A STUDY OF THE IMPACT OF BOUNDARIES IN URBAN PUBLIC SPACES ON USER PERCEIVED SAFETY

S.J.A.T.Rukshan*, D. P. Chandrasekara**
Department of Architecture, University of Moratuwa, Moratuwa, Sri Lanka

Abstract

Perceived safety of a public space is an important factor because it encourages visitors to enjoy available public spaces. In an urban environment, perceived safety relates to its urban boundaries. This research study investigates the impact of urban boundaries on user perceived safety in urban public spaces in reference to Sri Lankan context. The objectives of this study are to investigate how the physical and surface boundaries relate to the perceived safety and to understand the significant safety factors of boundaries which influence for the perceived safety. According to the theoretical framework, six safety factors were selected which relate to perceived safety of urban public spaces. Those factors were visibility, enclosure, accessibility, social interaction, territoriality and maintenance. The data was collected at Kalutara Children Park which has considerable public open spaces. The findings of the study reveals that the surface boundaries generate a high level of perceived safety than the physical boundaries. The perceived safety caused by grass, paving stones, kerbs and fences are higher than that of shelters, hedges, water, wall, and gates. The perceived safety created by boundaries is linked to safety factors .The findings of the study points out that safety factors of visibility, enclosure and social interaction play an vital role in enhancing the perceived safety.

Keywords: Perceived safety, Safety factors, Boundaries, Urban public spaces.

1.0. Introduction

Due to rapid urbanization, the human life styles have become complex. In the context it is important to find out the ways to create more interconnections not only among people humans but also among the people and the environment.

Elements in an urban space can affect the space-user interconnection. The elements also create the boundaries of the space. "Without boundaries, there is no space" (Ashihara ,1983). Hence boundaries play a significant role in the design of urban public spaces. The main function of a boundary is to separate space (Ozaki and Lewis, 2006) and to affect human behaviour and interactions (Lawrence, 1984). Hence, boundaries can affect user perception on perceived safety as physically and mentally. (Ozaki and Lewis, 2006)

* Corresponding Author: S.J.A.T.Rukshan; E-mail- rukshanthamila@gmail.com
** Corresponding Author: D.P.Chandrasekara; E-mail- dpcha@uom.lk

Perceived safety is one of the critical aspects of the quality of human life. People are incapable to receive a positive image and experience the environment when there is less perceived safety as both mental and physical contacts are negatively affected. Use of urban public spaces is extremely dependent on the feeling of safety by the users. (Bedimo-Rung et al., 2005).

1.2.Research Need of Study

With the rapid urbanization of Sri Lanka, it can be seen that more and more outdoor public spaces are designed for the wellbeing of urban dwellers. It is observed that certain such   public spaces have attracted general public more. The users tend to stay in these places for a long time. In addition higher level of social interactions can be noticed within these spaces. On contrary, it is clear that several other designed public spaces are abandoned by the people. They have failed to attract people or the stays in such spaces have become very short.

The existing studies reveal that the public spaces which have been designed without considering the significance of boundaries and their qualities have less safety (UCL,2014) . It is one of the key factors for the neglect   of the space. The broader aim of the study is to find out how the boundaries of public spaces affect the user perceived safety in Sri Lankan context.

The two main objectives of the study are;

• To investigate how the physical boundaries and surface boundaries relate to the perceived safety

• To understand the significant safety factors of boundaries which influence for the perceived safety.

1.3.Limitations of the study

The scope of the study is limited to the parks as the urban open spaces as they are the main gathering spaces of general public in Sri Lanka. The study limits to within western province and only day time observations.

A scholars have classified urban boundaries into four categories as physical, surfaces, signs and lines and personal boundaries. This study focuses attention to physical and surface urban boundaries among them.

2.0.   The Theoretical framework

The quality of outdoor human activities are strongly influenced by the physical environment. There are different types of physical boundaries used to define or separate the urban space. Some of them are walls, gates, fences, kiosks, trees, booths and hedges. Ozaki and Lewis (2006) describe the basic function of boundaries as to separate spaces. The boundaries and space act as both sides of the same coin. Without boundaries, space cannot represent its beginning or the end. On the other hand without space, boundaries have no carrier. Thus there is a strong relationship between boundaries and space.

Sack (1986) interpreted the boundaries as "signifiers of space". Blomley (2005) has described "boundaries as succinct statements' enhancing the direction of space. The boundary plays an important role of unifying the insides of the space that they mark. (Lynch, 1960).

 Urban life and urban spaces transform rapidly in the modern world. As an important element of space, the boundaries also change while generating many forms, characters with the effect of human interaction and human behaviours. Hsia (1994) described that quality of the space is affected by human interactions with boundaries and in the other hand, design of those

boundaries defines the quality of urban life in that space. Lawrence (1984) mentioned that daily affairs and behaviors during human interactions with the urban space are regulated by the limits of boundaries.

According to Ozaki & Lewis (2006) boundaries exist with our social environments. They also play an important role in characterizing both physical space and the psychological world (Baroth et al., 2011;). Ashihara(1983) stressed that in reference to aesthetic townscape, that "without boundaries, there is no space".

The boundaries in landscape space can be categorised in to several types

- Impermeable boundaries
- Permeable boundaries
- Temporary boundaries
- Rough boundaries
- Smooth boundaries

One of the basic human needs is safety and it enhances the quality of life. It was defined as "the state of being safe; freedom from the occurrence or risk of injury, danger, or loss". It can be categorized in to two parts as physical and psychological safety with the consideration of human needs in human life. Psychological safety is very important for humans when they have to control over their environment, to know where they are in space and in time. (Feagan, 2011)

Prospect and refuge theory

According to the Appleton's discussion on the theory, that people desire second level of prospect and the refuge which is offered by the environment. They prefer areas with broad open views. Appleton(1975) argues that protection is made according to the level of attention. and suggests that the attention would be made by pure aesthetic preference and it's the mechanism for directing attention based on the perceived safety/danger potential in landscapes. The aesthetic appeal would be different based on the brightness levels and the scale of the views. The theory identifies three important factors for the user perceived safety. They are enclosure, visibility and interaction. (Appleton, 1975)

Enclosure

Schulz (1976) mentioned enclosure as boundaries of openings of a built space and landscape. In another way, it refers to the degree of visually demarcations of streets and other public spaces by soft and hard landscape elements such as buildings, walls, level changes, fences, trees and lighting.

Visibility

User visibility relates with the ability to seen and to be seen. Clear visibility provides a visually permeable environment where user can clearly see the surrounding area. Also, clear visibility of an area create and increases to feel safe and may encourage use. Hence, the important of clear visibility in the design of an area to decrease the opportunity for crime is critical.Visibility directly relates to pedestrian safety and perceived safety in public buildings. (Stoker et al., 2015)

Interaction

Social interaction and use of the space highly depend on feeling of safety in space. Newman (1972) indicated "the influence of physical, social and managerial predictor variables on crime, fear and insecurity is through mediating variables which are use of space, social interaction and control of space".

Crime Prevention Through Environmental Design (CPTED) Principles

Crime prevention through environmental design, (CPTED) is a successful method to provide safer neighborhoods with manipulating the built environment and it helps to improve the quality of life. Basically, CPTED provides proper design and effective use of the built environment and that helps to reduce the fear of crime and incidence. The concept of CPTED generated to provide high quality and visually pleasing solutions as first responses that aim to enhance the legitimate use of space. Originally, CPTED was introduced by criminologist Jeffery , (1970) and was developed by "Defensible space theory" (Newman, 1972). CPTED emphasizes the following three design approaches indicating boundaries of urban space.

- Natural access control
- Natural territorial reinforcement
- Maintenance and Management

Natural access control

Natural access control helps to clearly differentiate between two spaces as public space and private space. So, the target for crime is reduced according to above mentioned factor. When natural access control occurs, it provides limitations to access or control flow by properly placed physical barrios as entrances and exits, shrubs, lighting, fencing and landscaping. In addition, access control can be providing with psychological barriers as the forms of signs, nature strips and paving textures.

Territorial reinforcement

Territorial reinforcement encourages sense of ownership in space, it formed by the land value of space. Land value is one of factors affects for the human usage of space. The land use values naturally form the safety and neglected spaces. The ownership can express by using Clear boundaries between private and public areas such as pavement treatment, fences, signs, art and landscaping. In well-defined spaces it is very easy to identify intruders. Because of that strategy, normal user feels safer and provide the potential offender aware of a significant risk.

Maintenance and Management

Maintenance interrelates with well-maintained environment as well as the territorial reinforcement. Elements in that kind of place provide clear idea for the users to notice and care about what happens around them. In the other hand, unmaintained area, it tend to attract and increase improper activities.

Vandalism of graffiti or broken attributes in an area, affects to decrease the aesthetic quality and attraction of human. So the less attractive areas keep away people from those areas

With the consideration of overall theoretical framework, it depicts that enclosure, visibility and interaction of the spaces are the main considerations for the perceived safety. Also those factors are affected by the boundaries of urban space.
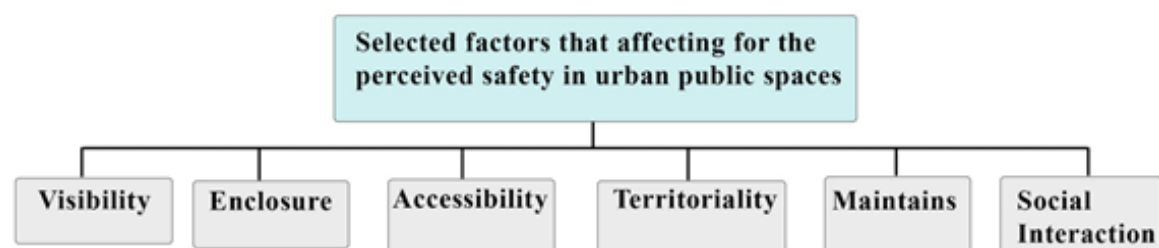
Figure 1: selected safety factors; Source; Compiled by author

3.0. Methodology

The study consisted of three main segments; background study, pilot study and the research study.

- Background study

This phase consisted of the study of literature and theories on impact of boundaries in public spaces in order to develop an overall idea about the main considerations/ factors that affect the human perceived safety.

- Pilot study

The pilot study helped to Identify the boundaries of case study and get an effective communication method for the data collection from the users of parks. A sample questionnaire was done to check data collection method and its applicability for the study.

- Research study

The respondents of the study is limited to the users of the parks of the age between 18 – 40 years. There were 30 responders .

The research study used qualitative and quantitative research methods. The data collection was carried out with,

  o Observing how much time people spend, and their behaviors in public spaces.

  o Using a questionnaire survey. The questionnaire was developed to investigate the different types of boundaries and the factors affecting the perceived safety in urban public spaces. different

The data was analysed by using logical comparisons and the conclusions were developed   with the interpretations of research findings.

Method of case study selection

The core goal of the research study,   is to understand the effect of boundaries on human perceived safety in urban public spaces. Hence, the use of a case study approach was identified as the appropriate strategy.

There were two parts in selection process of case study;

- Identification of the location for case studies

- Selection of most appropriate areas among the identified locations

4.0. Kalutara Children Park as the study context

The selected case study was the Kalutara Children Park. (*Kalutara Singithi Udyanaya*). The extent of the park is approx. 2.5 acres. The park is maintained by the Kalutara Municipal Council.

Kalutara Children Park is located adjoining the Colombo- Galle main road in Kalutara town area. The main landmarks around the park are town hall, Clock tower and Fire brigade. The park is located in between Ganga bada road and Udhyana road. The main users of the park are the people who come to the fair, town hall, Clock tower, Fire brigade and the school children. The park consists of children play area, resting areas with seating and a vehicular parking area.

The main reason for selection of Kalutara Childrens park for the case study is that it has different types of boundaries discussed in the theoretical framework above.

Figure 2: selected safety factors; Source; Compiled by author

Figure 3 - layout of the Kalutara children park; source- author

4.1.Perceived safety according to above boundary types in Kalutara children Park.
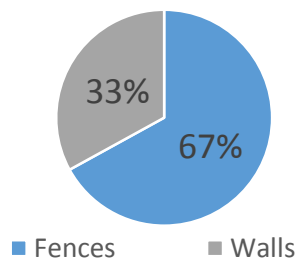

Figure 5: Kalutara Children park Gate as Boundary, Source Author

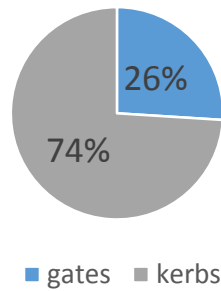**Figure 6** -Kalutara Children park- Kerb as Boundary; Source Author

4.11. Impermeable boundaries

Figure 7 : Percentage of responses- Safety perceived by fences and walls at Kalutara Children Park; source author
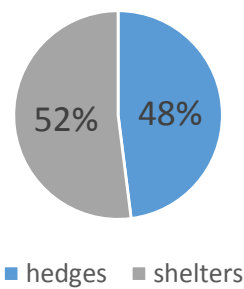
According to the responses, the highest perceived safety were recorded under the fences (67%) and walls recorded 33%. Because of that, fences can be considered as the most preferable boundary of the impermeable boundary category at Kalutara Children Park.

4.12. Permeable boundaries

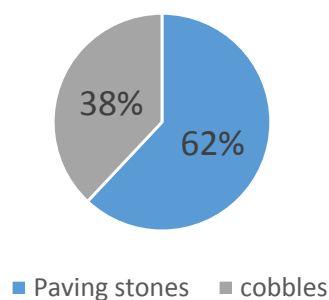Figure 7 : Percentage of responses- Safety perceived by fences and walls at Kalutara Children Park; source author

4.13. Temporal boundaries

Figure 9: Percentage of responses- Safety perceived by hedges and shelters at Katutura children Park, source author

The highest perceived safety was recorded under the shelters (52%) and 48% was recorded under the hedges. Therefore, shelters can be considered as the most preferred temporal boundary category at Kalutara Children Park
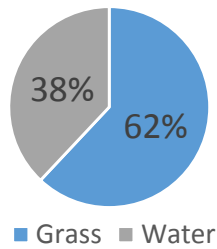
4.14. Rough boundaries

Figure 10 : Percentage of responses- Safety perceived by paving stones and cobbles at Kalutara children Park: source author

The highest perceived safety was recorded due to the paving stones (62%) and the 38% was due to cobbles. So, the paving stones can be considered as the most preferable boundary of the rough boundary category at Kalutara children Park.

4.15. Smooth boundaries

The highest perceived safety was recorded due to the presence of grass (62%) and 38% was recorded due to water. Hence, the grass can be considered as the most preferred boundary of the smooth boundary category at Kalutara Children Park.

gure 11 : Percentage of responses- Safety perceived by grass and water at Kalutara children Park; source author

4.2. Overall analysis of the study

According to the collected data of the study, the most significant boundary which influences for the user perceived safety is grass. The significance gradually decreases with paving stones, kerbs, fences, shelters, hedges, water, cobbles and walls. The least significant boundary in terms of perceived safety is the gates at Kalutara children Park.
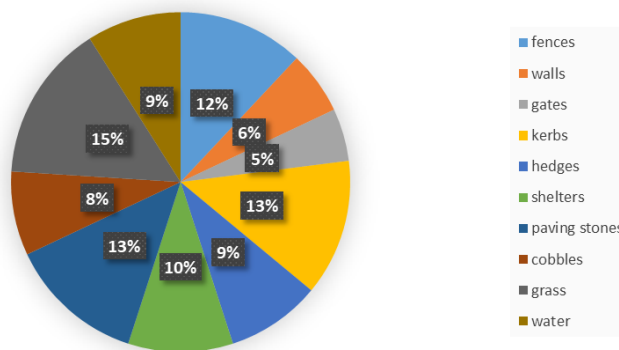

Figure 12: : Percentage of responses- Safety perceived by Physical and Surface boundaries at Kalutara children park

4.3. Analysis of perceived safety according to the boundary type in Kalutara Children Park
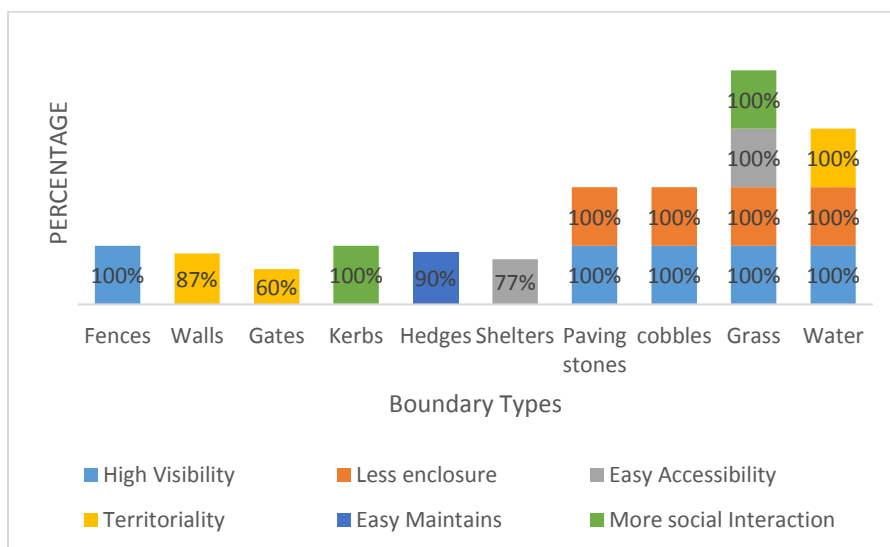

Figure 13 : : Percentage of responses- Safety perceived according to the boundary type at Kalutara children Park

According to data presented in Fig. 10, the boundaries of grass is linked to four types of safety factors; visibility, enclosure, accessibility and social interactions.

The boundaries of water is connected to three safety factors; visibility, enclosure and territoriality. The safety factors of   visibility and enclosure is related to boundaries of Paving stones and Cobbles. The other boundaries are linked to one factor by each.

The analysis shows that , visibility factor is linked to five types of boundaries, the enclosure factor to four types of boundaries and the maintenance factor to one boundary type(hedges).

5.0.   Conclusion

People in their day to day activities consider the concept of safety as one of the most significant priorities. Hence the urban landscapes has to fulfil user needs in respect to the perceived safety.

The research shows that the urban public spaces consist of different types of boundaries which make an impact on the perceived safety of the users. The study identifies six number of safety factors such as visibility, enclosure, accessibility, social interaction, territoriality and maintenance.

The outcome of this study shows that the users' perceived safety is altered with the boundary types in a space. The perceived safety caused by grass, paving stones, kerbs and fences are higher than that of shelters, hedges, water, wall, and gates.

It is clear that surface boundaries create high level of perceived safety. According to the findings of the study grass has the highest level of safety. The paving stones, kerbs and fences, also have a considerable impact.

The perceived safety created by boundaries is linked to safety factors. The findings of the study points out that safety factors of visibility, enclosure and social interaction play a vital role in enhancing the perceived safety.

Further studies on the subject area having other contexts as case studies such as urban plazas, residential neighbourhoods, public walkways etc. would contribute to understand the precise role of boundaries in perceived safety.

References

Aly,S.S.A., El-Ela, M.A., Elfiki, S. (2018).The impact of urban boundaries in public spaces upon user's perception of safety, with reference to Cairo, Egypt. *International Journal of Scientific & Engineering Research, 9*(2).

Appleton,Jay (1975)*The Experience of Landscape*, JohnWiley& Sons,London

Ashihara, Y. (1983). *The aesthetic townscape*. Cambridge, MA: MIT Press

Blomley, N. (2005). Flowers in the bathtub: Boundary crossings at the public–private divide. *Geoforum*, 36(3), 281-296.

Buyukpark And Hasanaga Park. *Metu Journal Of The Faculty Of Architecture*. doi:10.4305/metu.jfa.2017.1.7

Dallago, L., Perkins, D. D., Santinello, M., Boyce, W., Molcho, M., & Morgan, A. (2009). Adolescent Place Attachment, Social Capital, and Perceived Safety: A Comparison of 13 Countries. *American Journal of Community Psychology, 44*(1-2), 148-160. doi:10.1007/s10464-009-9250-z

Dogrusoy, I. T., & Zengel, R. (2017). Analysis Of Perceived Safety In Urban Parks: A Field Study In

Feagan, E. R. (2011). *Perceptions of safety on the north Oconeeriver Greenway.*Athens, Georgia: *B.S.*, Virginia PolytechnicInstitute and State University.

Hsia, C. J. (1994). *Public space.* Taipei, Taiwan: Artists Publisher

Ivanovic, G. W. (2014). People as place-making coordinate: A methodology for visualizing personal spaces. *Frontiers of Architectural Research, 3*(1), 36-43. doi:10.1016/j.foar.2013.11.003

Jeffery, C. Ray. (1971). *Crime Prevention Through Environmental Design*. Beverly Hills, CA: Sage Publications.

Kytta, M., Kuoppa, J., Hirvonen, J., Ahmadi, E., & Tzoulas, T. (2013). Perceived safety of the retrofit neighborhood: A location-based approach. *URBAN DESIGN International, 19*(4), 311-328. doi:10.1057/udi.2013.31

Lawrence, R. J. (1984). Transition spaces and dwelling design. *Journal of Architectural Planning and Research, 1*(4), 261-271.

Loewen, L. J., Steel, G. D., & Suedfeld, P. (1993). Perceived safety from crime in the urban environment. *Journal of Environmental Psychology, 13*(4), 323-331. doi:10.1016/s0272-4944(05)80254-3

Lynch, K. (1960). *The image of the city. Cambridge*, MA: MIT Press.

Mitra, P., & Bardhan, S. (2019). A Theoretical Perspective Of Designing For Safe Urban Public Place: Learnings From The Social And Urban Theorists. *International Journal Of Advanced Research In Engineering & Technology, 10*(2). doi:10.34218/ijaret.10.2.2019.037

Newman, O. (1972). Defensible Space: Crime Prevention Through Urban Design. New York: MacMillan

Ozaki, R., & Lewis, J. R. (2006). Boundaries and the Meaning of Social Space: A Study of Japanese House Plans. *Environment and Planning D: Society and Space, 24*(1), 91-104. doi:10.1068/d62j

Sack, R. D. (1986). Human territoriality: Its theory and history. Cambridge, MA: Cambridge University Press.

Schulz, Christian Norberg,(1971) *Existence, Space & Architecture*, London: Studio Vista Limited.

Shenassa, E., Liebhaber , A., & Ezeamama, A. (2006, June 1). Perceived Safety of Area of Residence and Exercise: A Pan European Study. *American Journal of Epidemiology*, 163, 1012–1017.

Stamps, A. E. (2012). Effects of Multiple Boundaries on Perceived Spaciousness and Enclosure. *Environment and Behavior*, 45(7), 851-875. doi:10.1177/0013916512446808

Stoker P, Garfinkel-Castro A, Khayesi M, et al. (2015) Pedestrian safety and the built environment: A review of the risk factors. *Journal of Planning Literature* 30(4): 377–392.

UCL, (2014). The different types of Boundaries in Berlin, UCL University, college of London. RetrievedMarch14,2016,from

http://projects.geog.ucl.ac.uk/studentprojects/berlin2014/boundaries