The Ridership and Condition of New York City Subway Elevators

An observational study conducted by students at Hunter College, CUNY and the TransitCenter

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Introduction

Much attention has been paid in the last year to the travails of New York City's subway riders. Lengthy delays and service disruptions have become everyday occurrences with passengers becoming increasingly angry about the subway system's poor performance.

Yet the difficulties that typical riders experience is far less than the challenges posed to riders who are wheelchair users. Individuals who use wheelchairs cannot even gain access to most subway stations. According to the MTA, only 118 out of the 472 stations in the system (25%) are accessible to disabled riders.[1] Viewed in terms of neighborhoods, the figures are even more disturbing. A recently released report by the comptroller's office found that of the 122 neighborhoods serviced by the subway system, 62 (50%) did not have a single station with an elevator.[2] The report labelled these neighborhoods as "ADA transit deserts," the vast majority of these stations being located in the outlying boroughs of Bronx, Brooklyn, and Queens.

Noteworthy is that wheelchair users are only one segment of the population hindered by the scarcity of elevators. Other groups which are in need of elevators include individuals who have sustained an injury, the elderly, families with young children, and straphangers carrying luggage or heavy packages. Combined, these groups represent a sizable percent of the city's total population. As the number of seniors or those with physical impairments living in the city increases, the percent of the population who are in need of elevators will continue to expand.

Subway stations without elevators impose a tremendous burden -- both economic and psychological – on the elderly or those with disabilities. As the comptroller's report states: "Lack of accessibility effects choice of residence, their access to jobs, and their cost of living. It is responsible for countless compromises, sacrifices, and inconveniences, depreciating the quality-of-life of hundreds of thousands of New Yorkers."[3]

In addition to the scarcity of subway elevators, maintenance is another serious problem. Breakdowns of elevators are common. One statistic records that on an average day 25 elevators break down and that the median length of time to fix an elevator is four hours.[4] Even when the elevators are not broken, there is a widely-

shared perception that they are places to be avoided. This sentiment was summarized by one journalist who wrote: "Indeed, able-bodied New Yorkers may have a different attitude when it comes to subway elevators: avoid them at all costs. They're often slow, dirty, and can feel rickety and unsafe."[5]

While there is abundant data about the number of accessible subway stations and the number of working elevators, there is surprisingly little information which has been gathered on the ridership and condition of subway elevators. The authors of this study are not aware of any systematic inquiries which have focused on the type of users or documented the actual physical conditions of the elevators.

The present study has two major objectives. The first is to construct a detailed profile of individuals who use subway elevators. The second is to describe the physical environment of the elevators.

Methodology

The observations of the ridership and conditions of the MTA subway system were carried out by undergraduate and graduate students enrolled in two courses in the Department of Sociology (Introduction to Research Methods and Intermediate Statistics), and two courses in the Department of Urban Policy and Planning (Quantitative Approaches to Urban Analysis and Urban Data Analysis) at Hunter College.

Students were assigned to conduct their observations at a subway station drawn from a random sample of all subway stations with elevators. All told, 90 stations were selected. From the sample, students (or pairs of students) were assigned to stations based on their home borough and subway lines they lived near. A total of 64 different stations were assigned. (The stations where observations were carried out are listed in the appendix.) Observations were confined to elevators which operated between the street level and the mezzanine (i.e., token booth) level. Some stations had more than one elevator. In those instances, students were told to pick one elevator and observe it for all of their visits to the station.

Students were instructed to conduct their observations on two separate days if enrolled in a sociology course and three separate days if enrolled in an urban policy and planning course. For each day in the field they were instructed to

gather data for one hour in duration. The hours were staggered so as to include both a weekday during peak hours (7:00 – 10:00 am, 4:00 – 7:00 pm) and a weekday during off- peak hours (10:01 am – 3:59 pm) or any hour between 7:00 am and 7:00 pm on a Saturday or Sunday.

Strict methodological guidelines were imposed on compiling the information for the study. When students arrived at their designated sites, they recorded whether the elevator was working or not. They also recorded the working status of the elevator according to the MTA's website. In addition, they noted the unique identification number which is assigned to each elevator in the subway system.

If the elevator was working, students were told to tally the total number of riders and riders with various attributes for every elevator trip within the hour they were conducting their observations. A trip was defined as one in which at least one individual rode the elevator. The tallies were taken at the time individuals boarded the elevator. Students gathered data on the following characteristics of the riders for each trip: (1) the total number of riders, (2) the number who used wheelchairs, (3) the number who used crutches, a cane, or a walker, (4) the number of baby strollers accompanying riders, (5) the number who were blind or visually impaired, (6) the number who were obese, (7) the number estimated to be 65 years of age or older, and (8) the number with large packages, knapsacks, suitcases, etc. Since these characteristics could be overlapping, students were instructed to count the number of individuals with each attribute. So, for example, a rider who was both obese and estimated to be 65 years of age or older would be tallied twice – once for each attribute. The students also recorded the total number of trips which occurred within the hour.

To gather information on the physical condition of the elevator, students boarded the elevator and made a one-way trip at the conclusion of the hour in which they conducted their observations. They obtained information on the following variables: (1) the quality of the lighting in the elevator, (2) the presence of graffiti, (3) the presence of any noticeable odors, and (4) the general level of cleanliness of the elevator. Students also clocked the time it took in seconds from boarding and exiting the elevator.

In addition to gathering information on the composition of the ridership and condition of the elevators, students collected contextual-level data. These data

included: the name of the subway station, the station's 5 digit zip code, the date observations were carried out, the day of the week, the time period (peak-hours or off-peak hours), the presence of an escalator at the station and, if so, whether the escalator was working at the time of each visit.

Lastly, in the "field notes," students noted any anomalies while gathering the data or other circumstances which might shed light on the observations they recorded.

Students were instructed to remain as inconspicuous as possible in carrying out their observations. They were explicitly told not to engage in any verbal interactions with riders or bystanders and to only "casually glance around" the elevator when collecting their data. Also they were told not to board the elevator if there were someone whose presence made them feel uncomfortable.

Data for the study were gathered between September 17 and October 31, 2018. During this time span the students visited a station 206 times. Altogether, they observed 10,528 passengers making 3,852 trips.

Findings

Overall Ridership and Functioning of Elevators

In 99 percent of the visits, the elevators were found to be working at the time the students arrived at their designated sites. However, there were two additional instances in which a station had more than one elevator, one of which was not functioning. In these instances, the students opted to conduct their observations at the elevator which was operating correctly. Including the two cases of malfunctioning elevators would have reduced the incidence of working elevators to 98 percent. This figure still exceeds the rate of working elevators recently compiled by the MTA – 96.5 percent.

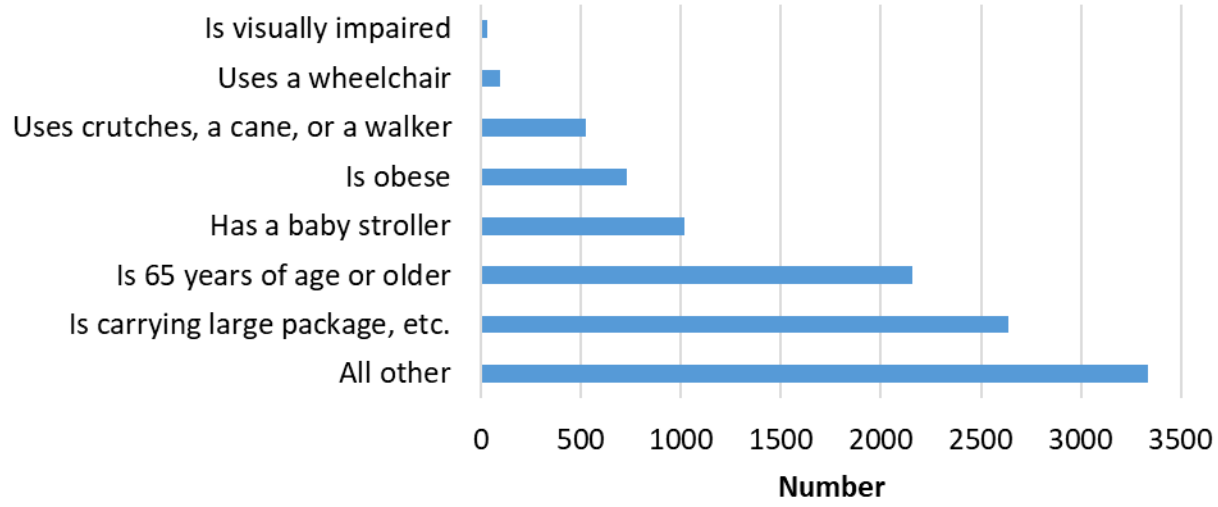
As might be expected, both the number of trips and the number of passengers rise dramatically if there is no escalator between the street-level and the mezzanine at the subway station. The number of trips increases by 160 percent and the number of passengers by 46 percent.

Types of Passengers

There are many different types of passengers who ride the elevators in subway stations. Among those with selected characteristics, individuals carrying a large package, suitcase, or knapsack, etc. were the most numerous (Figure 1). Ranking in second and third place respectively were seniors and those with a baby stroller. In fourth place were individuals who were obese and, in fifth place, riders using crutches, a cane, or a stroller. Wheelchair users ranked next to last and passengers with visual impairments were the least numerous.

In classroom discussions, students mentioned that visually impaired riders might be more disposed to use an elevator if there were auditory mechanisms or special tiles on the floor to orient these riders as to the location of the elevator.

Figure 1. Distribution of Elevator Riders by Selected Characteristics



Note: Elevator riders could have overlapping characteristics.

The effect of having an escalator at the subway station on elevator use varied considerably by type of passenger. In the absence of an escalator, use of elevators rose by a factor of approximately 3.5 for obese individuals and by a factor of 2.5 for individuals using a cane, crutches, or a walker. The number of seniors and those with large packages, suitcases, etc. riding elevators also rose

sharply when the station had no escalator (by multiples of 1.5 and 1.6, respectively).

Condition of Elevators

The condition of the elevators was evaluated on the basis of several criteria: the quality of the lighting, the presence of graffiti, the presence of foul odors, and the general cleanliness of the elevators. With respect to illumination, more than three-quarters of the elevators (76.7%) were seen as being "well lit." The presence of graffiti also was not viewed as problematic. In only 0.5 percent of the elevators was there found "a lot" of graffiti and in only 28.1 percent of the elevators was there observed "some" graffiti. The presence of foul odors, on the other hand, was frequent. In 6.4 percent of the elevators, the odors were termed pungent and in additional 36 percent of the elevators the odors were classified as being noticeable although not as strong. The smell of urine was the most frequently identified odor in the field notes. Overall, a third of the elevators were labelled as "dirty." Anecdotally, students also commented that many of the elevators were poorly ventilated.

Waiting for an Elevator

The median of time for a one-way trip on the elevator at the subway stations was recorded at being roughly 27 seconds. This time interval did not include the time passengers had to wait for the elevator to arrive before boarding. Several students remarked in the field notes that passengers often tired of waiting for the elevator to arrive and left.

Discussion

Several important findings have emerged from this study. First, the number of elevators which were found to be working correctly was exceedingly high – 99 percent. This figure, which exceeds the number generated by the MTA, could be attributable to the particular times and places visited by the students. It is, nevertheless, an encouraging finding.

Second, this study has shown that there are many diverse types of individuals who use the MTA's elevators. Aside from passengers in wheelchairs, these types include people who do not use a wheelchair but have physical disabilities which restrict their mobility, families with young children, the elderly, and individuals who are toting large packages or suitcases. Together, these groups constitute a broad swath of New York City's population. Making more stations accessible would have a significant impact on the lives of hundreds of thousands of New Yorkers.

A third finding documented in this study is that the number of riders in elevators rises appreciably when the subway station lacks an escalator. This increase is most pronounced among those who were viewed as being obese or passengers who used a cane, crutches, or a walker. When city officials initiate plans to install additional elevators, consideration should be given not only to the number of subway stops which now separate accessible stations but also whether these subway stations have escalators.

Lastly, this study has provided evidence buttressing the perception of elevators as places to avoid. More than two-fifths of the elevators were labelled as malodorous and a third were viewed as unclean. Based on the condition of the elevators, it is reasonable to assume that many individuals who have difficulty walking still opt to climb up and down stairs rather than ride an elevator. To make the subway system more accessible, the MTA needs to not only install added elevators but to make the existing ones more hospitable places.

Expanding subway accessibility in New York is an expensive proposition, particularly given the aging infrastructure of the system. Yet other cities with century-old transit systems – most notably Boston and Chicago – have succeeded in making their systems more accessible. As of now, 71 percent of Boston's system and 69 percent of Chicago's rail system are wheelchair accessible and both

are striving to achieve 100 percent accessibility.[6] The improvements in the transit systems of these two cities were implemented because of legal action and the necessary political will to commit the proper amount of funding. As stated in a report released by the TransitCenter, "These plans and improvements were only possible because elected officials and senior agency management took a firm position to make accessibility a priority and hold their agencies accountable."[7]

New York City has the largest subway system in the country. By providing greater accessibility to individuals with impaired mobility, the system will benefit hundreds of thousands of New Yorkers and at the same time bolster its reputation as one which addresses the transit needs of all -- and not just some -- of its citizens.

References

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2. "Service Denied: Accessibility and the New York City Subway System." Office of the Comptroller, New York City. July 17, 2018. https://comptroller.nyc.gov/reports/service-denied-accessibility-and-the-new-york-city-subway-system/

3. Ibid.

4. Sandra Blair-Goldensohn. "New York Has a Great Subway, if You're Not in a Wheelchair." *The New York Times.* March 29, 2017. https://www.nytimes.com/2017/03/29/opinion/new-york-has-a-great-subway-if-youre-not-in-a-wheelchair.html

5. Emily Nonke. "The NYC subway has an accessibility problem – can it be fixed?" *Transportation Week*. September 21, 2017. https://ny.curbed.com/2017/9/21/16315042/nyc-subway-wheelchair-accessible-ada

6. "Access Denied." TransitCenter. http://transitcenter.org/publications/access-denied/

7. Ibid

Appendix

Stations where observations were done by students

Bronx

3rd Avenue–149th Street	White Plains Road Line
161st Street–Yankee Stadium	Concourse Line
161st Street–Yankee Stadium	Jerome Avenue Line
231st Street	Broadway–Seventh Avenue Line
East 180th Street	White Plains Road Line
Fordham Road	Jerome Avenue Line
Hunts Point Avenue	Pelham Line
Kingsbridge Road	Concourse Line
Pelham Bay Park	Pelham Line
Simpson Street	White Plains Road Line

Brooklyn

Atlantic Avenue–Barclays Center	Eastern Parkway Line
Atlantic Avenue–Barclays Center	Fourth Avenue Line
Bay Parkway	West End Line
Church Avenue	Culver Line
Euclid Avenue	Fulton Street Line
Franklin Avenue	Franklin Avenue Line
Franklin Avenue	Fulton Street Line
Jay Street–MetroTech	Culver Line, Fulton Street Line
Kings Highway	Brighton Line
Marcy Avenue	Jamaica Line
Myrtle–Wyckoff Avenues	Canarsie Line
Park Place	Franklin Avenue Line
Prospect Park	Brighton Line, Franklin Avenue Line
Utica Avenue	Fulton Street Line

Manhattan

8th Avenue	Canarsie Line
14th Street	Eighth Avenue Line
14th Street–Union Square	Canarsie Line
23rd Street	Lexington Avenue Line
34th Street–Herald Square	Broadway Line

34th Street–Penn Station	Eighth Avenue Line
34th Street–Penn Station	Broadway–Seventh Avenue Line
42nd Street–Port Authority Bus Terminal	Eighth Avenue Line
47th–50th Streets–Rockefeller Center	Sixth Avenue Line
59th Street–Columbus Circle	Eighth Avenue Line
66th Street–Lincoln Center	Broadway–Seventh Avenue Line
72nd Street	Second Avenue Subway
72nd Street	Broadway–Seventh Avenue Line
86th Street	Second Avenue Subway
96th Street	Second Avenue Subway
96th Street	Broadway–Seventh Avenue Line
125th Street	Eighth Avenue Line
Bleecker Street	Lexington Avenue Line
Brooklyn Bridge–City Hall	Lexington Avenue Line
Canal Street	Lexington Avenue Line
Fulton Street	Lexington Avenue Line
Grand Central–42nd Street	Lexington Avenue Line
Lexington Avenue/53rd Street	Queens Boulevard Line
Lexington Avenue–63rd Street	63rd Street Lines
Times Square–42nd Street	Broadway Line
West Fourth Street–Washington Square	Sixth Avenue Line, Eighth Avenue Line

<u>Queens</u>

21st Street–Queensbridge	63rd Street Line
Aqueduct Racetrack	Rockaway Line
Court Square	Flushing Line
Flushing–Main Street	Flushing Line
Forest Hills–71st Avenue	Queens Boulevard Line
Jackson Heights–Roosevelt Avenue	Queens Boulevard Line
Jamaica Center–Parsons/Archer	Archer Avenue Lines
Jamaica–179th Street	Queens Boulevard Line
Jamaica–Van Wyck	Archer Avenue Line
Junction Boulevard	Flushing Line
Kew Gardens–Union Turnpike	Queens Boulevard Line
Queens Plaza	Queens Boulevard Line

Sutphin Boulevard–Archer Avenue– JFK Airport	Archer Avenue Lines
Woodside-61st Street	Flushing Line