicycle energy model

Malte Rothhämel (KTH Royal Institute of Technology).

Abstract

This contribution presents a physical model to predict the driving behaviour of a free cyclist (a cyclist who is not constrained by other cyclists): When observing cyclists, each of them used to have a personal speed and in steady-state conditions also a quite constant speed. Bicycling means to overcome driving resistances such as aerodynamic drag, rolling resistance, climbing resistance and inertia during acceleration but increase in potential / kinetic energy. The individual cyclist as well as the responsible party for infrastructure can affect these driving resistances (e.g. clothes -> aerodynamic drag; road roughness -> rolling resistance;

cycle track inclination -> climbing resistance; traffic lights control -> acceleration).

Driving resistances in combination with available power are the main causes for travel time. And travel time is one of the most important factors regarding choice of route and mode of transport, (Bovy & Bradley 1985, Stinson & Bhat 2003, Caulfield 2012, Bhat 2015). This means, those who want to increase the number of cyclists in utility trips also need to focus on and reduce driving resistances for cyclists. The presented energy and motion model could help to design infrastructure (the longer way around the hill vs. the short way over the hill?) or “green waves” at traffic lights along an alley etc.

The scope of the present model is to simulate the bicycle speed profile and the energy usage over a given route for a representative cyclist. The model is divided into two parts, a shell providing the necessary data, and the core model calculating bicycle speed and energy over distance. The core model is based mainly on the equation for driving resistance power.

The figure visualises the simplified process of the core model.

Details of the model and a case study will be presented at CRBAM24 and in the full paper.

Cycling Stories : vignettes of the texture and depth of marginalized Dutch cycling experiences

Michael Tahmoressi (TU Delft) and Matthew Bruno (TU Delft).

Abstract

The narratives of everyday people can be powerful testimonies. One application of Stories in the cycling research context is to counter dominant narratives that marginalize certain people or ways of cycling. Te Brömmelstroet et. al (2022) asked the ques-

tion of how cycling researchers “become skilled in the art of developing and using alternative narratives, finding fresh ways of seeing, understanding and shaping the issues to be organized and managed”. Matthew Bruno and I are undertaking a paper project to document and celebrate cycling perspectives from communities of color in the Netherlands. Our research will advance the mobility justice approach by providing detailed perspectives that contest the dominant narrative towards communities of color in the Netherlands that they lack the same cultural aptitude to cycle as white Dutch people. Our participant's narratives will provide texture and depth that will complicate the colonial simplicity of the dominant narrative. our analysis will explore how participants enact the human and bicycle relationship. As Well as cycling's role in the larger mobility experience of our participants. Our work will interrogate how these phenomena intersect with visible or invisible elements of the participant's lived experiences for example, gender, sexuality, class, and/or race. Our method to collect data for this research will go beyond traditional ethnographic practices of participation observation, focus groups, and interviews and include more novel methods such as ride-along or the observation of conversations within a bike kitchen during a workshop. Our research design is focused on collecting a small group of meaningful narratives. Our work could become part of a panel at CRB that focuses on underrepresented groups within cycling (full abstract is in the pdf)

Cycling as Traffic: The Importance of a Transport Planning Discourse for Cycling in Low-Cycling Contexts

Robert Egan (Centre for Transport Research, Trinity College Dublin) and Brian Caulfield (Centre for Transport Research, Trinity College Dublin).

Abstract

Reducing private car use while facilitating modal shift to cycling increasingly features as a major policy strategy to decarbonise mobility practices across many low-cycling contexts. One notable approach to achieve this shift has been to enact planning measures that overtly or covertly redistribute rights to space, access or speed that favours the practice of cycling over driving. Through impinging on the accessibility of driving, these measures can trigger public opposition, which can in turn limit the scale and disruptive potential of these pro-cycling measures. In this presentation, I outline the features of a major transport planning discourse drawn upon in public opposition to a redistributive active travel scheme proposed in Dublin, Ireland. This oppositional 'technical discourse of transport planning' is normatively car-centric. It incorporates several major representations of transport and traffic: 'traffic' as car-based (im)mobility, roads as 'traffic' spaces, 'traffic' as an immutable substance, and traffic demand-led planning. Building on this analysis, I propose an alternative cycling-centric discourse of transport planning. In particular, I consider the value of a counter-discourse where cycle mobility is worded as 'cycle traffic' and redistributive cycleways are represented as spaces of 'traffic conversion' rather than 'traffic diversion'. I evaluate this proposition in relation to discourses that are increasingly prevalent as a means to legitimise pro-cycling measures in low-cycling contexts such as Ireland. These discourses are centred on redefining streets as places rather than thoroughfares. I consider the possibility that an over-emphasis on place might limit the construction of cycling necessary for mass modal shift outside of central urban spaces, paying particular attention to the longer-distance cycling practices intrinsically planned for in 'cycle highways' or 'cycle through routes'.

'Keeping an Eye' and 'Wrapping Up': E-Cargo Bikes as a Technology of Cycle-Parenting in Ireland

Robert Egan (Centre for Transport Research, TCD / Behavioural Economics Unit, SEAI), Hannah Juellenne (Behavioural Economics Unit, Sustainable Energy Authority of Ireland) and Brian Caulfield (Centre for Transport Research, Trinity College Dublin).

Abstract

Like many low-cycling contexts in Europe, the practice of 'good' parenting is often intimately tied up with extensive private car use across Ireland. With the private car, parents spend considerable time transporting their children to various destinations and activities and supplying the family household with groceries and other everyday domestic items. In this study, we explore practitioners of 'cycle-parenting' in Ireland, who use private e-cargo bikes as a key component of their broader family mobilities. Interviewing parents based in Ireland who own either an electric long-tail bike, box-bike or box-trike, we develop a conceptualisation of how private e-cargo bikes are incorporated into more general 'cycle-parenting' practices intended to extend the practice of cycling with the arrival and growth of their children. Using grounded theory, we illustrate how private e-cargo bikes are used to achieve a variety of sub-practices of cycle-parenting: 'keeping an eye' on one's child, 'wrapping up' one's child for cycle journeys in varied weather, spending quality time as a family on otherwise mundane everyday journeys, and shielding one's child from the threats of the outside world. To conclude, we consider what cycle-parenting with e-cargo bikes in Ireland says about the Irish mobility context and propose several policy measures that could support the growth of cycle-parenting as a car-parenting alternative.

Electrifying Efficiency, Why Employers Should Offer E-Bikes Like Company Phones

Judith Van Den Hoeven (Veloplan GmbH).

Abstract

This presentation will delve into the innovative approach of mapping mobility patterns and promoting sustainable commuting practices, focusing on insights derived from the Binz district in Zurich. Using our software solution, we have meticulously analyzed the commuting behaviors of 288 employees, providing detailed insights into their current modes of transportation, origins, and frequency of commute. Our study reveals the predictable impact of infrastructure disruptions, such as the prolonged closure of the Uetlibergstrasse, on commuting patterns, highlighting the necessity for proactive measures.

Furthermore, we explore the potential for employers to play a pivotal role in promoting sustainable commuting by offering alternative transportation options, such as providing E-bikes on loan. By analyzing empirical data and insights covering over 50 parameters, we showcase the tangible benefits for both employers and the region of Zurich. Particularly noteworthy is the feasibility of combining train travel with cycling, emerging as a viable and environmentally friendly commuting alternative.

Through this presentation, we aim to spark discussions on innovative strategies to incentivize employers and individuals to embrace sustainable commuting practices. We invite participants to engage in a dialogue on the challenges and opportunities in promoting sustainable urban mobility and to explore potential avenues for future research and collaboration.

Conceptualizing Spatial Nudging: A Theoretical Framework for Integrating Interventions to Promote Cycling

Ayda Grisiute (Institute of Cartography and Geoinformation, ETH Zurich) and Martin Raubal (Institute of Cartography and Geoinformation, ETH Zurich).

Abstract

Promoting sustainable mobility, particularly cycling, is crucial for combating climate change and enhancing overall well-being. Strategies range from 'hard' measures such as infrastructure design to 'soft' measures such as digital nudging techniques, including personalized travel planners, to promote cycling.

Despite both physical and digital interventions aiming for behavioral change, opinions diverge over whether the design of physical environments constitutes a nudge. This debate has led to a fragmented and inconsistent landscape of interventions, burdening their effectiveness in promoting cycling. Additionally, the success of digital nudges often hinges on how users perceive the physical environment, yet these interventions are rarely designed concurrently. This underscores the need for a cohesive approach to nudging as a multifaceted behavioral change strategy in the mobility domain, necessitating a clear and integrated definition of various nudging strategies.

We introduce the Spatial Nudging framework — a theory-based framework that delineates nudging practices in the mobility domain and clarifies what constitutes a nudge, using insights from the Nudge Theory and the Theory of Affordances. Our study involves a comprehensive review and mapping of existing nudging practices aimed at travel behavior change. Informed by behavioral theories, we define the role of the physical environment in shaping these strategies, emphasizing the importance of perceived affordances.

The framework offers an integrated perspective on nudging interventions for sustainable mobility. As a result, we identify four distinct types of nudging: physical, digital, context-aware, and spatial nudging. Additionally, the framework allows us to define applied nudging techniques along three dimensions: what nudges target, where they target, and how they target travel behavior. Ultimately, the work lays a theoretical foundation for future research on integrating physical and digital interventions to promote sustainable mobility. However, real-world use cases remain essential to gain empirical evidence to support the Spatial Nudging framework.

Smarter cycling, safer cycling? Acceptance of advanced bicycle technologies – a cross-country comparison

Nora Studer (Fachhochschule Nordwestschweiz FHNW), Dorothea Schaffner (Fachhochschule Nordwestschweiz FHNW), Sergio Alejandro Useche (University of Valencia (Spain)), Felix Wilhelm Siebert (Technical University of Denmark DTU) and Philipp Wintersberger (TU Wien).

Abstract

While Advanced Driver Assistance Systems (ADAS) for cars are well-established in most high-income economies, the integration of advanced technologies in bicycles (ADAS-B) is less pronounced [1]. At a practical level, it is commonly assumed that ADAS-B offer an opportunity to improve the cycling experience, user behavior, and safety-related outcomes [2]. However, user-focused studies have shown that the adoption of technological advances for cycling highly depends on the willingness of cyclists to use and invest in these innovations [3]. Moreover, technology acceptance is influenced, among other factors, by cultural differences — even within different European countries [4]. Additionally, the quality of existing cycling infrastructure presumably influences attitudes

towards novel bicycle technologies [5]. Differences in cycling cultures and infrastructure [6] thus require cross-country approaches to ADAS-B acceptance. The objective of the present study was to analyze the acceptance of ten different ADAS-B features using the Technology Acceptance Model (TAM) framework [7]. The study was conducted in four European countries: Spain (n=560), Germany (n=505), Austria (n=tba), and Switzerland (n=534). The data was collected as part of a large, international cycling behavior project (BikeBarometer2023). The study aims to answer the following research questions: (1) Which ADAS-B features are most accepted by cyclists? (2) What factors influence the acceptance of ADAS-B? (3) Are there cross-country differences in the acceptance of ADAS-B, and if so, what are they? The outcomes can be summarized as follows: First, acceptance levels vary considerably between different ADAS-B features. The most accepted features are for warning other users, increasing visibility, and post-crash features. Secondly, the most relevant factors influencing the intention to use ADAS-B are their perceived contribution to safety, ease of use, and willingness to pay. Thirdly, cross-country comparisons reveal differences in acceptance ratings, which are also associated with cyclists' individual characteristics, such as age, gender, and cycling experience.

Global Learning, Local Implementation: Developing a Cycling Curriculum to Influence Decision-Making

Nicholas Meltzer (Cascades West Council of Governments), Meredith Glaser (Ghent University/Urban Cycling Institute), Rebecca Lewis (University of Oregon) and Marc Scholssberg (University of Oregon).

Abstract

Cities, states and higher-level government agencies have established broad goals for

climate adaption, often which include a significant investment in more sustainable modes of transportation such as cycling and transit. The urgency around sustainability transitions has accelerated the trend of city-to-city learning, of which study visits are by far the most commonly used technique (Glaser, 2022) to 'exchange knowledge' or 'transfer knowledge' especially to capture 'best practices'. These tours vary in length and focus, and while the attendees may return home with lots of ideas, how do we know this educational approach is being successful?

This research builds on previous research by Glaser (2021, 2022) to understand and improve learning from study tours, using Kolb's four stages of experiential education as a framework. Combining research from previous study tour participants, this workshop will present a typology of study tours, and then engage workshop participants to collaboratively assess three components:

1. How to structure study tours to deepen learning through focus on both infrastructure and governance within the individual and social context
2. Which decisionmakers can be influenced through learning to impact on communities? How do the characteristics of the participants affect the structure?
3. How do we as instructors create opportunities for reflection, embedded in a learning experience to encourage action and impact?

The future classroom for learning for transitions is not a classroom at all—and we want to hear from professionals, academics and elected officials what is needed to go from idea to action.

More than meets the eye - Wider economic benefits of bicycle infrastructure (WEBBI)

Keke Merz (TU München) and Allister Loder (TU München).

Abstract

While the wider economic benefits for car and high-speed rail infrastructure have been vastly researched, similar considerations for cycling infrastructure are lacking. This may lead to incomplete appraisal methods in policy-making decisions, thus limiting cycling infrastructure from wide-spread implementation and its climate crisis mitigating potential. This research aims to answer which wider economic benefits of cycling infrastructure in the urban transitions and transformations (UTT) exist and how they can relate to urban policy decision making in three steps.

Firstly, the status quo is analyzed regarding A) the state of the art of (wider economic) benefits in transport and UTT in connection to selected Sustainable Development Goals (SDGs), B) the inclusion or omission of these benefits in international policy decision making. Thus, the currently omitted benefits are prioritized for further research regarding their mechanisms, relevance and potential impact.

Secondly, the solution framework WEBBI (Wider Economic Benefits for Bicycle Infrastructure) defines and evaluates the wider economic benefits of cycling infrastructure. It details how the considered mobility measures and indicators can be measured and quantified, how they impact the model in the calculation process. Additionally, it gives an overview which procedural requirements and methods are to be used for the application to a city.

Thirdly, the framework will be applied to a South-German city as a case study evaluating its impact and policy implications. After defining the mobility measures, their implementation with the existing Street Network Manipulator (SNMan) of the ETH and importing to a transport simulation tool (e.g. Visum, MatSim), additional city-specific data is collected via survey. The developed framework will then be applied to the city model. Finally,

the impact of the simulated UTT will be evaluated and discussed regarding the selected SDGs, cost considerations, stakeholder involvements and possible policy implementations.

Improved cycling risk - more threatening car traffic?

Wout Baert (Fietsberaad Vlaanderen) and Dirk Lauwers (Visiting Professor Universiteit Antwerpen / Universiteit Gent).

Abstract

In countries where more people take up cycling, there is concern about cycling safety. The most obvious indicators, i.e. the evolution of the number of cycling fatalities and serious injuries, tend to show an upward trend. Without questioning the ambition to reduce the number of cycling casualties, it should be noted that by always depicting absolute numbers of victims - without taking into account the increasing use of bicycles, which in Flanders has risen by 70% over the past seven years - a negative perception of cycling is maintained, which in some interpretations may lead to a blame-the-victim. Fietsberaad developed a more nuanced approach, focusing on the annual fatal risk per million kilometres ridden. This appears to have fallen by about 40% over the past seven years. Remarkably, this risk factors in reference countries the Netherlands and Denmark remained almost constant during this period and the decreased Flemish risk figures are now very close to the Dutch and Danish figures. Some hypotheses were formulated to explain the evolution: more people cycling in Flanders and longer distances being travelled, in addition to firm investments by all authorities in Flanders. The research also identified differences according to age groups and the relationship of the risk rates with other modes of transport. The higher risk factors for cycling and the non-

decreasing absolute number of yearly cycling fatalities spurred the researchers to look for data on the 'threat' posed by the different means of transport. Similar research was already done by Rachel Aldred et al. based on crash data from the UK. Because the bicycle share in Flanders is very different from that of the UK, the researchers try to find out whether the conclusions from Aldred et al.'s research also apply and could lead to an adjusted road safety policy for cycling.

Understanding the mechanisms of change in a multi-city US cycling capacity building organisation

Dylan Power (Urban Cycling Institute), Lilian Markfort (Urban Cycling Institute), Kyle Wagenschutz (City Thread) and Meredith Glaser (Urban Cycling Institute).

Abstract

City Thread is a US-based national non-profit organisation who collaborate with diverse teams of elected officials, city staff, community leaders, funders, and residents to identify and address urban mobility problems in cities across the United States. A major component of City Thread's work is the implementation of the Accelerated Mobility Playbook (AMP), a toolkit for successful urban mobility project delivery, implementation, and community engagement which is used by multiple cities. In February 2024, the Urban Cycling Institute commenced a multi-year research project which aims to assist City Thread in unpacking the mechanisms and conditions of change which impact their work. The project will employ a comparative case study methodology, situating the city of Bentonville in Northwest Arkansas as the primary city, and Carmel, Indiana as the comparator. The primary phase of the research, a mixed methods approach utilising policy and document analysis, interviews, and focus groups with key multidisciplinary

stakeholders, will be conducted in Q2 2024 to understand the varying structures and systems in both cities. At the time of the Cycling Research Board Annual Meeting, it is anticipated that results from this preliminary phase of the research will be presented. Moreover, the overarching methodological approach for the remainder of the project will be presented. The overall anticipated outcomes for this research project are an understanding of the mechanisms of change of the work of City Thread which can be shared and scaled up to other contexts.

Is there something like a "Copenhagenize" effect? A comparative study in 13 European cities

Sergio A. Useche (University of Valencia), Francisco Alonso (University of Valencia), Mireia Faus (University of Valencia), Kira H. Janstrup (Hospital Afdelingen for Hjertesygdomme), Rich McIlroy (University of Southampton), Steve O'Hern (University of Leeds), Felix Siebert (Technical University of Denmark), Dorothea Schaffner (Fachhochschule Nordwestschweiz FHNW), Nora Studer (Fachhochschule Nordwestschweiz FHNW), Elias Willberg (University of Helsinki), Philipp Wintersberger (TU Wien) and The Bike-Barometer Project Members (University of Valencia).

Abstract

Currently, many cities are undergoing various changes and investments to transform their cycling culture and infrastructure. Depicting how these factors may lead to positive outcomes may encourage further initiatives. Cities with previous large investments in these areas, such as those included in the "Copenhagenize" ranking, may serve as valuable references of "why is it worth" (or not) investing in these settings. Therefore, this research aimed to compare a series of cyclist-related outcomes between bicycle riders of "Copenhagenized" (COP) versus "non-Copenhagenized" (N-COP) cities, hypothesizing that the outcomes of COP

cities would be comparatively more positive than those reported in N-COPs.

In terms of participants, we involved a full sample of n=909 cyclists from 13 European cities divided into two proportional groups: 47.5% (COPs) vs. 52.5% (NCOPs).

Overall, cyclists from Copenhagenized cities tended to report considerably more 'positive' outcomes in most of the spheres addressed by the study (cycling behavior, health and subjective wellbeing, and safety outcomes) than their counterparts from other European cities, even though some hypothesized differences in terms of cycling anger remained non-significant.

This research offers various conclusions, helpful to better understand the potential critical role of core cycling improvements in terms of infrastructure, urban planning, culture, and policing comprised by the Copenhagenized index. -Cyclists in COPs face fewer distractions, less stress, reduced psychological distress, and exhibit less verbal aggression and riding errors. Thus, a potential reply to the study title's question would be: "Yes, but with some exceptions". -However, inner anger experiences related to inter-user interaction would be greater among cyclists riding in "highly cycling-cultured" locations, especially for other cyclists, pedestrians, and motor vehicle drivers, even though their expression is less frequent. This is an interesting issue to further explore. -These results may help to encourage further stakeholders to strengthen efforts to increase the bicycle-friendliness of their cities.

Revealing who rides the storm: A mode choice model with heterogeneous weather preferences

Mads Paulsen (Technical University of Denmark) and Stefan Eriksen Mabit (Technical University of Denmark).

Abstract

Active transport modes such as cycling are generally more influenced by weather conditions. Stated preference studies on bicycle demand have consistently found negative effects of rain and extreme temperatures, while literature based on observational data is less conclusive, ranging from negative effects, to ambiguous effects, and no effect. Different effects have been found across trip purposes, but despite being proposed as future research, no existing studies have allowed weather preferences to differ across socio-economic groups. We allow so in a binary mode choice model (cycling vs other modes) with observed heterogeneous weather effects across socio-economic groups. We use weather data from the Danish Meteorological Institute combined with mode choice data from the Danish National Travel Survey). We only consider trips originating in Greater Copenhagen in the time period 2012-2019 to avoid interference by COVID-19. Furthermore, we omit walking trips, as we target the choice between cycling and non-active transport modes. We first search for potential heterogeneous effects across socio-demographic groups using a multinomial logit model to reduce computation times. The final model is estimated (in PandasBiogeme) using a mixed logit model with panel effects taking into account temperature, precipitation, wind, distance, trip purpose, sex, age, car availability, driving license, public transport tickets, and seasonality. The model intercept (general preference for cycling) is included as a random parameter. Although searching for specific groups less resilient to bad weather, we generally found that cyclists to a large degree simply ride out the storm with little influence of day-to-day weather conditions (estimation tables are included as appendix). Our results reveal a preference for cycling in temperatures between 20°C-26°C, but only for adult male cyclists. Precipitation has a

significant negative effect, but only for temperatures below 9°C, and for wind to affect substantially wind gusts must exceed mean wind speeds considerably.

Enhancing Cycling Research With Customer Journey Mapping: Insights For More Inclusive Cycling

Sam Delespaul (Mobiel 21), Elke Franchois (Mobiel 21) and Sanne Vanderstraeten (Mobiel 21).

Abstract

Taking your child for a bike ride. What might appear as self-evident to some parents, is less simple and straightforward to others. A large-scale Flemish survey (Gemeentemonitor) recently showed that women perceive their local neighbourhood to be less safe for cycling with kids compared to their male counterparts. These feelings of unsafety can have negative consequences, as women might think twice before cycling with their kids to school. Unfortunately, this limits the bicycle's potential as a sustainable way of getting to school and makes cycling less inclusive.

To ensure cycling is accessible and attractive to all, Mobiel 21 investigated how women experience traffic safety when cycling with their children. How? By applying a validated research method, customer journey mapping (CJM), to an entirely new context: cycling trips. This method is innovative because we apply a user-centered method, derived from marketing, to mobility research, gaining unique insights into the cyclist's perspective. CJM is a qualitative method, that combines participatory observation with an in-depth interview. This unique and innovative research method makes it possible to assess mobility and perceived unsafety from the perspective of a specific target group.

We observed twenty mothers while they cycled to school with their children during the

fall of 2023. We followed them through Leuven, gauging how safe they felt at pre-determined, potentially unsafe locations along their route. Afterwards, an in-depth interview followed. This resulted in unique stories about the obstacles and unsafe situations mothers encounter in everyday life when cycling to school with their children.

All in all, observations, interviews and digital mapping of cycling routes led to illuminating insights into why, when and where female cyclists experience traffic as unsafe. The CRBAM is the perfect place to discuss these results and our experience with the CJM method with other (cycling) researchers.

E-Scooters vs. Cycling or E-Scooters and Cycling?

Daniel Baehler (bfm - Büro für Mobilität AG) and Rebecca Hunziker (OST - University of Applied Sciences of Eastern Switzerland).

Abstract

Our proposal is based on a study on the consequences for transport planning and future requirements of e-scooters, conducted between 2022 and 2024 for the Swiss Federal Roads Office by an interdisciplinary research team, including bfm and OST - the University of Applied Sciences of Eastern Switzerland. It was based on the rapid spread of shared e-scooters in Swiss cities and the rise of sales of private e-scooters. These new electrically powered vehicles are challenging the use of infrastructure with bicycles, fast and slow e-bikes, three-wheeled vehicles for logistics and other mono- or two-wheeled electric vehicles. This development raises many questions to which the study provided answers using different methods such as a survey of users and non-users, interviews with experts, and driving tests. The findings of this research project show that, under certain circumstances, e-scooters can contribute to a more efficient overall transport

system and should therefore be considered when improving the framework conditions for cycling. E-scooters appeal more to car-savvy people than bicycles or public transport, while shared e-scooters can contribute to multi- and intermodality. As e-scooters do not require additional infrastructure, but "only" certain additional requirements for cycling infrastructure, which are also fundamental or at least of great benefit for bicycles, this potentially also further strengthens the latter. Particularly, the larger number of vehicles using the cycling infrastructure increases the need for action to expand and improve this infrastructure. Furthermore, an improved cycling infrastructure that meets the needs of e-scooter users will also prevent serious accidents (also for road users on foot or on bikes involved in collisions). These conclusions raised the question to discuss in this workshop – contributing to an emerging discussion on the links between e-micromobility and cycling and the role of e-scooters (e.g. Gösling 2020; Ignaccolo et al. 2022; Scott & Travers 2023).

Building a Planning Tool for the E-Bike City Vision

Elina Scheiring (Institute of Cartography and Geoinformation, ETH Zurich), Mischa Bauckhage (Institute of Cartography and Geoinformation, ETH Zurich), Ayda Grisiute (Institute of Cartography and Geoinformation, ETH Zurich), Nina Wiedemann (Institute of Cartography and Geoinformation, ETH Zurich) and Martin Raubal (Institute of Cartography and Geoinformation, ETH Zurich).

Abstract

Urban areas are increasingly prioritizing bike lanes as many cities reconsider the dominant role of cars and aim to repurpose existing road space for bike lanes [1]. While many initiatives progress incrementally, the E-bike City offers a more integrated vision that includes radical reconstruction of urban areas and considers the impact of large-

scale bike networks on car transportation [2]. However, user-friendly solutions to interact and compare more complex optimization approaches for bike network planning are scarce and primarily remain in scholarly work. There is a clear need for accessible, user-friendly tools that enable planners to evaluate both iterative and global strategies to support the vision of a bike-friendly city better.

Our objective is to develop an interactive web application that enables users to reallocate road space to bike lanes with multiple optimization strategies and evaluate their effects using metrics that reflect bike and car network efficiency and user perception [3]. The project will begin with creating a user interface that can visualize bike network configurations resulting from optimization implementation running on the backend, based on user-defined parameters: area of interest and the desired number of bike lanes. In addition, we design a dashboard for evaluating outcomes using Pareto optimality between bike and car travel times, among other metrics, and allow for pairwise comparison of different scenarios.

The developed web application allows flexible testing of road space reallocation from specific areas to entire city networks. It showcases network scenarios derived from both iterative and global optimization methods. Initially tested in Zurich, the tool uses Open Street Map (OSM) data, making it adaptable to different locations. The application also collects user feedback to refine its features and usability. This user-friendly web interface simplifies interaction with complex mathematical models for bike network optimization, improving the anticipation of impacts on other transportation modes.

Emergency Streets Countermeasure to Enable Urban Cycling and Livability

Kevin Krizek (University of Colorado).

Abstract

Traffic violence, at least in the United States, is a public health crisis that is outstripping local, regional, and federal efforts to reduce injuries and deaths on our public roadways. The general driving public behaves largely unconcerned, despite a real public health crisis. There's no NARCAN for traffic deaths. There's no race to develop a vaccine. There's no single public agency tasked to confront the challenge.

A powerful piece missing from current response efforts is reducing vehicle speeds, which helps avoid crashes and reduce the severity of the crashes that still occur. Extended speed reduction through an Emergency Streets response will improve safety immediately by enhancing driver awareness, while diminishing the likelihood and severity of future crashes. Yet, such a message, while critical to cycling safety, mostly falls on deaf ears, both politically and culturally. Is that possible to change?

The recently published Emergency Streets (ES) white paper articulates a framework to reinforce the benefits of vehicular speed reduction in a targeted area, elevating drivers' awareness of the connection between their driving speed and road fatalities.

Detecting Statistically Significant Changes in Cycling Volumes Based on Crowdsourced GPS-Data

Emely Richter (TU Dresden), Joscha Raudszus (TU Dresden) and Sven Lißner (TU Dresden).

Abstract

In order to enhance the cycling mode share and the amount of kilometres travelled, more and safe infrastructure is needed. In this context it is important to be able to eval-

uate the effects of cycling measures retrospectively. Detecting significant spatial changes in network-wide cycling volumes between various years serves this objective. Crowdsourced GPS tracks provide information on cycling volumes with high spatial coverage, but represent only a subset of the cycling population. Our approach utilizes GPS data from the annual nationwide campaign CITY CYCLING in Germany. Extending the method of Boss et al. 2018, the Local Moran's I index is used to determine clusters of high and low values regarding the change of cycling volumes between years. We test three different values for changes that serve as input: the absolute and relative differences between years weighted by the total number of cycling trips as well as a combination of both. In order to be independent of changes in the network obtained from OpenStreetMap, the cycling volumes are assigned to hexagonal grid cells in a preceding step. For validation, we compare the locations of clusters of high and low values to information on cycling measures and obstructions. Figure 1 shows the results for the comparison of cycling volumes from 2022 to 2023 within a network section in Dresden, Germany. Exemplary, two construction sites that prevented cyclists from travelling through are marked. The obstruction in 2022 results in a cluster of high values, thus indicating a significantly higher cycling volume in 2023 in comparison to 2022. The obstruction in 2023 results in a cluster of low values, accordingly. To further improve our results, we will take into account significant changes in numbers of cycling trips starting and ending at different areas to indicate spatially relevant changes among the campaign participants.

Assessing Public Preferences for Urban Street Re-Design: A Stated Choice Experiment

Michael Wicki (ETH Zürich), Claudia Sinatra (ETH Zürich) and David Kaufmann (ETH Zürich).

Abstract

Understanding public preferences regarding urban street design is crucial for fostering livable and sustainable cities. This study presents findings from a stated choice experiment aimed at evaluating residents' and users' preferences for street-level built environments, with a focus on walkability and bikeability, based on survey data from a representative panel of around 5000 respondents from the Swiss population. Participants are presented with visualizations of two hypothetical urban streets reflecting the current state and two proposed scenarios with varied improvements in infrastructure, environmental features, and social amenities. Utilizing a randomized design, participants rated each scenario in terms of bikeability, willingness to live there, and acceptance as a potential policy proposal. The experiment incorporates to present respondents either with a main road or a neighborhood street. Additionally, they received one of two distinct presentation formats: static pictures and immersive 360° visualizations. Participants are randomly assigned to either format to explore potential differences in perception and decision-making. We expect nuanced differences in response patterns between the two presentation formats, with the immersive nature of 360° visualizations potentially eliciting stronger engagement and more detailed evaluations. Furthermore, incorporating a comparative analysis of the two randomly presented scenarios, considering factors such as cost implications and biking time, provides valuable insights into trade-offs and priorities in urban street design. By assessing public preferences, this study contributes to filling gaps in the existing literature and offers practical guidance

for urban planners and policymakers seeking to create more pedestrian and cyclist-friendly environments. In conclusion, this research underscores the importance of incorporating public input into urban design decisions and highlights the nuanced considerations involved in optimizing street-level built environments for diverse user needs and preferences, while also recognizing the methodological implications of presentation formats on participant responses.

Workshop on social and material practices for cycle repair

Michael Tahmoressi (TU Delft), Jonne Silonsaari (University of Amsterdam), Margot Abord de Chatillon (Eiffel University), Daniel Valentini (SLU), Romee Nicolai (Bike Kitchen UVA) and Dirk Ploos van Amstel (TU Eindhoven).

Abstract

Repair and maintenance of cycles are essential to sustain cycling mobility. In recent years, the material and social infrastructures for material engagement with bicycle and maintenance practices have gained academic interest from various scholarly fields. Several of these investigations have explored Bike kitchens, and other more or less formal spaces for material engagements with bicycles. As alternatives to market-based repair, community bike spaces are part of the larger repair ecosystem, yet they supposedly prefigure radically different cycling practices; with the simple idea of providing people with the material and social infrastructure to maintain their bikes (Valentini & Butler 2023; Zapata-Campos, 2020). At the same time there is evidence that these ideals do not emerge automatically. This workshop will expand the knowledge base about how bicycle kitchens teach skills about community engagement and critical thinking and how bike repair like any other social practice remains marred by intersectional inequalities across gender, ethnicity, class

and age (Arnold, 2013; Abord de Chatillon, 2020; Silonsaari, forthcoming).

The Bicycle kitchen concept has been around for almost 30-40 years. But despite long-term interest in these practices, and the evident connections with bicycle and mobility policy targets for more circular futures, there is a need to have a meaningful discussion about how to create and sustain community repair as established social practice. This workshop aims at gathering a diverse audience interested in topics intersecting with issues of cycling materialities and repair to: 1. Map the landscapes of initiatives and researchers that practically and/or engage with the topics outlined above, and – drawing on their experiences and knowledge– 2. plot avenues for future research to consolidate and advance cycling materialities and repair as an intersectional research branch with strong practical grounding and relevance.

Let's talk about representativeness – a framework for evaluating primary data sources for cycling indicators

Emely Richter (TU Dresden), Sven Lißner (TU Dresden) and Fabian Wagner (TU Dresden).

Abstract

When seeking input data to create a model including cycling or, less elaborately, to answer a question concerning cycling in general, researchers and practitioners alike are looking for representative data. In contrast to the high demand, the literature scarcely provides consistent methods, whether the cycling data in question is representative. We focus on the representativeness of different sources for cycling indicators and the implications regarding their suitability to answer differing (planning) questions.

Representativeness is usually referred to in the context of sampling methods, i.e. reducing the sampling bias to obtain a representa-

tive sample of the population in question (e.g., Ortúzar and Willumsen (2024)). However, as Leao et al. (2019) argue regarding GPS data, a sample may be representative according to one or more criteria, while not being by other criteria. In extension to existing approaches, we investigate in which aspects different data sources can be considered representative (e.g., demographics, time, volumes).

Primary sources for cycling indicators as volumes, distances, etc. can be grouped into three parts: — Surveys with mobility focus in general or cycling in specific, — (Permanent)counters that provide the number of cyclists passing, — GPS tracks as part of campaigns or smartphone applications. We apply the methods for evaluation of the sources to exemplary data sets and interpret the results for implications regarding planning practices. The reference data sets (Figure 1) consist of cycling-specific data from about 500 permanent counters throughout Germany as well as GPS tracks and a user survey of a nationwide campaign. As general mobility surveys, we consult data from the nationwide household survey “MiD” and the urban-focused “SrV”.

As a result, we provide a framework on how to assess the representativeness of existing bicycle specific data sources, implications for applicability in different planning contexts and how best to combine data sources to maximize information.

Same same but different – Examining the influence of city-related factors on diverse cycling behaviors

Lißner Sven (Chair for Transportation Ecology, TU Dresden), Stefan Huber (Chair for Transportation Ecology, TU Dresden), Katrin Lubashevsky (Center for Information Services and High-Speed Performance Computing, TU Dresden) and Iryna Okhrin (Center for Scalable Data Analysis and Artificial Intelligence (ScaDS.AI) Dresden/Leipzig, TU Dresden).

Abstract

Research related to cycling behaviour faces the challenge of transferability as the study area in most projects is limited to one city/region. As different studies in different cities do not apply the same methodology, results are not comparable. In the DFG-funded project “Radverkehrsverhalten in Deutschland/ Cycling behaviour in Germany”, we use GPS data from up to 2,500 German cities from the CITY CYCLING campaign to reveal differences in route choice and cycling behaviour for different age groups and genders. To take a closer look we selected 94 cities of different sizes, topography and cycling mode-share all over Germany and processed the data to get information on trip-level. As secondary data, we added region-specific data like topography, mode share in cycling, population, length of the bicycle network, number of intersections and soft facts like satisfaction with cycling infrastructure (ADFC Bicycle Climate Test). Using established econometric models as well as new machine learning approaches, we aim to visualise different factors that influence route choice and driving behaviour (e.g., frequency, trip length, speed or waiting times at intersections) at city level as well as the goodness of fit of the different models. In our project, we focus on three main topics: route choice, driving behaviour and new models to explain both. These topics will also guide our workshop, discussing variables and their influences as well as new models and their interpretability. Within the workshop, we would like to present first results and discuss the implications to strengthen and foster our models. We also see a necessity to discuss further aspects to add in the selection process of cities or regions in our dataset.

Translating best practice into context: getting from «they can» to «we can»

Michael Liebi (OST - Ostschweizer Fachhochschule), Ursula Wyss (Büro für Strategische Stadtentwicklung und urbane Mobilität) and Patrick Rérat (Université de Lausanne).

Abstract

The Netherlands plays a prominent role in discussions about how to implement a bicycle city around the world. But way too often, the implementation work remains bogged down in good intentions. Many practitioners and activists know the feeling of disillusionment when all kind of reasons are credited in day-to-day business as to why "unfortunately it doesn't work for us". The necessary translation of best practice to local contexts is repeatedly underestimated. Pointing to the successes of other countries or cities does not guarantee success. What is true for "them" must be explained anew and adapted for "us". We have therefore "translated" the decades-long lead from the Netherlands to the Swiss and German context and realised that this meant that not only doing something for bicycles will be needed but a cycling turnaround ('Velowende'), which means understanding human mobility as a whole. For this, we have based our work on the various roles that are responsible for a cycling transition: politics, administration, science, and civil society. To provide more than just a theoretical discussion, we have come together as a group of researchers and authors from the respective fields where we share a wide experience. For this project, we have compared the lessons we have learned over the years to identify key strategies to overcome the challenges to translate the Dutch best practices into Swiss-German cities. The result is a common book to foster urban cycling, published in May 2024.

Roundabout safety: bicyclists' perceptions

Ian Trout (TU Delft), Maria Salomons (TU Delft), Haneen Farah (TU Delft) and Amir Afghari (TU Delft).

Abstract

While roundabouts, in comparison with intersections, are associated with decreased severity of motor vehicle crashes, recent crash data suggest that this is not the case for bicycle crashes (12% of all collisions). At the same time, the Netherlands is undergoing increasing congestion in bicycle facilities as more non-normal bicycles (fat tire bikes, ebikes, cargobikes, etc) are becoming popular. There is a working group of researchers and professionals that are actively working on an update to their roundabout design guidelines. This study aims to explore which design characteristics and socio-demographic factors influence bicyclists' perceptions of safety and comfort at roundabouts.

Several factors were identified from past research that have an influence on objective and subjective bicycle safety at roundabouts: recent bicyclist crash history, which mode has yielding priority, buffer width between the car lanes and bicycle facility, the number of crossing points for bicycles, and bicyclist behaviors (long term level of risk taking, errors, and positive behaviors). In addition, this research analyzed two different bicycle volumes, the presence of art and/or advertisements in the center island, whether the bicycle path is bi-directional or not, and the shape of the bicycle path in comparison with the vehicular roundabout. An empirical study was conducted to explore the relationship between bicyclists' perceptions of comfort and safety, with the aforementioned roundabout features. Photos of eight real world roundabouts in the Netherlands were modified and used in the study. Although the study is currently ongoing, with random sampling of the Dutch population around TU Delft campus, and the cities of Amsterdam, Rotterdam, and The Hague, the results and findings are expected to be completed by

mid-July. The main contribution that this research hopes to provide is bicycle oriented design and policy recommendations for government agencies in order to maximize perceived safety and in this way compliance.

The promise of floating bike data, are you a believer?

Felix Henriksson (Chalmers University of Technology), Pontus Wallgren (Chalmers University of Technology) and Helena Strömberg (Chalmers University of Technology).

Abstract

Cities around Europe have quite ambitious goals for increased cycling, but in most cases the change is slow. The North Sea Interreg project MegaBITS engages cities in the North Sea region that want to increase cycling through ITS solutions. It has been clear from the start of the project that the ITS solution everyone is interested in is the collection of floating bike data. Thus, an interview study has been conducted with 12 traffic and city planners from the involved cities. The result show that there is a strong belief that cycling data is important to drive change, consistent with the findings of Huber et. al. (2019). The interviewees claim that with more and more detailed data there will be increased possibilities to change policy and improve infrastructure. They also argue that politicians need data to be convinced.

As cycling researchers (and cycling enthusiasts) we are still not convinced that more data is the best way towards fulfilling cycling goals. Can cities handle the data? Are cities trying to measure stuff that is already clear to see with one's own eyes? Does it lead to the right data being collected? Are cities doing it because it is already done with cars? Even though the inclusion of data could contribute to more decisions or investments made for bicycling, the activity of collecting and analysing bike data is resource

demanding in terms of competence as well as money while possibly breaching the privacy of people. Is it worth it?

Cycling safety based on historical crashes: A comparison of the Netherlands and Switzerland

David Zani (ETH Zurich), Georgios Kapousizis (University of Twente), Karst Geurs (University of Twente) and Bryan T Adey (ETH Zurich).

Abstract

Cycling rates are rapidly increasing worldwide. Governments are promoting bicycles, especially electric bicycles (e-bikes), to improve sustainability in cities by mitigating transport externalities. Thus, many countries with little cycling infrastructure are investing in building new ones, and those with extensive cycling infrastructure, such as the Netherlands, are improving the existing infrastructure. However, many European countries with various cycling infrastructure levels are confronted with bicycle crashes, including e-bikes. For example, in the Netherlands, a country well known for its cycling policies, culture, and infrastructure, bicycle fatalities represented 40% of all road fatalities in 2022, and the e-bike rate of all cycling fatalities increased from 28% in 2017 to 34% in 2022. In contrast, in Switzerland, with scarce cycling infrastructure, there was an increase of 61.5% in cycling fatalities in 2020 compared to 2019, while e-bike user fatalities increased from 19% in 2017 to 55% in 2022, and bicyclists represent 17.4% of road fatalities. The aim of this project is to examine 1) differences in bicycling crashes between Switzerland and the Netherlands and to identify to what extent bicycle infrastructure affects bicycle crash patterns, and 2) the availability of transferrable learnings. Historical bicycling crash statistics will be analysed in both countries to explore the availability of transferrable learnings. Police

reports of bicycle crash data and various built environment characteristics from the open-source database OpenStreetMap will be used. By identifying crash locations, crash types (e.g., bicycle to vehicle), and severity, and linking them with the built environment characteristics, we can examine the influence of infrastructure on bicycling crash risk. We expect to better understand the differences in cycling crash risk between Switzerland and the Netherlands, identify locations that need re-design of the cycling infrastructure, indicate learnings applicable to the Swiss road typologies, and create a transfer of learning from both countries.

How will an E-Bike City change our accessibility?

Lukas Ballo (ETH Zurich, Institute for Transport Planning and Systems), Aurore Sallard (ETH Zurich, Institute for Transport Planning and Systems), Lucas Meyer de Freitas (ETH Zurich, Institute for Transport Planning and Systems) and Kay Axhausen (ETH Zurich, Institute for Transport Planning and Systems).

Abstract

Several decades of infrastructure investments in the global north have produced unprecedented accessibility gains, fueling the productivity of modern economies and providing us with choices none of the previous generations had. Now, these benefits are at risk, as there are no robust solutions for reconciling our present traffic patterns with actions against climate change. As possible alternatives, in recent years scholars proposed multiple systemic transformations, such as 15-minute cities, or an E-Bike City. However, it remains unclear to which extent they can maintain today's accessibility levels in the existing built environments.

In this work, we investigate the accessibility effects of such systemic changes. We have developed a network rebuilding software (<https://github.com/lukasballo/snman>) to transform the allocation of existing road

space in existing cities according to hypothetical design rules. On the resulting networks, we calculate accessibility levels for different regions and sociodemographic groups.

To account for changes in all opportunities and modes of transport, we use Hansen accessibility, extended with a mode choice model as proposed by Ben-Akiva and Lerman. Changes in travel times due to reduced capacity are estimated using a MATSim simulation. To account for long-term changes in cycling preferences, as well as the uncertainty associated with mode choice, we use multiple alterations of an existing mode choice model and report the resulting accessibility changes of each variant.

The process is demonstrated in a case study of Zurich, rebuilt into an E-Bike City, allocating roughly 50% of road space to safe infrastructure for small modes such as bicycles and e-bikes. This presentation will explain the network rebuilding process, the accessibility methodology, as well as the preliminary results. Finally, we invite other researchers to use the software for testing systemic mobility transitions in other cities.

Estimating the socio-economic impacts of cycling in the EU

Holger Haubold (European Cyclists' Federation).

Abstract

In 2019, ECF published its latest estimation of the socio-economic impacts of cycling in the EU. The document provided evidence on the different benefits in all relevant fields, and quantified them at the level of the EU-28 wherever possible. The calculation of benefits was based on an estimation of the cycling volume in the EU from a study on active modes data carried out for the European Commission. For calculating the health benefits of cycling, an updated version of the World Health Organisation's HEAT (Health

Economic Assessment Tool for Walking and Cycling) with more detailed parameters has been used. The results showed that already at current levels, cycling produces benefits of around €150 billion per year in the EU-28. More than 90 billion euros of these are positive externalities for the environment, public health and the mobility system. In comparison, a recent study by the European Commission estimated the negative externalities, i.e. the costs for the environment, health and mobility, of motorised road transport at more than €800 billion per year. Since the publication of the document in 2019, significant amounts of new data and evidence for the impacts of cycling have emerged. This includes a comprehensive survey on the mobility patterns of Europeans, which gives much more detailed and harmonised data on the kilometres cycled in the EU and in all member states. The HEAT tool has also been updated and expanded in the meanwhile. ECF is therefore planning to update its estimations on the socio-economic benefits of cycling using these new sources of data and evidence, and would like to present preliminary results at CRBAM. Like its predecessor, the new report will also serve as an invitation by the cycling community for further research into the impacts of cycling, trying to bridge the gap between practice and research.

Cycle storage and access in terraced housing: barriers and opportunities to increase cycle mode share

Alex Painting (University of West of England / Phil Jones Associates Ltd).

Abstract

Terraced houses comprise 32% of Bristol's housing stock, but they are not designed to accommodate cycles, nor are cycles designed to be stationary or parked outside. How cycles are stored in these houses and

transitioned to the public highway presents immediate barriers to making cycle trips, irrespective of the quality of the highway infrastructure. Cycle parking in existing residential settings is an empirical gap that receives little attention from policymakers. This study undertook an inductive thematic analysis of in-depth interviews with Bristol residents who live in terraced houses, using Social Practice Theory as the theoretical framework and interviews with experts and practitioners in this field to inform the discussion. The key findings were that the materials and competencies required of residents create barriers, which are overcome only by those who are already motivated to cycle but inhibit those less inclined to cycle. Those who rent their home face immediate barriers to owning and using cycles, but homeowners have greater agency to improve cycle storage and access arrangements; cycle hangars remove many of the barriers from terraced houses, but the current provision in Bristol does not suggest it radically changes travel behaviour or car ownership; and the provision of informal cycle parking is needed to supplement hangars. This study makes the following policy recommendations: (i) empower and incentivise homeowners and landlords to provide front-of-house cycle storage for terraced houses; (ii) increase the provision and variety of cycle hangars, bring the system in-house, and remove barriers to delivery; (iii) increase provision of informal/visitor cycle parking in residential areas; and (iv) develop a kerbside strategy for Bristol to reallocate and manage highway space.

Exploring the narrative behind Zurich's E-Bike City Research Project: a thematic analysis of self-identifying transport user types

Catherine Elliot (ETH Zurich), Michael Wicki (ETH Zurich), Robert Egan (Trinity College Dublin) and Kay Axhausen (ETH Zurich).

Abstract

E-Bike City is 3-year research project by the Federal Institute of Technology Zurich (ETHZ). There are nine subprojects using agent-based modeling to determine a realistic Plan B for sustainable urban mobility by 2050. This study explored public perceptions of an online newspaper article explaining the vision of Zurich transitioning to an E-Bike City (EBC). We reviewed 435 comments and found prominent themes including funding, street space allocation, safety, impacts on deliveries and tradespeople, overall access for those who cannot ride a bike, long-distance travel into cities, infrastructure, and weather. Overall, 58 comments where people explicitly or implicitly self-identified as a user of a particular mode of travel, (cyclist, motorist, pedestrian, public transport (PT) user, or multiple modes). We then employed an inductive thematic analysis on these comments to explore the narrative regarding e-biking and EBC from the perspectives of these transportation user types. There were no self-identified e-cyclists. Cyclists were more explicit in self-identifying compared to car drivers who suggested their car ownership (i.e., If you pay my car insurance and car tax...). Some people explained how they shifted modes over time or using several modes. Some car drivers explained that they are forced to drive for various reasons outside their control (part of job, kids, slow and inefficient PT). A theme emerged from motorists, pedestrians, PT users and cyclists (non e-bikers) about e-biking being unsafe. Most cyclists and PT users and a few motorists were in favor of EBC (even if it would limit their driving). Many motorists, pedestri-

ans and a few cyclists were against EBC or e-bikes. In an EBC, all citizens would benefit from cleaner air and quieter, safer streets plus a drastic increase in cycle paths which would induce a desirable traffic conversion from cars to bikes. E-bikes were not seen as a solution for all.

Naturalistic micromobility data: opportunities and threats

Marco Dozza (Chalmers University of Technology), Rahul Rajendra Pai (Chalmers University of Technology) and Alexander Rasch (Chalmers University of Technology).

Abstract

Micromobility data are increasingly available and promise to support not only researchers but also policymakers and authorities in best integrating micromobility into the transport system. When micromobility data are collected in the wild by road users attending to their daily routines, these data bring unprecedented insights into the behavior of micromobility road users and their interaction with other road users and infrastructure. Although GPS data is the most widely available micromobility data, electrified vehicles (e.g., e-bikes and e-scooters) often include sophisticated sensors such as inertial measurement units and cameras. New advances in technology make it possible to analyze video data with artificial eyes and leverage artificial intelligence to model and analyze vehicle dynamics and user behavior, complementing GPS with information crucial for understanding micromobility safety, efficiency, and acceptance.

Within the MicroVision and e-SAFER projects, naturalistic data from e-scooter rental services have been used to investigate crash causation and model rider behavior to improve advanced driving assistance systems, support automated driving functions, and inform Euro NCAP protocols. These

projects unveiled the peculiarities and prevalence of leisure riding on e-scooters and created some of the basis for sharing micromobility data and open behavioral models. If shared, the data and models from e-SAFER may serve new analyses and promote new countermeasures based on education, policymaking, and infrastructure design. However, data sharing is a double-edged sword where issues such as ethics, privacy, and security need to find a compromise with commercial interests, while the integrity of the data and analysis results must be warranted.

'Abandon your cars and get on your bikes': segmentation and behaviour change approaches in a bicycle-hostile city

Gail Jennings (University of Cape Town).

Abstract

This research considers approaches to shifting the cycling practices of car-owning individuals in a low-cycling, highly stratified, developing economy – in this instance, Cape Town. Segmenting user groups is key to promoting behaviour change: where car-oriented cities with little cycling tradition have grown bicycle share, this is partially because they have identified distinct user groups (Buehler, Teoman and Shelton, 2021). In Cape Town, TDM strategies need to be targeted rather than take the general approach they currently do (Behrens et al., 2015). In research and advocacy applications, cyclists are mostly segmented in terms of frequency of cycling, motivations for cycling, or the extent of choice (choice or captive). The City of Cape Town divides bicycle users into utility users and recreational users, and further divides utility users into commuters, or service, learner, or commercial users. Commuters travel to work, service users travel outside peak, learners travel to education institutions, and commercial users transport

goods. The Stages of Change Model has recently become more commonly applied to segment cycling behaviour and to understand what could shift people towards action. This research uses the above model and takes a longitudinal approach, using mobility biographies and narrative analysis to understand transitions from contemplation stage to action and maintenance stages among car-owning ('choice') 'commuters' or 'service users' in Cape Town. It explores whether motivations differ at different stages of change. Findings are that what influences individuals to start a cycling practice and then maintain it are significantly different, but that policy or advocacy approaches are undifferentiated and frequently do not reflect individual motivations. The research suggests that Cape Town's segmentation approach is not appropriate for 'choice' users, and that segmentation by underlying motivation – personal benefit, normative needs, or altruism – has greater potential to catalyze cycling shifts among this cohort.

Cycling comfort and self-stated cyclist type: The role of rural leisure and typical cycling habits

Yangqian Cai (Technical University of Munich), Ana Moreno (Technical University of Munich) and Mads Paulsen (Technical University of Denmark).

Abstract

Self-sated cyclist types are widely adopted to consider different perceptions of urban street configuration among cyclists, and has been used for segmenting cyclists along with cycling habits (e.g., frequency) to predict perceived comfort (Clark et al., 2021). Furthermore, there could be a relationship between self-stated cyclist type (SCT), cycling habits, and perceived comfort level (PCL), and cycling habits under different contexts, such as in Piras et al. (2021) who

found a positive impact of leisure cycling frequency on utilitarian cycling frequency. However, generally, such connections have rarely been investigated in urban cycling, let alone in rural cycling. As rural leisure cycling gains more popularity (Buning et al., 2019), it becomes vital to explore rural leisure cycling habits (RLH) and how they affect typical cycling habits (TH).

This study aims to understand how RLH and TH shape self-stated cyclist type (SCT) utilizing Four Types of Cyclists (Geller, 2006) and perceived comfort level (PCL), following the Theory of Cognitive Dissonance (behavior-attitude causality) (Festinger, 1957). An online US survey targeting existing cyclists, especially those with rural leisure cycling experience, was conducted (Moreno et al., 2024). Three parts of the survey were adopted: rural leisure and typical cycling habits, individual attributes, and PCL for nine urban street configurations. In total, 914 participants and 8,226 observations were used for further analysis.

Initial results of multivariate ordered probit models (Fig. 1) for cycling frequency show that RLH and TH have a stronger positive impact on SCT than PCL. Furthermore, higher rural leisure cycling frequencies lead to higher typical cycling frequencies. After controlling for endogenous effects and sociodemographic covariates, the correlation between the two cycling frequencies was insignificant. These findings imply the "true" causal effect of RLH on TH. Promoting bicycle use may influence cycling-specific attitudes but not the perception of cycling environments.

A Workshop on Public Outreach Via Social Media

Kevin H Posey (Urban Cycling Institute).

Abstract

Proposals for new infrastructure typically generate at least some opposition. Planners and other officials will often attempt to engage in outreach via public meetings in order to learn about potential stumbling blocks and address them. Unfortunately, by the time the public meetings take place, objections have already circulated on social media. Opponents leverage social media to gain support for their side, often by promulgating misinformation. This can leave public officials in a bind, as they may not be prepared to answer objections in a manner that can quickly tamp down counterfactual assertions. If they assume a defensive strategy, they risk further emboldening opponents, who may sense weakness, to fight the current proposal and, perhaps, ones yet to be proffered. Fortunately, objections to infrastructure for people on bikes tend to have some commonalities. This creates the potential for a ready-made strategy covering such proposals. This strategy should leverage social media to prepare the ground in advance of likely opposition, potentially muting it before it can build. Academia has a vital role to play in this, as practitioners have access to research that can back up arguments in favor of bicycle infrastructure. In order to make this research easily accessible, academic institutions must also use social media to create talking points that planners can use in their efforts. Given this, how best can academic institutions put forth their expertise on LinkedIn, Facebook, Instagram, and others? Each social media outlet has differences in audience and technical requirements which can affect a post's length, format (such as video), and aggressiveness. This latter aspect can be particularly tricky, as it involves a political skill that some may not be comfortable with. This should be a workshop where audience participation is encouraged, as the social media landscape is constantly in flux.

Once Upon a Time: Creative and Engaging Storytelling for Cycling

Shefali Bharati (Urban Cycling Institute and University of Amsterdam).

Abstract

What does the ideology of a political leader, the product of a CEO and the mission of social activist have in common? - They emerge from compelling stories that influences and invites the public to be aligned with their purpose. Good storytelling has the power to capture imagination, challenge narratives and enable action.

So why not unlock the potential of cycling narratives by harnessing the tools of impactful storytelling? Through riveting characters, emotional connections, strong visuals, rooted data, and calls to action, we can weave engaging tales that resonates with audiences to embrace cycling.

In my presentation, I will urge participants to prioritize storytelling in their cycling research and work. I'll delve into key ingredients and frameworks for crafting captivating stories, and demonstrating how these can be applied across various formats. To support this, I will showcase interactive storytelling tools, striking websites, creative blogs, and illustrative choices. Additionally, the presentation will feature examples of best practices, and links to resources grounded in my research and knowledge of engaging media and communication elements- with an aim to empower individuals and organizations with proven methods and practices.

For researchers, it will offer resourceful tools for presenting their work interactively to broader audiences. For organizations or groups, it will provide ideas for designing communication strategies with key indicators in mind. Above all, it will reinforce the notion that good storytelling is a structured practice with identifiable patterns and can be an important educational tool to shape our cycling mission(s) effectively.

Cycling through Criticism: Decoding Media Impact on Frankfurt's Ride towards Urban Change

Jana Busse (ReLUT), Dennis Knese (ReLUT) and Klara Franke (ReLUT).

Abstract

In 2018, a cycling referendum, endorsed by over 40,000 individuals, called for improved cycling infrastructure in Frankfurt. A cornerstone of this referendum was the proposal for "Bicycle-Friendly Side Streets." These are streets set apart from primary traffic arteries, designed to be especially appealing for cyclists. By 2019, this proposal gained substantial endorsement from a significant majority of the city council. Consequently, the development of these Bicycle-Friendly Side Streets started with strong political and societal backing. After initiating the preliminary steps, the city of Frankfurt decided to have three streets scientifically evaluated in order to assess the acceptance among different user groups and the impact on traffic, safety, quality of stay, and business activity. However, as the implementation progressed, scepticism and critiques in media and political circles intensified. The inaugural Street, "Oeder Weg", evolved into a topic of debate at both municipal and state levels. A year post-implementation, the initiative faced critical coverage from both national and local media, which led to many heated debates among the population and the street becoming a symbolic image in the mayoral election. Subsequent assessments, including two surveys with more than 2,900 participants only on Oeder Weg, suggested that this criticism predominantly echoed the sentiments of a vociferous minority. Through an in-depth meta-analysis of the quantitative findings, our objective is to clarify the extent which media narratives shaped the opinions of the survey participants. Establishing a timeline-based correlation between media publications and survey feedback reveals how strong the influence of the media is on public

perception, even when confronted with misrepresentations or isolated opinions in the press. Using a media analysis by defining key words of the media reports, date of publication and the tone of the coverage we discover similar keywords and attitude mirrored in free-text responses in the raw data of two surveys.

Crafting A Mobile Platform for unreported Incident Notation to close the data Gap

Marc Gschwend (moveable (ETHZ Alumni)), Hannes Heller (moveable (ETHZ Alumni)) and Thomas Hug (Urbanista AG, moveable).

Abstract

The majority of bicycle accidents go unreported, posing significant challenges for accident research and infrastructure planning. In response, we are developing a new feature within the established platform bikeable.ch, a community-driven tool for reporting infrastructure issues.

The new accident reporting tool allows users to easily document (near) accidents online via both a mobile app and website and will have been online for about 3 months at the time of the conference. The reporting will be based on the federal highways police report template for bicycle accidents, which allows to compare the collected data with reported incidents.

The data will be made available to researchers and municipalities, enabling ongoing or project-based analysis of accident information. Benefits to stakeholders include access to a platform for the continuous collection of qualitative and quantitative data, with opportunities for stakeholder and community engagement in its development. Leveraging an existing and growing community of cyclists, stakeholders can improve research and planning practices by identifying hidden accident hotspots and preventing future incidents.

Incorporating discrete route choice models into agent-based simulations

Adrian Meister (ETH Zurich), Milos Balac (CSFM), Kay W. Axhausen (ETH Zurich) and Zheng Liang (HKUST).

Abstract

This paper presents the integration of explicit discrete route choice models into the agentbased simulation framework MATSim, as an example. It represents an obvious research direction, which to the best of the authors' knowledge has not yet been presented for any other agent-based transport simulation framework. Discrete route choice models, estimated from stated- or revealed preference data, are backed by years of research and can be effectively used for prediction. They allow to realistically model heterogeneity using econometric theory, and typically allow for faster model convergence towards user equilibria. We describe the technical integration of such models into MATSim and demonstrate the results using a scenario of Zurich. In a first step, we implement the route choice model only for cycling, but stress that our method is applicable to any non-PT mode.

Cycling safety campaigns. A way to perpetuate the hegemony of the car?

Patrick Rérat (OUVEMA University of Lausanne).

Abstract

The lack of safety is a crucial issue for cycling. It prevents more people to cycle and makes other stop doing so. One major challenge is to accommodate cycling in contexts dominated by the car. This domination is reflected in the way roads are designed and used but also in immaterial elements such as social meanings and images.

Several research have addressed how media coverage of crashes frame safety in a way to remove car drivers' responsibility while exaggerating cyclists' agency. Safety

campaigns are another important media that influences the debates on what should be done to improve road safety. While road safety campaigns are regularly broadcast on a large scale, they have surprisingly received little scholarly attention. This paper aims to fill this gap.

This paper analyses the national cycling safety campaigns launched during the last 10 years in Switzerland. It is based on visual material (e.g. posters) as well as the related media releases. The theoretical framework draws on Carol Bacchi's "What's the Problem Represented to be?" (WPR) approach. It scrutinizes safety campaigns and their justification to identify 1) which problems are represented, 2) what assumptions underpin these representations, 3) how they have come about, 4) what is left unproblematic (or what is absent) and 5) what are the potential effects of these representations.

I show that cycling safety campaigns put the responsibility of safety on individual cyclists, promote individual measures they must adopt (helmet, hi-viz, positioning) while totally ignoring cars and car drivers. By neglecting the fact that roads are a social system with a hierarchy of users, they reinforce the domination of cars and moto-normativity (as coined by Walker).

Enriching OpenStreetMap Data using Computer Vision and Street View Imagery

Iwan Porojkow (TUD Dresden University of Technology).

Abstract

OpenStreetMap is an universal, openly available, crowdsourced and free geographic database covering global street networks. Researchers utilize OSM for a diverse range of bicycle research topics, including route choice, bikeability assessment and simulation. However, the crowdsourced nature of OSM does reveal substantial gaps such as

missing, mistagged cycling paths or land use attributes in certain areas. To mitigate this problem, georeferenced Street View Imagery (SVI) and computer vision (CV) tasks can be performed for feature extraction. Similar approaches have been utilized for bikeability (Ito & Biljecki 2021), walkability (Nagata et al. 2020) and bicycle infrastructure classification issues (Saxton 2022). These studies, however, do not focus on OSM data enrichment. This contribution presents a CV method, a fine-tuned Mask2Former approach (Cheng et al. 2022) that is deployed and used for inference on the SVI. It incorporates a Detection Transformer (Carion et al. 2020) fine-tuned on German traffic signs for further analysis. The features extracted (e.g. proportion of roads, buildings, greenery, visible sky) are matched to the OSM network and attributed to their respective network edges, which can be utilized for further research goals, such as route choice modeling. For the proof of concept, around 25.000 SVI were collected in the city center of Bitigheim-Bissingen, Germany, covering an area of around 4,1 km². Features were extracted using aforementioned CV methods, aggregated and attributed to the OSM network using valhalla. The developed method helps closing knowledge and data gaps and explore and identify novel attributes to enrich bicycle research. The next steps include a thorough adaptation of the CV tasks to German cycling infrastructure as well as validation between cycling infrastructure present in OSM and SVI. Prospectively, CV-enriched network data will be able to improve bicycle research tasks in general.

An Agent-Based Model to simulate urban mobility policies in favour of active modes

David Alvarez Castro (Newcastle University), Alistair Ford (Newcastle University), Roberto Palacin (Newcastle University), Philip James (Newcastle University) and Dominik Ziemke (TU Dresden).

Abstract

The UK has adopted policies that target a shift from widespread use of private cars in urban areas to increased use of sustainable modes (e.g. walking, cycling, and public transport). These include policies framed around decarbonisation of transport and public health. It is often not clear to urban policy-makers which levers are most effective in achieving the necessary modal shift. This could involve a portfolio of measures where a combination of changes to the built environment, human behaviours and financial incentives or penalties are considered. Given the imperative to achieve decarbonisation targets and rapidly reduce emissions from transport, tools and models are needed to test the effectiveness of urban policies, including physical interventions in infrastructure and financial instruments. The distributional effects of such policies on different social groups and in different spatial locations within urban areas must be considered.

The work presented in this abstract tests different urban mobility policies in favour of cycling and walking by applying Agent-Based Modelling (ABM) techniques (MAT-Sim). Such models simulate the spatio-temporal interactions of synthetic individuals travelling for daily activities (e.g., work, shopping) and using different transport modes (e.g., car, public transport, walk and bicycle) during a normal working day. Examples of policies simulated are the implementation of fully segregated cycle paths, low traffic neighbourhoods, economic rewards for cycling, economic penalties for driving, and combining cycling with public transport modes.

ABMs allow the results of each mobility policy to be analysed from 4 different perspectives: transport (e.g., mode shares and transitions of individuals between transport modes), geospatial (e.g., identification of geographical areas where the policy was successful), statistical (e.g., average trip time,

distance and speed by transport mode) and socio-demographic (e.g., identification of groups in society that benefited the most of the simulated policy). Results will be presented for Tyne and Wear, UK.

Evaluating Conference Impact: Amplifying the Importance of Nurturing the Urban Cycling Community - From Bottom to Top

Valeria Leyva Reyes (Urban Cycling Institute) and Dáša Vodvarkova (Urban Cycling Institute).

Abstract

In the domain of urban cycling advocacy, fostering a vibrant and engaged community is crucial. Change often originates from community-driven efforts, emphasizing the significance of fostering the urban cycling community from the bottom up. This perspective aligns with the understanding that impactful transformations in urban mobility occur when communities are empowered and actively engaged in the process. Simultaneously, assessing the impact of urban cycling conferences goes beyond mere participant numbers or feedback forms; it requires a detailed understanding of how ideas disseminate, collaborations form, and knowledge evolves post-event.

This proposed workshop, titled "Evaluating Conference Impact: Amplifying the Importance of Cultivating the Urban Cycling Community - From Bottom to Top," delves into the critical need for effective assessment methodologies within the conference sector, with a specific focus on the Cycling Research Board. Beyond merely assessing impact, the workshop aims to redefine success by identifying and understanding indicators for a successful conference. Through a collaborative approach, the session aims to co-create and identify indicators and tools that contribute to a better understanding of how conferences can effectively serve the urban cycling community. Additionally, expert opinions will

be integrated to enrich the discourse and ensure that the identified indicators align with the overarching goals of fostering community engagement and amplifying impact.

By connecting these narratives, the co-creation workshop not only recognizes how community-driven urban cycling groups can bring significant change but also emphasizes the importance of looking at conferences in a holistic way. One anticipated outcome of this assessment is the potential to secure additional funding to sustain and enhance these events, therefore fostering the advocacy and community-building efforts in urban cycling, as well as generating a list of potential indicators for analyzing the impact of future CRB conferences.

Routinizing a Mobility Practice: Exploring the Impact of Social Environment on the Iteration between Cognition and Everyday Cycling

Ran Zhang (University of Amsterdam).

Abstract

While there is a global push towards active mobility, many regions have faced challenges in transitioning successfully. Nevertheless, there are intriguing exceptions, such as in the Netherlands, where individuals embrace active modes like cycling despite adverse weather conditions. This phenomenon validates what mobility research has long recognized: utility factors, such as cost and time, are not the only attributes that people consider when choosing how to travel. This paper contends that the social environment plays a crucial role in shaping the routinization of mobility practices through everyday experience, using cycling as a prime example.

Throughout this process, cognitive changes emerge as indispensable elements, constructed and adjusted through repeated

practice, both consciously and unconsciously, thereby guiding subsequent individual practices. Addressing the research question of how the social environment impacts the iteration between cognition and everyday cycling practice, this paper proceeds in two main stages. First, we delve into the formation of routinized cycling practices, particularly examining adverse weather as a changeable condition. Within this formation, we pinpoint critical junctures where the social environment becomes influential. Second, we explore the role of the social environment during the iterative process of practice and cognition.

Improving active mobility on Bonaire: a 4 year multidisciplinary project in the Caribbean Netherlands

Dylan Power (Urban Cycling Institute), Desmond Lartey (Urban Cycling Institute), Bárbara Oliveira Soares (Urban Cycling Institute) and Meredith Glaser (Urban Cycling Institute).

Abstract

Introduction The multifaceted benefits of increasing physical activity levels in those who are inactive has been suggested to hold significant impacts for public health. Walking and cycling can act as an easy way to incorporate physical activity into daily life which can lead to substantial health and societal benefits. Data suggest there are low levels of physical activity in Bonaire, an island in the Caribbean Netherlands, where less than 1 in 4 women and 1 in 6 men meet the recommended guidelines for physical activity.

Methods The Urban Cycling Institute, supported by the Ministry of Health, Welfare and Sport began a 4 year research project to enhance active mobility on the island of Bonaire in January 2024. In year 1, a literature review, GIS mapping and interviews with key stakeholders in Bonaire will be employed to understand current levels, and

barriers and facilitators, to active mobility on Bonaire. In year 2, particular focus will be placed on understanding the good practice interventions and areas for future focus within the system of active mobility on Bonaire. In the third year of the project, interventions addressing specific gaps outlined by stakeholders in year 2 will be co-developed. In the final year of the project, stakeholder consultations will be conducted to co-design an action plan and policy recommendations for active mobility on the island of Bonaire in 2028.

Anticipated outcomes This project is intended to be pragmatic and iterative, where findings from research activities will be used to inform practice in Bonaire, and vice versa. Overall, the project will gather context-specific data to inform the development of an action plan and policy recommendations to increase active mobility on the island of Bonaire.

Exploring the effects cycling infrastructure improvements in a broader mode-choice experiment

Lucas Meyer de Freitas (ETH Zurich) and Kay Axhausen (ETH Zurich).

Abstract

Stated-preference (SP) mode-choice surveys are the basis for transport models therefore impacting behavioral forecasting, impacts of infrastructures and policies as well as on their evaluations. Typically these models as well as such SP surveys have a focus on public transport and motor vehicles. We intend to include contextual changes in street design in a SP experiment, in which more space is allocated to active mobility, especially cycling, to evaluate how these impact individual's preferences. Additionally, the significant increase in car travel times as well as externalities are included in the experiment. With the results, not only elasti-

cities for cycling demand in a context of significantly improved cycling infrastructure can be measured, but also the elasticities for car travel in a context of significant reductions in the attractiveness of motor vehicle travel.

How Does Selective Attention For Cyclists Work? Analysis Of Attention In The Perception Process

Martin Bejarano (University of Applied Sciences of Karlsruhe).

Abstract

The decisions taken by any road users in any given situation depend mainly on the perception of reality. In the perception process, attention, understood as one of its main phases, is decisive for decisions and actions within the multiple scenarios of mobility. The senses, primarily vision, play a key role in assessing attention with respect to bicycle mobility, considering that, unlike pedestrians or motor-vehicle drivers, the cyclist is constantly subjected to abrupt changes in infrastructure, signage or the environment in general. In this scenario, the attention given to the route itself, as well as to the challenges of each change, determine sequences that can be measured, analysed and interpreted, leading to a first approximation of the elements influencing the cycling experience and its impact on a route. Although psychological or biological aspects, among others, have been addressed in a wide range of studies in different areas of research on human decisions and behaviour, it is essential to highlight those aspects that are fundamental in the context of cycling transport research. Understanding the cycling perspective, i.e. their personal experience in relation to their senses, is crucial, in order to effect real change in cycle infrastructure planning. Taking into account the fact that there are disparate theories as to the process of per-

ception, the research in this study aims in its first phase, to put these theories onto a comparative plane, commencing with the evaluation of the concept of attention in cyclists, with a specific focus on the concept of “selective attention”. As such, this study analyzes the vision of cyclists using technological devices (Eye-Tracking technology), while concurrently observing biomechanical actions, e.g. pedalling or braking, using videos and sensors.

Exploring free-riding behavior: An instrumented bicycle study on the influence of infrastructure design on cycling

Danil Belikhov (Chair of Bicycle Traffic, School of Architecture and Civil Engineering, University of Wuppertal), Guillermo Pérez Castro (The Swedish National Road and Transport Research Institute (VTI)), Fredrik Johansson (The Swedish National Road and Transport Research Institute (VTI)), Heather Kathis (Chair of Bicycle Traffic, School of Architecture and Civil Engineering, University of Wuppertal) and Johan Olstam (The Swedish National Road and Transport Research Institute (VTI)).

Abstract

Cycling behavior is shaped by infrastructure design, weather conditions, other road users, and individual preferences. The human-powered motion in cycling indicates that physical capabilities and perceptions of effort play a key role in how bicyclists ride. In this study, we examine the behavior of bicyclists not influenced by other road users or traffic regulations, also known as free-riding behavior. Given the broad heterogeneity in the characteristics of bicyclists, free-riding behavior varies greatly in bicycle traffic. Understanding how free-riding behavior differs among bicyclists and how it correlates with the environment is critical for planning efficient, safe, and attractive transportation systems. However, collecting detailed and reliable free-riding data is challenging due to technical limitations, privacy

regulations, and the presence of traffic rules and other road users. In this study, we introduce a data collection method using instrumented bicycles in a semi-controlled experiment for collecting detailed data on free-riding behavior (e.g., speed, acceleration, power output, heart rate, energy expenditure) over designated routes. The proposed method enables participants to use their own bicycles. Bicyclists who frequently commute are instructed to ride along a designated route and complete a survey to assess their experience and perceived effort. Based on the collected data, we characterize free-riding in connection to the longitudinal gradient of the route and identify clusters of bicyclists sharing common traits. We conduct the experiments in two locations, one in Germany and one in Sweden. Both locations differ in infrastructure design and longitudinal gradient. Preliminary findings demonstrate that route gradient significantly influences free-riding behavior. For example, increasing gradients tend to reduce speed and increase power output linearly on light to moderate uphill. Furthermore, gradients prompt tactical behaviors associated with energy expenditure. Findings can support bicycle traffic planning by providing data-driven insights that inform decision-making, traffic model development, and designing e-bikes that optimally support bicyclists.

How do bicycles improve women's mobility and access to essential services and economic opportunities?

Winnie Sambu (World Bicycle Relief & University of Cape Town).

Abstract

Walking is often the primary mode of travel for majority of people living in rural areas of sub-Saharan Africa. People walk for long periods of time or forego travel when they lack affordable transportation. This can have ad-

verse consequences, including time poverty, reduced access to healthcare and education, and limited access to income-generating opportunities. This presentation will demonstrate the potential of bicycles to positively impact women's travel patterns, productivity, and livelihoods. We draw on quantitative data from nearly 450 adults in three rural locations (Malawi, Kenya, and Zambia) who received donated bicycles from World Bicycle Relief. The study follows a pre and post evaluation design. Prior to bicycle receipt in 2022, a random sample of program participants were interviewed in a baseline survey. This was followed by an assessment a year later.

The findings will show a significant change in women's travel patterns, with a shift from walking to using bicycles for nearly all trips. As a result, transportation expenditure is significantly reduced and by an average of nearly 50% in Malawi. Additionally, 95% of women in Malawi, 75% in Zambia, and 50% in Kenya report that bicycles have decreased time spent on day-to-day travel. For example, travel to markets reduced by an average of 33% in Malawi. Time savings are used for income generation, household chores, rest, and leisure. From an economic perspective, women report positive impacts on livelihoods, with more than 80% in all three locations saying that bicycles have contributed to increased household income levels. Additionally, there are improvements in subjective measures of wellbeing, as women report feeling empowered and appreciative of the independence and convenience that a bicycle offers. Given these positive effects, there is an increased need for system-level interventions that support improved bicycle uptake, including increasing access to high-quality bicycles.

Classification of bicycle infrastructure in OpenStreetMap

Mirosława Lukawska (TUD Dresden University of Technology), Emely Richter (TUD Dresden University of Technology), Iwan Porojkow (TUD Dresden University of Technology) and Stefan Huber (TUD Dresden University of Technology).

Abstract

Reliable cycling network data is a crucial element of bicycle research. OpenStreetMap (OSM) is a global and open-source network dataset and several studies used OSM to classify the bicycle infrastructure, mostly as a means to achieve a further goal (e.g., modelling cycling). However, infrastructure classification varies across studies and common standards are lacking.

In this work, we focus sheerly on the categorization of OSM data, aiming to understand the patterns in the typification of the bicycle infrastructure in the German context. We differentiate between five categories: separate bicycle tracks, painted bicycle lanes, shared bus lanes, roads mixed with other non-motorized modes, and bicycle roads (Fahrradstraße). We further differentiate between three categories of roads which are not explicitly excluding cyclists: paths and tracks, dedicated pedestrian infrastructure, and roads mixed with motorized modes. The classification is based on a compilation and intertwinement of multiple queries across OSM key tags (Table 1). For the implementation, we draw inspiration from *netapy* — a Python library classifying different types of infrastructure in OSM — and refine and extend the code by conditions and categories relevant to Germany. As a result, we provide an easy-to-use framework for utilizing (often not clearly tagged) OSM data to infer information about bicycle infrastructure. Furthermore, we intend to make the results of this work publicly available in an easy-to-use interface format.

This work results in a standardized, widely-available data basis for modelling cycling in

a network. Our approach is adjusted to capture the patterns in Germany, enabling region-specific insights and models. It aims to foster a conversation between municipalities, facilitating transferable and comparable results — a feature much desired in research. The next steps encompass a systematic comparison with other network sources and validation of the results by the authorities from different types of municipalities throughout Germany.

Safety Implications of Bicycle Sharing Systems: A Case Study from Konya, Turkey

Ömür Kaygisiz (Mugla Sıtkı Kocman University) and Ahmet Yıldız (Macromedia University of Applied Sciences).

Abstract

In the study, spatial and non-spatial analyzes are carried out using data on fatal or injured traffic accidents involving a total of 1026 cyclists in Konya City (Turkey) between 2009 and 2012, and the effect of establishing a bicycle sharing system - established in 2011- on the temporal and spatial distribution of accidents involving cyclists is revealed. The analysis begins with spatial assessments, discussing findings from before and after the system's installation. At this stage, firstly, annual accident density maps are created with the Kernel Density Estimation Method and the effect of the establishment of the system on the spatial distribution of bicycle accidents is revealed. Subsequently, colocation analysis is used to examine changes in spatial accident patterns before and after the installation. In the second stage, where non-spatial analyzes are carried out, the annual distribution of accidents involving cyclists is examined according to the variables "days of the week, driver gender, driver education level, accident occurrence, intersection status of the accident scene, weather, driver age". Three main con-

clusions are reached with the preliminary findings: First, approximately half of the bicycle accident victims are in the 5-21 age group, and the number of cyclists involved in fatal or injured accidents increases by 116% after the installation of the bicycle sharing system. Secondly, after system installation, the pattern of accidents involving cyclists differs dramatically and accident intensities are shifted to the locations where the bike sharing system is installed. Furthermore, bicycle crashes significantly cluster around stations both before and after installation, with a confidence level of 0.95. In addition, after the installation, the significance level increases significantly from a r^2 value of 0.26 to a r^2 value of 0.77 in 2012.

Cyclists' delays at urban intersections

Ueli Isenschmid (ETH Zürich) and Mads Paulsen (Technical University of Denmark).

Abstract

Recent studies on cycling behavior using GPS data have provided insights into factors affecting cycling speeds and delays, including infrastructure, traffic signals, and rush hour congestion (Clarry et al., 2019; Gillis et al., 2020; Pazdan & Kiec, 2023; Poliziani et al., Strauss & Miranda-Moreno, 2017). These works have identified critical aspects such as the presence of traffic signals and road design as significant contributors to delays, yet few have quantitatively modeled these delays across different urban settings, and no studies have examined the influence of different intersection designs in terms of both geometrical layout and built environment specifically. The "DataKrykke" project at the Technical University of Denmark leverages an extensive GPS dataset containing hundreds of thousands of bicycle trips. This master's thesis, as a component of the broader project, focuses on modeling cyclist delays at urban intersections. A special em-

phasis is given on the role of traffic lane layouts at intersections, but incorporates geometric factors like road grade, characteristics of built urban and traffic design measures and surface type. Utilizing enrichment data from OpenStreetMap, in-person-documentation where appropriate and municipal data, the project aims to ensure accurate representation of real-life conditions of cyclists' behavior immediately in front of, on, and after passing intersections. In the analysis, a linear regression model is employed to quantitatively assess the impact of intersection characteristics on average cyclist delay time. It takes into consideration variable cycling speeds influenced by diverse urban environments and incorporates both signalized and non-signalized intersections. A comparative analysis across different urban settings is conducted to derive generalizable findings and possibly produce an "urban designer's handbook" with concrete recommendations. Additional variables will be assessed and discussed during the conference presentation, which will also include a discussion on how to use the measures to obtain better conditions for cyclists.

Identifying and connecting Low Traffic Neighbourhoods for optimal cycle network growth

Chris Larkin (Newcastle University), Craig Robson (Newcastle University) and Alistair Ford (Newcastle University).

Abstract

Low traffic neighbourhoods (LTNs) form a major part of cycle infrastructure across Europe where they have been shown to increase rates of cycling, improve air quality and reduce usage of private motor vehicles when studied at a local scale. The reduced speeds and volumes of vehicles provide streets which are safer and more accessible for cyclists and can be used as a cost-effective

alternative to segregated cycle infrastructure. However, there remains a lack of integration of these LTN zones to cities' cycle networks. This is driven by a lack of knowledge on both where LTNs are and how to connect these zones optimally. This research presents two open-source tools for planning and connecting LTN infrastructure. Firstly (i), an identification tool to delineate and classify existing LTNs within urban areas and secondly (ii), a connection tool to eliminate the 'missing links' between LTN zones and existing cycle infrastructure at a minimum cost. The LTN identification tool uses OpenStreetMap data to identify potential neighbourhoods where streets are safer for cyclists. For each neighbourhood, a LTN plausibility score is computed, consisting of measures of modal-filter density, neighbourhood permeability by mode type, and through-traffic modelling. K-means clustering is used to classify the likelihood of neighbourhoods as either low-traffic or not. The LTN connection tool uses the plausible LTN zones from (i), OpenStreetMap and measures of graph network centrality to identify where and what type of missing links are found between neighbourhoods and existing cycle infrastructure. Cities' cycle networks are then optimised by procedural addition of links to generate a synthetic best-connected cycle network, utilising as much existing infrastructure as possible. Our results show how plausible LTNs can be identified at national scale and how these neighbourhoods should be best connected in the context of city-scale cycle networks through automated analysis.

Organising integrated urban mobility: Exploring cycling's role through an action net analysis

Russell Cannon (Lund University), Dalia Mukhtar-Landgren (Lund University) and Mats Fred (Lund University).

Abstract

Multimodal integration is currently being discussed as a way to challenge the dominance of automobility by offering a vision of interconnected urban mobility that can provide an attractive alternative to private car ownership. In this article, we explore multimodal integration through a vélomobility lens by analysing the urban mobility system as a network of connected and disconnected actions, using the organisational concept of an action net. Combining critical organisation studies and a mobilities perspective, the article provides an insight into the role of cycling in the current and envisioned integrated urban mobility system. The analysis is based on actions taken with the intention to promote integrated mobility during one year in two Swedish cities.

We identify physical, digital and conceptual boundary objects that support (and hinder) actions to connect: (1) Bike & Ride facilities and bike-sharing docking stations operate and bridge the boundary between the cycling and public transport domains, providing a durable connection between the actions that support each mode; (2) the regional travel planning app plays a crucial role in coordinating the multimodal journey, but also in delimiting this multimodality in a way that excludes and marginalises cycling; (3) the 'whole journey' concept emphasises the role of cycling in the first-and-last-mile and acts, to some extent, as a counterpoint to fragmented responsibilities and modal share targets at municipal and regional level.

The results also show that while many actions have a future-oriented focus and relate to 'innovative' or 'smart' solutions, cycling integration is primarily achieved through everyday, mundane planning, thus challenging the pro-innovation bias in future sustainable mobility visions. Furthermore, while actions taken to support emerging forms of smart and shared mobility may help to challenge automobility and promote cycling, this is

contingent on the mode being packaged into a commercial service.

Rethinking methods for planning support: replicating existing patterns or planning for inclusive, enabling future mobility?

Christian Werner (University of Salzburg) and Martin Loidl (University of Salzburg).

Abstract

Methods for planning support that aid the creation of coherent cycling networks have great potential. Infrastructure interventions may be prioritized according to their systemic impact, enabling us to raise higher cycling potentials. However, many - especially data-driven - methods tend to replicate present spatial mobility patterns rather than supporting the evolution of new patterns as a result of integrated planning.

For example, data on observed travel demand is commonly used to determine the systemic relevance of road and path segments. However, such data - if available in appropriate quality, timeliness and spatial resolution at all - by definition captures a past or present pattern. In many cases, it is also focused on a specific trip purpose. This implies that decisions based on such data in consequence optimize towards these past or present patterns.

This is why we want to critically reflect present approaches and discuss the idea of enabling mobility for everyone, on any possible relation within and in between inhabited areas up to a given maximum bikeable distance as foundation. We present a method that implements this approach by following a merely topological and morphological spatial network science perspective. It relies on segment-based bikeability to generate bikeable routes which are then utilized to assess systemic importance of each segment. Furthermore, we propose to move away from presenting single results to regarding a set

of outputs which are based on different model assumptions. This allows to better address diversity of mobility requirements and behavior. We will provide real-world examples for the method outlined and make them available alongside the code used to generate the results.

This input should serve as starting point for discussing the topic in a broader context. We expect a high-quality discussion with participants from diverse domain backgrounds which should inform future research.

Cycling to work - using entropy balancing to decompose changes in bike share over time

Nicole Reinfeld (Frankfurt University of Applied Sciences - ReLUT) and Tobias Hagen (Frankfurt University of Applied Sciences - ReLUT).

Abstract

In recent years, developments in the society (e.g., demographic change, urbanization, migration) have influenced the modal share of cycling, prompting the need to discern whether these changes stem from observable factors like age and income or from unobservable ones like attitudes.

To decompose the impact of the (un)observables on the modal shift, previous studies used conventional approaches like Oaxaca-Blinder Decomposition. We propose employing Entropy Balancing, a method rooted in causal inference literature. This technique aims to compare groups, balancing observable characteristics to mimic controlled randomized trials from medical research.

Applying this method on German Microcensus data spanning from 1980 to 2020, we assess changes in commuting behavior, particularly focusing on bicycle traffic. By treating respondents from 1980 as the "treatment group" and subsequent years as "control groups", we aim to understand how travel habits would differ if people today had

similar characteristics to those in 1980 for varying scenarios.

Our findings indicate that if the residential structures today would on average equal the residential structures of 1980, 13% of the employed respondents living in Western Germany would use the bicycle on their way to work (instead of 10.4% of the respondents in the raw data). Likewise, only 8.4% of the employed respondents living in Western Germany would use the bicycle on their way to work if female labor market participation would equal the year 1980. The raw data indicate an increase in bicycle usage of 3.9 pp from 1980 to 2020. When controlling for all observable characteristics in the data, the increase amounts to 4.5 pp. We assign the difference (-0.6 pp) to unobservable characteristics in the data. Next to subjective factors like attitudes, these can include pricing of alternative modes or changes on the supply side (e.g., infrastructure).

Agent-Based Study of the Cycling Potential in a Medium-Sized City

Gregor Rybczak (Technische Universität Berlin) and Kai Nagel (Technische Universität Berlin).

Abstract

In accordance with the overarching goal of German transport planning, the city of Gladbeck, situated within the Ruhr region of Germany, has set a target of reducing CO2 emissions in the mobility sector by 68 % by 2030. To facilitate further discussion on the means of achieving this goal, the city will conduct a series of small living labs. One of these focused on improving the cycling infrastructure on one of the busiest streets in Gladbeck. The marginal effects in terms of the number of cyclists and public backlash due to the elimination of parking spaces resulted in a return to the status quo. Given the task of evaluating these living labs using MATSim (Multi-Agent-Transport Simulation), we also

observed no significant change regarding cycling (+0.4 %pt. bike share in the modal split) within our simulation framework. However, as we believe that cycling can be an essential part of achieving the goals set by the city, we have examined a radical scenario for promoting cycling within the city. Our sensitivity studies on the current MATSim bicycle extension presented at the last Cycling Research Board Meeting showed that accelerating bicycle traffic is the most effective measure to achieve a modal shift. In consequence, inspired by the E-Bike-City, we rededicate half of the road space in favor of bicycles and double the speed of cyclists. The results show a change in the modal split (+11 %pt. bike share) resulting in a significant reduction in CO2 emissions (-8 %), calculated based on the Handbook of Emission Factors for Road Transport and noise levels based on the German guidelines for noise protection on roads. A comparison with the other measures discussed in the city that we evaluated indicates that this radical scenario is promising in terms of the city's objectives.

A systematic evaluation of travel time based accessibility provided by bicycles

Marco Miotti (ETH Zurich) and Stefanie Hellweg (ETH Zurich).

Abstract

Efforts to improve cycling infrastructure are being discussed and implemented across cities around the world, including in Switzerland. The primary goal of this new infrastructure is usually to make cycling safer and more comfortable, thus better accommodating current cyclists while also attracting new riders, that is, incentivizing modal shifts. A key question in this context is whether, where, and how often cycling is an effective mode of transport in terms of travel time compared to alternative modes. The more effective cycling as a mode, the more

sense it makes to actively promote cycling infrastructure from an integrated policy perspective. Here, we use a previously developed multi-scale travel time engine to estimate the travel time with different modes for millions of origin-destination pairs across several cities in Switzerland. Based on these estimations, we evaluate the access in terms of travel time that is provided by bicycle in comparison to other modes for different trip purposes. We conduct this analysis twice: once for regular bicycles, and once for e-bikes, yielding highly spatially resolved maps for the accessibility level of service provided with the two types of bicycles. Finally, we derive implications for citizens and policy makers in terms of for socio-economic benefits of a strengthened cycling infrastructure.

A Network for the People: Planning User-Friendly Bike Highways in Solothurn with Levels of Traffic Stress

Sascha Attia (Amt für Verkehr und Tiefbau, Kanton Solothurn), Simone Hunziker Piller (Amt für Verkehr und Tiefbau, Kanton Solothurn), Julian Baker (Kontextplan AG, Solothurn), Pascal Humbert (Kontextplan AG, Solothurn), Leila Rathey (Kontextplan AG, Solothurn) and Annekäti Hartmann (Kontextplan AG, Solothurn).

Abstract

The Canton Solothurn will build a 150km long network of bicycle highways. The main political goal is to create a substantial modal shift to cycling. Thus the core question of our project is: How do we build Infrastructure that people actually want to use?

In order to achieve this goal, we have adapted the American concept of Levels of Traffic Stress (LTS) to the Swiss environment. Together with Kontextplan, an engineering firm, we have developed a planning method for evaluating possible routes and defining the infrastructures needed in order to get people cycling.

We assume that about 60-70% of the population are interested in cycling but very concerned about their safety. By using LTS we can address these concerns. We have defined specific criteria for measuring LTS for routes and intersections. By adding scores we are able to calculate Levels of Traffic Stress between 0 (suitable for 100%) and 4+ (suitable for 1%). Also, we assume that the weakest link defines the LTS for the entire route.

Further we will present an example of how we apply LTS when finding a route for a bike highway. We will show in particular how LTS helps us finding the weakest link (i.e. intersection or section) in a proposed route. Furthermore how we evaluate proposed routes against each other by weighing solutions for the weakest links of each route against each other.

Our aim at the conference is to present our method and the related tools we have developed. In particular, we would like to discuss our set of criteria with other participants. Following the conference, we would like to improve our method by including results from related research.

Inclusive cycling mobilities: Experiences with assisted cycling services for elderly care home residents

Daniel Valentini (Swedish University of Agricultural Sciences (SLU)).

Abstract

Cycling is often framed as 'active' modes of transport and mobility around the category of a 'standard' non-disabled bicyclist. Such representations tend to marginalize people outside the cycling mobility norm, for instance, people with disabilities – including elderly people challenged to participate in 'normal' bicycling. Yet, mobilities scholarship has evidenced the importance of diversified cycling representations for inclusive

and just mobilities. This study aims to foreground assisted cycling services for senior care-home residents. It departs from the work of the non-profit organization Cycling Without Age which offers cycling trips in adapted tricycles for people challenged to experience cycling on their own. It is empirically based in central Uppsala, Sweden, where we conduct trips with care-home residents from several care facilities using questionnaires to assess their general well-being before and after each trip to capture their cycling experience. We present preliminary findings from these trips. Our tentative results confirm previously established benefits of assisted cycling services on the well-being of care-home residents in other contexts. We identify benefits that revolve around a diversification of care-home residents' mobilities and its corollaries, such as experiencing social interactions outside their everyday environments. Building on these findings, we see the potential to increase assisted cycling services in Uppsala further. More than 40 cycles are currently available at different care homes in Uppsala municipality. Their frequent utilization depends on, for instance, the active engagement of care workers volunteers to proliferate inclusive cycling services. Based on survey data from these groups, we identify both challenges and opportunities for care-home residents' increased participation in cycling.

The contribution presents preliminary findings of the Formas-financed project "Inclusive Cycling Mobilities in Uppsala", a collaboration between SLU, Uppsala Kommun, Cycling Without Age Sweden, and the Red Cross Uppsala.

Improving mobility equity: developing the Cycling Potential Index

Roxani Gkavra (University of Natural Resources and Life Sciences (BOKU)) and Pantelis Kaniouras (ESRI).

Abstract

Cities globally encourage cycling for improved urban well-being, health, and personal mobility. However, urban planning practices and policies on active mobility tend to favour certain areas and disregard others, leading to disparities in cycling infrastructure. Thus, low horizontal and vertical equity appears. To tackle this issue we introduce a comprehensive indicator, the "Cycling Potential Index". The indicator's development aims at providing a tool for evaluating and prioritizing locations regarding their need and potential for increasing the usage of bikes. This indicator considers multiple and diverse factors, such as existing cycling infrastructure, safety, air quality, and population characteristics, to identify priority areas for cycling infrastructure development. The initial and simplest form of the indicator is a linear, additive (with or without weights) equation that sums the relative values of the different decisive parameters. Factors indicating higher potential for cycling infrastructure construction, e.g. sufficient road width for the introduction of cycling lanes, have a positive sign. On the contrary, parameters that create unsafe cycling circumstances, such as heavy motorized traffic, reduce the Cycling Potential Index's value. Nevertheless, the signs might differ based on the desired outcome of the interventions. The indicator's flexible definition allows for analysis at different spatial levels, ranging from local neighbourhoods to national scales. The index can also adapt specific local considerations, aligning with distinct goals and demographics. Moreover, the method not only addresses current gaps in cycling infrastructure planning but also presents an adaptable approach suitable for varied urban contexts and easy to use by policymakers. The output of this research could contribute to the design of urban environments that are not only more bike-friendly but also more inclusive, align-

ing with the broader theme of accessibility and equitable mobility.

Understand the effect of e-bike trial in substituting Vehicle Kilometres Travelled (VKT)

Abhilash Singh (University of Limerick), Louise Foley (University of Limerick), James Green (University of Limerick), Yvonne Ryan (University of Limerick), Catherine Woods (University of Limerick), Colin Fitzpatrick (Dept of Electronic & Computer Engineering, University of Limerick), Cathal Walsh (Trinity College Dublin), Sinead Moylett (Trinity College Dublin) and Anna Barrero (University of Limerick).

Abstract

E-bikes offer a sustainable, equitable way to travel, while still offering a health-oriented active travel choice. A systematic, longitudinal approach is crucial for understanding the impact of e-bikes on modal shift patterns through objectively measured travel behaviour. The Inclusive Sustainable Cycling (ISCycle) behaviour change intervention aims to assess the impact of e-bike loans on replacing car trips, increasing physical activity levels, developing sustainable travel habits and likelihood of future e-bike purchases. A randomised controlled trial is being conducted, with participants randomised to one of three intervention groups (4-, 8-, or 12-week e-bike loan) or to a waitlist control group. Participants are recruited as working adults who currently use a car for at least some commuting trips per week and interested in adopting an e-bike. Measurements include self-reported questionnaires, passive GPS logging using Google Maps, and on-bike GPS tracking.

In this analysis, we aim to develop a modelling framework to estimate participants' modal shift from baseline to the intervention period. Particularly, we aim to understand the impact of the e-bike loan intervention in substituting Vehicle Kilometres Travelled

(VKT). This analysis is further segmented by three intervention groups, for each 4-, 8-, or 12-week e-bike loan, to estimate marginal differences in effect of loan duration on VKT substitution, automaticity and subsequent purchase. The analysis will also estimate the impact of e-bike loan interventions on duration of weekly active travel, measured by active-VKT (distance travelled actively, such as by walking or cycling) and active travel duration (the time spent in active modes of transportation). By comparing these metrics before and during the e-bike loan intervention, the study can quantify the increase in active travel resulting from access to an e-bike.

Exploring the Role of Bottom-Up Cycling Initiatives in Immigrant Integration: A Comparative Study - Peru & South Africa

Paloma Chuquín Alarcón (Independent scholar).

Abstract

This study will investigate the potential of cycling as a catalyst for immigrant integration and social inclusion in contexts where cycling culture is absent and governmental support is lacking. Drawing on contrasting cases from South Africa and Perú, where immigrants face distinct challenges, this research seeks to examine why grassroots cycling initiatives thrive in one context while faltering in another. In South Africa, township residents, primarily immigrants from various countries of Africa endure long commutes to access employment opportunities amidst economic constraints and limited public transport, however, social stigma associated with cycling is prevalent among residents and hinders its potential. Conversely, in Perú, a group of Venezuelan immigrants initiated a cycling collective that rapidly gained traction among both Venezuelans and Peruvians, fostering a sense of belonging and social cohesion. By analysing the motivations, successes, and challenges

of these initiatives, this research aims to identify key factors driving the Peruvian case's success and its potential to influence governmental support. This research underscores the significance of bottom-up approaches in promoting immigrant integration.

RADBEST: Cycling guidance under constrained road conditions

Rebecca Hunziker (OST Ostschweizer Fachhochschule) and Lena Rügge (OST Ostschweizer Fachhochschule).

Abstract

We want to present the findings of our study in the DACH region (Germany, Austria, Switzerland) on the evaluation of cycling guidance under constrained road conditions, conducted between 2022 and 2024 by an interdisciplinary and international research team. Guiding bicycle traffic under constrained conditions often presents a unique challenge, as optimal solutions are not realisable and conflicts tend to accumulate. However, finding the best solution possible is of great importance for the promotion of subjectively and objectively safe cycling. Although the guidelines allow for a wide range of measures, evidence-based recommendations are needed. Therefore, it was the goal to assess which infrastructural solutions are the best in such situations and to derive recommendations concerning measures for planning practice. Empirical data was collected on different routes with various bicycle traffic guidance measures. Mobile and stationary sensor technology (ultrasound, LIDAR, video) was used to measure objective safety (vehicle overtaking maneuvers) and surveys and human sensor data to assess subjective safety. The results show that regardless of infrastructure type, country, or speed regime, medians mostly range between 1.0m and 1.3m. The only infrastruc-

ture type where a median of more than 1.5m was observed was on a core carriageway with a narrow core and wide bicycle lanes of 2m. These results lead to the conclusion that cyclists should either be overtaken with a safe distance or not be overtaken at all. The infrastructure should clearly convey this to motor vehicle drivers, so that the principle is intuitively understood, and the desired behavior occurs. In order to improve cycling in constrained road conditions, it is consequently necessary to give priority to bicycles over cars by reducing the space for cars and increasing the space for bicycles. Depending on the road widths, we will present preference solutions that aim to be objectively and subjectively safe simultaneously.

Green Wave for Cyclists: An Overview from Practical Implementations

Md Azizur Rahman (Chair of Traffic Process Automation, Technische Universität Dresden), Sven Fröhlich (Chair of Traffic Process Automation, Technische Universität Dresden), Django Adam (Chair of Traffic Process Automation, Technische Universität Dresden), Sebastian Pape (Chair of Traffic Process Automation, Technische Universität Dresden) and Meng Wang (Technische Universität Dresden).

Abstract

As cities around the globe struggle with increasing traffic congestion, transport-related emissions, and the pressing need for sustainable mobility, cycling has become an effective mode of transport to mitigate these hurdles. Furthermore, despite the implementation of numerous political and traffic planning measures in various German cities, bicycle traffic has largely been overlooked in the realm of urban traffic control strategies. Instead, the focus has primarily been on addressing the operational requirements of motorized and public transport traffic. Traditionally, cyclists frequently encounter red lights at signalized intersections, forcing them to come to a halt and expend additional

energy to regain momentum through physical effort, producing double disadvantages for them: prolonged travel delays and a sense of exclusion from traffic control measures primarily designed to accommodate motorized traffic. It is argued that it is perhaps more necessary to have the green wave for cyclists instead/in addition to motorized traffic to keep the bicycle delays and the number of bicycle stops as low as possible. It could also offer great potential to improve the overall bicycle traffic flow, reducing noise and air pollution, promoting general health, shifting the modal split in favor of cycling, and finally ensuring city-friendly traffic. However, there is hardly any reliable and detailed information on implementing bicycle green waves and their effects on other modes of transport. This study aimed to close the gap by exploring the applicability of green waves for cyclists in an urban corridor, focusing on gaining insights from global practices and highlighting an overview that enhances the general understanding. Finally, the study underscored that while designing green waves for cyclists is achievable, it necessitates comprehensive studies. More importantly, what is required are real commitments from policyholders to foster a greener and more sustainable urban environment.

Building a Cycling Culture in Nairobi: A Case Study of Nairobi Central Business District

Harriet Omondi (None).

Abstract

For a city that was established due to the development of transport infrastructure, Nairobi is lagging when it comes to catering to the ever-changing transportation needs of its residents.

Non-Motorized Transport(NMT) mode accounts for more than half of the trips made within the Nairobi CBD. Among these, cycling makes up a very small percentage. The ma-

major factors preventing the popularity of different modes of cycling are; the failure to uphold policies that have been created over the years, and the lack of safe, continuous cycling lanes and complementary cycling infrastructure. Do these policies even exist and what guides their formulation?

This study aims to understand the history of Nairobi's cycling policy, to look at how the existing infrastructure can be leveraged to attract more cyclists and to provide information about cycling in African cities that are especially missing from major conversations being had around the topic in the global north.

The research adopts the literature review of papers done around the same topics, and a review of the Nairobi city plans as a method of data collection. We also use qualitative interviews of stakeholders working on cycling promotion and policies in Nairobi city.

This paper sheds light on the issue of cycling in Nairobi CBD and proposes questions on future research around the topic.

Fast-lane for cycling infrastructure: On the effectiveness and efficiency of cycling infrastructure planning processes

Arnór B Elvarsson (ETH Zürich), David Zani (ETH Zürich) and Bryan Adey (ETH Zürich).

Abstract

Canton Zürich has set ambitious targets to achieve their goals to complete the Canton Zürich cycling network of about 1921 km until 2043. This will require construction and modification of a total of 602 km of its cycling network. Some projects already lag behind: construction of the 12 km long Limmattal cycling highway from Zürich to Dietikon, expected to begin in 2024, has been delayed indefinitely. Furthermore, these projects require high investments (e.g., the Limmattal cycling highway is estimated to cost ca. 50

million CHF) in comparison to the Canton's annual budget allocated to cycling (about 20 million CHF).

This presentation will visualise the cycling infrastructure planning process for the Canton of Zürich and identify the hindrances to being able to prioritise the cycling infrastructure to achieve the set targets until 2043, based on resource allocation, technical readiness, and consensus-building. The presentation will include an analysis of 1) Canton Zürich's cycling infrastructure investments since the first Cycling plan in 2010, 2) the planning process' capability to foster technical readiness, e.g., by designing all 602 km, and 3) factors related to consensus building for cycling infrastructure, e.g., communicating cost effectiveness and societal objectives related to the investments, like contributions to net-zero goals. Finally, the presentation will close with suggestions of planning support tools to make the planning process more effective and efficient including an outlook of future research.

Shaping our Cycling Culture – case example from the winter cycling capital Oulu

Isabel Scherer (Cycling researcher, EIT Urban Mobility Graduate).

Abstract

Cycling is an essential component in making our cities more sustainable and livable. Numerous factors are shaping a city's cycling culture. However, it is usually hard to grasp the term 'culture', not to mention trying to define it. This presentation offers a glimpse into which factors and stakeholders shape a cycling culture based on a master's thesis completed at Aalto University in the autumn of 2023.

The case study for this thesis is the City of Oulu, commonly recognised as the winter cycling capital of Finland. Usually, Oulu's success is traced back to its well-planned cy-

cling infrastructure with a separated cycling lane network established in the 60s, alongside reliable and well-planned winter maintenance providing service 24/7 on the main routes during winter. However, what is interesting about Oulu is the fact that winter cycling is considered a convenient everyday means of transportation. Instead of the classic portrayal of a 'sporty, tough, mostly male' winter cyclist, the City of Oulu has succeeded in creating a picture of cycling being something fun, a social activity, for everyone and everyday purposes.

The idea for the CRB conference is to transform the framework from winter cycling to cycling culture in general. It includes a mixture of theoretical background, exploring the importance of including culture as an aspect of cycling planning, and practical insights into which factors and stakeholders shape the cycling culture. The main aim of the presentation is to provide food for thought/action on how to shape your city's cycling culture.

Human-centric digital twins: a contradiction-in-terminis or a useful tool to plan the cycling city?

Lucas van der Meer (University of Salzburg), Philip Amaral (European Cyclists' Federation), Mario Cools (University of Liège), Lukas Esterle (University of Aarhus), Gustav Friis (Aarhus Municipality), Richa Maheshwari (University of Liège), Sofie Malm (Eskilstuna Municipality), Fariya Sharmeen (KTH Royal Institute of Technology), Christopher Stelzmüller (Triply GmbH), Peiling Wu (KTH Royal Institute of Technology), Dana Kaziyeva (Triply GmbH), Christian Werner (University of Salzburg) and Martin Loidl (University of Salzburg).

Abstract

Digital twins are virtual representations of physical systems. They originated as a way to anticipate rocket engine failure. Recently they became popular in urban planning, as a realistic digital model of a city, fed by sen-

sory data and informing decision making. Many promises have been made, painting a futuristic picture of a "smart city brain" that automatically senses and steers its dynamic processes.

Those promises have remained largely empty and the urban digital twin is struggling to move past the stage of a mere hype technology. Cities are not rocket engines, and they don't satisfy our equations. They are complex systems made out of people, in which a myriad of social and economical processes are taking place, bringing along diversity, chaos, and unpredictability. These are characteristics of cities that bring them to life, rather than unwanted noise complicating our models.

However, when hype technologies move forward, and we begin to be honest about their limitations, they can turn into a tool of practical use. A shift towards a human-centric perspective on urban digital twins is increasingly promoted, in which the technology serves actual human needs, rather than vice versa. In which human involvement in the digital processes is seen as a strength rather than a limitation. And in which black-box algorithms are replaced by transparent and explainable models, adaptable to a local context.

This workshop will be organized as a group discussion with all attendees about human-centric digital twins of the cycling city, exploring different perspectives. What is the potential, what are the challenges, and which requirements do we need to fulfill? Is there even any use at all? The final goal is to come up with a concrete list of objectives and requirements, which we all together may publish as a viewpoint article in an academic journal or magazine.

Workshop on Ensuring Cycling Safety at Road Construction Site: Identifying Key Safety Perception Criteria

Frederik Hilden (University of Kassel), Angela Francke (University of Kassel) and Maik Bock (University of Kassel).

Abstract

Cycling through road construction sites poses unique challenges for cyclists, often leading to safety concerns and increased risk of accidents. Despite this, research specifically focusing on the needs of cyclists at construction sites remains limited. The research project BRAVOUR (Needs of Cyclists at Construction Sites - Traffic Psychological Analysis on User-Specific Requirements) funded by the German Federal Ministry for Digitalisation and Transport aims to fill this gap by investigating the factors that contribute to safety issues for cyclists at construction sites. This workshop will present preliminary findings from a quantitative survey conducted as a part of the BRAVOUR project. Participants will engage in discussion and brainstorming sessions to identify key criteria for enhancing cyclist safety at road construction site.

Bicycle parking dreamscapes: Reimagining existing apartment building sites

Julia Sievert (Hamburg University of Technology) and Maximilian Freude (Hamburg University of Technology).

Abstract

Private property takes center stage in this workshop on residential bicycle parking. We will focus on sites of existing apartment buildings and explore how they can be molded into bicycle parking dreamscapes. Most existing apartment buildings were not originally designed to have bicycle parking. While some sites have since been adapted, deficiencies are common. Barriers to leaving

an apartment on a bicycle can be high. These include physical hurdles such as navigating narrow basement hallways or carrying a bicycle down multiple flights of stairs. Barriers can also be subtler. A resident faced with leaving a bicycle outside, vulnerable to weathering and theft, may select a bicycle that is lower quality and less comfortable or pleasant to ride. Yet, improving the situation can be challenging. In dense urban settings, there is high competition for limited space, and established uses can be resistant to change. Workshop participants will draw on knowledge of their own local contexts and lived experiences. Using a generic building typology as a base, the teams will develop creative alternatives, with the goal of making bicycle parking at existing apartment buildings irresistible. Through our conversations and discussions, we will bring to light challenges, identify constraints, and ultimately develop creative solutions. The resulting concepts will help us move toward a greater understanding of bicycle parking landscapes that creatively engage private actors, thereby reducing the pressure on public actors to be the main drivers of transformation. Bicycle parking dreamscapes take bicycles out of the shadows, making them highly visible, and giving them a prominent role in the types of private settings encountered by vast populations of urban residents.

Residential bicycle parking infrastructure in urban streetscapes

Julia Sievert (Hamburg University of Technology).

Abstract

Many apartment building residents lack access to sufficient bicycle storage. In response, some municipalities have expanded efforts to add formal bicycle parking infrastructure in public space, especially bike racks and sheds. Less emphasis has been placed on the role of private space. Yet, the

provision, or lack of provision, of bicycle storage on private property affects how people park their bicycles in public space. To better understand the dynamics at the boundary of public and private, this study focuses on three urban streetscapes in Hamburg, Germany. Broadening the scope beyond formal bicycle parking infrastructure, I mapped fine-grained spatial arrangements of hard and soft infrastructure, open-space functions, and parked bicycles. I aim to understand how hyper-local choices about the arrangement of space along the boundary of public and private property results in patterns of hostile, tolerant, and inviting settings for bicycle parking. The identified patterns indicate both active modification and inaction. In some cases of inaction on private property, a lack of bicycle parking resulted in the expected “wild” parking of bicycles on public property; in other similar settings, bicycles were conspicuously absent. The reverse was also occasionally true: formal infrastructure went underused. These results raise questions about the relative importance of availability of parking elsewhere on private property, perceived cycling utility, and sensitivity to theft and weathering. Urban policy on bicycle parking often focuses on formal infrastructure, such as bike racks and sheds. In reality, bicycle parking landscapes are more complex. My findings open up questions about the roles of, and coordination between, public and private actors in the provision of bicycle parking for urban residents. This research suggests the need for a more holistic perspective on residential bicycle parking – one that better accounts for the intricacies of attractive bicycle parking landscapes.

Developing a methodology to assess health and well-being impacts of employee active mobility: lessons from the bicycle industry

Dylan Power (Urban Cycling Institute), Inah Okon (Urban Cycling Institute), Luis Costa (Decathlon) and Meredith Glaser (Urban Cycling Institute).

Abstract

The bicycle industry is faced with new challenges to reduce carbon emissions and achieve ambitious environmental and sustainability goals. In the pursuit of reducing carbon emissions, promoting active mobility among employees (and customers) remains a neglected, yet fruitful, strategy. Despite the acknowledged benefits of active mobility, there’s a lack of a comprehensive approach to assess how it impacts health & wellbeing, especially within workplace settings.

Methods This is a multiphase mixed methods project which aims to investigate the health and wellbeing impacts of active mobility for employees in the bicycle industry. In September 2024, preliminary results of a multi-country cross sectional health and wellbeing survey of employees in the bicycle industry will be available for presentation which will shine light on the engagement in active mobility behaviours and barriers and facilitators to active mobility for employees.

Anticipated outcomes The research project will aim to address a gap in the public health literature pertaining to health and wellbeing impacts of workplace public health interventions. Cycling Research Board will be used as a sounding board to co-create a set of indicators that would inform a methodology for evaluating health and wellbeing aspects of employee active mobility.

Analyzing Cyclist Stress in Traffic Through Data Fusion

Anna Takayasu (TUM School of Engineering and Design), Fabian Stöcker (TUM School of Medicine and Health), Waltraud Stadler (TUM School of Medicine and Health), Lisa Kessler (TUM School of Engineering and Design) and Klaus Bogenberger (TUM School of Engineering and Design).

Abstract

This research investigates perceived stress factors affecting urban cyclists by fusing self-reported surveys, physiological and cycling behavior data, and traffic observations. The lack of regular bicycle usage often stems from travel stress. Bicycle infrastructures are often assessed by Level of Traffic Stress (LTS). However, perceived stress is influenced by various factors, and studies suggest LTS metrics do not fully represent the subjective or physiological stress experienced by cyclists. Our study aims to clarify the stress factors based on a synchronized dataset from various sources, including biometric responses, which are indicative of the broader mental health impacts of urban cycling. Our pilot study in Ingolstadt, Germany, involved 13 participants to gather a synchronized holistic dataset, including heart rate, eye tracking, and drone-captured traffic data. Despite limited traffic, e.g., few cyclist encounters, leading to fully synchronized and high-quality data acquisition from only two participants, we observed stress-related physiological responses correlating with self-reported stress incidents. Insights from this pilot will be a foundation for the next experiment designs. The next phase involves real-field and controlled test-bed experiments in varied traffic situations and infrastructural setups to assess stress factors in more detail and comprehensively. We plan to integrate EEG and cortisol measurements to provide deeper insights into stress responses. Under the supervision of psychology and physiology specialists, the baseline biomarker levels of each participant will be

established using a bike simulator under controlled conditions. This approach will allow us to consider various traffic densities, infrastructure types, and potential future scenarios, such as increased e-bike usage and aging cyclist populations. The overall findings will contribute to the improvement of bike-friendly urban infrastructure and traffic management. The outcomes are expected to inform educational initiatives and policymakers, enhancing awareness among stakeholders about the impact of cycling stress.

City Climate Initiative Bikes instead of Cars

Silas Hobi (umverkehrR).

Abstract

With the urban climate initiatives, 1 percent of the road surface in eleven Swiss cities is to be converted each year within 10 years. One half - i.e. 0.5% per year - for more space for public transport, pedestrians and cyclists. The other half for more green spaces with trees. There is usually not enough space to create a safe cycling infrastructure. This is why the areas need to be redistributed. In principle, the lower the speed and traffic volume of cars, the safer it is for all other road users. Instead of expensive infrastructure projects, car traffic can therefore also be reduced in order to improve the situation for cyclists. This also frees up space for green areas and trees, which benefits the majority of the population. The urban climate initiatives define the political framework for this process.

Resilient on two wheels: How disruptions are getting us on bikes

Angela Francke (Uni Kassel), Shreya Sing (Uni Kassel) and Maik Bock (Uni Kassel).

Abstract

This poster examines how disruptive events influence commuters' transportation mode choices, especially the shift towards cycling. Understanding these shifts are vital for developing strategies to address future challenges like the climate crisis. A nationwide survey in Germany and targeted research in the cities of Leipzig, Bad Hersfeld, and Dresden gathered over 1,800 responses on travel behavior during disruptions, including pandemics, financial changes, and infrastructure issues. We analyzed the groups that changed their mobility due to disruptive events. Who is it and why did they switch to cycling as a mode of transportation? Analysis revealed a significant shift towards bicycles and e-bikes, especially during the COVID-19 pandemic, while motorized transport decreased. The study highlights the adaptability of commuters and emphasizes the importance of investing in cycling infrastructure to promote sustainable transportation long-term.

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