Examining the impact on cycling levels of Streetspace modal filters: a controlled before-and-after study in Dulwich Village, London.

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Disclaimer

Dr Anna Goodman lives in Lambeth, around 2km from the Streetspace site, and her parents live in Dulwich Village. Dr Goodman designed the study, supervised the data collection, conducted the analysis, and wrote the report. She takes full responsibility for the work presented here, and all the opinions expressed are solely her own.

Acknowledgements

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The cover photographs are of the Dulwich Village Junction Streetspace scheme. Photo credits: Crispin Hughes (www.crispinhughes.co.uk) and Anna Goodman

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Executive Summary

In June 2020, Dulwich Village Junction (Southwark, London) was closed to motor traffic by Streetspace modal filters. On 4 November 2020, a manual cycle count was carried out on one of the roads most affected by the Streetspace changes. A simultaneous count was carried out on a nearby comparable road without any Streetspace interventions as a control site. Both sites had previously been the subject of manual counts by the Department for Transport in 2018 or 2019, which provided one source of 'before' data for the analysis.

On the street affected by the Streetspace measures, the number of cyclists almost doubled from the previous manual count (94% relative increase). At the control site, cycling numbers were relatively unchanged, showing a 6% relative increase.

The street affected by the Streetspace measures also saw far more children on bicycles: in total, 21% of people on bicycles were children (19% cycling independently and 2% carried on cycles), versus 11% at the control site. During the school run, there was a 7-fold increase in the number of child cyclists at the Streetspace site relative to the control site, as judged against the modelled number of children cycling to school via the two streets in 2011.

These findings demonstrate the substantial potential to increase cycling if infrastructure is provided that allows people to travel safely and comfortably. The impact of such measures will be particularly large if they are implemented in a joined-up way, such that one goes from isolated schemes to a comprehensive network.

1 INTRODUCTION AND RESEARCH AIM

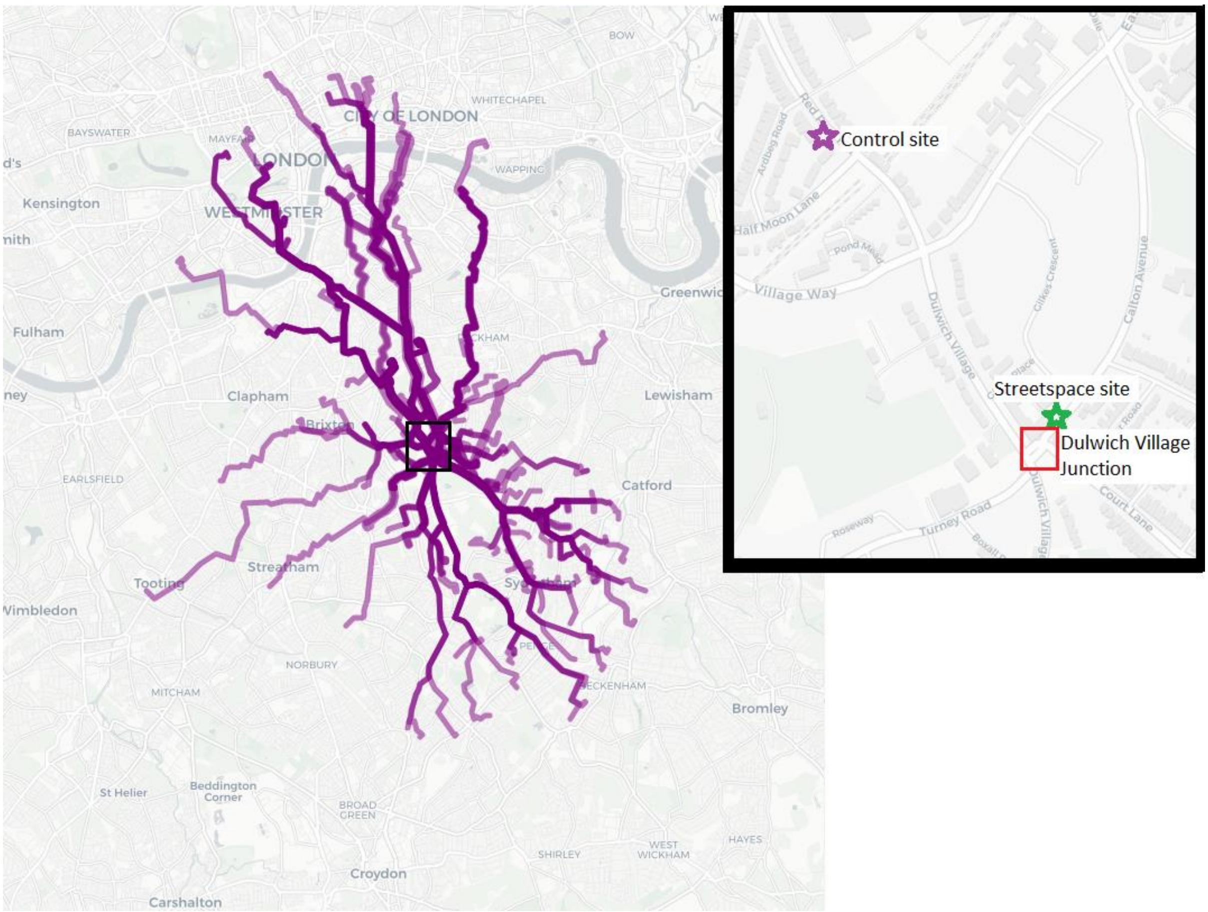
'Modal filters' refer to measures that restrict motor vehicles while allowing access for pedestrians and cyclists. They can be used to create improved conditions for walking and cycling on specific routes, or to create low traffic neighbourhoods if implemented on an area-wide basis. Under emergency legislation introduced during the Covid-19 pandemic, modal filters have been introduced on a trial basis across London and the UK.

In June 2020, Dulwich Village Junction (Southwark, London) was closed to motor traffic by Streetspace modal filters installed at the bottom of Calton Avenue and the adjacent road (Figure 1). This junction is near several schools and serves cycle commuters from across South-East London (Figure 2). This report examines the impact of this Streetspace scheme on cycling.

Figure 1: Modal filter planters at the Streetspace site

Photo credit: Anna Goodman

Figure 2: Main cycle commute routes passing through Dulwich Village (left), and the Streetspace and control count sites (right)



The left-hand side shows the top 200 cycle commute routes passing through Dulwich Village in the 2011 Census (source: www.pct.bike). The right-hand inset map shows Dulwich Village Junction, and the two count sites.

2 RESEARCH METHODS

2.1 Sources of 'Before' Data

Streetspace measures were introduced under emergency legislation, during the Covid-19 pandemic. This makes it harder to evaluate their impact, as there was generally no opportunity to collect 'before' travel data prior to implementation. The ongoing pandemic also continues to affect travel behaviour, making it particularly essential to use control groups when evaluating impacts of Streetspace measures.

One promising source of 'before' data are the manual counts that the Department for Transport routinely performs on a random sample of minor roads, as part of creating the national Road Traffic Statistics data series. In 2018 and 2019 these manual counts happened to include:

- The bottom of Calton Avenue, almost exactly where one Streetspace modal filter is now located (Figure 1, Figure 2).[1] Data was collected on Tuesday 11 September 2018 (maximum daily temperature 23 degrees, sunny weather plus clouds).
- Opposite 24 Red Post Hill (Figure 2).[2] Data was collected on Friday 6 September 2019 (maximum daily temperature 18 degrees, sunny weather plus clouds).

Since the planters were installed, Calton Avenue has far fewer motor vehicles on it and Dulwich Village junction is safer and easier to navigate by bicycle. The bottom of Calton Avenue is henceforth referred to as the 'Streetspace site'.

By contrast, there have been no major interventions to affect cycling conditions on Red Post Hill. Red Post Hill is also a suitable control site for Calton Avenue because: both roads are close to the centre of Dulwich Village; both are near major local state and independent schools; both are important commuting desire lines that are roughly perpendicular to each other, meaning they will mostly carry different cyclists (rather than the same cyclist at different points in a trip). In addition, as shown below, prior to 2020 the two sites were used by roughly similar numbers of cyclists. Red Post Hill is henceforth referred to as the 'control site'.

Another older source of 'before' data is the 2011 National School Census, which asked all state-maintained schools to record the usual main mode that pupils used to travel to school. This, in combination with anonymized information on where pupils lived, was used to create the Propensity to Cycle Tool 'schools' layer (www.pct.bike). This Tool includes modelled estimates of likely routes taken by children who were cycling to school in 2011.

2.2 Collection of 'After' Data and Data Analysis

On 4 November 2020, local volunteers conducted simultaneous 6-hour manual counts from 07:00am-12:59pm at the Streetspace and control sites, supervised by Dr Anna Goodman. Data collectors used standard forms to record the number of bicycles ridden in either direction, and estimated the age and gender of each cyclist. Data collectors only counted bicycles passing the count point (not those visible further away), and only counted bicycles being peddled (not those pushed along the pavement). The Appendix contains the full set of instructions provided to data collectors plus a blank data entry form.

Dr Goodman compared these November 2020 counts with the data collected by the Department for Transport and modelled by the Propensity to Cycle Tool.

[1] Data available at: https://roadtraffic.dft.gov.uk/manualcountpoints/801350
[2] Data available at: https://roadtraffic.dft.gov.uk/manualcountpoints/810983

3 RESEARCH FINDINGS

3.1 Total Number of Cycles

At the control site, the number of bicycles passing between 07:00 and 12:59 increased from 295 in the September 2019 manual count to 313 in the November 2020 manual count (see Figure 3). This corresponds to a 6% relative increase that was not statistically significant (p=0.29 for change in a negative binomial regression analysis). At the Streetspace site, the number of bicycles increased from 417 in the September 2018 manual count to 808 in November 2020 manual count. This corresponds to a 94% relative increase and is highly statistically significant (p<0.001 for before-to-after change, and p<0.001 for change relative to the control site), i.e. it is extremely unlikely to have occurred by chance.

Thus, there was no evidence that the volume of cycling changed at the control site, but there was very strong evidence of a large increase – almost doubling – at the Streetspace site.

Figure 3: Total number of bicycles passing the Streetspace and control sites, 07:00 to 12:59

Note that in recent years the average daily number of cycle trips has been increasing at approximately 3%/year in Inner London (Transport for London: Travel in London 12). As such, the fact that the control site count took place one year after the Streetspace site count is a bias that would be expected to reduce the change observed in the control site relative to the Streetspace site, but only by a few percentage points.

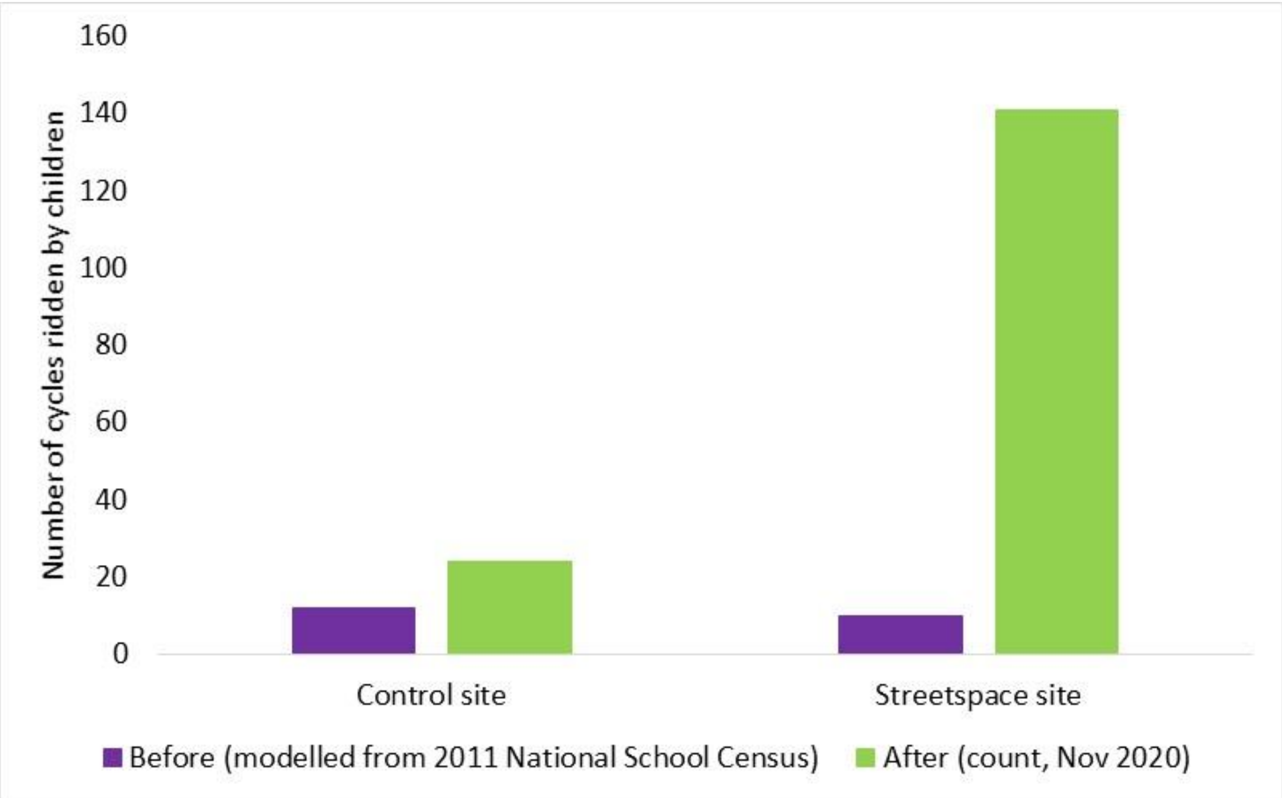
3.2 Number of Children Cycling to School

The Propensity to Cycle Tool estimates that 12 children travelled to school via the control site in 2011, and 10 children travelled to school via the Streetspace site. These numbers are approximate as they are not based on counts – instead they take children who were known to cycle and then use journey planning software to model their likely cycling route, based on a known home location and known school. These numbers are expected to be underestimates as they exclude Independent schools. The magnitude of this underestimation may approximately balance out between the two sites, however, as there is a large independent school near to both the control site (JAGS) and the Streetspace site (Alleyn's).

Between 07:45 and 08:45 (i.e. the peak of the school run) 24 children were observed cycling past the control site in the November 2020 manual count (4 aged 0-10, 20 aged 11-17), and 141 were observed cycling past the Streetspace site (104 aged 0-10, 37 aged 11-17, see Figure 4). This corresponds to a rate ratio of 7.1 for the increase in the absolute numbers of cyclists at the Streetspace site relative to the control site (95% confidence interval 2.7 to 18.1, $p<0.001$ in negative binomial regression)[3].

It therefore appears that the number of children cycling to school via the Streetspace modal filters has been transformed. It is also notable that three quarters of the children cycling at the Streetspace site were of primary school age, i.e. an age when parents typically only allow their child to cycle on routes they perceive to be very safe from injury by motor vehicles.

Figure 4: Number of children travelling to school

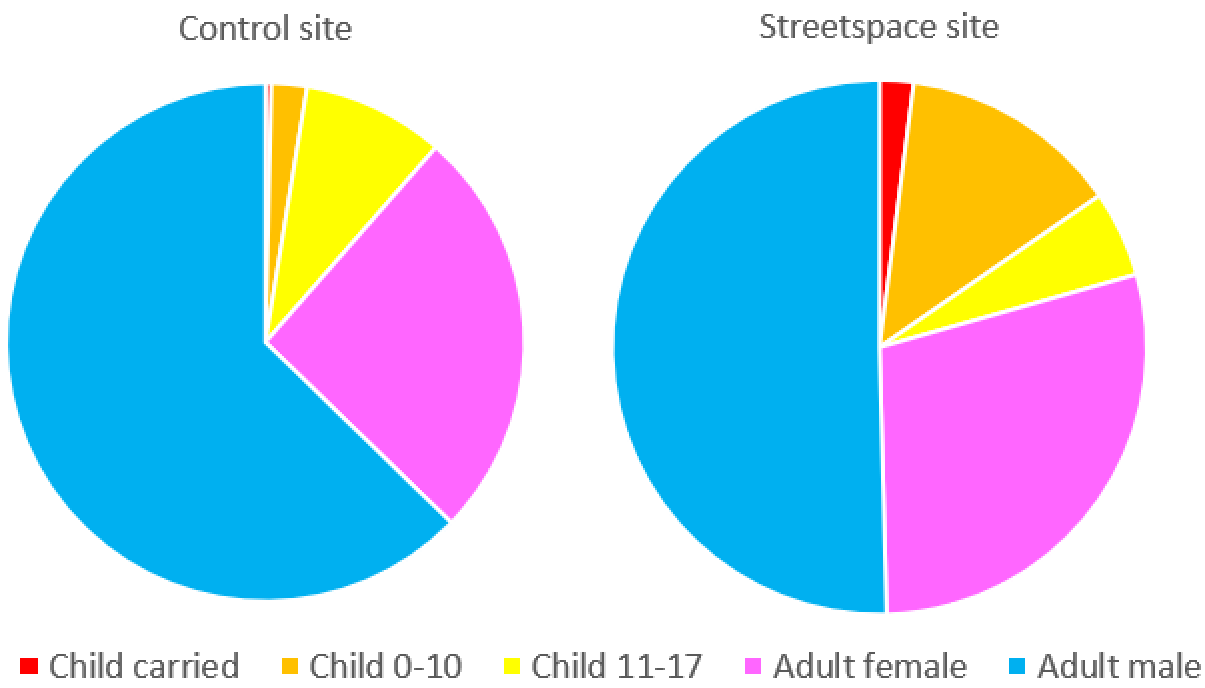


[3] Note that this confidence interval does not capture the additional uncertainty stemming from the use of modelled rather than observed 'before' data.

3.3 Diversity of Bicycle Riders

The large increase in the number of children cycling at the Streetspace site contributed to **that site showing a greater diversity of bicycle riders than the control site** (Figure 5). The Streetspace site also saw a trend towards a higher proportion of women cycling among adult cyclists (36% at the Streetspace site versus 30% at the control site), although this did not quite reach statistical significance (p=0.06 in a chi-squared test).

Figure 5: Composition of bicycle riders in November 2020 manual counts, 07:00 to 12:59



4 CONCLUSION

The large increase in cycling at the Streetspace site (Calton Avenue, Dulwich Village, London) demonstrates the substantial potential to increase cycling if infrastructure is provided that allows people to travel safely and comfortably. Achieving modal shift from car use to more sustainable forms of transport has the potential to yield very large public health and environmental benefits.[4] It can also create more liveable, people-centred neighbourhoods. Installing modal filters, as in this Streetspace program, is a very effective way to make this happen.[5] The impact of such measures will be particularly large if they are implemented in a joined-up way, such that one goes from isolated schemes to a comprehensive network.

[4] Gotschi, T., Kahlmeier, S., Castro, A., Brand, C., Cavill, N., Kelly, P., Lieb, C., Rojas-Rueda, D., Woodcock, J. & Racioppi, F. 2020. Integrated Impact Assessment of Active Travel: Expanding the Scope of the Health Economic Assessment Tool (HEAT) for Walking and Cycling. Int J Environ Res Public Health, 17.
[5] Aldred, R., & Goodman, A. (2020). Low Traffic Neighbourhoods, Car Use, and Active Travel: Evidence from the People and Places Survey of Outer London Active Travel Interventions. Transport Findings, September. doi: https://doi.org/10.32866/001c.17128

APPENDIX: Instructions provided to data collectors & blank data collection form

Where?

- Bottom Calton Avenue, by construction site [between Dulwich books + Gilkes Crescent]
- 24 Red Post Hill [between Half Moon lane and Ardbeg road]

What to count?

- Record the characteristics of each cyclist in either direction.
- Only count cycles that **go past you**, not ones you can see further away.
- Only count cycles being pedalled. Don't count cycles being pushed along the pavement. Do count cycles being cycled along the pavement.

What is a pedal cycle?

- Yes: all pedal cycles, including ebikes, cargo bikes, mobility adapted bikes, tricycles.
- No: scooters, e-scooters, mopeds.
- An adult bike with a child's bike extension attached, or an adult bike pulling a trailer, counts as only ONE cycle – but you can note the child as being pulled/carried.

How to fill out the form

- See over the page for some examples with interpretation.
- Each cycle gets one row.
- Every cycle should have one of the three 'age' boxes ticked.
- The other boxes are ticked if they apply, otherwise are left blank.
- Do your best on age and sex, obviously you may not always be sure.
- We may want to analyse data in specific time windows. Please note the time in the margin on the hour and every quarter hour

Here is an example showing three cyclists recorded correctly plus one row incorrectly completed:

Adult (18+)	Child, 0-10	Child, 11-17	Female?	No. kids carried/pulled	Cargo bike?	Mobility bike?	***Interpretation***
X							*= Male adult, regular bike, no kids*
X				2	X		*= Male adult, 2 kids in a cargo bike*
		X	X				*= Female child age 11-17*
X	X						*= Incorrectly filled in. If these are two cyclists, then each should have a separate row.*

Count location: ____________________ Name of data collector: _________________

Time you start this page _________________

Remember to note the time in the margin on the hour and every quarter hour

	Adult (18+)	**Child, 0-10**	**Child, 11-17**	**Female?**	**No. kids carried/pulled**	**Cargo bike?**	**Mobility bike?**
1							
2							
3							
4							
5							
6							
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