



# Perceived Risk and Fear of Crime in Public Transport Nodes: The Experience from Nigerian Transit Environment

Adewumi Israel Badiora<sup>1</sup>

Joseph Ayo Babalola University, Nigeria

Oluwole Samuel Ojewale<sup>2</sup> & Olasunkanmi Habeeb Okunola<sup>3</sup>

Obafemi Awolowo University, Nigeria

## Abstract

*This study examines perceived risk and fear of crime in Nigerian transit environment with a view to providing strategies to prevent crime in public transit systems. Systematic sampling was used to select one out of every ten commuters (10%). Data was collected with respect to three different periods; days in the week, days in the weekend and Christmas period. Relative to commuters' perception, robbery was revealed as the major threat in Nigerian transit environment. Victimization was higher at the routes between stop stations. Nonetheless, transit related crime also occur at stop stations, transits towns and paths within urban centres that have higher than normal rates of criminal activity in general. Findings further reveal that crime consistently does not peak during the day but are concentrated late at night. In addition, crime occur more in the weekends (52%) and festive periods (62%) than in the weekdays (48%) and non-festive periods (38%). Variables which were found to have significant association with commuters' fear were gender ( $\beta=0.542$ ;  $p=0.01$ ), age ( $\beta=0.644$ ;  $p=0.01$ ), and perception of crime rate ( $\beta=0.732$ ;  $p=0.00$ ). The study concluded that crime is very notable and may have a powerful negative effect on commuters and the degree to which people are comfortable using public transit in Nigeria.*

Keywords: Fear of crime, Transport nodes, Perceived risk, Crime pattern theory, Routine activity approach.

## Introduction

Being able to live in a safe environment is of high value to individual. Equally important is to have access to safe transportation. In a given environment, inhabitants move around between home and work and other daily activities either by foot, buses, trains and cars. Regardless of where they go, it has been noted that individuals are exposed

<sup>1</sup> Department of Urban and Regional Planning, Joseph Ayo Babalola University, Ikeji-Arakeji, Nigeria. Email : wumi\_zion@yahoo.com; aibadiora@jabu.edu.ng

<sup>2</sup> Department of Urban and Regional Planning, Obafemi Awolowo University, Ile-Ife, Nigeria.

<sup>3</sup> Department of Urban and Regional Planning, Obafemi Awolowo University, Ile-Ife, Nigeria.

to differentiated levels of risk of crime (Hägerstrand, 1972). Particularly, for those who use public transportation, individuals bundle their paths at specific points in urban space in the so-called 'public transport nodes'. Transport nodes are here defined as roads and those places along the road where people come together to embark or disembark on transportation in order to reach a new destination. Transport nodes therefore exist not only off a stop or station but also in the immediate surrounding environment. Transport nodes can be bus stops, rail stations or larger structures where several transportation modes come together, such as a central station (Ceccato, 2009). The use of the concept "transport node" however in this study is limited to the analysis of roads and bus stations along the roads.

Crime in public transport covers a wide range of offences that could occur in at least three different types of situation, namely: walking to, from or between transport facilities or stops (walking from departure point e.g. home to a taxi rank or back; from a taxi stop to a bus station; from a train station to destination point e.g. workplace or back); waiting at boarding points and facilities (e.g. taxi/bus stops, train/bus stations, modal interchanges etc.) and travelling on board a mode of transport such as a bus, train or taxi (Newton, 2004). The targets of crime also vary and could include crime itself (vandalism and fare evasion), employees (assaults on ticket collectors) and passengers (pick-pocketing, assault) (Smith & Clarke, 2000).

Fear of crime and perceived risk play an important role in commuter's decisions not to make use of certain types of public transport. Perceived risk is for the purpose of this study is defined as commuter's assessments of crime rates and the probability of victimization while fear relates to how vulnerable a commuter feels in transport environment. A number of studies highlight the impact of crime and the fear of crime on the use of public transport (Van der Reis 1980, 1997; Page et al, 2001). For example, in a study in Durban, Page et al (2001) found that one out of six of all the respondents making use of public transport had been a victim of crime. The most common types of crime experienced by the victims included pick-pocketing, bag snatching and jewellery theft, and in extreme instances few violent crimes such as assault, stabbings and rape had also been experienced. These incidents had all taken place in locations specifically associated with public transport such as train stations, taxi ranks, bus stops or modal interchanges, as well as on board trains and taxis (Page, et. al., 2001).

According to Uittenbogaard (2014), in the developing countries, fear of crime among commuters appears stronger and citizens feel less safe and are even afraid of using public transport. In the case of Nigeria, loss of lives on roads occasioned by crime and criminalities is on the increase and indeed worrisome (Omidiji & Ibitoye, 2010). The country has lost a good number of her productive populations to the incidences of crime on board public transportation, which most times result to road crashes (Agunloye, 1990). According to the Federal Road Safety Commission (FRSC), road transits crime is on the increase as road travel represents about 65% percent of all passenger journeys in Nigeria. In 2008 for instance, about 4,944 deaths occurred in 9,114 road crashes with 17,390 persons injured as a result of criminal activities. Although, the industry is certainly striving to encourage potential passengers, crime on the Nigerian highways has recently emerged as a high profile priority requiring scrutiny.

Despite these facts, incidence and the fear of transit crime are two of the more under researched areas in the field of crime prevention in Nigeria. This is the case with respect

to both the actual incidence of crime along transit corridors and the commuters' perception of crime associated with transit usage. This study arises not only because fear of transit related crime experienced by the general public has a profound effect on citizens' well-being and their choice of transportation (Cozens, Neale, & Hillier, 2004; Loukaitou-Sideris and Fink, 2009) but also the need to establish guidelines to best measure crime in public transit systems and identify the appropriate theoretical perspective(s) with which to do so in the country. Analyzing patterns of crime in these environments provides evidence of regularities of high risk areas, and therewith provide a legitimate basis for intervention. The most significant impact of this study is in contributing towards a better understanding of the safety conditions in urban environments, particularly related to transport nodes.

### **Factors and Theory of Crime in Transport Nodes**

While the major theoretical perspective used to explain risk and fear of crime in relation to movement is crime pattern theory, the routine activity approach assumed that for crimes to occur in any environment, there must be a convergence in time and space of at least three elements: a likely offender, a suitable target, and the absence of a capable guardian against crime. The approach in present study took the 'likely offender' as given and focused on the other two elements as mentioned in the routine activity theory. The guardian here was not usually a police officer or security agent but rather anybody whose presence or proximity would either prevent or discourage a crime from happening (such as neighbour, housewife, housemaid, children among others). Targets of crime can be a person or an object, whose position in space or time puts it at more or less risk of criminal attack. Nonetheless, both crime pattern theory and the routine activity approach consider how people involved in crime move about in space and time (Felson & Clark, 1998).

Crime pattern theory as a central component of environmental criminology has three major concepts which are: nodes, paths, and edges. "Nodes", which is a term from transportation, refers to where people travel to and from and such places has the tendency to generate crime within and also from the nearby. Thus the word "node" conveys a sense of movement and hence carries extra meaning about crime opportunities. In this case, each offender searches for crime targets around personal activity nodes (such as: home, school and road). In addition, the paths that people take in their everyday activities are closely related to where they fall victim to crime. This is why crime pattern theory pays so much attention to the geographical distribution of crime and the daily rhythm of activity. The third concept of crime pattern theory, i.e. edges, refers to the boundaries of areas where people live, work, shop or travel. Some crimes are more likely to occur at the edges such as robberies, or shoplifting because people from different areas who do not know each other come together at edges. The distinction between insiders and outsiders helps underscore the importance of edges, since insiders usually commit crimes closer to their own neighbourhoods, while outsiders find it safer to offend at the edges, then to retreat to their own areas.

Safety at transport nodes, paths and edges is related to a variety of factors which includes the road itself, bus stop stations and its environmental attributes. However, since transportation is embedded within a city's infrastructure, surrounding environment and neighbourhood as well as the larger context of the city play a role. These provide a socio-economic and urban perspective, representing the station's relative situation in the city's organization.

Transport nodes are not necessarily the foci for more crime incidences than other places in the city (LaVigne, 1997). Nevertheless, several studies advocate that they are places where crime concentrates. Transport nodes are crime attractors and crime generators (Brantingham & Brantingham, 1993; 1995) since they concentrate large flows of people creating both a 'blend-in opportunity' for offenders and provision of several potential targets. Smith and Clarke (2000) argue that transport nodes are the places where the connection between environment and occurrence of crime is actually most apparent. Studies have continuously argued for the influence of surrounding environments.

A couple of aspects in the vicinity of transport nodes affecting crime levels are for instance bars and alcohol shops (Block and Block, 1995), large infrastructures (Loukaitou-Sideris et al, 2002), commercial and entertainment centers (Kinney et al, 2008), youth hang-outs, parks, and schools (Newton and Bowers, 2007), and many more. For transport nodes, land-uses and social activities play a large role in influencing crime levels. The socio-economic situation of the neighbourhood is linked to crime levels at the station. It is proven that deprived areas with more crime have also stations with higher levels of crime (Pearlstein & Wachs, 1982). Often transport nodes are not a stand-alone feature in the urban space, but part of a larger structure and urban fabric. Commonly, they are surrounded by some forms of commercial activities and other mixed types of land-uses.

## **Literature Review**

Unlike developing nations, studies abound on perception of risk and fear of crime in transit environments of developed nations. For instance, (Loukaitou-Sideris & Fink, 2008) posited that the physical characteristics of the immediate neighborhood where a bus stop or station is located can affect people's risk perception and fear of crime. The specific design characteristics of a transportation setting can also induce fear among passengers (Wallace et al., 1999). 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 to escape. Underpasses, tunnels, and dark underground stations are typically more feared than open or ground-level transit facilities (Wilson & Kelling 1982; Zelinka & Brennan 2001). Cordner (2010) established that significant relationships exist between fear of crime and actual experience of crime on the one hand and a range of socio-economic and demographic variables including age, gender, ethnicity, education and land tenure among others.

According to Idaho State Police Statistical Analysis Center (2004), survey participants indicated feeling less safe on Idaho's highways than walking alone in their neighborhood at night. Studies on the perceptions of passengers in transit have revealed a number of issues related to passengers' risk perception about personal security. According to the Department of Transport (2002), fear of crime in transit is more pronounced in certain social groups than others. The study isolated gender as the most significant factor related to anxiety and fear about victimization in transit environments. However, Loukaitou-Sideris and Finck (2008) posited that 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 transit environments.

While these extant literature have suggested that fear of crime is among the most important reasons why people choose routes and whether not to use public transport

facilities, fewer studies in developing nations have focused on intra-urban analysis of the fear of crime among city dwellers (Aguda 1994; Alemika, & Chukwuma, 2005; Badiora & Afon, 2013; Badiora, Fadoyin & Omisore 2013). An array of studies that have been carried out on criminal activities spanned through ecology of crime, spatial pattern and risk perception in developing countries. The transit aspect of fear of crime on highways in the developing nations such as Nigeria has not been adequately documented.

### Data and Findings

The study adopted a case study method having studied the East-West road. This is a major Federal highway in Nigeria which traverses about seven states (Lagos, Ogun, Edo, Delta, Bayelsa, Rivers and Akwa-Ibom) as shown in Figure 1. The highway is very important to Nigeria's economy because it is the only major highway connecting the oil producing states in the south of the country to Lagos state (former capital city and now the commercial centre of the Country). The road is a busy Federal Road notable for heavy traffic throughout the year, especially during weekends and festive periods. This highway under study has been notable for incidence of crime for many years.



Data for this study were obtained from commuters of East-western highway in Nigeria. One out of every ten commuters of age 18 years and above (10%) was selected using systematic sampling. Data was collected first for a period of one week; covering days in the week and weekend. Second, Christmas week was purposively selected as festive period for study. Data collected included the commuters' socio-economic characteristics, purpose of trip and perception of different types of crime occurring along this route. In

determining perception of crime among the commuters, respondents were provided with a list of crime. They were further instructed to indicate the rate of occurrence of each of the identified crime type. They were to express their opinion using one of five Likert scales of ‘very frequent’ (VF), ‘frequent’ (F), ‘just frequent’ (JF), ‘not frequent’ (NF) and ‘not frequent at all’ (NFA). The analyses of the ratings indicated by commuters from the Likert’s scales adopted evolved into an index called “Rate of Occurrence Index” (ROI). To arrive at ROI, rating value of 5,4,3,2 and 1 were respectively attached to ‘very frequent’ (VF), ‘frequent’ (F), ‘just frequent’ (JF), ‘not frequent’ (NF) and ‘not at all frequent’ (NAF). The index for each type of crime was arrived by dividing the Summation of Rating Value (SRV) by the total number of responses.

The SRV for each type was obtained through the addition of the product of the number of responses to each type and the respective weight value attached to each rating.

This is mathematically expressed as: 
$$SRV = \sum_{i=1}^5 x_i y_i \dots \dots \dots (1)$$

Where: SRV= Summation of Rating Value;  $x_i$  = number of respondents to rating  $i$ ; and  $y_i$  = the weight assigned to a value ( $i=1, 2, 3, 4, 5$ ).

$$ROI = \frac{SRV}{\sum_{i=1}^5 x_i} \dots \dots \dots (2)$$

The index for each of the identified crime type thus takes a value of between 5 and 1. The nearer the value to 5, the higher is the rate of occurrence that residents attached to such crime type under consideration. Furthermore, the mean index was computed. This was obtained by summing the indices of crime types and dividing by the number of the identified crime ( $n=8$ ). This is denoted by  $ROI_m$ .

**Table 1: Commuters’ and Trip Characteristics**

Characteristics	%
<b>Gender</b>	
Male	64.0
Female	36.0
<b>Age Distribution</b>	
18-40 years	44.0
41-60 years	36.0
61 and above	20.0
<b>Purpose of Trip</b>	
Work	25.0
Socials	10.0
Personal	18.0
Business	35.0
Others	13.0

**N = 141**

Summary of commuters’ characteristics as presented in Table 1 revealed that male represented 64% while female accounted for 36%. The most common age range of commuters of East-western highway in Nigeria was 18 to 40 years (44%). Next to this category was 41 to 60 years, accounting for 36.0% while 61 years and above accounted for 20.0% of the commuters. Furthermore, trips’ characteristic reveals that commuters travel this highway for one or more purposes. Business purposes are revealed as the major reasons having accounted for 35% of the total trips on this route. Next to this were work trips (25%). While personal and social trips accounted for 18% and 10% respectively, other trip purposes such as school, educational, medical, recreation, shopping among others described 13% of the total trips along this corridor.

**Table 2: Commuters’ Perception of Crime Occurrences**

Likely Road Crime	Rating and Weight Value							
	VF (5)	F (4)	JF (3)	NF (2)	NAF (1)	SWV	ROI	MD
Robbery (Including Armed)	80	175	180	70	18	523	3.74	1.11
Stealing, Pilfering and Theft	30	205	160	60	31	486	3.47	1.07
Vehicle Hijacking	20	10	30	90	78	488	3.46	0.83
Vehicle Theft	60	120	190	86	23	479	3.42	0.79
Sexual harassment	30	75	135	88	48	376	2.69	-0.03
Rape (Including Attempt)	5	100	130	92	47	374	2.67	-0.04
Kidnapping	10	35	135	100	54	334	2.39	-0.24
Assassination	0	0	0	66	107	173	1.67	-0.96
Murder	0	0	8	6	105	141	1.00	-1.63

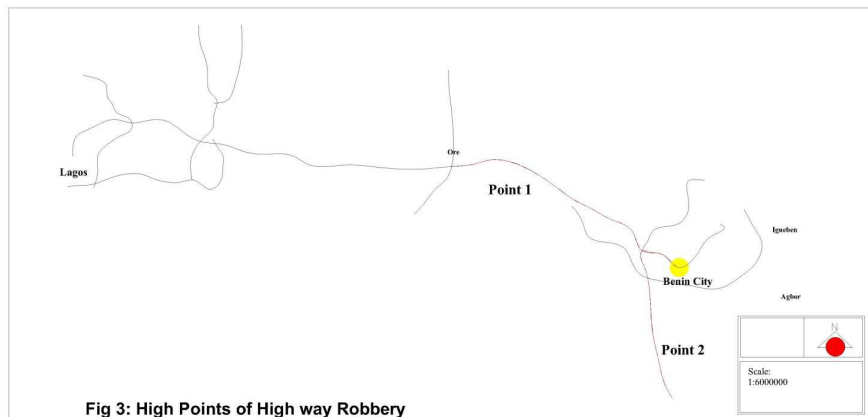
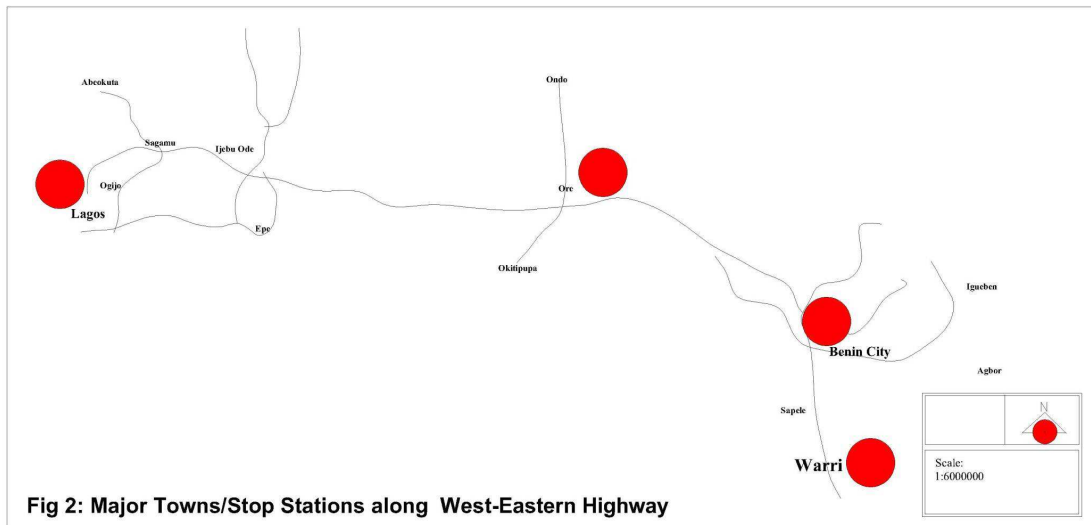
  

Time of Occurrence	Period of Occurrence			
	Weekdays	Weekends	Festive	Non-Festive
Day Time	13.7%	20.6%	23.4%	15.7%
Night Time (Dark)	34.3%	31.4%	38.6%	22.3%
<b>Total (Periods)</b>	<b>48.0</b>	<b>52.0</b>	<b>62.0</b>	<b>38.0</b>

$$ROI_m = \sum ROI = 24.51, ROI_m = \frac{\sum ROI}{(N = 9)} = \frac{24.51}{9} = 2.72$$

Relative to commuters’ perception, it was revealed that robbery was the major threat along this route with an index of 3.74 (See Table 2). Next to this were stealing, pilfering and theft (ROI=3.47). Other significant crime incidences along this highway include vehicle hijacking and vehicle theft. The ROI of these crime types are 3.46 and 3.42 respectively. Furthermore, with negative deviation from ROI<sub>m</sub> of crime types such as sexual harassment (- 0.03), actual and attempt rape (-0.04), kidnapping (-0.24), assassination (-0.96) and murder (-1.63), indicates that these might not constitute major challenge in this route. Commuters confirmed that these crime types were spread across

the bus stations and routes between stations. Commuters specifically identify transits' towns/stations such as Shagamu, Ijebu Ode, Ore, Benin and Warri as points of crime (See Figure 2). However, passengers face higher crime risk when moving to and from these towns/stations as routes between stations were identified as hot spots of highway robbery. Specifically, those routes identified were Ore-Benin route (labeled Point 1) and Benin-Warri Route (labeled Point 2) in Figure 3). Interestingly, Benin town/station was identified as highest point of victimization along this route (See Figure 3).





Summary in Table 3 revealed that in Nigerian transit environment, crime consistently occur more during the night time than in the day time. In addition, crime occur more in the weekends (52%) and festive periods (62%) than in the weekdays (48%) and non-festive period (38%). While 29% of the commuters felt very safe in the day time, only 11% felt very safe in the night. Furthermore, approximately 31% and 40% felt neither safe nor unsafe during the day and night time respectively. The findings of the study further revealed that approximately 3% and 7% felt very unsafe respectively in the day and night time. In summary, commuters’ security index (CSI) computed was 2.45 during the day and 3.51 in the night. These rating points gave indications that commuters felt neither safe nor unsafe during the day and night (See Table 3).

**Table 3: Feeling of Safety**

Commuters’ Level of safety	Rating Point	Day Time		Night Time	
		N	%	N	%
Very safe	1	41	29.3	16	11.4
Safe	2	48	34.3	50	35.5
Neither safe nor unsafe	3	40	31.4	57	40.3
Unsafe	4	06	04.2	09	06.4
Very unsafe	5	04	02.8	10	07.1
<b>Commuters’ Security Index</b>	<b>CSI</b>	<b>2.45</b>		<b>3.51</b>	

**Note:**  $CSI = \frac{SRV}{\sum_{i=1}^5 x_i} \dots\dots\dots (3)$

Where: SRV= Summation of Rating Value;  $x_i$  = number of respondents to rating i; and  $y_i$ =the weight assigned to a value (i=1, 2, 3, 4, 5).

**Table 4: Factors influencing Commuters’ Feeling of Safety**

S/N	Variables	Beta	Cumm (R <sup>2</sup> )	F-Ratio	Sig. level
1	Gender	0.542	0.584	14.44	0.01*
2	Age	0.644	0.573	10.27	0.01*
3	Purpose of Trip	0.532	0.631	03.58	0.13*
4	Perception of Crime/Risk	0.732	0.652	21.44	0.00*

N=141; Constant = 2.745

The important of some range of factors in explaining this pattern of commuters’ feeling of safety was examined. The technique used is the stepwise regression analysis which explains the effects of each factor on the dependent variable (in this case commuters’ feeling of safety). It also provides the net effect of variation of the independent variables on the dependent variable. This is presented in Table 4. Significant variable were selected based on the F-ratio value. It should be noted that F-ratio value of 4.0 or higher indicates a significant relationship in the multivariate context. Therefore, from the summary of F-ratio presented in Table 4, the independent variables which were found to have significant association with commuters’ feeling of safety were gender, age and perception of crime

rate. However, purpose of trip was found to be insignificant. The cumulative  $R^2$  for these entire variables was put at 0.652. Thus, these variables together explain 65.2% of the total variance in commuters' feeling of safety while the remaining 34.8% error term indicated that there were other important explanatory variables pertaining to commuters' feeling of insecurity which could be explored in future analysis.

## **Discussion and Conclusion**

Robbery and theft were identified as prevalent transits crime on Nigerian highways with space and time as independent, additive contributors to the risk of robbery and theft. From space dimension, victimization was higher at the routes between stop stations. Such usually do not occur on urban streets with natural surveillance (observers who would report threats). However, only when moving in isolated areas are transit passengers likely to incur high crime risk. However, routes between transit stations are not the only risky places. There is also risk at stop stations. Victimization are greatest at transits towns (an intermodal transportation station) with higher passenger densities. This has been consistently found over a number of years in other countries (Smith and Clarke, 2000; Smith and Cornish, 2006, Newton, 2004). Furthermore, transits related crime is most likely to occur along those routes within an urban centre that have higher than normal rates of criminal activity in general. For instance, contemporary history in Nigeria has come to recognize Benin as criminogenic society with higher than normal rates of criminal activity in the country (Ebohon, 2012). This is consistent with Pearlstein and Wachs (1982) and Newton (2004) observations that the external environment and public transport vehicle traverses can influence the level of crime.

In terms of time, transit crimes do not peak during the day, but are concentrated at night. At this time, neither community policing nor resident vigilante patrols are active. The ability of some potential targets to resist and the likelihood that their victimization will be observed are both low. Feeling of insecurity is higher at this time. In a study involving London taxi drivers by Mourato et al (2004), cited in Vanderveen, (2006) it emerged that one third of the drivers cited fear of crime particularly in the night time as the most pressing issue affecting their jobs. This is supported by Crawford's (1998) view that crime is one of the principal anxieties shared by the public. Aside from perceived risk, other variables which were found to have significant association with commuters' fear were gender and age. Hence, factors that contribute to fear of transit crime are not unique from those associated with crime in general. Yavuz and Welch (2010) added that the dynamics of vulnerability along transport nodes varied based on gender, ethnicity, age, and other factors. However, the differential experiences and levels of fear associated with transit crime between men and women were cited as an area in need of attention. Similarly, the study conducted by Department of Transport (2002) isolated gender as the most significant factor related to fear of victimization in transit environments.

On the whole, there is all evidence to suggest that transit related crime is becoming more serious. All indicators point out that, like the broader crime picture, transit crime is on the increase in the country. Fear of transit related crime is unique and poses challenges for transit authorities to contend with. Fear of crime is often significantly out of proportion with the actual incidence of crime and may have a powerful negative effect on commuters and the degree to which people are comfortable using public transit. It is therefore possible that a significant number of potential commuters simply will not use

public transit on account of fear. To this end, several strategies, including policing and crime prevention through environmental design (CPTED) have found varying degrees of success in addressing both crime and the fear of crime on and along transit nodes.

In respect of policing, adequate patrol should be on the highways and at stop stations. However, where the risk is high and widely dispersed within the transit neighbourhood, the root causes of crime rather than their symptoms must be attacked. Poverty and lack of jobs, resource control among others must be ameliorated within the neighbourhood before highway robbery can be reduced. It should be noted that where poverty is widespread and transit crime occurs anywhere, problem-oriented policing may be of little use in crime reduction.

In terms of environmental design, the security of transit passengers should extend from the bus stop or station platform (place) to the public environment that surrounds the transit stop (space) including the routes. Good visibility and pedestrian presence are important in reducing crime. Every effort should be made to site bus stops away from desolate spaces, empty lots, and vacant buildings and in front of establishments that offer opportunities for natural surveillance. The placement of bus stops near undesirable establishments such as liquor stores and bars and near facilities that favor many crime attraction transactions should be avoided. In addition, ways of entry and exit into stations should be limited.

Since most of the highway robbery occurred in the night time, it may be appropriate to install good lighting on the highway, in particular for problem areas as dark spots. Put signs in place of control and consequences for violation of rules. A more directly effective crime prevention strategy would be to increase control through guardianship, cameras and presence of informal guardians. Because crime tends to be concentrated disproportionately in specific dangerous areas, a regular security audit by transit authorities will reveal the hot spots of crime at the bus stops or transit stations. This audit could be used to guide a targeted deployment of security personnel to the most dangerous spots during the most dangerous times. For bus stops, specifically, patrolling police should reduce opportunities for crime.

Using the example of a building with a broken window that remains unrepaired, Wilson & Kelling (1982) suggested that a society or section of society that appears to be lawless will itself breed lawlessness. Therefore, the upkeep, good maintenance, and cleanliness of the transit environment are of paramount importance for the safety of commuters. Incidents of vandalism that plague transit systems can be reduced through the use of vandal-resistant materials. Transport as well as city agencies should strive to keep the environment free of litter, thus sending the message that authority other than the criminals is in control of the transit stop and its environment. Finally transit environment should be safe and comfortable. Good planning and design can definitely increase the odds that the trip to home or work and others will be a safe one in the country.

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