UC Berkeley
Earlier Faculty Research

Title

Addressing Women's Fear of Victimization in Transportation Settings A Survey of U.S. Transit Agencies

Permalink

https://escholarship.org/uc/item/23t2q2gc

Authors

Loukaitou-Sideris, Anastasia
Fink, Camille

Publication Date

2008-10-01

Addressing Women's Fear of Victimization in Transportation Settings

A Survey of U.S. Transit Agencies

Anastasia Loukaitou-Sideris
Camille Fink
University of California, Los Angeles

Past research has shown that transit passengers' fears and concerns about safety influence their travel decisions. While the relationship between women's fear of crime and public space has been the focus of considerable research, transit environments—which are especially threatening to female passengers—have received much less attention. This study examines the issue of women's safety on transit through a survey of U.S. transit operators. The findings show that most respondents believe women have distinct safety and security needs, but most do not think agencies should put specific programs into place to address these needs. In addition, only a handful of agencies currently have programs that target the safety and security needs of women. This survey suggests that there is a significant mismatch between the safety and security needs and desires of female passengers and the types and locations of strategies that transit agencies use.

Keywords: women; fear; transportation; transit agencies

Fear and anxiety about personal security are important detractors from using public transit (Needle and Cobb 1997). People avoid specific transit routes or bus stops, use them only during daytime, or do not use transit at all if they believe that they may be harassed or victimized when on the bus or train or at the station or stop. Empirical research in different cities of the Western world has confirmed that fear about crime affects transit ridership. Indeed, a survey by the U.K. Department of Transport, conducted in 2002, showed that "an extra 10.5% of journeys would be

1

generated if the public felt more secure when traveling, particularly when waiting at stations" (Carter 2005, 100). Similarly, Wekerle and Whitzman (1995) found that the negative perception of passengers about transit security influenced riders' decisions to use transit in New York City, Toronto, and London, while Loukaitou-Sideris (1997) found that the majority of car owners who responded to a Los Angeles survey would use public buses if they perceived them as clean and safe.

Surveys of the perceptions of transit passengers have revealed a number of issues related to passengers' anxiety about personal security. For one, fear of transit is more pronounced in certain social groups than others. Indeed, gender emerges as the most significant factor related to anxiety and fear about victimization in transit environments (Department of Transport 2002). Researchers have also identified more pronounced levels of fear of public settings among the elderly (Brownson et al. 2001), certain ethnic groups (Clancy et al. 2001), and low-income people (Craig et al. 2002), who typically tend to live in high-crime neighborhoods. Important differentiations because of age, race, class, cultural and educational background, sexual orientation, prior victimization experiences, and disability status seem to exist among members of specific social groups in their fear of public settings and transit environments (Loukaitou-Sideris 2006). But researchers also warn us not to fall into the trap of considering social groups as uniform or stereotypical, urging for a more nuanced analysis of the causes of fear of victimization and crime (Gilchrist et al. 1998).

Empirical studies have also shown that the presence of certain environmental factors in a public setting is, in general, associated with greater fear. These include darkness, desolation, lack of opportunities for informal surveillance by the general public or the residents of surrounding establishments, lack of maintenance, and poor environmental quality (Atkins 1989; Valentine 1990). Therefore, the physical characteristics of the immediate neighborhood where a bus stop or station is located can affect people's perception of risk and fear. Criminologists have long talked about the relationship between physical incivilities (such as run-down or vacant buildings, litter, or graffiti) and fear (Wilson and Kelling 1982). The specific design characteristics of a transportation setting can also induce fear among passengers. People are mostly fearful in places where they do not have a clear line of sight of their surroundings; where there are many nooks, corners, or other objects behind which someone can hide; and where they may feel trapped with no possibilities of escape. Underpasses, tunnels, and dark underground stations are typically more feared than open, ground-level transit facilities (Day in Zelinka and Brennan 2001, 7).

Desolation and general lack of people and activity in a transportation setting contribute to anxiety and the fear that no one will be there to help if a crime occurs. The absence of visible staff and other passengers on station platforms and train wagons contributes to concerns about safety. Women, in particular, have been found quite fearful of empty train wagons (Department of Transport 1997).

While passengers typically like to be surrounded by others, the presence of drunks, beggars, panhandlers, the homeless, and rowdy crowds (often referred to as "social incivilities") in the vicinity of a transit stop or station or on the vehicle can also have a chilling effect on transit riders. Surveying a national sample of 1,101 randomly selected adults, LaGrange, Ferraro, and Supancic (1992) noted a significant relationship between neighborhood incivilities and perceptions of risk. Rohe and Burby (1988) found that social incivilities were more predictive of fear than physical incivilities, while LaGrange, Ferraro, and Supancic did not find one type of incivility more predictive of fear than the other.

Almost every survey of transit passengers has found that they feel more unsafe walking to their stops or waiting for the bus or the train after dark than during daytime (Department of Transport 2002). Indeed, very few respondents of a 1997 survey administered by the Department of Transport in the United Kingdom felt unsafe waiting at the bus stop alone during the day, but this number increased significantly for nighttime waiting, when 44% of women and 19% of men felt unsafe (Department of Transport 1997). Additionally, passengers are typically more fearful during their journeys to and from the stop or station and during their wait for the bus or train than when they are on the transit vehicle (Department of Transport 1997; Loukaitou-Sideris 1999). This fear seems to be justified by empirical research. Indeed, in a survey of 10 transit agencies, Shen et al. (1997) found that most crime incidents took place either at the transit station or stop (36%) or in the near vicinity (42%), while only 22% of the incidents happened on the transit vehicle.

The prospect of long waits for the bus is enough to deter transit use, not solely because of inconvenience but also because of the perceived risk that an extended wait can entail. Presumably, the presence of a bus driver or train operator and the structured setting of the transit vehicle are more reassuring to passengers than the unpredictability of the more public and open environment of the bus stop or station platform.

Women's Fear of Transit Environments

Almost every fear-of-crime survey reports that women are much more fearful of crime than are men (Gordon and Riger 1989). A number of explanations

have been given for this phenomenon; they include the perceived vulnerability of women because of a lesser physical ability to defend themselves (Junger 1987), the influence upon women of parental and societal admonitions and warnings (Loukaitou-Sideris 2005), or women's greater propensity to transfer past experiences and memories of victimization to present situations (Warr 1984). While the fear of rape and serious violence from men may lie in the back of many women's minds, feminists also argue that the fear is caused by an existing "continuity" of violence against women, which includes intimidation, groping, sexual comments and harassment, threats, and other nuisance crimes with sexual undertones, which some women may encounter in public settings, including buses and trains (Stanko 1990; Morrell 1996). In explaining the gendered nature of fear of crime, feminists highlight these often "invisible" and underreported crimes against women.

Regardless of being rooted in real or only perceived danger, fear has some significant consequences for women and leads them to use precautionary measures and strategies that affect their travel patterns. These range from the adoption of certain behavioral mechanisms when in public to choosing specific routes, modes, and transit environments over others to completely avoiding particular transit environments, bus stops and railway platforms, or activities (e.g., walking and bicycling) that are deemed as more unsafe for women. Empirical studies have shown that women often drive or take taxis rather than walk or use public transit because of fear for their safety (Wekerle and Whitzman 1995; Stanko 1990). Women more than men also tend to confine their use of public transit to certain hours of the day or use it only if they are accompanied by a boyfriend, spouse, or friend (Atkins 1989; Ross 2000).

Women's fear of public and transit environments often has social connotations; it also appears to be firmly situated in particular built environments. Empirical studies such as the analysis of crime data from Chicago showed that women tend to be more sensitive than men to signs of danger and social disorder, graffiti, and unkempt and abandoned buildings (Wekerle and Whitzman 1995). Women have different responses than men to similar environments and may perceive as risky some places that men do not (Smith and Torstennson 1997). Valentine (1990) emphasizes two general categories of spaces as particularly frightening to women: (1) enclosed spaces with limited exit opportunities, such as multistory parking structures, underground passages, and subway stations, and (2) anonymous and deserted open spaces such as desolate transit stops. The first provide opportunities for criminals to trap and attack women, while the second may allow potential offenders to conceal themselves and act outside the visual range of others.

Women's fear of crime in public spaces has been adequately documented (Hall 1985; Gordon and Riger 1989; Valentine 1990; Gilchrist et al. 1998; Koskela and Pain 2000; Pain 2001). Research of transit passengers' perceptions of transit safety has also intensified in response to the recognition that anxieties about crime are impeding travel choices and affecting transit ridership and revenue (Thrasher and Schnell 1974; Austin and Buzawa 1984; Atkins 1989; Ingalls, Hartgen, and Owens 1994; Wallace et al. 1999; Loukaitou-Sideris 1999; Reed, Wallace, and Rodriguez 1999), and researchers have written guidelines for safer cities and transit environments (Wekerle and Whitzman 1995; Needle and Cobb 1997; Boyd and Boyd 1998). Some of the aforementioned studies incorporate an analysis of gender differences in perceptions of safety on transit; however, the focus is not specifically on women and safety. In contrast, a small subset of studies has focused on women's concerns and fears about personal safety in transit environments (Lynch and Atkins 1988; Trench, Oc, and Tiesdell 1992; Loukaitou-Sideris 2005). Criminologists complain, however, that our increased knowledge about the causes of fear has not necessarily translated into nuanced policy responses tailored to the particularities of different groups and physical settings. Additionally, there remains a general lack of knowledge regarding specific female requirements for transit environments. Researchers have argued that "this is partly due to the imperceptibility of women, for which female researchers criticize most of the existing research. It applies a universal human concept based on the assumption that women and men are in the same situation, and therefore, have the same needs and attitudes" (Larsen and Topsøe-Jensen 1984, 2).

Input of Women Passengers

Few researchers, transit agencies, or policy makers have directly asked women passengers about their safety needs or sought to identify women's proposals and preferences regarding safe and secure travel. The limited information we have on this topic comes primarily from surveys of women in the United Kingdom and Canada as well as safety audits undertaken by women in these two countries. In safety audits, women walk around a transportation setting or public environment, noting their fears and concerns and making suggestions for improved safety. From such surveys and audits, we know that women passengers generally prefer staffing to technological solutions and are very skeptical of the tendency of transit agencies to replace with automated machines the staff from trains or buses. Discussing the findings of a 2002

survey by the Department of Transport in the United Kingdom, Carter (2005, 100) explained that "when traveling by bus, women prefer an additional staff member and the refusal by the driver to board those influenced by alcohol or drugs, whereas men prefer CCTV [closed-circuit-television] and in-vehicle radio contact for the driver. On trains, women and men both prefer to have a staff member walking through a train, although for women the preference is more marked." Similarly, an earlier survey of women in Southampton, England, found that they repeatedly favored more staff and police officers as measures to improve their perceptions of safety while on buses, in parking lots, or on streets (Lynch and Atkins 1988).

The tendency of many transportation agencies to retrofit their station platforms and bus stops with CCTV cameras seems to offer little comfort to women. Female participants in focus groups and workshops at Nottingham, England, argued that they "do not feel more secure in the knowledge that someone, somewhere is supposed to be watching them" (Trench, Oc, and Tiesdell 1992, 291). Similarly, a study of transit passengers' reactions to implemented safety measures in Ann Arbor, Michigan, found that while CCTV cameras were the most noticed of the various security improvements, they did not have a significant impact on passengers' feelings of safety (Wallace et al. 1999).

Certain design measures seem to have a positive effect in reducing women's fear. Surveys of women passengers in the United Kingdom (Lynch and Atkins 1988; Trench, Oc, and Tiesdell 1992), Canada (Scarborough Women's Centre/METRAC 1991), and the United States (Wallace et al. 1999) showed that good lighting has a positive role in reducing women's fear. Women conducting safety audits in Scarborough, Canada, indicated, however, that good lighting should extend from the bus stops to the adjacent streets so that bus stops avoid the "fishbowl effect"[1] (Scarborough Women's Centre/METRAC 1991).

Finally, women seem to have mixed reactions to segregated transport schemes, which establish women's-only services or women's-only cars on commuter trains and subways. Female transit riders in Brazil seemed to appreciate them (Khimm 2006), while women in Southampton, England, were concerned that such segregated transport facilities would draw attention to them as targets (Lynch and Atkins 1988). Policies that receive high marks from women passengers include request-stop programs, allowing women to disembark from the bus at locations closer to their final destination during late evening hours, and public-awareness campaigns denouncing groping (Trench, Oc, and Tiesdell 1992; Schulz and Gilbert 1996).

Are these preferences satisfied by U.S. transit operators? Do transit agencies have in place distinct strategies to address the safety concerns of female passengers? What types of policies and design measures, if any, are taken by

transit agencies and transportation authorities to make travel less threatening to women? This research will explore these issues by reviewing and analyzing information from a survey of transit operators in the United States.

A Survey of U.S. Transit Agencies

During the winter of 2006, we administered a survey to U.S. transit agencies across the country.[2] This Web-based survey targeted all 245 transit agencies in the United States that operate at least 50 vehicles in peak-period service as indicated in the Federal Transit Administration's National Transit Database.[3] The sizes of these agencies spanned a considerable range, from MTA New York City Transit at the high end with 9,551 vehicles to a number of agencies at the low end with 51 vehicles, including Montgomery Area Transit System in Montgomery, Alabama; Bay Metropolitan Transportation Authority in Bay City, Michigan; Okaloosa County Transit in Fort Walton Beach, Florida; City of Jackson Transportation Authority in Jackson, Mississippi; and Kalamazoo Metro Transit System in Kalamazoo, Michigan.

The purpose of our survey was to identify the types of strategies these agencies have used, are currently using, or plan to use for the safety of their passengers on different transportation modes and different components of their transportation systems, as well as the perceived effectiveness of these strategies. The survey asked respondents both closed- and open-ended questions about the safety and security strategies used in six different areas of their systems (where applicable): (1) buses, (2) bus stops, (3) trains (light, heavy, and commuter rail), (4) train stations and platforms, (5) train station entrances and exits, and (6) parking lots and areas adjacent to stops or stations. These strategies included uniformed and nonuniformed police officers, public education and user outreach, surveillance cameras or CCTV, panic/alarm buttons, emergency telephones, public-address systems, other security hardware, and environmental design.[4]

Another major purpose of the survey was to identify what, if anything, U.S. transit agencies are doing to address the security needs of female passengers. Earlier surveys of U.S. transit agencies, one by Needle and Cobb (1997) and one by Shen et al. (1997), have explored the type of strategies followed by agencies against crime, but they have only surveyed a small number of agencies (45 and 10, respectively), they were conducted 10 years ago, before 9/11, and they did not investigate the security needs of women passengers. Similarly, a more recent survey of 113 transit agencies in the United States focused primarily on the agencies' responses to the threat of terrorism

and did not investigate women's concerns or their specific security needs (Taylor et al. 2005). The same survey compared the use of different categories of security strategies before and after 9/11 as well as between systems with and without rail (Taylor et al. 2005). Our survey seeks to expand on this work by examining the strategies used on particular and separate components of transit systems, including vehicles, facilities, and areas around stations and stops, but also by identifying if transit operators tailor safety and security strategies and programs to the particular needs of their female clients.

In all, respondents from 131 transit agencies completed the survey (53% of the 245 agencies contacted). The geographical distribution of respondents varied, with most respondents in California (27 agencies), Florida (13 agencies), Ohio (8 agencies), Washington (8 agencies), and New York (6 agencies). The size distribution of responding agencies generally mirrored that of the survey universe, including a number of the smallest and largest agencies in the final survey count. Appendix A lists the participating agencies, the size of their fleet, the modes of transportation they provide,[5] and the size of the metropolitan area in which their systems are located.

Choice and Perceived Effectiveness of Security Strategies

Since 9/11, passenger security has been elevated as an all-important concern of transit agencies. Indeed, Taylor et al. (2005) found that safety and security strategies in four categories (policing, security hardware and technology, public education and user outreach, and environmental design) became much more central in the security planning of transit agencies after 9/11. Taylor et al. noted that a significant collateral benefit of this attention may be an increase in the personal safety of transit passengers through the reduction of personal and property crime (2005, 16).

In our survey, we found that transit operators draw from all four strategies for their security planning but tend to privilege certain strategies over others, while certain components of their system more often receive particular types of security measures than do other components.[6] Figure 1 shows how agencies are using policing, CCTV technology (the most common of the technology strategies), public education and user outreach, and environmental design strategies to protect different parts of their systems. We wish to clarify that our survey documents the relative popularity and perceived effectiveness of some security strategies over others but did not attempt to measure the amount of resource commitment to or the extent of system coverage via any strategy.

The types of security measures provided to the different components of the transportation system are quite unequal. Train stations and trains—and to

Figure 1
Security Strategy Use by System Area
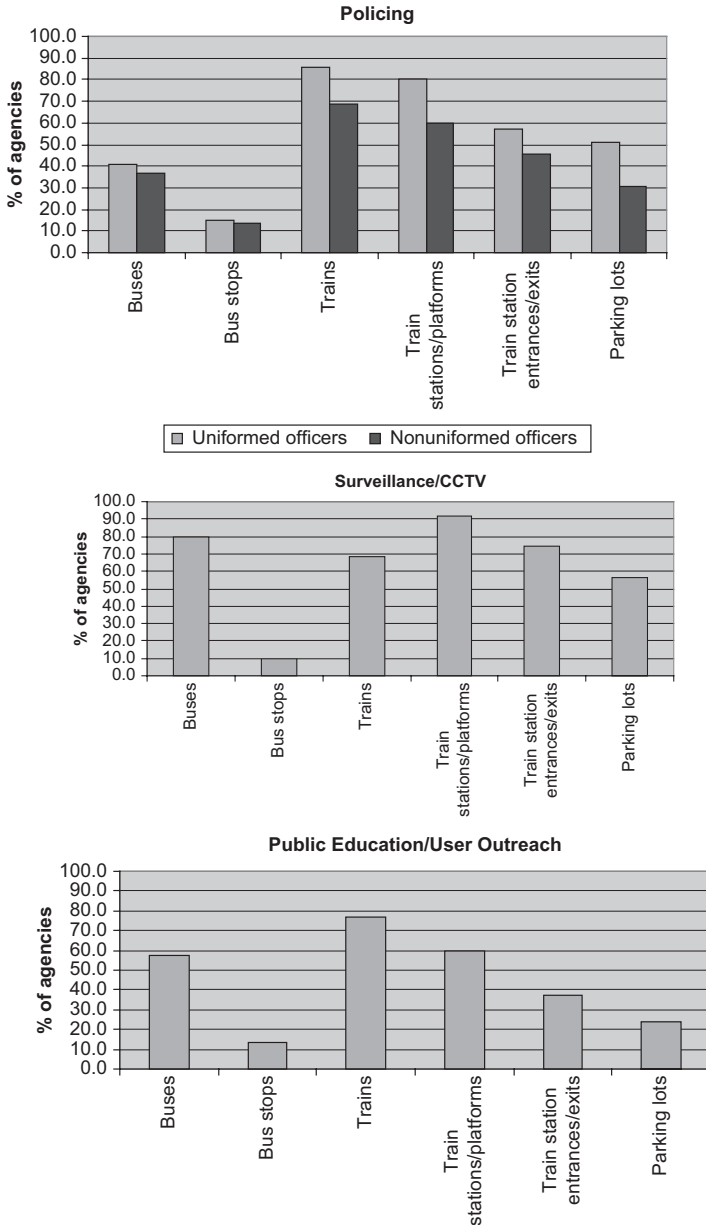
Figure 1 (continued)
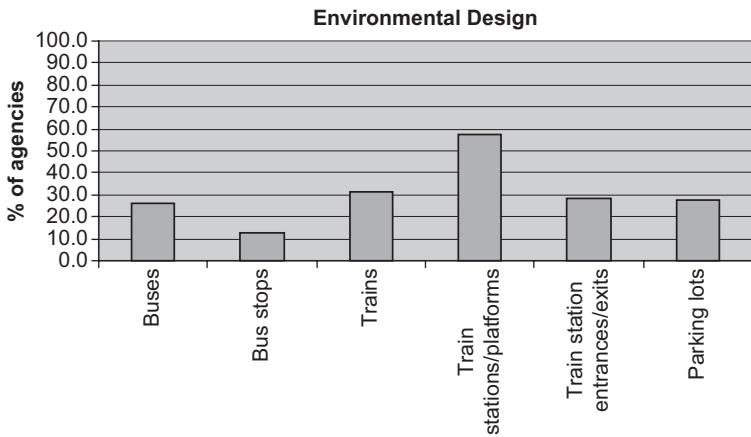
a certain extent, buses—are most often the focus of security efforts by transit agencies. In contrast, the use of various safety and security strategies is very low at bus stops, even though most passengers (especially women) report greater levels of anxiety and fear while waiting for the bus than while riding on a transit vehicle. Most survey respondents indicated that they do not use particular strategies at their bus stops. Only 15% of agencies reported using uniformed officers, and about 13% use nonuniformed officers, public education and user outreach, and environmental design.[7] Similarly, relatively low percentages of agencies not currently using particular safety and security strategies at bus stops indicated they would like to use such strategies in the future. Between 5% and 10% want to use public-address systems, CCTV, panic/alarm buttons, and emergency telephones. Interestingly, very few agencies want to employ uniformed and nonuniformed officers in the future at bus stop facilities (2% and 1%, respectively), even though most women passengers prefer human than technological security measures. On the other hand, the security of buses receives greater attention. The majority of responding agencies reported using various hardware and technology strategies on their buses: surveillance cameras/CCTV (80%), panic/alarm buttons (76%), and public-address systems (73%) (Figure 2).

The security of rail stations and trains receives significant attention; the vast majority of agencies use a wide range of safety and security strategies on the various components of their systems, both vehicles and stations (Figure 3). The most common strategies are security hardware and technology, including

Figure 2
Current Bus and Bus Stop Strategies
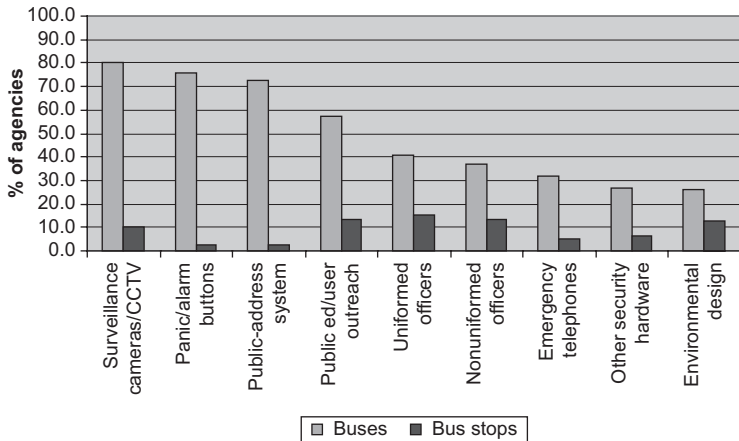
public-address systems and CCTV, and policing strategies, specifically uni-formed officers. For example, 9 out of 10 agencies use public-address systems on their trains and CCTV in their stations. About 8 out of 10 use uniformed officers on trains and in stations as well as public-address systems in stations. However, only half the agencies reported using CCTV and uniformed officers to help protect station parking areas, despite the fact that studies have shown that a significant percentage of crime incidents occur at station parking lots (Loukaitou-Sideris, Liggett, and Iseki 2002). The relative lack of attention to the security of the more open and public areas of the transportation system is arguably because of the greater difficulty and cost of securing open areas and the perception by transit agencies that they are not solely responsible for the protection of such areas, which are viewed as belonging to the city's larger public realm.

The survey also asked those respondents not currently using a particular strategy if they anticipated using it in the future. The strategies that agencies most often reported wishing to use in the future were hardware and technol-ogy strategies, and to a lesser extent, policing. Very high percentages of respondents want to use CCTV on buses (88%), on trains (73%), and in park-ing lots and areas around stops and stations (71%). Other hardware and tech-nology strategies desired by high percentages of respondents for future use include panic/alarm buttons on buses (55%), public-address systems on trains

Figure 3
Current Rail Strategies
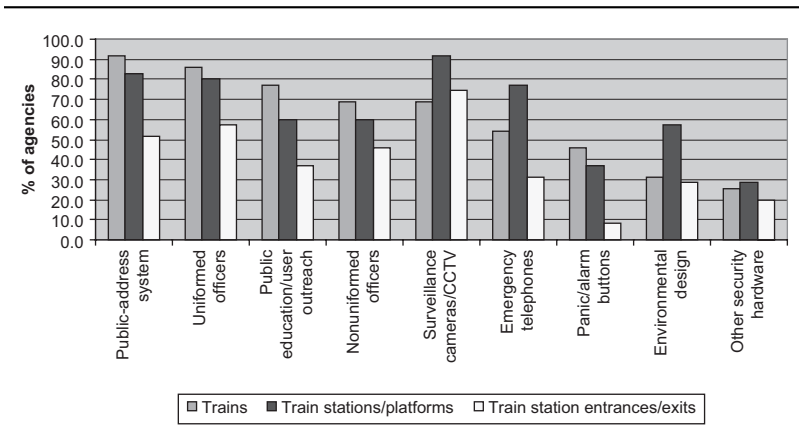
(33%), public-address systems (50%) and emergency telephones (50%) at train stations, and emergency telephones in parking areas (44%). The percentage of agencies wishing to use uniformed or nonuniformed officers throughout their systems in the future was moderate (25%).

Figure 4 shows the top three strategies in terms of effectiveness, as perceived by transit operators, for the different components of their system.[8] For buses, the three strategies with the highest *very effective* ratings included other security hardware[9] (66%), uniformed officers (62%), and CCTV (57%). While most agencies do not employ officers at bus stops and did not express a desire to use them in the future, almost three-quarters of those who do use uniformed officers perceived them to be very effective. In contrast, only 25% of respondents using CCTV at bus stops considered it very effective. The three security strategies perceived as most effective on trains were uniformed officers (90% of respondents rated them *very effective*), nonuniformed officers (68% of respondents rated them *very effective*), and CCTV (52% of respondents rated them *very effective*). With regard to train stations, respondents rated the use of uniformed and nonuniformed officers as the most effective strategy for the protection of station platforms, entrances and exits, and station parking lots. Interestingly, an earlier survey by Needle and Cobb (1997) also found that transit operators cited uniformed officers as the most effective strategy for transit security.

Transit operators were also asked if they implement safety and security strategies only on specific lines or routes of their system. Less than one-third

Figure 4
Three Perceived Most Effective Strategies by System Area
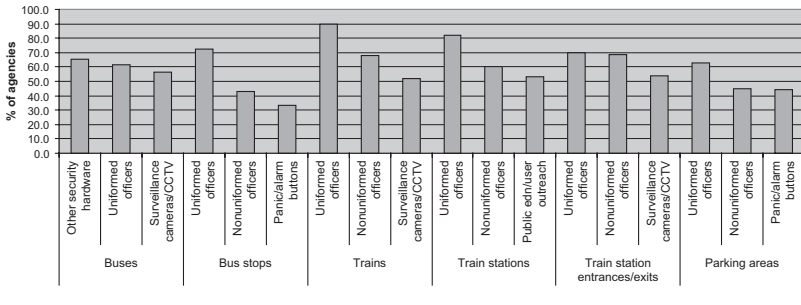
(27%) of the agencies indicated that this was the case, and a number of these respondents reported that their staff monitors incident reports and patterns to more effectively use particular safety and security tools:

> While all of our strategies can be implemented on all routes, information from our security database identifies problem areas and issues and is used to target police resources (operations administrator, female, very large agency in the West).
>   The utilization of police officers is "target-specific." In other words, when a serious issue develops and we can pinpoint a specific route, bus, etc., off-duty officers [are] used (safety and security officer, male, small agency in the West).

One respondent reported that the agency had three buses with surveillance cameras, and these vehicles were moved to different routes as needed. Other agencies sought to identify particular locations in their transit networks that they believed were more prone to crime—such as transit centers, high-profile terrorist targets, and, particularly, schools—and implemented safety and security strategies along lines and routes in those areas. The use of random patrols and uniformed and nonuniformed officers on certain routes was mentioned specifically by two respondents. Another respondent discussed the employment of overtime officers on sections of a rail line used heavily by school children, a demographic group that a number of bus-agency respondents also reported to be a target group for potential safety and security concerns.

Overall, a very small percentage of agencies (only seven) have safety and security strategies for particular railway lines, even though several indicated that the various lines in their systems have very different needs:

> Each rail line route is different and has local operating safety measures, speed restrictions, horn sounding instructions, etc. (administrator, male, very large agency in the West).
>
> Confined space and volume of people in the subways require varied measures (director of system safety, male, very large agency in the Northeast).

Such responses were, however, the exception, as most transit agencies did not report adjusting security strategies to anticipated levels of crime risk or tailoring them to the particularities of specific customers or transit routes. Empirical research has shown that transit crime is highly concentrated in specific hot spots (Loukaitou-Sideris 1999); therefore, selective spatial and temporal application of security measures in the most dangerous routes of the transit system, especially during the late evening hours, can provide a more efficient deployment of limited resources. Nevertheless, most transit agencies do not seem to differentiate their practices in a way that takes into account the spatial, temporal, or social characteristics of the transportation setting.

(Not) Addressing the Specific Needs of Female Passengers

A specific interest of the survey was to assess the transit operators' perspectives about the safety and security of female passengers specifically. Therefore, a series of questions sought to identify if transit operators (1) believed that women have distinct security needs, (2) considered as necessary the instigation and implementation of specific security programs targeting women passengers, (3) had such programs in place for the safety of their women passengers, and (4) knew of programs in other transit agencies addressing the security needs of female passengers.

While two-thirds of the respondents (67%) indicated that female passengers have distinct safety and security needs, only about one-third (35%) believed that transit agencies should put into place specific safety and security programs for them. A higher percentage of female (74%) than male (65%) respondents thought that female passengers have special needs; still, this difference was not statistically significant.[10] Those respondents who claimed that women do have specific safety and security concerns supported this contention by asserting that women are more vulnerable than men for a number of reasons. One group of respondents believed that women are physically more vulnerable than men:

> In general, female passengers are more vulnerable than male passengers due to physical size and ability to defend themselves (field operations manager, male, small agency in the West).

To most criminals, most women are not seen as big a threat or [as] able to resist an assault or robbery as a man (chief of transit enforcement, male, small agency in the West).

Women walking alone between the bus stop and their destination or origin are vulnerable. They are also more vulnerable than men on the bus (director of transit operations, male, small agency in the West).

Other respondents felt that the ways women travel make them more vulnerable than men:

Visibility of bag/purse could attract thief (director of operations, male, large agency in the Midwest).

Generally, because they [women] are carrying purses, traveling with small children, and/or carrying several packages [they are more vulnerable] (administrative analyst, female, very small agency in the South).

Women, especially those with young children, and senior citizens may be more susceptible to attacks by an assailant. Women with young children typically have additional items (i.e., strollers, bags, and young children in tow) (transportation analyst, female, very small agency in the Northeast).

Some respondents stated that women have particular safety and security needs because they perceive themselves to be more vulnerable than men:

Female passengers tend to believe they are vulnerable (risk manager, male, medium agency in the West).

Female riders feel they are more frequent targets of crime, especially in parking lots (director of safety and training, male, very small agency the Midwest).

Female passengers may feel more vulnerable, particularly when traveling alone or at night, even if they are not being targeted for crime at a higher rate (assistant general manager, male, very large agency in the Northeast).

Respondents also suggested that assailants focus on female passengers, and therefore, women have safety and security needs distinct from male passengers:

Women are usually targeted by criminals more often than men. Because of this high rate, we must target all areas but be especially aware of areas where there are large concentrations of female patrons (training and safety specialist, male, very small agency in the South).

[Women are] perceived as easier crime targets by the criminal element (safety officer, male, small agency in the West).

Finally, some respondents stated that women have particular safety and security needs in general, not just on transit:

> I believe females in general have distinct safety needs—in all areas, not just in transit use (public transportation director, female, very small agency in the West).
>
> Females and children may be more vulnerable in any public setting (director of safety and training, male, very small agency in the Midwest).

Those who stated that female passengers do not have different safety and security needs supported this assessment by providing two general arguments. The first was that safety and security are issues that affect all passengers, regardless of gender:

> We ensure the safety of all our passengers! Everyone is treated equally (regional director of safety, female, small agency in the South).
>
> In today's society I [feel] all passengers have the same safety and security needs. We should not just focus on one group of individuals. We as a transit agency should attempt to protect all passengers equally (director of safety and security, male, very small agency in the Midwest).
>
> Safety and security issues and concerns are non–gender specific (safety and security manager, male, small agency in the West).

The second argument was that women are no more vulnerable than men and do not have special safety and security needs:

> We are not aware of any specific information that our female passengers have any more [or fewer] safety and security needs than our other passengers (general manager, male, very small agency in the South).
>
> Statistical data for our system does not show females have a greater risk (system safety and security officer, male, small agency in the South).
>
> You're assuming that the world is less safe for females (chief operating officer, male, small agency in the West).

Despite the fact that two-thirds of the respondents believed that women have distinct transit-security needs, only three agencies reported having in place such programs for women. Since our survey covered more than half of all the large and medium-sized transit operators in the United States, we have to sadly conclude that the United States is considerably behind other countries on the issue of transit safety for women. Canada, the United Kingdom, Australia, Germany, Sweden, and Japan, among

other countries, have initiated and practiced a variety of measures to ease the fear of women passengers and provide them with more safe and secure public transportation.

Among the one-third of respondents who believed that transit agencies should have women-focused safety and security programs, some argued that such an effort would provide benefits to all passengers:

> I see that safety and security programs for females will also help men. Men too are at risk, but they will not admit it. Any security upgrades will assist all of our customers and employees (transit safety supervisor, male, very small agency in the West).
>
> We feel if you plan to protect those who are less likely to be able to protect themselves, you will meet the greatest need (administrator, male, small agency in the South).

Others emphasized that public education efforts were key to empowering women and improving their overall safety:

> [We should] explain vulnerabilities, threats, trip planning, travel precautions, emergency actions, and what protective measures are currently in place (safety officer, male, small agency in the West).
>
> Using other social agencies/programs to [provide] the education aspect in self-defense, safe-haven locations, tips in staying safe/secure (transit planner, male, small agency in the Midwest).

While several respondents did think these programs should be implemented, they were not sure about what types of programs would be most useful:

> Other than a high-profile security presence, escort, or shuttle programs to and from the parking facilities, I am not sure what more can be done (chief of transit enforcement, male, small agency in the West).
>
> Unsure just what would be effective (general manager, male, very small agency in the Northeast).

Finally, one respondent argued that such programs should be developed not just within an agency but among agencies:

> There should be a coordinated effort to enhance safety and security programs for female passengers on a national scale (chief operations officer, male, small agency in the Northeast).

Many of the respondents who did not see the need for specific programs for women stated again that agencies should develop safety programs that would help all passengers and not solely female passengers:

> I feel that transit agencies should place more effort and emphasis on educating the ridership as a whole on safety and security materials and not one type of passenger (deputy director of operations, male, small agency in the South).
>
> I think specific safety and security programs should be in place for all passengers: the elderly, the disabled, females, males. I'm not sure that females as a group should be singled out for any special programs, but safety programs should reflect the needs of the entire passenger community (claims specialist, female, small agency in the Midwest).
>
> Increasing overall safety and security awareness for all should solve the special issues for female passengers (operations director, male, medium agency in the West).

Other respondents reiterated earlier sentiments about women's generally not having specific safety and security needs by stating that agencies should not put female-specific programs into place because this was not necessary:

> The public has not indicated a need for specific programs only for women passengers (director of transit services, female, small agency in the West).
>
> [Our agency] believes that general safety and security features should be sufficient to address the needs of female passengers (manager of strategic planning and compliance, male, very small agency in the West).

Only three agencies reported having heard about safety and security programs specifically for female passengers. One program is a night-stop service that allows passengers after dark to alight the vehicle at locations other than bus stops. The goal of this program is to enhance safety by decreasing walking distances for passengers at night. A second program is a collaborative effort between a transit agency and a local domestic-violence prevention agency. If a victim boards a bus and requests help from the driver, the agency has in place an established protocol to transfer the person to the domestic-violence facility. Local police are called if the situation is one that cannot be handled safely by transit agency personnel. A third program involves teaching drivers to encourage female passengers to sit at the front of the bus and to notify operators as soon as possible if someone is causing them to feel uncomfortable.

Respondents were also asked if their agencies had programs for other vulnerable populations, such as elderly, disabled, and young riders; 39% stated

they did have specific programs for other groups. These programs focused on different transit-user populations and used a variety of approaches, including safety and security education for young riders, programs to aid unaccompanied minors using the system, safety and security training for agency staff about issues specific to elderly and disabled riders, participation in National Safe Place programs (programs that help youths in need to access emergency resources), safety brochures, and community outreach meetings. Several respondents stated that they wanted to develop and implement such programs for vulnerable populations, and one respondent cited the agency's limited financial resources as a barrier in pursuing target programs:

> Currently, we have no specific or general safety and security programs in place for any population classification on our system. This is an area that we need to do more work to ensure that staff and riders are properly educated and aware of situations (deputy director of operations, male, small agency in the South).
>
> [We are] currently working on an initiative to include elderly/disabled as part of emergency response plans (safety and security administrator, male, medium agency in the West).
>
> We are a small agency with about 160 bus drivers. We just don't have the funds to create programs for these groups. We would love to provide them, but we must focus on the basics (transit safety supervisor, male, very small agency in the West).

This last response regarding funding was the only mention by an agency about resource limitations in implementing specific programs. Operations funding is a challenge for many transit agencies, as safety and security funding is often very limited. As such, the fact that this was not discussed as a factor in the development of safety and security strategies and programs is quite surprising.

Conclusion

At the turn of the twentieth century, the Hudson and Manhattan Railroad, which ran between New York and Jersey City, briefly instituted women-only cars on its system (Schulz and Gilbert 1996). This consideration of the specific anxieties and needs of women passengers was short-lived. A hundred years later, such special attention to women travelers is all but missing from the practices of U.S. transit agencies, despite the fact that empirical studies show women are typically more fearful of transportation settings than are men. While women, like all passengers, are expected to benefit from the increased attention given to the security of transportation systems post-9/11,

no special effort is made by most transit agencies to offer special safety or security programs for women. Simply, the concept of providing services and security tailored to the needs of women passengers is not yet espoused by U.S. transit operators, despite the fact that most of them admit that women do have some specific and different needs than men. Interestingly, a significant number of agencies rightly provide special services to other subgroups of vulnerable customers but are worried that they may be accused of "reverse discrimination" if they develop specific security strategies for women.

Additionally, our study showed a serious mismatch between the existing safety and security practices of transit operators and the needs and desires of women passengers as identified by focus groups, safety audits, and empirical studies. For example, the concentration of security measures on the more enclosed and easily controllable parts of the transportation system (buses, trains, and station platforms) and the relative neglect of the more open and public parts (bus stops and parking lots) does not serve women's needs well. Women passengers are typically more fearful of waiting at desolate bus stops or walking through parking lots devoid of human activity than of being seated among other passengers on the bus or train. Similarly, the practice of privileging technological over human security measures—which is widely followed by transit agencies, as our survey has found—goes contrary to women's wishes. Women passengers certainly feel safer being watched by a police officer than by the lenses of CCTV cameras.

There seem to be important reasons why the response of U.S. transit operators to the particular safety and security needs of women is less than satisfactory and why there seems to be a mismatch between research findings and policy. For one, there are only limited financial resources available to public transit operators. As indicated by Taylor et al. (2005, 8), especially after 9/11, "transit managers have struggled to balance the costs and uncertain benefits of increased transit security against the costs and certain benefits of attracting passengers." There is no doubt that transit agencies do not have the resources to install a police officer at every transit stop of their system. Security strategies generally favored by transit operators, such as the installation of cameras, are decidedly less expensive than instigating police patrols or employing security personnel on transit vehicles and stops.

Second, the overreliance on technological responses to crime is also influenced by the aggressive marketing of "antiterrorist" technologies and security hardware by the security industry, post 9/11, as well as the example of British and Japanese cities that have extensively retrofitted their stations with security cameras and CCTV technology (Cherry, Loukaitou-Sideris, and Wachs 2008).

Third, transit operators are facing a risk-management dilemma, as courts are not inclined to find against them when passengers are accosted while traveling to and from bus stops and stations. On the other hand, if a transit agency institutes an on-street security program, then fails to provide accurate security measures and an incident occurs, the agency may be found liable by the court.[11]

Fourth, transportation planning arguably has a higher concentration of male planners than do other planning subfields. Therefore, it is likely that the gender mix of management in public-transit agencies is over-represented by male planners, who may not be as knowledgeable about or responsive to the particular needs of their female transit customers. In our survey (which was sent to the general managers of transit agencies), 76% of the respondents were male. As already mentioned, a higher percentage of female than male survey respondents indicated that women passengers have distinct needs; however, this difference was not statistically significant.

The past decade has witnessed an increase in scholarly activity on issues relating to women's safety, travel patterns, and health.[12] Nevertheless, our survey revealed a general ambiguity among transit operators regarding the security needs and the appropriate security measures for female passengers and an almost complete lack of implemented programs in the United States. This finding points to a major gap between research and practice. A number of combined initiatives may help close this gap. For example, the initiation of researcher–practitioner dialogues in professional and academic conferences would help make research on women's issues in transportation more accessible to transit professionals. Initiatives, programs, and policies targeting women's safety in the United Kingdom, Canada, Australia, Germany, Japan, and Sweden remain largely unknown in the United States. The compilation, publication, and dissemination of best practices from the American Public Transportation Association and/or the Transit Cooperative Research Program would allow operators to access information about the lessons learned from successful programs in other countries. The creation of certain pilot programs supported through targeted and competitive funding from the Federal Transit Administration would also go a long way toward implementing programs "on the ground" and measuring their impact and success. Finally, the incorporation of women's voices in planning and policy making around transportation issues, through regular safety audits and targeted surveys of women passengers, would help diminish the current ambiguity regarding gender-appropriate security measures. Such measures would be the necessary first steps toward a transportation system that serves the needs of female passengers.

Appendix A
List of Participating Agencies (By Number of Vehicles in Operation)

Agency Name	City	State	Vehicles in Operation	Modes Used	Urbanized Area (UZA) Name	Urbanized Area (UZA) Population
Montgomery Area Transit System	Montgomery	AL	51	Bus	Montgomery, AL	196,892
Okaloosa County Board of County Commissioners	Fort Walton Beach	FL	51	Bus, dial-a-ride	Fort Walton Beach, FL	152,741
City of Jackson Transportation Authority	Jackson	MI	51	Bus	Jackson, MI	88,050
Bay Metropolitan Transit Authority	Bay City	MI	51	Bus	Bay City, MI	74,048
Broome County Department of Public Transportation	Vestal	NY	54	Bus	Binghamton, NY–PA	158,884
Portage Area Regional Transportation Authority	Kent	OH	54	Bus	Akron, OH	570,215
City of Waukesha Transit Commission (Waukesha Metro Transit)	Waukesha	WI	54	Bus	Milwaukee, WI	1,308,913
Centre Area Transportation Authority	State College	PA	55	Bus	State College, PA	71,301
CyRide	Ames	IA	57	Bus	n/a	n/a
Charleston Area Regional Transportation Authority	Charleston	SC	58	Bus	Charleston–North Charleston, SC	423,410
Kanawha Valley Regional Transportation Authority	Charleston	WV	59	Bus	Charleston, WV	182,991
Montebello Bus Lines	Montebello	CA	60	Commuter rail, bus, dial-a-ride	Los Angeles–Long Beach–Santa Ana, CA	11,789,487
Antelope Valley Transit Authority	Lancaster	CA	60	Bus	Los Angeles–Long Beach–Santa Ana, CA	11,789,487

Appendix A (conitnued)

Agency Name	City	State	Vehicles in Operation	Modes Used	Urbanized Area (UZA) Name	Urbanized Area (UZA) Population
Livermore / Amador Valley Transit Authority	Livermore	CA	61	Bus	San Francisco–Oakland, CA	3,228,605
Greater Bridgeport Transit Authority	Bridgeport	CT	61	Bus	Bridgeport–Stamford, CT–NY	888,890
Eastern Contra Costa Transit Authority	Antioch	CA	63	Bus	Antioch, CA	217,591
Indian River County Council on Aging, Inc.	Vero Beach	FL	63	Bus	Vero Beach-Sebastian, FL	120,962
Central Arkansas Transit Authority	North Little Rock	AR	64	Light rail, bus	Little Rock, AR	360,331
Greater Peoria Mass Transit District	Peoria	IL	65	Bus	Peoria, IL	247,172
Northern Indiana Commuter Transportation District	Chesterton	IN	66	Commuter rail	Chicago, IL–IN	8,307,904
Southeastern Regional Transit Authority	New Bedford	MA	66	Bus	New Bedford, MA	146,730
StarTran	Lincoln	NE	68	Bus	Lincoln, NE	226,582
Chattanooga Area Regional Transportation Authority (CARTA)	Chattanooga	TN	68	Bus, incline railway	Chattanooga, TN–GA	343,509
City of Tallahassee	Tallahassee	FL	69	Bus	Tallahassee, FL	204,260
Virginia Railway Express	Alexandria	VA	69	Commuter rail Bus	Fredericksburg, VA	97,102
City of Appleton—Valley Transit	Appleton	WI	69		Appleton, WI	187,683
Potomac and Rappahannock Transportation Commission	Woodbridge	VA	70	Commuter rail, bus	Washington, DC–VA–MD	3,933,920
Whatcom Transportation Authority	Bellingham	WA	70	Bus	Bellingham, WA	84,324
Stark Area Regional Transit Authority	Canton	OH	78	Bus	Canton, OH	266,595
Greater Roanoke Transit Company	Roanoke	VA	80	Bus	Roanoke, VA	197,442
Cape Cod Regional Transit Authority	Dennis	MA	81	Bus	Barnstable Town, MA	243,667
San Diego Trolley, Inc.	San Diego	CA	83	Bus	San Diego, CA	2,674,436
Knoxville Area Transit	Knoxville	TN	83	Bus	Knoxville, TN	419,830

23

Appendix A (conitnued)

Agency Name	City	State	Vehicles in Operation	Modes Used	Urbanized Area (UZA) Name	Urbanized Area (UZA) Population
Santa Barbara Metropolitan Transit District	Santa Barbara	CA	84	Bus, demand response	Santa Barbara, CA	196,263
Greater Hartford Transit District	Hartford	CT	85	Paratransit	Hartford, CT	851,535
Sarasota County Area Transit	Sarasota	FL	86	Bus	Sarasota–Bradenton, FL	559,229
Champaign–Urbana Mass Transit District	Urbana	IL	88	Bus	Champaign, IL	123,938
The Greater New Haven Transit District	Hamden	CT	89	Bus	New Haven, CT	531,314
Rockland Coaches, Inc. (Coach USA)	Westwood	NJ	91	Bus	New York–Newark, NY–NJ–CT	17,799,861
Gainesville Regional Transit System	Gainesville	FL	93	Bus	Gainesville, FL	159,508
Regional Transportation Commission of Washoe County	Reno	NV	93	Bus, paratransit	Reno, NV	303,689
Municipality of Anchorage—People Mover	Anchorage	AK	94	Bus	Anchorage, AK	225,744
Ann Arbor Transportation Authority	Ann Arbor	MI	98	Bus	Ann Arbor, MI	283,904
Prince George's County Transit	Largo	MD	102	Bus	n/a	n/a
Lane Transit District	Eugene	OR	107	Bus, paratransit	Eugene, OR	224,049
San Joaquin Regional Transit District	Stockton	CA	109	Bus	Stockton, CA	313,392
Mountain Metropolitan Transit (Mountain Metro)	Colorado Springs	CO	109	Bus	Colorado Springs, CO	466,122
Monterey–Salinas Transit	Monterey	CA	111	Bus	Seaside–Monterey–Marina, CA	125,503

Appendix A (continued)

Agency Name	City	State	Vehicles in Operation	Modes Used	Urbanized Area (UZA) Name	Urbanized Area (UZA) Population
Regional Public Transportation Authority, dba: Valley Metro	Phoenix	AZ	114	Bus	Phoenix–Mesa, AZ	2,907,049
Dallas—VPSI, Inc.	Arlington	TX	119	Vanpool	Dallas–Fort Worth–Arlington, TX	4,145,659
Blue Water Area Transportation Commission	Port Huron	MI	123	Bus	Port Huron, MI	86,486
Laketran	Grand River	OH	128	Bus	Cleveland, OH	1,786,647
Central Oklahoma Transportation and Parking Authority	Oklahoma City	OK	136	Bus	Oklahoma City, OK	747,003
Clark County Public Transportation Benefit Area Authority	Vancouver	WA	136	Bus	Portland, OR–WA	1,583,138
Montachusett Regional Transit Authority	Fitchburg	MA	140	Bus, paratransit	Leominster–Fitchburg, MA	112,943
Georgia Regional Transportation Authority	Atlanta	GA	143	Bus, vanpool	Atlanta, GA	3,499,840
Metropolitan Transit Authority	Nashville	TN	144	Bus	Nashville–Davidson, TN	749,935
County of Volusia, dba: VOTRAN	South Daytona	FL	147	Bus	Deltona, FL	147,713
Santa Monica's Big Blue Bus	Santa Monica	CA	148	Bus, paratransit	Los Angeles–Long Beach–Santa Ana, CA	11,789,487
CNY Centro, Inc.	Syracuse	NY	155	Bus	Syracuse, NY	402,267
Intercity Transit	Olympia	WA	155	Bus	Olympia–Lacey, WA	143,826
Southern California Regional Rail Authority	Los Angeles	CA	159	Commuter rail	Los Angeles–Long Beach–Santa Ana, CA	11,789,487

(continued)

25

Appendix A (continued)

Agency Name	City	State	Vehicles in Operation	Modes Used	Urbanized Area (UZA) Name	Urbanized Area (UZA) Population
Capital Area Transportation Authority	Lansing	MI	167	Bus	Lansing, MI	300,032
ATC /Vancom–Dallas	Oak Brook	TX	169	Bus	Dallas–Fort Worth–Arlington, TX	4,145,659
Lehigh and Northampton Transportation Authority	Allentown	PA	170	Bus, paratransit	Allentown–Bethlehem, PA–NJ	576,408
Interurban Transit Partnership	Grand Rapids	MI	175	Bus	Grand Rapids, MI	539,080
Riverside Transit Agency	Riverside	CA	180	Bus, paratransit	Los Angeles–Long Beach–Santa Ana, CA	11,789,487
Des Moines Metropolitan Transit Authority	Des Moines	IA	181	Bus, vanpool	Des Moines, IA	370,505
Connecticut Transit—Hartford Division	Hartford	CT	183	Bus	Hartford, CT	851,535
ABQ Ride	Albuquerque	NM	183	Bus, paratransit	Albuquerque, NM	598,191
Toledo Area Regional Transit Authority	Toledo	OH	191	Bus	Toledo, OH–MI	503,008
Long Beach Transit	Long Beach	CA	197	Bus, ferry	Los Angeles–Long Beach–Santa Ana, CA	11,789,487
Hillsborough Area Regional Transit Authority	Tampa	FL	199	Light rail, bus, paratransit	Tampa–St. Petersburg, FL	2,062,339
Indianapolis and Marion County Public Transportation	Indianapolis	IN	200	Bus	Indianapolis, IN	1,218,919
San Diego Metropolitan Transit System	San Diego	CA	211	Light rail, bus	San Diego, CA	2,674,436
Capital District Transportation Authority	Albany	NY	215	Bus	Albany, NY	558,947
North County Transit District	Oceanside	CA	221	Commuter rail, light rail, bus	San Diego, CA	2,674,436

Appendix A (continued)

Agency Name	City	State	Vehicles in Operation	Modes Used	Urbanized Area (UZA) Name	Urbanized Area (UZA) Population
Greater Dayton Regional Transit Authority	Dayton	OH	221	Bus	Dayton, OH	703,444
Greater Richmond Transit Company	Richmond	VA	221	Bus	Richmond, VA	818,836
Golden Gate Bridge, Highway and Transportation District	San Francisco	CA	222	Bus	San Francisco–Oakland, CA	3,228,605
Memphis Area Transit Authority	Memphis	TN	226	Light rail, bus, paratransit	Memphis, TN–MS–AR	972,091
Omnitrans	San Bernardino	CA	233	Bus	Los Angeles–Long Beach Santa Ana, CA	11,789,487
Spokane Transit Authority	Spokane	WA	233	Bus, van	Spokane, WA–ID	334,858
Mass Transportation Authority	Flint	MI	235	Bus	Flint, MI	365,096
Metro Regional Transit Authority	Akron	OH	247	Bus	Cleveland, OH	1,786,647
Advanced Transportation Solutions, LLC	Miami	FL	259	Demand response	Miami, FL	4,919,036
Jacksonville Transportation Authority	Jacksonville	FL	275	Light rail	Jacksonville, FL	882,295
Transit Authority of River City	Louisville	KY	280	Bus	Louisville, KY–IN	863,582
Central Ohio Transit Authority	Columbus	OH	283	Bus	Columbus, OH	1,133,193
Kitsap Transit	Bremerton	WA	283	Bus, ferry, paratransit	Bremerton, WA	178,369
Niagara Frontier Transportation Authority	Buffalo	NY	321	Light rail, bus	Buffalo, NY	976,703
San Mateo County Transit District	San Carlos	CA	346	Commuter rail, bus	San Francisco–Oakland, CA	3,228,605
Charlotte Area Transit System	Charlotte	NC	363	Light rail, bus	Charlotte, NC–SC	758,927
Sacramento Regional Transit District	Sacramento	CA	383	Light rail, bus	Sacramento, CA	1,393,498

(continued)

27

Appendix A (conitnued)

Agency Name	City	State	Vehicles in Operation	Modes Used	Urbanized Area (UZA) Name	Urbanized Area (UZA) Population
Board of County Commissioners, Palm Beach County, PalmTran, Inc.	West Palm Beach	FL	384	Bus, paratransit	Miami, FL	4,919,036
City of Los Angeles Department of Transportation	Los Angeles	CA	388	Bus, paratransit	Los Angeles–Long Beach–Santa Ana, CA	11,789,487
Central Florida Regional Transportation Authority	Orlando	FL	390	Bus	Kissimmee, FL	186,667
Regional Transportation Commission of Southern Nevada	Las Vegas	NV	405	Bus	Las Vegas, NV	1,314,357
Access Transportation Systems, Inc.	Pittsburgh	PA	430	Paratransit	Pittsburgh, PA	1,753,136
Snohomish County Transportation Benefit Area Corporation (Community Transit)	Everett	WA	467	Bus, vanpool, dial-a-ride	Seattle, WA	2,712,205
Bi-State Development Agency	St. Louis	MO	476	Light rail, bus, paratransit	St. Louis, MO–IL	2,077,662
Metropolitan Council	St. Paul	MN	507	Light rail, bus	Minneapolis–St. Paul, MN	2,388,593
Capital Metropolitan Transportation Authority	Austin	TX	510	Bus	Austin, TX	901,920
San Francisco Bay Area Rapid Transit District	Oakland	CA	522	Heavy rail	San Francisco–Oakland, CA	3,228,605
Access Services Incorporated	Los Angeles	CA	530	Demand	Los Angeles–Long Beach–Santa Ana, CA	11,789,487
VIA Metropolitan Transit	San Antonio	TX	538	Bus response	San Antonio, TX	1,327,554

Appendix A (conitnued)

Agency Name	City	State	Vehicles in Operation	Modes Used	Urbanized Area (UZA) Name	Urbanized Area (UZA) Population
City and County of Honolulu Department of Transportation Services	Honolulu	HI	541	Bus, paratransit	Honolulu, HI	718,182
Pierce Transit	Tacoma	WA	543	Bus, paratransit	Seattle, WA	2,712,205
City of Phoenix Public Transit Department	Phoenix	AZ	572	Bus	Phoenix–Mesa, AZ	2,907,049
Santa Clara Valley Transportation Authority	San Jose	CA	630	Light rail, bus	San Jose, CA	1,538,312
Alameda–Contra Costa Transit District	Oakland	CA	633	Bus	San Francisco–Oakland, CA	3,228,605
Milwaukee County Transit System	Milwaukee	WI	646	Bus	Milwaukee, WI	1,308,913
The Greater Cleveland Regional Transit Authority	Cleveland	OH	679	Heavy rail, light rail, bus	Cleveland, OH	1,786,647
Metro Transit	Minneapolis	MN	744	Light rail, bus	Minneapolis–St. Paul, MN	2,388,593
Miami–Dade Transit	Miami	FL	783	Heavy rail, bus, automated guideway transit	Miami, FL	4,919,036
Orange County Transportation Authority	Orange	CA	796	Bus	Los Angeles–Long Beach–Santa Ana, CA	11,789,487
San Francisco Municipal Railway	San Francisco	CA	815	Light rail, bus, cable car	San Francisco–Oakland, CA	3,228,605
MTA Long Island Rail Road	Jamaica	NY	969	Commuter rail	New York–Newark, NY–NJ–CT	17,799,861
Dallas Area Rapid Transit	Dallas	TX	969	Commuter rail, light rail, bus, paratransit	Dallas–Fort Worth–Arlington, TX	4,145,659

(continued)

Appendix A (continued)

Agency Name	City	State	Vehicles in Operation	Modes Used	Urbanized Area (UZA) Name	Urbanized Area (UZA) Population
Port Authority of Allegheny County	Pittsburgh	PA	1,056	Light rail, bus, incline plane	Pittsburgh, PA	1,753,136
Maryland Transit Administration	Baltimore	MD	1,140	Commuter rail, heavy rail, light rail, bus	Washington, DC–VA–MD	3,933,920
Denver Regional Transportation District	Denver	CO	1,292	Light rail, bus, paratransit	Longmont, CO	72,929
Metropolitan Transit Authority of Harris County, Texas	Houston	TX	1,933	Light rail, bus	Houston, TX	3,822,509
Washington Metropolitan Area Transit Authority	Washington	DC	2,221	Heavy rail, bus, paratransit	Washington, DC–VA–MD	3,933,920
Southeastern Pennsylvania Transportation Authority (SEPTA)	Philadelphia	PA	2,224	Commuter rail, light rail, bus	PA–NJ–DE–MD	5,149,079
Los Angeles County Metropolitan Transportation Authority	Los Angeles	CA	2,338	Heavy rail, light rail, bus	Los Angeles–Long Beach–Santa Ana, CA	11,789,487
King County Department of Transportation—Metro Transit Division	Seattle	WA	2,615	Bus	Seattle, WA	2,712,205
New Jersey Transit Corporation	Newark	NJ	3,221	Commuter rail, light rail, bus	New York–Newark, NY–NJ–CT	17,799,861
Chicago Transit Authority	Chicago	IL	3,812	Commuter rail, bus	Chicago, IL–IN	8,307,904
MTA New York City Transit	Brooklyn	NY	9,551	Commuter rail, bus	New York–Newark, NY–NJ–CT	17,799,861

Notes

1. The "fishbowl effect" describes the situation in which a setting (e.g., a bus shelter) is brightly lit, but the surrounding environment is dark. In such a case, the passenger is seen, but he or she is unable to see others outside the bus shelter.

2. The survey template is available at http://www.its.ucla.edu/safety/instructions.htm

3. We sent hard-copy and electronic letters to the general managers of the 245 transit agencies asking them to designate the most appropriate person or persons to complete an online survey. In the case of smaller systems, this was often the general manager, and in larger systems, this was most often (but not always) the director of security or safety. Of the respondents, 76% were men.

4. In the directions given to survey respondents, we had defined environmental design strategies as "strategies working to deter or reduce crime through modifications in the built environment and physical space. These changes alter the social and physical use of space and help with surveillance and access control." One anonymous reviewer of this article commented that the survey could have offered response options detailing specific environmental design elements and that the relative lack of attention to environmental design strategies observed in the survey responses may have been real or a survey artifact.

5. Of the responding agencies, 92% have bus service, 27% manage rail systems, and two agencies provide some type of ferry service. About a quarter of agencies have various other modes as part of their systems, including paratransit, van pools, dial-a-ride or demand-response vehicles, people movers, and cable cars. Of the agencies with rail networks, about two-thirds (66%) have light rail, 40% have commuter rail, and 17% have heavy rail.

6. The survey also asked respondents to indicate the percentage of their overall budget that is allocated for security. Unfortunately, only a small number responded to this question, and thus, we are unable to report findings.

7. Environmental design strategies mentioned included lighting, solar lighting, transparent panels on bus shelters, and general crime prevention through environmental design (CPTED) strategies.

8. We asked respondents to rate the perceived effectiveness of security strategies on a scale from 1 = *not at all effective* to 5 = *very effective*.

9. Respondents listed a range of different security hardware strategies, including global positioning system (GPS) vehicle locators, two-way radios, wireless live surveillance, silent alarms for drivers, and electronic fare boxes. Of these additional hardware strategies, respondents mentioned GPS devices most often (15 respondents).

10. In addition, analysis of survey questions related to the safety and security needs of female passengers showed no statistically significant differences among respondents based on fleet size or types of modes in operation.

11. We thank an anonymous reviewer for this comment.

12. There have been three conferences in the United States explicitly on women's issues in transportation. The first was sponsored by the U.S. Department of Transportation in 1978. The second was sponsored by the Federal Highway Administration in 1996. The third, sponsored by the Transportation Research Board (TRB), took place in 2004 and produced two volumes of conference proceedings with research on women's issues in transportation (TRB 2005a, 2005b). The TRB has also established a committee on women's issues in transportation.

References

Atkins, S. 1989. *Critical paths: Designing for secure travel*. London: Design Council.

Austin, T., and E. Buzawa. 1984. Citizen perceptions on mass transit crime and its deterrence: A case study. *Transportation Quarterly* 38 (3): 103-20.

Boyd, A., and P. Boyd. 1998. Transit security handbook. Report FTA-MA-90-9007-98-1, DOT-VNTSC-FTA-98-4, FTA, U.S. Department of Transportation.

Brownson, R. C., E. A. Baker, R. A. Houseman, L. K. Brennan, and S. J. Bacak. 2001. Environmental and policy determinants of physical activity in the United States. *American Journal of Public Health* 91 (12): 1995-2003.

Carter, M. 2005. Gender differences in experience with and fear of crime in relation to public transport. In *Research on women's issues in transportation*, Vol. 2, *Conference proceedings 35*, 100. Washington, DC: Transportation Research Board.

Cherry, C., A. Loukaitou-Sideris, and M. Wachs. 2008. Subway station design and management: Lessons from case studies of contemporary terrorist incidents. *Journal of Architectural and Planning Research* 25 (1): 76-90.

Clancy, A., M. Hough, R. Aust, and C. Kershaw. 2001. *Policing and justice: The experience of ethnic minorities—Findings from the 2000 British Crime Survey*. London: Home Office.

Craig, C. L., R. C. Brownson, S. E. Cragg, and A. L. Dunn. 2002. Exploring the effect of the environment on physical activity: A study examining walking to work. *American Journal of Preventive Medicine* 23 (2): 36-43.

Department of Transport. 1997. *Crime concern and transport and travel research: Perceptions of safety from crime on public transport*. London: Author.

———.2002. *People's perception of personal security and their concerns about crime on public transport: Literature review*. London: Author.

Gilchrist, E., J. Bannister, J. Ditton, and S. Farrall. 1998. Women and the "fear of crime": Challenging the accepted stereotype. *British Journal of Criminology* 38:283-99.

Gordon, M., and S. Riger. 1989. *The female fear*. New York: Free Press.

Hall, R. E. 1985. *Ask any woman: A London enquiry into rape and sexual assault*. Bristol: Falling Wall Press.

Ingalls, G., D. Hartgen, and T. Owens. 1994. Public fear of crime and its role in bus transit use. *Transportation Research Record* 1433:201-11.

Junger, M. 1987. Women's experience of sexual harassment. *British Journal of Criminology* 27 (4): 358-83.

Khimm, S. 2006. Warning: No-groping zone. http://www.alternet.org/module/printversion/35753 (accessed June 6, 2006).

Koskela, H., and R. Pain. 2000. Revisiting fear and place: Women's fear of attack and the built environment. *Geoforum* 31:269-80.

LaGrange, R., K. Ferraro, and M. Supancic. 1992. Perceived risk and fear of crime: Role of social and physical incivilities. *Journal of Research in Crime and Delinquency* 29 (3): 311-34.

Larsen, V., and H. Topsøe-Jensen. 1984, November. *Urban planning and the everyday life of women*. Hørsolm: Danish Building Research Institute, Urban and Regional Planning Division.

Loukaitou-Sideris, A. 1997. Inner-city commercial strips: Evolution, decay—retrofit? *Town Planning Review* 68 (1): 1-29.

———. 1999. Hot spots of bus stop crime: The importance of environmental attributes. *Journal of the American Planning Association* 65 (4): 395-411.

———. 2005. Is it safe to walk here? Design and policy responses to women's fear of vic-
timization in public places. In *Research on women's issues in transportation*, Vol. 2,
Conference Proceedings 35, 102-112. Washington, DC: Transportation Research Board.

———. 2006. Is it safe to walk? Neighborhood safety and security considerations and their
effects on walking. *Journal of Planning Literature* 20 (3): 219-32.

Loukaitou-Sideris, A., R. Liggett, and H. Iseki. 2002. The geography of transit crime:
Documentation and evaluation of transit incidence on and around transit stations in Los
Angeles. *Journal of Planning Education and Research* 22 (2): 135-51.

Lynch, G., and S. Atkins. 1988. The influence of personal security fears on women's travel
patterns. *Transportation* 15:257-77.

Morrell, H. 1996. Women's safety. In *Changing places: Women's lives in the city*, edited by
C. Booth, J. Darke, and S. Yeandle. Thousand Oaks, CA: Paul Chapman.

Needle, J. R., and M. Cobb. 1997. *Improving transit security*. Transit Cooperative Research
Program. Washington DC: National Academy Press.

Pain, R. 2001. Gender, race, age, and fear in the city. *Urban Studies* 38 (5/6): 899-914.

Reed, T. B., R. W. Wallace, and D. A. Rodriguez. 1999. Transit passenger perceptions of
transit-related crime reduction measures. *Transportation Research Record* 1731:130-41.

Rohe, W. M., and R. J. Burby. 1988. Fear of crime in public housing. *Environment and
Behavior* 20:700-20.

Ross, C. E. 2000. Walking, exercising, and smoking: Does neighborhood matter? *Social
Science and Medicine* 51 (2): 265-74.

Scarborough Women's Centre/METRAC. 1991. *Making transit stops safer for women:
Scarborough moves forward*. Scarborough, Canada: Author.

Schulz, D., and S. Gilbert. 1996. Women and transit security: A new look at old issues. In
Women's Travel Issues Second National Conference. Washington, DC: Federal Highway
Administration.

Shen, D., D., Ospoina, F. Zhao, and H. Elbardawi. 1997. *Analyses of technologies and method-
ologies adopted by US transit agencies to enhance security*. National Urban Transit
Institute, Florida International University.

Smith, W., and R. Torstennson. 1997. Gender differences in risk perception and neutralizing
fear of crime—Towards resolving the paradoxes. *British Journal of Criminology* 37 (4):
608-34.

Stanko, E. 1990. *Everyday violence: Women's and men's experience of personal danger*.
London: Pandora.

Taylor, B., A. Loukaitou-Sideris, R. Liggett, C. Fink, M. Wachs, E. Cavanagh, C. Cherry, and
P. Haas. 2005. *Designing and operating safe and secure transit systems: Assessing current
practices in the US and abroad*. San Jose, CA: Mineta Transportation Institute.

Thrasher, E., and J. Schnell. 1974. Studies of public attitudes toward transit crime and van-
dalism. *Transportation Research Record* 487:26-33.

Transportation Research Board (TRB). 2005a. *Research on women's issues in transportation*,
Vol. 1, *Conference overview and plenary papers*, *Conference Proceedings 35*. Washington,
DC: Author.

———. 2005b. *Research on women's issues in transportation*, Vol. 2, *Technical papers*,
Conference Proceedings 35. Washington, DC: Author.

Trench, S., T. Oc, and S. Tiesdell. 1992. Safer cities for women: Perceived risks and planning
measures. *Town Planning Review* 63 (3): 279-93.

Valentine. G. 1990. Women's fear and the design of public space. *Built Environment* 16 (4):
288-303.

Wallace, R. R., D. A. Rodriguez, C. White, and J. Levine. 1999. Who noticed, who cares? Passenger reactions to transit safety measures. *Transportation Research Record* 1666:133-38.

Warr, M. 1984. Fear of victimization: Why are women and the elderly more afraid? *Social Science Quarterly* 65 (3): 681-702.

Wekerle, G., and C. Whitzman. 1995. *Safe cities: Guidelines for planning, design and management*. New York: Van Nostrand Reinhold.

Wilson, J. Q., and G. L. Kelling. 1982. Broken windows: The police and neighborhood safety. *Atlantic Monthly* 249 (3): 29-38.

Zelinka, A., and D. Brennan. 2001. *Safescape: Creating safer, more livable communities through planning and design*. Washington, DC: American Planning Association Planner's Press.

Anastasia Loukaitou-Sideris is a professor in the University of California, Los Angeles Department of Urban Planning. She specializes in urban design and physical planning. She is the coauthor of the book *Urban Design Downtown: Poetics and Politics of Form* (University of California Press, 1998), the coeditor of the book *Jobs and Economic Development in Minority Communities* (Temple University Press, 2006), and the author of many articles on transit and pedestrian safety and security, inner city revitalization, and cultural determinants of design.

Camille N. Y. Fink is a PhD student in the University of California, Los Angeles Department of Urban Planning. Her interests include transportation safety and security, transportation equity, qualitative methods in transportation research, and race, gender, and the built environment. She has a BA in sociology from UC Davis and an MA in urban planning from UCLA.