Biking Behavior in Mid-Manhattan

A Study Conducted by Students at Hunter College,
The City University of New York
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Introduction

Across the country the number of cyclists is rising markedly. In New York City, for example, between 2007 and 2008 (the most recent year for which data are available) the number of commuter cyclists jumped 35 percent (Chan, 2008). Several factors working in combination are contributing to this trend: the high price of gasoline, the health benefits associated with biking, a growing environmental consciousness, and the promotion of cycling on the part of municipalities as a way of both reducing pollution and alleviating traffic congestion.

With this upsurge in the number of those riding a bike, it is ever-more important for those who share the same city streets – motorists, pedestrians, and cyclists alike – to accommodate themselves to the presence of others. Motorists need to maintain a safe driving distance between themselves and cyclists, not open a door that would impede the passage of cyclists or park in designated bike lanes. For their part, pedestrians should not jaywalk or cross the street when the sign reads “Don’t Walk.” Cyclists, too, must obey the traffic laws: stopping at a red light, going in the same direction as traffic, and not riding on sidewalks.

Abundant research has been carried out on obedience to traffic laws by city drivers. Surprisingly, though, few systematic studies have been conducted on the behavior of urban cyclists. The scant attention that has been paid to cyclists has tended to focus exclusively on the use of helmets. Little, if any, inquiry has been directed at the extent to which cyclists adhere to traffic laws. Nor has any research (of which the authors of this study are aware) examined the degree to which cyclists use electronic devices (e.g., cell phones, Ipods, etc.) which might reduce their concentration.
The present study is aimed at filling this void. It has three primary objectives. The first objective is to gauge the use of helmets by cyclists in mid-Manhattan. According to a New York State law enacted in 1994, all riders under the age of 14 are required to wear a bicycle helmet. In addition, a City ordinance passed in 2007 mandates that bicycle delivery workers wear helmets (Rivera, 2007). The second objective of this study is to measure the adherence to a number of traffic laws by cyclists in the central business district of Manhattan. Specifically, these laws include: stopping at a red light, riding with traffic, and not riding on a sidewalk. For commercial cyclists, two additional laws are investigated: whether these cyclists properly identify their business name and whether they use both headlights and taillights after dusk. The third objective of this study is to examine the use of electronic devices such as cell phones and music players by cyclists in the midtown area.

The geographic setting of this study is the mid-Manhattan area. This area was chosen as the site for this study for a number of reasons. First, according to survey results, 81 percent of cyclists who commute within the City have Manhattan as their destination (City of New York, 2007). Second, a major focus of this study is to examine the riding behavior of commercial cyclists. It is likely that both of these groups – commuter and commercial cyclists – have a large numerical representation in the central business area.

**Methodology**

The results of this study are based upon observations of 5,275 bicyclists at 45 different intersections in New York City. The intersections were randomly selected from all intersections spanning the area from 1st to 10th Avenues (east to west) and from 14th Street to 59th Street (south to north). This area constitutes a
broad swath of Manhattan and comprises a large portion of what can be thought of as the central business district.

All observations were carried out by Hunter College students currently enrolled in either two sections of an undergraduate Introduction to Research Methods course in the Department of Sociology or a graduate course entitled, “Urban Data Analysis” in the Department of Urban Affairs and Planning. Prior to carrying out the field work, the students were trained in observational research techniques.

Students were given strict methodological guidelines in carrying out their observations. Importantly, students had to choose cyclists they observed at a given location on a random basis without employing subjective criteria and they had to remain as inconspicuous as possible.

All students carried out observations at three distinct time periods – each period being exactly one and one-half hours in duration. For undergraduate students, the three time periods were staggered so as to fall within the following intervals: 1) a weekday between 9:00 am and 1:00 pm, 2) a weekday between 1:01 pm and 6:00 pm, and 3) a Saturday or Sunday between 9:00 am and 6:00 pm. For graduate students, the three periods consisted of two distinct weekdays and either a Saturday or Sunday with the hours ranging from 6:01 pm to 10:00 pm.² ³

Students were instructed to record observations for every cyclist who passed them by within each distinct time period with a few exceptions. The exceptions were as follows: First, no more than one observation could be recorded by a student within the same minute of time.⁴ Second, for cyclists riding in parallel fashion, observations were to be carried out on the cyclist in closest physical proximity to the student. Third, no information was to be gathered on the same cyclist more than once. And fourth, no
information was to be gathered on any cyclist who had an “intimidating presence.”

The above methodology was designed so that intersections that had more cyclists traversing them would have greater representation in the sample. Thus, the study is based upon a self-weighted sample of observations.

With respect to biking behavior, students gathered data on the following variables: (1) use of a helmet, (2) stopping/pausing at a red light, (3) going in the same direction as traffic, (4) riding on the sidewalk, (4) using the designated bike lane (if applicable), and (5) using a cell phone or MP3 player while cycling. For commercial cyclists, information was also gathered on whether they had proper identification and whether they used headlights and taillights after dark.

In addition to these variables, students collected the following demographic information on each rider: (1) his/her sex, (2) whether the rider was under 14 years of age, and (3) for adult riders (14 years of age or older), whether they were commercial cyclists (e.g., messengers, food delivery workers) or non-commercial cyclists.

Finally, a number of contextual variables at both the street and the census-tract level were appended to each record. The street-level attributes included whether the street/avenue was one or two-way. Census data at the census-tract level consisted of the following: the percent white, the percent African-American, the percent Asian, the percent Hispanic, and the median household income.

All observations were carried out between April 2-28, 2009.
Findings

Overall Profile of Riders

One-half of the riders observed in this study were “general” (e.g., non-commercial) cyclists (49.8%), followed by “delivery riders” (44.4%). As might be expected, children under the age of 14 constituted only a minuscule segment of the riders in mid-Manhattan (0.5%). For a small portion of the cases (5.3%), commercial vs. non-commercial status could not be determined.

In the hours after dusk (after 7:30 pm), the proportion of commercial riders exceeded that of “general” riders with the former group now comprising about 57.3 percent of the riders and the latter group comprising 34.8 percent of the riders.

Also coinciding with expectations, a noticeable sex disparity in ridership was evident. Fully ninety-one percent of the riders observed were male. Not surprisingly, this demographic imbalance was even more pronounced among commercial cyclists of whom 99 percent were males.

Use of Helmets

Less than a third of the riders (29.8%) were observed wearing helmets. This figure varied considerably by type of rider. The usage rate for children under the age of 14 was 48 percent.5

Combining the sex of the cyclist with the type of cyclist (general vs. commercial) also produces a noticeable variability in usage rates.6 Female general cyclists are far more likely to wear a helmet (50.8%) than either male general cyclists (32.2%) or
male commercial cyclists (23.6%). Thus, there is both a sizable gender and type-of-rider gap in terms of helmet usage (See Table 1).

Stopping at Red Lights

More than one-third of cyclists (37%) did not stop at all at red lights. In addition, another 28.7 percent paused at a red light but then went through the light while it was still red.

As was the case with helmet use, both gender and type of rider exert an influence on the likelihood of going through a red light without stopping. Male commercial riders are the most likely to “run a red light” (40%), followed by male general riders (37.4%), and then female general riders (22.5%) (See Table 2).

Importantly, the tendency to “run a red light” without stopping is even more pronounced during the evening hours than during daylight hours (49.5% vs. 35.1%). This finding persists for the three major subgroups in this study: male commercial riders, male general riders, and female general riders.

Moreover, the data show that helmet usage is related to stopping fully at a red light. For both male general cyclists and female general cyclists, those who wear helmets are more likely to stop or pause at a red light.

Riding Against Traffic

Overall, 13.2 percent of cyclists were observed riding against traffic and an additional 4.1 percent were observed riding both with and against the flow of traffic. Conforming to the pattern described above with respect to helmet use and stopping at a red
light, male commercial cyclists showed the greatest tendency to ride against traffic (16.1%), followed by male general cyclists (10.8%), and then female general cyclists (7.7%) (See Table 3). The tendency to ride against traffic was also more evident in the evening hours.

Rides On Sidewalk

Only a small proportion of cyclists (3.7%) were observed riding on sidewalks. An additional 3.5 percent were observed riding on both the street and the sidewalk. No marked differences were recorded in the incidence of riding on the sidewalk by the three major subgroups of riders in this study.

Riding In The Designated Bike Lane

Among the cyclists observed at a street with a bike lane, 29.3 percent did not use the designated lane and an additional 4.5 percent used both the designated lane and another street lane. Noteworthy is that 10 percent of the cyclists were not able to use the bike lane even if they were disposed to do so because it was obstructed.

Use of the bike lane was correlated with type of rider. Among male commercial riders, 58.2 percent used the designated bike lane; among male general riders, the corresponding figure was 64.5 percent and among female general riders, the figure jumped to 69.9 percent (see Table 4). Cyclists also used the designated bike lane more during the daylight hours than in the evening hours (64.9% vs. 50.5%).
Displaying Business Name

Among commercial cyclists, only a minority (27.3%) displayed the name of a company on their apparel or on their bikes. In an additional 12 percent of the cases, a firm determination could not be made.\(^8\)

Uses Headlights and Taillights During the Evening

Altogether, roughly three-quarters of the cyclists (73.7%) used neither a headlight or taillight during the evening hours. Among male commercial cyclists, the figure is even higher – 80.9 percent.\(^9\)

Cycling with Distractions

While only a small segment of cyclists were observed holding a cell phone to their ear when riding their bikes (1.6%), 6.7 percent were observed using a hands-free electronic device (e.g., cell phone, music player, Bluetooth, etc.). Both male and female general riders were far more disposed towards riding with a hands-free electronic device (10% and 12.7%, respectively) than male commercial cyclists (3.2%) (see Table 5).

Conclusions

The findings that have emerged in this study raise serious concerns. First, the results show that less than a third of all cyclists observed in this study (29.8%) were wearing a helmet. Another disturbing finding is that the incidence of helmet usage among delivery cyclists – who are required by law to wear a helmet – was even lower – 23.6%.
Statistics for the country as a whole show that in 2006 there were 773 bicycle fatalities (98 of whom were children under the age of 14) and an additional 44,000 injuries sustained in traffic accidents (National Highway Traffic Safety Administration, 2008). Noteworthy too are statistics from New York City showing that “nearly all bicyclists who died (97%) were not wearing a helmet” (Bicycle Helmet Safety Institute, 2008) and also that “helmet use among bicyclists with serious injuries was low (13%)” (Ibid.).

That the vast majority of cyclists in the mid-Manhattan area (where both vehicular and pedestrian traffic is one of the densest in the country) are not wearing helmets argues strongly that the existing helmet law should be more rigorously enforced. Furthermore, consideration might be given to extending this law to all cyclists. To the authors of this study, it makes little sense to require a 13 year old cyclist to wear a helmet but not a 14 year old cyclist or, for that matter, any adult.

This study has also demonstrated that a large number of cyclists routinely disobey many traffic laws. Among the cyclists observed, the proportions who ignored certain traffic laws were as follows: (1) 37 percent did not stop at a red light at all, (2) 13.2 percent rode against traffic, and (3) 29.3 percent did not use a designated bike lane. Importantly, the tendency to violate these laws was much greater in the evening hours. Even confining the analysis to males (who were more likely to be riding in the evening hours), this pattern is upheld.

Among commercial cyclists, only a minority (27.3%) showed proper identification on their apparel or bikes as is required by law. Based on this finding, one possible recommendation might be to have commercial cyclists display license plates. This might be more practical (and more enforceable) than wearing apparel with a business name or showing an ID card when requested to do so by the appropriate authorities. 10 Also, having a license plate affixed
to a bike might serve as a greater inducement to comply with traffic laws.1

This study also found that approximately three-quarters of all cyclists (and 80 percent of commercial cyclists) used neither a headlight nor a taillight during evening hours which is mandated by New York State law. Businesses which employ commercial cyclists need to actively promote the use of headlights and taillights after dark on the part of their workers and there should be more rigorous enforcement of the existing law for all cyclists by the appropriate authorities.

Finally, this study has revealed that a significant proportion of riders (8.3%) use electronic devices (e.g., cell phones, music players, etc.) while pedaling in the mid-town area. Among general riders, this figure was even higher. Though the dangers of driving a car while distracted have aroused considerable public interest and concern, little attention has been given to “distracted cyclists.” Yet, just like motorists, cyclists, especially in an urban environment, need to be fully focused on the task of riding a bike safely. Only when both motorists and cyclists conscientiously follow the rules of the road and devote their full attention to the road will fatalities and injuries be significantly reduced.
Notes

1. City regulations require that a commercial cyclist “wear upper body apparel with business’ name and operator’s number on the back” (New York City Department of Transportation). The rules for a commercial cyclist also stipulate that “White headlight and red taillight must be used from dusk to dawn” (ibid.)

2. Because of their particular study and work schedules, a few students were not able to adhere to this regimen and, therefore, they conducted their observations at hours that did not coincide with the prescribed schedule of times. All told, 160 observations by undergraduate students were carried out after 6:00 pm and 443 of the observations by graduate students were carried out before 6:00 pm.

3. We could have randomized the times as well as the locations at which the observational data were gathered. Given the study and work schedules of the students, it would have been difficult to implement this strategy. We, therefore, imposed the specific time intervals for data-gathering as discussed above.

4. To comply with this guideline, students were told to record observations for every first cyclist who passed them by after the beginning of a “new” minute on their watches.

5. This figure has to be treated with considerable caution as there were only 25 cases in the entire sample of children under the age of 14.

6. As the number of female commercial cyclists was so small, we created a three-group typology: (1) general cyclists who
were male, (2) general cyclists who were female, and (3) male commercial cyclists.

7. Some cyclists were riding with the flow of traffic on one street and against the flow on the intersecting street during the time they were observed.

8. In the evening hours it was particularly difficult to record whether a commercial cyclist was showing proper identification.

9. For male commercial cyclists, the distribution on this variable was as follows: using both headlight and taillight (5.3%), using a headlight but not a taillight (6.2%), using a taillight but not a headlight (6.2%), using neither lighting fixtures (80.9%), and indeterminate status (1.4%).

10. A city ordinance stipulates that a commercial cyclist “must carry and produce on demand a numbered ID card with operator’s photo, name, home address and business’ name, address and phone number” (New York City Department of Transportation).

11. The suggestion to have cyclists display license plates was made to the authors by Ms. Bunny Abraham of New York City.
References


### Table 1. Helmet Use by Type of Cyclist

<table>
<thead>
<tr>
<th>Helmet use</th>
<th>Male commercial</th>
<th>Male general</th>
<th>Female general</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>23.6%</td>
<td>32.2%</td>
<td>50.8%</td>
<td>29.9%</td>
</tr>
<tr>
<td>no</td>
<td>76.4%</td>
<td>67.8%</td>
<td>49.2%</td>
<td>70.1%</td>
</tr>
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<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
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</table>

### Table 2. Stops at Red Light by Type of Cyclist

<table>
<thead>
<tr>
<th>Stops at red light</th>
<th>Male commercial</th>
<th>Male general</th>
<th>Female general</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>24.2%</td>
<td>22.6%</td>
<td>34.8%</td>
<td>24.5%</td>
</tr>
<tr>
<td>pauses at red light</td>
<td>25.0%</td>
<td>32.2%</td>
<td>35.3%</td>
<td>29.1%</td>
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<tr>
<td>does not stop at red light at all</td>
<td>40.0%</td>
<td>37.4%</td>
<td>22.5%</td>
<td>37.3%</td>
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<tr>
<td>not sure</td>
<td>10.8%</td>
<td>7.8%</td>
<td>7.5%</td>
<td>9.2%</td>
</tr>
<tr>
<td>Total</td>
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<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
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</table>
Table 3. Rides Against Traffic by Type of Cyclist

<table>
<thead>
<tr>
<th>Type of Cyclist</th>
<th>Male commercial</th>
<th>Male general</th>
<th>Female general</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rides with traffic</td>
<td>rides with traffic</td>
<td>78.3%</td>
<td>85.6%</td>
<td>89.8%</td>
</tr>
<tr>
<td></td>
<td>rides against traffic</td>
<td>16.0%</td>
<td>10.8%</td>
<td>7.7%</td>
</tr>
<tr>
<td></td>
<td>both</td>
<td>5.5%</td>
<td>3.5%</td>
<td>2.5%</td>
</tr>
<tr>
<td></td>
<td>not sure</td>
<td>.2%</td>
<td>.1%</td>
<td>.1%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 4. Use of Designated Bike Lane by Type of Cyclist

<table>
<thead>
<tr>
<th>Type of Cyclist</th>
<th>Male commercial</th>
<th>Male general</th>
<th>Female general</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rides on bike lane</td>
<td>yes</td>
<td>58.2%</td>
<td>64.5%</td>
<td>69.9%</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>36.4%</td>
<td>29.9%</td>
<td>26.0%</td>
</tr>
<tr>
<td></td>
<td>both</td>
<td>4.8%</td>
<td>4.9%</td>
<td>2.4%</td>
</tr>
<tr>
<td></td>
<td>not sure</td>
<td>.7%</td>
<td>.8%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*Based on observations in which the bike lane was not obstructed*
Table 5. Use of Electronic Devices by Type of Cyclist

<table>
<thead>
<tr>
<th>Rider’s use of electronic devices</th>
<th>Type of Cyclist</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>male commercial</td>
<td>male general</td>
</tr>
<tr>
<td>hand-held cell phone</td>
<td>1.5%</td>
<td>2.3%</td>
</tr>
<tr>
<td>hands-free electronic device</td>
<td>3.2%</td>
<td>10.0%</td>
</tr>
<tr>
<td>other</td>
<td>.3%</td>
<td>.4%</td>
</tr>
<tr>
<td>not sure</td>
<td>4.0%</td>
<td>3.5%</td>
</tr>
<tr>
<td>no device</td>
<td>91.0%</td>
<td>83.9%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
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