MOBIS-COVID19/03

Results as of 20/04/2020

Joseph Molloy

Christopher Tchervenkov

Beaumont Schoeman

Beat Hintermann

Kay W. Axhausen

Arbeitsbericht Verkehrs- und Raumplanung 1494 **April 2020**

IVT *Institut für Verkehrsplanung und Transportsysteme*
Institute for Transport Planning and Systems

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

MOBIS-COVID19/03

Joseph Molloy
IVT
ETH Zürich
CH-8093 Zurich
joseph.molloy@ivt.baug.ethz.ch

Christopher Tchervenkov
IVT
ETH Zurich
CH-8093 Zurich
christopher.tchervenkov@ivt.baug.ethz.ch

Beaumont Schoeman
WWZ
University of Basel
CH-4002 Basel
b.schoeman@unibas.ch

Beat Hintermann
WWZ
University of Basel
CH-4002 Basel
b.hintermann@unibas.ch

Kay W. Axhausen
IVT
ETH Zurich
CH-8093 Zurich
axhausen@ivt.baug.ethz.ch

April 2020

Abstract

To slow down the spread of the coronavirus, the population has been instructed to stay at home if possible. This measure consequently has a major impact on our daily mobility behaviour. But who is being affected, and how? The MOBIS-COVID-19 research project, an initiative of ETH Zurich and the University of Basel, is a continuation of the original MOBIS study. The aim of the project is to get a picture of how the crisis is affecting mobility and everyday life in Switzerland.

Keywords

GPS logger; Travel diary app; COVID-19; Corona virus; MOBIS; Mobility behaviour; Switzerland

Suggested Citation

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MOBIS-COVID19/03

Joseph Molloy
IVT
ETH Zürich
CH-8093 Zurich
joseph.molloy@ivt.baug.ethz.ch

Christopher Tchervenkov
IVT
ETH Zurich
CH-8093 Zurich
christopher.tchervenkov@ivt.baug.ethz.ch

Beaumont Schoeman
WWZ
University of Basel
CH-4002 Basel
b.schoeman@unibas.ch

Beat Hintermann
WWZ
University of Basel
CH-4002 Basel
b.hintermann@unibas.ch

Kay W. Axhausen
IVT
ETH Zurich
CH-8093 Zurich
axhausen@ivt.baug.ethz.ch

April 2020

Zusammenfassung

Um die Ausbreitung des Coronavirus zu verlangsamen ist die Bevölkerung angewiesen worden, wenn möglich zu Hause zu bleiben. Diese Massnahme hat daher einen grossen Einfluss auf unser tägliches Mobilitätsverhalten. Doch wer ist davon betroffen und wie? Das Forschungsprojekt MOBIS-COVID-19, eine Initiative der ETH Zürich und der Universität Basel, ist eine Weiterführung der originalen MOBIS-Studie. Ziel des Projekts ist es, ein Bild zu erhalten, wie sich die Krise auf die Mobilität und das Alltagsleben in der Schweiz auswirkt.

Schlagworte

GPS logger; Travel diary app; COVID-19; Corona virus; MOBIS; Mobility behaviour; Switzerland

Zitierungsvorschlag

Molloy, J., C. Tchervenkov and K.W. Axhausen (2020) MOBIS-COVID19/03: Results as of 20/04/2020, *Arbeitsberichte Verkehrs- und Raumplanung*, **1494**, IVT, ETH Zurich, Zurich.

Introduction

On March 16, 2020, 3700 participants who completed the MOBIS study between September 2019 and January 2020 were invited to reinstall the GPS Logger and Travel Diary App 'Catch-My-Day', developed by MotionTag, to record their mobility behaviour during the period of special measures implemented to control the spread of the Corona Virus. The first 4 weeks of mobility data from the original MOBIS Study is taken for each participant as a baseline against which to compare current mobility patterns. These 4 weeks start place anywhere between 1st September and 15th November, depending on the participant. Only trips in Switzerland are currently considered, although data on cross border travel is available.

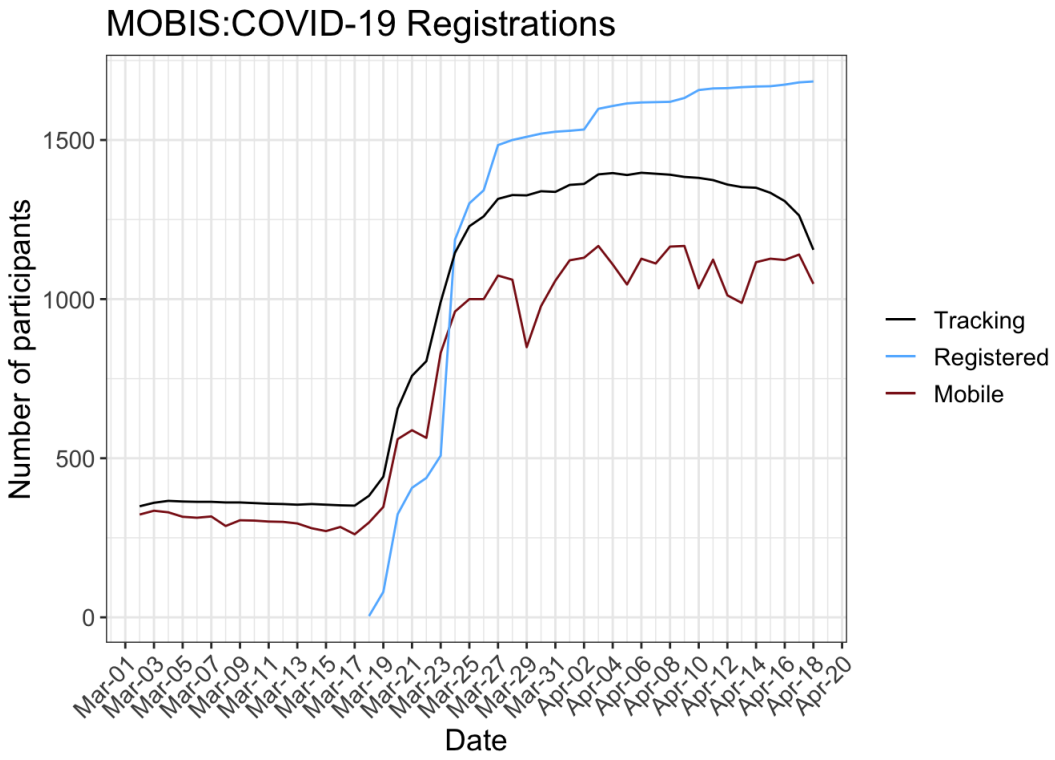
The following figure shows the number of registered and tracking participants per day. A running panel of around 250 participants were already tracking before the sample was reinvited. This allows results for the weeks before the MOBIS:COVID-19 study was officially started, although the sample size is a lot smaller, and hence the results.

In the MOBIS study, participants were only eligible if they used a car at least 3 days a week - which skews the sample away from the Swiss general population.

The number of tracking participants each day used to calculate the average daily values includes all participants who recorded tracks before or after that date. This allows the consideration of those who stay at home while still allowing for survey dropouts.

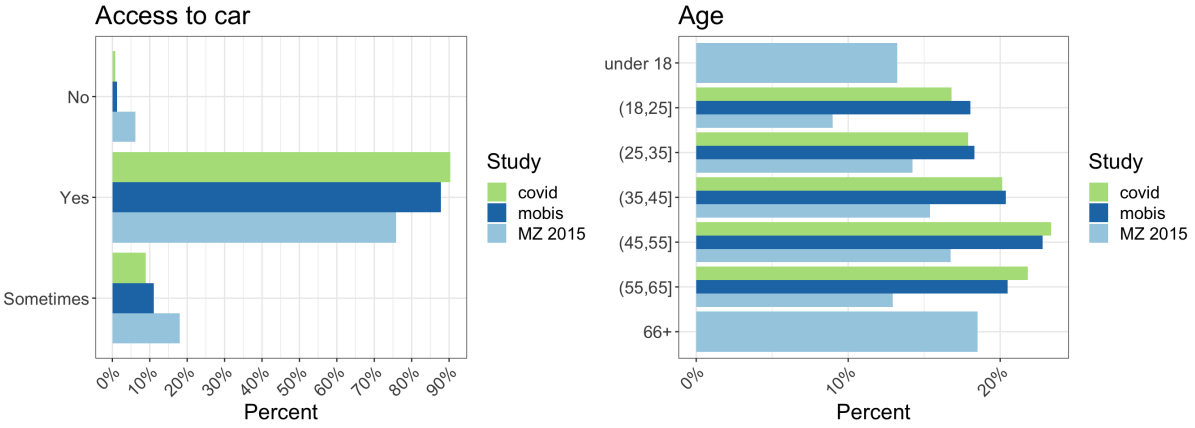
The GPS Travel diary used, Catch-My-Day (for iOS and Android) can have a 2-3 day delay before the tracks are available for analysis. The scaling by active participants accommodates for this, but the results of previous reports may change when the report is updated.

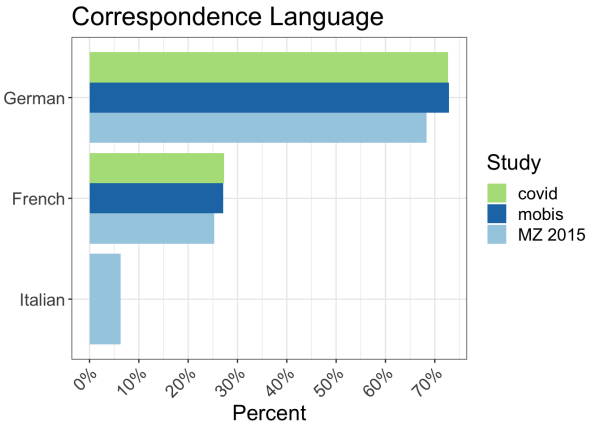
Participation

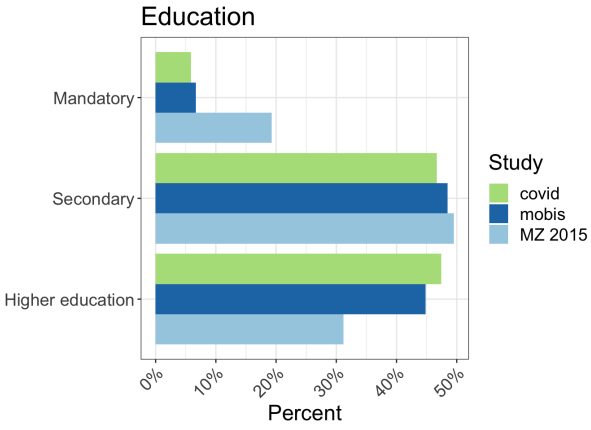


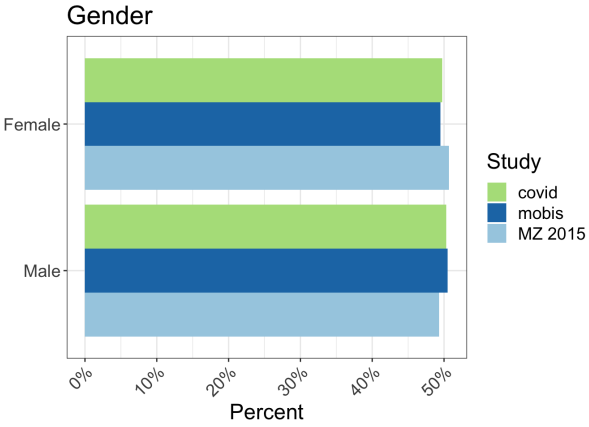
Differences in the distributions

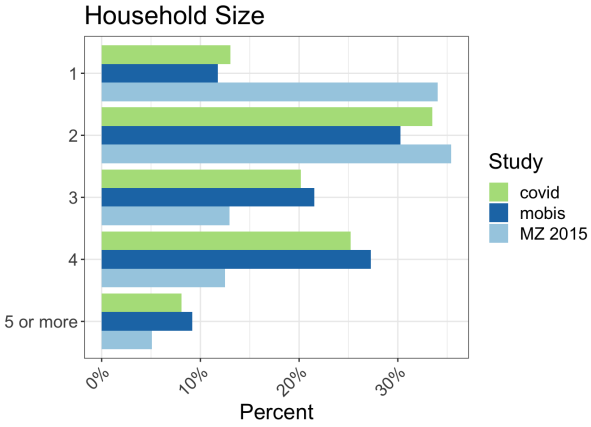
The following charts show the characteristics of the MOBIS:COVID-19 sample compared to the original MOBIS Sample. There are some small differences, but generally the samples are consistent. This chart will be extended to compare to the relevant census data.

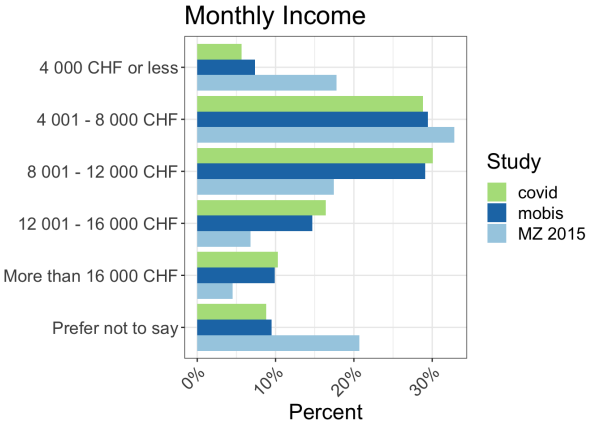


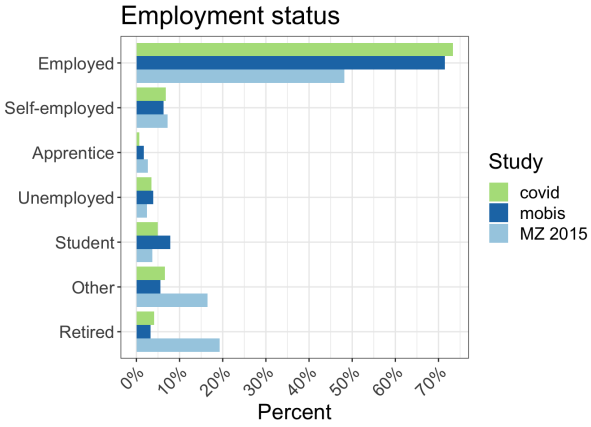

Correspondence Language
German
French
Italian
0%
10%
20%
30%
40%
50%
60%
70%
Percent
Study
covid
mobis
MZ 2015


Education
Mandatory
Secondary
Higher education
0%
10%
20%
30%
40%
50%
Percent
Study
covid
mobis
MZ 2015


Gender
Female
Male
0%
10%
20%
30%
40%
50%
Percent
Study
covid
mobis
MZ 2015


Household Size
1
2
3
4
5 or more
0%
10%
20%
30%
Percent
Study
covid
mobis
MZ 2015


Monthly Income
4 000 CHF or less
4 001 - 8 000 CHF
8 001 - 12 000 CHF
12 001 - 16 000 CHF
More than 16 000 CHF
Prefer not to say
0%
10%
20%
30%
Percent
Study
covid
mobis
MZ 2015


Employment status
Employed
Self-employed
Apprentice
Unemployed
Student
Other
Retired
0%
10%
20%
30%
40%
50%
60%
70%
Percent
Study
covid
mobis
MZ 2015

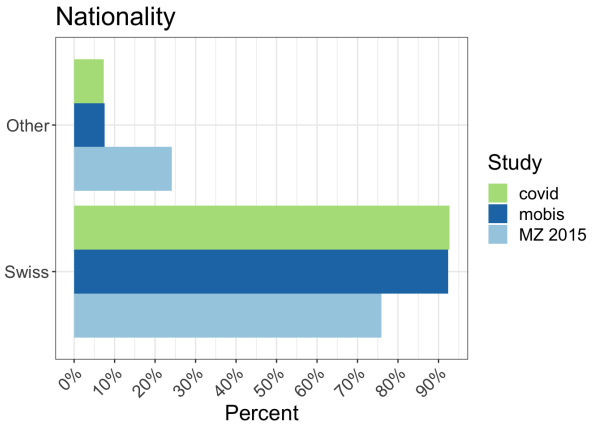
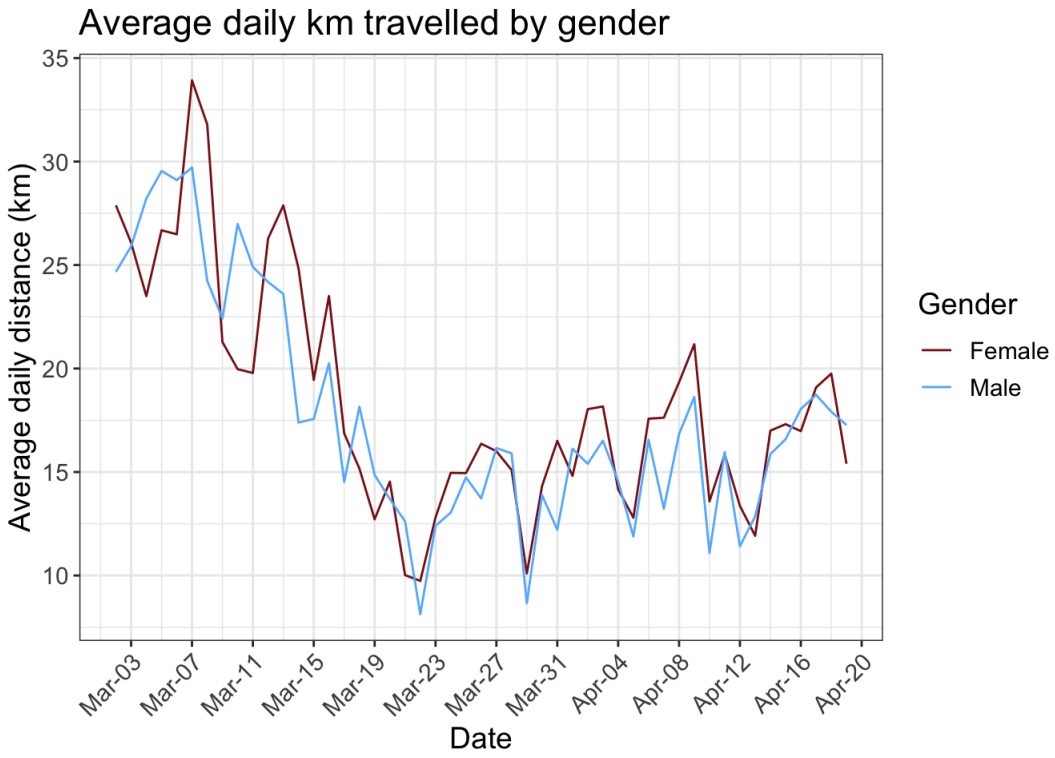


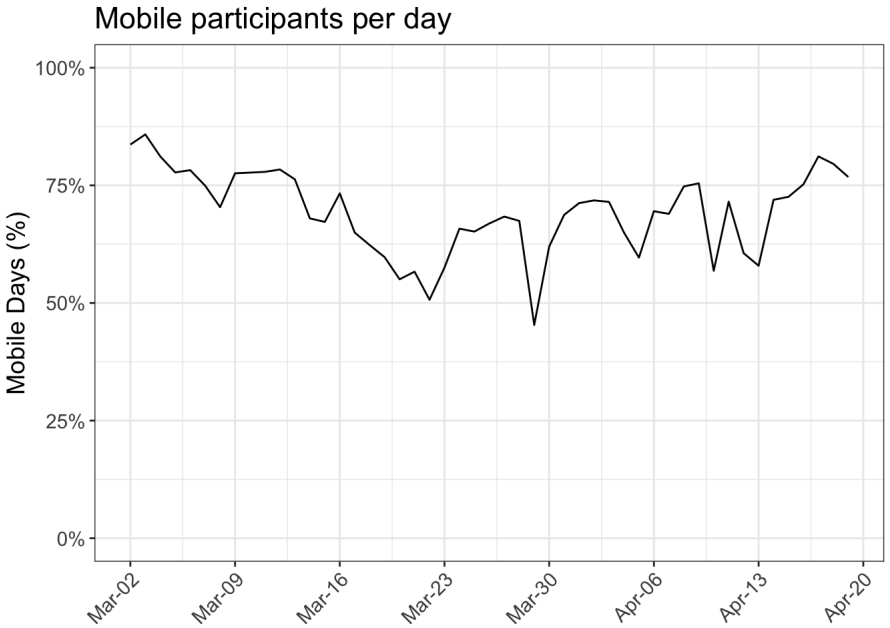
Table 1: Comparison with the last national travel diary Mikrozensus (MZ) 2015

	N		%	
	Covid	MZ	Covid	MZ
Aargau	80	4,325	5.0	7.6
Basel-Landschaft	182	1,940	11.4	3.4
Basel-Stadt	37	1,555	2.3	2.7
Berne	187	7,244	11.7	12.7
Fribourg	8	1,942	0.5	3.4
Geneva	122	3,062	7.6	5.4
Schwyz	17	1,005	1.1	1.8
Solothurn	17	1,813	1.1	3.2
Vaud	286	5,303	17.9	9.3
Zurich	656	10,410	41.1	18.2
Other	3	18,491	0.2	32.4

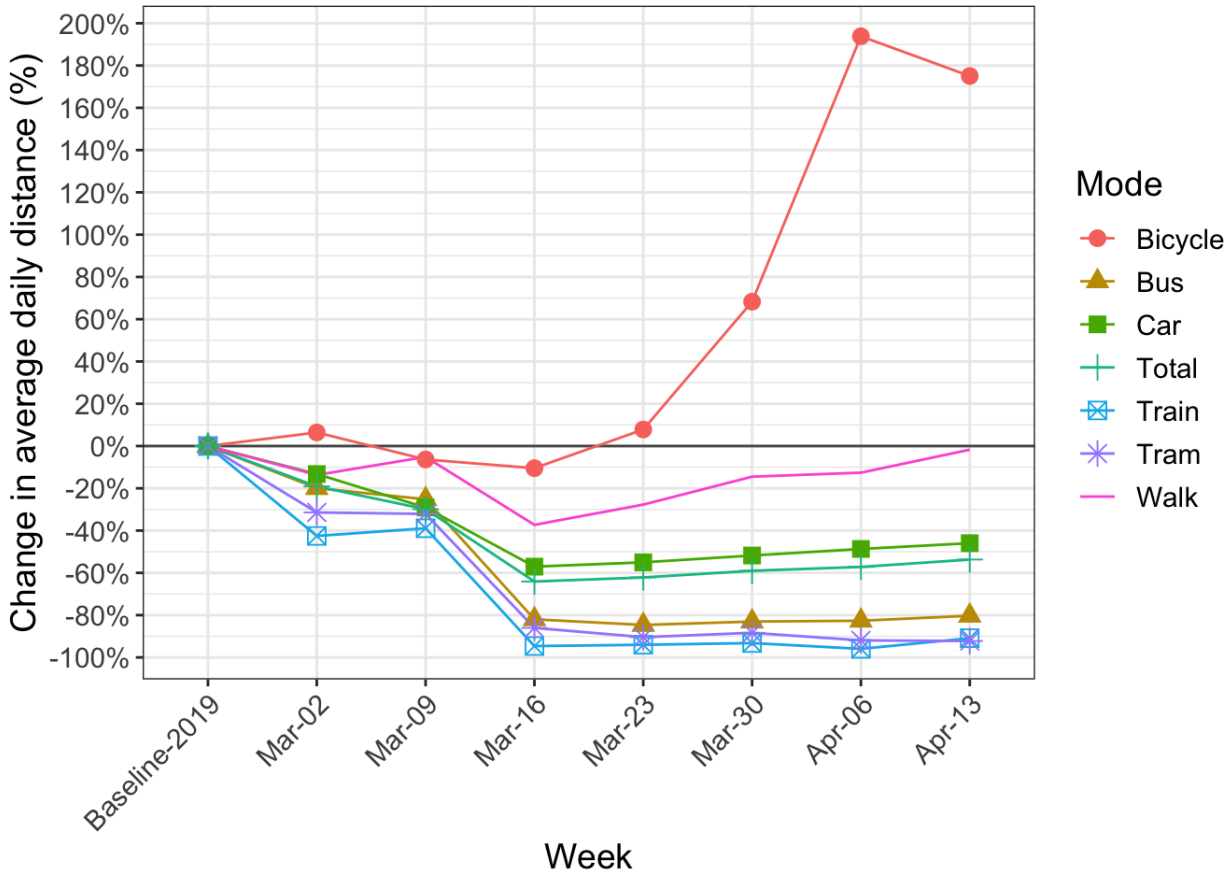
Average daily distance



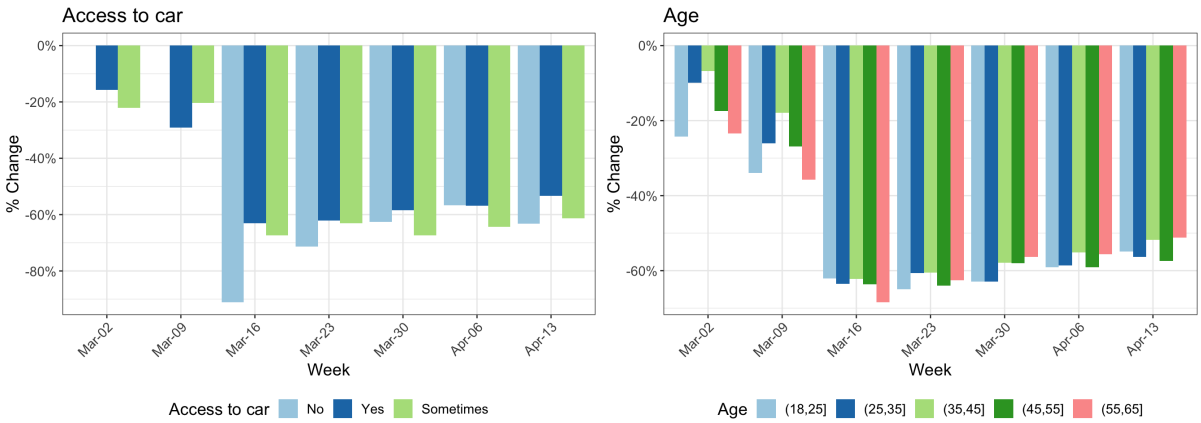
Active days

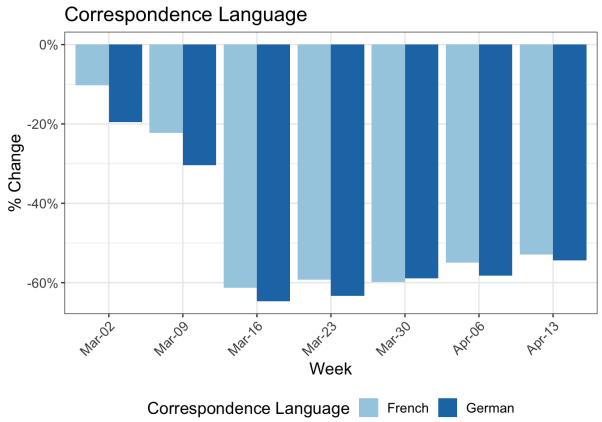


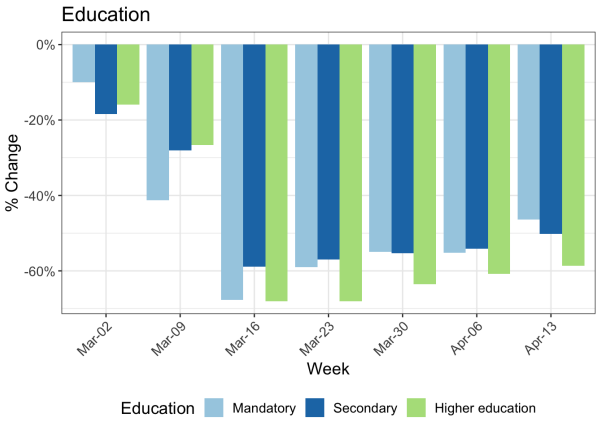
Change in kilometers travelled by transport mode

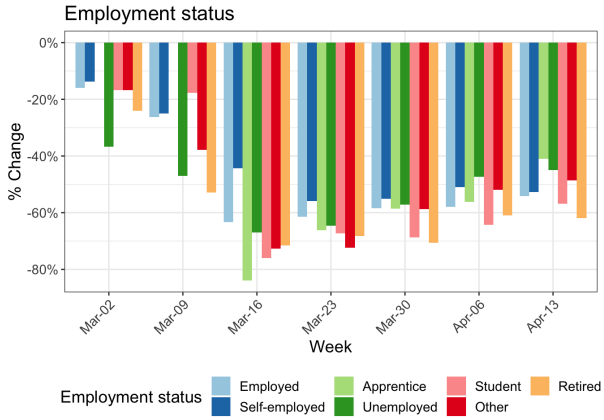


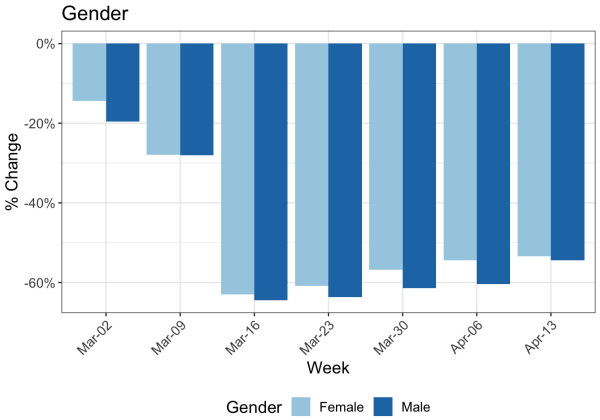
Change in kilometers travelled by:

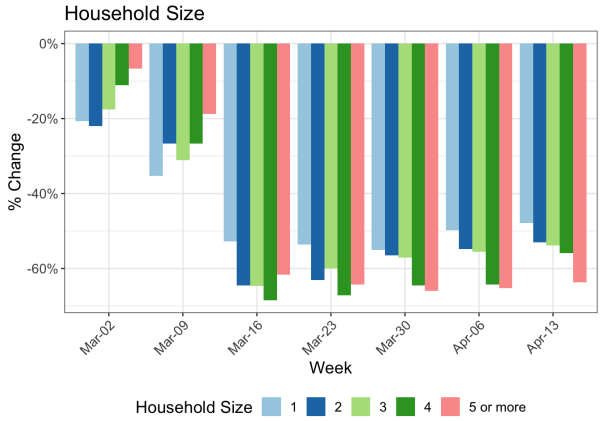


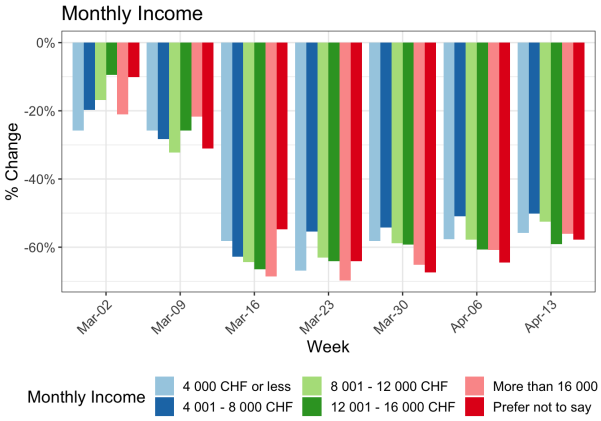

Correspondence Language
0%
-20%
-40%
-60%
% Change
Mar-02
Mar-09
Mar-16
Mar-23
Mar-30
Apr-06
Apr-13
Week
Correspondence Language
French
German

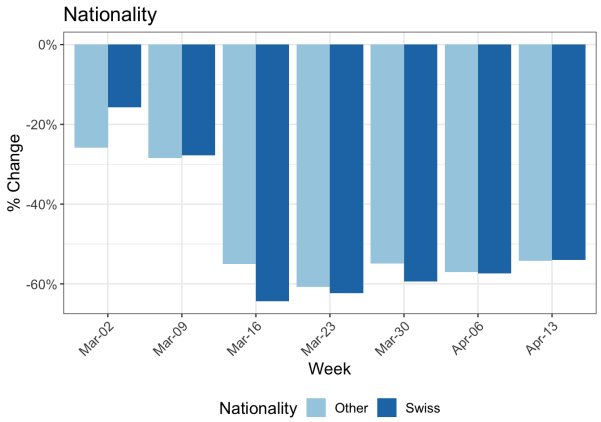

Education
0%
-20%
-40%
-60%
% Change
Mar-02
Mar-09
Mar-16
Mar-23
Mar-30
Apr-06
Apr-13
Week
Education
Mandatory
Secondary
Higher education


Employment status
0%
-20%
-40%
-60%
-80%
% Change
Mar-02
Mar-09
Mar-16
Mar-23
Mar-30
Apr-06
Apr-13
Week
Employment status
Employed
Self-employed
Apprentice
Unemployed
Student
Other
Retired


Gender
0%
-20%
-40%
-60%
% Change
Mar-02
Mar-09
Mar-16
Mar-23
Mar-30
Apr-06
Apr-13
Week
Gender
Female
Male


Household Size
0%
-20%
-40%
-60%
% Change
Mar-02
Mar-09
Mar-16
Mar-23
Mar-30
Apr-06
Apr-13
Week
Household Size
1
2
3
4
5 or more


Monthly Income
0%
-20%
-40%
-60%
% Change
Mar-02
Mar-09
Mar-16
Mar-23
Mar-30
Apr-06
Apr-13
Week
Monthly Income
4 000 CHF or less
4 001 - 8 000 CHF
8 001 - 12 000 CHF
12 001 - 16 000 CHF
More than 16 000
Prefer not to say



Reduction in kilometers travelled by Canton

Table 2: Change in kilometers travelled by home canton (%)

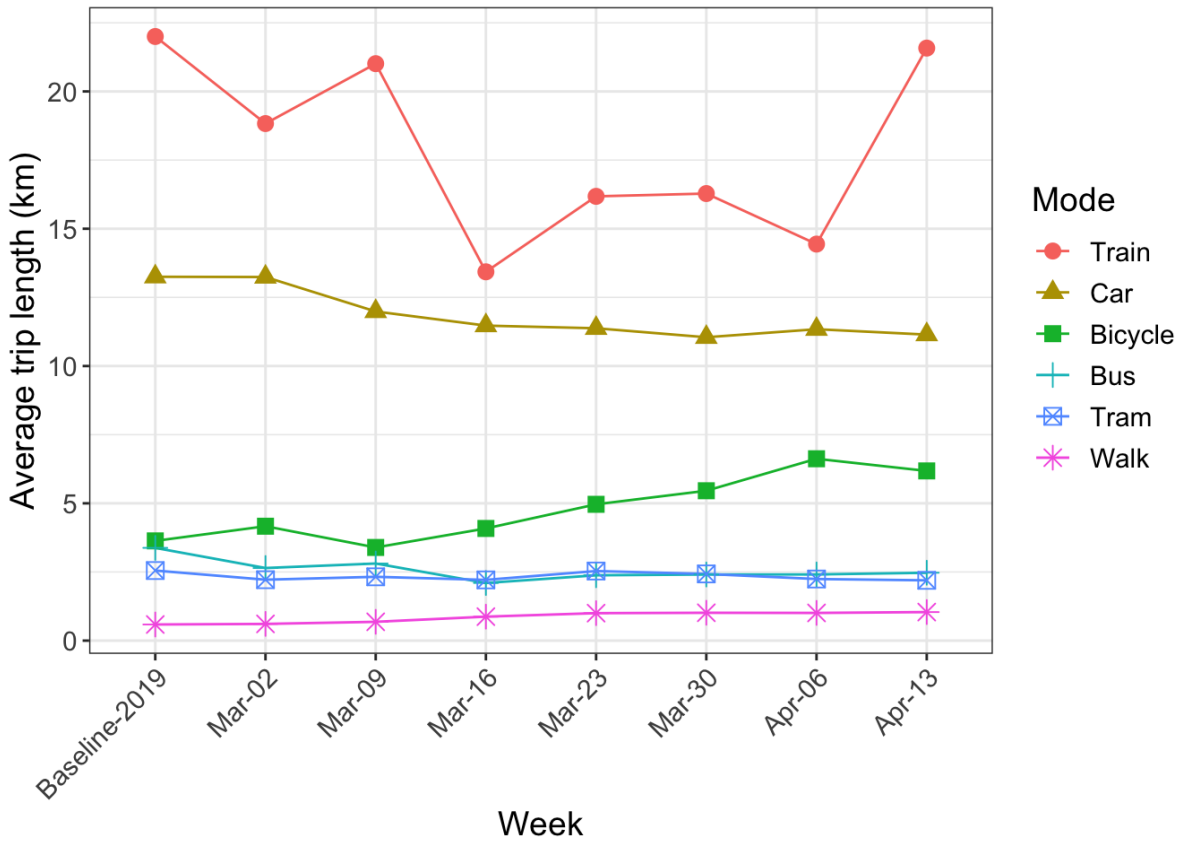
Canton	N	Mar-02	Mar-09	Mar-16	Mar-23	Mar-30	Apr-06	Apr-13
Aargau	**67**	-25	-41	-71	-58	-50	-57	-52
Basel-Landschaft	**153**	-14	-9	-60	-61	-59	-60	-53
Basel-Stadt	**32**	-17	-38	-72	-75	-67	-61	-68
Berne	**158**	-30	-33	-66	-60	-57	-55	-46
Fribourg	**6**	-61	-23	-63	-56	-61	-52	-44
Geneva	**111**	7	-45	-69	-61	-58	-65	-55
Schwyz	**11**	-24	-13	-55	-70	-46	-50	-41
Solothurn	**16**	-13	-41	-62	-65	-53	-49	-56
Vaud	**237**	-9	-23	-65	-71	-67	-65	-61
Zurich	**569**	-16	-25	-60	-58	-56	-52	-52

Trip duration by transport mode and gender

Table 3: Median trip duration by gender and mode (minutes)

Mode	Gender	Baseline-2019	Mar-02	Mar-09	Mar-16	Mar-23	Mar-30	Apr-06	Apr-13
Bicycle	**Female**	15	15	16	13	19	27	31	38
	Male	14	14	15	25	24	28	36	32
Car	**Female**	52	41	38	36	36	36	37	35
	Male	51	47	42	34	34	35	35	35
Local PT	**Female**	14	9	9	5	6	7	5	6
	Male	15	11	12	9	8	8	8	7
Train	**Female**	36	31	35	19	28	28	16	19
	Male	35	25	33	12	26	23	18	25
Walk	**Female**	17	22	21	19	18	21	21	21
	Male	17	20	20	16	18	20	21	21

Average trip length by transport mode (km)



Activity space and daily travel radius

A commonly used definition of the activity space is the 95% confidence ellipse of the activity locations, in this case weighted by duration. In the following analysis, the activities at the home location are included, for those that had the app activated on that day. This is an important metric which gives an idea of the area in which travel is being performed. The daily travel radius is also presented.

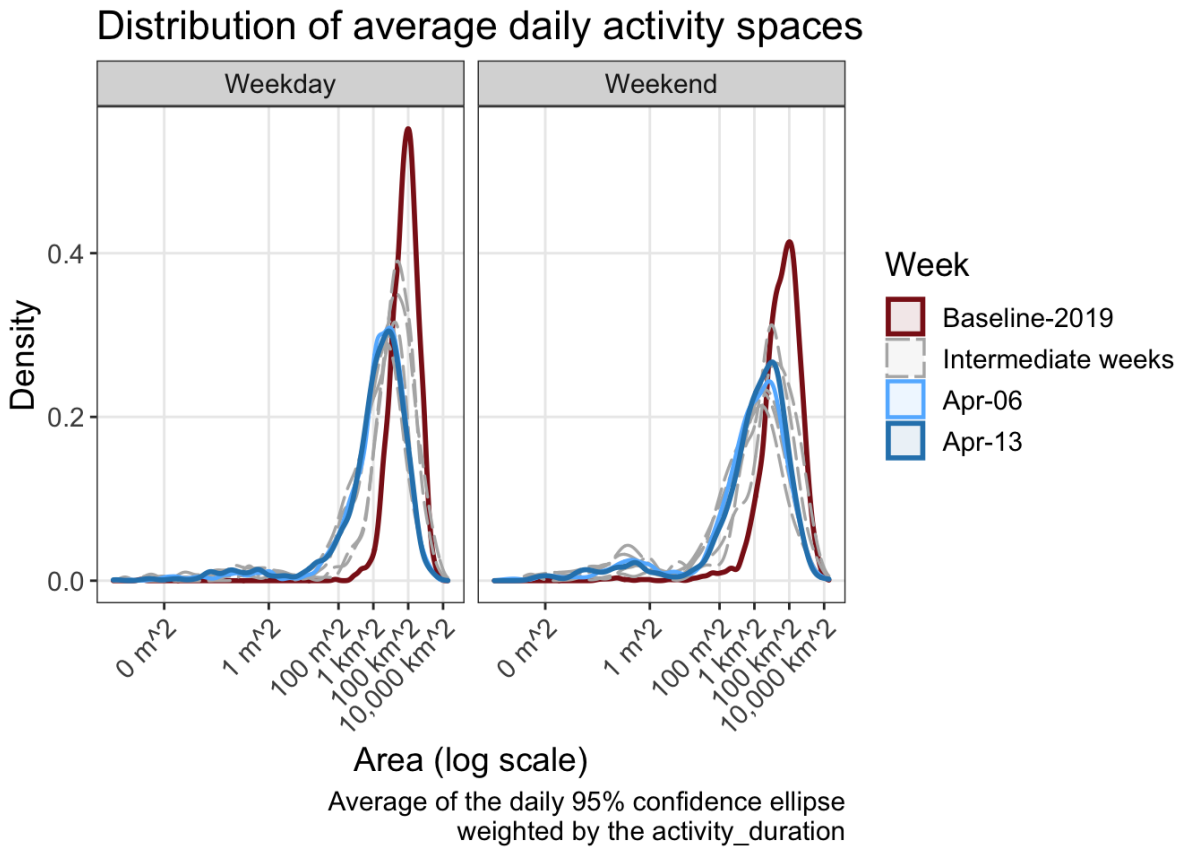


Table 4: Change in average activity space area and average daily radius (%)

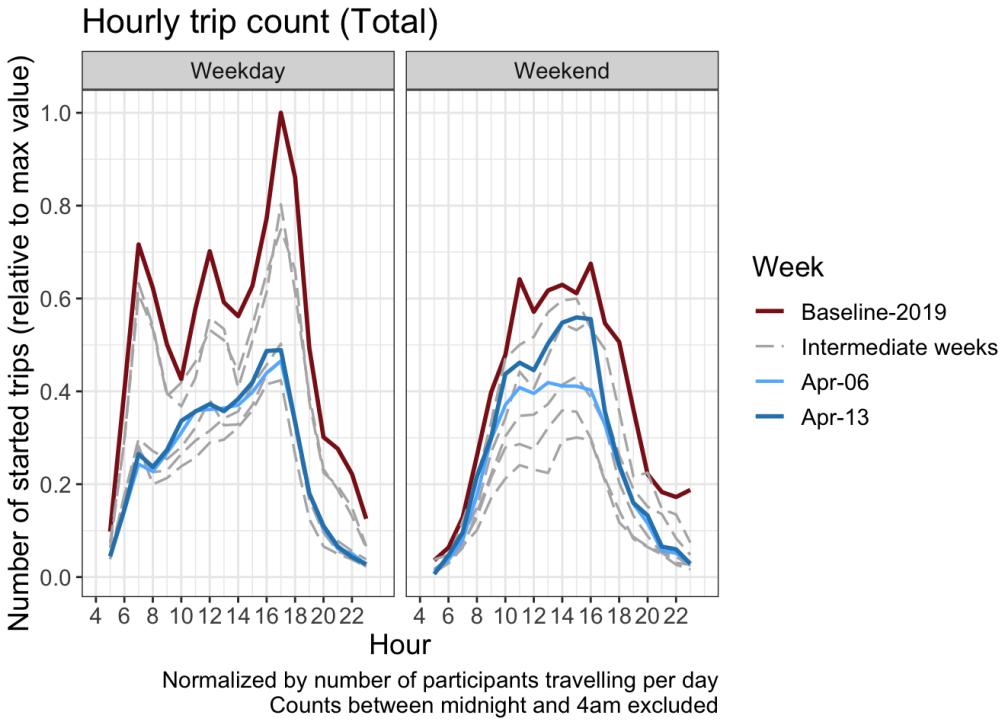
Week		# Activities/day	Change	Area (km^2)	Change	Daily Radius (km)	Change
Baseline-2019	Weekday	4.74		199.94		10.07	
	Weekend	3.92		224.87		9.89	
Mar-02	Weekday	3.98	-16%	188.70	-6%	8.70	-14%
	Weekend	3.46	-12%	128.24	-43%	8.06	-18%
Mar-09	Weekday	3.98	-16%	120.04	-40%	7.39	-27%
	Weekend	3.19	-19%	81.71	-64%	5.89	-40%
Mar-16	Weekday	2.87	-39%	31.41	-84%	3.97	-61%
	Weekend	2.02	-49%	16.78	-93%	2.29	-77%
Mar-23	Weekday	2.67	-44%	34.63	-83%	3.61	-64%
	Weekend	2.23	-43%	31.25	-86%	3.18	-68%
Mar-30	Weekday	2.88	-39%	41.32	-79%	3.85	-62%
	Weekend	2.55	-35%	33.42	-85%	3.70	-63%
Apr-06	Weekday	2.96	-38%	37.56	-81%	4.13	-59%
	Weekend	2.79	-29%	42.13	-81%	3.82	-61%
Apr-13	Weekday	3.00	-37%	39.91	-80%	4.29	-57%
	Weekend	2.77	-29%	40.02	-82%	3.65	-63%

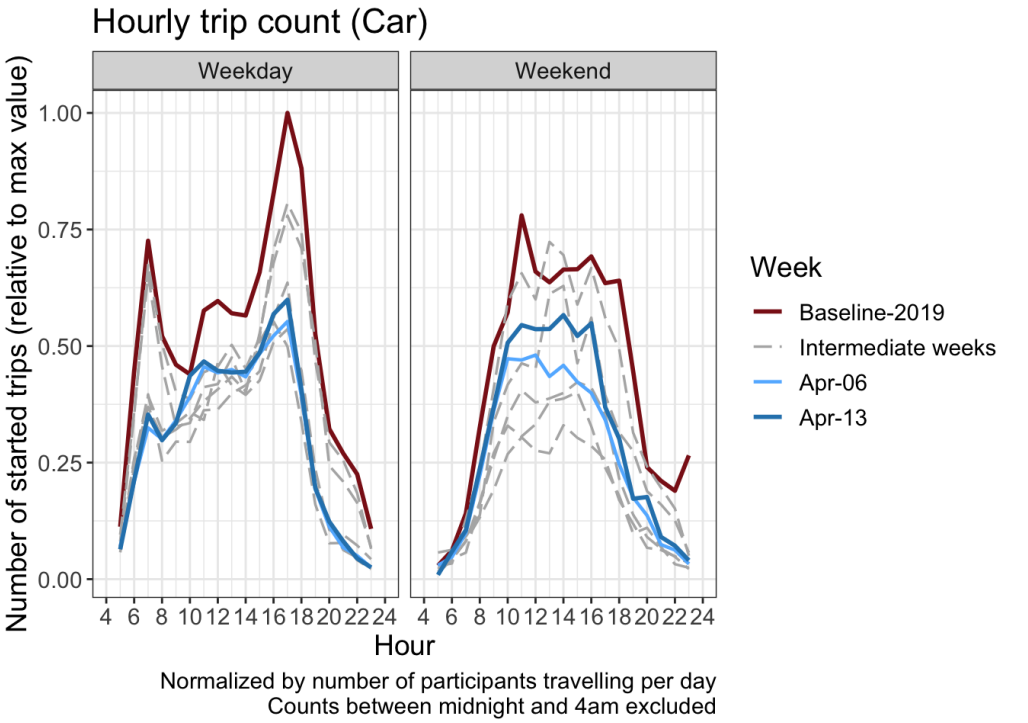
Table 5: Change in median weekly activity space by type of day and age class (km^2)

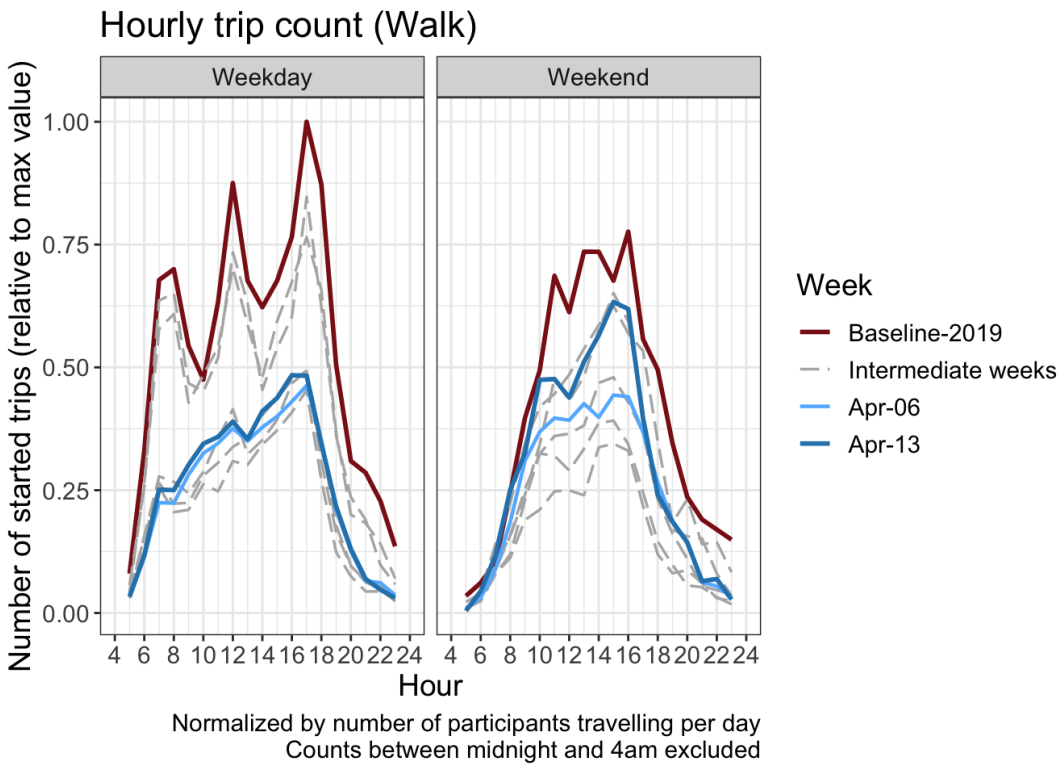
Age		2019	Mar-02	Mar-09	Mar-16	Mar-23	Mar-30	Apr-06	Apr-13
(18,25]	Weekday	65.1	35.9	48.1	6.6	2.6	3.2	5.8	7.9
	Weekend	35.7	5.8	9.8	0.6	0.9	0.8	1.2	2.8
(25,35]	Weekday	71.3	85.2	42.6	2.3	4.9	4.6	7.7	6.3
	Weekend	42.6	14.5	3.3	0.4	0.6	1.4	2.3	4.6
(35,45]	Weekday	74.9	36.4	75.0	6.8	3.3	7.6	8.2	9.2
	Weekend	24.9	29.9	20.5	0.4	1.6	0.8	1.4	4.7
(45,55]	Weekday	74.5	40.5	53.8	4.0	3.1	4.7	7.0	4.8
	Weekend	28.2	13.3	7.0	0.7	1.2	1.6	1.6	5.8
(55,65]	Weekday	67.2	64.0	46.4	7.3	2.8	5.8	5.2	7.1
	Weekend	21.5	9.1	8.7	0.1	1.1	1.1	1.2	4.8

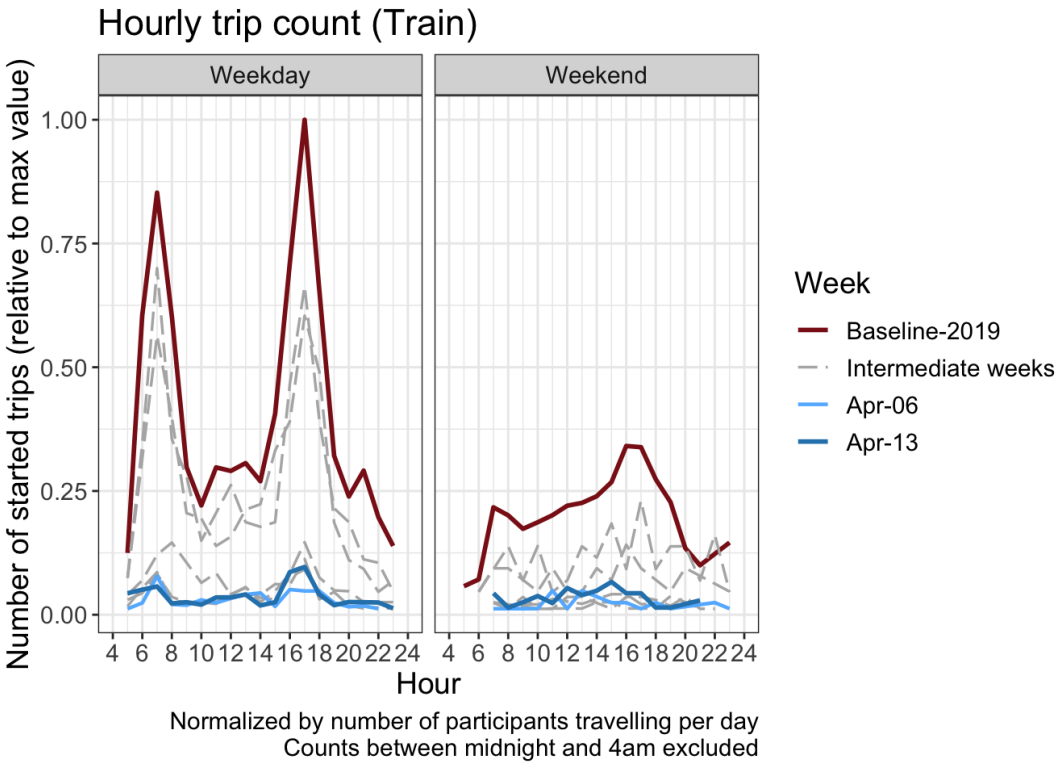
Hourly counts

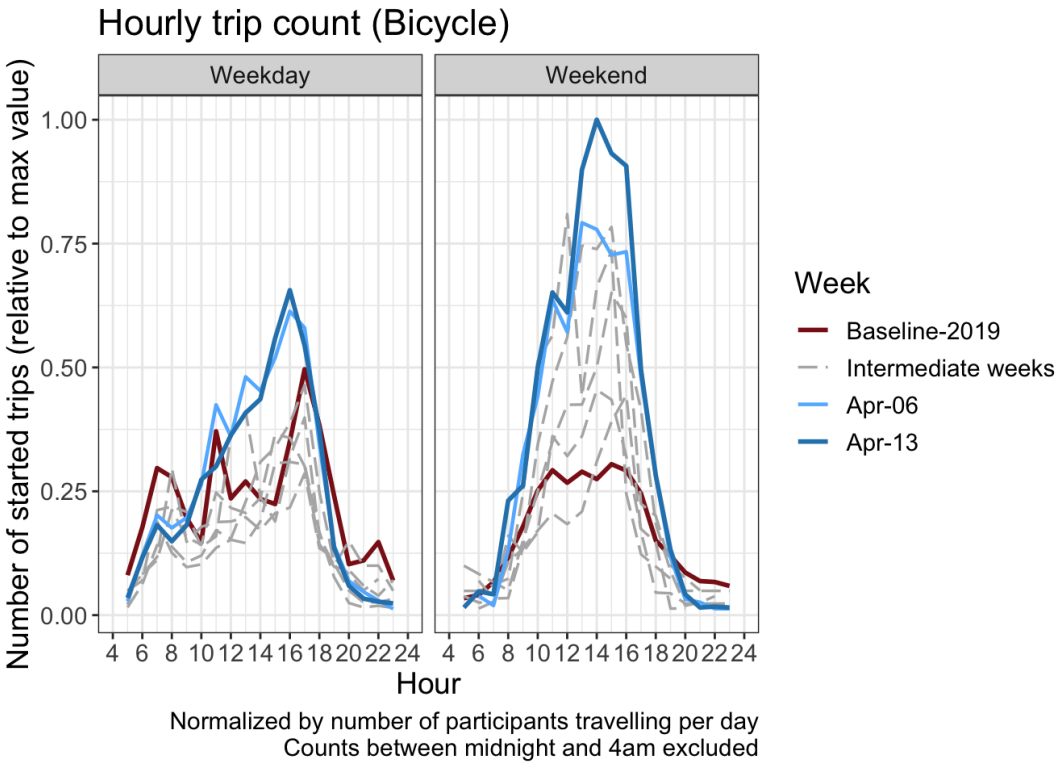
The number of trips started per hour. The y axis is normalized by the maximum hourly value in the graph.

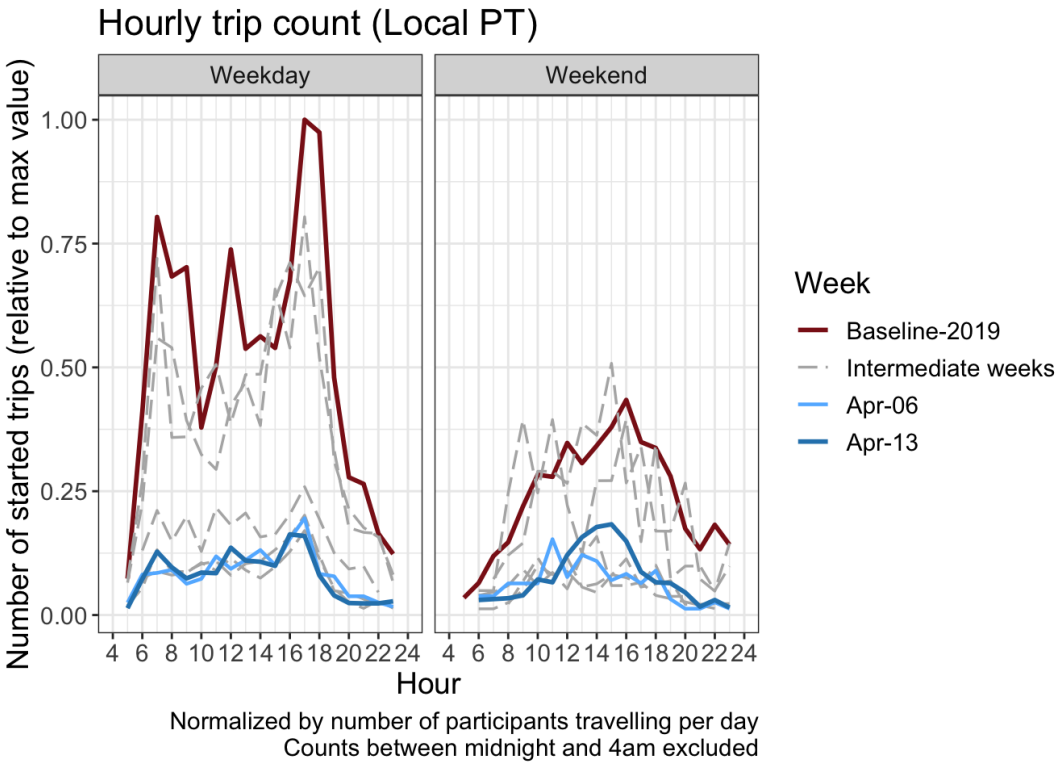



Hourly trip count (Car)
Weekday
Weekend
Number of started trips (relative to max value)
1.00
0.75
0.50
0.25
0.00
4 6 8 10 12 14 16 18 20 22 24
Hour
Normalized by number of participants travelling per day
Counts between midnight and 4am excluded
Week
Baseline-2019
Intermediate weeks
Apr-06
Apr-13


Hourly trip count (Walk)
Weekday
Weekend
Number of started trips (relative to max value)
1.00
0.75
0.50
0.25
0.00
4 6 8 10 12 14 16 18 20 22 24
Hour
Normalized by number of participants travelling per day
Counts between midnight and 4am excluded
Week
Baseline-2019
Intermediate weeks
Apr-06
Apr-13


Hourly trip count (Train)
Weekday
Weekend
Number of started trips (relative to max value)
1.00
0.75
0.50
0.25
0.00
4 6 8 10 12 14 16 18 20 22 24
Hour
Normalized by number of participants travelling per day
Counts between midnight and 4am excluded
Week
Baseline-2019
Intermediate weeks
Apr-06
Apr-13


Hourly trip count (Bicycle)
Weekday
Weekend
Number of started trips (relative to max value)
1.00
0.75
0.50
0.25
0.00
4 6 8 10 12 14 16 18 20 22 24
Hour
Normalized by number of participants travelling per day
Counts between midnight and 4am excluded
Week
Baseline-2019
Intermediate weeks
Apr-06
Apr-13



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