TARGET-HARDENING AT A NEW YORK CITY SUBWAY STATION: DECREASED FARE EVASION — AT WHAT PRICE?

by

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Abstract: This *paper evaluates the effect of the installation of "high-wheel" turnstiles on the incidence of fare evasion at a subway station in New York City. Ridership, summons and arrest data at the treatment station and two adjacent control stations suggest that the new high-wheel turnstiles were somewhat effective in reducing fare evasion, with little evidence of displacement. In light of these results, this article addresses the issue of whether the marginal success of these measures, which some say create a draconian, prison-like environment, justifies their detrimental effects on station aesthetics.*

INTRODUCTION

Fare evasion results in significant losses of revenue to transit systems worldwide. It can take any of three forms, contingent upon the characteristics of the system in which it occurs: (1) blatant types, such as turnstile vaulting; (2) surreptitious avoidance of proper fare payment, which occurs in systems in which riders are "on their honor" to pay the appropriate fare for the distance they are traveling; and (3) use of slugs {counterfeit forms of fare). There are many subtle differences in the way these types of fare evasion occur, depending upon the traits of individual systems.

Of the handful of studies that examine the effectiveness of situation-specific measures in combating fare evasion, all focus on variations of the latter two forms (Clarke, 1993; Clarke et al., 1994; DesChamps et al., 1991; Hauber, 1993; van Andel, 1989). For instance, in a study of 50 pence slug use in the London Underground, Clarke and his associates (1994) found that the incidence of defrauding ticket vending machines—a prob-

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lem that had been impervious to intensified surveillance by revenue officers and police—dropped dramatically once ticket machines were modified ("hardened") to stop the abuse. These researchers, upon finding no evidence of displacement to other forms of slug use, conclude that their data support the tenet of the rational choice perspective that crime displacement will occur only when a similar illicit act (one that entails comparable levels of rewards, efforts and risks) can be committed (Cornish and Clarke, 1986).

Other studies have addressed surreptitious fare evasion endemic to systems that have varying fares based upon distance traveled. For example, Clarke (1991) found that the introduction of an automated ticketing system on the London Underground, which replaced the more fallible visual inspection of tickets at entry and exit points, lowered the incidence of fare evasion by two-thirds.

In a review of fare evasion in the transit systems of over a dozen European cities, Hauber (1993) concludes that the best measure these systems can take is to increase the frequency of ticket inspection, and thereby increase the risk of detection. He found this measure to be more effective than increasing penalties for evasion or reducing fares. Finally, DesChamps and his associates (1991) found that, after initiating a Fare Evasion Audit Program to gauge and analyze varying forms of fare evasion, British Columbia's Transit Police developed a variety of effective situation-specific solutions to fare evasion problems with different etiologies.

In light of these various successes, this study examines the effectiveness of measures taken at one Manhattan subway station by the New York City Transit Authority (NYCTA). The fare evasion problem at this station consisted primarily of turnstile vaulting and other forms of physical avoidance. These brazen forms of fare evasion may be especially harmful in evoking fear of crime among riders. Legitimate passengers may perceive fare evasion as indicative of more deep-seeded disorder, and may fear that the transit system has no control over these lawbreakers (Wilson and Kelling, 1982).

Just as the fare evasion addressed was of a more serious nature, the situational prevention measures the NYCTA implemented to redress the problem were more dramatic: the strategy hinged upon implementing staunch—some say draconian, dehumanizing—target-hardening measures. This tactic is fundamentally different from those discussed in the studies reviewed above. A common finding of the earlier studies is that the incidence of deceptive forms of fare evasion can be reduced by increasing the risk of detection. By contrast, the primary focus of the NYCTA's strategy to control physical forms of payment avoidance — in

addition to making slug use more difficult — was to increase the effort to evade.

THE SETTING AND THE PROBLEM

The New York City subway system is one of the most extensive and heavily used, running more subway cars (5,942), over a longer distance (230 route miles), to more stations (469) than any other system in the world (Winfield, 1993). It serves approximately 2 billion passengers annually. The fare evasion problem is also large: the Authority estimates that between $60 and $80 million is lost annually as the result of fare evasion (Del Castillo and Lindner, 1994).

These direct monetary losses are in addition to indirect fiscal costs of fare evasion, which come in the form of increased police and court processing of fare evaders. There are also other costs. For instance, many worry that due to the "copy-cat" syndrome, fare evasion will become commonplace. It is also commonly believed that widespread fare evasion results in a reduction in the quality of life. The literally free access that the practice of fare evasion affords could lead to increased use by vagrants, and could encourage criminals to favor the subway over the street (Del Castillo and Lindner, 1994). Where this occurs, there is the distinct possibility that riders' perceptions of loss of control and fear will be enhanced (Wilson and Kelling, 1982). Evidence exists that such fears are not unfounded; many criminals who enter the system to commit a serious crime (e.g., robbery) first fail to pay a fare. Moreover, one of every six arrested fare evaders is wanted on an outstanding warrant for another crime (Winfield, 1993).

THE INTERVENTION

The Target-Hardening Measures in Context

The target-hardening measures discussed herein were one small element of a broad program to improve the New York City subway system. In 1982, the NYCTA embarked upon a ten-year renovation project designed to reverse the damage caused by decades of poor maintenance, neglect and vandalism. Reducing the incidence of subway crime was but one facet of the overall goal of improving the whole system, including renovating

worn tracks, remodeling antiquated stations and overhauling the fleet of railcars.[1]

Among the steps taken by the NYCTA to improve station quality and, in turn, rider satisfaction were:

- initiating a program to encourage the homeless who habituated the subway to seek help at public shelters and welfare agencies;
- improving illumination and lighting color at inadequately lighted stations;
- altering stations to make them more accessible to the physically disabled; and
- hiring "station managers" whose role was to: (1) provide a professional presence at individual stations and accept complaints directly from passengers, and (2) monitor the conditions in the stations and coordinate personnel to quickly address maintenance problems. It was hoped that customer concerns about disorder would be stemmed by expediently addressing complaints regarding token selling, maintenance, security and service. As of 1993, 38 managers oversaw 149 (roughly one-third) of the stations (Winfield, 1993).

To reinforce these improvements, beginning in 1990 the NYCTA Police attacked subway system crime with renewed vigor. Police employed "mini-sweeps" to combat fare evasion, in which a group of plainclothes officers apprehended all fare evaders at a particular subway station entrance, sometimes for several hours, issuing summonses and arresting fare evaders. The Transit Authority also employed Property Protection Agents, unarmed uniformed guards who could issue warnings to fare evaders and radio for police assistance. A systemwide policy was also enacted that delineated specific proscribed behaviors, including: creating unsanitary conditions; using alcohol or drugs; begging; playing "boom boxes"; lying down; and smoking. The penalty for violating these clearly delineated "Rules of Conduct" was ejection from the system.

These new resources, personnel and policies collectively had a dramatic effect on the number of ejections and summonses issued. In the first quarter of 1993, transit officers performed 27,079 ejections of rule violators — *439% more* than during the first quarter of 1990. Also during this quarter, transit police issued 83,251 summonses — 40% more than for the same period in 1990 (Winfield, 1993).

Target-Hardening at 110th and Lexington

Fare evasion at certain "problem" stations was addressed by a variety of target-hardening measures. Experience had shown that some types of fare evasion, such as those described below, were remarkably easy to commit:

- At stations with "slam gates" (swinging gates that lack a locking mechanism), the evader had but to walk through an open, unmanned gate to enter the paid-fare area illegally.
- Some evaders were adept at "backcocking," the practice of turning back the arms on a turnstile and squeezing through.
- Vaulting (turnstile hopping) over waist-high turnstiles or low fence railings could be undertaken at many stations, with little risk of reprisal from staff or other passengers.
- Slug use was easy to accomplish at the many stations with antiquated mechanical turnstiles.

The changes made in May 1991 at 110th Street and Lexington Avenue (a "problem" station located in the Harlem District of upper Manhattan) represent an extreme version of target-hardening to combat the above forms of fare evasion. At this station, as at many others, floor-to-ceiling railings were installed, replacing the three- to four-foot easily jumped ones. Further, modern electronic token devices, which replaced more slug-susceptible older models, were installed. However, only at the 110th Street Station were clerk-controlled high wheel (floor-to- ceiling) turnstiles installed, which made most forms of fare evasion impossible. Initially, the procedure for entry onto the platform was for each passenger to pay the clerk manually even if he possessed a token (automated token turnstiles were not in operation), after which the clerk would deactivate a turnstile lock, permitting the rider to enter. Subsequently, the turnstiles at 110th Street were modified to allow customers to deposit tokens in a box near the entrance.

METHODOLOGY

Study Design

The effects of the floor-to-ceiling gates were gauged by examining pre- and post-intervention data on fare evasion at the 110th Street station. For purposes of comparison, data for two stations adjacent to 110th Street —

the 103rd and 116th Street stations on the Lexington line — were used. These control stations are similar to 110th Street in that they are: (1) of similar size and handle a similar number of riders, and (2) both equipped with floor-to-ceiling railings (but not gates), and (3) located in the Harlem district of New York City.

Data

The Transit Authority supplied monthly totals of the number of fare evasion arrests made, fare evasion summonses issued and ridership (measured by turnstile registrations) for a 60-month period, from May 1989 through April 1994. As the intervention occurred in May 1991, there are 24 pre- and 36 post-intervention observations. These police data were supplemented with results of a 1992 survey administered by the Policy Research Division of the NYCTA that measured 110th Street riders' reactions to the (then newly installed) high-wheel turnstiles.

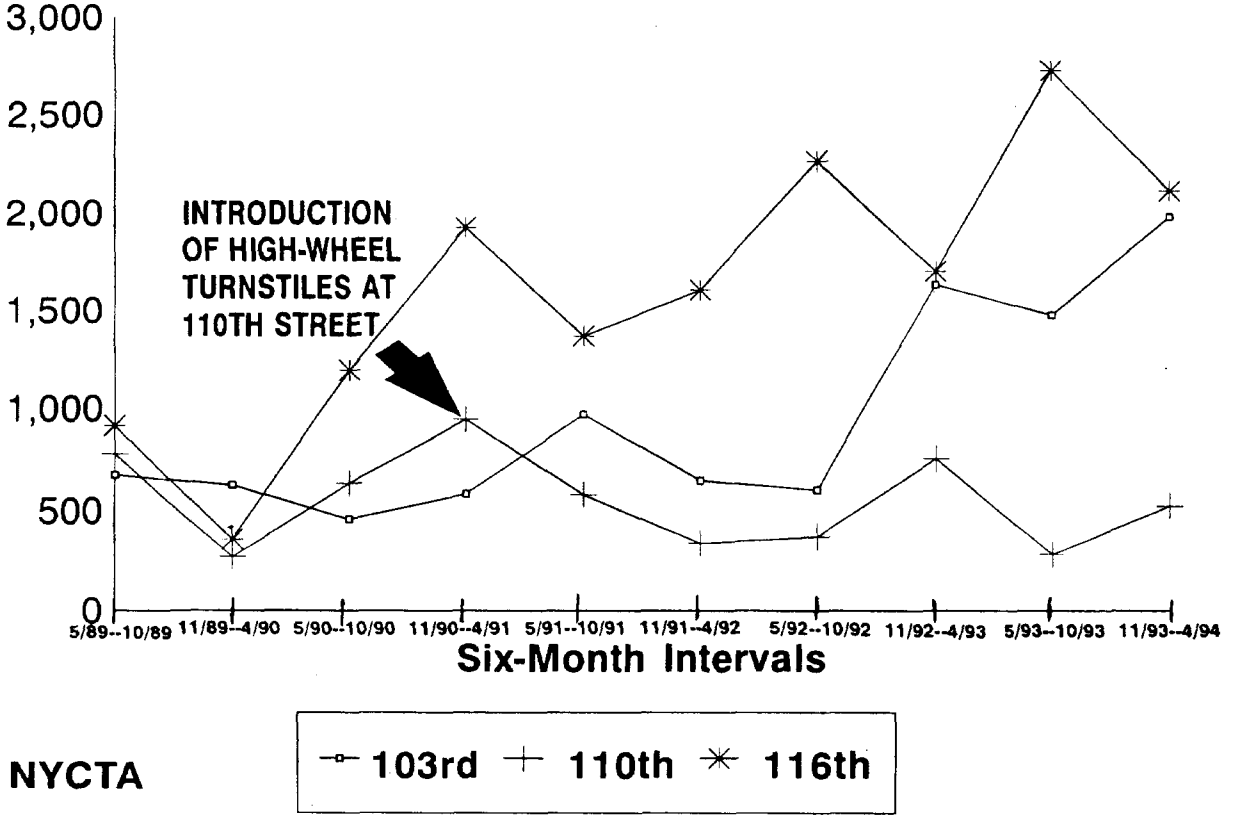
RESULTS

Fare Evasion Arrests and Summonses

Fare evasion arrests and summonses figures were compared for the pre- and post- intervention periods across the three stations in order to see whether altering the physical environment at 110th Street alleviated the need for official police action there. Figure 1 shows that following the installation of the turnstiles, arrests and summonses for fare evasion declined at 110th Street and remained static at about 500 per six-month period. By contrast, totals of arrests and summonses for 116th Street and especially 103rd Street rose dramatically over the same time span. For 103rd Street, the figures almost tripled over the observation period, increasing from 674 for the first six-month span to 1,970 for the last. Also for the last six-month span, 116th Street logged 2,101 arrests and summonses, four times more than 110th Street's 525. In sum, it is certainly plausible to conclude that the staunch target-hardening measure at 110th Street did indeed reduce the need for police action there.[2]

Figure 1: Fare Evasion Summonses and Arrests

May 1989-April 1994, 110th Street Station and Two Controls



Source: NYCTA

A major caveat to the above findings is that records of arrests and summonses are not direct measures of the intervention's effectiveness. That is, arrest and summons data may reflect fluctuations in official response to fare evasion rather than change in actual incidence of evasion. Indeed, the reason that data were aggregated into six-month spans was in order to "smooth" the "choppy" month-to-month figures. Such stark variations are much more likely to be a result of variations in police enforcement practices (e.g., "minisweeps") than of dramatic differences in actual incidence of evasion. This is a point that will arise again in the discussions about displacement and ridership.

Displacement

One must question whether the decline in fare evasion arrests and summonses at 110th Street aggravated the fare evasion problem at 103rd and 116th Streets. Were fare evaders simply displaced to the two stations adjacent to 110th? To investigate this possibility, the increases at 103rd and 116th Streets were compared to systemwide trends in fare evasion summonses and arrests. Several non-parametric statistical analyses all failed to show any statistically significant differences between 11 Oth Street and the controls, or between the controls and the systemwide incidence of fare evasion and arrest (Kanji, 1993). Yet, in light of the findings illustrated in Figure 1, one may conclude that the lack of statistically significant findings is more a product of a low sample size than of the absence of a substantive difference between 110th Street and the controls. It certainly appears as if the intervention had an effect.

Nonetheless, the likelihood that there was displacement is low. A tenet of rational choice is that crime displacement will occur only when a different crime yields a comparable reward and involves a similar amount of effort and risk (Cornish and Clarke, 1986). It would seem that the level of purposiveness behind the act of fare evasion at 110th Street was probably weak. That is, the environmental changes (in the form of new turnstiles) at 110th Street rendered a previously convenient act inconvenient to commit. It is likely that would-be evaders, deterred by the new turnstiles, desisted from evading altogether rather than continuing to evade at either of the adjacent stations, which would have necessitated them walking many blocks to locate a suitable target.

But if displacement was not occurring, why was there such great post-intervention divergence between 110th Street and the two controls? It could be because the increase in fare evasion arrests and summonses

was spurred by changes in police enforcement policies rather than by an increase in fare evasion at the two control stations.

Table 1. Fare Evasion Arrests and Summonses Across Observation Periods

Period	103rd, 110th and 116th	System Total	Percent of Total
5/89-10/89	2,366	110,859	2.13
11/89-4/90	1,255	90,036	1.39
5/90-10/90	2,284	112,104	2.04
11/90-4/91	3,253	138,970	2.34
5/91-10/91*	2,409	129,893	1.85
11/91-4/92	2,588	148,831	1.74
5/92-10/92	3,228	155,326	2.01
11/92-4/93	4,075	136.201	2.99
5/93-10/93	4,471	133,336	3.35
11/93-4/94	4,596	133,392	3.45

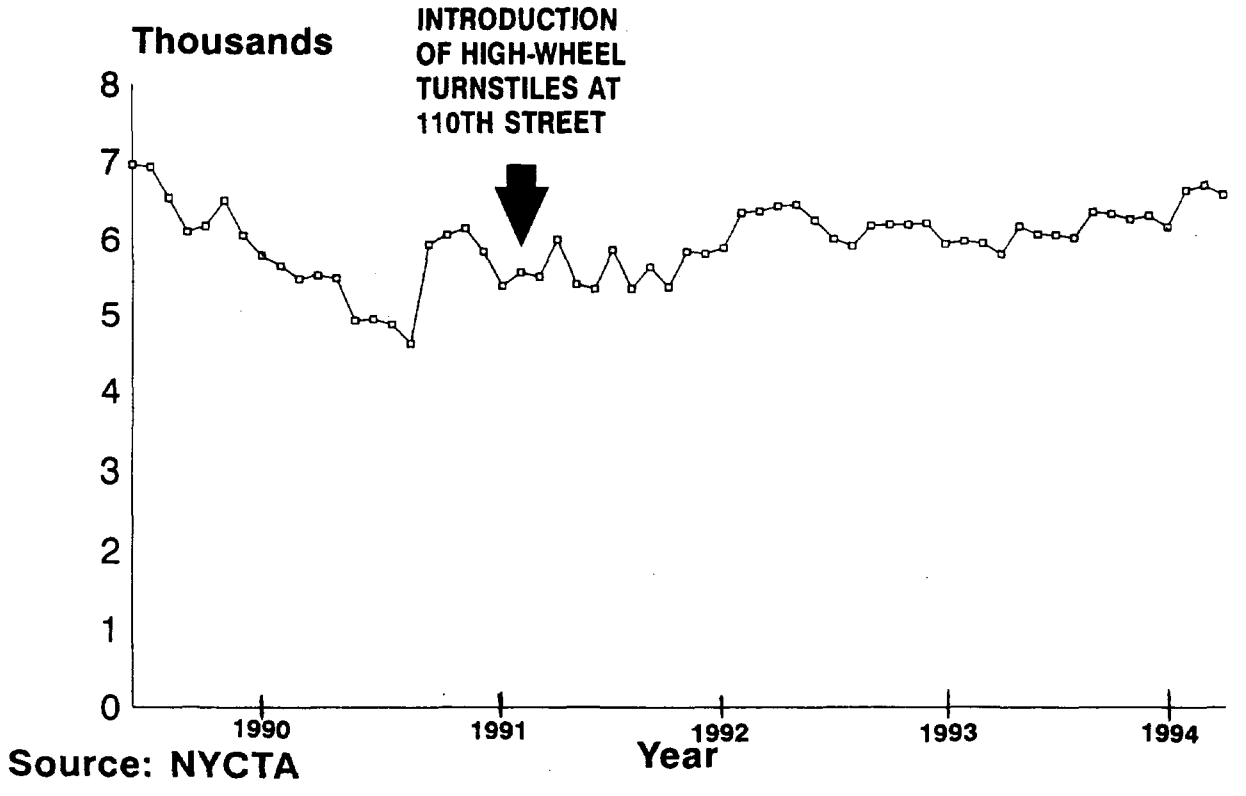
* First post-intervention observation period.

Source: NYCTA

Table 1 illustrates that across the 60-month observation period (both pre- and post- intervention), the three stations combined had disproportionately high fare evasion arrest and summons numbers relative to systemwide totals. Although these stations represent only 0.64% (3 of 469) of all stations, their arrests and summonses figures, across observation periods, comprise from two times (1.39%) to almost six times (3.45%) that amount.[3] And the heavy enforcement of these three stations did not cease when situational changes were made at 110th Street (beginning in May 1991). Instead, it seems that the effectiveness of the turnstiles at 110th Street allowed police to concentrate their enforcement efforts on the two remaining "problem" stations. Increased patrols there led to increased detection, and, in turn, higher numbers of arrests and summonses.

Figure 2: Average Turnstile Registrations Per Day

May 1989-April 1994, 110th Street Station



Ridership Data

Official data indicate that the target-hardening measure at 110th Street had little effect on the level of ridership at the station (Figure 2). The number of turnstile registrations across the 60-month observation period remained virtually static at the control stations as well. This may be surprising, given that target-hardening measures may be expected to transform evaders into paying passengers, or make legitimate passengers feel safer and more prone to use the subway, thus increasing ridership. However, those who were sanctioned for fare evasion comprised only a very small proportion of all passengers (Table 2).

Table 2: Arrest and Summonses Per Million Riders, Across Observation Periods

Period	Summonses	Arrests
5/89-10/89	532	52.1
11/89-4/90	354	6.7
5/90-10/90	649	26.6
11/90-4/91	840	27.4
5/91-10/91*	784	71.6
11/91-4/92	659	37.7
5/92-10/92	764	65.7
11/92-4/93	1,012	46.9
5/93-10/93	1,035	46.9
11/93-4/94	1,052	67.9
* First post-intervention observation period Source: NYCTA		

For example, as Table 2 illustrates, even at peak enforcement levels, there was only one fare evasion summons issued for every 1,000 riders, and one arrest for every 14,700 riders. Thus, even if all of these fare evaders began to buy tokens, there would be little discernable effect on ridership statistics.

Rider Opinion Surveys

A 1992 survey of 380 riders who used the 110th Street/Lexington Avenue station, which was conducted by the Policy Research Division of the NYCTA, found that, initially, the modifications met with a substantial amount of criticism. While 51% of riders approved of the new turnstiles and method of entry into the station, 44% disapproved. Of those who approved, 71% cited improved personal safety as the reason, based on the belief that the turnstiles helped keep the "bad elements" out of the system. Much of the disapproval was a product of the great inconvenience (in terms of long queues and missed trains) caused by the manually operated turnstiles that were initially installed. The cumbersome entry procedure required that all customers, whether they possessed a token or not, had to pay the attendant, who would then deactivate a turnstile lock to admit them. Sixty-six percent of those who disapproved cited inconvenience as the reason; 11% cited a feeling of being imprisoned (NYCTA, 1992).

One may ask what the results of the survey would have been if it had been conducted after the method of entry was made more convenient and delays were curtailed? An educated answer to this question can be made by comparing rider survey results from a similarly hardened station, Wilson Avenue in Brooklyn.[4] Wilson Avenue's turnstiles never required that tokens be handed directly to a clerk in order to gain admittance; instead, the customer could always insert a token directly. Moreover, Wilson Avenue's shiny stainless steel high-wheels are smaller, more aesthetically pleasing and "modern looking" than to 110th Street's bulky matte black gates. Results of 403 interviews indicate that a greater proportion — 61% — of Wilson Avenue riders approved of the new gates; 33% disapproved. Over two-thirds of respondents wanted to keep the new turnstiles at the station, mainly to stop fare beaters and ensure safety (NYCTA, 1994).

DISCUSSION

Compared with nearby control stations, arrests and summonses for fare evasion at 110th Street did decline, suggesting a diminished need for law enforcement action at the station. Moreover, opinions gleaned from surveys conducted at the 110th Street Station in 1992 suggest that the target-hardening measures enhanced feelings of security among most riders. These results, especially positive rider feedback, have led to calls for adoption of the high-wheel turnstiles at every station in the system. It is argued that this step — accompanied by the universal installation of

automatic fare collection systems — would eventually remove the need for token clerks, saving the system money in addition to making it safer.

Yet high-wheel turnstiles, and target-hardening in general, are not favored by all. As an example of a crime control measure's costs outweighing its benefits, an opponent of such measures cited the emergence in the late 1970s of razor wire in urban settings, a method that had previously been used only at military bases and prisons. In his view, regardless of its effectiveness as a target-hardening tool, the detrimental effects razor wire had on urban landscapes rendered its use unacceptable. As he put it, today in America: "[c]oncern for security has led to a new brutalism. Fortification creates a conflict between the desire to make people feel welcome and the grim need for defense" (Vergara, 1994:121).

Even when the "bottom line" does indicate that changes to the environment, such as high-wheel turnstiles, are effective, important questions must be addressed: First, what are the negative consequences of such measures? One is the concern of how riders would exit a "fortified" station in an emergency, such as a fire or bomb scare. This fear was realized in a residential setting in Detroit in 1993, when seven children died when they were unable to escape from a burning apartment because its windows were barred (Vergara, 1994).

Also, the high-wheel turnstiles at 110th Street cannot prevent one fear-evoking, unnerving form of fare evasion: double entry, when the fare evader forces his way onto the platform by pushing against a legitimate rider as he enters the turnstile. The smaller, sleeker high-wheels that are installed at Wilson Avenue are designed to make this practice more difficult. Nonetheless, both of these considerations merit continued attention until the issue is unequivocally resolved.

Another question that must be addressed is, are there alternative means to accomplish the same goals? Whether the same benefits could have been obtained in other ways at 110th Street remains unclear. Perhaps making stations cleaner and brighter, and having station managers maintain them, would have improved the rider's sense of security just as much, or more than, the knowledge that fare evaders had been excluded by the new turnstiles. There may be ways to alleviate the problem of fare evasion, and make legitimate riders feel safe, without making everyone — illegitimate and legitimate riders alike — feel "caged in." Undoubtedly, the inconclusive results of this study go against the common sense assumption of Transit Authority officials, including an opponent of the measure, that hardening steps like floor-to-ceiling turnstiles are certain to be effective.

CONCLUSION

The indicators examined suggest that the high-wheel turnstiles at the 110th Street/Lexington Avenue Station were somewhat effective in reducing fare evasion, but the measure was not an unqualified success in terms of stemming lost revenue (at best, ridership was minimally affected) or enhancing riders' perception of safety (44% of riders surveyed disapproved of the turnstiles). In light of these results, might less intrusive efforts to control fare evasion and bolster riders' sense of security have been equally effective?

To answer this question, further study is required. Subway stations in the New York City Transit System are not physically identical, nor do they serve the same populations. It is therefore inevitable that they will face varying types of fare evasion, in different degrees of severity, caused by divergent factors. The dramatically different ways in which fare evasion occurs — and accordingly, in the ways it is successfully combatted — demonstrate the need to look not just at specific kinds of crime, but also at the varying methods employed to commit them (Clarke, 1992). Such careful examinations may indicate that at many stations, less obtrusive efforts, such as the Station Manager Program, may indeed be sufficient to keep fare evasion in control.

Results of subsequent evaluations may serve to satisfy both sides in the target-hardening debate. Security-minded proponents may be happy to learn that fare evasion can be held in check through a variety of (perhaps less intrusive and expensive) means, depending on station idiosyncrasies. Similarly, opponents of target-hardening would undoubtedly feel vindicated by the finding that the "grim need for defense" (Vergara, 1994:121) is sometimes overstated — that stations with less-severe evasion problems may benefit from less restrictive forms of intervention.

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NOTES

1. A component of this effort was the removal of spray-painted graffiti from the entire fleet of subway cars. For a full account of this remarkably successful crime prevention program, see Sloan-Howitt and Kelling (1990).

2. That there was need for any police action against fare evaders at 110th Street was probably due to forms of fare evasion that the floor-to-ceiling turnstiles do not prevent (e.g., slug use).

3. Similar overrepresentation was found when comparing ridership at the three stations to overall ridership.

4. The modifications to the Wilson Avenue station were made in early 1994. Thus, as of this writing, there are insufficient data to contrast pre- and post-intervention trends.

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