Zal het openbaar vervoergebruik herstellen? Verkenning van de dynamiek tussen attitude en gedrag onder treinreizigers

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Still structural loss in PT ridership

- Train travel: 1.1 million travellers on an average working day, compared to 1.3 before Corona (NS half-yearly report).
- Will PT ridership recover?
- Unfortunately, I do not have a crystal ball to look into the future…

Three indirect ways

1. By assessing to what extent travellers' attitudes towards using public transport fundamentally changed, e.g., due to fear of infection in the early days of COVID-19
   - If so, a more lasting effect may be expected

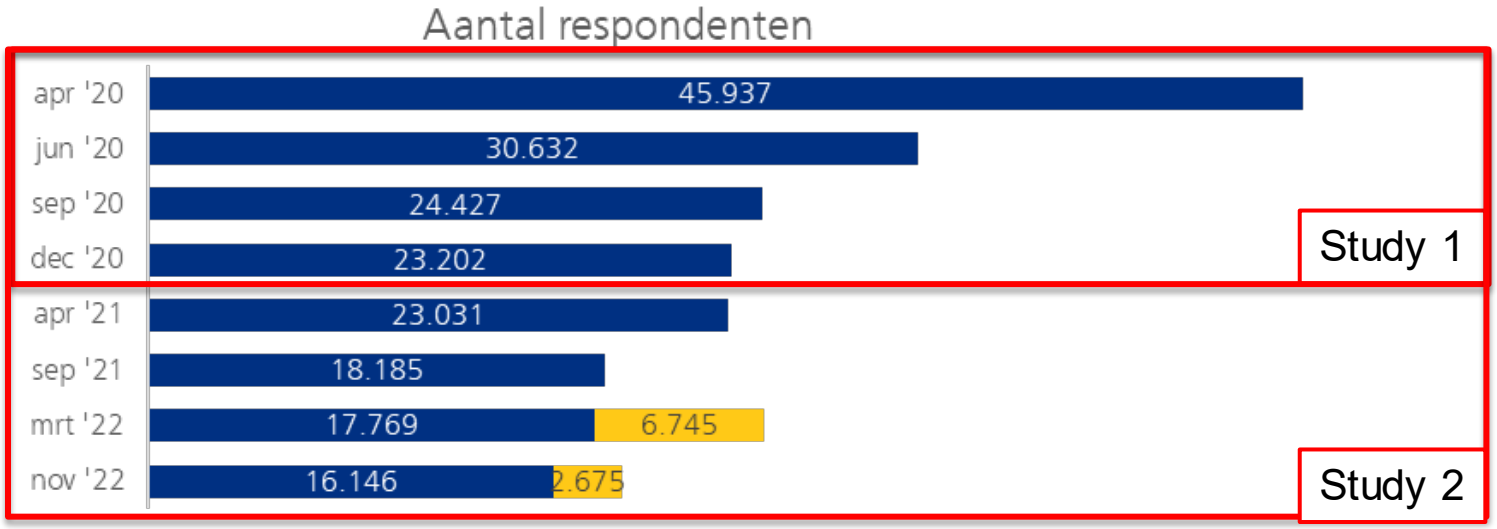
Study 1

2. By examining stated intentions of people, do travellers indicate that they intend to travel as much as before?
   - note: intentions may be biased by current behavior
3. By determining the alternatives that people have resorted to (working from home, other modes)
   - Shift to WFH more easily reversed than shift to car.

Study 2

Panel of Dutch railways

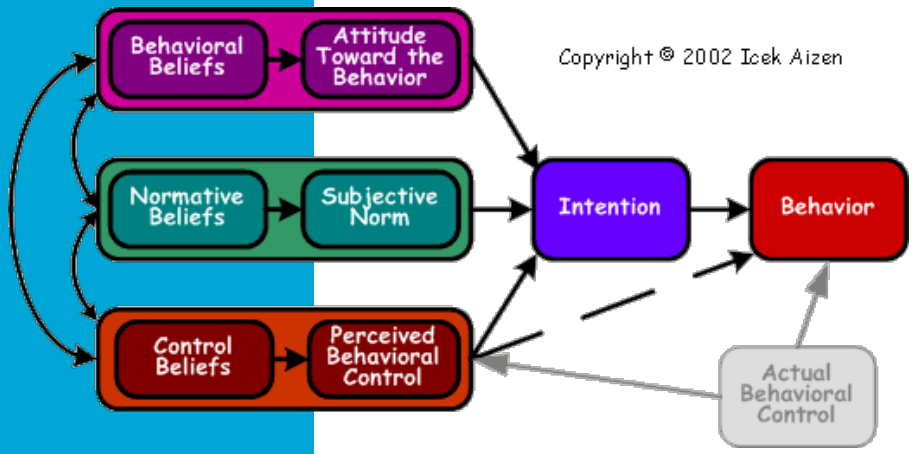
- ~46,000 respondents (train users)
- 8 ‘waves’:

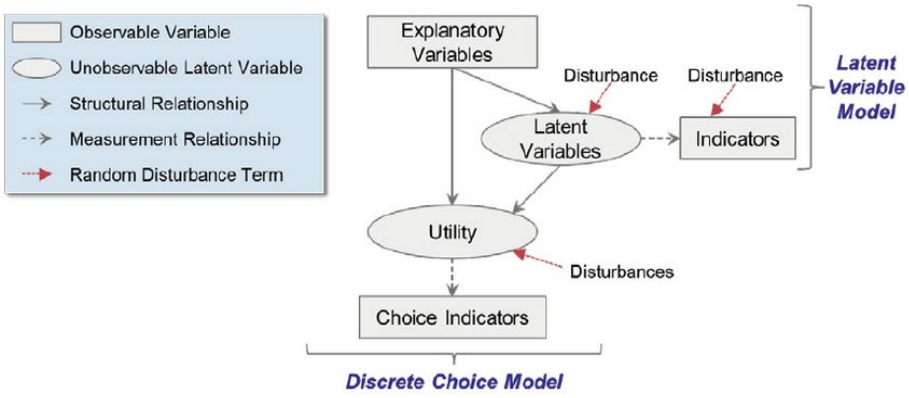


- Study 1: pure stayer sample of waves 1-4 (N=14,760)
- Study 2: wave 1 participants of waves 1-8 (N=45,937)

Study 1: role of attitudes

- Attitudes ('feelings of favorability towards on object or behavior') are relevant in the prediction of (travel) behavior:
  - In social-psychological models (e.g. theory of planned behavior)
  - In econometric models (e.g. hybrid choice models)





Study 1: sample descriptives

Variable	Categories	Full sample (%)
Gender	Male	48.1
	Female	49.7
	Other / missing	2.1
Age	18 - 34 years	5.1
	35 - 44 years	5.2
	45 - 54 years	10.5
	55 - 64 years	24.9
	65 - 74 years	38.8
	75 years and older	10.8
	Missing	4.6
Level of education	Intermediate secondary education	9.8
	Higher secondary education	10
	Intermediate vocational education	12.4
	Higher vocational education (college)	33.7
	University	29.0
	Missing or other	5.2
Occupational status	Paid employment	35.9
	Freelancer or self-employed	4.4
	Attends school or is studying	2.2
	Takes care of the housekeeping	1.8
	Pensioner	46.1
	Missing or other	9.5
Household composition	Alone	34.0
	With partner	49.2
	With partner and child(ren)	10.3
	Missing or other	6.5

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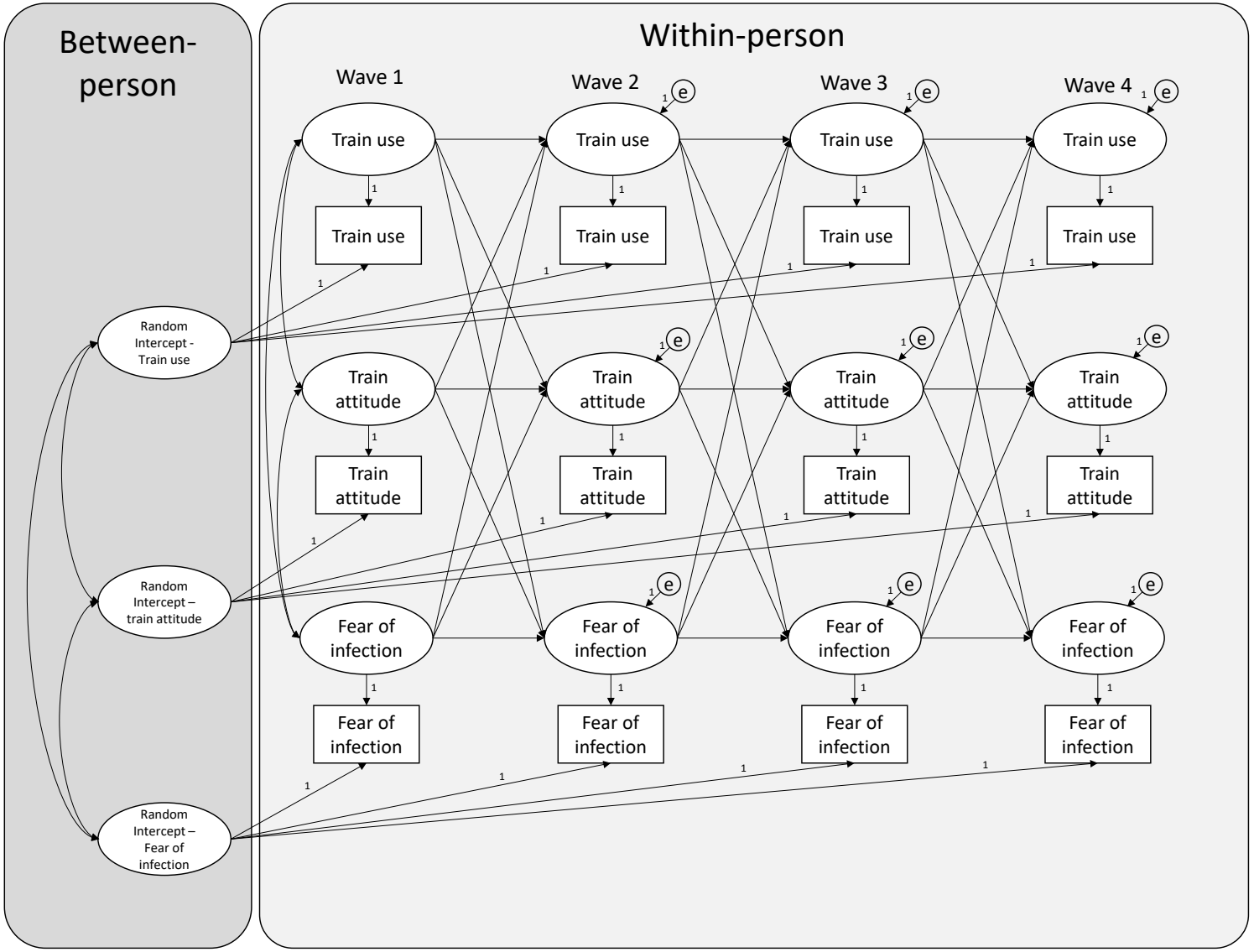
Dependent variables

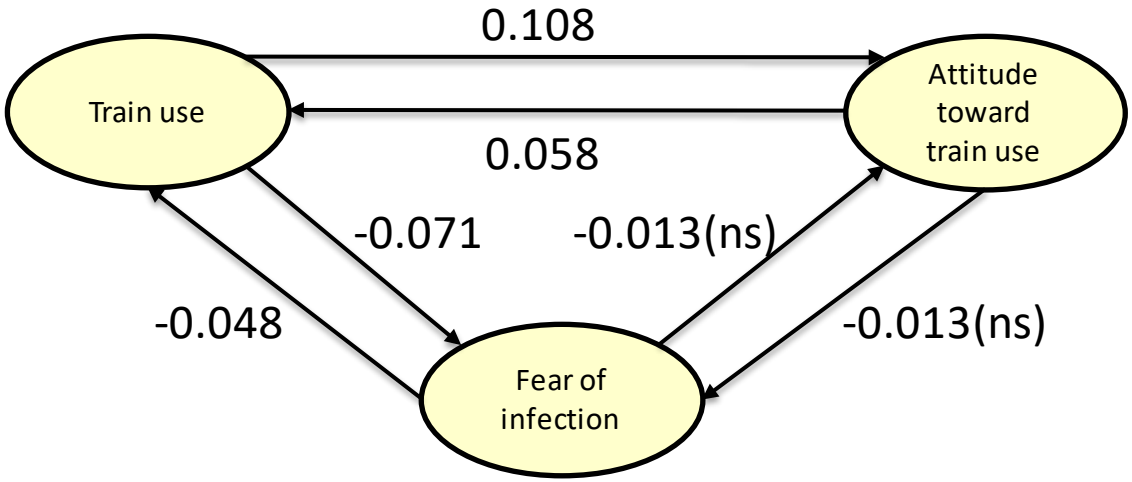
- Train use
  - How often have you used the train in the past week (0-7 days)?
- Attitude towards train use
  - I enjoy travelling by train (1=strongly disagree – 5=strongly agree)
- Fear of infection
  - I am afraid to be infected by the coronavirus (1=strongly disagree – 5=strongly agree)

	Train use (days/week)		Attitude toward train use (1-5)		Fear of infection (1-5)	
Wave	Mean	SD	Mean	SD	Mean	SD
0. pre-COVID-19	1.3	1.7				
1. April - lockdown	0.2	0.7	2.8	1.5	3.3	1.1
2. June – end of lock down, with restrictions	0.4	0.9	3.1	1.3	3.0	1.0
3. September – some office working allowed	0.7	1.2	3.3	1.2	3.2	1.0
4. December – second wave of COVID-19	0.5	1.0	3.1	1.3	3.4	1.1

RI-CLPM


Between-person
Within-person
Wave 1
Wave 2
Wave 3
Wave 4
Random Intercept - Train use
Random Intercept – train attitude
Random Intercept – Fear of infection
Train use
Train attitude
Fear of infection
e
1

Within-person lagged effects (full sample)



	Autoregressive effects			
Effect	Est.	p-value		
Train use (t-1) → train use (t)	0.328	0.000		
Attitude toward train use (t-1) → Attitude toward train use (t)	0.117	0.000		
Fear of infection (t-1) → Fear of infection (t)	0.144	0.000		
	Cross-lagged effects (within-person)		Correlation random intercepts (between-person)	
Effect	Est.	p-value	Est.	p-value
Train use (t-1) → Attitude toward train use (t)	0.108	0.000	0.264	0.000
Attitude toward train use (t-1) → Train use (t)	0.058	0.000		
Train use (t-1) → Fear of infection (t)	-0.071	0.000	-0.186	0.000
Fear of infection (t-1) → Train use (t)	-0.048	0.000		
Attitude toward train use (t-1) → Fear of infection (t)	-0.013	0.073	-0.377	0.000
Fear of infection (t-1) → Attitude toward train use (t)	-0.013	0.109		

Study 1: discussion

Structural change in train use?

- Fear of infection does not affect attitude toward train use
- Attitude toward train use has become more negative due to reduced train travel, but will recover when train travel increases
- Attitudes mainly 'follow' behavior instead of vice versa (in line with previous research findings)

Study 2

1. By assessing to what extent travellers' attitudes towards using public transport fundamentally changed, e.g., due to fear of infection in the early days of COVID-19
   - If so, a more lasting effect may be expected

Study 1

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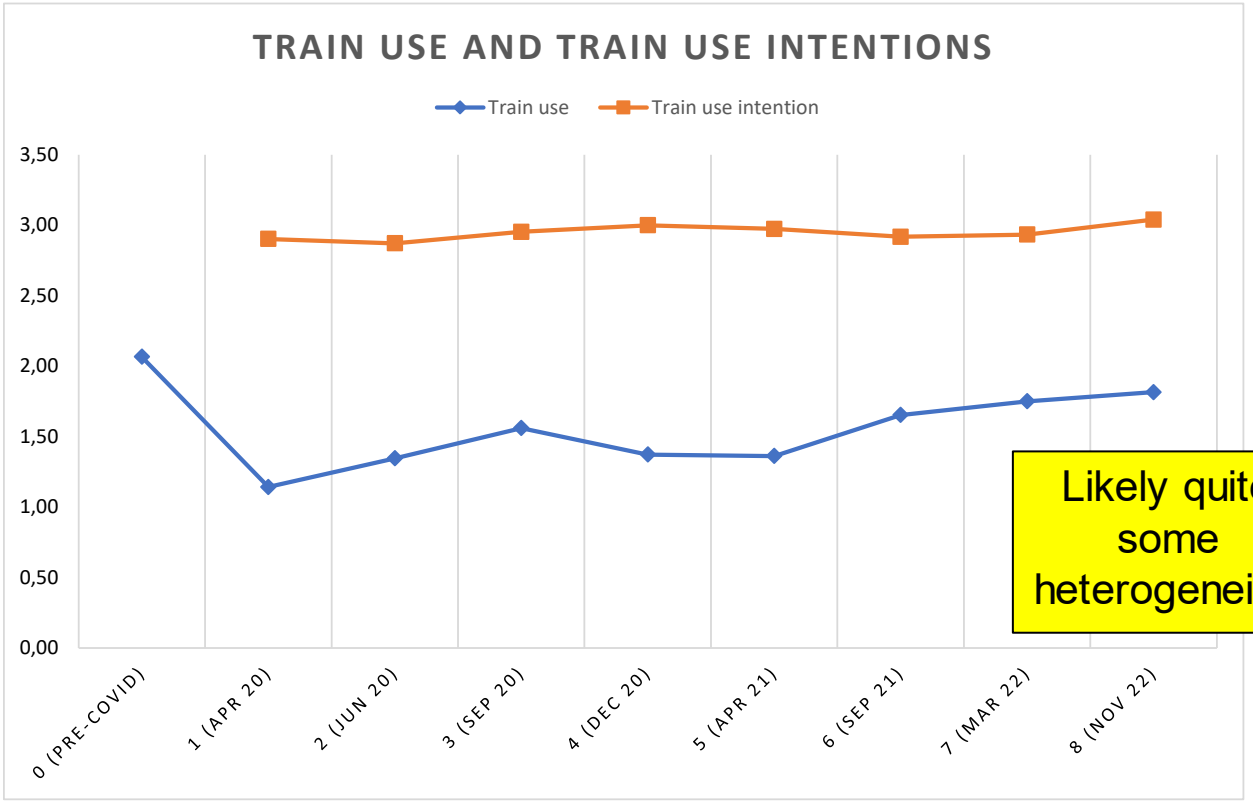
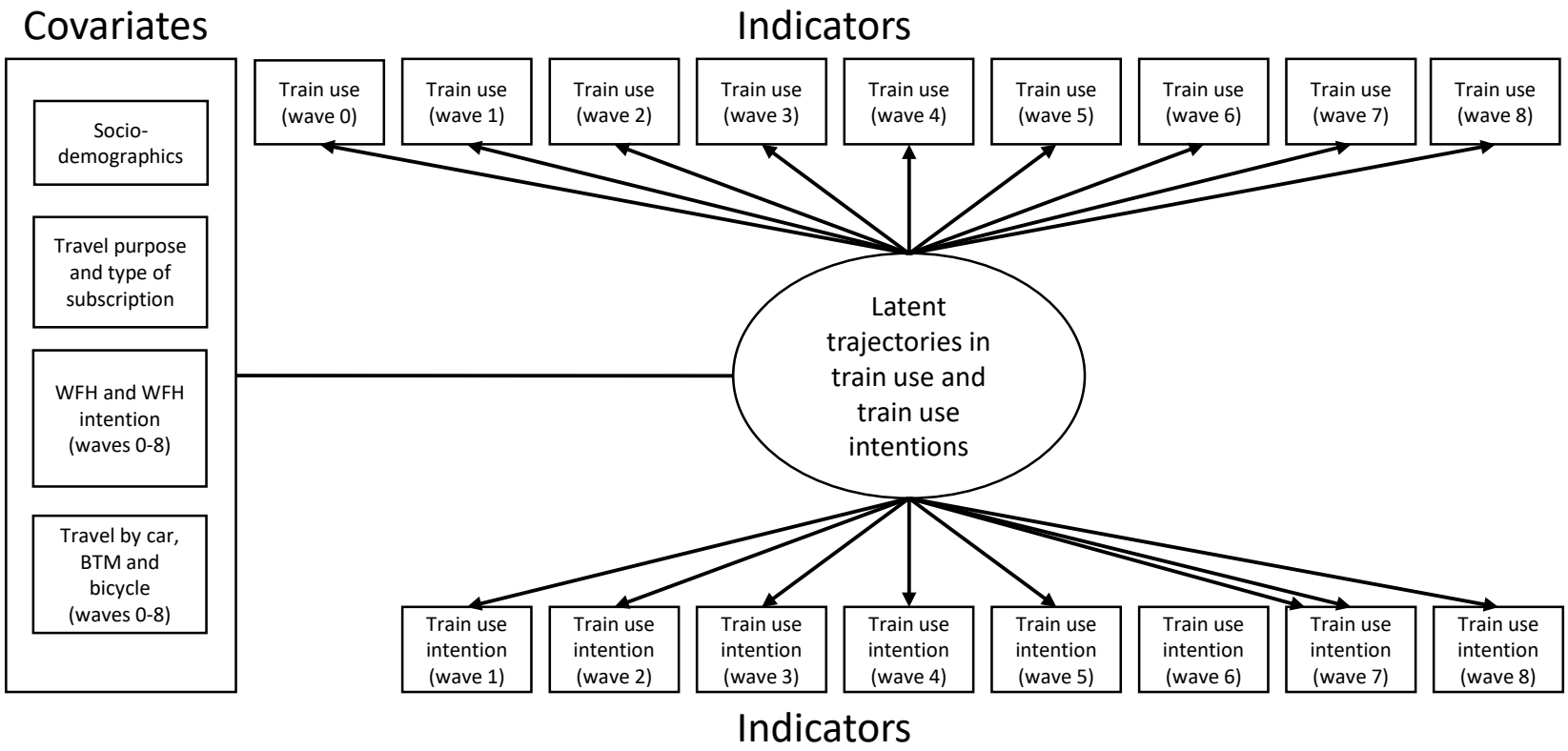
Study 2

Dependent variables

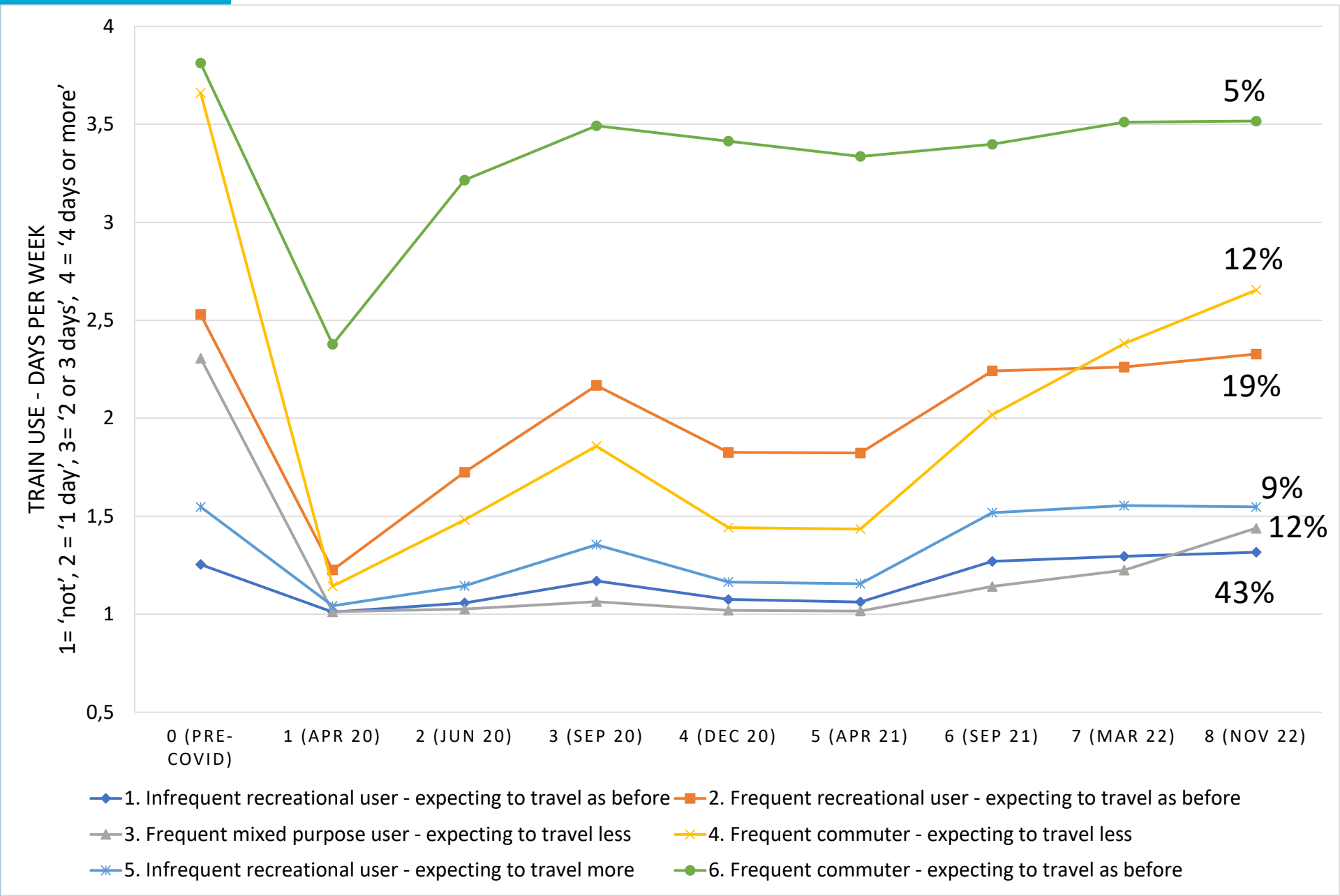
- Train use
  - How often have you used the train in the past week (1='not', 2 = '1 day per week', 3= '2 or 3 days per week', 4= '4 days per week or more')
  - Retrospective measurement 'pre-COVID' ('wave 0')
- Intended train use:
  - 'I expect to travel [answer] by train after COVID when compared to pre-COVID.' (1 = 'a lot less', 2 = 'less', 3 = 'just as much', 4 = 'more', 5 = 'a lot more')
  - In November 2022 (wave 8), when all government restrictions were relaxed, this statement was reformulated as follows: 'In the coming months I expect to travel [answer] by train'



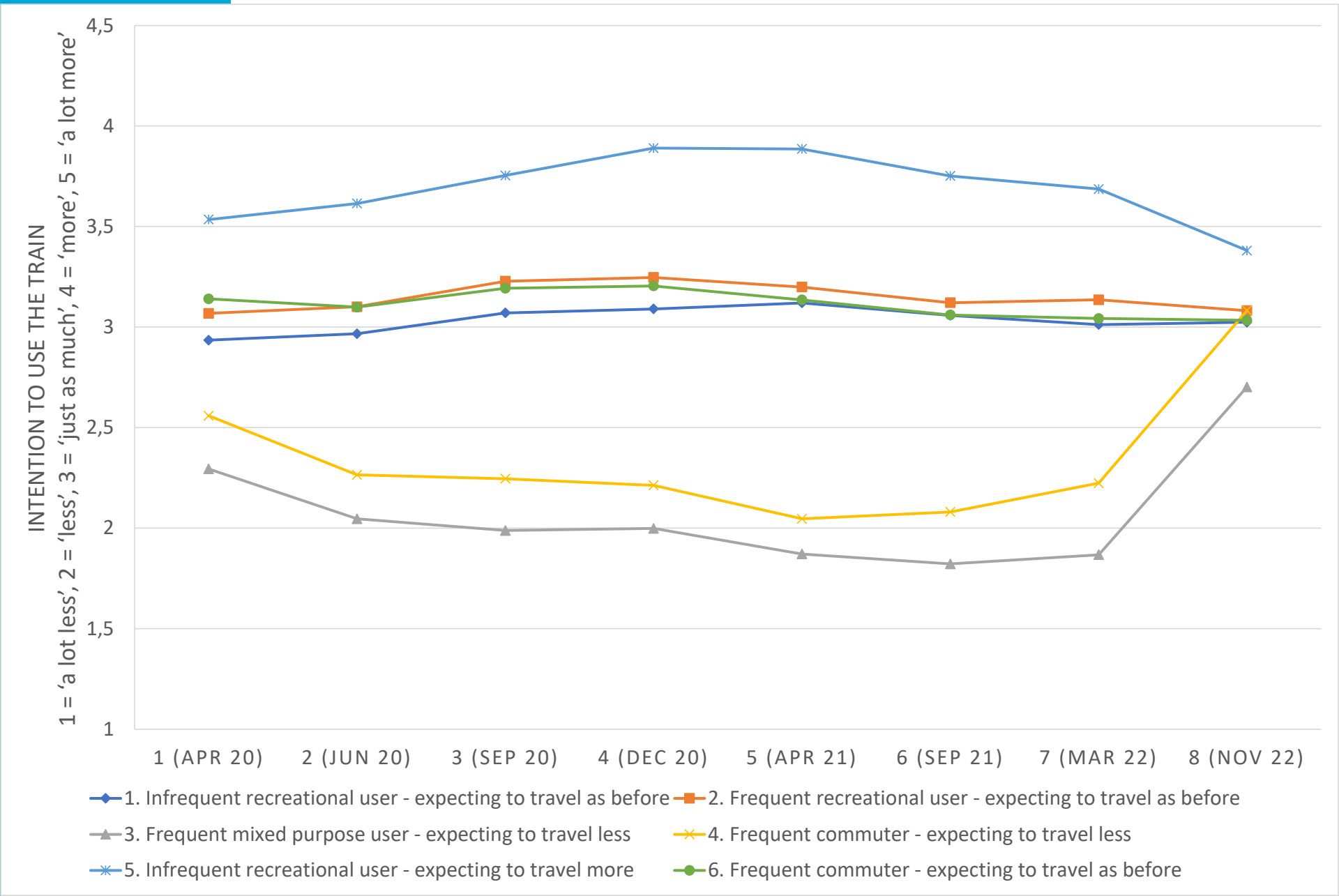
Longitudinal latent class model



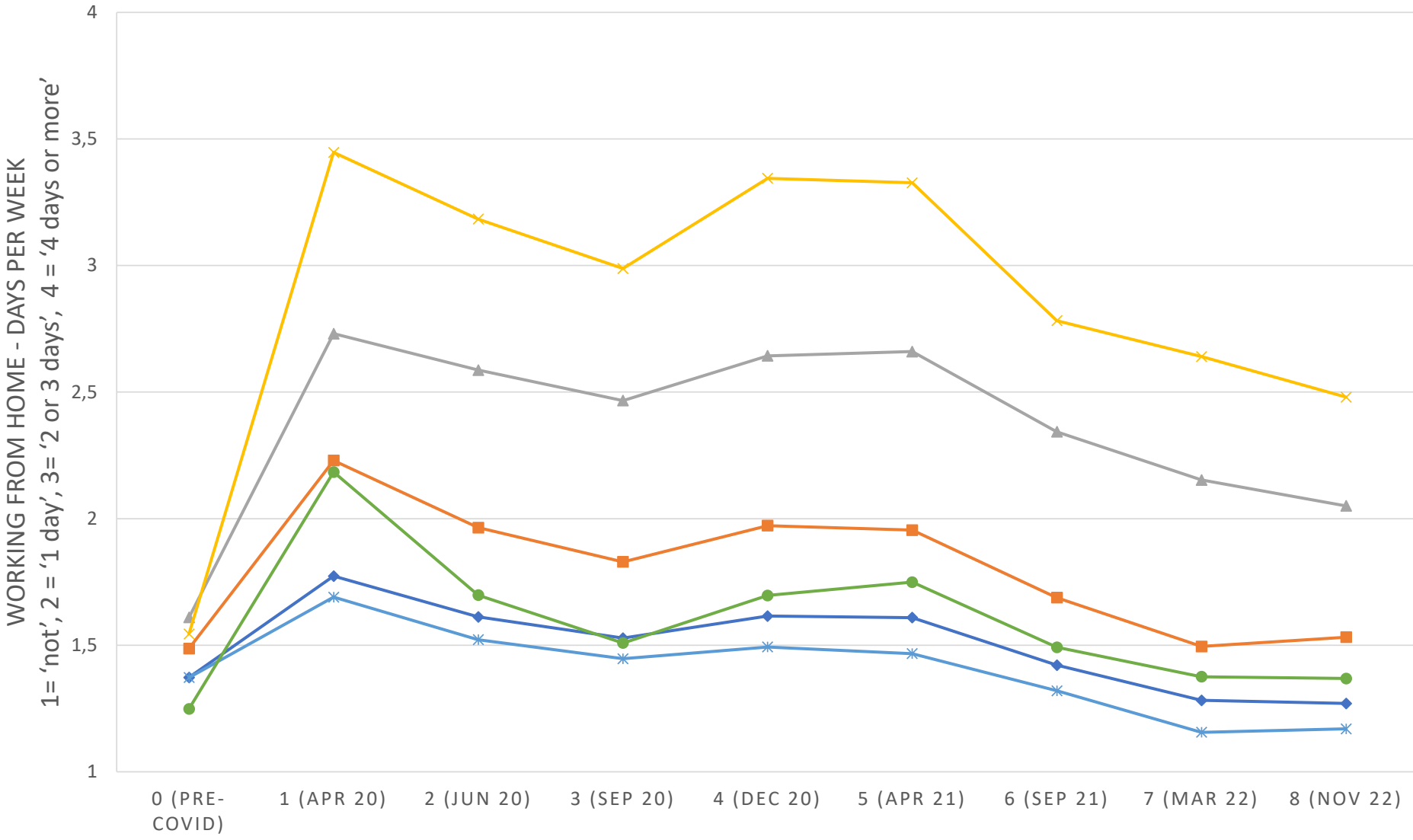
6 latent trajectories – train use



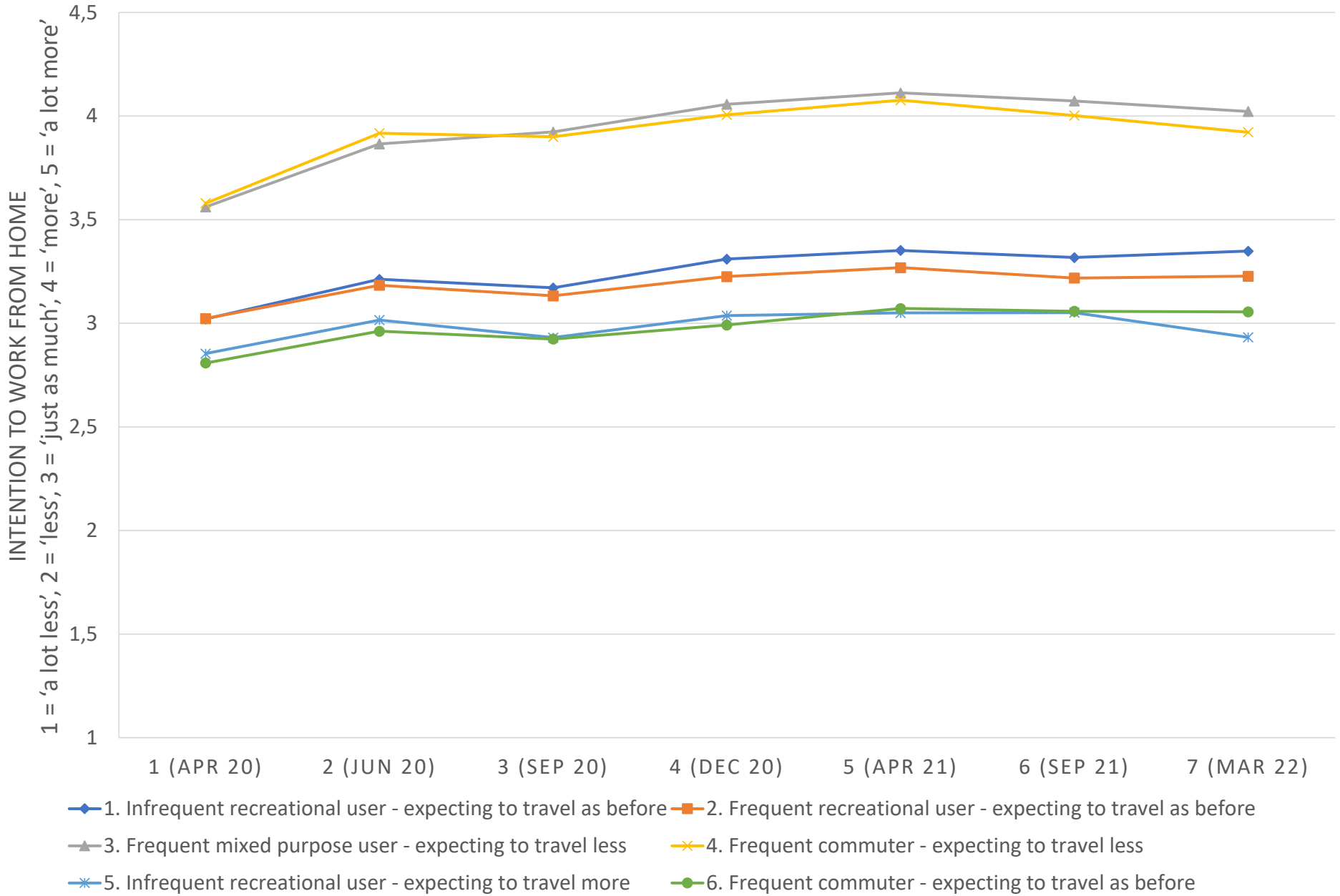
6 latent trajectories – intended train use



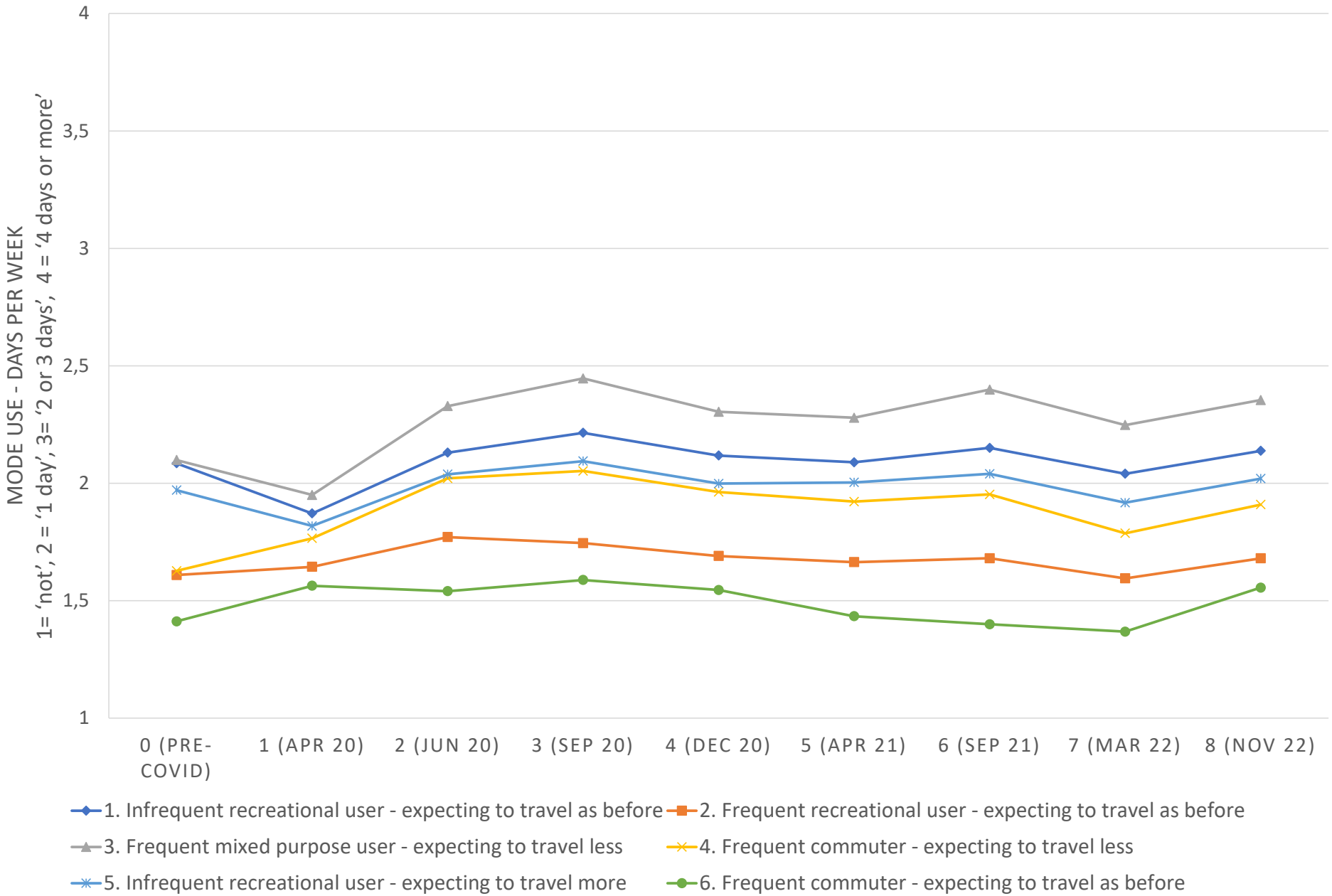
6 latent trajectories – working from home



6 latent trajectories – WFH intention



6 latent trajectories – car use



Reasons to travel less in the future – wave 8

	November 2022 - Wave 8					
Class	**1**	**2**	**3**	**4**	**5**	**6**
Expecting to travel less (%)	5	3	8	3	2	2
Stated reasons						
I will be working from home more (%)	1	6	11	33	1	13
I make fewer trips to visit family/friends/acquaintances (%)	21	15	15	4	23	4
I make fewer trips for recreational outings (%)	30	13	20	5	32	6
I use a different mode of transport (%)	20	21	33	18	14	28
I have less money to spend (%)	12	12	12	4	15	7
My train travels less frequently (%)	29	37	30	29	40	32
My train is too busy (%)	40	48	42	41	48	30
Other reasons (%)	10	14	18	20	16	22

Results

- 2 groups have fully recovered (classes 1 and 5, 51%)
  - Class 5 even expects to travel more, but not the case yet
- 2 groups have almost recovered (classes 2 and 6, 24%)
  - Car not considered an alternative for recreational trips (class 2)
  - WFH not an option (class 6)
  - Loss in ridership may primarily be due to lower level of service in last wave
- 2 groups have not recovered (classes 3 and 4, 23%)
  - Main cause for loss in ridership
  - In both groups WFH is most likely substitute
  - Car use only marginally increased, no segment that switched to car
  - WFH remains popular, so likely the changed behavior of these groups persists over time.

Implications

- COVID did not have fundamental effect on attitudes towards train travel
- WFH mostly responsible for the current loss in ridership. Is this shift 'bad'?
  - Difficult to say: less train travel, but more energy consumption at home + more recreational trips.
  - If people WFH on the same days, high peak capacity is still needed on Tuesdays and Thursdays
- Some shift to car use, which is undesirable of course.
- For NS:
  - Reconsider subscriptions, e.g., instead of a general discount card, discount card mays be offered for the off-peak working days (Monday, Wednesday and Friday) → included in proposal for new tariff system
  - Lower level of service most important reason for travelling less

Limitations

- Single-item ordinal measurements (measurement errors)
  - the pre-COVID retrospective measurements may also be prone to recall bias
- Older people are overrepresented in NS panel
  - But: analysis on weighted data did not lead to large differences in class sizes
- Statistical methods offer some glimpse in the future, but continuous data collection is necessary

Questions

Attitude towards travelling by train