



# Exploring the Role of Access to Public Transport in Commute Choices and Wellbeing in London

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Commuting and Wellbeing: Academic Symposium 2017

# London Commuter Wellbeing

- Why London?
  - Comprehensive transport network
  - Londoners make different commute choices
  - Public transport accessibility level data

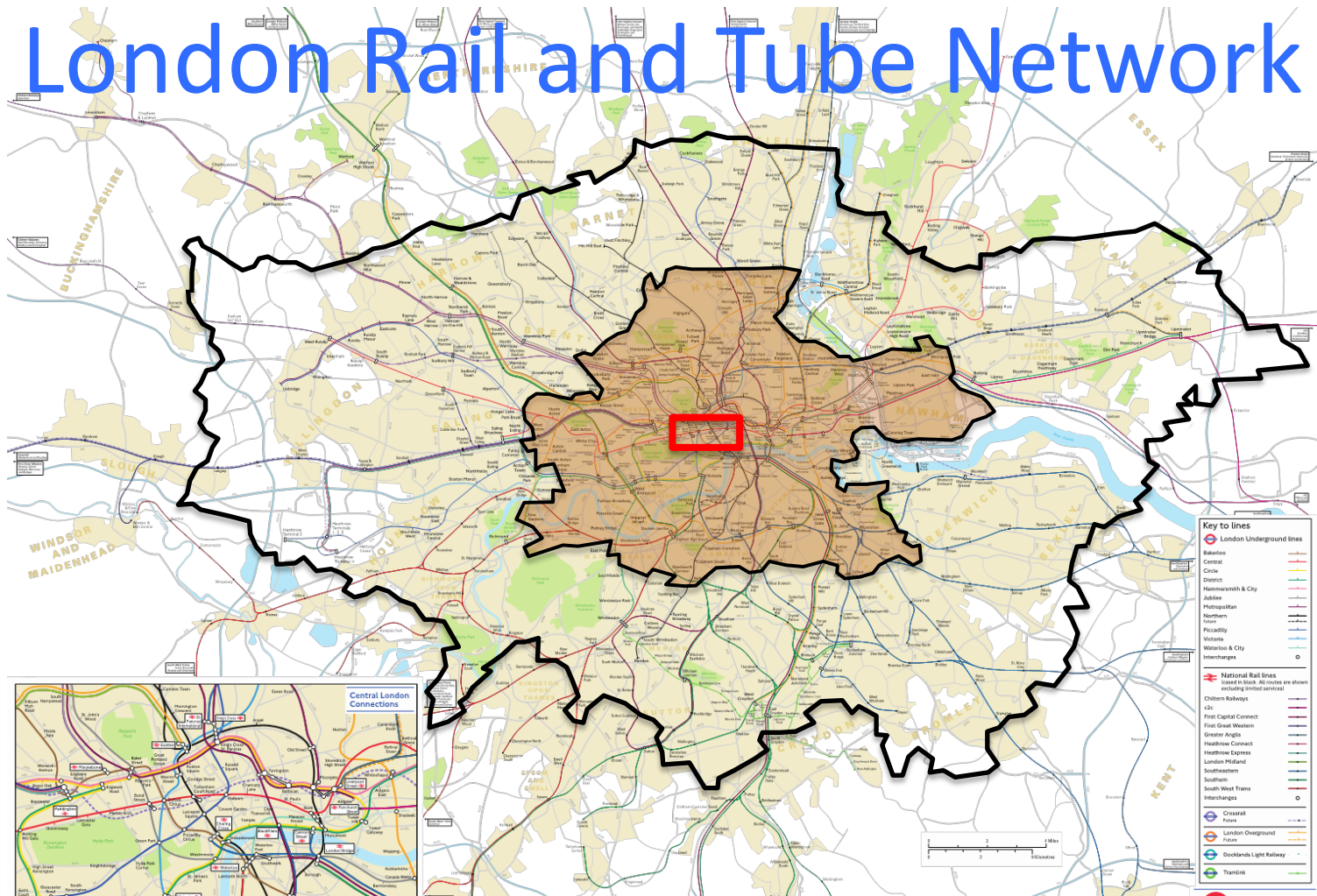
# London



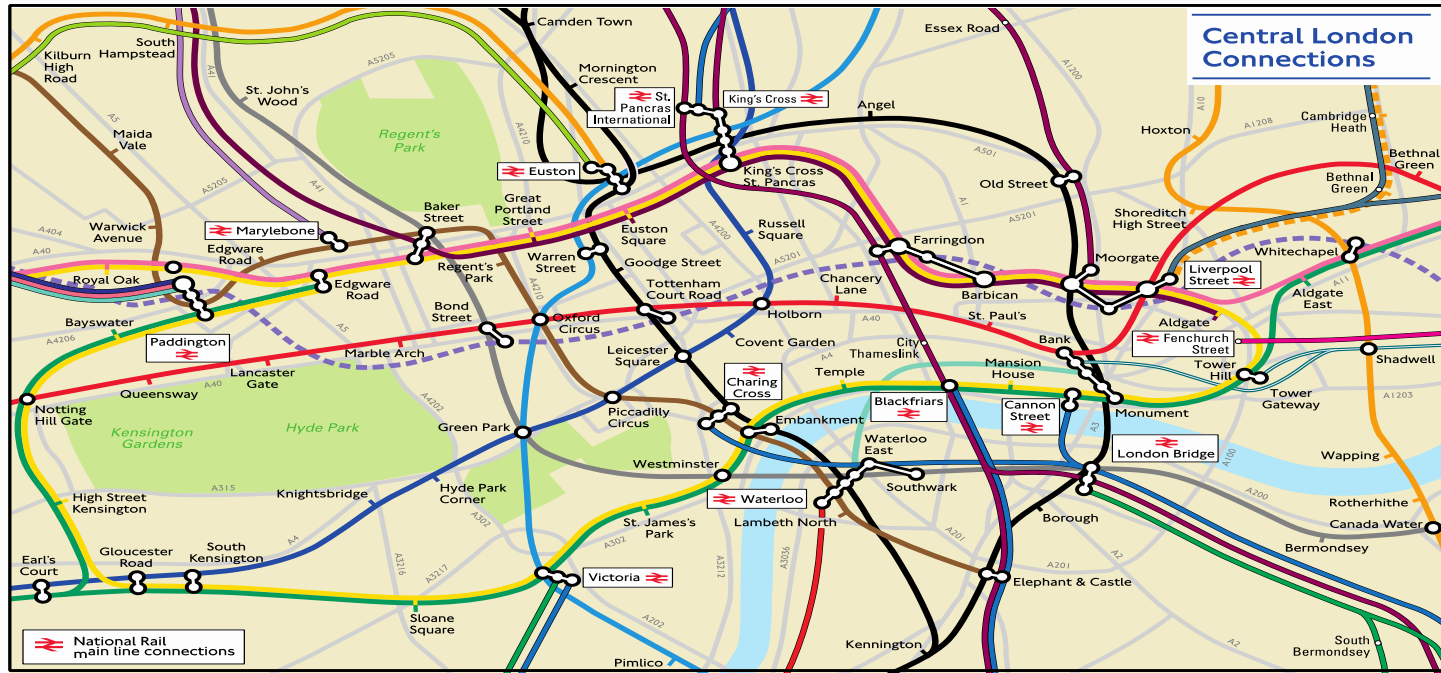
# London Road Network



# London Rail and Tube Network



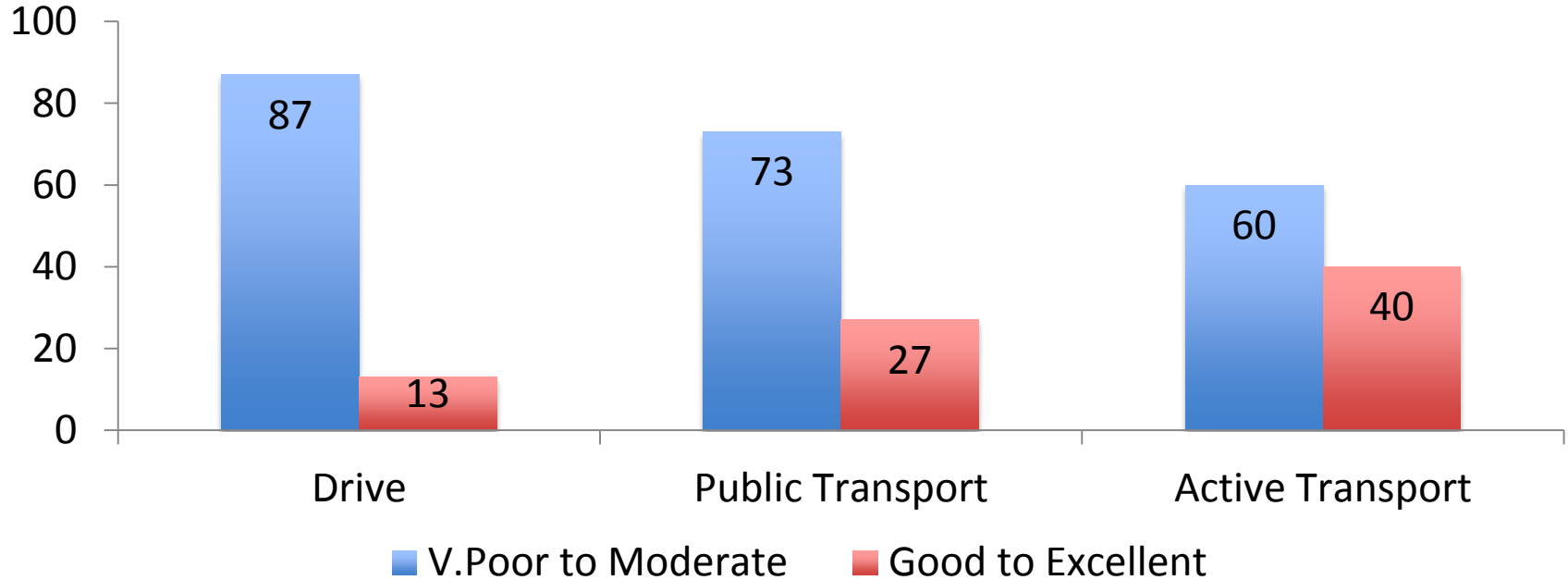
# Central London



# London Commuter Wellbeing

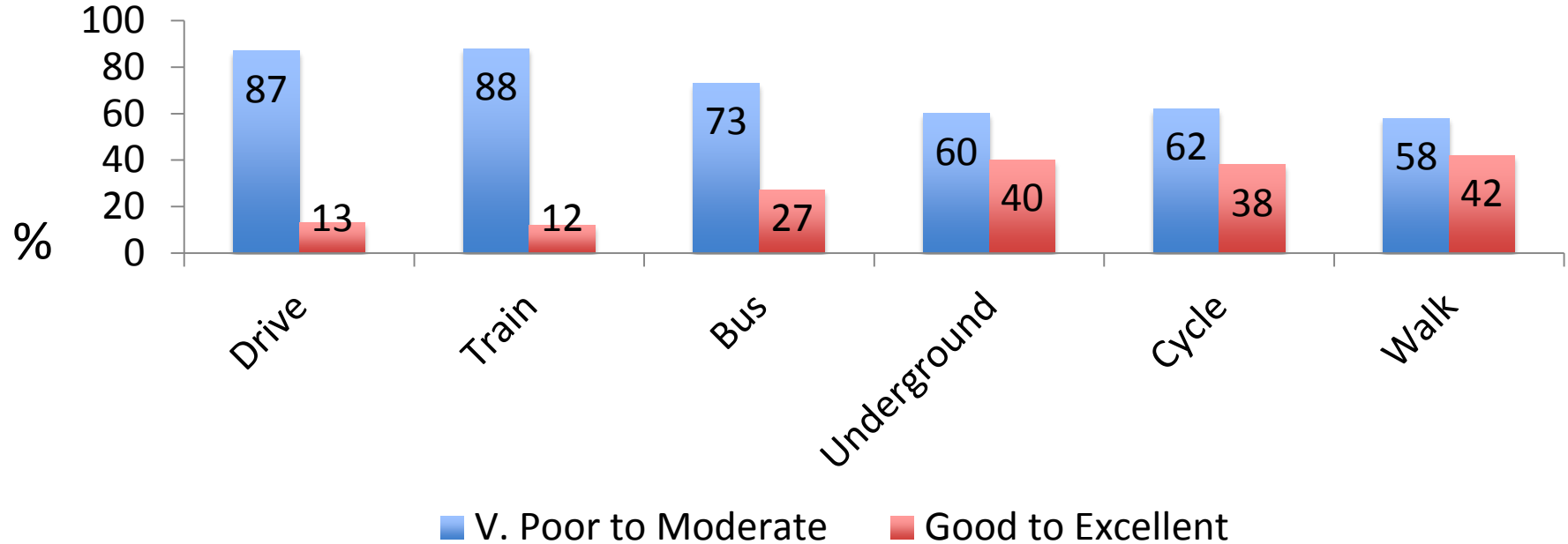
- Wave 2 (2010/11) of Understanding Society
  - 3,630 London adult commuters
  - 6 types of commute mode
  - Public transport accessibility
  - Psychological wellbeing
    - Life satisfaction - Positive
    - Mental distress (GHQ-12) - Negative

# Results (Commute Mode)





# Results (Commute Mode)



# Results (All Commuters)

- Multivariate linear regressions
  - Life satisfaction
    - Walkers reported higher satisfaction (over and beyond reduction in mental distress)
  - Mental distress
    - No difference found between modes
    - Those with good connectivity reported lower mental distress (almost comparable with observed difference in income)

# Results (All Commuters)

- Predicting public transport use
  - Having good connectivity not found significant
  - Predictors of use
    - Longer commute distances
  - Predictors of non-use
    - Increasing age
    - Having at least one child
    - Having a car in the household

# Results (Public Transport Users)

- Public transport use and wellbeing
  - Bus and underground users reported higher life satisfaction than train users
    - No difference in mental distress
  - Good connectivity associated with higher life satisfaction and lower mental distress (potentially operating through shared variance)

# Results (Public Transport Users)

- Underground use and wellbeing
  - Those with good connectivity reported higher life satisfaction and lower mental distress
- Train use and wellbeing
  - Those with good connectivity reported greater mental distress
  - And higher life satisfaction after accounting for mental distress

# Results (Public Transport Users)

- Bus use and wellbeing
  - Those with good connectivity reported lower mental distress
  - Those within the congestion zone reported lower life satisfaction but also lower mental distress

# Conclusion

- Life satisfaction appears to be more closely related to the type of public transport used
- Mental distress appears more closely related to the connectivity of public transport

# Next steps

- What good does accessibility have to be?
  - How does the perception of accessibility evolve?
  - What does having good accessibility mean?
  - Role of user experience and satisfaction?
- Changing urban form?
- Potential cultural differences?



# Thank you



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Chng, S., White, M., Abraham, C., & Skippon, S. (2016). Commuting and wellbeing in London: The roles of commute mode and local public transport connectivity. *Preventive Medicine*, 88, 182-188.

**Table 3.1.**

Results of linear regression models investigating the association between commuting modes, public transport connectivity and life satisfaction amongst London commuters. Values are difference (95% confidence interval) in life satisfaction/GHQ scores.

	Life satisfaction (higher score = better wellbeing)				GHQ (higher score = higher mental distress)			
	Unadjusted (n = 2,704)	PTAL adjusted (n = 2,704)	Fully adjusted <sup>a</sup> (n = 2,574) <sup>b</sup>	GHQ- controlled <sup>c</sup> (n = 2,549) <sup>d</sup>	Unadjusted (n = 2,694)	PTAL adjusted (n = 2,694)	Fully adjusted <sup>a</sup> (n = 2,567) <sup>b</sup>	LS <sup>e</sup> - controlled <sup>c</sup> (n = 2,549) <sup>d</sup>
<b>Commute mode</b>								
Car/van	0	0	0	0	0	0	0	0
Public transport								
Train	0.10 (-0.14, 0.34)	0.10 (-0.14, 0.33)	-0.03 (-0.30, 0.24)	0.02 (-0.23, 0.26)	-0.28 (-1.45, 0.89)	-0.26 (-1.42, 0.91)	0.30 (-0.99, 1.60)	0.29 (-0.87, 1.45)
Bus/coach	-0.14 (-0.48, 0.20)	-0.15 (-0.48, 0.20)	0.23 (-0.08, 0.54)	0.11 (-0.14, 0.36)	-0.32 (-1.56, 0.91)	-0.21 (-1.46, 1.04)	-1.21 (-2.43, 0.01)	-0.80 (-1.83, 0.23)
Underground/light railway	0.32* (0.06, 0.58)	0.31* (0.04, 0.57)	0.24 (-0.04, 0.52)	0.19 (-0.04, 0.42)	-0.91 (-2.35, 0.53)	-0.69 (-2.05, 0.66)	-0.46 (-1.87, 0.94)	-0.07 (-1.28, 1.13)
Active transport								
Cycle	0.33* (0.02, 0.65)	0.31* (0.00, 0.62)	0.24 (-0.08, 0.55)	0.17 (-0.08, 0.43)	-0.94 (-2.08, 0.20)	-0.73 (-1.91, 0.45)	-0.56 (-1.90, 0.79)	-0.17 (-1.27, 0.94)
Walk	0.32* (0.05, 0.60)	0.31* (0.02, 0.59)	0.48** (0.14, 0.81)	0.35* (0.05, 0.66)	-0.44 (-1.43, 0.55)	-0.26 (-1.28, 0.76)	-0.90 (-2.03, 0.22)	-0.13 (-1.13, 0.88)
<b>Public transport accessibility level (PTAL)</b>								
Very poor to moderate		0	0	0		0	0	0
Good to excellent		0.06 (-0.16, 0.28)	0.16 (-0.03, 0.35)	0.04 (-0.14, 0.21)		-0.70 (-1.72, 0.33)	-1.10* (-2.08, -0.12)	-0.85 (-1.75, 0.06)

**Notes:**

\* Indicates statistical significance at the  $p < 0.05$  level.

\*\* Indicates statistical significance at the  $p < 0.01$  level.

**Table 3.2.**

Results of logistic regression models investigating the association between public transport connectivity and the use of public transport amongst London commuters.

	Unadjusted ( <i>n</i> = 3,630)	Fully adjusted ( <i>n</i> = 3,512) <sup>a</sup>	
	Odds ratio (95% CI)	Odds ratio (95% CI)	Wald
Public transport accessibility level			
Very poor to moderate	1	1	
Good to excellent	1.18 (0.84, 1.66)	1.00 (0.62, 1.16)	
Congestion zone			
Outside zone		0	
Inside zone		0.93 (0.29, 2.96)	
Residential density (1000 person per sq km)			
		1.00 (1.00, 1.00)	
Distance to work (miles)			
0 to 2		1	<i>p</i> < .001
3 to 5		4.77 (2.74, 8.30)***	
6 to 10		10.89 (6.54, 18.15)***	
11 to 20		21.32 (11.75, 38.68)***	
> 20		5.00 (2.36, 10.61)***	
Equivalent household income (5ths)			
1 Lowest		1	<i>p</i> = .76
2		1.09 (0.57, 2.07)	
3		1.46 (0.75, 2.83)	
4		1.29 (0.69, 2.43)	
5 Highest		1.34 (0.75, 2.42)	

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	Unadjusted ( <i>n</i> = 3,630)	Fully adjusted ( <i>n</i> = 3,512) <sup>a</sup>	Wald
	Odds ratio (95% CI)	Odds ratio (95% CI)	
Highest educational qualification			<i>p</i> = .49
None		1	
Other		0.70 (0.35, 1.41)	
≥Degree		0.80 (0.39, 1.66)	
Gender			
Male		1	
Female		1.16 (0.83, 1.63)	
Age		0.97 (0.96, 0.99) <sup>***</sup>	
Child in household			
No children		1	
Children <16		0.67 (0.49, 0.91) <sup>**</sup>	
Number of cars in household			
None		1	
At least one		0.19 (0.12, 0.29) <sup>***</sup>	
Limiting illness or disability			
None		1	
Yes		0.84 (0.56, 1.26)	
Month of interview		1.02 (0.97, 1.06)	

Notes:

<sup>\*\*</sup> Indicates statistical significance at the *p* < 0.01 level.

<sup>\*\*\*</sup> Indicates statistical significance at the *p* < 0.001 level.

**Table 3.3.**

Results linear regression models investigating the association between public transport commuting, public transport connectivity and wellbeing.

Life satisfaction: Values are difference (95% confidence interval) in life satisfaction scores (higher score = better wellbeing).

	All public transport		Train		Bus/coach		Underground/light railway	
	Fully adjusted <sup>a</sup> (n = 1,349) <sup>b</sup>	GHQ- controlled <sup>c</sup> (n = 1,331) <sup>d</sup>	Fully adjusted <sup>a</sup> (n = 442) <sup>b</sup>	GHQ- controlled <sup>c</sup> (n = 442) <sup>d</sup>	Fully adjusted <sup>a</sup> (n = 370) <sup>b</sup>	GHQ- controlled <sup>c</sup> (n = 360) <sup>d</sup>	Fully adjusted <sup>a</sup> (n = 537) <sup>b</sup>	GHQ- controlled <sup>c</sup> (n = 529) <sup>d</sup>
Commuter mode								
Train	0	0						
Bus/coach	0.34** (0.01, 0.67)	0.16 (-0.09, 0.42)						
Underground/light railway	0.29* (0.02, 0.57)	0.22 (-0.01, 0.46)						
Public transport accessibility level								
Very poor to moderate	0	0	0	0	0	0	0	0
Good to excellent	0.35** (0.12, 0.59)	0.18 (-0.08, 0.45)	0.33 (-0.08, 0.74)	0.50* (0.12, 0.89)	-0.14 (-0.39, 0.68)	-0.16 (-0.65, 0.32)	0.50* (0.09, 0.90)	0.34 (-0.12, 0.81)

GHQ: Values are difference (95% confidence interval) in GHQ-12 scores (higher score = higher mental distress).

	All public transport		Train		Bus/coach		Underground/light railway	
	Fully adjusted <sup>a</sup> (n = 1,344) <sup>b</sup>	LS <sup>e</sup> - controlled <sup>c</sup> (n = 1,331) <sup>d</sup>	Fully adjusted <sup>a</sup> (n = 445) <sup>b</sup>	LS <sup>e</sup> - controlled <sup>c</sup> (n = 442) <sup>d</sup>	Fully adjusted <sup>a</sup> (n = 362) <sup>b</sup>	LS <sup>e</sup> -controlled <sup>c</sup> (n = 360) <sup>d</sup>	Fully adjusted <sup>a</sup> (n = 536) <sup>b</sup>	LS <sup>e</sup> - controlled <sup>c</sup> (n = 529) <sup>d</sup>
Commuter mode								
Train	0	0						
Bus/coach	-1.66 (-3.42, 0.09)	-1.17 (-2.67, 0.33)						
Underground/light railway	-0.59 (-2.11, 0.93)	-0.17 (-1.52, 1.18)						
Public transport accessibility level								
Very poor to moderate	0	0	0	0	0	0	0	0
Good to excellent	-1.74* (-3.18, -0.29)	-1.22 (-2.68, 0.25)	1.88* (0.06, 3.70)	2.31** (0.58, 4.05)	-2.56* (-4.61, -0.51)	-2.32* (-4.19, -0.44)	-1.82* (-3.60, -0.03)	-0.97 (-3.04, 1.10)