THE PURSUIT OF HAPPINESS

Variation in satisfaction with bus transit service among different bus users using a large-scale survey from London, UK

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ABSTRACT

- To retain and grow ridership, transit agencies continuously **survey riders** to learn how to improve services and understand what leads to **rider satisfaction**. Nevertheless, **transit riders are not a homogeneous entity** and understanding important distinctions among transit riders can help transit agencies in their efforts to provide satisfactory service and attract different rider segments
- We examined a large-scale survey from London to address how **the satisfaction of riders with encumberances** and **riders with disabilities** may depend on different service characteristics
- Our findings indicate that **improving waiting area conditions can increase the satisfaction of riders with disabilities and encumbrances**
- By highlighting the needs of two special groups of bus riders that were previously overlooked in the public transport literature, we offer insights for transit planners about determinants of these riders' satisfaction with bus service.

METHODOLOGY

- Large-scale survey on satisfaction from London, UK from 2010–2015
- Riders rated overall satisfaction from 0 (dissatisfied) to 10 (very satisfied); for logit modelling, 0–6 was considered 0 or dissatisfied and 7–10 was considered 1 or satisfied
- Riders were asked about satisfaction with different characteristics (bus cleanliness, reliability, etc.). Principle component analysis was used to group similar characteristics
- Riders were segemented into regular riders (no disabilities and no encumberances), riders with disabilities (mobility, visual, and/or hearing), and riders with encumberances (shopping bags, child, or large-item)
- Multinomial logit modelling of being satisfied overall based on different characteristics of service and some personal attributes

DESCRIPTIVE STATISTICS

Variable description		Regular 16,830	Encumbered 4,136	Disabled 555
Dependent variable				
Satisfaction with overall service	Dummy variable equal to 1 if satisfied (score >6)	0.87	0.87	0.90
Independent variable				
Out-of-vehicle				
Shelter	Dummy variable equal to 1 if stop had a shelter	0.86	0.86	0.82
Waiting area condition	Factor loading for satisfaction with waiting area condition	-0.0051	0.011	0.063
Bus exterior	Factor loading for satisfaction with the bus exterior	-0.022	0.074	0.11
Time waited	Satisfaction with length of time waited	76.91	78.27	80.13
Bus stop/shelter information	Satisfaction with information available at bus stop/shelter	79.64	79.95	81.26
In-vehicle				
Journey time	Total journey time in minutes	19.74	19.31	18.08
Journey time satisfaction	Satisfaction with the length of time for the journey	81.03	82.14	83.46
Interior comfort	Factor loading for satisfaction with interior comfort	-0.018	0.043	0.21
Ride quality	Factor loading for satisfaction with the ride quality	0.011	-0.025	-0.16
Seat	Dummy variable equal to 1 if rider had a seat	0.96	0.94	0.98
Security agent	Dummy variable equal to 1 if a police officer, ticket inspector, and/or traffic warden was on the bus	0.038	0.040	0.031
Service attributes				
Reliability satisfaction	Satisfaction with reliability of present and recent trips on current bus route	76.52	77.67	78.65
Trip purpose				
Commuter	Dummy variable equal to 1 if main trip purpose is commuting (including employer's business)	0.43	0.28	0.18
Education	Dummy variable equal to 1 if main trip purpose is for education	0.12	0.061	0.023
Shopping	Dummy variable equal to 1 if main trip purpose is shopping	0.15	0.38	0.34
Leisure	Dummy variable equal to 1 if main trip purpose is visiting friends/relatives, leisure, personal business or holiday/sightseeing	0.29	0.26	0.46
Child-related	Dummy variable equal to 1 if main trip purpose is taking or collecting a child	0.0092	0.025	–
Personal attributes				
White	Dummy variable equal to 1 if respondent is White (British, Irish, other)	0.54	0.62	0.78
Mixed race	Dummy variable equal to 1 if respondent is Mixed race (White and Black Caribbean, White and Black African, White and Asian, any other mixed background)	0.031	0.022	0.011
Asian	Dummy variable equal to 1 if respondent is Asian/Asian British (Indian, Pakistani, Bangladeshi, Chinese, other)	0.25	0.17	0.083
Black	Dummy variable equal to 1 if respondent is Black/Black British (Caribbean, African, other)	0.17	0.18	0.12
Male	Dummy variable equal to 1 if respondent is male	0.53	0.33	0.50
Familiar	Dummy variable equal to 1 if respondent is very or quite familiar with the journey	0.98	0.98	–
Encumbered				
Large item	Dummy variable equal to 1 if the respondent is carrying a suitcase/heavy luggage and/or large or awkward item	n.a.	0.16	n.a.
Shopping	Dummy variable equal to 1 if the respondent is carrying shopping bags and/or shopping trolley	n.a.	0.72	n.a.
Child	Dummy variable equal to 1 if the respondent is carrying a small child/baby in arms and/or baby buggy/pushchair/pram	n.a.	0.12	n.a.
Disability				
Mobility	Dummy variable equal to 1 if the respondent has a mobility impairment (including age-related)	n.a.	n.a.	0.83
Visual	Dummy variable equal to 1 if the respondent has a visual impairment	n.a.	n.a.	0.11
Hearing	Dummy variable equal to 1 if the respondent has a hearing impairment	n.a.	n.a.	0.09

n.a. indicates variables not included in a specific subgroup; – indicates variables with too few entries to be included in the model

ANALYSIS

	Regular			Encumbered			Disabled		
	Odds ratio	90% Conf. intervals		Odds ratio	90% Conf. intervals		Odds ratio	90% Conf. intervals	
Out-of-vehicle									
Shelter (dummy)	**1.19****	1.05	1.34	**1.47*****	1.16	1.88	1.07	0.52	2.17
Waiting area condition	**1.52*****	1.45	1.58	**1.40*****	1.28	1.53	1.27	0.97	1.67
Bus exterior	**1.10*****	1.05	1.15	**1.21*****	1.11	1.32	0.80	0.59	1.09
Time waited	**1.02*****	1.01	1.02	**1.02*****	1.01	1.02	1.00	0.99	1.02
Bus stop/shelter information	**1.00*****	1.00	1.01	1.00	0.99	1.01	**1.02****	1.00	1.04
In-vehicle									
Journey time	**0.99*****	0.98	0.99	**0.98*****	0.98	0.99	0.99	0.97	1.02
Journey time satisfaction	**1.02*****	1.02	1.03	**1.02*****	1.02	1.03	**1.03*****	1.01	1.05
Ride quality	**1.40*****	1.27	1.38	**1.46*****	1.33	1.59	1.24	0.94	1.63
Interior comfort	**1.32*****	1.27	1.38	**1.46*****	1.33	1.59	1.26	0.93	1.70
Seat	**1.44*****	1.19	1.75	**1.70*****	1.22	2.36	0.28	0.02	4.66
Security agent	**0.66*****	0.54	0.80	1.32	0.82	2.12	0.45	0.13	1.59
Service attributes									
Reliability satisfaction	**1.02*****	1.01	1.02	**1.02*****	1.01	1.02	**1.03*****	1.02	1.05
Trip purpose (compared to commuting)									
Education	0.95	0.83	1.08	1.10	0.76	1.59	0.84	0.19	3.82
Shopping	1.06	0.93	1.22	1.04	0.83	1.31	1.88	0.84	4.20
Leisure	**1.25*****	1.12	1.40	1.28	0.99	1.64	1.71	0.83	3.49
Child-related	1.66	0.97	2.84	**0.58***	0.34	0.98	n.a.	n.a.	n.a.
Personal attributes									
Mixed race[#]	0.96	0.75	1.23	0.82	0.47	1.43	0.18	0.022	1.48
Asian[#]	0.95	0.85	1.05	1.15	0.91	1.47	0.60	0.24	1.47
Black[#]	**0.72*****	0.64	0.81	0.86	0.69	1.08	**0.34*****	0.17	0.68
Male	**1.13****	1.03	1.24	1.01	0.83	1.24	0.85	0.48	1.52
Familiar	**1.47****	1.10	1.96	0.72	0.32	1.60	–	–	–
Encumbered (compared to large item-carrying)									
Shopping	–	–	–	0.97	0.75	1.25	–	–	–
Child	–	–	–	1.09	0.75	1.60	–	–	–
Disability									
Mobility	–	–	–	–	–	–	0.75	0.17	3.43
Visual	–	–	–	–	–	–	0.59	0.14	2.47
Hearing	–	–	–	–	–	–	0.92	0.22	3.90
N	16,830			4,136			555		
Pseudo R^2	0.25			0.25			0.30		
Log-likelihood	-4793.41			-1195.44			-126.43		
AIC	9630.82			2438.87			298.85		
BIC	9800.90			2590.73			398.19		

– indicates variables not included in a specific subgroup; n.a. indicates variables with too few entries to be included in the model; [#]compared to White riders; **bold** indicates statistically significant variables at *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

MAIN FINDINGS

Regular riders

- **Waiting area condition** is most important **out-of-vehicle factor**
- **Seat avaliability** is most important **in-vehicle factor**
- **Decreased** odds of **satisfaction for visible minorities**

MAIN FINDINGS (CONTINUED)

Encumbered riders

- Having a **shelter** is most important **out-of-vehicle factor**
- **Seat avaliability** is most important **in-vehicle factor**
- **Decreased** odds of **satisfaction for child-related trips**

Disabled riders

- Bus **information at the stop** is most important **out-of-vehicle factor**
- **Journey time satisfaction** is most important **in-vehicle factor**
- **Decreased** odds of **satisfaction for Black riders**

CONCLUSIONS

- By studying **typically overlooked bus riders**, we uncovered how encumbered riders and riders with disabilities **value different aspects of a bus journey**.
- As some riders use buses for daily errands and may lack car access, having **a shelter and seat or place on the bus for their encumberances or child improves their satisfaction** with the bus.
- For **riders with disabilities**, providing **information at the bus stop is crucial for their satisfaction**. Riders with disabilities may lack access to schedules on computers or other devices and thus rely on schedules at the stop.
- **Transit agencies** can improve the satisfaction of marginalized riders by **targeting waiting area conditions and seat priority measures**.

RECOMMENDATIONS

Out-of-vehicle

- Ensure **clean and graffiti-free waiting area**
- **Provide a shelter** where possible
- Ensure **schedule information is avaliable and current**, while **accounting for visually- or hearing-impaired riders**

In-vehicle

- **Sensitize riders** with **priority-seating awarness for encumbered riders**
- Ensure **clean bus interiors**
- Ensure **bus drivers are courteous and drive safely**

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