For Many New York City Motorists A Red Light Does Not Mean Stop

An Observational Study of the Incidence of Red Light Running in New York City

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Introduction

Each year in the United States hundreds of people are killed and thousands maimed as a result of motorists running red lights. According to the Insurance Institute for Highway Safety, in 2012, 683 people died and an estimated 133,000 were injured nationwide because of red light running. More than half of those who died were not the drivers themselves but innocent pedestrians, cyclists, or drivers or passengers in other vehicles (Insurance Institute for Highway Safety, 2015).

Despite these sobering statistics, preventing red light running has not been a high priority among government officials. Only recently have government officials made concerted efforts to address this problem and adopt specific measures to curb the incidence of red light running.

New York City has been in the vanguard of efforts to promote traffic safety including measures to counter red light running. In 2014, Mayor Bill de Blasio launched Vision Zero, a comprehensive traffic safety program aimed at substantially reducing the number of fatalities and injuries incurred on the City's streets. One of the features of this program is the installation of additional cameras which automatically photograph vehicles running red lights. In 2013, there were 187 red light cameras in operation at 150 intersections (New York City Department of Transportation, 2014).

Data gathered by New York City's Department of Transportation (DOT) reveal that the installation of red light cameras does, in fact, deter drivers from violating red lights. From 1993, when the red light camera program was initiated, through 2013, the average number of violations recorded by the cameras dropped steeply from 80.1 per day to just 12.3 per day (New York City Department of Transportation, 2014).

Another measure aimed at reducing the number of drivers who speed through red lights is ticketing. Traffic statistics gathered by the New York City Police Department show an upsurge in the number of tickets for moving violations (including running a red light) in 2014. Almost 105,000 tickets were issued to scofflaws who were speeding, did not give the right-of-way to pedestrians, or disobeyed a steady red signal (New York City Police Department, 2014).

Previous Research on the Incidence of Red Light Running and Characteristics of Those Who Run Red Lights

Surprisingly, very little systematic data has been gathered, in general, on the incidence of red light running. One study, carried out at 5 intersections over several months in Fairfax, Virginia, found that a red light violation occurred on average once every twenty minutes at each intersection (Retting, et al., 1999). A second study, conducted at 19 intersections in four states, found that motorists ran a red light on the average 3.2 times per hour per intersection (Hill and Lindly, 2003). Both of these studies are based on observations carried out at a limited number of sites and were conducted several years ago.

There have also been a few studies which have investigated the duration of the yellow light on the tendency to run a red light. (Bonneson and Zimmerman, 2004; Guerin, 2012). The major finding emanating from these studies is that increasing the yellow phase decreases red light running.

No empirical data (to the knowledge of the authors of the present study) exists on the extent to which New York City drivers run red lights. Knowing the frequency with which drivers run red lights at intersections equipped with cameras by itself is not a valid indicator of the overall incidence of red-light running in the City. The intersections with red light cameras consist of only a tiny fraction of all signalized intersections and they do not constitute a representative sample of the City's intersections. Most importantly, the placement of the cameras is publicized to maximize their deterrent effect. Thus, motorists are aware of their presence and are likely to alter their driving behavior.

Previous research has found that, overall, red light violators tend to be younger, less likely to wear a seat belt and more likely to have compiled a poorer driving record than those who do stop at a red light (Retting et al., 1999). Past research, however, has not uncovered any gender differences between red light violators and red light "compliers" – except in instances when running a red light resulted in a crash. In these instances, the proportion of males who are red light runners exceeds that of females.

Objectives of the Present Study

The present study has two major objectives. The first is to gauge the overall incidence of red light violations in the City. To what extent is this a common phenomenon or a relatively rare one? If the findings of this study reveal that red light running is widespread, then perhaps additional countermeasures or more stringent enforcement of existing traffic laws need to be considered to combat this problem.

A second goal of this study is to measure the effect of specific factors which might be associated with a higher or lower incidence of red-light running. These factors include the gender of the driver, the presence or absence of front-seat passengers, the gender of any front-seat passengers, and the type of vehicle being driven. Other factors which are examined include possible environmental influences such as the day of the week, the time of the day, the number of travel lanes of the street/avenue, and the length of time the light is red. Identifying which, if any, of these factors is linked to red light running can help to formulate more effective strategies to decrease red light violations.

Methodology

The results of this study are based upon 4,379 observations carried out at 50 signalized intersections in Brooklyn, Bronx, Manhattan, and Queens. All observations were carried out by Hunter College students enrolled in one of five different courses. Three of the courses were offered in the Department of Sociology (Introduction to Research Methods, Honors Seminar, Mapping Social Science Data), and the other two courses were offered in the Department of Urban Affairs and Planning (Urban Data Analysis, Quantitative Approaches to Urban Analysis).

The intersections at which the observations were conducted were selected in the following manner. First, a random sample of subway stops in each of the four boroughs (weighted by the borough's proportionate number of traffic signals) was selected. Second, once students arrived at their assigned subway stop, they walked at least two full blocks in any direction to an intersection with a traffic light. (Intersections at which a traffic police officer was stationed, or where there was a separate signal light for cyclists, or where other anomalous conditions were present were excluded.) Lastly, the students flipped a coin to determine whether to carry out their observations on the intersecting avenue or street.

Each site was visited for a period of one hour on two distinct days. The hours were staggered across the seven days of the week and ranged from 7:30 am to 6:30 pm.

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

Students were instructed to collect data during the time the signal light was red for each red light phase during the hour they were carrying out their observations. Students gathered information for **every first vehicle** which approached the intersection at any time after the traffic light turned from yellow to red. In order for a driver to be recorded as having "run a red light," the light had to be red before the entire vehicle passed through the intersection. If no vehicle approached the intersection during the entire span of time the light was red, the absence of a vehicle was noted.

With respect to the driver's behavior, the following coding scheme was employed: (1) the driver stops at red light, (2) the driver pauses and then goes through red light in any direction, (3) the driver runs red light and goes straight, (4) the driver runs red light and makes a turn, or (5) the driver has directional signal on and is already in the intersection when the light turns red. A separate code was also employed if the "box was blocked."

In addition to the behavior of the driver, the gender of the driver, the presence or absence of a front-seat passenger, the gender of a front-seat passenger (if applicable), and the type of vehicle were recorded. Also appended to each record (i.e., every red light phase) were the following variables: the calendar date, the day of the week, the time period, the total number of traffic lanes, the number of travel lanes, and the number of seconds the light remained red.

Observations were carried out between April 2 and May 13, 2015.

Findings

Presence or Absence of a Vehicle at the Intersection When the Light Is Red

Altogether, on about one-quarter of the occasions when the light was red (24%) there was no vehicle which approached the intersection at which observations were being conducted. As would be expected, vehicles were more likely to be absent during weekday off peak hours (9:30 am – 4:30 pm) or when observations were being carried out on a Sunday.

Overall Frequency of Stopping at or Running a Red Light

When the analysis is confined to those occasions when a vehicle approached the intersection when the traffic light was red, the data reveal that nearly one out of ten drivers runs the light (8.7%). Of these, the majority (4.4%) runs straight through the light, about 2.6 percent turn on a red light, and the remainder (1.7%) pause and then go through the light (see Table 1).[1]

Table 1 Frequency of Red Light Running

	Number	Percent
Stops at red light	2976	91.3
Pauses, then runs red light	54	1.7
Runs straight through red light	144	4.4
Turns on red light	85	2.6
TOTAL	3259	100.0

This table excludes those occasions when (1) no vehicle approached the intersection when the light was red, (2) the box was blocked, or (3) students were not able to make a precise determination whether the driver had run the red light or not.

It is important to note that the figure presented above concerning the total number of red light runners (8.7%) is a conservative one. The figure is based on the first vehicles which approached the intersection *during any time* the light was red. If the analysis were to be confined to the first vehicles which were approaching the intersection as soon as the light changed from yellow to red, the incidence of red-light running would be markedly higher. The reason for this is that there is a greater tendency to run a red light immediately after the light changes to red than during the remainder of the time the light is red. Evidence of this phenomenon is supported by data gathered by the students on a sub-sample of the observations. These data show red-light running was far more pervasive when the light initially turned red than during the time afterwards. A second reason the 8.7% figure is conservative is that data were only gathered for the first

[1] In this study the overall incidence of red light running was 6.6%. (This includes those occasions when no vehicles approached the intersection when the light was red.) The 95% confidence interval for this statistic is 5.9% to 7.3%. There were 11,915 signalized intersections in the Bronx, Brooklyn, Manhattan and Queens as of June 30, 2011 (New York City Department of Transportation website: http://www.nyc.gov/html/dot/html/infrastructure/signals.shtml). Assuming that a traffic light is red for sixty seconds for one street at an intersection and sixty seconds for the other street, there would be a total of 60 red phases per hour. Observations for this study were carried out from 7:30am to 6:30pm, or eleven hours. During an eleven hour period then, there would be 660 red phases. Using a conservative estimate of 5% for the incidence of red light running, the red light would be run 33 times out of the 660 red phases. Projecting this number to the 11,915 signalized intersections in the four boroughs covered by this study, there would be 393,195 red light violations on a typical day between 7:30am and 6:30pm.

vehicle approaching an intersection after the light turned red. However, it is possible that on multi-lane streets vehicles other than the first one might have run the light.[2]

Gender of Driver and Stopping at or Running a Red Light

Coinciding with the results of previous research noted above, this study shows no gender gap in the incidence of stopping at a red light. The difference between the percentage of females vs. males who stop at a red light (93.2% vs. 92.5%) is negligible and not statistically significant (see Table 2).

Table 2 Red Light Running by Gender of Driver

	Male	Female
Stops at red light	2255 (92.5%)	644 (93.2%)
Runs red light	183 (7.5%)	47 (6.8%)
TOTAL	2438 (100%)	691 (100%)

Drivers Whose Gender was "Not Visible" and Stopping at or Running a Red Light

When recording the gender of the driver, students were instructed to use a separate code if the gender of the driver was "not visible." This lack of visibility was either due to the vehicle traversing so rapidly that the driver's gender was difficult to determine or, in many cases, the vehicle had tinted windows. Notably, the incidence of red light violations is considerably higher among drivers whose gender was not visible versus drivers whose gender could be determined.

Caution must be exercised in imbuing this finding with too much importance since there were only 57 instances in which the gender of the driver was not visible (see Table 3). With this caveat in mind, though, it is noteworthy that in a similar investigation centering on red light running in the fall of 2014, motorists whose gender was not visible also were greatly overrepresented among those who ran red lights.

Table 3 Red Light Running by Driver Visible or Not

	Visible	Not Visible
Stops at red light	2899 (92.6%)	39 (68.4%)
Runs red light	230 (7.4%)	18 (31.6%)
TOTAL	3129 (100%)	57 (100%)

[2] Thirteen locations had six or more red light violations over the two-hour observation period. Those locations are in the appendix.

Presence or Absence of a Front-Seat Passenger and Stopping at or Running a Red Light

The data indicate that the presence of a front-seat passenger does not appear to deter red light running. While there is a greater tendency for drivers to stop at a red light when there is a female front-seat passenger than a male counterpart, the difference is very slight (see Table 4). Moreover, the lack of an association between the frequency of red light running and the presence/absence of a front-seat passenger persists for both male and female drivers.

Table 4 Red Light Running by Presence or Absence of Front Seat Passenger

	Yes Male	Yes Female	No Front Passenger
Stops at red light	441 (92.5%)	480 (94.5%)	1985 (92.5%)
Runs red light	36 (7.5%)	28 (5.5%)	162 (7.5%)
TOTAL	477 (100%)	508 (100%)	2147 (100%)

Type of Vehicle and Stopping at or Running a Red Light

More so than other motorists, taxi cab drivers are inclined to run red lights. Roughly 15 percent are observed engaging in this practice. On the other hand, drivers of livery cars show no greater propensity to run a red light than other types of drivers (see Table 5). Livery cab drivers may be more compliant with the law than taxi cab drivers because they charge a flat rate and also do not have to scramble to pick up passengers at curbside.

Table 5 Red Light Running by Type of Vehicle

	Non-commercial car/van	Commercial car/van	Truck	Taxi	Livery
Stops at red light	2121 (91.9%)	191 (92.3%)	89 (93.7%)	195 (85.5%)	192 (93.7%)
Runs red light	186 (8.1%)	16 (7.7%)	6 (6.3%)	33 (14.5%)	13 (6.3%)
TOTAL	2307 (100%)	207 (100%)	95 (100%)	228 (100%)	205 (100%)

Number of Travel Lanes and Stopping at or Running Red Light

A discernible relationship exists between the number of travel lanes (i.e., unimpeded lanes) and the tendency to run a red light. As the number of travel lanes goes from 1 to

4 there is an increasing likelihood that the driver will run the red light (see Table 6). In single travel lane roads, the incidence of red light running is 6.7 percent. By comparison, the corresponding figure for 4 travel lane roads is 16.5 percent. This finding could be attributable to several factors. First, motorists may be driving at a higher rate of speed on wider streets/avenues than streets/avenues which are narrower and, thus, less inclined to break for a red light. Second, motorists who flout the law may be less conspicuous on multi-lane roads than roads with fewer lanes. A third reason may be because pedestrians crossing intersections may be more noticeable on single or double lane roads than wider roads. Thus, motorists might be more cautious in their driving behavior on these narrower roads.

Table 6 Red Light Running by Number of Travel Lanes

	1	2	3	4
Stops at red light	1844 (93.3%)	763 (90.5%)	177 (84.7%)	192 (83.5%)
Runs red light	133 (6.7%)	80 (9.5%)	32 (15.3%)	38 (16.5%)
TOTAL	1977 (100%)	843 (100%)	209 (100%)	230 (100%)

Day of the Week and Stopping at or Running Red Light

Failure to stop at a red light varies considerably by the day of the week. The highest percentage of motorists who run a red light occurs on Mondays – 13.5 percent (see Table 7). A similar investigation carried out on red-light running in the Fall of 2014 also found that red light running was more pronounced on Mondays than other days. This finding may be a reflection of the different emotional state of motorists at the start of the workweek (e.g., feelings of anxiety, impatience, etc).

Table 7 Red Light Running by Day of Week

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Stops at red light	218 (86.5%)	541 (90.8%)	403 (90.0%)	528 (93.8%)	458 (93.9%)	384 (93.0%)	444 (89.0%)
Runs red light	34 (13.5%)	55 (9.2%)	45 (10.0%)	35 (6.2%)	30 (6.1%)	29 (7.0%)	55 (11.0%)
	252 (100%)	596 (100%)	448 (100%)	563 (100%)	488 (100%)	413 (100%)	499 (100%)

Conclusion

The findings which have emerged in this study are troubling. Of the motorists in New York City who first approach a signalized intersection when the light turns red, nearly one in ten run the red light. And this figure is a conservative one. If the analysis were carried out just on vehicles which were approaching an intersection *immediately* when the light turned from yellow to red, the prevalence of red light running would be considerably higher. These findings are evidence that a sizable proportion of City motorists blatantly disregard a fundamental rule of the road – stopping at a red light. In the process they are not only endangering themselves, but other motorists, cyclists, and pedestrians.

At the present time, New York City is in a period of transition, going from an autocentric road system in which motorized vehicles occupy a dominant position in a multi-user road system to one in which diverse groups -- motorists, cyclists, and pedestrians -- all have legitimate title to the road. This period of transition coincides with an effort by cities such as New York to take advantage of their natural strengths (e.g., buildings in walking distance to one another, high gasoline prices affecting suburban commuters, etc.) which make them inviting places for pedestrians and cyclists (Dominus, 2015). In order, though, for cities to take advantage of their assets, urban streets and avenues must be perceived as safe for all road users. This means that traffic laws – and particularly those pertaining to speeding or running red lights – need to be strictly enforced. Perhaps it is time to invoke a “broken streets” policy in which scofflaws who run red lights will not be tolerated.

In addition to stricter enforcement of existing traffic laws, though, motorists need to imbibe the message that certain types of driving behavior, which may have been condoned in an earlier age when the car was king, are no longer socially acceptable. This message may take time to be internalized, but it will pay enormous dividends – from helping cities to restore their former vibrancy to reducing the needless deaths and injuries from motor vehicle crashes.

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Appendix

The 13 intersections below had six or more red light violations. The names printed in bold indicate whether the observations were carried out on the street or the avenue. Also shown are the number and percentage of vehicles that stopped at the red signal and the number and percentage of vehicles that ran the red signal.

Intersection	**Stopped at light**	**Ran light**
Gates Ave. and **Evergreen Ave.** Brooklyn	68 (70.8%)	28 (29.2%)
88th St. & **4th Ave.** Brooklyn	37 (62.7%)	22 (37.3%)
New Lots Ave. & Miller Ave. Brooklyn	58 (77.3%)	17 (22.7%)
50th St. & 7th Ave. Manhattan	40 (70.2%)	17 (29.8%)
29th St. & 38th Ave. Queens	46 (76.7%)	14 (23.3%)
89th Ave. & Parsons Blvd. Queens	144 (91.1%)	14 (8.9%)
77th St. & **7th Ave.** Brooklyn	53 (80.3%)	13 (19.7%)
East 33rd St. & Lexington Ave. Manhattan	69 (84.1%)	13 (15.9%)
Fleet St. & **Flatbush Ave. Extension** Brooklyn	48 (80.0%)	12 (20.0%)
63rd St. & 18th Ave. Brooklyn	69 (86.3%)	11 (13.8%)
East 31st St. & Lexington Ave. Manhattan	70 (87.5%)	10 (12.5%)
Bergen St. & Bond St. Brooklyn	52 (86.7%)	8 (13.3%)
Moffat St. & **Evergreen Ave.** Brooklyn	64 (91.4%)	6 (8.6%)