

Dear Rita,

I am writing in response to your letters to the 24 Professors who signed the letter on cycle superhighways. I know some of them have responded to you individually but I also offered to collate a more extensive response, with a list of references which may be of interest.

You write: 'As these proposals, if implemented, seem likely to have a negative impact on the smooth functioning of the capital's bus services on which six and a half million trips are made each working day, it would be helpful to have specific references for the academic evidence to which you refer.'

I know you, like me, will be pleased to have seen that the TfL modelling results released yesterday show relatively low bus delays (and that some bus journeys will be quicker). This modelling should also be viewed as a 'worst case' scenario, as it does not take into account likely modal shift towards sustainable modes which should free up capacity and improve bus flow. (Although modelling can be good when dealing with incremental change, larger scale changes usually elicit responses which are frequently beyond the capacity of models to adequately reflect.) Nor does it fully take into account current delays to buses caused by sharing with bicycles, which will be reduced by separation.

I also note that TfL's initial research into bus stop bypasses on Stratford High Street shows that generally those seem to be working quite well, even though the concept is new to London and the design there not always optimal.

On the question of evidence for people wanting separate space for cycling on busy roads and other benefits of separating cycles and motor traffic, I am pleased to be able to pass on a number of relevant sources and - in most cases - links to freely available versions of the papers, to allow you to review the evidence yourself.

The evidence on what people say they prefer ("stated preference"), and what they actually choose on the ground given the option ("revealed preference"), is overwhelmingly in favour of being kept away from motor traffic. (On Embankment and Blackfriars, this would clearly mean separated tracks, while on residential streets, it is more likely to mean the kind of modal filtering that Hackney and other boroughs have put in place). Evidence from New York (the NYCDOT references) suggests that separate cycle tracks on busy roads can generate a range of benefits, from positive retail impacts, to safety improvements, to increasing and broadening cycling uptake.

Work from Dublin demonstrates that a separated cycle track attracted a higher percentage of women than a parallel on-road cycle lane, while other literature supports the general point that women have a stronger preference than men for motor-traffic-free cycling. Recent work by Anna Goodman and colleagues shows that putting in place motor-traffic free walking and cycling routes leads to people getting more physical activity, where they live nearer the route.

In terms of injuries and cycle infrastructure, I'd say probably the clearest recent evidence comes from Kay Teschke and her colleagues' work on the BICE study, of which more here - <http://cyclingincities.spph.ubc.ca/injuries/the-bice-study/>.

I could go on. But I am keen to give you the information so you can read the relevant references yourself. I hope that you will find them interesting. Many of them relate to stated or revealed preferences for separate bicycle infrastructure and to gender differences in preferences. Others

relate to a variety of benefits from separating cyclists from motor traffic (either by tracks or by filtering), and to broader benefits of providing infrastructure that is likely to increase cycling levels.

Best wishes

Rachel

Dr. Rachel Aldred
Senior Lecturer In Transport
Course Leader, MSc Transport Planning and Management
Department of Planning and Transport
Faculty of Architecture and the Built Environment
University of Westminster
Marylebone Campus
35 Marylebone Road
London
NW1 5LS

References

1. Anderson, M. 2014 How protected bike lanes helped Denmark win its war on inequality <http://www.peopleforbikes.org/blog/entry/does-better-biking-help-poor-people-denmark-shows-the-slow-huge-payoff>
2. Arancibia, D. 2013 Cyclists, Bike Lanes, and On-Street Parking: Economic Impacts Toronto University of Toronto http://www.torontocycling.org/uploads/1/3/1/3/13138411/daniel_arancibia_ce_report_bike_lanes_december_10.pdf
3. Barton, J. and Pretty, J. 2010 What is the Best Dose of Nature and Green Exercise for Improving Mental Health? A Multi-Study Analysis. *Environmental Science and Technology* 44 (10): 3947–3955 <http://www.julespretty.com/wp-content/uploads/2013/09/4.-Dose-of-Nature-EST-Barton-Pretty-May-2010.pdf>
4. Beecham, R. and Wood, J. (2014) Exploring gendered cycling behaviours within a large-scale behavioural data-set, *Transportation Planning and Technology*, 37:1, 83-97, <http://openaccess.city.ac.uk/2479/>
5. Bernhoft, I.M. and Carstensen, G. (2008) Preferences and behaviour of pedestrians and cyclists by age and gender, *Transportation Research Part F: Traffic Psychology and Behaviour*, 11(2), pp. 83–95, https://wiki.cecs.pdx.edu/pub/ItsWeb/PortlandBikeRiderPerformance/Preferences_and_behaviour_of_pedestrians_and_cyclists_by_age_and_gender.pdf
6. Bhatia, R. and Wier, M. 2011 “Safety in Numbers” re-examined: Can we make valid or practical inferences from available evidence? *Accident Analysis & Prevention* 43(1) : 235–240
7. Björklund, G. and Isacson, G. 2013 Forecasting the impact of infrastructure on Swedish commuters’ cycling behaviour, Stockholm Centre for Transport Studies, KTH <http://www.diva-portal.org/smash/get/diva2:677865/FULLTEXT01.pdf>

8. Bonham, H. and Koth, B. 2010 Universities and the cycling culture *Transportation Research Part D* 15: 94–102
9. Broach, J., Dill, J. and Gliebe, J. (2012) Where do cyclists ride? A route choice model developed with revealed preference GPS data, *Transportation Research Part A* 46 1730–1740
10. Camp, A. (2013) Closing the bicycling gender gap: the relationship between gender and bicycling infrastructure in the nation's largest cities, Project presented to the University of Oregon in partial fulfilment of the requirements for the degree of Master of Community and Regional Planning, available at https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/12935/Camp_Terminal_Project_CRP_4%2026.pdf?sequence=1
11. Caulfield, B., Brick, R. and McCarthy, T. 2012 Determining bicycle infrastructure preferences – A case study of Dublin *Transportation Research Part D: Transport and Environment* 17(5): 413–417
<http://edepositireland.ie/bitstream/handle/2262/68118/TRD-D-11-00237R1.pdf>
12. Clifton, K.J., Muhs, C., Morrissey, S., Morrissey, T., Currans, K. and Ritter, C. 2013 Examining Consumer Behavior and Travel Choices
http://ppms.otrec.us/media/project_files/OTREC-RR-12-15%20Final.pdf
13. de Hartog, J.J. et al 2010 Do the Health Benefits of Cycling Outweigh the Risks? *Environmental Health Perspectives* 118(8): 1109–1116.
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2920084/>
14. Forsyth, A. and Krizek, K. 2011 Urban Design: Is there a Distinctive View from the Bicycle? *Journal of Urban Design*, 16:4, 531-549,
<http://www.tandfonline.com/doi/full/10.1080/13574809.2011.586239#.VA7c1WMkXDU>
15. Gan, W.Q., Davies, H.W, Koehoorn, M. and Brauer, M. 2012 Association of Long-term Exposure to Community Noise and Traffic-related Air Pollution With Coronary Heart Disease Mortality. *American Journal of Epidemiology* 175(9): 898-906
<http://aje.oxfordjournals.org/content/175/9/898.full>
16. Garrard, J., Rose, G. and Loc, S.K. (2008) Promoting transportation cycling for women: The role of bicycle infrastructure, *Preventive Medicine* 46(1) pp. 55–59, <http://health-equity.pitt.edu/916/1/12pm.pdf>
17. Garrett-Peltier, H. 2011 Pedestrian and Bicycle Infrastructure: a national study of employment impacts. Massachusetts University of Massachusetts
http://www.peri.umass.edu/fileadmin/pdf/published_study/PERI_ABikes_June2011.pdf
18. Goodman, A. (2013) Walking, cycling and driving to work in the English and Welsh 2011 census: trends, socio-economic patterning and relevance to travel behaviour in general. *Plos One* 8(8), e71790,
<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0071790>
19. Goodman, A., Panter, J., Sharp, S.J. and Ogilvie, D. (2013) Effectiveness and equity impacts of town-wide cycling initiatives in England: a longitudinal, controlled natural experimental study., *Social Science and Medicine* 97: 228-37,
<http://researchonline.lshtm.ac.uk/1236286/1/1-s2.0-S0277953613004826-main.pdf>
20. Goodman, A., Sahlqvist, S. and Ogilvie, D. 2014 New Walking and Cycling Routes and Increased Physical Activity: One- and 2-Year Findings From the UK iConnect Study.

- American Journal of Public Health: 104(9): e38-e46.
<http://ajph.aphapublications.org/doi/full/10.2105/AJPH.2014.302059>
21. Greater London Authority 2014 Transport and Health in London: The main impacts of London road transport on health
http://www.london.gov.uk/sites/default/files/Transport%20and%20health%20in%20London_March%202014.pdf
 22. Grous, A. 2011 The British Cycling Economy. London: LSE
https://corporate.sky.com/documents/pdf/press_releases/2011/the_british_cycling_economy
 23. Haines, A. and Dora, C. 2012 How the low carbon economy can improve health *BMJ* 2012; 344 <http://www.bmj.com/content/344/bmj.e1018>
 24. Hart, J. and Parkhurst, G. 2011 Driven to excess: Impacts of motor vehicles on the quality of life of residents of three streets in Bristol, UK. *World Transport Policy & Practice* 17(2): 12-30 <http://www.eco-logica.co.uk/pdf/wtpp17.2.pdf>
 25. Heesch, K.C., Sahlqvist, S. and Garrard, J. (2012) Gender differences in recreational and transport cycling: a cross-sectional mixed-methods comparison of cycling patterns, motivators, and constraints, *International Journal of Behavioral Nutrition and Physical Activity* 2012, 9:106, <http://www.ijbnpa.org/content/9/1/106>
 26. Heinen, E., van Wee, B. & Maat, K. (2010) Commuting by Bicycle: An Overview of the Literature, *Transport Reviews: A Transnational Transdisciplinary Journal*, 30:1, 59-96
 27. Jarjour, S., Jerrett, M., Westerdahl, D., de Nazelle, A., Hanning, C., Daly, L., Lipsitt, J. and Balme, J. 2013 Cyclist route choice, traffic-related air pollution, and lung function: a scripted exposure study. *Environmental Health* 12:14
<http://www.biomedcentral.com/content/pdf/1476-069X-12-14.pdf>
 28. Jarrett, J., Woodcock, J., Griffith, U.K., Chalabi, Z., Edwards, P., Roberts, I. and Haines, A. 2012 Effect of increasing active travel in urban England and Wales on costs to the National Health Service. *Lancet* 379, 9832: 2198–2205
<http://www.sciencedirect.com/science/article/pii/S0140673612607661>
 29. Jay, S. 2014 How are pedestrians in Vancouver being impacted by separated bike lanes? San Francisco SFU <http://summit.sfu.ca/item/13887>
 30. Joshi, M.S., Senior, V. and Smith, G.P. 2001 A diary study of the risk perceptions of road users *Health, Risk and Society*, 3:3, 261-279
 31. Kaur, S., Nieuwenhuijsen, M.J. and Colvile, R.N. 2005 Pedestrian exposure to air pollution along a major road in Central London, UK. *Atmospheric Environment* 39: 7307–7320
 32. Kendrick, C.M., Moore, A., Haire, A., Bigazzi, A., Figliozzi, M., Monsere, C.M. and George, L. 2011 Impact of Bicycle Lane Characteristics on Exposure of Bicyclists to Traffic-Related Particulate Matter *Transportation Research Record*, No. 2247: 24–32.
http://web.cecs.pdx.edu/~maf/Journals/2011_Impact_of_Bicycle_Lane_Characteristics_on_Exposure_of_Bicyclists_to_Traffic-Related_Part particulate_Matter.pdf
 33. Krizek, K.J., Johnson, P.J. and Tilahun, N. (2006) Gender Differences in Bicycling Behavior and Facility Preferences, in *Research on Women's Issues in Transportation*, Report of a Conference, pp. 31-40 (Transportation Research Board), <http://kevinjkrizek.org/wp-content/uploads/2012/04/Womenandcycling.pdf>

34. Lindsay, G., Macmillan, A. and Woodward, A. 2011 Moving urban trips from cars to bicycles: impact on health and emissions. *Australian and New Zealand Journal of Public Health* 35(1): 54–60
35. Lorenc, T., Brunton, G., Oliver, S., Oliver, K. and Oakley, A. 2008 Attitudes to walking and cycling among children, young people and parents: a systematic review. *Journal of Epidemiology and Community Health* 62: 852-857
<http://eprints.ioe.ac.uk/5126/1/Oliver2008Attitudes852.pdf>
36. Macmillan, A., Connor, J., Witten, K., Kearns, R., Rees, D. and Woodward, A. 2014 The Societal Costs and Benefits of Commuter Bicycling: Simulating the Effects of Specific Policies Using System Dynamics Modeling <http://ehp.niehs.nih.gov/1307250/>
37. Marqués, R., Hernández, V., Calvo, M. and García-Cebrián, J.A. 2012 Sevilla: a successful experience of promotion of urban cycling in the south of Europe. Presentation to Velocity Conference http://www.ecf.com/wp-content/uploads/Hernandes-V_-et-al-Sevilla-A-Successful-Experience-of-Promotion-of-Urban-Cycling.pdf
38. Martin, A., Goryakin, Y. and Suhrcke, M. 2014 Does active commuting improve psychological wellbeing? Longitudinal evidence from eighteen waves of the British Household Panel Survey, *Preventive Medicine*, in press
<http://www.sciencedirect.com/science/article/pii/S0091743514003144>
39. Mindell, J.S., Leslie, D. and Wardlaw, M. 2012 Exposure-Based, ‘Like-for-Like’ Assessment of Road Safety by Travel Mode Using Routine Health Data. *PLoS ONE*
<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0050606>
40. Mitchell, G. and Dorling, D. 2003 An environmental justice analysis of British air quality. *Environment and Planning A* 35: 909-929
http://www.sasi.group.shef.ac.uk/publications/2003/mitchell_and_dorling_air_quality.pdf
41. National Institute for Health and Care Excellence 2008 Physical activity and the environment. <http://www.nice.org.uk/guidance/ph8/resources/guidance-physical-activity-and-the-environment-pdf>
42. National Institute for Transportation and Communities 2014 Lessons from the Green Lanes: Evaluating Protected Bike Lanes in the U.S.
http://ppms.otrec.us/media/project_files/NITC-RR-583_ProtectedLanes_FinalReport.pdf
43. New York City Department of Transport 2012 Measuring the Street: New Metrics for 21st Century Streets. <http://www.nyc.gov/html/dot/downloads/pdf/2012-10-measuring-the-street.pdf>
44. New York City Department of Transport 2014 Protected Bicycle Lane Analysis.
<http://www.nyc.gov/html/dot/downloads/pdf/2014-09-03-bicycle-path-data-analysis.pdf>
45. Nielsen, T.A.S, Skov-Petersen, H. and Carstensen, T.A. 2013 Urban planning practices for bikeable cities – the case of Copenhagen Urban Research & Practice, 6:1, 110-115
<http://www.tandfonline.com/doi/pdf/10.1080/17535069.2013.765108>
46. Pooley, C., Jones, T., Tight, M., Horton, D., Scheldeman, G., Mullen, C., Jopson, A and Strano, E. 2013 Promoting Walking and Cycling: new perspectives on sustainable travel Bristol Policy Press
47. Pooley, C., Tight, M., Jones, T., Horton, D., Scheldeman, G., Jopson, A., Mullen, C., Chisholm, A., Strano, E. and Constantine, S. 2011 Understanding Walking and Cycling:

Summary of Key Findings and Recommendations.

http://www.its.leeds.ac.uk/fileadmin/user_upload/UWCReportSept2011.pdf

48. Pucher, J. and Buehler, R. 2008 Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany. *Transport Reviews* 28(4): 495-528
<http://policy.rutgers.edu/faculty/pucher/irresistible.pdf>
49. Pucher, J., Buehler, R. and Seinen, M. (2011) Bicycling renaissance in North America? An update and re-appraisal of cycling trends and policies, *Transportation Research Part A: Policy and Practice*, 45(6), pp.451-475, <http://www.vtpi.org/pucher3.pdf>
50. Rabl, A. and de Nazelle, A. 2012 Benefits of shift from car to active transport. *Transport Policy* 19: 121–131 <http://www.arirabl.com/publications/rabl11-activetransport.pdf>
51. Rowe, K. 2013 BIKENOMICS: Measuring the Economic Impact of Bicycle Facilities on Neighborhood Business Districts. Washington, DC University of Washington
<http://www.dot.state.fl.us/planning/policy/bikeped/bestpractice/Bikenomics.pdf>
52. Schepers, J.P. and Heinen, E. 2012 How does a modal shift from short car trips to cycling affect road safety? *Accident Analysis and Prevention* 50: 1118–1127
<http://www.sciencedirect.com/science/article/pii/S0001457512003119>
53. Shaw, B., Watson, B., Frauendienst, B., Redecker, A., Jones, T. with Hillman, M. 2012 Children’s independent mobility: a comparative study in England and Germany (1971-2010) London: Policy Studies Institute
http://www.psi.org.uk/images/uploads/CIM_Final_report_v9_3_FINAL.PDF
54. Smith, O.B. 2013 Peak of the Day or the Daily Grind: Commuting and Subjective Well-Being Portland, Oregon University of Portland PhD Thesis.
http://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=2025&context=open_access_etds
55. Steer Davies Gleave 2012 Cycle route choice: Final survey and model report. London: Transport for London/Steer Davies Gleave
<https://www.whatdotheyknow.com/request/143729/response/398827/attach/3/Final%20report%20CRC.pdf>
56. Stefánsdóttir, H. 2014 Urban routes and commuting bicyclist’s aesthetic experience. *FORMakademisk*7(2)
<https://journals.hioa.no/index.php/formakademisk/article/view/777>
57. Steinbach, R., Green, J., Datta, J. and Edwards, P. 2011 Cycling and the city: A case study of how gendered, ethnic and class identities can shape healthy transport choices *Social Science & Medicine* 72(7): 1123–1130
http://researchonline.lshtm.ac.uk/1179/1/Cycling_and_the_city_published_author_copy.pdf
58. Sustrans 2003 Traffic restraint and retail vitality. Bristol: Sustrans
http://www.polisnetwork.eu/uploads/Modules/PublicDocuments/sustrans_ff39.pdf
59. Sztabinski, F. 2009 Bike Lanes, On-Street Parking and Business: A Study of Bloor Street in Toronto’s Annex Neighbourhood Toronto Clean Air Partnership.
<http://www.cleanairpartnership.org/pdf/bike-lanes-parking.pdf>
60. Teschke, K. Harris, M.A., Reynolds, C.C., Winters, M., Babul, S., Chipman, M., Cusimano, M.D., Brubacher, J.R., Hunte, G., Friedman, S.M., Monroe, M., Shen, H., Vernich, L. and Cripton, P.A. 2012 Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study. *American Journal of Public Health*, Vol. 102, No. 12, pp. 2336-2343

61. Tiemens, H. and Molenaar, I. 2014 Impact Assessment of the Hague Traffic Circulation Plan 2011. Presented to the Modelling on the Move: Cycling and Transport Modelling event, January 2014. http://modellingonthemove.org/wp-content/uploads/2014/01/Herbert_The_Hague.pdf
62. Transport for London 2012 Attitudes towards Cycling. <http://www.tfl.gov.uk/cdn/static/cms/documents/attitudes-towards-cycling-2012-report.pdf>
63. Tuckel, P., Milczarski, W. and Maisel, R. 2014 Pedestrian injuries due to collisions with bicycles in New York and California *Journal of Safety Research* 51: 7–13
64. van Goeverden, K. and Godefrooij, T. 2011 The Dutch Reference Study: Cases of interventions in bicycle infrastructure reviewed in the framework of Bikeability. Copenhagen: University of Copenhagen
<http://repository.tudelft.nl/view/ir/uuid%3Acc6d7d3b-6ebf-4ef7-a57c-2d4834baf9d/>
65. Wang, J.Y.T., Mirza, L., Cheung, A.K.L and Moradi, S. 2012 Transforming Auckland into a bicycle-friendly city: Understanding factors influencing choices of cyclists and potential cyclists. Australasian Transport Research Forum
http://www.atrf.info/papers/2012/2012_Wang_Mirza_Cheung_Moradi.pdf
66. Winters, M. and Teschke, K. 2010 Route preferences among adults in the near market for bicycling: findings of the Cycling in Cities study. *American Journal of Health Promotion* 25(1): 40-7.
67. Winters, M., Babul, I., Becker, H.J.E.H, Brubacher, J.R., Chipman, M., Cripton, P., Cusimano, M.D., Friedman, S.M., Harris, M.A., Hunte, G., Monroe, M., Reynolds, C.C.O., Shen, H. and Teschke, K. 2012 Safe Cycling: How Do Risk Perceptions Compare With Observed Risk? *Canadian Journal of Public Health* 103(Suppl. 3): S42-S47.
<http://journal.cpha.ca/index.php/cjph/article/view/3200/2668>
68. Woodcock, J., Edwards, P., Tonne, C., Armstrong, B.G., Ashiru, O., Banister, D., Beevers, S., Chalabi, Z., Chowdhury, Z., Cohen, A., Franco, O.H., Haines, A., Hickman, R., Lindsay, G., Mittal, I., Mohan, D., Tiwari, G., Woodward, A. and Roberts, I. 2009 Public health benefits of strategies to reduce greenhouse-gas emissions: urban land transport *Lancet* 2009; 374: 1930–43
<http://www.sciencedirect.com/science/article/pii/S0140673609617141#>
69. Woodcock, J., Givoni, M. and Morgan, A.S. 2013 Health Impact Modelling of Active Travel Visions for England and Wales Using an Integrated Transport and Health Impact Modelling Tool (ITHIM) *PLoS ONE*
<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0051462>
70. Woodcock, J., Tainio, M., Cheshire, J., O'Brien, O. and Goodman, A. 2014 Health effects of the London bicycle sharing system: health impact modelling study *BMJ*. 2014; 348: g425. <http://www.bmj.com/content/348/bmj.g425>
71. Woodcock, J., Tainio, M., Cheshire, J., O'Brien, O. and Goodman, A. (2014) Health effects of the London bicycle sharing system: health impact modelling study, *BMJ: British Medical Journal* 348 <http://www.bmj.com/content/348/bmj.g425>
72. Zander, A., Passmore, E., Mason, C. and Rissel, C. 2013 Joy, Exercise, Enjoyment, Getting out: A Qualitative Study of Older People's Experience of Cycling in Sydney, Australia *Journal of Environmental and Public Health*, Volume 2013, Article ID 547453, 6 pages
<http://www.hindawi.com/journals/jep/2013/547453/>