

Governing Urban Transformation

Understanding what works: Evaluating Cycle

Infrastructure

A Critical Evaluation of the Oxford Road Corridor
Cycle Infrastructure with a Specific Focus on Female
Cyclists

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9481589 and 9207252

Author declaration:

I 9481589 confirm that this report is based on my own work and that I am happy with both my own and my partner's (9207252) contribution to the final submitted version.

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Executive Summary

This report has been commissioned by Manchester City Council with the aim of critically evaluating the newly implemented Dutch style cycle infrastructure on the Oxford Road Corridor in relation to gender disparity in cycling. Several data collection methods were selected for evaluation of the cycle infrastructure which aimed to improve user safety; interviews, observations and surveys. The semi-structured interviews were conducted at the ‘Women on Wheels’ event with five female cyclists who regularly cycle on the Corridor. Online surveys with fifty female participants were also used to gain opinions to support the findings from the interviews. Finally, observations were used to count how many male and female cyclists were on the Corridor over an hour at three selected locations. This figure was then compared to the figures before the new infrastructure was put in place to assess whether the infrastructure has encouraged more women to cycle.

Upon analysis of the collected data, it was found that the newly implemented cycle infrastructure has had mostly positive impacts through encouraging female cyclists yet this was not reflected in the observations. The scheme boasts a significant amount of safety features, which have played a huge role in increasing the confidence of female cyclists on the Corridor although pedestrian safety has been questioned. Whilst the success the scheme so far has been located in this research, improvements and continual maintenance of infrastructure are still encouraged to maximise the benefits that the scheme could offer to not only female cyclists but a wider demographic.

1. Introduction

1.1 Background

This report, commissioned by Manchester City Council was produced to evaluate the Dutch style cycle scheme on Oxford Road, in relation to promoting cycling for underrepresented groups, particularly women through safer infrastructure (Thomas and DeRobertis, 2013). Following a £20 million funding budget awarded to the city to enable safer cycling (TfGM, 2014), the Council triggered the legal framework for segregated cycle lanes along the Oxford Road Corridor in December 2014 (BBC, 2014), having undertaken extensive public consultation. Thereafter, work on the corridor commenced in 2015, a joint project between Transport for Greater Manchester (TfGM) and the Council (TfGM, 2015), with some areas such as fronting Manchester Metropolitan University still under maintenance.

1.2 Report Outline

The significant underrepresentation of women cyclists presents an issue for both academic scholars in the field and local authorities (such as Manchester City Council) who aim to ensure inclusive and safe cycling for all (Garrard *et al.*, 2008). The purpose of this study is to critically evaluate the recently upgraded cycling infrastructure on the Oxford Road Corridor, with research questions in Chapter 3.3, focusing on how such infrastructure has influenced female cyclists. The position of Manchester's Oxford Road as an Urban Living Lab (Bulkeley and Catan Broto, 2012) will be fully considered in this research to understand the extent to which recently implemented urban governance strategies have created an inclusive and 'just' landscape (Swyngedouw, 2005). Furthermore, the conclusion will show the mixed success of the scheme in terms of raising the profile of cycling but the struggle to address gender gaps.

1.3 - Study location

Figure 1 displays the Oxford Road corridor and the start of Wilmslow Road, adjacent to Whitworth Park. The Oxford Road corridor covers a large area, from St. Peter's Square (North) to Whitworth Park (South) before merging into Wilmslow Road.

Bus Priority Package – Oxford Road Corridor

Work phases

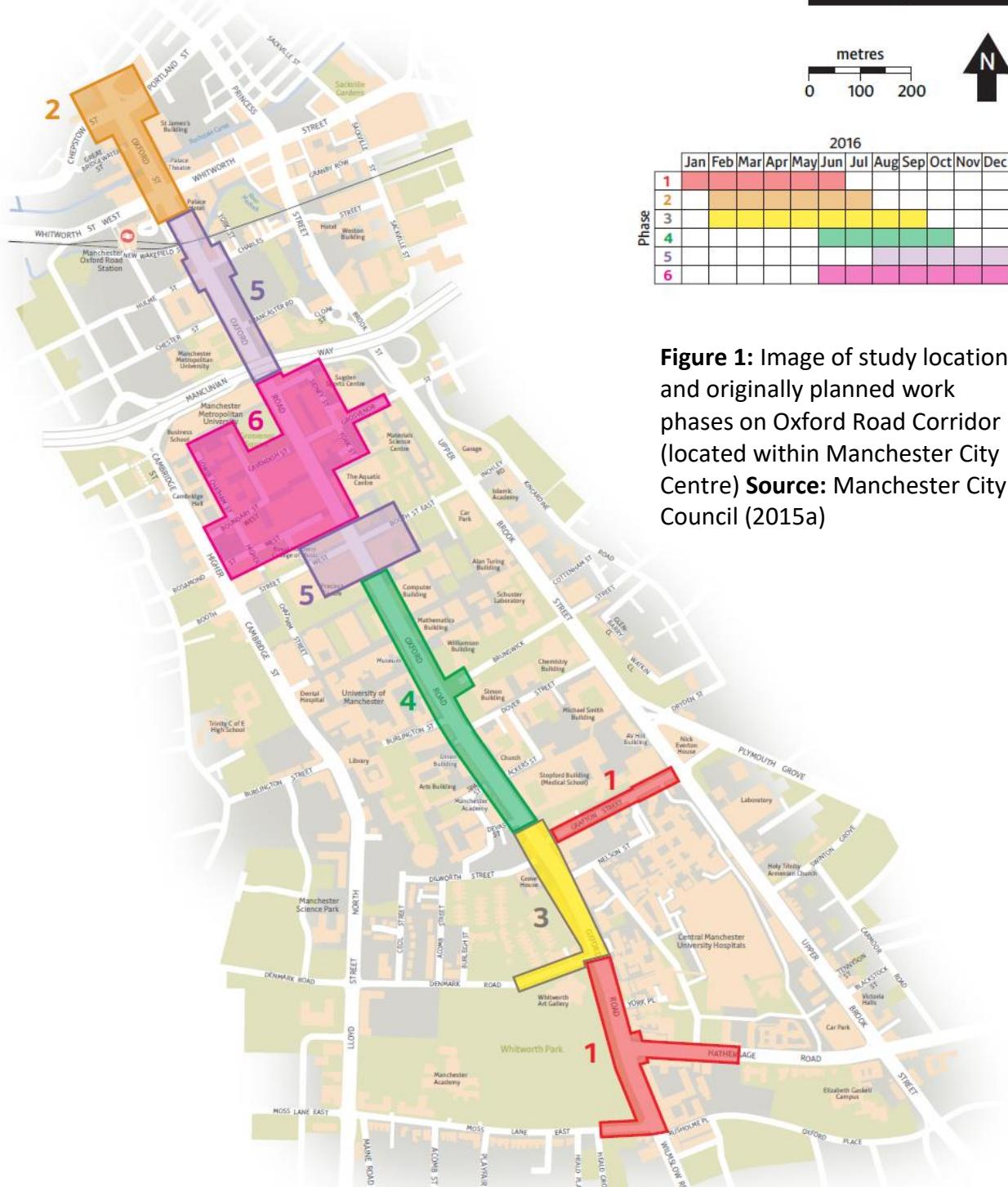


Figure 1: Image of study location and originally planned work phases on Oxford Road Corridor (located within Manchester City Centre) **Source:** Manchester City Council (2015a)

2. Context

2.1 Gender and Cycling

It is widely understood that there are significant gender disparities in transport behaviours (Law, 1999; Dickinson *et al.*, 2003). These differences play a role in shaping travel patterns such as mode choice, duration of journey and distance travelled (Matthies *et al.*, 2002, Gordon *et al.*, 1989, Bostock, 2001). In particular, cycling has poor uptake amongst females (Buehler and Dill, 2016), with females accounting for only one in three riders in London (Steinbach *et al.*, 2011). Garrard (2003) debates women are more concerned with the risk of cycling than men, resulting in lower participation. Therefore, infrastructure that creates a barrier between vehicles and cyclists increases the likelihood of women choosing to cycle as it reduces the anticipated risk of accidents (Garrard *et al.*, 2008). Hence, it is suggested more research should try to understand successful strategies which could promote cycling as a key travel mode for women (*ibid*). This research will address this challenge and explore whether the transformation of the Oxford Road Corridor, as an urban living lab, has been an inclusionary process; an ultimate goal of successful urban governance (Bloomfield *et al.*, 2001).

2.2 Urban Living Labs (ULL's)

The ‘urban living lab’ (ULL) can be used to understand how cities approach the sustainability challenges in a real-life setting (Voytenko *et al.*, 2016); in this case, exploring ways to increase cycling uptake by women. Often labelling themselves as ‘smart’ due to citizen invention and their ability to transition (Hollands, 2008), they are controlled by local stakeholders whilst aspiring to promote extensive community participation (Baccarne *et al.*, 2014). Moreover, universities and their surrounding estates have become a focal point for experimenting, to create solutions to current unsustainable living (Evans *et al.*, 2015). It is especially true of Manchester, whereby the implementation of hard infrastructure seen as a technical fix, to support more general calls for increasing numbers of cyclists, reinforces the urgent and timely manner in which we must respond to such urban threats (Stern, 2006). This research will

therefore explore the use of University of Manchester's staff and student population as a living lab, following the newly built cycle lanes, in regards to gender inequality in cycling.

2.3 – Socio-Technical Transitions

Socio-technical transitions in transport, brought about by changes in social expectations and technological innovations (Markard *et al.*, 2012), have been put into motion on the Oxford Road Corridor ULL. This is due to Manchester City Council calling for the city to be more sustainable, having developed a long-term plan to achieve this (see: Manchester Climate Change Agency, 2017). To date, several studies have evaluated large-scale renowned cycle schemes such as in the city of Copenhagen (Larsen, 2017; Carstensen *et al.*, 2015; Gossling, 2013). Accordingly, this research seeks to address the experiment on Manchester's Oxford Road, to provide an evaluation of a scheme of a smaller, pilot-sized scale. The present socio-technical regime advocates a need for further study to evaluate the current system lock-in (Seyfang and Haxeltine, 2012) which supports unsustainable transport use. As the new segregated cycle paths on Oxford Road are under review, this work involves gaining a thorough understanding of incentives and disincentives for cycling on the route in question (Winters *et al.*, 2011), based upon female perspectives.

3. Methodology

Building upon previous mixed method evaluations of cycle infrastructure which focus on various specific demographic groups (for example: Heesch *et al.*, 2012 and Guell *et al.*, 2013), three approaches to data collection were employed in this research. This permitted a triangulation of the results in order to gain a broad and rigorous insight into female user perceptions of Oxford Road's new cycle lanes (Baxter and Eyles, 1997).

3.1 Philosophical Approach and Ethics

This research comes from a feminist geography angle (Nelson and Seager, 2008) which usually incorporates qualitative methods, described as the popular feminine choice in social geography (Stanley and Wise, 1993). Hence, Johnson (2012) advocates the use of methods that underpin female perspectives of everyday geographies. Having chosen open-ended surveys and interviews which allow individual expression (Creswell, 2014), these tools enabled a feminist geographical insight into the effects of urban governance. To ensure respondents remained anonymous, the online platform prevented personal identification of those who took part (Ilieva *et al.*, 2002). Moreover, by reflecting on our position as researchers, which adds value to our findings, we acknowledge potential areas of bias (Vandenberg and Hall, 2011). Moreover, consent was obtained from those who participated in interviews.

3.2 Methods

In previous research on the gender differences within cycle infrastructure usage, surveys have been a dominant data collection technique (see: Emond *et al.*, 2009; Dickinson *et al.*, 2003; Krizek and Johnson, 2006). Therefore, as this method has proven successful records, online surveys were selected to capture a larger demographic of women than face-to-face surveys; in total 50 female participants (Van Selm and Jankowski, 2006). Also, we used observations to count the number of female cyclists on the Oxford Road Corridor over a 60 minute period (at each cross section) on a warm, sunny day which may have affected the count. We decided on three different locations; (1) Outside of Oxford Road train station (North) (2) The University of Manchester and (3) Whitworth Park (South). These locations were chosen to give a fair

representation of the number of female cyclists at different sections of the corridor. Additionally, as part of our primary data collection, we attended the ‘Women on Wheels’ event at the UK National Cycling Centre on 11th March 2017. This event involved the gathering and representation of a large number of organisations which actively encourage female participation in cycling. We conducted five semi-structured interviews, undertaken at this event, to obtain in-depth perspectives from women who recognise the gender disparities within cycling (Baxter and Eyles, 1997).

3.3 Research Questions

1. Since the intervention on Oxford Road Corridor, what impact has this had on the number of female cyclists?
2. Which elements of the current infrastructure need further review?

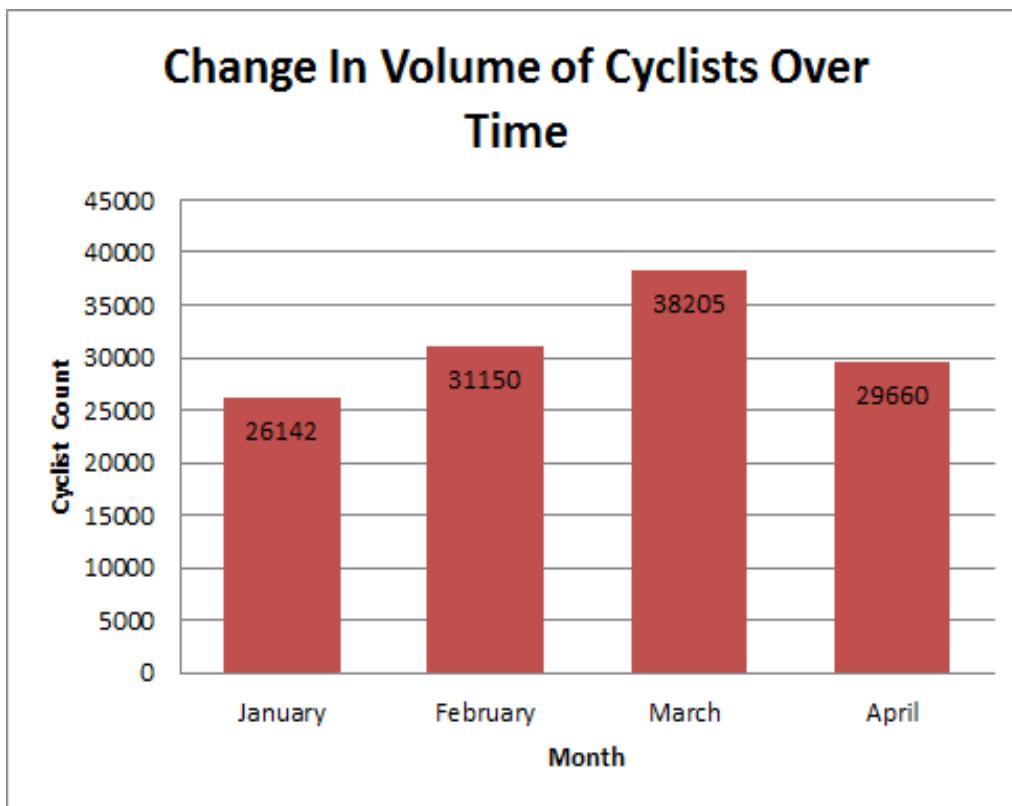
4. Findings and Discussion

4.1 Impacts of Segregated Cycle Lanes on Female Participation

Overall, 46% of the women from the online survey stated that they felt the cycle lanes had encouraged them to cycle more frequently, which is in line with research by Garrard *et al.*, (2012). Surprisingly, only 72% of users ride along the new segregated cycle lanes, with the latter choosing to use the road network. This could be due to being more experienced cyclists (Antonakos, 1993), longer routes by using the segregated cycle path (Aultman-Hall *et al.*, 2008) and possibly due to congested cycle tracks (van der Horst *et al.*, 2014). From a safety perspective, 68% of respondents 'agreed' or 'strongly agreed' with the statement that they felt safer as a result of the new infrastructure whilst 76% rated the quality as 'good' or 'excellent'. As Manchester City Council's cycle report strongly focuses on improving safety and minimising risk (Manchester City Council, 2015b), this research shows that as a result of intervention, a significant proportion of women feel safer, thus encouraging cycle use (Baker, 2009) but there is still room for improvement.

However, as Table 1 clearly demonstrates, there is a significant difference in the volume of male and female cyclists on the Oxford Road Corridor, a ratio of 1:4, i.e. 25%, for women to 75% men respectively. It was found that the most frequent cycle activity was around the main University sites whilst the gender difference was particularly significant, despite the newly implemented segregated cycle lanes, enhancing cycling safety. At every cross section measured, the number of male cyclists was more than double that of female cyclists, demonstrating a clear underrepresentation of female cyclists on the corridor (Dill, 2009). Despite the segregation, the 2011 travel to work survey for Manchester by sex revealed that the ratio of women to men who frequently cycled was 13:50, i.e. 26%, slightly greater than the current ratio on Oxford Road found in this research (ONS, 2011). This suggests that more broadly, there has been little change to increasing female participation amongst female cyclists.

	Oxford Road (North)	University of Manchester	Wilmslow Road (South)	Average
Male Cyclists	92	155	143	130
Female Cyclists	24	35	40	33
Percentage Female	26%	23%	28%	25%

Table 1: Number of Male and Female Cyclists at three different locations on the Oxford Road**Figure 2:** Change In Volume Of Cyclists Over Time. **Source:** Eco Counter, 2017

On the other hand, in terms of the total number of cyclists using the segregated cycle lanes, the numbers appears to be increasing. Secondary data was collected which measures the daily number of cyclists in a one-way direction on Oxford Road, adjacent to the hospitals and Whitworth Art Gallery (Eco Counter, 2017). It shows the number of cyclists per month gradually increased January 2017 to March 2017, before dipping in April 2017 which will be due to university holidays reducing student numbers and staff taking annual leave. Figure 2 shows the change over time, since the Dutch cycle lane scheme was finished. Although this could be partly due to changes in weather conditions and temperature, the significant percentage change of 46% in number of cyclists from January to March implies there are other circumstances, which can be attributed to the Dutch cycle lanes encouraging uptake.

4.2 Further Considerations

The survey also investigated the gender stereotypes in cycling and determined how the Oxford Road Bus and Cycle gate have helped tackle this attitude. However, there still appears to be a rather large gap in equality despite the high profile of the scheme. The women in the survey results repeatedly highlighted that men are perceived as ‘faster’, ‘stronger’, ‘more aggressive riders’ and ‘risk taking’. Moreover, three out of five interviews highlighted that men seemed to dominate cycling as they argued it is seen as a ‘sport’, as inferred by Daley and Rissel (2011). Therefore, it is recommended that Manchester City Council should do more to promote female participation in cycling through local events, public relations and in schools. Governance through education would help to address the uptake of sustainable transport whilst reducing the gender gap (Black and Nijkamp, 2002).

“Men constantly pull in front of me when I'm stopped at junctions then proceed to cycle really slowly so I have to overtake...then do it again at next junction. I think the perception is girls are slow.”

(Interview Respondent 4)

Additionally, more than half of survey respondents mentioned a risk to pedestrians which needs to be addressed. As a result, perhaps Manchester City Council could contemplate

implementing barriers similar to those described in one interview at the Women on Wheels event, at all bus stops, to ensure that when people step off a bus, they cannot accidentally step into oncoming bicycle traffic. Moreover, Daniels *et al.* (2009) demonstrated that physical barriers also reduce the number of accidents and injuries. Already at some bus stops these barriers are in place partially, but do not run the full extent behind the bus stop.

"There should be barriers between the bus stops and the cycle lane because people often get off the bus and walk straight into the cycle lanes without looking."

(Interview Respondent 3)

Therefore, in addition to physical barriers i.e. technical solutions, Manchester City Council could again intervene by creating more awareness campaigns to educate the public to address this issue along with tackling the social and behavioural aspects such as eye-catching signs, advocated by Haileyesus *et al.* (2007). One perhaps quite radical solution to this could be to fine people who walk on cycle paths when an alternative footpath is available, just as cyclists are banned from public pavements (Department for Transport, 2004). Through implementing a solution such as this, monitored through CCTV, Oxford Road Corridor would become safer for all road users, albeit it would be costly and involve ethical questions around additional surveillance (Koch *et al.*, 2013).

5. Conclusion

In summary, we have evaluated the Dutch style infrastructure on Oxford Road is the foundation for a low carbon transition in active travel within Manchester (Geels, 2012). Gender difference in cycling was chosen as the key angle for this evaluation due to academic literature highlighting female participation as low in cycling (Bonham and Wilson, 2012). Therefore, this research limited the evaluation of the cycle infrastructure scheme through women's perspectives, conversely not looking at alternative demographics such as age, income or ethnicity. However, this research briefly touches open the increasing cycle numbers which were measured through the eco counter, a secondary data source.

In terms of further research, there is space on the agenda for assessing potential policies which would prevent pedestrians from walking in cycle lanes, such as physical barriers, fines and CCTV monitoring as highlighted in Chapter 4.2 which could be tested in a further pilot study. Moreover, as mentioned in Chapter 1.1, the scheme is still under construction in some areas and additional roadworks are affecting the Manchester Oxford Road Corridor. Once completed, perhaps a further study could be undertaken again to compare results and opinions, especially in terms of revisiting the gender ratio as current roadworks are a disincentive to female cyclists (Jensen *et al.*, 2007).

Finally, it can be concluded that overall the scheme is having a positive impact in increasing the number of female cyclists. In general, the scheme has raised awareness of cycling for women, especially due to the improved safety aspect of the scheme although there is still scope for improvement. However, the proportion of women to men observed in this study remained very similar in comparison to the census data, within Manchester City Council's local authority boundary, collected prior to the scheme (ONS, 2011). Yet, with some areas still undergoing further work, it may take time and more social governance measures to encourage greater female participation (Shove and Walker, 2010) before dramatic change is evident.

Bibliography

Antonakos, C.L. (1993) *Environmental and Travel Preferences Of Cyclists* (Doctoral Dissertation).

Aultman-Hall, L., Director, U.V.M., Spencer, C., Motion, L., Bell, A., Barl, C., Turnpike, B. and Newington, C.T. (2008) Context Sensitive Solutions, Bicycles and Pedestrians: Some Lessons Learned In New England. In *87th Annual Meeting Of The Transportation Research Board. Washington, DC.*

Baccarne, B., Mechant, P., Schuurma, D., De Marez, L. and Colpaert, P. (2014) 'Urban Socio-Technical Innovations With and By Citizens', *Interdisciplinary Studies Journal*, 3(4), pp.143-156.

Baker, L. (2009) 'How To Get More Bicyclists On The Road', *Scientific American*, 301, pp.28-29.

Baxter, J. and Eyles, J. (1997) 'Evaluating Qualitative Research In Social Geography: Establishing 'Rigour' In Interview Analysis', *Transactions Of The Institute Of British Geographers*, 22(4), pp.505-525.

BBC (2014) *Manchester's 'Dutch-Style' Cycle Lanes On Oxford Road Revealed*. Available At: <Http://Www.Bbc.Co.Uk/News/Uk-England-Manchester-30113834>. (Accessed: 30/04/2017)

Black, W.R. and Nijkamp, P. (2002) 'Pathways To Sustainable Transport and Basic Themes', In Black, W.R. and Nijkamp, P. (Eds) *Social Change and Sustainable Transport*. Indiana: Indiana University Press. pp. Xi-Xiii.

Bloomfield, D., Collins, K., Fry, C. and Munton, R. (2001) 'Deliberation and Inclusion: Vehicles For Increasing Trust In UK Public Governance?', *Environment and Planning C: Government and Policy*, 19(4), pp.501-513.

Bonham, J. and Wilson, A., (2012) 'Bicycling and The Life Course: The Start-Stop-Start Experiences Of Women Cycling', *International Journal Of Sustainable Transportation*, 6(4), pp.195-213.

Bostock, L., (2001) 'Pathways Of Disadvantage? Walking As A Mode Of Transport Among Low-Income Mothers', *Health & Social Care In The Community*, 9(1), pp.11-18.

Buehler, R. and Dill, J. (2016) 'Bikeway Networks: A Review Of Effects On Cycling', *Transport Reviews*, 36(1), pp.9-27.

Bulkeley, H. and Castan Broto, V. (2013) 'Government By Experiment? Global Cities and The Governing Of Climate Change', *Transactions Of The Institute Of British Geographers*, 38(3), pp.361-375.

Carstensen, T.A., Olafsson, A.S., Bech, N.M., Poulsen, T.S. and Zhao, C. (2015) 'The Spatio-Temporal Development Of Copenhagen's Bicycle Infrastructure 1912–2013', *Geografisk Tidsskrift-Danish Journal Of Geography*, 115(2), pp.142-156.

Creswell, J.W. (2014) *A Concise Introduction To Mixed Methods Research*. London: Sage Publications.

Daley, M. and Rissel, C. (2011) 'Perspectives and Images Of Cycling As A Barrier Or Facilitator Of Cycling', *Transport Policy*, 18(1), pp.211-216.

Department For Transport (2004) *The Highway Code*. London: UK Government.

Dickinson, J.E., Kingham, S., Copsey, S. and Hougie, D.J.P. (2003) 'Employer Travel Plans, Cycling and Gender: Will Travel Plan Measures Improve The Outlook For Cycling To Work In The UK?', *Transportation Research Part D: Transport and Environment*, 8(1), pp.53-67.

Dill, J. (2009) 'Bicycling For Transportation and Health: The Role Of Infrastructure', *Journal Of Public Health Policy*, 30(1), pp.S95-S110.

Eco Counter (2017) *Bike Count Display Interactive Map*. Available At: <Http://Eco-Public.Com/Parcpublic/?Id=4586#>. (Accessed: 02/05/2017)

Emond, C., Tang, W. and Handy, S. (2009) *Explaining Gender Difference In Bicycling Behaviour*, *Transportation Research Record: Journal Of The Transportation Research Board*, (2125), pp.16-25.

Evans, J., Jones, R., Karvonen, A., Millard, L. and Wendler, J. (2015) 'Living Labs and Co-Production: University Campuses As Platforms For Sustainability Science', *Current Opinion In Environmental Sustainability*, 16, pp.1-6.

Garrard, J. (2003) 'Healthy Revolutions: Promoting Cycling Among Women', *Health Promotion Journal Of Australia*, 14(3), pp.213-215.

Garrard, J., Handy, S. and Dill, J. (2012) 'Women and Cycling', In Pucher, J. and Buehler, R. (Eds.) *City Cycling*, London: MIT Press pp.211-234.

Garrard, J., Rose, G. and Lo, S.K. (2008) 'Promoting Transportation Cycling For Women: The Role Of Bicycle Infrastructure', *Preventive Medicine*, 46(1), pp.55-59.

Geels, F.W. (2012) 'A Socio-Technical Analysis Of Low-Carbon Transitions: Introducing The Multi-Level Perspective Into Transport Studies', *Journal Of Transport Geography*, 24, pp.471-482.

Gössling, S. (2013) 'Urban Transport Transitions: Copenhagen, City Of Cyclists', *Journal Of Transport Geography*, 33, pp.196-206.

Guell, C., Panter, J. and Ogilvie, D. (2013) 'Walking and Cycling To Work Despite Reporting An Unsupportive Environment: Insights From A Mixed-Method Exploration Of Counterintuitive Findings', *BMC Public Health*, 13(1), pp.497-507.

Haileyesus, T., Annest, J.L. and Dellinger, A.M. (2007) 'Cyclists Injured While Sharing The Road With Motor Vehicles', *Injury Prevention*, 13(3), pp.202-206.

- 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*, 9(1), pp.106-118.
- Hollands, R.G. (2008) 'Will The Real Smart City Please Stand Up? Intelligent, Progressive Or Entrepreneurial?', *City*, 12(3), pp.303-320.
- Ilieva, J., Baron, S. and Healey, N.M. (2002) 'Online Surveys In Marketing Research: Pros and Cons', *International Journal Of Market Research*, 44(3), pp.361-376.
- Jensen, S.U., Rosenkilde, C. and Jensen, N. (2007) 'Road Safety and Perceived Risk Of Cycle Facilities In Copenhagen', *Presentation To AGM Of European Cyclists Federation*.
- Johnson, L.C. (2012) 'Feminist Geography 30 Years On—They Came, They Saw But Did They Conquer?' *Geographical Research*, 50(4), pp.345-355.
- Koch, H., Matzner, T. and Krumm, J. (2013) 'Privacy Enhancing Of Smart CCTV and Its Ethical and Legal Problems', *European Journal Of Law and Technology*, 4(2).
- Krizek, K.J. and Johnson, P.J. (2006) 'Proximity To Trails and Retail: Effects On Urban Cycling and Walking', *Journal Of The American Planning Association*, 72(1), pp.33-42.
- Larsen, J. (2017) The Making Of A Pro-Cycling City: Social Practices and Bicycle Mobilities. *Environment and Planning A*, 49(4), pp.876-892.
- Law, R. (1999) 'Beyond 'Women and Transport': Towards New Geographies Of Gender and Daily Mobility', *Progress In Human Geography*, 23(4), pp.567-588.
- Manchester City Council (2015a) *Bus Priority Package: Oxford Road Corridor*. Available At: <Http://Documents.Manchester.Ac.Uk/Display.Aspx?Docid=29024>. (Accessed: 30/04/2017)

Manchester City Council (2015b) *City Cycle Ambition Grant*. Available At:
[File:///C:/Users/Franc/Downloads/6. Cycle City Report%20\(1\).Pdf](File:///C:/Users/Franc/Downloads/6. Cycle City Report%20(1).Pdf). (Accessed: 02/05/2017)

Manchester Climate Change Agency (2017) *Manchester: A Certain Future*. Available At:
<Http://Www.Manchesterclimate.Com/Sites/Default/Files/MACF%202010-20.Pdf>.
(Accessed:01/05/2017)

Markard, J., Raven, R. and Truffer, B. (2012) 'Sustainability Transitions: An Emerging Field Of Research and Its Prospects', *Research Policy*, 41(6), pp.955-967.

Nelson, L. and Seager, J. (Eds) (2008). *A Companion To Feminist Geography*. London: John Wiley & Sons.

Office For National Statistics (2012) *2011 Census*. Available At:
<Https://Www.Ons.Gov.Uk/Census/2011census>. (Accessed: 10/04/2017)

Seyfang, G. and Haxeltine, A. (2012) 'Growing Grassroots Innovations: Exploring The Role Of Community-Based Initiatives In Governing Sustainable Energy Transitions', *Environment and Planning C: Government and Policy*, 30(3), pp.381-400.

Shove, E. and Walker, G. (2010) 'Governing Transitions In The Sustainability Of Everyday Life', *Research Policy*, 39(4), pp.471-476.

Stanley, L. and Wise, S. (1993) *Breaking Out Again*. (2nd Ed.) London: Routledge.

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), pp.1123-1130.

Stern Review (2006) *Stern Review: The Economics Of Climate Change* (Vol. 30). London: HM Treasury.

Swyngedouw, E. (2005) 'Governance Innovation and The Citizen: The Janus Face Of Governance-Beyond-The-State', *Urban Studies*, 42(11), pp.1991-2006.

Thomas, B. and Derobertis, M. (2013) 'The Safety Of Urban Cycle Tracks: A Review Of The Literature', *Accident Analysis & Prevention*, 52, pp.219-227.

Transport For Greater Manchester (2014) *Greater Manchester Cycling Strategy*. Available At: <Http://Cycling.Tfgm.Com/Pages/Pdfs/Cycling-Strategy-Summary.Pdf>. (Accessed: 05/05/2017)

Transport For Greater Manchester (2015) *Oxford Road Is Gearing Up To "Go Dutch"*. Available At: Http://Www.Tfgm.Com/Corporate/Media_Centre/Pages/News.Aspx?Articleid=778. (Accessed: 30/04/2017)

Van Der Horst, A.R.A., De Goede, M., De Hair-Buijssen, S. and Methorst, R. (2014) 'Traffic Conflicts On Bicycle Paths: A Systematic Observation Of Behaviour From Video', *Accident Analysis & Prevention*, 62, pp.358-368.

Van Selm, M. and Jankowski, N.W. (2006) 'Conducting Online Surveys', *Quality & Quantity*, 40(3), pp.435-456.

Vandenberg, H.E. and Hall, W.A. (2011) 'Critical Ethnography: Extending Attention To Bias and Reinforcement Of Dominant Power Relations', *Nurse Researcher*, 18(3), pp.25-30.

Voytenko, Y., McCormick, K., Evans, J. and Schliwa, G. (2016) 'Urban Living Labs For Sustainability and Low Carbon Cities In Europe: Towards A Research Agenda', *Journal Of Cleaner Production*, 123, pp.45-54.

Winters, M., Davidson, G., Kao, D. and Teschke, K. (2011) 'Motivators and Deterrents Of Bicycling: Comparing Influences On Decisions To Ride', *Transportation*, 38(1), pp.153-168.