

**A STUDY OF ASSOCIATION BETWEEN FEAR OF CRIME
OF PEOPLE AT BUS STOPS AND FEATURES OF STREET
SEGMENTS**

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ABSTRACT:

Fear of crime is one of the prime concerns for people apart from traffic related safety and comfort while waiting at the bus stops. The major determinants of fear of crime include socio- demographic variables, direct and indirect victimisation, physical and social incivilities, and the physical environmental cues. The environmental cues that influence the fear of crime are created mainly by the planning, design and detailing of built environment and landscape features. In bus stop environments the features of the street segment in which the bus stop is located contribute to the environmental cues in addition to the features of the bus shelter and the surrounding built environment. The association between fear of crime of people at bus stops during night hours and features of street segments such as width of the road, street lighting, landscape elements such as trees and street hardware, on-street parking and pedestrian traffic were investigated in this study. Street characteristics of selected bus stops in Tiruchirappalli were recorded and the people waiting at the bus stops were interviewed to assess the fear of crime. Features such as street lighting, on-street parking and pedestrian traffic were found to be associated with fear of crime, whereas significant associations could not be established in case of street width, trees and street hardware from the results of the analyses using Analysis of Variance (ANOVA) and t-tests.

Keywords: Fear of Crime, Bus Stops, Street Physical Features, Street Lighting, Pedestrian Traffic.

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1. INTRODUCTION:

In most of Indian towns and cities bus is the major or only form of public transportation available for intra-city movements and bus stops are the first point of contact between the passengers and the bus service. Fear of crime is one of the prime concerns for people apart from traffic related safety and comfort while waiting at the bus stops. The perception of personal security at bus stops may affect travellers' decisions of what routes or stops to use or the confidence in using those routes or stops (Tucker 2003). Previous researchers have shown that many of the factors that influence fear of crime of people in general also explain fear of crime of people travelling on public transport (Stafford and Pettersson 2002). The major determinants of fear of crime include socio- demographic variables, direct and indirect victimisation, physical and social incivilities, and the physical environmental cues. Environmental cues of urban settings serve as signals, interpreted by the people and categorise the setting either safe or threatening at the micro level (Nasar and Jones 1997). The environmental cues that influence the fear of crime are created mainly by the planning, design and detailing of built environment and landscape features of the setting. The bus stop settings include the actual bus stops, street segment in which it is located and surrounding built environment. Specific environmental design recommendations are developed for location and design of bus stops in countries like USA and UK based on research studies, which need to be tailored for Indian context. Though people have raised concerns about the crime and fear of crime in urban public places such as bus stops in major cities, not many studies focus on the role of physical design aspects of urban environments in the reduction of both crime and fear of crime in India. Hence the association between fear of crime of people at bus stops during night hours and one group of physical features of bus stop settings, namely the features of the street segment in which the bus stops are located were investigated.

2. REVIEW OF LITERATURE:

2.1 Fear of Crime and its Effects on People at Bus Stops

Personal safety concern is one of the factors that influence the choice of mode of transport apart from comfort, convenience, reliability, carrying luggage, and fast journey times. Fear of crime of

people is clearly a limiting factor to patronage and levels of usage of public transportation (Levine and Wachs 1986). Due to crime and fear of crime people make less use of public transport, and resort to private modes of transport (Stafford and Pettersson 2002). Bus stops are identified as common settings for crime as they provide cover for criminals who hang out waiting for potential victims without arousing any suspicion (Loukaitou-Sideris and Liggett 2000). Transit stations either generate crime and disorder by producing crowds; or opportunities for crime due to lack of surveillance and deserted at times. Crowded stations facilitate picking pockets, while isolated, empty stations permit muggings or rapes (Richards and Hoel 1980). Such conditions also increase the fear of crime of passengers. Most of the bus-related crimes were found to occur at the bus station or whilst in its immediate proximity (Levine and Wachs 1986). Passengers are more fearful during their wait for the bus apart from their journeys to and from the stop.

2.2 Predictors of Fear of Crime at Bus Stops

Fear of crime is generally influenced by broad range of factors including personal, social, cultural and environmental features. Gender and age emerged as the predominant predictors of fear of crime in transit environments (Stafford and Pettersson 2002). Women are more afraid in bus stops mainly because of nuisance behaviours such as drunkenness, obscene language, verbal threats, and groping apart from crimes (Loukaitou- Sideris 2005). Eve teasing - the name given to a nuisance behaviour in India appears to have widespread concern among women when they venture out into a variety of public places including bus stops (Smith 2008). Older people feel progressively less safe than younger people (Stafford and Pettersson 2002). Strangers to a public transportation setting feel more vulnerable than those who know their way around. Direct experience or victim of a crime incident was found to contribute significantly to levels of fear. Television and newspapers reporting of most crime incidents can also give rise to fear of crime (Lynch and Atkins 1988). Fear is much greater at night on public transport, for all sections of people. Increased fear of crime during night hours may be due to general darkness, presence of lesser number of people (Lynch and Atkins 1988), and likelihood of encountering drunks and rowdy groups (Stafford and Pettersson 2002). One of the main factors contributing to fear appears to be the presence of drunks and beggars, whose behaviour is felt to be erratic and unpredictable, and hence potentially violent. Fear of crime of people at bus stops is also

influenced by the design features of bus shelters and the features of the immediate surrounding environment of bus stops in addition to personal factors, previous victimisation and presence of non- passengers at bus stops.

2.3 Fear of Crime and Environmental Features

People act and behave differently in different settings. People have the ability to distinguish the environments that are safe from environments that are dangerous (Nasar and Fisher 1993). The sources and consequences of fear of crime reflect the processes of environmental perception, and the environment experienced by an individual is a product of the interplay of personal, social, and contextual factors (Ward et al. 1986). The contextual factors include the physical aspects of spaces which can serve as cues to danger for normal users, or as cues to crime opportunities for perpetrators (Nasar and Fisher 1993). The environmental cues that tell normal users of the space that they are safe have an inverse effect on the potential offenders by increasing the perception of risk (Crowe 2000). Previous studies have identified various environmental cues associated with fear of crime, ranging from generalised cues such as darkness to detailed cues. The important cues include darkness (Warr 1990); territoriality (Newman 1972; Taylor et al. 1984); surveillance (Jacobs 1961; Newman 1972); prospect, entrapment, and concealment (Nasar and Fisher 1993; Nasar and Jones 1997); physical and social incivilities (Wilson and Kelling 1982; Taylor 1997); and the presence of bystanders or companions (Warr 1990).

In transportation settings such as bus stops, the physical environment cues may signal crime opportunities and also affects the fear of crime (Smith 2008) as in the case of any other urban spaces. The socio-physical characteristics of a place such as the number of people present, the level of surveillance, physical layout, and environmental attributes can have positive or negative effects on crime (Loukaitou- Sideris et al. 2002) at bus stops. Tucker (2003) pointed out that the image of safety and security at bus stops is influenced by bus stops location, shelter design, and environmental attributes surrounding the bus stops. Vogel and Pettinari (2002) consider ownership, activity and land use, visibility, mobility, and readability to be the principles of personal safety and security in relation to transit stop environments. Thus the physical characteristics of the bus stops and their surrounding environment can affect people's perception of risk and fear.

2.3 Fear of Crime at Bus Stops and Features of Street Segments

The bus stop environment include the actual bus stops, street segment in which it is located and surrounding built environment. The features of street segments also contributes to various environmental cues related to fear of crime in addition to features of bus shelters and surrounding built environment. In narrow streets the distance between bus stop and the buildings located on the opposite sides of the bus stop gets reduced and this might offer better natural surveillance from the buildings. This may instill some sense of security to people waiting at the bus stops as they can hope to get help easily or move to a safer place in case of any threat. Good street lighting encourages presence of more people on the street, increase surveillance and enhances perceptions of personal security of people at bus stops. If street lighting provides non-uniform lighting of streets, then dark areas are created which limit prospect and offer hiding places for offenders and thereby enhance the concerns about personal security of people at bus stops. Presence of on-street parking particularly four wheelers, large trees and street hardware present on the streets may offer hiding places, block visibility and block street lighting, and thereby may increase the concerns about the personal security of people. The pedestrian traffic may have a positive impact on the perceptions of personal security as the presence of more people on the streets increase the natural surveillance and as well give a confidence to people waiting at the bus stops that there are people around to help in case of any threat.

3. METHOD:

3.1 Selection of Bus Stops

The bus stops for the present study were selected in the city of Tiruchirappalli, the fourth largest city (corporation) in Tamil Nadu state, with an approximate population of 1 million in the year 2010. Bus transport is the only form of public transportation available for the intra-city movements in Tiruchirappalli. All areas within corporation limits and the outskirts of Tiruchirappalli are well served by wide network of intra-city bus transportation operated by state owned transport corporation and private agencies. The shelters at bus stops are provided and maintained by the city corporation authorities on their own or with the funding from business establishments. Based on the reconnaissance survey the bus route from KK Nagar, a fast growing

suburb of the city to Srirangam, a historic temple town was selected for this study. In this bus route 10 bus stops having diverse characteristics of street segments were selected. The selected bus stops were labelled from A to J as shown in Fig. 1.

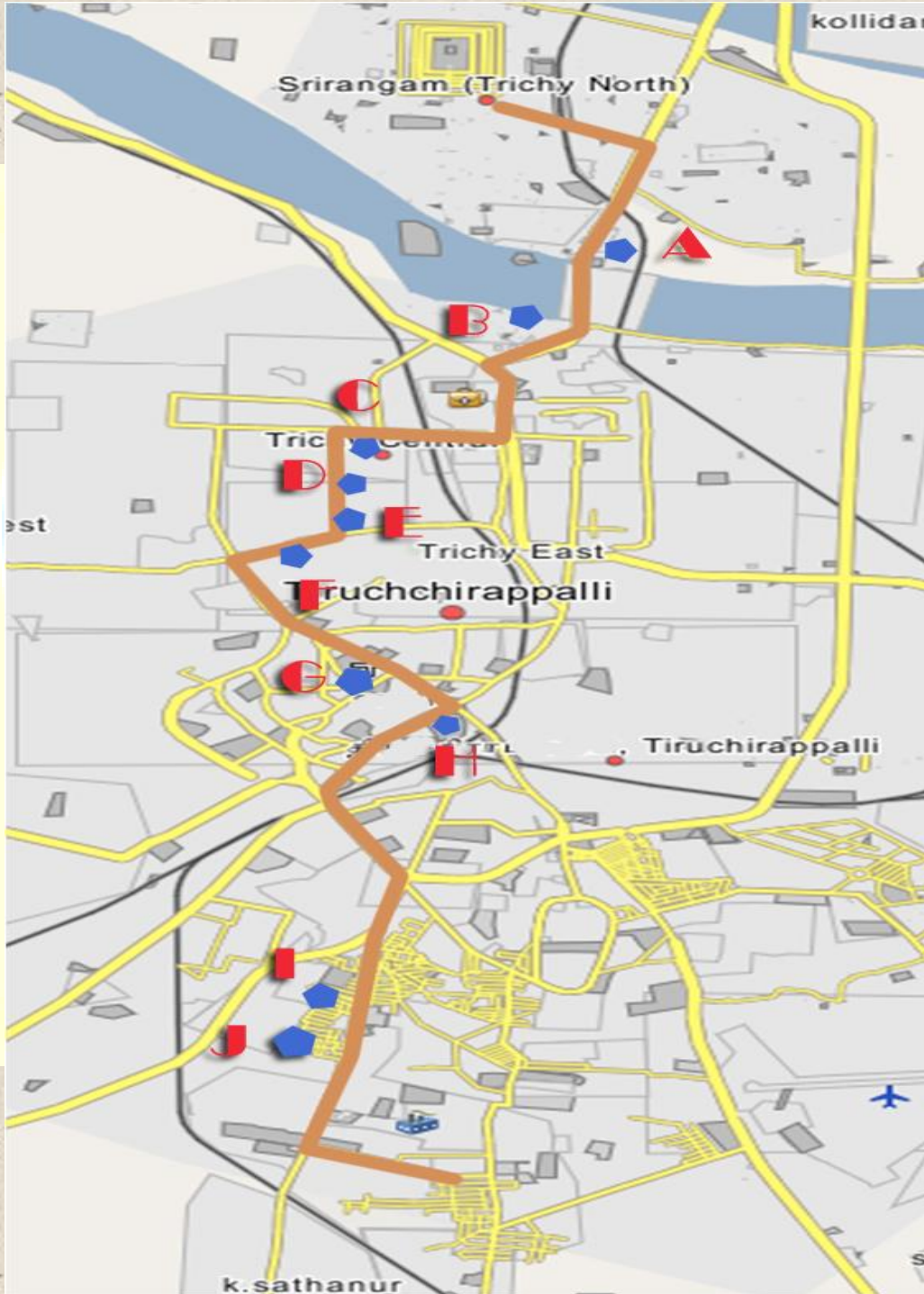


Fig.1 Map of Tiruchirappalli showing the Bus stops locations

3.2 Rating of Features of Street Segments of Bus Stops Locations

Five trained under-graduate students of Architecture rated the selected features of the street segments of bus stops and the actual users of the bus stops were interviewed to measure the perceived security levels. The practice of using expert group to rate the features of the environment and the actual users for safety ratings was employed in many studies on fear of crime and features of environment (Nasar and Fisher 1993; Wang and Taylor, 2007). The street segment measuring 45 metres radius around the bus stops along the roads in which the bus stops are located was considered for recording of features of street segments in this study. The students visited the selected bus stops between 6 P.M. and 9.30 P.M. and independently rated street segment of each selected bus stop. Street (road) width was measured in terms of number of lanes. The street lighting was measured by the qualitative assessment of absence of shadows on a five point scale ranging from 1 (too many) to 5 (none). The presence of on-street parking of vehicles very close to the bus stops was recorded. Number of large trees and street hardware such as dustbins, post boxes, etc., that may block the visibility of people at bus stops and offer places for someone to hide easily were counted for each bus stop locations. Pedestrian traffic on streets in terms of number of people on streets excluding the people at bus stops was counted at a given point of time.

3.3 Fear of Crime

People waiting at the bus stops were asked to report their fear against crimes such as theft, pick pocketing, chain snatching, etc., and fear of harassment crimes or nuisance behaviour separately on 5-point scale ranging from very high (5) to not at all (1). The survey was carried out on two or three days (holidays and festival seasons are excluded) in each of the bus stop between 6 P.M. and 9.30 P.M. The overall sample of all bus stops consisted of 340 people and in each bus stop the numbers of people surveyed vary from 27 to 42. The overall sample consisted of 152 male and 188 female; and 153 people below 30 years of age, 160 people in the range of 31- 50 years of age and 27 people are above 50 years of age. The survey also collected information on sex, age and frequency of use (familiarity) of the particular bus stop. The people waiting at the bus stops were selected at random for the interview and ensured to the extent possible that the next person interviewed is of opposite sex and from different age group.

4. ANALYSIS AND RESULTS:

4.1 Fear of Crime at Bus Stops

Fear of crime of each respondent was arrived at by taking the mean score of the fear about general crimes and fear about harassment crimes or nuisance behaviours as the fear of individuals are combination of both. The bus stops level data on reported fear of crime is given in table 1.

Table 1: Mean Fear of Crime at Bus Stops

Bus stop	A	B	C	D	E
Fear of Crime	2.41 _{abc}	1.66 _d	2.06 _{bcd}	1.66 _d	1.87 _d
Bus stop	F	G	H	I	J
Fear of Crime	2.16 _{bcd}	2.37 _{abc}	2.53 _{ab}	2.44 _{ab}	2.76 _a

Note: Means with same subscript did not differ significantly from each other, whereas means with different subscript differ significantly from each other.

Simple Analysis of Variance (ANOVA) revealed significant differences [$F(9,330) = 8.809$, $p < .001$] in the levels of fear of crime of people among the bus stops. Based on the post-hoc analysis of bus stops level fear of crime of people, the bus stops were categorised into five groups as described below: B, D and E as very safe; C and F as safe; A and G as neutral; H and I as unsafe; and J as very unsafe bus stops.

4.2 Fear of Crime and Personal Characteristics

During night hours, female reported more fear ($M=2.50$) than male ($M=1.86$) and the difference was statistically significant $t_{(338)} = 7.806$, $p < 0.001$ for the combined sample of all bus stops. At the individual bus stops also female reported more fear than male during night times. For the combined sample of all bus stops, ANOVA revealed a significant difference in the fear of crime among people of different age groups [$F(2,337) = 18.320$, $p < .001$]. Pair-wise comparison revealed that the fear of crime of each group of people was significantly different from the other group. People in the age group below 30 reported less fear ($M=1.95$), followed by people in the age group 30 – 50 ($M=2.36$), and people in the age group above 50 reported maximum fear of crime ($M=2.78$). ANOVA revealed that the fear of crime during night hours did not vary

significantly [$F(2,337) = 3.821, p > .01$] among the three groups of people based on frequency of use of bus stops for the combined sample of all bus stops.

4.3 Street Width

Three groups of bus stops were formed based on street width, namely bus stops located in streets of four lanes with central median, four lanes and two lanes. There difference in the mean fear of crime [$F(2,337) = 0.552, p = .576$] among the bus stops groups based on their street width was not statistically significant. It was observed that the fear of crime of people at bus stops located in streets of four lanes with central median ($M = 2.15$) and of bus stops located in streets of four lanes ($M = 2.21$) were marginally low compared to the mean fear of crime of bus stops located in streets of two lanes ($M = 2.29$). From the fear level individual bus stops present in each street type, clear association between the fear of crime and street width could not be established. Hence it may be assumed that the fear of crime of people waiting at the bus stops during night hours may not be influenced by the respective street widths in which the bus stops are located.

4.4 Street Lighting

Uniform street lighting without shadows and dark spots was considered as good lighting and street lighting with shadows and dark spots was considered as poor lighting. Accordingly the bus stops were classified into two groups i.e., bus stops with good street lighting and poor street lighting. The mean fear of crime of people at bus stops group with poor street lighting was higher ($M = 2.54$) than that of bus stops group with good street lighting ($M = 1.98$) and the difference was statistically significant $t_{(338)} = 6.596, p < 0.001$. At the individual bus stops level, the bus stops with poor street lighting were rated as very unsafe and unsafe bus stops; whereas the bus stops with good street lighting were rated as neutral, safe and very safe bus stops.

4.5 On-Street Parking Near Bus Stops

The bus stops were categorised into two groups based on the presence or absence of on-street parking near bus stops. The results of t- test revealed that the mean fear of crime of people

during night hours at bus stops with on-street parking ($M=2.37$) was higher than that of bus stops with out on-street parking ($M=2.05$) near bus stops and the difference was statistically significant $t_{(338)} = 3.622, p < 0.001$. The vehicles parked on streets block the easy movement and visibility of the people into and from the bus stops could be the reason for the association between on-street parking and fear of crime.

4.6 Trees Near Bus Stops

Two groups of bus stops were formed based on the presence or absence of large trees that block movement and visibility near bus stops. The mean fear of crime of bus stops with trees ($M=2.21$) was marginally lower than that of bus stops without trees ($M=2.24$) near bus stops and the results of t- test revealed that the difference was not statistically significant [$t_{(338)} = 0.283, p = 0.777$]. From the fear level of the individual bus stops present in the both the groups also the clear link between the presence of trees and fear of crime of people could not be established. So it may be assumed that trees present around the bus stops may not have a direct impact on the fear of crime of people waiting at the bus stops during night hours.

4.7 Street Hardware

Two groups of bus stops were formed based on the presence or absence of street hardware such as large post boxes, dust bins, transformers, etc. The mean fear of crime of bus stops with street hardware ($M=2.02$) was almost equal with the mean fear of crime of bus stops without street hardware ($M=2.01$) near bus stops and the results of t- test revealed that the difference was not statistically significant $t_{(753)} = 0.118, p = .906$. The fear levels of the individual bus stops present in both the groups also indicated that logical relationship between street hardware and fear of crime did not exist.

4.8 Pedestrian on Streets

The bus stops were categorised into three groups, namely bus stops with high, medium and low pedestrian traffic on streets. In this study, the pedestrian traffic was considered as low when there

were less than five people on streets; as medium when there were five to nine people on streets; and as high when there were ten or more people on streets, as adopted in the study on effects of built environment on bus stop crime (Loukaitou- Sideris et al., 2001). ANOVA revealed a significant difference in the mean fear of crime [$F(2,337) = 25.776, p < .001$] among the three bus stops groups based on the number of pedestrian on street. Pair-wise comparison revealed that the mean fear of crime of each group of bus stops is significantly different from the other group. It was observed that the mean fear of crime of people at bus stops with high pedestrian traffic was the least ($M=1.82$) followed by bus stops with medium pedestrian traffic ($M=2.18$) and the mean fear of crime of people at bus stops with low pedestrian traffic ($M=2.58$) was maximum during night hours. At the individual bus stops level, bus stops with high pedestrian traffic were rated as very safe and safe bus stops; bus stops with medium pedestrian traffic were rated as very safe, safe and neutral bus stops; and bus stops with low pedestrian traffic were rated as unsafe and very unsafe bus stops.

5. CONCLUSIONS:

This study clearly established that fear about personal security is prevalent during night hours in public places like bus stops in India. The significant variation in fear of crime expressed by people among the bus stops indicates that the fear of crime is influenced by the physical features of the bus stop locations in addition to personal and socio-economic characteristics of people. As reported in various studies on fear of crime, female and elderly people reported more fear compared to male and younger people respectively. Significant association between familiarity of the place and the fear of crime at night times could not be established in this study. Clear link between fear of crime of people at bus stops during night hours and the street width of bus stop locations could not be established. The reason could be that the buildings on opposite side were within the visible ranges of people at bus stops located in different types of streets considered for investigation. To ascertain the influence of street width on fear of crime of people at bus stops research may be extended by incorporating bus stops that are located in very wide streets. In this study, it was found that people expressed less fear at bus stops located in areas with good street lighting compared to bus stops located in areas with poor street lighting. As the findings indicate uniform street lighting is crucial for the perception of personal security at bus stops, the location

of the bus stops may be integrated with the existing street lighting. The mean fear of crime of people at bus stops with on-street parking was higher than that of bus stops without on-street parking close to the bus stops. The reduced visibility into and from the bus stops and possible restriction for the free movement of people could be the reason for increased fear of crime during night hours. Also clear link between fear of crime of people at bus stops and the presence of trees on streets and street hardware could not be established. This may be due to the reason that people may not consider trees on streets and street hardware as possible hiding places due to increased presence of pedestrian on streets. The fear of crime of people at bus stops was found to be inversely related to the pedestrian traffic of the streets. Bus stops located on streets with high and medium pedestrian traffic were rated safer than those located on streets with low pedestrian traffic. During night hours the increased pedestrian traffic on streets enhances natural surveillance and also gives confidence of getting help in case of any threat.

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