PARIS LODRON UNIVERSITÄT SALZBURG

Die Mehrfachdividende der Radverkehrsförderung

Radvernetzungstreffen
Salzburg, 25. Mai 2023

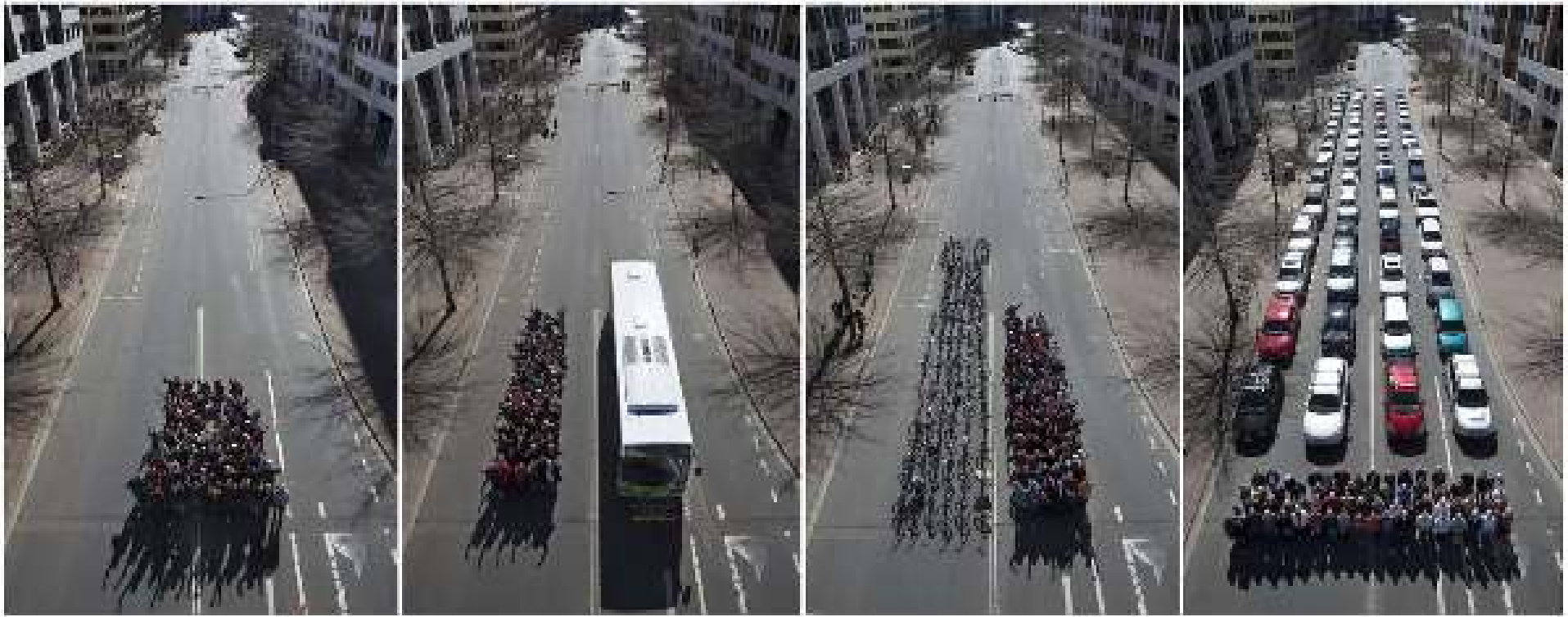
Dr. Martin Loidl| martin.loidl@plus.ac.at

Z GIS

Warum Radverkehrsförderung?

https://www.flickr.com/photos/eucyclistsfed/7413190516

https://www.flickr.com/photos/skohlmann/14728500727/



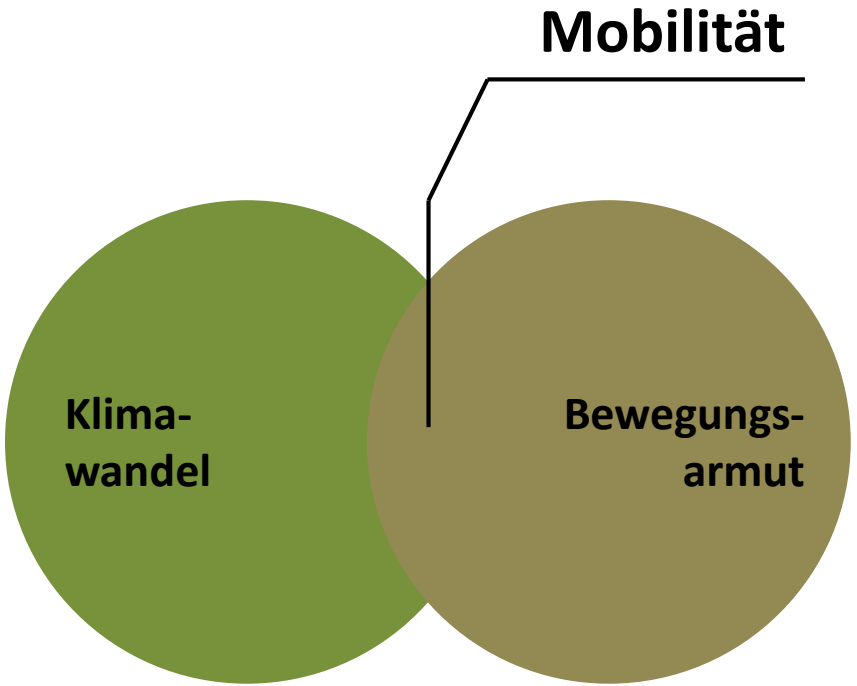
https://www.weride.org.au/events/the-power-of-an-image-the-canberra-transport-photo/

M Laidl

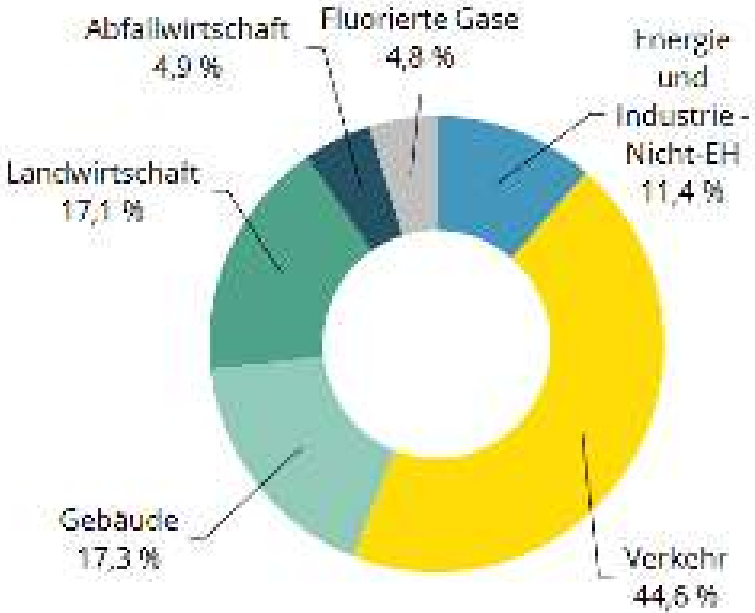
Stadt Salzburg, A Killer

https://www.flickr.com/photos/16nine/6291979004

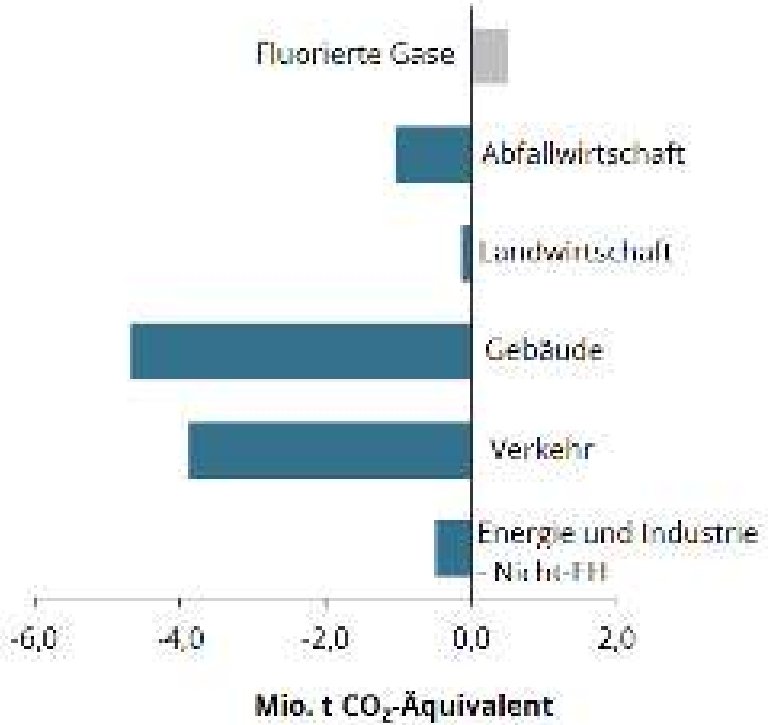
https://www.flickr.com/photos/biggreymare/14261903263


Mobilität
Klima-
wandel
Bewegungs-
armut

Anteil der Sektoren an den gesamten THG-Emissionen 2020 (ohne Emissionshandel)



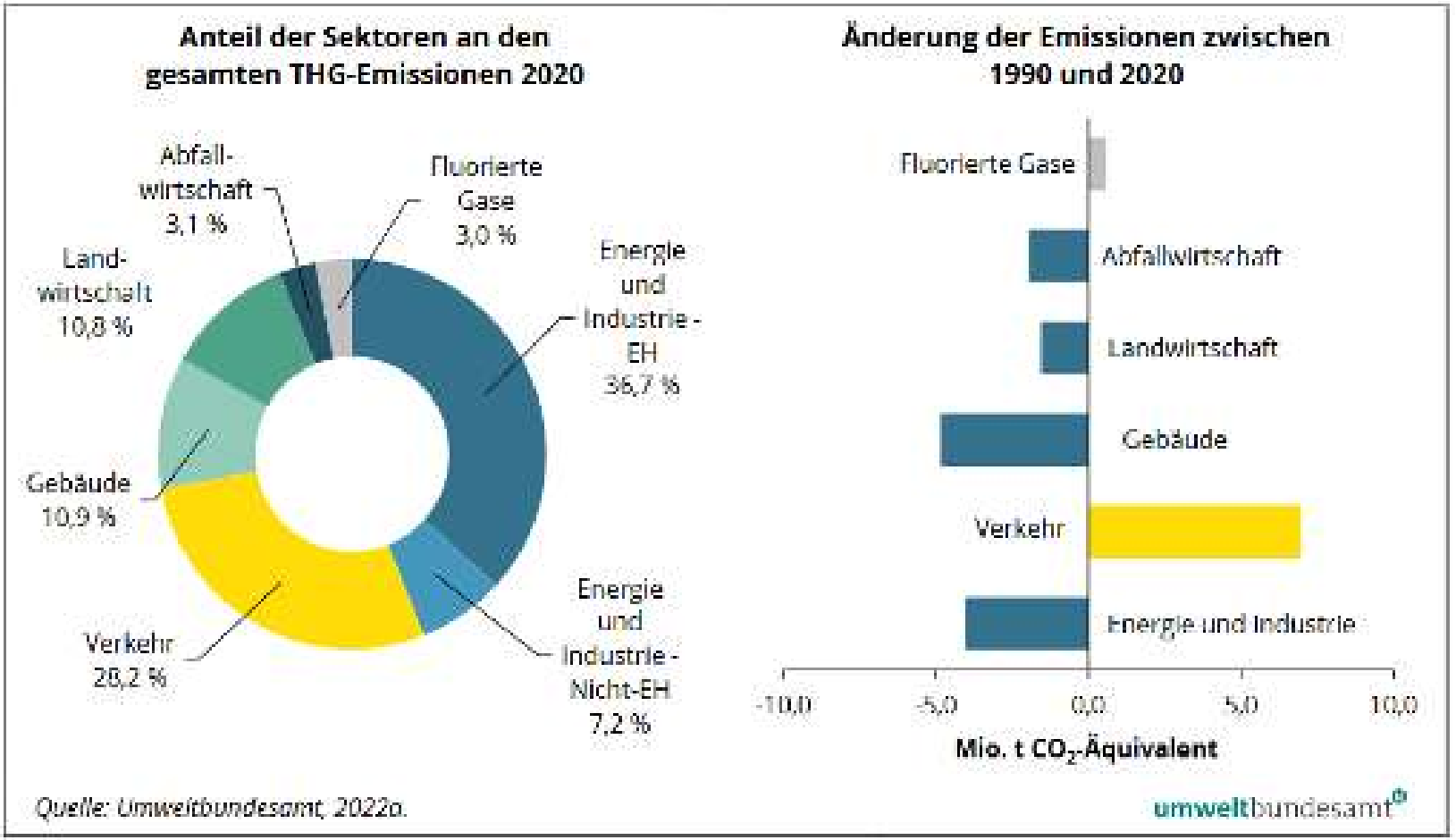
Änderung der Emissionen zwischen 2005 und 2020

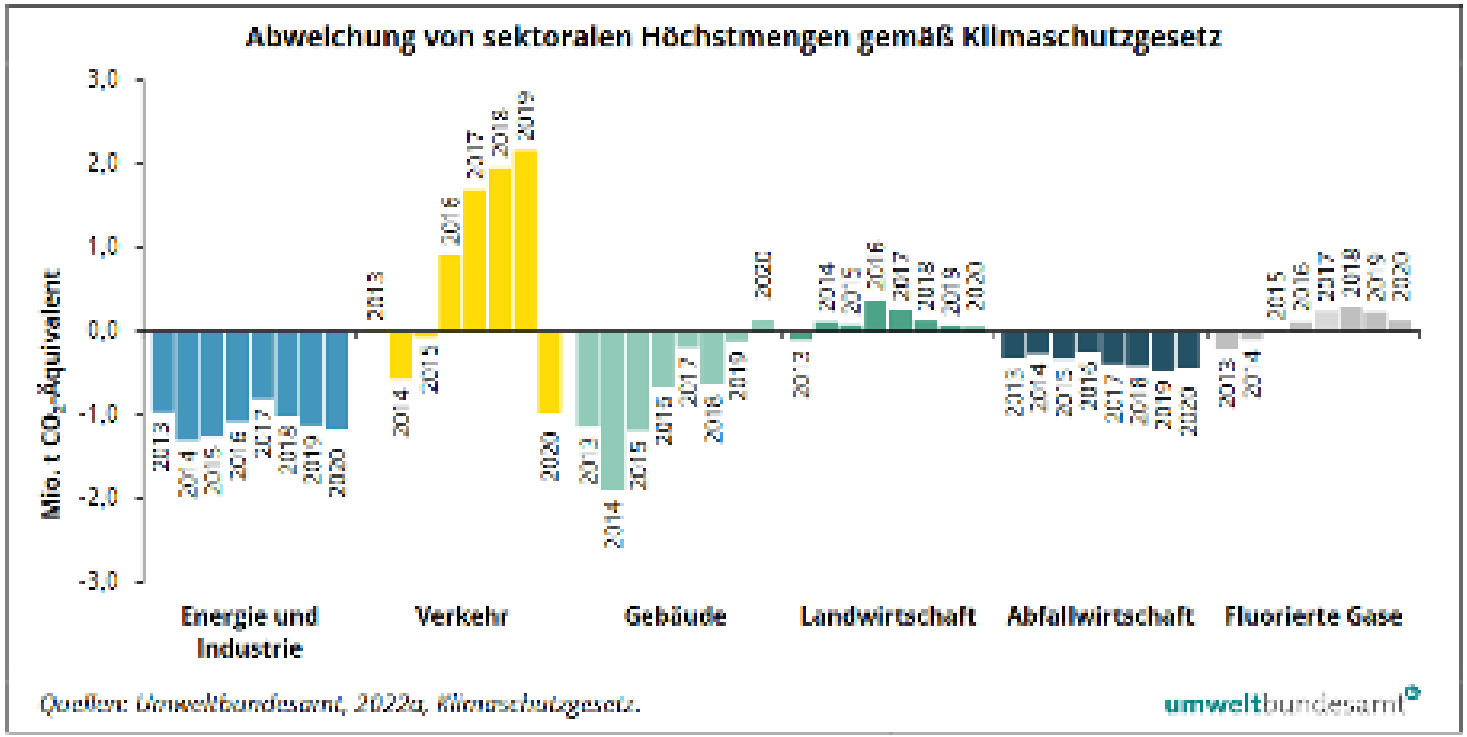


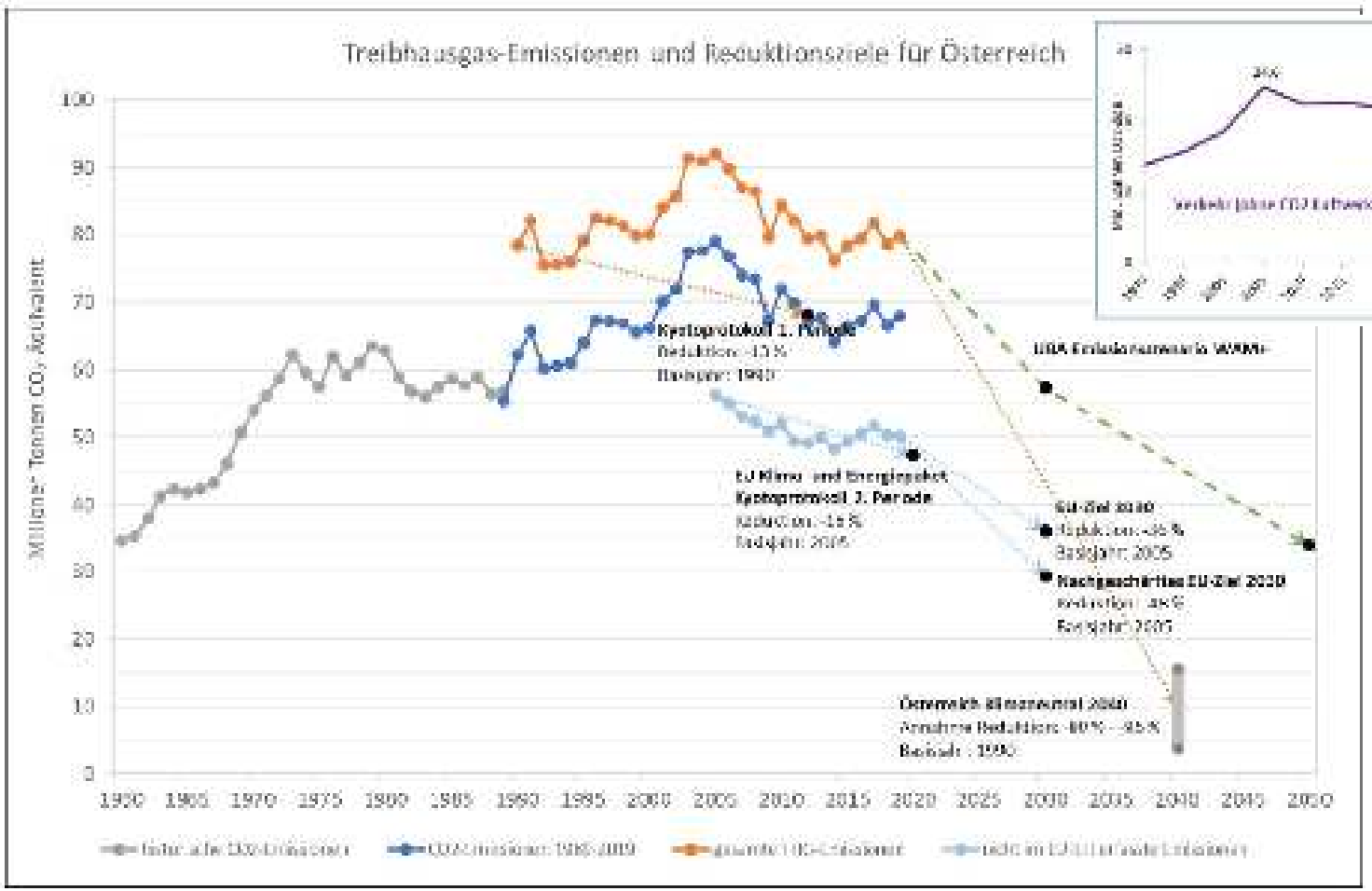
Quelle: Umweltbundesamt, 2022a.

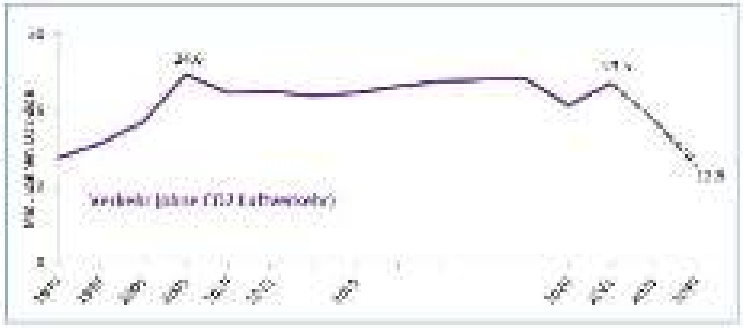
umweltbundesamt

ZGIS


Anteil der Sektoren an den gesamten THG-Emissionen 2020
Abfall-wirtschaft 3,1 %
Fluorierte Gase 3,0 %
Land-wirtschaft 10,8 %
Energie und Industrie - EH 36,7 %
Gebäude 10,9 %
Verkehr 28,2 %
Energie und Industrie - Nicht-EH 7,2 %
Änderung der Emissionen zwischen 1990 und 2020
Fluorierte Gase
Abfallwirtschaft
Landwirtschaft
Gebäude
Verkehr
Energie und Industrie
-10,0
-5,0
0,0
5,0
10,0
Mio. t CO2-Äquivalent
Quelle: Umweltbundesamt, 2022o.
umweltbundesamt


Abweichung von sektoralen Höchstmengen gemäß Klimaschutzgesetz
Mio. t CO2-Äquivalent
3,0
2,0
1,0
0,0
-1,0
-2,0
-3,0
Energie und Industrie
Verkehr
Gebäude
Landwirtschaft
Abfallwirtschaft
Fluorierte Gase
Quellen: Umweltbundesamt, 2022a, Klimaschutzgesetz.
umweltbundesamt





Schleicher & Kirchengast (2022), https://wegcloud.uni-graz.at/s/659/KoKtq3zeRea

Schwarzl et al. (2021), https://www.uninetz.at/optionenbericht_downloads/SDG13_Target_13_2_u_13_3.pdf

Klimaschutz in Österreich –
Maßnahmen und Zielerreichung 2020
Bericht des Rechnungshofes

Ausgabenschätzungen[1] für einen allfälligen Ankauf von Emissionszertifikaten im Verpflichtungszeitraum 2021 bis 2030

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Summe 2021 bis 2030
	in Mio. EUR										
Bund	247	356	465	574	683	792	901	1.010	1.118	1.227	7.371
Niederösterreich	12	17	22	27	32	37	43	48	53	58	349
Oberösterreich	10	15	19	24	29	33	38	42	47	51	308
übrige Bundesländer	40	57	75	92	110	128	144	162	180	198	1.186
gesamt	**308**	**445**	**581**	**717**	**853**	**989**	**1.126**	**1.262**	**1.398**	**1.534**	**9.214**

Rundungsdifferenzen möglich

Quelle: Landesfinanzreferentinnenkonferenz; Zusammenstellung: RH

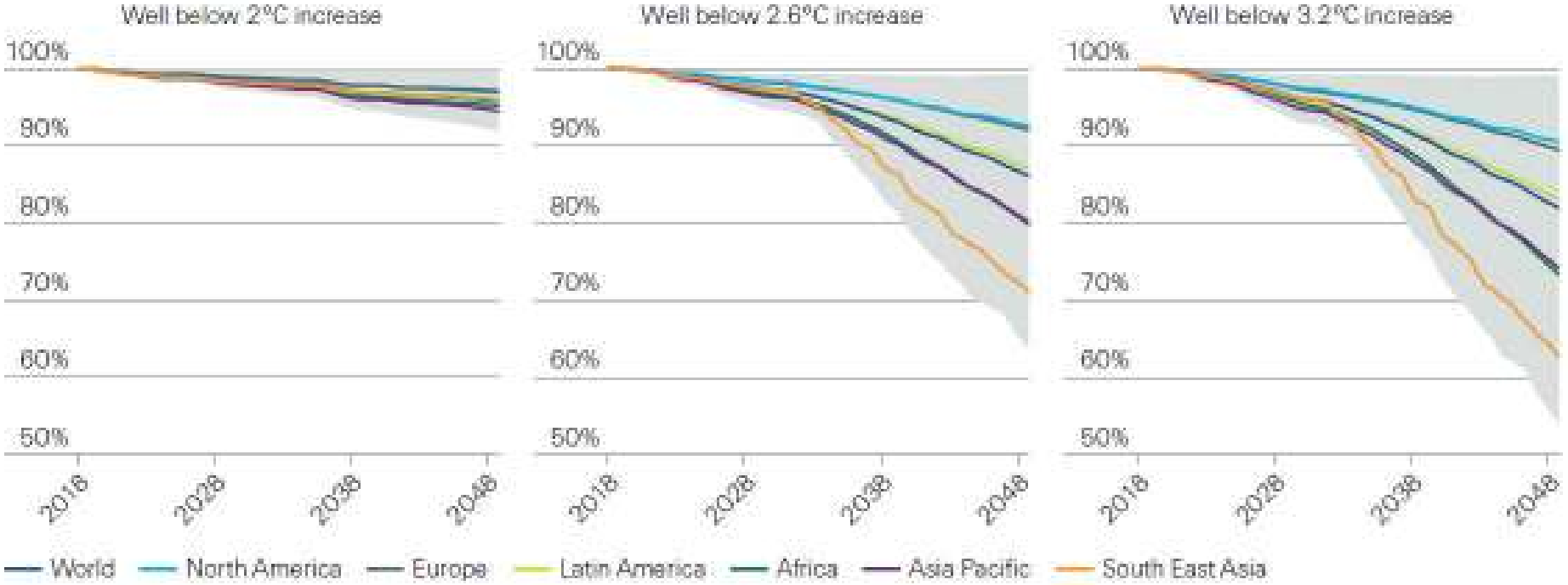
[1] bei angenommenen Kosten von 100 EUR pro t CO_2-Äquivalenten

https://www.rechnungshof.gv.at/rh/home/home/Bund_2021_16_Klimaschutz_in_Oesterreich.pdf

ZGIS

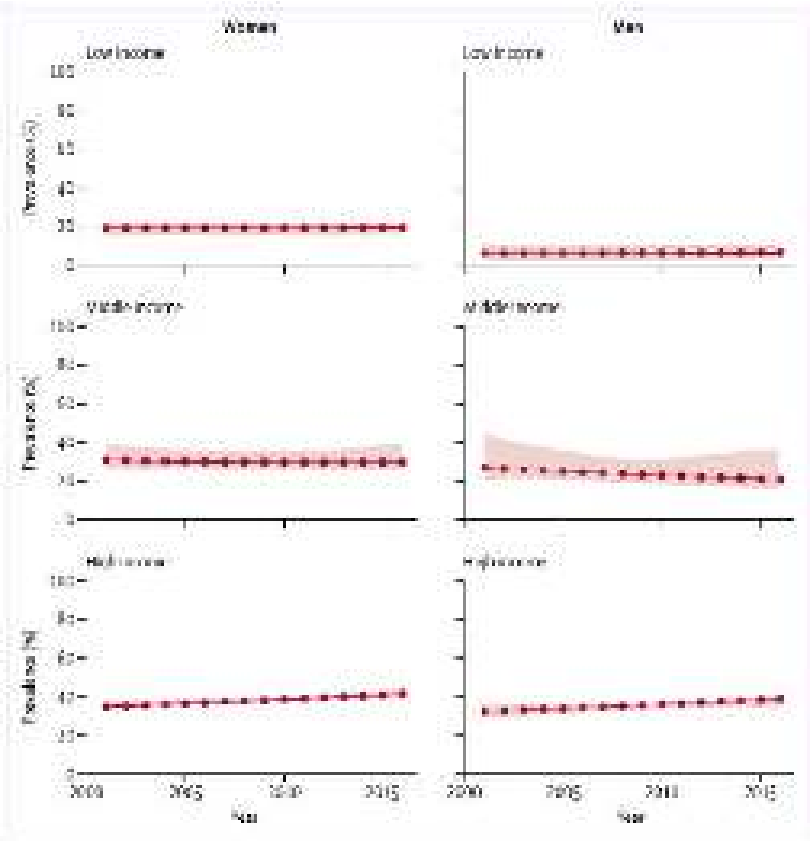
Figure 7

Deviations of scenarios versus no-climate change real GDP



Note: Shown scenarios adjust for omitted channels and account for (un)known unknowns of potentially increased severity of economic outcomes of physical risks with the factor 10. Temperature rises are from pre-industrial times to mid-21st century. The grey shaded area represents the dispersion of cross-country results.
Source: Swiss Re Institute

GUO, J., KUBLI, D. & SANER, P. 2021. The economics of climate change: no action not an option. In: RONKE, P. (ed.). Zurich: Swiss Re Institute.



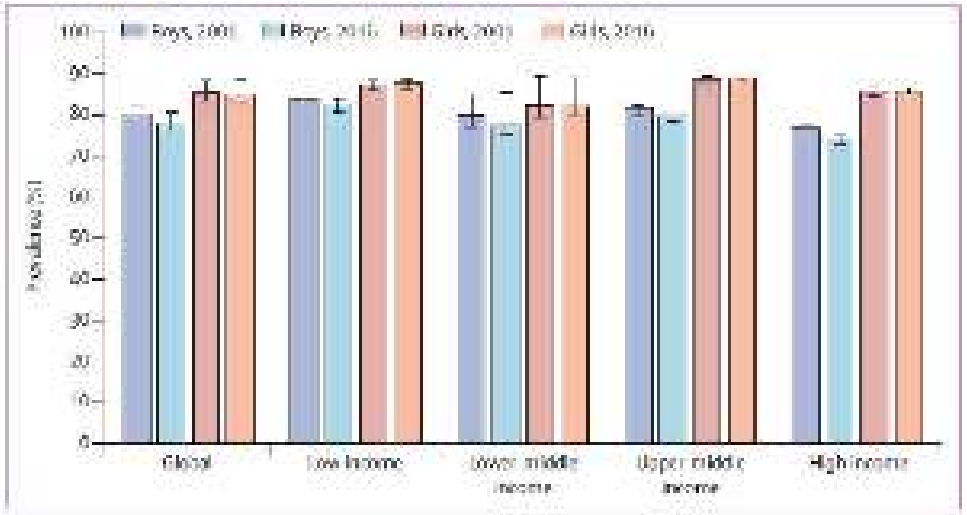


Figure 2: Prevalence of insufficient physical activity among school-going adolescents aged 11–17 years, globally and by World Bank income group, 2001 and 2016

GUTHOLD, R, STEVENS, G. A, RILEY, L. M & BULL, F. C. 2019. Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1.6 million participants. The Lancet Child & Adolescent Health.

GUTHOLD, R, STEVENS, G. A, RILEY, L. M & BULL, F. C. 2018. Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1.9 million participants. The Lancet Global Health, 6, e1077–e1086.

Salzburg

Österreichisches Bewegungsmonitoring 2017. BMKÖS: GPAQ (Global Physical Activity Questionnaire)

Österreichische Gesundheitsbefragung 2014 Statistik Austria: ATHIS (Austrian Health Interview Survey)

https://www.bmkoes.gv.at/sport/breitensport/breiten-gesundheitssport/Bewegungsmonitoring.html

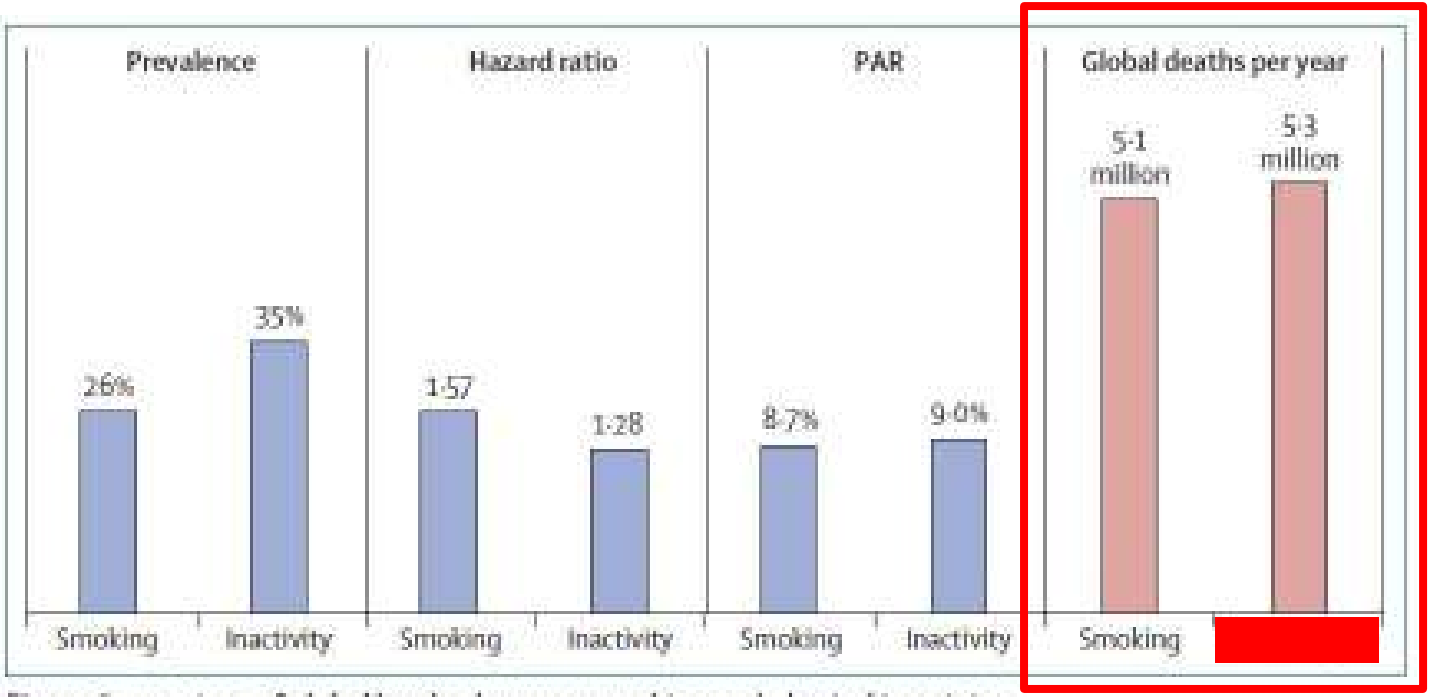


Figure: Comparison of global burden between smoking and physical inactivity
Prevalence of smoking, population attributable risk (PAR), and global deaths for smoking were obtained from WHO.[1] Hazard ratio for all-cause mortality of smoking was obtained from meta-analysis studies.[8,9] All inactivity data were obtained from Lee and colleagues.[1]

WEN, C. P. & WU, X. 2012. Stressing harms of physical inactivity to promote exercise. The Lancet, 380, 192-193.

The cost of inaction on physical inactivity to public health-care systems: a population-attributable fraction analysis

Andreia Costa Santos, Jeanne Willumsen, Filip Meheus, Anne Ilbawi, Fiona C Bull

Summary

Background Physical inactivity is an important modifiable risk factor for non-communicable diseases (NCDs) and mental health conditions. We aimed to estimate the public health-care costs associated with these diseases because of physical inactivity, which will help policy makers to prioritise investment in policy actions to promote and enable more people to be more active.

Methods We used a population-attributable fraction formula to estimate the direct public health-care costs of NCDs and mental health conditions for 2020–30. The disease outcomes that we included were incident cases of coronary heart disease, stroke, type 2 diabetes, hypertension, cancer (breast, colon, bladder, endometrial, oesophageal, gastric, and renal), dementia, and depression in adults aged at least 18 years. We used the most recent health and economic data evidence available for 194 countries.

Findings 499·2 million new cases of preventable major NCDs would occur globally by 2030 if the prevalence of physical inactivity does not change, with direct health-care costs of INT$520 billion. The global cost of inaction on physical inactivity would reach approximately $47·6 billion per year. Although 74% of new cases of NCDs would occur in low-income and middle-countries, high-income countries would bear a larger proportion (83%) of the economic costs. The cost of treatment and management of NCDs varied—although dementia accounted for only 3% of new preventable NCDs, the disease corresponded to 22% of all costs; type 2 diabetes accounted for 2% of new preventable cases but 9% of all costs; and cancers accounted for 4% of new preventable cases but 15% of all costs.

Interpretation This health and economic burden of physical inactivity is avoidable. Further investments in and implementation of known and effective policy interventions will support countries to reach the Sustainable Development Goal of reduction of NCD mortality by 2030.

Lancet Glob Health 2022; 10: e1192–206

Published Online December 5, 2022 https://doi.org/10.1016/S2214-109X(22)00454-8

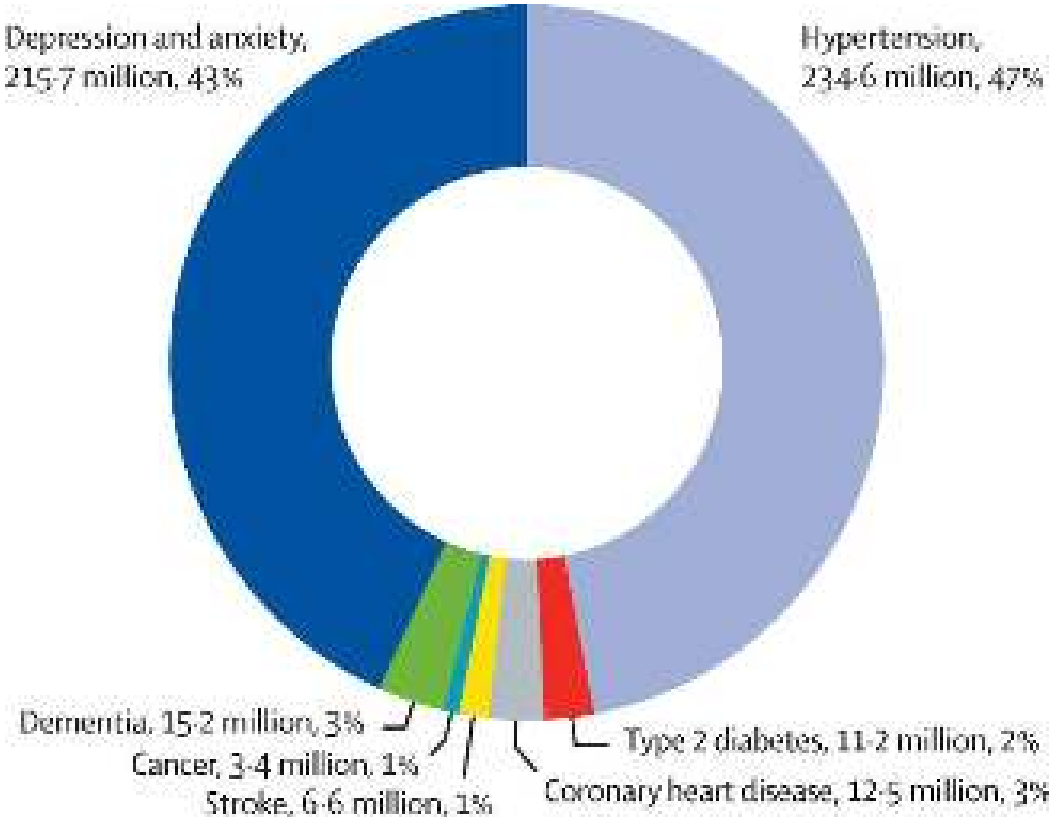
See Comment page e1142

WHO, Geneva, Switzerland

A C Santos PhD, J Willumsen PhD, F Meheus PhD, A Ilbawi MD, F C Bull PhD

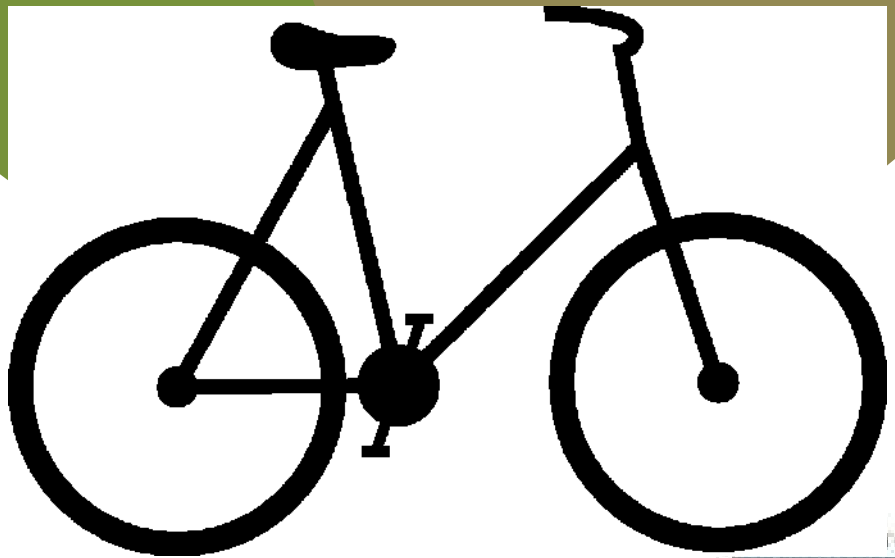
Correspondence to: Dr Fiona C Bull, WHO, Geneva, Switzerland bullf@who.int

Nicht übertragbare Krankheiten – Fälle 2020-2030 aufgrund mangelnder körperlicher Aktivität

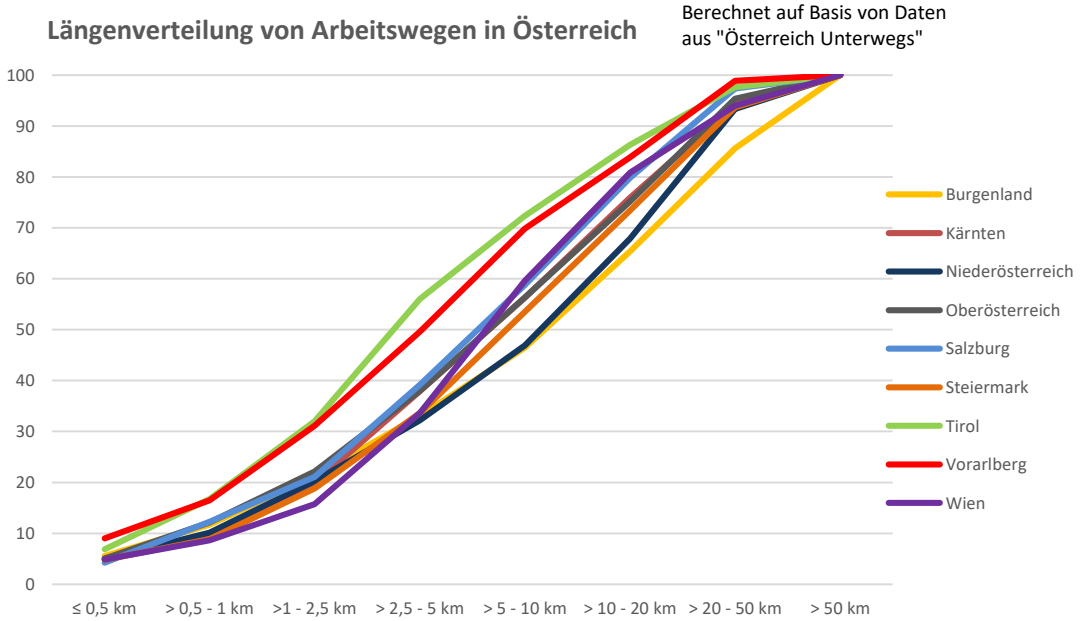


SANTOS, A. C., WILLUMSEN, J., MEHEUS, F., ILBAWI, A. & BULL, F. C. 2023. The cost of inaction on physical inactivity to public health-care systems: a population-attributable fraction analysis. The Lancet Global Health, 11, e32-e39.

Bewegungsarmut **Mobilität** Klimawandel



55.96% aller Weg in Österreich sind **kürzer als 10 km**.



TOMSCHY, R., HERRY, M., SAMMER, G., KLEMENTSCHITZ, R., RIEGLER, S., FOLLMER, R., GRUSCHWITZ, D., JOSEF, F., GENSASZ, S., KIRNBAUER, R. & SPIEGEL, T. 2016. Österreich unterwegs 2013/2014. Ergebnisbericht zur österreichweiten Mobilitätserhebung „Österreich unterwegs 2013/2014“. Vienna: Bundesministerium für Verkehr, Innovation und Technologie.

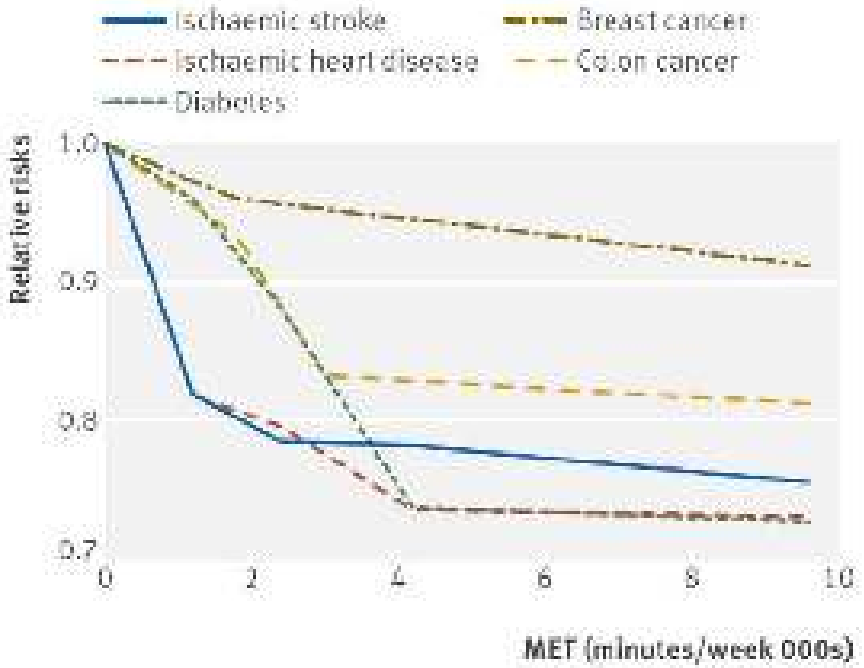


Fig 7 | Continuous risk curves for association between physical activity and breast cancer, colon cancer, diabetes, ischemic heart disease, and ischemic stroke

KYU, H H, BACHMAN, V. F., ALEXANDER, L. T., MUMFORD, J. E., AFSHIN, A., ESTEP, K., VEERMAN, J. L., DELWICHE, K., IANNARONE, M. L., MOYER, M. L., CERCY, K., VOS, T., MURRAY, C. J. L. & FOROUZANFAR, M. H. 2016. Physical activity and risk of breast cancer, colon cancer, diabetes, ischemic heart disease, and ischemic stroke events: systematic review and dose-response meta-analysis for the Global Burden of Disease Study 2013. BMJ, 354, i3857.

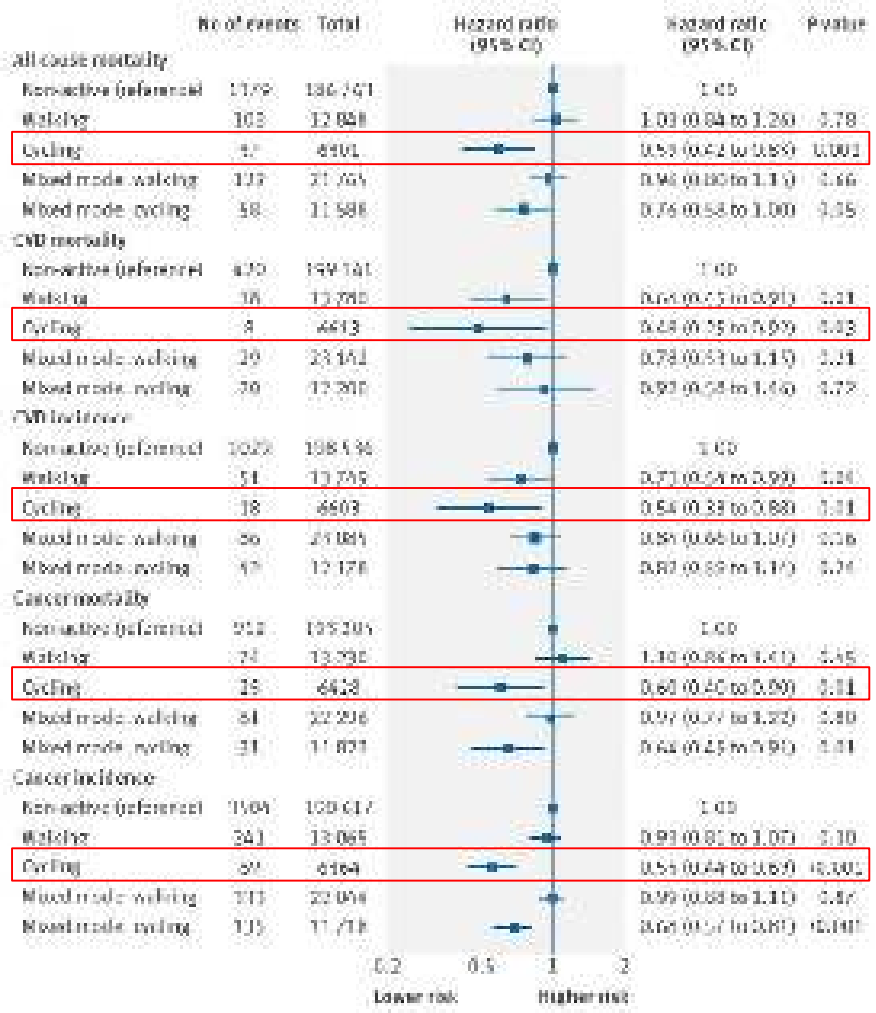


Fig 1 | Hazard ratio for all cause mortality, cardiovascular disease (CVD) incidence and mortality, and cancer incidence and mortality by commuting mode

CELIS-MORALES, C. A, LYALL, D. M, WELSH, P., ANDERSON, J., STEELL, L., GUO, Y., MALDONADO, R., MACKAY, D. F., PELL, J. P., SATTAR, N & GILL, J. M R 2017. Association between active commuting and incident cardiovascular disease, cancer, and mortality: prospective cohort study. BMJ, 357.

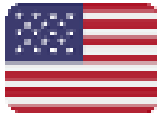
Substituieren kurzer Wege.

Table 4 **Active Transportation (AT) Benefits and Costs**

	Improved AT Conditions	Increased AT Transport Activity	Reduced Automobile Travel	More Compact Communities
Benefits	• Improved user convenience, comfort and safety • Improved accessibility for non-drivers, which supports equity objectives • Option value • Higher property values • Improved public realm (more attractive streets)	• User enjoyment • Improved public fitness and health • More local economic activity • Increased community cohesion (positive interactions among neighbors) • More neighborhood security	• Reduced traffic congestion • Road and parking facility cost savings • Consumer savings • Reduced chauffeuring burdens • Increased traffic safety • Energy conservation • Pollution reductions • Economic development	• Improved accessibility, particularly for non-drivers • Transport cost savings • Reduced sprawl costs • Openspace preservation • More livable communities • Higher property values • Increased security
Costs	• Facility costs • Lower traffic speeds	• Equipment costs (shoes, bikes, etc.) • Increased crash risk	• Slower travel	• Increases in some development costs

Active transport has various benefits and costs.

LITMAN T. 2022. Evaluating Active Transport Benefits and Costs – Guide to Valuing Walking and Cycling Improvements and Encouragement Programs. Victoria, BC: Victoria Transport Policy Institute.



Jeder mit dem Fahrrad gefahrene Kilometer **bringt** 0,16 €.
Jeder mit dem Auto gefahrene Kilometer **kostet** 0,15 €.

YANOCHA, D. & MAWDSLEY, S. 2022. Making the Economic Case for Cycling. Cycling City. New York: Institute for Transportation and Development Policy.

$$\frac{\text{Kosten für adäquate Fahrradinfrastruktur}}{\text{Volkswirtschaftliche Effekte}} = \frac{\mathbf{1}}{[\mathbf{10 \ldots 25}]}$$ innerhalb von 40 Jahren

MACMILLAN, A., CONNOR, J., WITTEN, K., KEARNS, R., REES, D. & WOODWARD, A. 2014. The Societal Costs and Benefits of Commuter Bicycling: Simulating the Effects of Specific Policies Using System Dynamics Modeling. Environmental Health Perspectives, 122, 335-344.

REDUCED ABSENTEEISM

Employees who are physically active take **27%** fewer sick days than their colleagues

SUPPORTING THE NHS

If every Londoner walked or cycled for 20 minutes each day, this would save the NHS

£1.7bn

in treatment costs over 25 years

"If as a nation we keep going on the journey around the workforce we'll be going on the journey of future [illegible] to keep the NHS afloat.

I don't think it's any exaggeration to say that the health of millions of our fellow citizens, the sustainability of the NHS, and the economic prosperity of Britain now depends on a radical upgrade in prevention and public health."

https://tfl.gov.uk/corporate/publications-and-reports/economic-benefits-of-walking-and-cycling

Which benefits can we measure today?

Benefit	Estimated Value (billion euros)
CO2 emissions savings	0.6 – 5.6
Reduction of air pollution	0.435
Reduction of noise pollution	0.3
Fuel savings	4.0
Longer and healthier lives	73
Less sickness absence at the workplace	5
Bicycle market	13.2
Cycle tourism	44
Easing of road congestion	6.6
Saving on construction and maintenance costs for road infrastructure for motorised vehicles	2.9
Total annual benefits	**150 - 155 bn euros**

https://ecf.com/resources/cycling-facts-and-figures

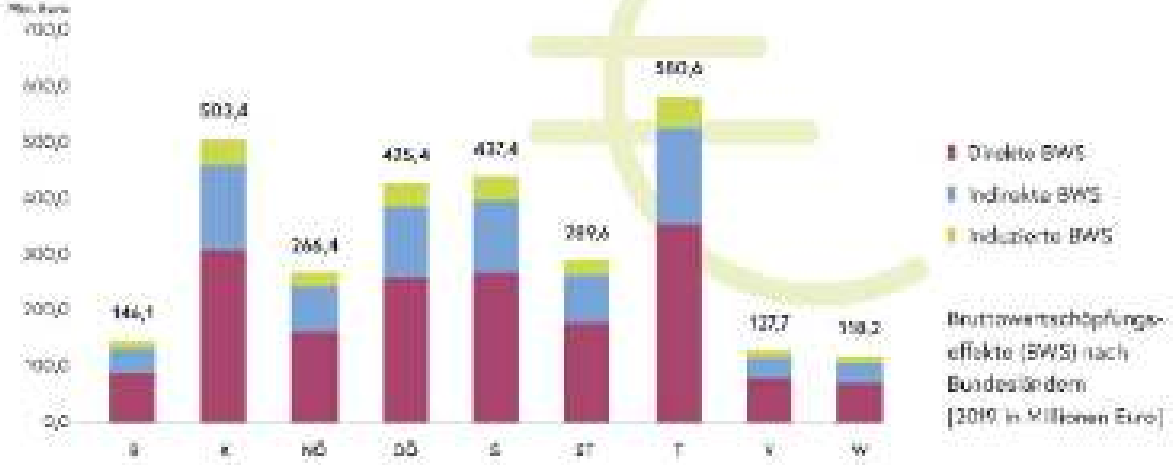
Studie 2022 ohne Berücksichtigung der Gesundheitseffekte!

klimaaktiv

Bundesweit 2,9 Milliarden Euro Bruttowertschöpfung durch die Radwirtschaft

Vergleich: Die direkten Bruttowertschöpfungseffekte der Radwirtschaft sind größer als die des Straßenbaus.

Bruttowertschöpfungseffekte durch die Radwirtschaft in den Bundesländern



Bundesministerium
Klimaschutz, Umwelt,
Energie, Mobilität,
Innovation und Technologie

klimaaktiv

46.000 Arbeitsplätze in Österreich durch die Radwirtschaft gesichert

Vergleich: Die Radwirtschaft beschäftigt so viele Menschen wie die Energieversorgung.

Beschäftigungseffekte durch die Radwirtschaft in den Bundesländern

Quelle: Wirtschaftsfaktor Radfahren (2022)

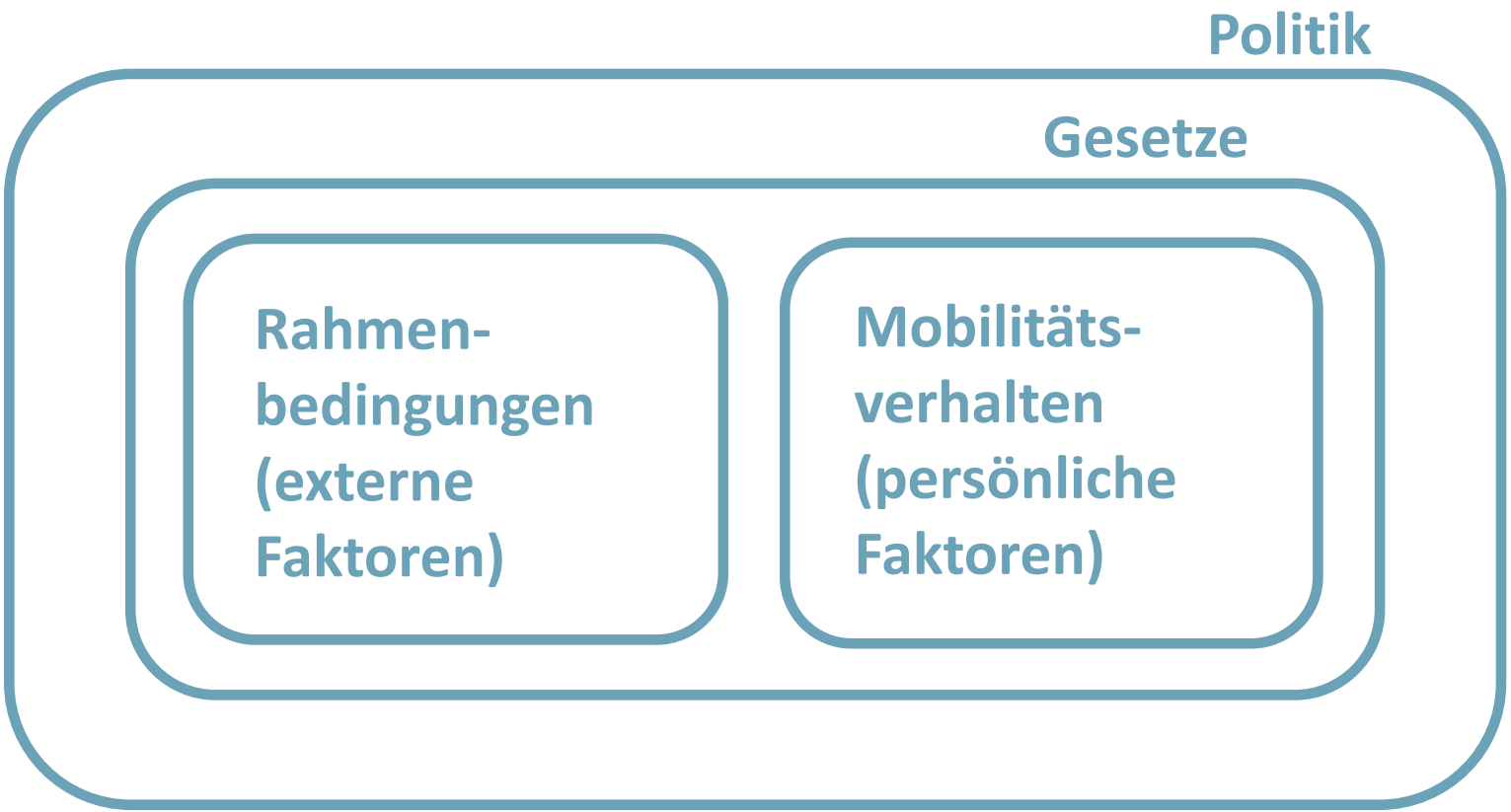
ZGIS

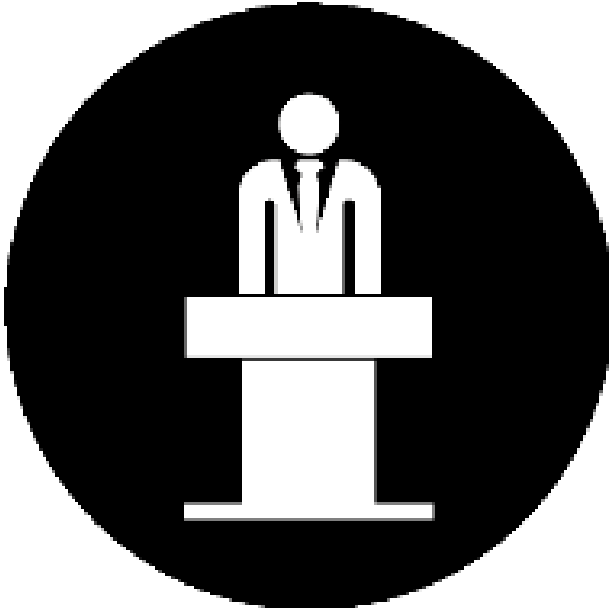
Kosten oder Investitionen?

Radverkehrsförderung

- Vorteile nutzen
- Als Beitrag zum Kampf gegen Klima- und Gesundheitskrise („Doppeldividende“)

- Lebenswerte Gemeinden und Regionen
- Individuelle und gesellschaftliche Nutzen
- Ökonomischer Mehrwert


Politik
Gesetze
Rahmen-
bedingungen
(externe
Faktoren)
Mobilitäts-
verhalten
(persönliche
Faktoren)



https://www.theguardian.com/cities/2015/may/05/amsterdam-bicycle-capital-world-transport-cycling-kindermoord

https://wijnemenjemee.nl/divers/nieuws/doe-mee-met-de-landelijke-fiets-naar-je-werk-dag/


1 KEINE ARMUT
2 KEIN HUNGER
3 GESUNDHEIT UND WOHLERGEHEN
4 HOCHWERTIGE BILDUNG
5 GESCHLECHTER-GLEICHHEIT
6 SAUBERES WASSER UND SANITÄR-EINRICHTUNGEN
7 BEZAHLBARE UND SAUBERE ENERGIE
8 MENSCHENWÜRDIGE ARBEIT UND WIRTSCHAFTS-WACHSTUM
9 INDUSTRIE, INNOVATION UND INFRASTRUKTUR
10 WENIGER UNGLEICHHEITEN
11 NACHHALTIGE STÄDTE UND GEMEINDEN
12 NACHHALTIGER KONSUM UND PRODUKTION
13 MASSNAHMEN ZUM KLIMASCHUTZ
14 LEBEN UNTER WASSER
15 LEBEN AM LAND
16 FRIEDEN, GERECHTIGKEIT UND STARKE INSTITUTIONEN
17 PARTNER-SCHAFTEN ZUR ERREICHUNG DER ZIELE
ZIELE FÜR NACHHALTIGE ENTWICKLUNG

Bild: https://twitter.com/gewessler/status/1394721657227517955/photo/1

Vienna Declaration:
Building forward better by transforming to new, clean, safe, healthy and inclusive mobility and transport

18. Commit to achieving the following objectives by 2030:

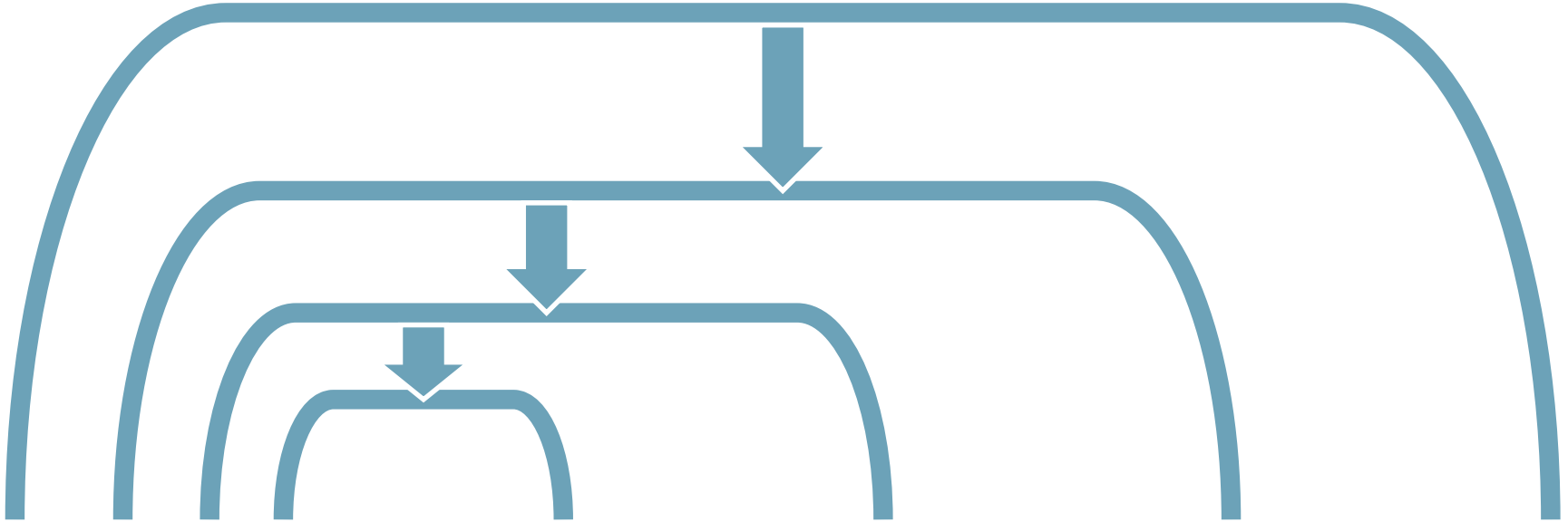
(a) Significantly increase cycling and walking in every country and contribute to the overall target of doubling cycling in the region as a whole;
(b) Extend and improve infrastructure for safe cycling and walking in every country in the region;
(c) Develop and implement national cycling and walking policies, supported by national cycling and walking plans, strategies and programs, including the setting of national targets, in every country in the region, and also promote their implementation in relevant subnational plans and policies;
(d) Significantly improve the safety of cyclists and pedestrians in every country in the region and significantly reduce the number of fatalities and serious injuries amongst these road users in the region as a whole;
(e) Integrate cycling and walking into health policies, as well as transport infrastructure and land-use planning;

https://thepep.unece.org/sites/default/files/2021-03/2103410E.pdf

Pan-European Master Plan for Cycling Promotion

- Verdopplung des Radverkehrs bis 2030
  - Ökonomischer Effekt verdoppelt auf € 260 Mrd.
  - Einsparung von 8 Millionen Tonnen CO_2 Äquivalent (entspricht € 1,1 Mrd. pro Jahr)
  - Verhinderung 30.000 frühzeitiger Todesfälle (entspricht € 78 Mrd. pro Jahr)
- Reorganisation des Straßenraums (Flächenverteilung)
- Ausbau der Infrastruktur
- Erhöhung der Radverkehrssicherheit
- Radfahren als Gesundheitspolitik
- Verbindung von Radfahren und Raumplanung

https://commons.wikimedia.org/wiki/File:Domy_Towarowe_Centrum.jpg



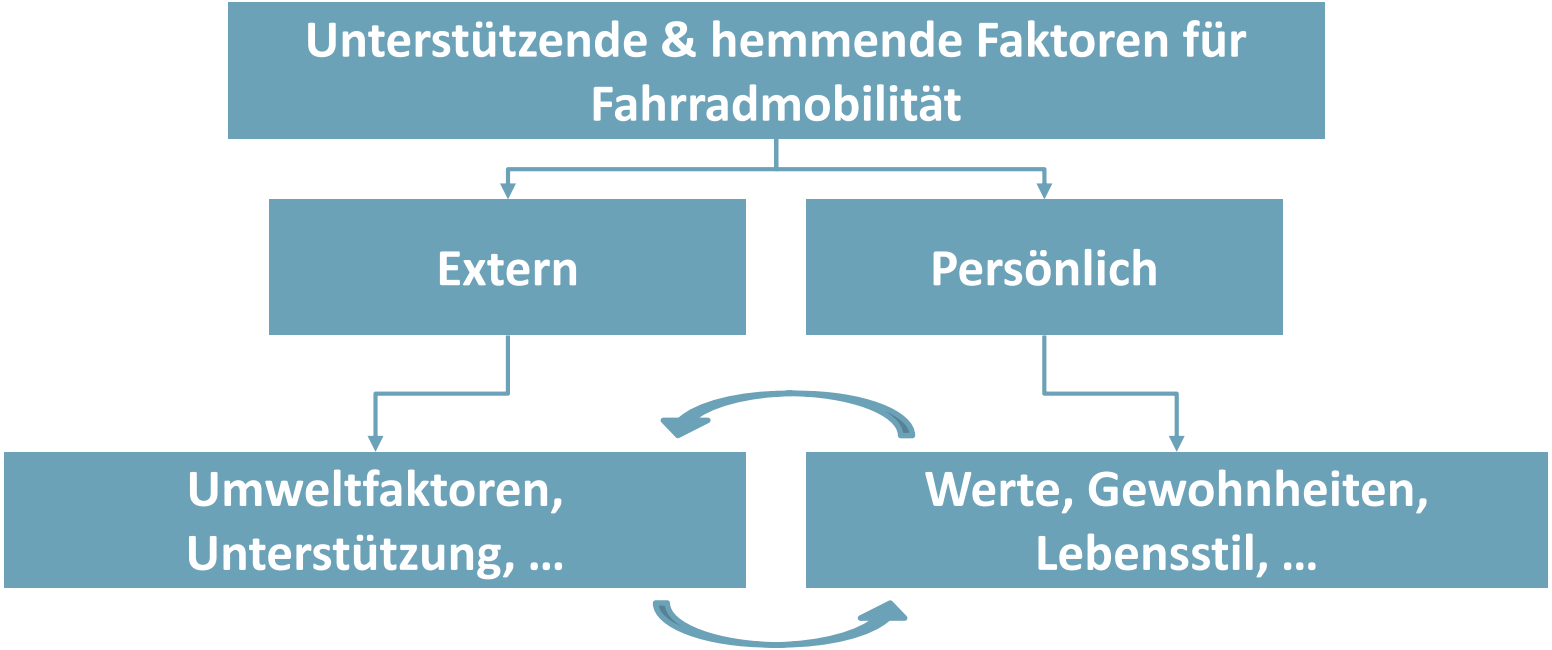
Lokale,
strategische
Zielvorgaben
Maßnahmen

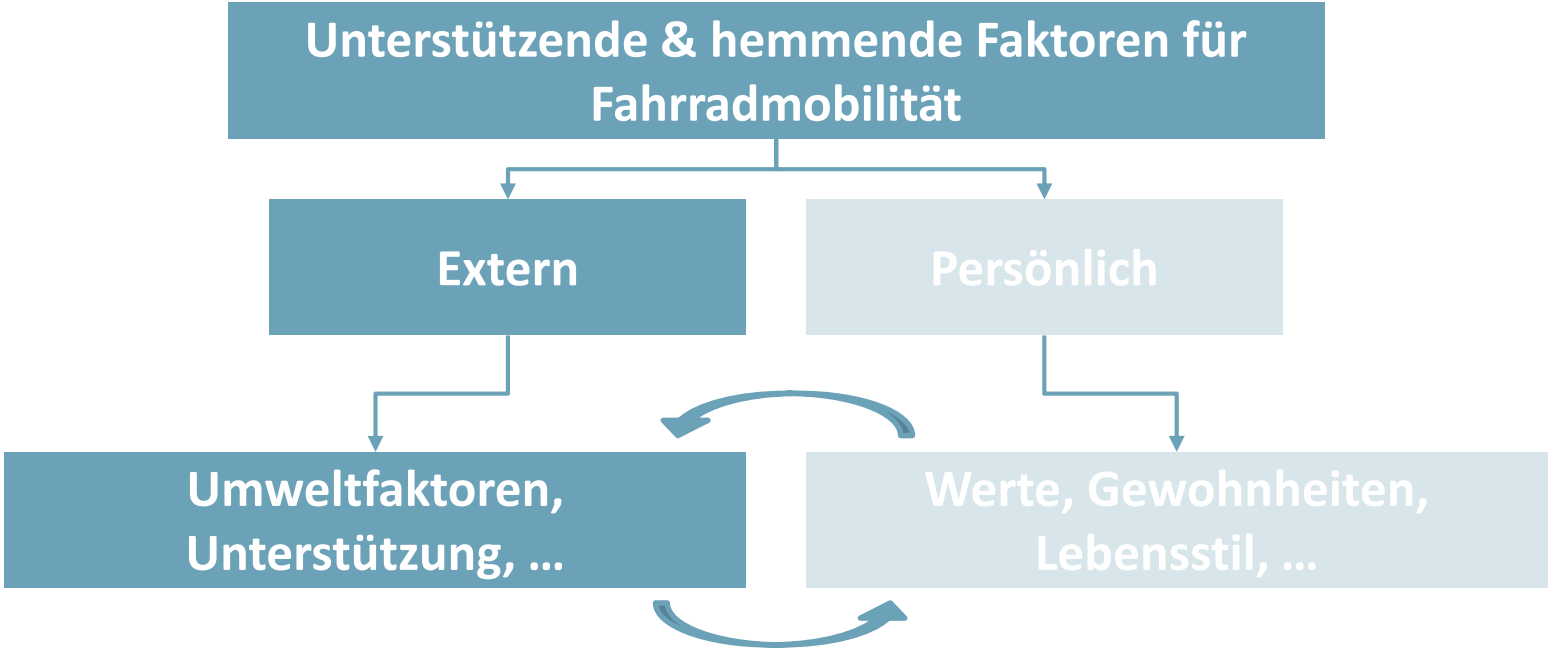
Regionale,
strategische
Zielvorgaben
Förderungen
Maßnahmen

Nationale,
strategische
Zielvorgaben
Rechtlicher Rahmen
Förderungen

Übergeordnete,
strategische
Zielvorgaben
Finanzielle
Ressourcen


Politik
Gesetze
Rahmen-bedingungen (externe Faktoren)
Mobilitäts-verhalten (persönliche Faktoren)


Unterstützende & hemmende Faktoren für Fahrradmobilität
Extern
Persönlich
Umweltfaktoren, Unterstützung, …
Werte, Gewohnheiten, Lebensstil, …


Unterstützende & hemmende Faktoren für Fahrradmobilität
Extern
Persönlich
Umweltfaktoren, Unterstützung, …
Werte, Gewohnheiten, Lebensstil, …

Adäquate Infrastruktur zieht Verkehr an.

M Laidl

M Laidl

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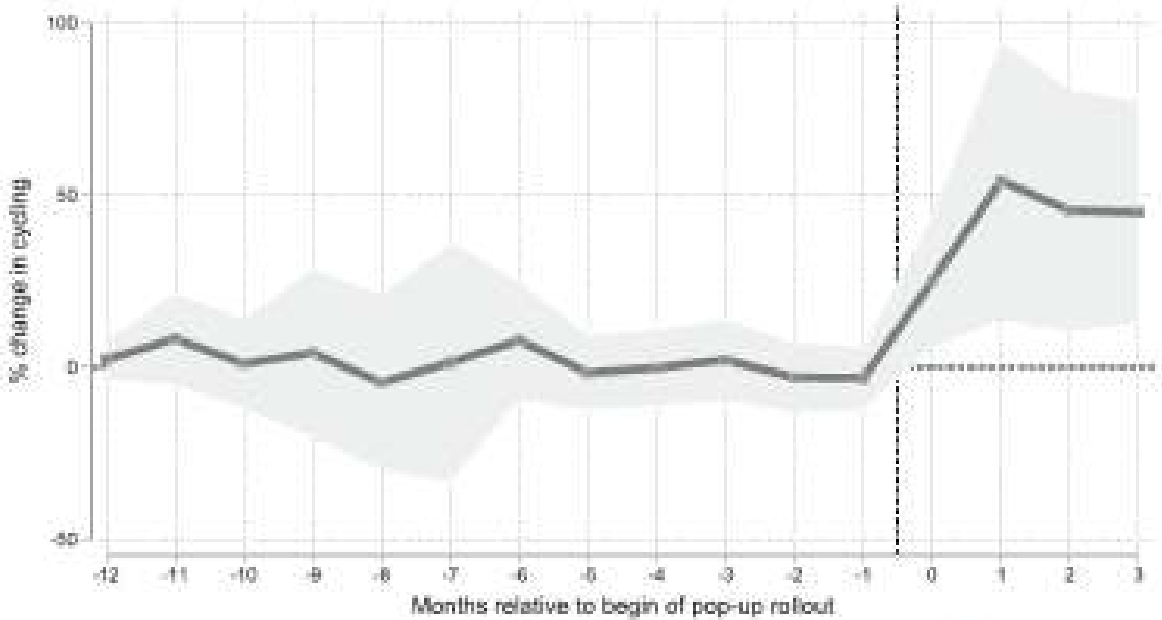
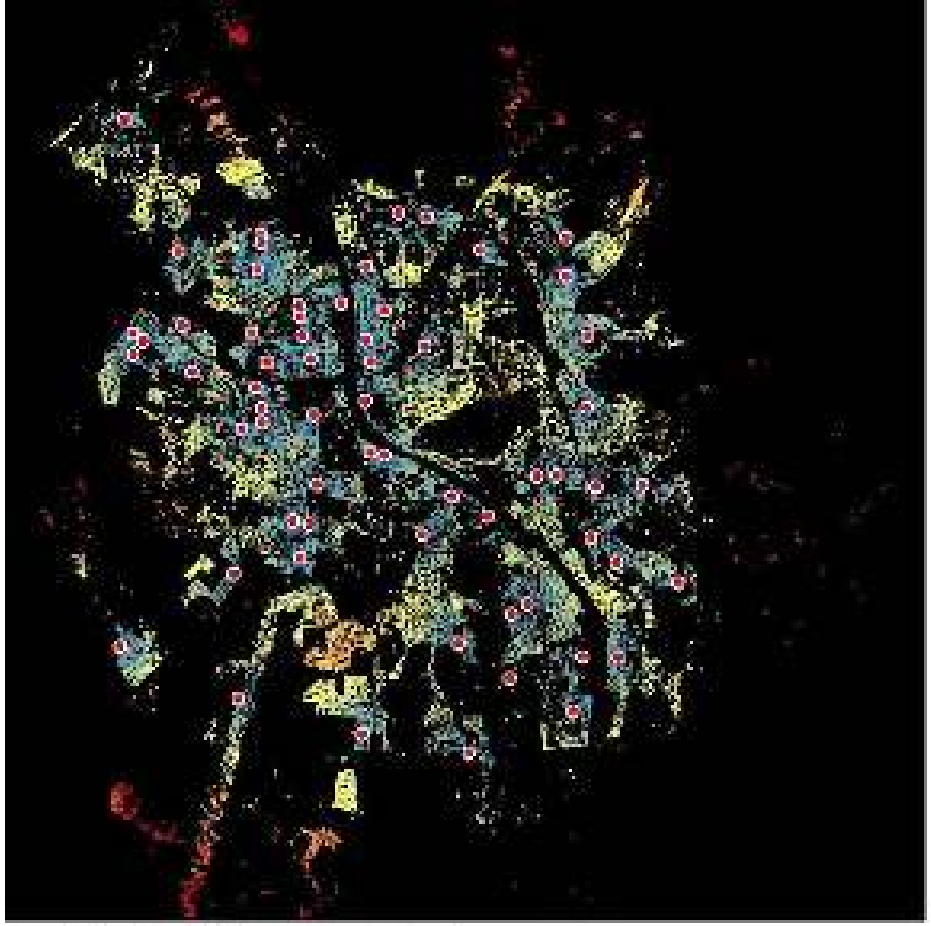
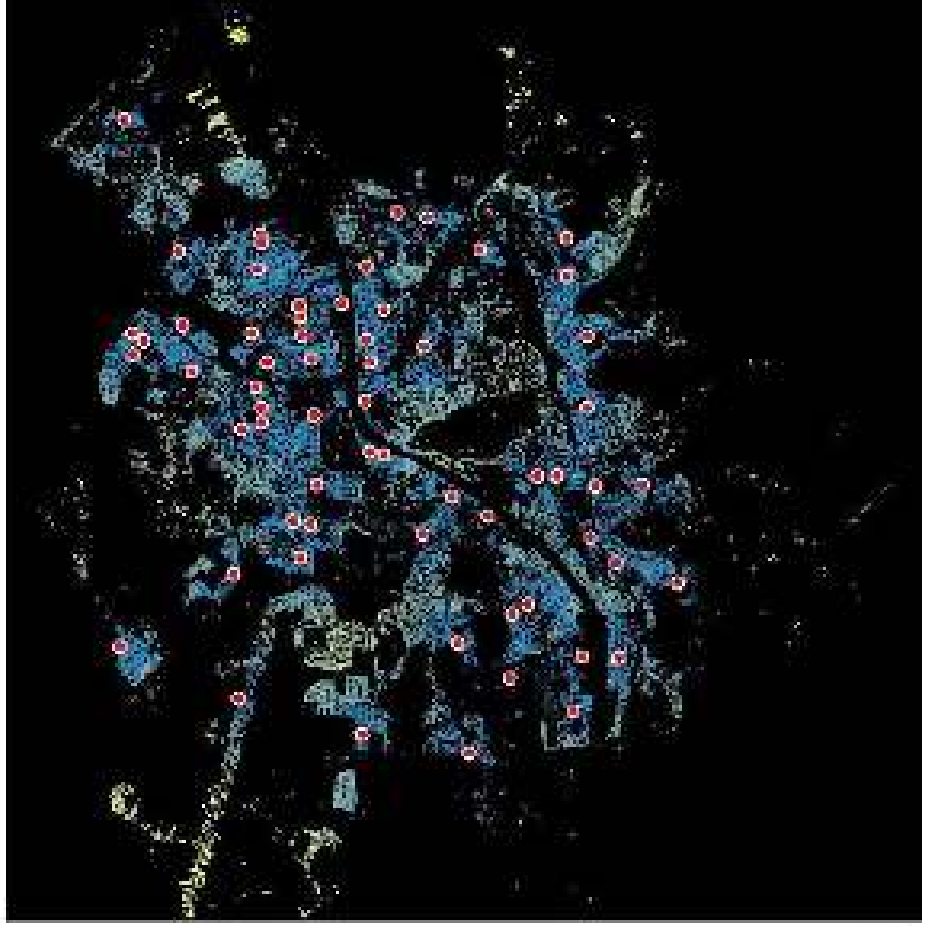


Fig. 2. Treatment effect (difference between treated and control cities) in months before and after the beginning of the pop-up bike lane policy. Observations are binned into months. Treatment for this plot is hard coded to March 2020 and the baseline category and the beginning of the sample are set to February 2019. Estimates are from Poisson regressions that include city and country-day fixed effects (*SI Appendix*, Eq. S1). The shaded area shows the 95% confidence interval. Data for the outcome variable are from the European Cyclists' Federation (3) and data for the treatment variable are from municipal bike counters (*Materials and Methods*).





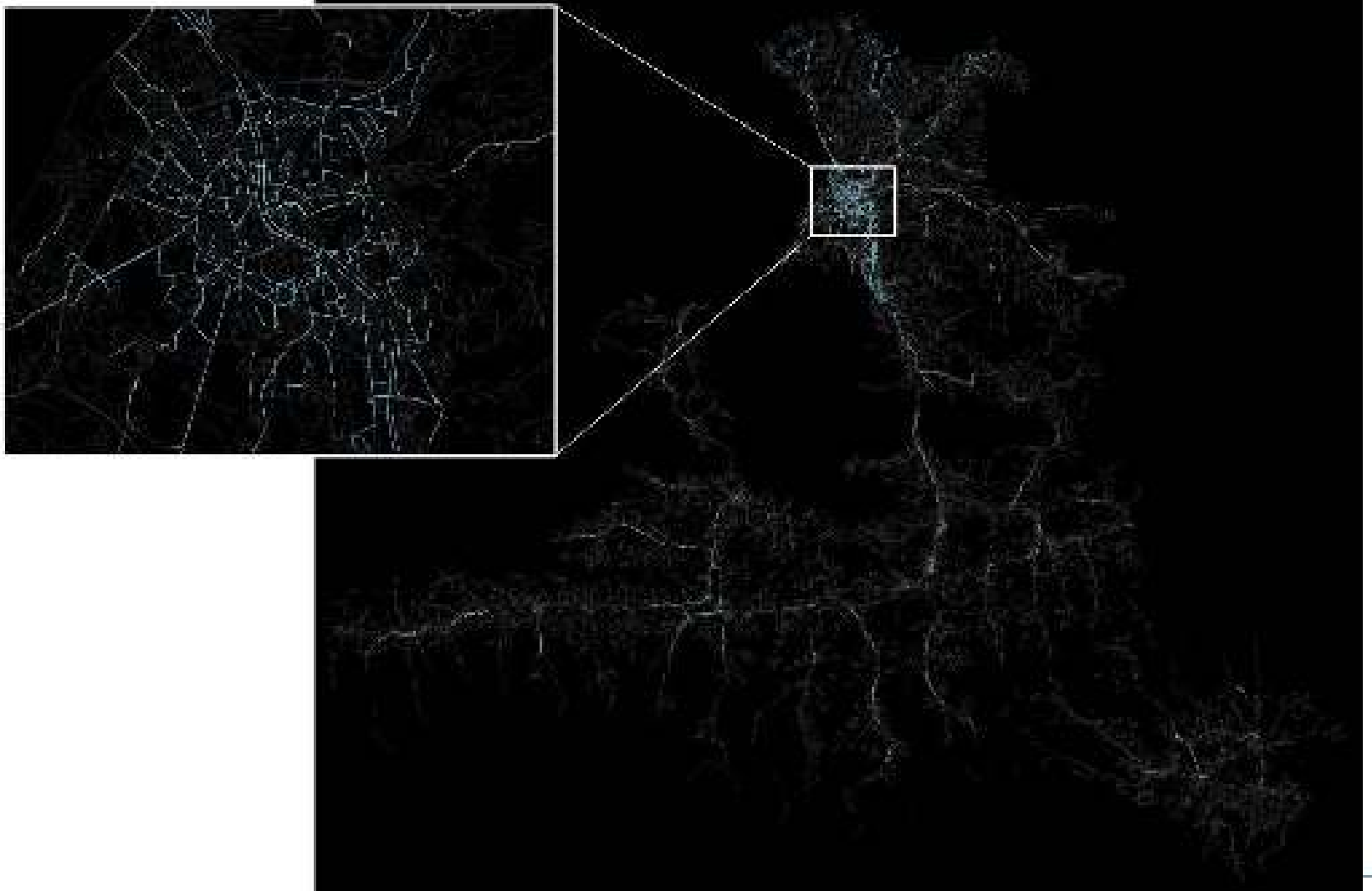
Travel time to next kindergarten in minutes

- ≤ 2.50
- 2.51 - 5.00
- 5.01 - 7.50
- 7.51 - 10.00
- 10.01 - 15.00
- 15.01 - 20.00
- 20.01 - 25.00
- 25.01 - 30.00
- > 30.00

Kindergarten

km
0 1 2

https://twitter.com/gicycle_/status/925465125120770048/photo/1



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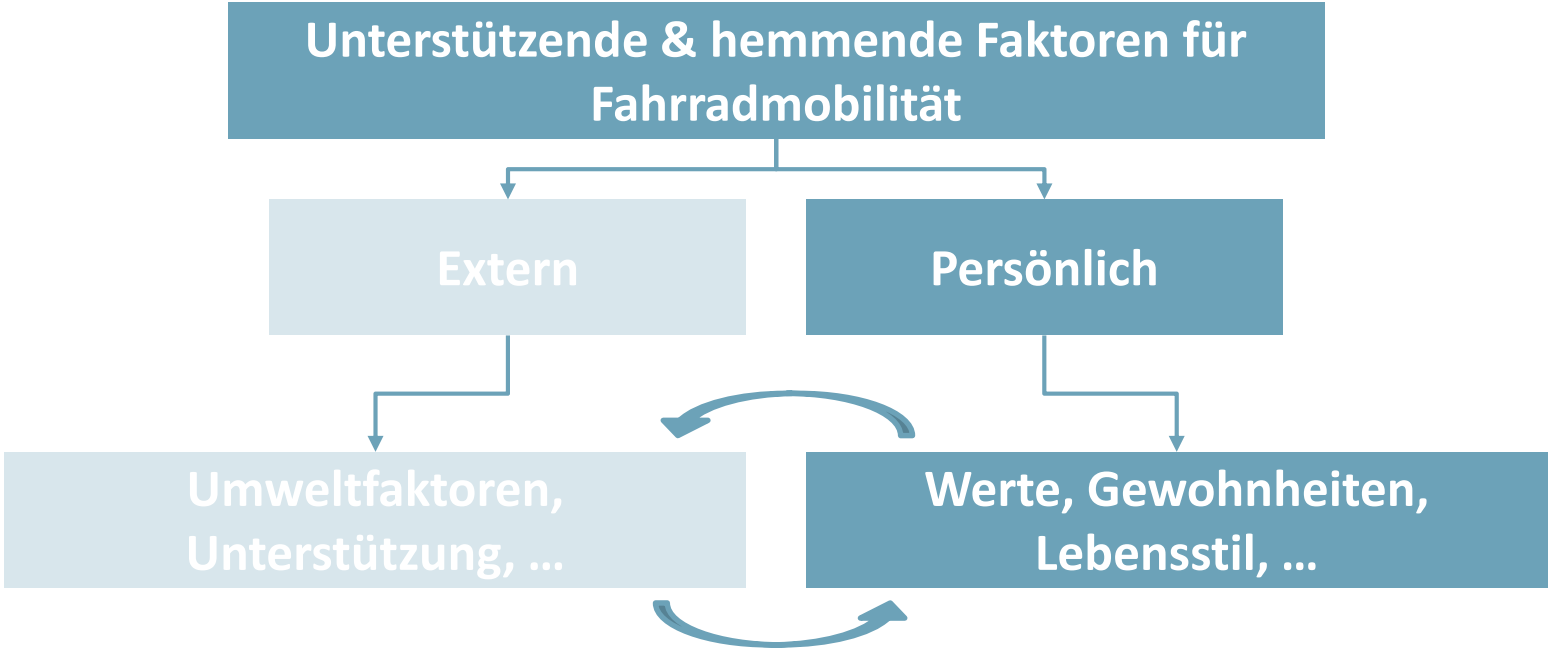
Unterstützende & hemmende Faktoren für Fahrradmobilität
Extern
Persönlich
Umweltfaktoren, Unterstützung, …
Werte, Gewohnheiten, Lebensstil, …

Faktoren Änderung Mobilitätsverhalten (nach G. Fehr)

- ~~**Kosten und Zeit** (Treibstoff, Versicherung, Instandhaltung, Gesamtreisezeit …)~~
- **Psychologische Faktoren** (Flexibilität, Status, Unabhängigkeit, Komfort …)
- **Individuelle Faktoren** (Reiseziel, Wegzweck …)
- **Kontextuelle Faktoren** (Wetter, Saison, Uhrzeit, Wochentag …)
- **Habitualisierung** (Routinen …)

FEHR, G., GEISSELER, L. & JÄGER, M. 2018. Der Mensch im Verkehr – ein Homo Oeconomicus? Zürich: Fehr Advice.

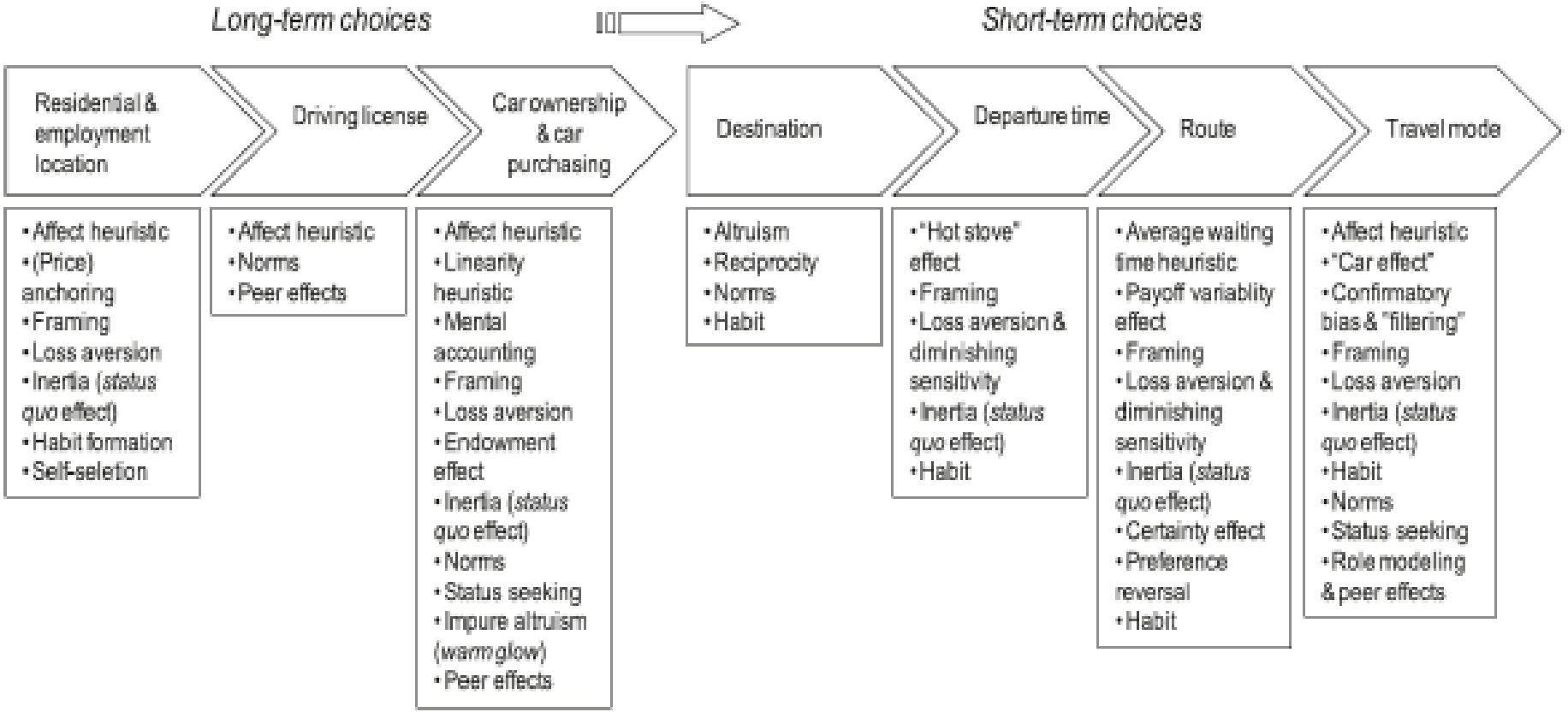

Fig. 1. Behavioural biases and anomalies in short- and long-term travel choices.

GARCIA-SIERRA, M, VANDENBERGH, J. C. J. M. & MIRALLES-GUASCH, C. 2015. Behavioural economics, travel behaviour and environmental–transport policy. Transportation Research Part D: Transport and Environment, 41, 288-305.


RADKULTUR:
gemeinsam für mehr Radverkehr
6. Vernetzungstreffen
Radverkehr Salzburg

https://www.theguardian.com/cities/ng-interactive/2020/sep/25/garden-streets-bike-superhighways-cities-future-coronavirus

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