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Investigation of the relationship between CPTED principles and people's feeling of safety: A Pilot study in the City of Adelaide

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Investigation of the relationship between CPTED principles and people's feeling of safety: A Pilot study in the City of Adelaide

ABSTRACT: *While CPTED concepts and principles have been incorporated into urban design policy from the federal level to that of local council, there is little research in Australia, or elsewhere, that evaluates and critiques CPTED principles in relation to urban design and people's feelings of safety and comfort. This paper presents a pilot research project that explores the link between CPTED principles and people's feelings of safety and comfort in an urban precinct of Adelaide, South Australia. The research combines a micro-scale analysis of the built environment using GIS mapping and a series of interviews and this paper will focus on the built environment survey methods and results. The research found that while many of the CPTED principles were identified in the urban fabric of this precinct, what makes people feel safe was not necessarily and foremost directly related to the built environment design. The main factors that contributed positively to people's feelings about the area are the presence of activity, familiarity with the surroundings and maintenance of the area, building, or space. It is expected that the approach and methods implemented to conduct this pilot research can be adopted in a wider scale research in other parts of the City and elsewhere.*

Keywords: *CPTED, urban design, safety, comfort*

Introduction

Since 2010 the Property Council of Australia has commissioned an annual survey of people's views about the importance of liveability attributes that make Australian cities good places in which to live. In 2013, as in previous years, topping the list of 17 attributes is "a safe place for people and their property" (Wyatt 2014). Other attributes included "an affordable place to have a good standard of living" (ranked 2nd), "clean, well maintained and unpolluted" (ranked 5th), "a good road network and minimal traffic congestion" (ranked 8th), "the natural environment is attractive" (ranked 12th), and "the look and design of the city is attractive" (ranked 16th). Feeling safe in the built environment is seen as the most important aspect of the liveability of cities.

The Australian government's National Urban Policy reports on this finding and goes on to say:

> The strong connection between social inclusion, urban planning and the safety of communities is becoming increasingly well understood, along with the relationship to mental and physical health outcomes. (Australian Government 2011, p. 65)

The concern about liveability is reflected at local government level where much of the work of translating broad principles into on-the-ground solutions occurs. For example, creating a 'liveable city' is one of six desired outcomes listed in the City of Adelaide Strategic

Plan (Adelaide City Council 2012). The Safer City Policy (Adelaide City Council 2013b) suggests that "places will be made more welcoming and safe through the application of Crime Prevention Through Environmental Design (CPTED) principles in development planning and place activation". The Safer City Strategy expands on this:

> Council is committed to applying Crime Prevention Through Environmental Design (CPTED) principles by ensuring public places are inviting, well-lit, open, clean and encourage positive activity. (Adelaide City Council 2013c)

Crime Prevention Through Environmental Design (CPTED) is one theory that links urban design and crime prevention. CPTED is based on the idea that "the proper design and effective use of the built environment can lead to a reduction in the fear and incidence of crime, and to an improvement in the quality of life" (Crowe and Fennelly 2013, p. 4). CPTED principles are reflected, either explicitly or through references to key concepts, in planning documents at all levels of government.

While CPTED concepts and principles have been incorporated into urban design policy internationally and in Australia from the federal to local council level, there is little research that evaluates and critiques CPTED principles in relation to urban design. While Cozens et al. (2005) maintain that "there is a growing body of research that supports the assertion that crime prevention through environmental design is effective in reducing both crime and fear of crime in the community" others argue that the evidence is contradictory and inconclusive (Pain 2000; Lorenc et al. 2013a; Lorenc et al. 2013b). For a crime to occur four elements come together: the victim or target, location or setting, opportunity, and offender. Disentangling the contribution of location or place-based aspects to crime is often impossible while control groups are unreasonable. This is not to say that such strategies do not work, rather that claims need to be considered carefully. It is difficult to establish a causal link between actual crimes committed, fear of crime, and the urban space.

Likewise there is still little research in Australia that evaluates the impact of the application of CPTED principles on people's actual feeling of safety in an urban environment. This is despite the fact that the federal government's National Urban Policy lists 'feeling safe' as one of the seven characteristics of a liveable city, along with being equitable, socially inclusive, affordable, accessible, healthy and resilient (Department of Infrastructure and Transport 2011).

The pilot study reported in this paper is the first conducted in South Australia that explores the link between CPTED principles and people's feelings of safety in an urban precinct. The research, conducted by an interdisciplinary team from sociology, property and planning law,

and architecture, used an area in Adelaide CBD to develop and test the methods to conduct such study and to explore the relevant issues.

Brief background: CPTED in South Australia

CPTED has been integrated into planning and policy for many decades in South Australia. Early research identified crime as one of the many issues that may impact both new and existing communities (Knapman, Lambert & Manuel 1975; Sarkissian 1976; RGS 1978; Bell 1987). Later in 1989, Bell and Sarkission were engaged by the Crime Prevention Unit of the South Australian Attorney-General's department to report on the role of urban design in crime prevention (Bell, 1991; Bell and Sarkissian Associates Planners 1991). Problem areas in the Adelaide CBD were identified, an assessment of these areas carried out, and amelioration measures suggested (Bell and Sarkissian Associates Planners 1991; Sumner 1991; Millbank 1991).

Following this, the Attorney-General's Department produced a manual for crime prevention officers (1999) and a CPTED Manual in 2001. In 2004 the Department of Transport and Urban Planning released 'Designing Out Crime: Design Solutions for Safer Neighbourhoods'. This document is referred to in the region plans of the South Australian Planning Strategy. Several councils in South Australia also incorporate CPTED principles in their planning policies (for example City of Charles Sturt 2013; Adelaide City Council 2013a).

The most comprehensive and integrated documents are the Adelaide City Council with Operating Guidelines (2013a), Safer City Policy (2013b), and Safer City Strategy (2013c). Since 2005 the Council has conducted at least 3 Late Night Safety Audits per year at a number of locations throughout the CBD, with a concentration on the entertainment precincts (West 2012). Volunteers were taken to various sites and asked to rank how they felt on a number of issues including how safe they would feel if they were alone, sightlines, cleanliness and the behaviour of people in the area. The responses were analysed to determine the locations considered most unsafe and to prioritise remedial work. Solutions have ranged from improving lighting in dark laneways to using piped Barry Manilow music to dissuade loiterers in another area.

The Study

In evaluating CPTED, there is a natural tendency to focus on finding out the reduction in the number of crimes committed as a result of applying CPTED principles. This research, on the

other hand, was intended to develop a methodology to evaluate CPTED principles and their relationship with urban design *from the point of view of the people or users* of urban spaces. In other words, it examined what aspects of the urban design contributed to a feeling of safety and comfort, or otherwise.

The area known as the East End (Figure 1) of the CBD in Adelaide was used as a case study. This area was selected due to its long and significant history, its mixed-use character, and the changes that have taken place in the past 50 years. In recent years the East End has had a lively café culture during the day and at night, underpinned by the residential population that consists largely of university students and retirees. The population swells during late summer and early autumn when the parkland becomes a major venue for events held during the Adelaide Fringe Festival, music festivals and a major car race.

The East End is not an area that is particularly associated with crime, although, as in any other cities around the world, there have been a number of incidents including assaults, thefts and vandalism as well as issues with harassments at particular times of the year. Further changes to the East End are likely in the next few years with the re-location of the Royal Adelaide Hospital to the West End.

The study area is bordered on two sides by parklands although to the north the parklands are largely built on with the hospital complex and university campuses. To the west is Rundle Mall, the main retail shopping strip of the city. Major roads that surround this area are: North Terrace, East Terrace, Grenfell Street and Pulteney Street. Within the area are an east-west street, Rundle Street, and Frome Street, which stretches north-south.

Figure 1: Case study area – Adelaide East End

Methods

The study was conducted through two main methods: a fine-grained built environment survey and interviews with residents and people who work in, live in or frequently come to, the case

study area. The built environment survey was intended to assess the extent to which the case study area exhibits features identified in CPTED theory. Results from the built environment survey were then cross-checked against the interviews to identify whether areas that were identified as 'safe' or of concern, according to CPTED principles, were indeed of concern or considered safe and comfortable by the people who frequent this area.

A list of common CPTED principles was distilled from a number of sources (Parliament of Victoria, 2013; Adelaide City Council, 2013; Brisbane City Council, 2000; City of Charles Sturt, 2013). Based on these, four main areas were covered: (1) character and image, (2) built form, (3) 'eyes on the street' and (4) pedestrian activity. Within each of these CPTED principles are a number of safe design features. These are presented in Table 1.

Table 1: Surveyed safe design features

SAFE DESIGN FEATURES	OBSERVATION AND DATA COLLECTED
CHARACTER AND IMAGE:	
Does the area have particular character?	Type of buildings and businesses; opening hours
Is there a different mix of people in the space?	Different age groups, type of users (eg. students, workers, families with small children)
Is the area well maintained?	Maintenance and cleanliness of streets/paths/buildings, waste collection areas and management
Is the distinction between private and public clear?	Entrances, separation and interaction between private and public spaces
Are there obvious security measures?	Presence of CCTV, gates, security bars, security doors
Are building uses, entrance and exits obvious?	Signage, clear entry and exit paths
Is there landscaping?	Type of landscaping (eg. planter boxes, street trees)
Is there street furniture or public arts?	Type of street furniture (eg. benches, table and chairs, sculptures)
BUILT FORM:	
Describe the built form	Architecture style, building height
Is there a variety of scale and material?	Type of materials, colours, textures
Are there blank walls?	Indicate the presence and location of blank walls
EYES ON THE STREET:	
Are buildings oriented to public spaces or street?	Presence or absence of windows to the public spaces or street
Are there good slight lines?	Presence of absence of obstructions to the buildings or spaces where people gather
Is there adequate lighting?	Illumination levels in spaces and brightness levels of surfaces at night time; type of lighting and lamps
Is there activity in the space at all or some times?	Type and occurrences of activities
Can façade be used as natural ladders?	Presence of structures that can be used as natural ladders to the windows or roof
PEDESTRIAN ACTIVITIES:	
Identify pedestrian activities	Note routes of pedestrians on the map
What materials are used for ground surfaces?	Type of materials used for paving / footpaths and streets
Is there frequent people activity?	Frequency and volume of pedestrian activity; sound levels
Are there obvious pedestrian corridors and easily identifiable destination points	Clear eye sight to pedestrian destination, presence or absence of obstructions
Are there entrapments or concealment spots?	Presence of entrapment or concealment spots (eg near car park, services and waste collection areas

Built environment survey

The case study area was divided into four sections and a survey map and questionnaire were prepared for each quadrant. These quadrants were formed 'naturally' by the existing main streets. Each quadrant was further divided into several areas so that detailed data could be clearly recorded. An example is shown in Figure 2 below.

Figure 2: Example of further division of the case study area for the purpose of recording

Before the data collection and recording took place, the researchers conducted general observations for a number of times, both day and night, in order to familiarize themselves with the study areas. The observations were conducted on foot, through the footpaths along all the streets and laneways including those rarely accessed by the general public. These observations helped the researchers have a better idea about the area and the physical attributes that needed to be carefully observed and recorded.

The surveys were then conducted at different times of the day and evening, using a survey form and a publicly-available cadastral map. Apart from observing the activities that took place, the opening hours of each business was noted, pedestrian routes were marked as well as the location of facilities such as on-street car parks, car park entrances, taxi stands, bus stops, parking ticket boots, and telephone boxes. The map indicated the type of building, such as offices, commercial and residential, however the researchers noted more particular information about the buildings or businesses and recorded any recent changes in the types of business activities.

Photographs of the areas, streets and buildings were taken during the day and night. Particular attention was given to taking night-time photos of areas that were identified during

the day as possible areas of concern. In addition video footage was taken to capture the atmosphere of the spaces both during the day and at night.

The illumination levels along the foot paths, at building and car park entrances and exits, and near buildings were measured and recorded using a hand-held illumination level (light) meter. Similarly, the noise or sound levels were measured and recorded for the same spots.

Data recording

Data from each area were recorded in separate worksheets in Excel. In each area, data of safe design features as shown in Table 2 were entered for each property number (parcel label). This method allows the data to be transferred into a GIS (Geographic Information System) mapping program. Photographs were also taken using smart phones and these were also entered into the GIS program, either by using the parcel labels or the location coordinates of the object provided by the smart phone. Table 2 shows an example of data recording of one area of the north-west quadrant.

Table 2: Example of data recording from the survey in Excel for one area in a quadrant

ID	Building Type	Opening Hours	Built form	Obvious entry/exit	Character	Variety of scales, materials, colours, textures	Foot path materials	Landscape/ planting
	See map	Only if outside regular hours	Victorian, Art Deco, shopfront, old red brick, new red brick, old stones, old market façade, concrete, steel frame	Yes/No	Vibrant, mixed use, traffic thoroughfare, quite, neighbourhood	Yes/No	Concrete, ashphalt, slates, brick, mixed	Planter box, street trees, grass
								SYNAGOGUE PLACE
D55161 A101	Previously education	Closed	Sandstone	No	Old/Historic but unused	No	Ashphalt	None
F181875 A223	Back of car park	Closed	Old red brick	No	Old/Historic but unused	No	Ashphalt	None
C27077 F1005	Apartment	24 hrs / 7 days	Concrete frame	Yes	Residential	Yes	Dark grey concrete	None
C27039 F5	Service part of Apt	Closed to public	Concrete frame	No	Quiet	Yes	Dark grey concrete	None
F128505 A5	Retail	Shop opening hours	Sandstone	Yes	Quiet	Yes	Dark grey concrete	None

Street Furniture	Presence of blank wall	Security measures	Adequate Lighting	Well maintenance	Eyes on the street	Space feel active	Pedestrian activities	Clear pedestrian routes and destination	Entrapment	Photo
Seats, stools, tables, public art, decorative lighting	Yes/No	CCTV, bars to windows, restricted access	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	(all in JPEG)
None	Yes	None	Yes	No	No	No	No	No	Yes	D55161_A101_1;D55161_A101_2;D55161_A101_3;D55161_A101_4
None	No	None	Yes	No	No	No	No	No	No	F181875_A223
Public art	No	CCTV	Yes	Yes	Yes	Yes	Yes	No	No	C27077_F1005_1;C27077_F1005_2;C27077_F1005_3
Public art	Yes	CCTV	Yes	Yes	No	No	Yes	No	No	C27039_F5
None	Yes	CCTV	Yes	Yes	No	No	Yes	No	No	F128505_A5_1;F128505_A5_2
None	No	CCTV	Yes	Yes	No	No	Yes	No	No	D32059_A6

Data mapping

The data recorded in Excel were exported into GIS mapping using ArcGIS and arranged using the grouping presented in Table 1 (character and image, built form, eyes on the street, and

pedestrian activities). The observations in each group as well as the groups are presented in separate layers which can be turned on and off for clear viewing. Cadastral numbers are used to determine which data are to be presented.

Two examples of the GIS mapping are presented below.

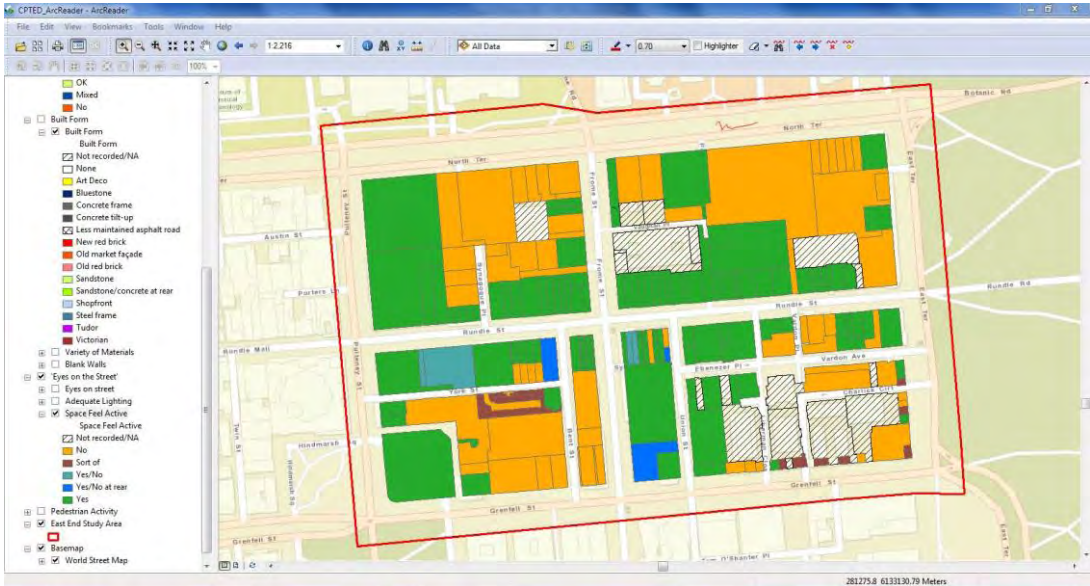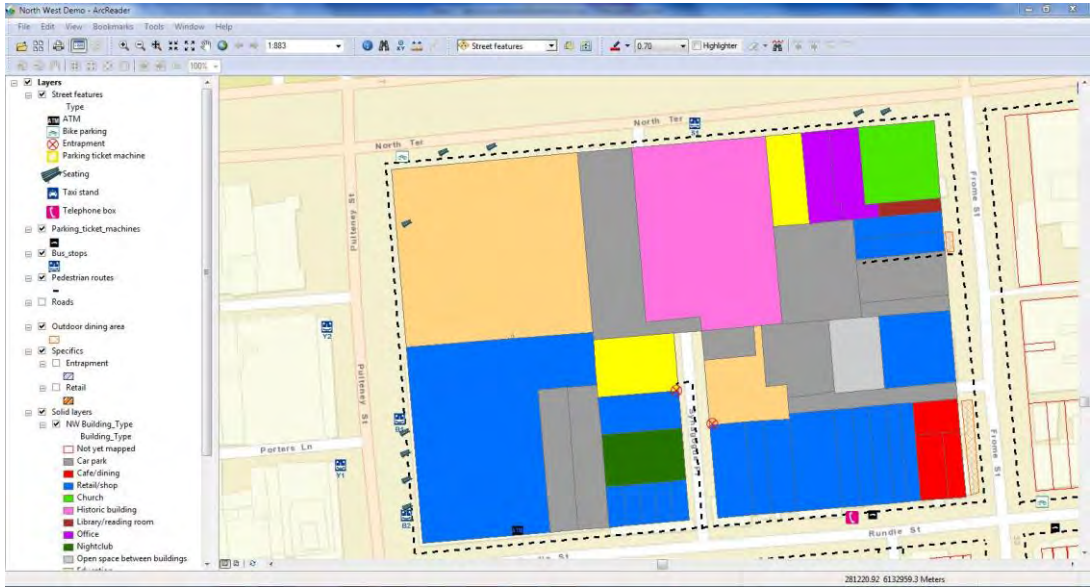Figure 3: Example of GIS mapping for 'Eyes on the street' (yes = green; no = orange)

Figure 4: Example of GIS mapping for features of 'Eyes on the street' (e.g. pedestrian routes, entrapment spots) overlayed with 'Character and image')

Interview

Interviews were conducted with people who lived, worked, or frequented the case study area. Note that as this was a pilot study conducted over a relatively short period, the respondents

for the interviews were people who were known to the researchers. No wide recruitment from the general public and business owners was conducted although this method could be employed in future studies.

Although the main focus of the study related to the CPTED principles, the researchers did not ask direct questions on this matter rather they tried to find out first what people liked or disliked about the East End and what made them feel comfortable and uncomfortable. The interview adopted an open ended method; the researcher only prompted simple questions to then allow the interviewees to respond freely to the prompt. Oher impromptu questions were also raised when the conversation naturally allowed those questions to be asked. A total of 18 interviews were conducted including six with business owners (one of whom was also a resident), nine with workers who lived outside of the area, two local residents and one long-term frequent visitor to the precinct.

Analysis of survey vs interviews

The transcriptions of the interviews were analysed in terms of the categories recorded in the built environment surveys and the comments were grouped under the same headings. Results from the built environment survey were then cross checked against the views of the respondents to identify whether aspects of the urban environment that reflected the CPTED principles were referred to by the respondents as contributing to a sense of safety and comfort.

Results

Particular outcomes from the built environment survey are presented below. Detailed discussions about the results from the interviews are presented elsewhere; however, brief discussions about how people perceived the area in relation to each of the CPTED features will be presented.

Character and image

Building

The survey identified similarities between the four quadrants in terms of types of buildings, people and activities; however, there were distinct characters that were observed, particularly between the western and eastern quadrants. The western quadrants had a more 'fast-pace' feel, due to the size of the buildings (larger size) and less engaging shopfronts, which means people tended to walk by rather than stopping and sitting down. This image started to change toward the east, where the individual buildings were smaller with more variety in the façade,

colour and style of the buildings, and more frequent entries to the building. People were observed to slow down, window-shop, mingle and sit.

Maintenance

There were parts of the case study area that were observed to be poorly maintained, particularly in areas not frequented by the general public such as the service laneways behind the shops on the main roads. These laneways had uneven and broken surfaces, and rubbish and used card boxes were seen lying around. The walls of the surrounding buildings were poorly maintained and mostly of dark colours. These areas were not at all inviting and suggested that they could be unsafe.

Security measures

There were several types of security measures noted in the case study area however these were not obvious. There were no barred windows visible; however, CCTVs were installed at pubs, night-clubs or drinking areas and near a police station. Apartment buildings usually had restricted access through the use of entry cards or codes. Most shops and restaurants did not have any visible security measures although most, if not all of them, had an alarm system.

Clarity of usage and access

It was not difficult to recognize most of the building types in the case study area due to the nature of their activities (shops, restaurants, and cafes). Some buildings, however, particularly of office types, were not easily identified either because the entrance was not easily found, or no signage was visible. The most difficult access to find was to the residential buildings or individual units; however, this may have been intentional to ensure the privacy of the residents.

Landscaping and street furniture

Scattered street trees, some shrubs and pot plants lined many of the streets in the case study area. Hard landscaping, benches and well-maintained trees were observed in the southeast as and northeast quadrants; however, in the latter area there were less trees and vegetation, thus this area did not have the same atmosphere as the open spaces in the southeast quadrant. Other forms of street landscaping were artworks and painting on the walls. An interesting artwork was placed on the blank wall of a police station perhaps to soften the image of law enforcements. Some shops decorated their walls with paintings on the walls, providing an attraction to the streetscape.

<u>People's perception vs findings from survey on character and image</u>

The different, and often complementary, information obtained through the techniques employed in the study was most marked in relation to the character and image of the case study area. The terms used during the interviews to describe the character of the East End – a destination, friendly, trendy etc – were based on people's feelings, history and associations with the place as well as the building types in the area. On the other hand the built environment survey was necessary to record the types of buildings, their uses, opening hours, security measure etc. Apart from a few references to coffee shops, these issues did not tend to come up in the interviews.

Built form

The survey recorded that many of the buildings on both the north-west and south-west quadrants were relatively large both in vertical and horizontal dimensions, compared to the buildings in the eastern quadrants. The scale of these buildings gave a less friendly atmosphere compared to the eastern quadrants where many of the buildings were single-fronted and between 2 and 4 stories. The residential development in the south-eastern quadrant included high-rise (up to 8 storeys); however, balconies and other articulation of the facades created a more 'domestic' appearance than some of the other multi-story accommodation in the other quadrants.

<u>Blank walls</u>

Blank walls are often perceived as undesirable as they block the view and prohibit surveillance from inside the building. Some blank walls were identified within the case study area; however, none of them were extensive. Two areas were noted to have distinctively long blank walls, and in both bases they were the back sides of multi storey buildings.

<u>Colour</u>

As expected, the colour of the façade did have impact on the perception of the space; variety of colour can contribute to a sense of 'liveliness', black as well as pale, cream colour can give a sense of 'boring' and 'uninviting. While the former was supported by the survey, the research found that the latter was not always true. Buildings that had black-painted or pale colour painted walls, as long as there were activities in them, did not seem to deter people from using them or being around those buildings. Also if the buildings were well lit at night, the impact of the colour of the buildings seemed to be minimal.

<u>People's perception vs findings from survey on built form</u>

While building scale or height can give a certain impression to the street, it was the presence or absence of activities on the ground floor that was important for whether the space felt safe or otherwise. One example noted in the survey was a multi-story apartment building at the end of the dead-end street lined with buildings that were mostly closed. Nonetheless, people were seen to walk to the end of this street and congregate as there was a popular eatery on the ground floor of this apartment building.

The interviewees made no direct mention of 'blank walls'; however, there were a few locations where people said they felt uncomfortable or unsafe and the survey had identified blank walls on both sides of the street. It is unclear whether these feelings were due to the blank walls per se or due to the fact that as both sides of the streets had blank walls there was no activity visible inside the buildings. None commented on areas where only one side of the street had blank walls, and activities were observed around these areas. In other words, it seems that a blank wall is not necessarily a negative feature in an urban design, as long as there is a nearby activity that attracts people.

Eyes on the street

<u>Facing the street</u>

It was noted that buildings with windows to the street or footpath did not necessarily equate to having 'eyes on the street'. The survey found that if there was no activity on the ground floor level of a building, or if the activities inside could not be seen from the street, there was, in practice, no surveillance to the street. Areas that felt safer were those where people could really look into the buildings and see or hear other people or activities inside.

<u>Line of sight</u>

There were a number of laneways in the case study area where it was difficult to know from one end what was at the other end. Another factor that could affect the line of sight was the built structures, in particular walls and columns of buildings. An example was a laneway that, even though frequented by many people, did not provide a good line of sight due to very wide columns (one meter wide) that supported the building above, thus blocking visual access to the surroundings.

Lighting

Illumination levels were measured during an evening in various locations along the footpaths of the main roads and laneways. Overall the streets and laneways had street lighting that provided lighting levels around the light sources of around 15 to 50 lux; however, further from the light sources, the illumination level could go down to 2 to 3 lux. Some areas that were predicted to be dark and gloomy at night due to their appearance during the day were surprisingly well lit at night with illumination levels achieving 30 to 50 lux around the light sources.

People's perception vs findings from survey on 'eyes on the street'

When people discussed what they liked and valued about the East End, they consistently referred to the café culture, friendliness, and liveliness of the area. Areas identified to feel less safe were those with no one looking out from the building. The presence of people and activity also meant the presence of sound (or perhaps better termed 'noise'). While technically the term noise means 'unwanted sound', in this case hearing the noise of people, particularly at night, provided a sense of activity and surveillance, so that the noise became 'wanted sound'. Similarly, having adequate illumination at night did not necessarily equate to a feeling of safety. The respondents indicated a number of areas that felt unsafe because there was no activity around, yet data from measurements revealed illumination levels that conformed to requirements.

Pedestrian activity

Pedestrian routes

Most pedestrian activity occurred along Rundle Street, Pulteney Street, and the roads closer to Rundle Street while less foot traffic was seen along the southeast corner of the case study area and all the back alleys and laneways. North Terrace was also frequented by pedestrians as this is a major road with a number of bus stops; however, as there was almost no other activity that attracted people to this area (no eateries, no shops), it often seemed to be deserted and unappealing despite the fact that pedestrians' presence was apparent. The same was found along Grenfell Street, the southern boundary of the case study.

Entrapment spots

Several entrapment or concealment spots were identified around the study area. Most were around car park entries and exits where the wall designed to separate cars from pedestrians blocked the view from or to the door for the pedestrians. Other entrapment spots were found

in service laneways (with large rubbish bins blocking the view) and around some entries to buildings with large columns that blocked the view from or to the doors.

<u>People's perception vs findings from survey on pedestrian activity</u>

There were several features identified by the researchers that were not mentioned by the respondents. For example, the researchers identified a number of entrapments locations and potentially 'scary' spots in the case study area, such as the back alleys that were rarely used by general public, dead-end lane ways or areas that were poorly maintained. However, most respondents indicated that they had never visited those spots because there was no necessity to do so. Or, if they heard about the unfriendly characters of certain areas and they did not feel comfortable to be in those areas, then they tended to avoid going there, particularly on their own. This perhaps indicates that people have used their personal safety strategies in dealing with their surroundings. Whether or not this actually indicates that the area may be unconsciously perceived as 'unsafe' can be debated, but being precautious is certainly part of human instinct.

Summary of findings

This pilot study has developed methods to evaluate the link between CPTED principles and urban design and people's feeling of safety and comfort in an urban space. While it is acknowledged that the number of respondents for the interviews was small, the research found common themes that were mentioned as affecting all the respondents' feelings of safety in the case study area. They are:

1. Activity - is the key for feeling of safety, through the number of people, hours of operation, the sound generated by the activity;
2. Familiarity - of shop owners, employees and visitors to the area;
3. Maintenance – lack of maintenance can lead to feeling of unsafe;
4. Urban design, including:
   a. small shop fronts with lots of variety
   b. clear line of sight including being able to see easily see from one side of street to the other
   c. good scale, that is the proportion of street/footpath to buildings on either side
   d. clear mental map, through walkable distances and unobstructed path and defined 'ends'

      e. active use of exterior space, such as outdoor dining (semi-protected with verandahs etc)

      f. privileging pedestrians over cars

5. Connectivity – both in term of infrastructure (footpaths, laneways, or streets) and activities. Having connected laneways but with no activity along the way will not be effective.

At the same time people have adopted personal strategies to feel safe, which include:

1. Avoiding some areas, particularly avoiding drinking venues at certain times of the year

2. Changing tactics according to time, for example when arriving early or leaving late, some businesses ask their employees to never walk alone

3. Using bicycles, which enable people to leave the area easily at any time and at a faster pace than walking.

Conclusion

A pilot study to explore the link between CPTED principles and people's feelings of safety in an urban precinct has been conducted. The study was conducted through (1) a fine-grained built environment survey to assess the extent to which the case study area exhibits features identified in CPTED theory and (2) a series of interviews to identify whether areas that were identified as safe or of concern, according to CPTED principles, were considered safe and comfortable or of concern by the people who frequented the area.

The results demonstrate that while CPTED principles and guidelines are useful, they are in a way 'universal' and that the particular context is a vital consideration. Factors that may make one location feel unsafe may not have the same impact elsewhere. The research found that while the built environment did play a role in people's feelings about the case study area, it was the presence of activity, connectivity and familiarity with the surroundings (including people) that were most often mentioned by the respondents. Out of the many items in the CPTED guidelines, the ones that made people feel safe were: variety of shopfronts or facades, clear line of sight, good proportion of street/footpath and buildings on either side, clear mental map, active use of external space, and having good pedestrian access. On the other hand, poor maintenance and lack of activity contributed to people feeling unsafe or uncomfortable.

The pilot study has shown that the two sources of data (from the mapping and the interviews) provided fertile information for the research. For a future study, the information

from the interviews could also be mapped onto the built environment survey maps to clearly highlight areas of concern and areas considered to be safe and comfortable. Such GIS-based maps will then provide rich information about an area to local authorities and community groups and help identify those aspects to be maintained because they work well and places that need improvement. Also, while the two methods proved to be appropriate for this study, if the research were to be extended to a larger area of the CBD or another area, it would be important to include more respondents, particularly those who frequent or visit the area at various times of the day or year, and more residents.

Acknowledgements

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