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Investigating the rates and impacts of near misses and related incidents among UK cyclists

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ABSTRACT

The paper investigates the occurrence of non-injury incidents among cyclists in the UK, seeking to (i) generate a rate that can be compared with injury rates, (ii) analyse factors affecting incident rates, and (iii) analyse factors affecting the impact of incidents on cyclists.

We collected data on non-injury cycling 'incidents' (near misses and other frightening and/or annoying incidents) from 1692 online diaries of cycle trip stages[1] and incidents, participants having signed up in advance for a specific day. Following data cleaning and coding, a dataset was created covering 1532 diary days and 3994 records of incidents occurring within the UK. Incident rates were calculated and compared to injury risks for cyclists. Cross-tabulation and regression were used to identify factors affecting incident rates and the effect an incident has on the cyclist.

Frightening or annoying non-injury incidents, unlike slight injuries, are an everyday experience for most people cycling in the UK. For regular cyclists 'very scary' incidents (rated as 3 on a 0–3 scale) are on average a weekly experience, with deliberate aggression experienced monthly. Per mile, non-injury incidents were more frequent for people making shorter and slower trips. People aged over 55 were at lower risk, as were those cycling at the weekend and outside the morning peak. Incidents that involved motor vehicles, especially those involving larger vehicles, were more frightening than those that did not.

Near miss and other non-injury incidents are widespread in the UK and may have a substantial impact on cycling experience and uptake. Policy and research should initially target the most frightening types of incident, such as very close passes and incidents involving large vehicles. Further attention needs to be paid to the experiences of groups under-represented among cyclists, such as women making shorter trips.

1. Introduction

Cyclists have a higher risk of death or serious injury, per mile, than users of motorised modes of transport except motorcycles (DfT, 2014). Despite higher mode-specific risks, public health researchers argue this is outweighed by societal health benefits (De Hartog et al., 2010). For an individual this depends on age, gender and background injury risk levels (Woodcock et al., 2009): for example, cycling risks in the UK are substantially higher than in countries such as the Netherlands (Mindell et al., 2012).

While it is government policy within UK member countries to support and increase cycling, at a national level cycling levels have barely changed. Perceived risk is a major barrier to uptake (Horton, 2007) and experiencing or even witnessing non-injury incidents may contribute. A study in the San Francisco Bay Area (Sanders, 2015) found 86% of those who cycled at least annually had experienced a near miss, with 20% having been hit. Near misses were more strongly associated than collisions with perceived traffic risk. Earlier research in Oxford, UK, by Joshi et al. (2001) highlighted near misses as a relatively common experience for cyclists.

Hence initial evidence suggests non-injury incidents may both be frequent and contribute to perceived safety, with potential impacts on uptake. However, both Sanders (2015) and Joshi et al. (2001) only examine one locality, and only Joshi et al.'s methods allow for a rate

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[1] A cycle trip stage being a part of a trip made by cycle; for example, cycling to the train station.

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calculation. This paper reports on the first national cycling 'near miss' research, providing an in-depth window into frequency and experiences. We view this as valuable given (a) over-representation of cyclists in casualty statistics, (b) government policy to increase cycling and (c) continued policy marginalisation of cycling (Aldred, 2012, 2013).

Although injury figures are high by European standards (Mindell et al., 2012; Wardlaw, 2014) a regular UK commuting cyclist is extremely unlikely to experience death or serious injury. Even a slight injury might only happen once every two decades. However, our data suggest that the 'very scary' incident is a 'normal' weekly experience, and harassment a monthly experience. This reflects the low status cyclists still have in the UK, embodied in poor cycling infrastructure design, lack of legal protection and enforcement, and low empathy from other road users (Aldred, 2012, 2013). Similar issues are likely to arise in other low-cycling countries where cycling's status is low (see e.g. Daley and Rissel, 2011). All these factors are likely to counteract policy aims to increase cycling.

2. Material and methods

The study asked participants to complete an online diary, using KeySurvey software. Ethical approval was granted by the University of Westminster. A convenience sample of people who cycle was recruited with channels including organisational mailing lists, cycling organisations, some leafleting (in London), social media dissemination, and previous survey participants who had agreed to be re-contacted. As registration was open and online, while the survey was aimed at people cycling in the UK, a small number of people from other countries did also complete it.

Participants registered online and nominated a day over a two-week period to record trips and any incidents. This provided some advantages over other methods used to examine near-misses, by allowing us to calculate a rate per trip stage, hour or mile travelled. By contrast, the various apps and reporting systems[2] offering posthoc reporting do not allow the calculation of rates.

The survey questionnaire included a range of quantitative and qualitative questions, with the focus here being the former. Cyclists were asked to record the cycle trips they made, when each started and finished, and distance travelled. They also provided some basic demographic and residential location data. The number of incidents (defined as causing some level of annoyance and/or fear) experienced while cycling on their diary day was recorded. This was left open to enable participants to self-define incidents, with coding later taking place to allocate descriptions to inductively generated categories. To minimise respondent burden, participants were only asked for the details of the first 10 incidents. For each, people were asked for the location, a description, details about other road users' involvement, its effect on them (immediately and any likely impact in the future), and whether and how the incident might have been prevented.

The survey produced 1692 completed day diaries, with the number of individual participants slightly lower as several completed two diaries. Around 60% of participants who initially registered fully completed the diary. People were encouraged to complete the diary whether they had no, few, or many incidents; however, possible bias might run both ways. Those experiencing no incidents may not have bothered to complete it, conversely, so may those experiencing many incidents and finding the diary too onerous.

Participants commented that they might not have noticed many recorded incidents, had this not been their 'diary day'. This could be interpreted as bias in the sense that we were eliciting incidents that normally would not have mattered to people. However, we would argue that the survey gives voice to incidents that would otherwise count for nothing. The qualitative material collected in this study, like other research (see e.g. Pooley et al., 2013), suggests that to cycle regularly in an often difficult context, people must develop a level of tolerance for unpleasantness and hostility. Hence, in asking people about any annoying or frightening incidents, the study has brought to the fore events which – despite having some level of negative consequence, even if only mild annoyance – might otherwise have been accepted as part of their cycling experience.

The study has other limitations. Without GPS tracking, it does not allow the calculation of risks by infrastructure type as we lack information on whole route characteristics. We piloted the concomitant use of an app; however, the diary alone required substantial commitment and we believed using both would have lowered response rates significantly. Another limitation is the focus on the 'cyclist's perspective', unlike Joshi et al. (2001). However, we feel this is justified within a small project because of the strong policy relevance of investigating cycling near misses, and because it allows us to explore how cyclists themselves define near miss and related incidents.

Analysis was conducted using SPSS, Excel, and NVivo. This involved various stages, including cleaning and coding data (e.g. coding incident categories, cross-checking reported involvement of others, etc.). Non-UK incidents were removed, as were several hundred incidents classed as either reported in error or as, for example, witnessed rather than directly experienced. This produced a dataset containing 4662 incidents. 96.7% (1596) of those participants experienced between 0 and 10 incidents (84.9% experienced 0–5 incidents). We removed the 55 people (3.1%) who recorded over 10 incidents (maximum=55) as outliers. The justification for this was that (a) these people may have been using a different definition of incident compared to others and (b) incident data were for them by definition incomplete as we only obtained information on the first 10 incidents. Nine more participants were removed due to incomplete time or distance data. Hence the following analysis relates to 1532 UK-based diarists and 3994 incidents.

3. Results

3.1. Demographics

Participants were disproportionately male (72.1%). This broadly reflects the gender balance of UK cycling with the English National Travel Survey[3] showing that men make three times more cycle trips than women (22 per year compared to 7 per year). The age distribution was also skewed, with a relatively low proportion of under-25s. The decline at older ages is characteristic of utility cycling in countries such as the UK (Pucher and Buehler 2008) (Fig. 1).

[2] For example Collideoscope or the CTC's Road Justice project for reporting bad driving.
[3] https://www.gov.uk/government/statistical-data-sets/nts06-age-gender-and-modal-breakdown.

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