

---

**WHERE ANGEL FEARS TO TREAD: A  
TEST IN THE NEW YORK CITY  
SUBWAY OF THE ROBBERY/DENSITY  
HYPOTHESIS**

---

by

**Ronald V. Clarke**

and

**Mathieu Belanger**

**Rutgers, The State University of New Jersey**

and

**James A. Eastman**

**New York City Transit Authority**

**Abstract:** *Angel (1968) hypothesized that street robberies were more likely to occur at intermediate levels of pedestrian traffic and less likely to occur at either low or high levels. The present study examines this hypothesis using recent data on platform robberies and passenger densities for 206 stations in the New York City Subway. Contrary to Angel's contention, the incidence of subway robberies was found to be greater at low levels of passenger density. Reasons why these findings might not hold beyond the subway environment are discussed, and the implications for reducing subway robbery are explored.*

A frequently cited, but untested, hypothesis of environmental criminology is Angel's (1968) posited relationship between the rates of street robbery and densities of pedestrian traffic. He argues that robberies are unlikely to occur when traffic is either sparse or dense. To use terminology later developed by Cohen and Felson (1979), in the one case there are too few suitable targets to attract robbers, while in the other there would be too many capable guardians to intervene. Rather, he contends, robberies

---

Address correspondence to: Ronald V. Clarke, School of Criminal Justice, Rutgers University, 15 Washington Street, Newark, NJ 07102.

are most likely to occur at intermediate levels of pedestrian traffic, or at what he calls "the critical intensity zone."

If valid, Angel's (1968) hypothesis has important implications for both personal security and police deployment. It suggests that places and times that are only moderately busy should be avoided by those fearful of being robbed. These same places and times should also be the most heavily patrolled if the police are to maximize their deterrent role. These implications should hold not just for robberies committed in the street, but also for those committed in any open public spaces such as parks, river walks, campuses, parking lots, hospital grounds and, in some circumstances, public transit systems. In all these cases, there is wide variation in the numbers of people present at different times, and robbers might be expected to calculate the chances of encountering a suitable target or of intervention by a capable guardian.

In support of his hypothesis, Angel (1968) noted that street robberies in Oakland in 1966 tended to occur along (or close to) commercial arteries between the hours of 6 p.m. and 2 a.m., which he attributed partly to reduced use of the street at night, as well as to other factors such as poor lighting and the likely intoxication of victims. In a later analysis of robbery data for Oakland for 1966 to 1968, Wilcox (1973) found further support for Angel's (1968) hypothesis in that robberies committed by females tended to occur in areas that fringed the most active shopping district. Robberies committed by males, however, seemed less influenced by street activity.<sup>1</sup>

Neither Angel (1968) nor Wilcox (1973) measured pedestrian traffic, but assumed it would be heaviest in commercial areas and shopping districts. Indeed, no direct test of Angel's hypothesis has been reported using measured pedestrian flows, for three reasons that are not difficult to understand. First, because it is a rare offense, data on robbery would need to be collected for long periods. Second, the major source of such data — police records — frequently lack the necessary precision about the location and timing of crimes. Third, reliable data about pedestrian flows for a sufficient sample of streets for various times of the day and night would be extremely time-consuming and expensive to collect.

We were therefore fortunate in locating some available data robberies and on passenger densities for the New York City subway that proved suitable for examining Angel's (1968) hypothesis. This data set contained not only enough robberies to make a study feasible, but their timing and location were precisely recorded. The robbery data could also be related in our study to comprehensive data on passenger densities. Specifically, our study was designed to relate the numbers of passengers at 206 stations with the number of robberies occurring on the platforms of those

stations. For purposes of comparison, the study also relates passenger densities to a crime that we assume would be facilitated by high densities — "bag opening," a form of surreptitious theft that requires victim and offender to be in close proximity under conditions that fail to arouse the victim's suspicions.

Before describing the study in more detail, some consideration must be given to the distinction between counts and rates of robbery. This distinction was not addressed by Angel (1968) or Wilcox (1973), whose discussions were framed exclusively in terms of the number of robberies, possibly because their urban planning and policing perspectives would have led them to focus on ways to reduce these numbers. Had they approached the topic from a personal safety perspective, they might have focused more upon reducing the risks of victimization under different density conditions.

The distinction between numbers and rates can have important consequences for Angel's (1968) hypothesis, as shown by the following hypothetical case. For a particular location at three different but equal time periods, assume three levels of pedestrian density: 50 people (low density), 250 people (medium density) and 1,000 people (high density). On the basis of Angel's (1968) hypothesis, further assume that at medium density five robberies occur, while only one robbery occurs at each of the low- and high-density periods. This would translate into risks per person of 0.1 % at high density (1 per 1,000), but of 2% for both low (1 per 50) and medium (5 per 250) densities. In other words, the risks of robbery would be lowest at the high-density period, and there would be no difference in risks between low- and medium-density periods.

For our study, we chose to examine the relationship between density and the *rates* of robbery, principally because our preliminary examination of data showed a significant but weak positive correlation (0.26) between our measure of density for the 206 stations and the *number* of platform robberies. This immediately cast doubt on Angel's (1968) hypothesis, but was not an entirely unexpected result since the volume of crime generally increases with population. Indeed, in comparing crime statistics it is usual to express these as a function of the numbers of people at risk. However, the possibility remained that Angel's hypothesis might still hold for rates of robbery at individual stations. Moreover, we were as much interested in the implications of the relationship between density and robbery for victimization theory as for preventive policy. In particular, we were interested in exploring whether low passenger densities explained the subway system's apparently high risks of robbery in the late-night/early-morning hours (Smith, 1986), or whether other factors, such as the demographic make-up of passengers at this time or the intoxication of offenders and

victims, might also be playing a part. For all these reasons we chose to relate passenger densities to rates of robbery.

### **THE NEW YORK CITY SUBWAY**

The New York City subway system is one of the world's largest, with 469 stations, 230 route miles and 5,917 subway cars. The subway is open 24 hours a day and serves about 3.5 million passengers on an average weekday. Trains run two to five minutes apart during rush hours, but frequency declines during the off-peak until the period from midnight to 6:00 a.m., when they run every 15 to 20 minutes. The 25 subway lines are interconnected, and many have express trains with across-platform transfers to local trains.

About two-thirds (277) of the stations are underground, with most of the rest located on structures elevated above the street. Almost all the stations were completed during the first 40 years of this century. In the 1960s and 1970s, the system suffered from neglect and lack of investment, but an extensive capital program was begun in the 1980s. About one-third of the stations have now been upgraded, and the entire fleet of cars has been replaced with new air-conditioned vehicles (Kiepper, 1994). In 1995, the independent transit police force serving the system was merged with the New York Police Department.

### **DATA**

Fifty-seven stations in the system were excluded from the study because adequate data on passenger densities could not be supplied for them by the New York City Transit Authority (NYCTA). To reduce the labor involved in manipulating complex data files, a 50% random sample (N=206) was selected from the remaining 412 stations by including every other station on each of the 25 lines.

Robbery data for these 206 stations were obtained for the 30-month period between August 1992 and January 1995. Robberies were defined as the use or threat of force to steal property. Because precise data about the location of robberies were required by the analysis, all robberies occurring on moving trains and those without a reported location were excluded. (These robberies comprised respectively 37% and 5.4% of the 3,912 robberies reported systemwide in 1994.) In addition, because the differing station configurations make for little consistency in stairways, mezzanines and token booth areas, which might have complicated interpretation of the results, robberies occurring in these areas (29.6% of all

robberies in 1994) were also excluded. The remaining robberies (N= 1,492) included in this study were all those occurring on the platforms of the 206 stations during the 30-month period.<sup>2</sup>

Passenger density data were available from the NYCTA for two consecutive days in 1989, and consisted of hourly counts of the number of people entering and exiting any station. More recent and complete density data would have been desirable, but there were two reasons for believing those available would be adequate for the present purpose: there is only moderate seasonal variation in passenger densities, and the overall number of passengers using the subway was relatively stable throughout the late 1980s and early 1990s. During the ten-year period between 1985 and 1994, ridership was at its lowest in 1991 (with 995 million riders), and at its highest in 1994 (with 1,079 million riders).

Platform robbery rates were computed for individual stations by dividing the total robberies for the period for each station by their daily passenger counts. The resulting totals were expressed as rates of robbery per 1,000 passengers. In order to facilitate analysis, stations were classified into three equal groups: 69 "low-density" stations (serving 435 to 7,013 passenger per day); 69 "medium-density" stations (7,057 to 16,532 passengers); and 68 "high-density" stations (16,815 to 266,800 passengers).

## FINDINGS

Robbery rates for each station were plotted against their daily passenger densities. The resulting log-linear distribution (see Figure 1) suggests that rates of robbery are highest for those stations with the fewest passengers.<sup>3</sup> The mean robbery risk for low-density stations was 1.36 per 1,000 passengers; for medium-density stations, 0.63 per 1,000 passengers; and for high-density stations, 0.26 per 1,000 passengers. The relationship between density and risk of robbery held for both the 127 underground stations in our sample and the 79 elevated stations, though it was marginally stronger for the latter.

A plot of the 46 stations with less than 5,000 passengers per day shows that even for this high-risk group, robbery risks continue to increase with a decrease in passengers (see Figure 2).

These results show that the highest robbery risks are associated with low levels of passenger densities, not with intermediate levels as predicted by Angel (1968). Before drawing any firm conclusions about his hypothesis, however, some alternative explanations for the results need to be explored. The first relates to the low passenger densities of stations

commonly found outside Manhattan. This phenomenon points to the possible spuriousness of the observed relationship between low passenger densities and high robbery rates, reflecting the fact that the lowest density stations are those outside Manhattan, in areas with high rates of robbery.

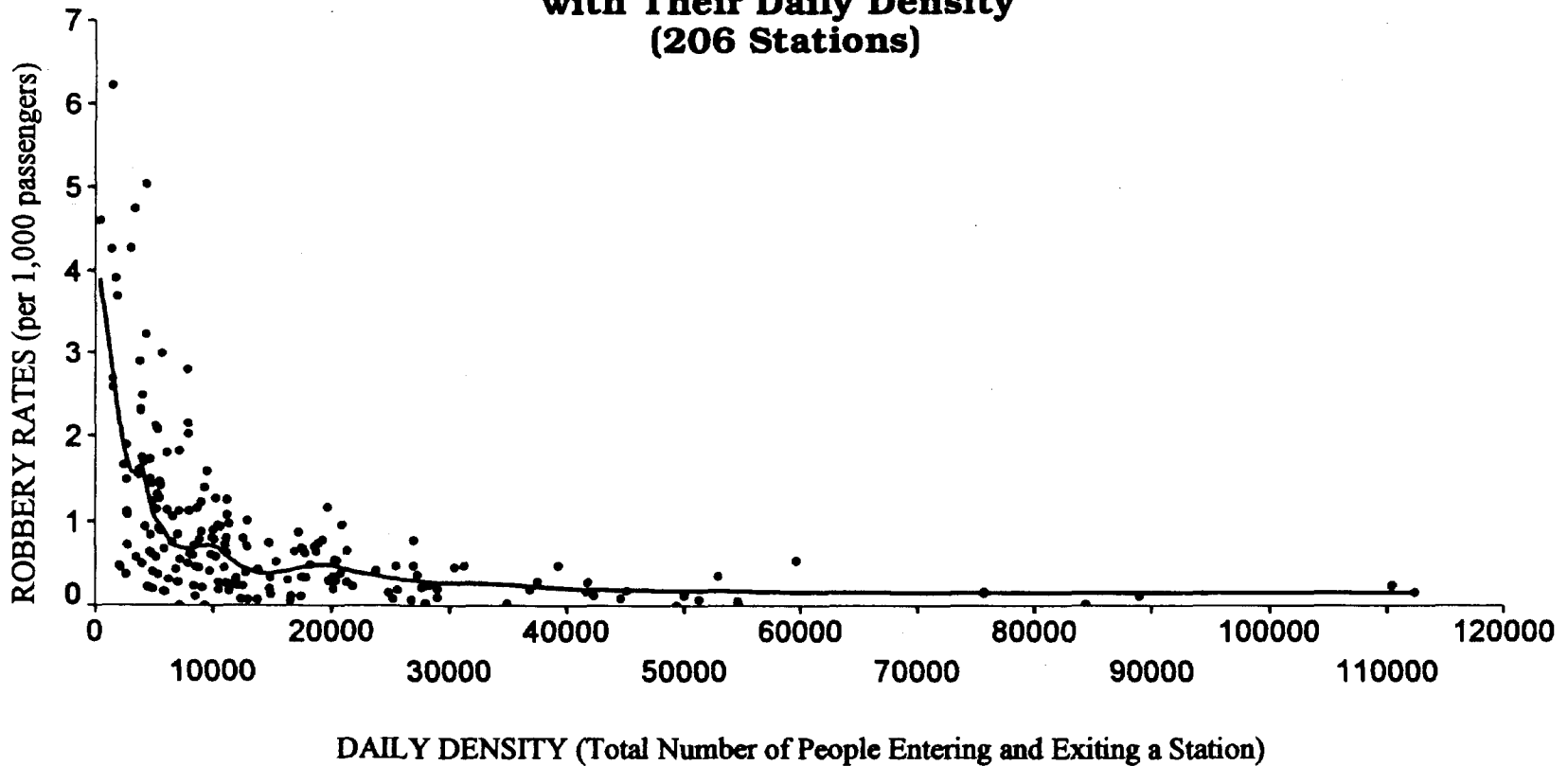
To examine this possibility, we obtained robbery rate data for 1992 (New York Police Department, 1993) for the 60 police precincts served by the subway (the precincts on Staten Island, which has no subway service, were excluded). We found that station robbery rates were not correlated with those of the precinct in which they were located ( $r = -0.07$ ,  $N = 203$ ).<sup>4</sup> Moreover, wide disparities emerged in the robbery rates for stations within particular precincts. This finding is illustrated in Table 1, which shows the robbery rates and passenger densities for the two precincts (within and outside Manhattan) containing the largest number of stations in our sample. Two facts stand out from this table. First, there is substantial variation in robbery rates for stations within each precinct (for example, in the 108th Precinct the rate of robbery for Court Square is nearly 17 times as great as that for 46th St./Bliss). Second, consistent with the findings depicted in Figure 1, there is a reasonably strong inverse relation within each precinct between station robbery rates and density levels.

Precincts are large areas and different results might have been obtained if robbery rates had been available for much smaller areas around each station. Nevertheless, the present results do not support the notion that station robbery rates merely reflect those of the surrounding area in which they are located.

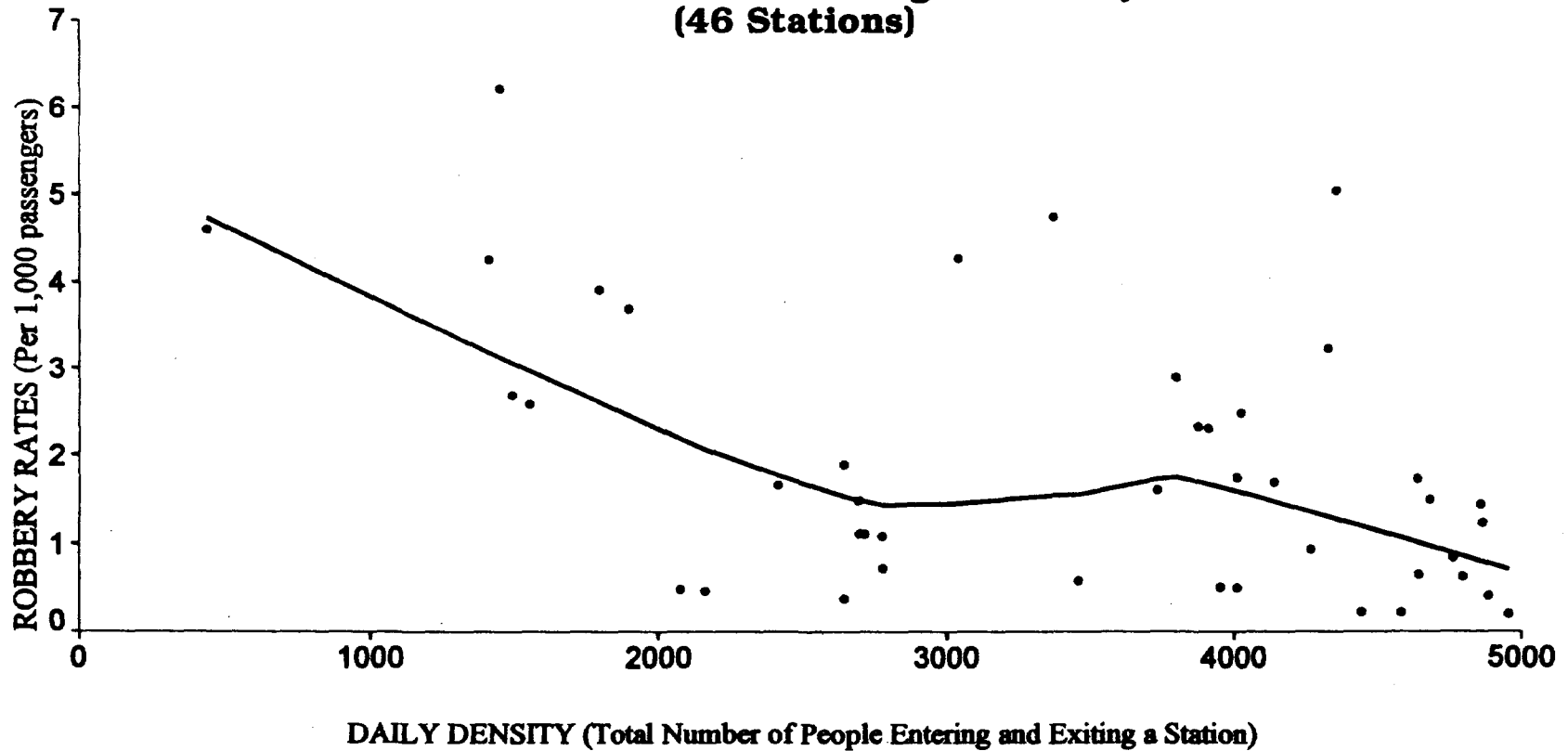
Another argument to be considered before reaching any firm conclusions about Angel's (1968) hypothesis is that the relationship it posits can only be tested by using more specifically situational data about passenger densities than was used in Figure 1. Thus, it could be argued that Angel was concerned not with average densities over a period of 24 hours, but with densities for the point at which a robber might strike.<sup>5</sup>

Data for the numbers of people present at the point of robbery were not available for the present study, but hourly data about passenger numbers (which could be related to the timing of robberies) were available for each station for each hour of the day. While not ideal, this approach comes closer to a situational test of Angel's hypothesis than that using aggregated data for 24 hours. In order to reduce labor, we used random samples of 20 stations from each density group, and computed mean hourly densities and robbery rates. Hourly density data (based upon people entering and exiting stations) were adjusted to reflect the impact of different train frequencies on the numbers of people waiting on platforms at different times of the day. This adjustment was needed because when trains are less frequent people will wait longer on platforms, thus

**Figure 1: Platform Robbery Rates of New York City Subway Stations with Their Daily Density (206 Stations)**



**Figure 2: Platform Robbery Rates of New York City Subway Stations with Fewer than 5,000 Passengers Per day (46 Stations)**





increasing the average density levels. The adjustment was made by dividing hourly passenger counts by the average number of trains passing through each station in both directions at each hour.

**Table 1: Platform Robbery Rates and Daily Number of Passengers for Two New York Police Department Precincts**

<b>The 1st Precinct in Manhattan</b>		
<b>Stations</b>	<b>Robbery Rate</b>	<b>Daily Number of Passengers</b>
Franklin St.	0	49,352
Park Place	0.03	34,993
Cortland St.	0.04	27,966
Broadway/Nassau	0.08	12,918
Whitehall St.	0.08	25,190
South Ferry	0.12	49,992
Cortland St.	0.29	7,013
Wall Street	0.41	9,692
Chambers St.	0.50	18,125
<b>The 108th Precinct in Queens</b>		
<b>Stations</b>	<b>Robbery Rate</b>	<b>Daily Number of Passengers</b>
46th St./Bliss	0.16	24,821
Vernon-Jackson	0.27	11,063
33th St./Rawson	0.31	20,336
61st St./Woodside	0.34	17,782
Queens Plaza	0.39	20,703
Queens Boro	0.64	18,629
65th St.	1.49	4,685
Court St.	2.68	1,490

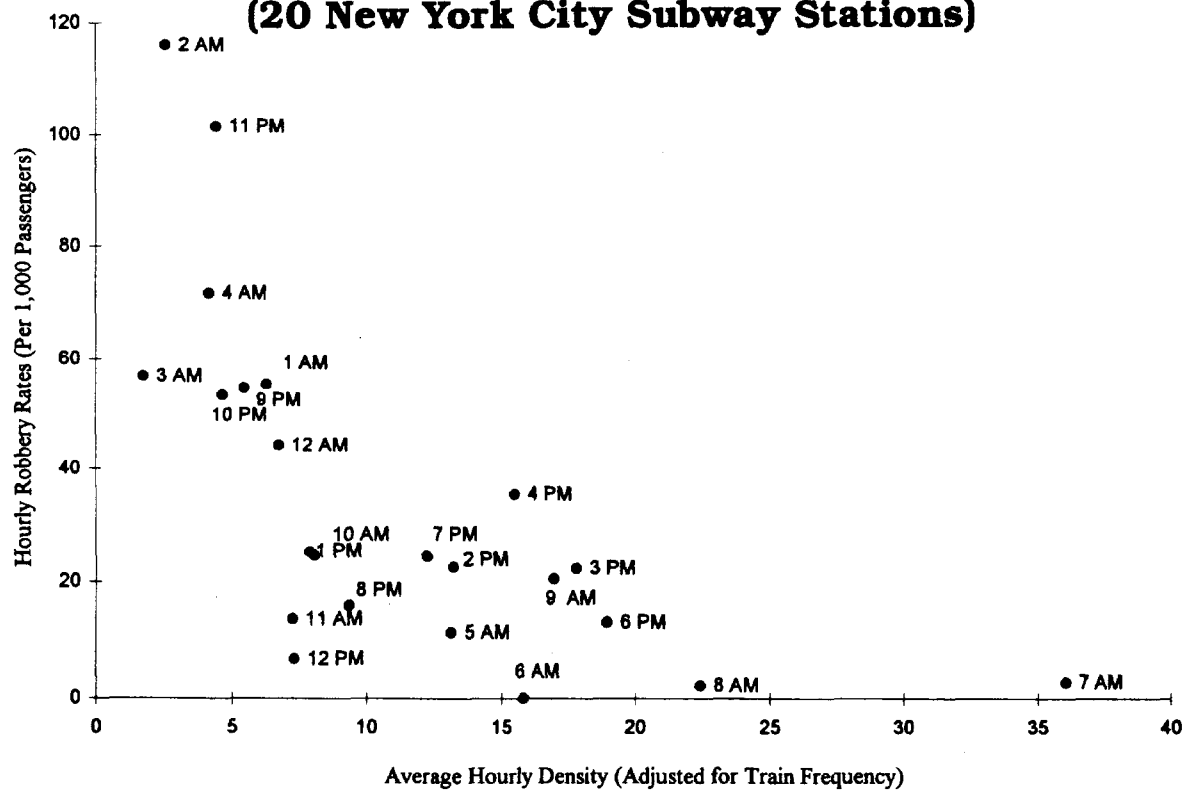
The data for low-density stations are shown in Figure 3. For hours with few passengers, robbery rates are higher, and, indeed, the shape of the distribution is similar to that of Figure 1. The results were essentially the same for the medium- and high-density stations, but, consistent with the findings of Figure 1, the *magnitudes* of the robbery rates were not as great for these groups. For the low-density group, the mean hourly robbery rate was 34.2 per 1000 passengers, whereas the medium- and high-density groups had rates of 12.8 and 9.2 per 1000, respectively.

Because robbery rates are particularly high between 9 p.m. and 5 a.m., a late-night/early-hours effect is also suggested by the data in Figure 3. While few people are present on platforms at this time, there may also be some other reasons making this time especially dangerous. For instance, at these hours a greater proportion of passengers are likely to be young males, who comprise the demographic group most likely to include robbers. There is also a greater likelihood that both offenders and victims using the system late at night may have been drinking, which again increases the probability of robbery.

To examine whether a late-night/early-hours effect existed independent of density, a regression analysis using a log transformation of the adjusted hourly robbery rates was undertaken.<sup>6</sup> The analysis confirmed that a late-night/early-hours effect existed, and that this was even stronger than the density effect (see Table 2). In addition, the term representing the interaction between density and late night/early hours was highly significant, indicating that the risk-producing effect of low passenger densities is enhanced during this period.<sup>7</sup>

It should not be concluded from these results that the "late-night" effect may be as important as passenger densities in explaining differences in robbery rates *between stations*. The regression analysis reported in Table 2 was undertaken to explore the major sources of *hourly* variation in platform robberies, which is a different task from that accomplished in Figure 1 of exploring the sources of annual<sup>8</sup> variation between stations. It is possible, however, that this annual variation stems principally from not to the variation in daily density but the variation in density at the early hours. In other words, high robbery-risk stations are those that are particularly busy in the early hours, but that may be comparatively quiet at other times. This possibility would require that differences in daily density mask much greater differences in "early-hours" density. The data in Table 3 show, however, that the relative differences in density for the three groups of station are generally consistent for the two periods of the day.

**Figure 3: Average Hourly Platform Robbery Rates for Low Density Stations (20 New York City Subway Stations)**



N.B: Hours refer to the specific density and robbery rate of a whole hour interval (Ex.: 4 AM means from 4:01AM to 5:00 AM)

**Table 2: Regression Analysis of Robbery Rates on Density and Late Night With an Interaction Term (N=72)**

Variable	Beta Value	Standard Error
DENSITY (Day)	-6.43*	2.19
LATE NIGHT	66.23*	11.61
DENSITY (Night)	-21.17*	4.16
R-Squared: 0.66		
Adjusted R-Squared: 0.65		

\*  $p < .01$

Note: LATE NIGHT is a dummy variable, coded 0 for hours between 5:01a.m. and 9p.m., and coded 1 for hours between 9:01p.m. to 5a.m.

DENSITY (Night) is the multiplicative interaction term, or the effect of density on robbery rates during the night hours as opposed to daytime hours.

**Table 3. Mean Hourly Density of Passengers for Three Groups of New York City Subway Stations for Two Periods of The Day**

	N	9:01 PM to 5:00 AM	5:01 AM to 9:00 PM
Low Density Stations	20	4.5	14.4
Medium Density Stations	20	9.7	76.3
High Density Stations	20	24.2	103.4

Note: Density is adjusted for train frequency.

One last argument to be considered before reaching any conclusions about Angel's (1968) hypothesis is that, because a larger proportion of "likely" offenders may be present in the subway at off-peak hours, especially in the early morning, the explanation for the high robbery rates at these times is this concentration of likely offenders, rather than the

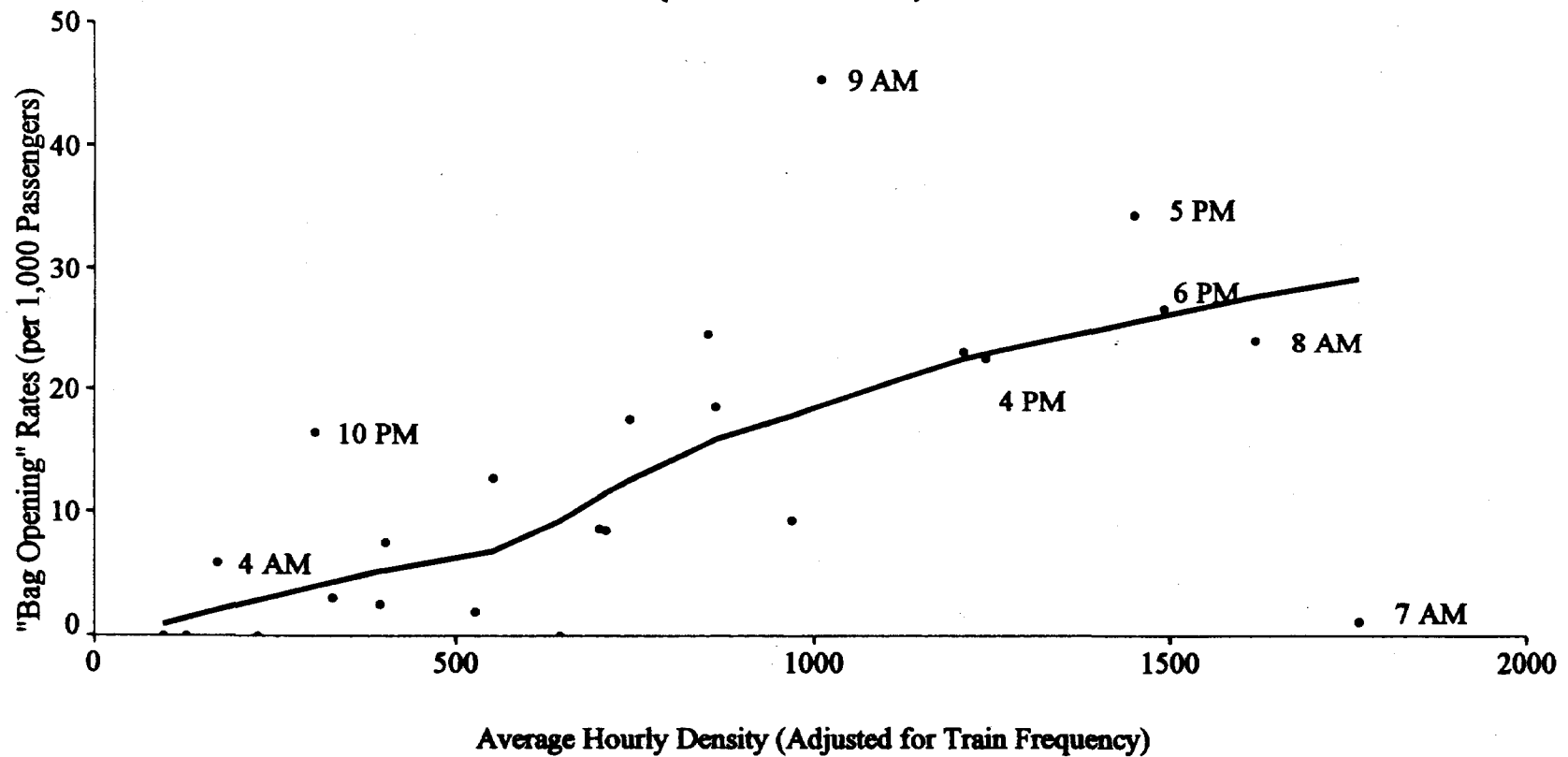
greater opportunities for robbery per se provided by low passenger densities. If this argument has any merit (and it assumes that robbers are not highly specialized offenders), a greater incidence of all forms of crime, not just robbery, should be associated with low densities of passengers. To examine this possibility we related passenger densities to the risk of "bag opening." A crime category created by the New York City Transit Police bag opening is defined as the theft of articles from the person by stealth whereby the victim does not become immediately aware of the theft. It is a form of crime that relies on close contact between offender and victim under conditions where the latter's suspicions are not aroused (for example, the offender might "accidentally" bump into the victim). Such conditions would be provided by crowded stations.

Our analysis utilized only bag openings occurring on the platforms of the 206 stations. Hourly density measures were based, however, on the combined group of 60 stations, 20 from each density group, used for the regression analyses reported above. Hourly densities were adjusted as before to take account of different train frequencies. As expected, Figure 4 shows that bag opening occurs, not at low-density times, but during rush hours when stations are busiest. (Highest rates are between 8 and 10a.m. and between 4 and 7p.m.). Because this pattern is the reverse of that found for robbery, it provides some collateral support for the robbery results.

## SUMMARY AND DISCUSSION

During preliminary work undertaken for this study, contrary to Angel's (1968) hypothesis it was found that the *numbers* of platform robberies in 206 New York City subway stations were positively (though weakly) correlated with the numbers of passengers using those stations. Consequently, this study has examined whether *rates* of platform robbery might show a relationship with passenger densities more closely in line with Angel's (1968) hypothesis, i.e. that robbery rates are highest at intermediate levels of passenger traffic. In fact, it was found that station robbery rates are inversely correlated with passenger densities. This result was resistant to several alternative interpretations of the data. Some collateral support was also provided by the finding that bag opening, which is facilitated by crowds, was *positively* related to passenger densities. Taken together, the present results therefore provide no support for Angel's (1968) hypothesis holding that robbery is most likely to occur at intermediate levels of pedestrian traffic. Rather, subway robbery seems more likely to be committed when few people are present.

**Figure 4: Platform Rates of "Bag Opening" by Hourly Density for the New York City Subway (206 Stations)**



It could be argued that the present study is of limited generalizability because subway platforms differ in some important respects from streets. In particular, since the subway never ceases to operate, robbers might reasonably expect to find some potential victims, even when it is least busy. Indeed, to some extent the relative infrequency of trains in the quiet periods serves to compensate for the lack of riders, and may ensure that there is nearly always someone present on a platform who would be suitable to rob. On the street, on the other hand, people may hurry home faster when there are few people about, which would further reduce the chances of the robber finding a victim.

This argument is premised on a model of robbery that assigns a considerable degree of premeditation to the offender, while in many cases robberies are ill-planned and seem highly opportunistic and planned on the spur of the moment (Feeney, 1986; Indermaur, 1995). Indeed, unless one is willing to believe that subway robbers are unusually likely to suffer inconvenience in completing their crimes, the present finding of an important late-night/early-hours effect suggests, too, that many subway robberies are opportunistic and may result from a combination of inebriated victims and offenders brought together briefly and alone in a somewhat confined space. Such conditions would facilitate the preliminary conversational contact that is a frequent precursor of street robbery (Lejeune, 1977; Luckenbill, 1980) and would also limit escape by the victim. These conditions might even result in there being a larger proportion of opportunistic robberies in the subway than in the street. If so, our results might suggest that, rather than being rejected, Angel's (1968) hypothesis should be given more limited application. In cases where offenders have set out to find a victim, it may still hold as originally formulated (i.e., robbery is facilitated by intermediate levels of pedestrian traffic); it may not hold, however, for more opportunistic robberies, which might be precipitated by very low pedestrian densities.

## **Policy Implications**

It was argued above that the generalizability of these findings about passenger densities might be limited by particular features of subway platforms that constrain evasive action on the part of the victim. Moreover, not all the results could be generalized to other subway systems; for example, a late-night effect could only occur on systems that operate for 24 hours. Whatever their generality, however, these results have implications for the New York City subway. Like those of any situational analysis, they do not in and of themselves prescribe solutions for robbery, but they do help to narrow the range of possible options. Some of these might be

dismissed quite quickly; for example, closing the system or selected stations in the early hours might greatly reduce overall rates of robbery, but would probably be unacceptable to the city government because of the widespread belief that 24-hour operation of the subway is vital to the city's economy. Other options would emerge only as the result of more finely grained analyses of robbery patterns. For example, even some of the low-density stations do not have especially high rates of robbery and an understanding of the reasons might lead to preventive suggestions for other stations.<sup>9</sup> In thinking about prevention, it would also be important to know more about the modus operandi of robbers. For example, do robbers generally select passengers waiting for trains or those exiting from the system? At what point do they strike? How do they flee the scene? Information on these and similar points would undoubtedly contribute to the analysis of preventive options.

The NYCTA has been engaged in a successful program to reduce crime on the subway, with the result that robberies have declined on the system by 58% between 1990 and 1994. This program is multi-faceted, but has relied heavily on a crackdown on fare evasion and other incivilities, which has resulted in netting a large number of serious robbery offenders (Levy, 1994; Kelling and Coles, in press). This general program might continue to bring reductions in robbery, but the present findings suggest that some current strategies within the NYCTA's portfolio might be pursued more determinedly. These include: closing off lightly used station areas at night; concentrating passengers in particular parts of the train or the platform late at night; and providing more surveillance of platforms by staff. For example, shorter trains are run on some routes in the early hours, and passengers are encouraged to ride in the car with the conductor. The operation of these policies ought to be examined to see if there are ways in which they can be extended and improved. Many stations, have "off-hour waiting areas," though few of these are protected by closed-circuit television (CCTV) surveillance. In general, the use of CCTV in the New York subway lags far behind that of other systems (only 68 stations are equipped with CCTV), which is surprising in view of its other efforts to cut crime and improve passenger confidence. There is evidence from the London Underground, for example, that CCTV promotes both these objectives (Mayhew et al., 1979; Webb and Laycock, 1992). Another serious shortcoming of the New York subway is good information about train frequencies. On the London Underground, electronic signs on platforms announce the number of minutes before arrival of the next train. If this information were to be provided outside the station or in the ticket hall it might be even more effective. In particular, it could help to concentrate



passengers at a particular place offering greater surveillance, and would help reduce waiting time on deserted platforms.<sup>10</sup>



**Acknowledgements:** We would like to thank the New York City Transit Authority and the Crime Analysis Section of the NYPD's Transit Bureau for their assistance. Dr. Phyllis McDonald readily granted access to data and facilities, and Officer Kevin Boyce provided much needed help with data management. We are also grateful to Professors Marcus Felson and Elin Waring of the Rutgers School of Criminal Justice for their advice.

### NOTES

1. Wilcox also found that rates of commercial robbery in 11 streets were unrelated to the volume of *automobile* traffic.
2. The correlation between robberies occurring on the platforms (28% of robberies occurring systemwide in 1994 were on platforms) and those occurring elsewhere in the station for the 206 stations in our sample was 0.55 in 1994. Plots of non-platform robberies and a series of regression analyses showed, in fact, that the relationships reported in the body of the article between density and platform robberies also held generally for non-platform robberies.
3. Three stations were excluded because precise information about the precinct in which they were located was not available.
4. The solid line in Figure 1 (and also in subsequent figures) is a trend fitting line to capture the overall pattern of the data.
5. For example: "If we wanted to describe the intensity of use in predictive terms we would relate the number of crimes in the section with the probability that a witness would show up in effective range during the time it takes to perpetrate the offense" (Angel. 1968:16).
6. Since the relationship between passenger densities and robbery rates is not perfectly linear, taking the natural log of passenger density results in a better fit with the data (the correlation is raised from -0.47 to -0.71).
7. Given the purpose of this analysis (to examine whether a late-night/early-hours effect existed independent of density), we were less

troubled by the fact that the robbery rate was computed with density as its denominator than if we had been testing a causal model.

8. In fact, combined data for 30 months (August 1992 through January 1995).

9. An important missing piece in the present study is some clear indication of whether there is a density level below which robberies become highly likely. Our analysis of the robbery rates for stations with daily densities below 5,000 suggested that the risk of robberies increases in a linear fashion, with decreases in density below this point.

10. After this writing, it was announced that the NYCTA would be placing electronic message screens in 54 subway stations by the end of 1997. Initially, these would be placed on platforms and would inform passengers of the general frequency of trains, but "... in years to come, with the potential addition of equipment for tracking the precise location of subway cars, the screens could inform riders on a platform or at a token booth of the precise wait before the next train arrives" (Bruni, 1996:B2).

## REFERENCES

- Angel, S. (1968). *Discouraging Crime Through City Planning*. Working Paper, #75. Berkeley, CA: Center for Planning and Development Research.
- Bruni, Frank. (1996). "Message Screens Planned for 54 Subway Stations." *New York Times*, April 1, B2.
- Cohen, L.E. and M. Felson (1979). "Social Change And Crime Rate Trends: A Routine Activity Approach." *American Sociological Review* 44:588-608.
- Feeney, F. (1986). "Robbers As Decision-Makers." In: D.B. Cornish and R.V. Clarke (eds.), *The Reasoning Criminal*. New York, NY: Springer-Verlag.
- Indermaur, D. (1995). *Violent Property Crime*. Annandale, AUS: Federation Press.
- Kelling, G.L. and C. Coles (in press). *Fixing Broken Windows: Restoring Order in American Cities*. New York, NY: Free Press.
- Kiepper, A.F. (1994). "New York Restores Class to a Classic Metro." *Railway Gazette International* Jan: 1 -3.
- Lejeune, R. (1977). The Management of A Mugging." *Urban Life* 6:123-148.
- Levy, N.J. (1994). *Crime In New York City's Subways. A Study and Analysis of the Issues with Recommendations to Enhance Safety and the Public's Perception of Safety Within the Subway System*. Albany, NY: New York State Senate Transportation Committee.

- Luckenbill, D.F. (1980). "Patterns of Force in Robbery." *Deviant Behavior* 1:361-378.
- Mayhew, P., R.V. Clarke, J.N. Burrows, J.M. Hough and S.W.C. Winchester (1979). *Crime In Public View*. (Home Office Research Study, #49.) London, UK: Her Majesty's Stationery Office.
- New York Police Department (1993). *Statistical Report. Complaints and Arrests, 1992*. New York, NY: Crime Analysis Unit, New York Police Department.
- Smith, M.J. (1986). *Transit Crime Study. Volume II: Final Report*. New York, NY: New York City Criminal Justice Agency.
- Webb, B. and G. Laycock (1992). *Reducing Crime on the London Underground*. (Crime Prevention Unit Paper, #30.) London, UK: Home Office.
- Wilcox, S. (1973). *The Geography of Robbery: The Prevention and Control of Robbery, vol 3*. Davis, CA: Center of Administration of Justice, University of California at Davis.