



Diminishing returns of additional active travel infrastructure?

**Evaluating Barcelona's Decade of
Sustainable Transportation Progress.**

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Motivation

- Researchers and policymakers aim to identify built environment conditions that promote active transportation.
 - Research has predominantly concentrated on urban areas where densification is viable, examining the interplay between changes in activity density and new infrastructure.
 - Less attention has been given to analyzing urban areas with established high activity density, where the primary built environment intervention revolves around improving active mobility infrastructure and experience.
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Case study in Barcelona

- Activity density has remained stable in the last few decades
- **Active mobility infrastructure priority in local governments**

Have changes in infrastructure led to shifts in travel behavior?



Method



1 Characterization of built environment changes

Source: Barcelona Municipality year-to-year annual statistics

Variables: Area of sidewalks, pedestrian priority streets, and road area for traffic. Length of bike lanes. Number of on-street parking.

Scale: Citywide (1.6 Million people – 100 sq. km)

2 Characterization of travel behavior

Source: Year-to-year household travel survey

Variables: Trips per person grouped by mode and/or purpose for each year between 2010-2019

Scale: Citywide

Considerations: Barcelona residents only, some years were excluded due to quality considerations or availability

3. Contrast both data sets

Considerations: Changes in the built environment are not uniformly distributed in at the city scale and travel survey are randomly selected.

Therefore, the analysis wants to find suggestive evidence from the aggregate level than can be explored in the future in more detail.

Built environment changes

Example of sidewalk expansion



2014



2019

Source: Google street view

Built environment changes Example of pedestrian priority street (single platform)

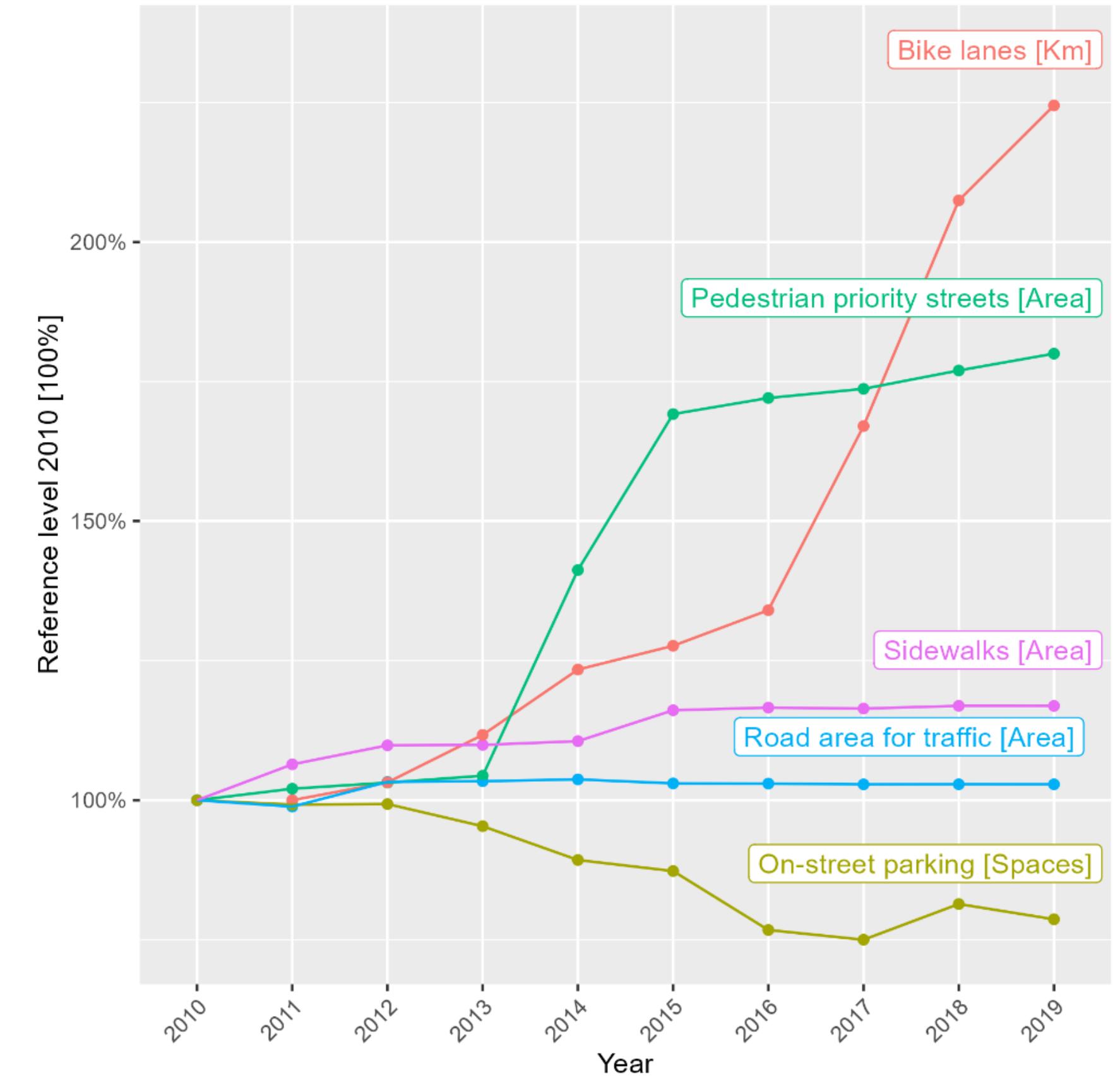


Source: Google street view

Built environment

Changes between 2010-2019

- Road space had small changes across the decade
- Increase in sidewalks come mainly from on street parking (-32000 parking spots) and account for and increase of 143 ha in the period.
- Bike lanes start from 94 km, increase of 117 km (total 211 km).
- Pedestrian priority streets increase from 73 to 141 ha.

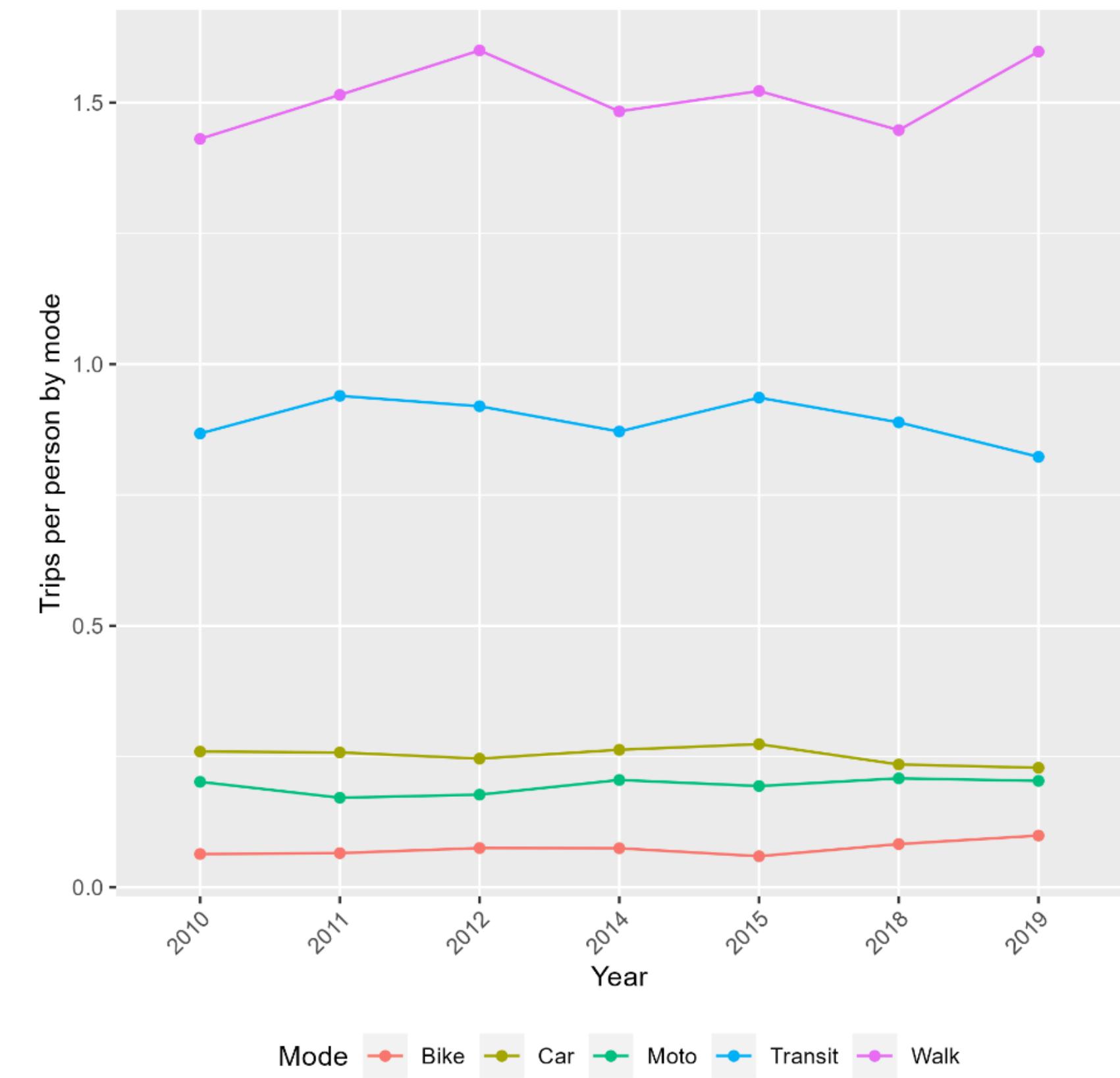


Travel behavior

Modal trips per person/mode share

- Trips per person per mode relative stable
- No clear trend change
- Modal share also relative stable

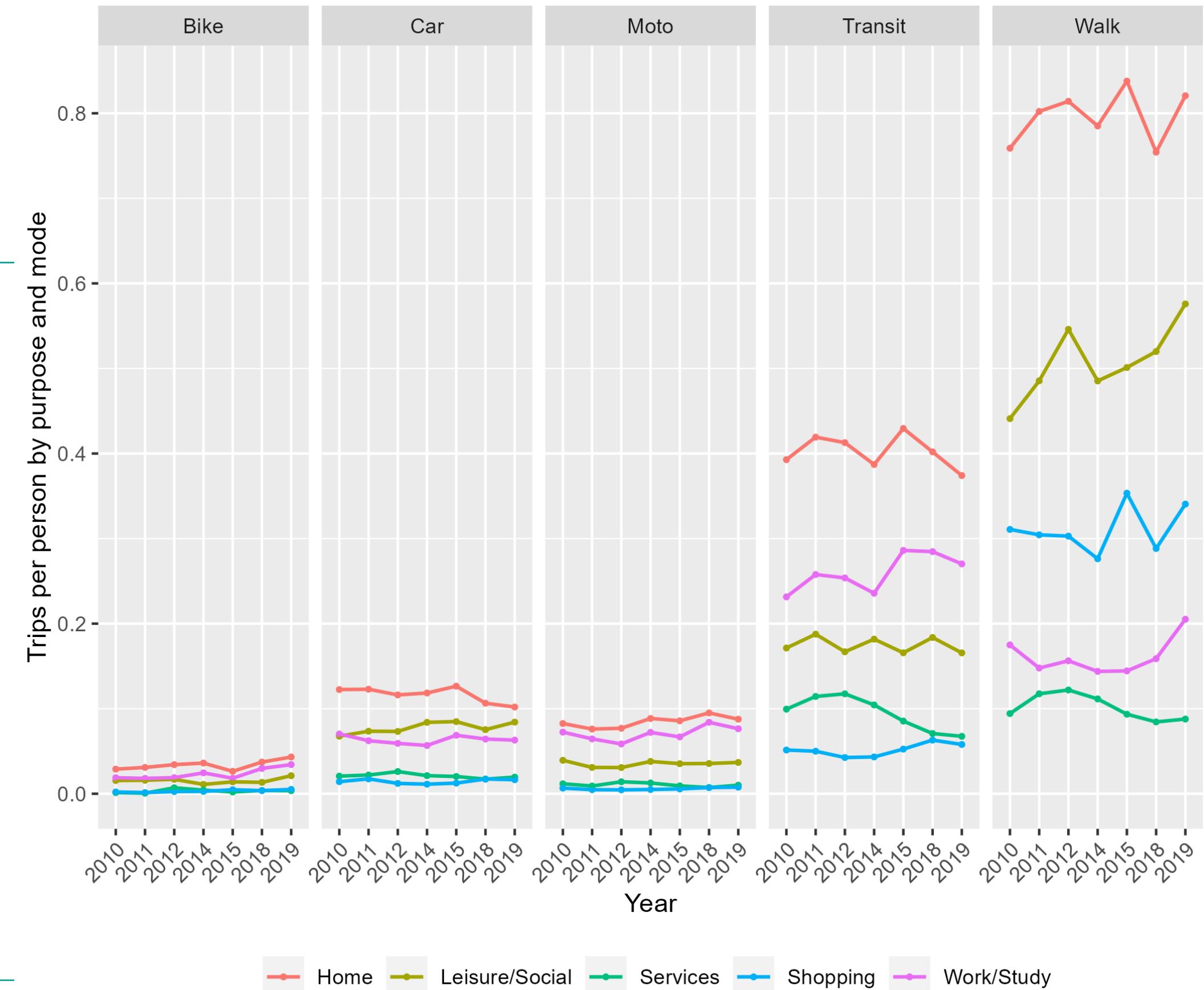
Year	Bike	Car	Moto	Other	Transit	Walk
2010	2%	8%	6%	1%	28%	54%
2011	2%	8%	5%	1%	29%	54%
2012	2%	7%	5%	1%	28%	56%
2014	2%	8%	6%	1%	28%	54%
2015	2%	8%	6%	1%	29%	54%
2018	3%	8%	7%	2%	29%	53%
2019	3%	7%	6%	2%	26%	56%



Travel behavior

By mode and purpose

- Insights from the trip purpose analysis that are not seen without purpose disaggregation.
- Increase in walking trips for Work/Study and for Leisure/Social.
- Increase in Work/Study trips in Transit
- Decrease in total trips for services, that are predominately made in transit and walking. Remote activities may be behind this. However, not decrease in mode share.
- Bike and Motorcycle increase use in Work/Study



Discussion

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- **Have changes in infrastructure led to shifts in travel behavior? Not in the big picture. Possible reasons?**
 - High prevalence of walking and transit use (~85%), car/moto trips may not be able to shift to other modes.
 - Additionally, the creation of the new pedestrian spaces has been achieved by repurposing on-street parking, resulting in no additional cost for car users (Noting there is 6:1 between off-street to on-street parking).
 - **However,**
 - The new bike lanes might have encouraged more people to ride bikes.
 - The changes in infrastructure could also have helped keep walking levels steady, as any reduction in trips for services might have been balanced by walking trips for other reasons.
 - More detailed data set could help to better examine these associations.
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Thank you!
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