



Title: **The Impact of Private and Shared Open Space on Liveability in Subtropical Apartment Buildings**

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The Impact of Private and Shared Open Space on Liveability in Subtropical Apartment Buildings



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Abstract

As the number of tall apartment buildings significantly increases in most cities across the globe, their ability to deliver quality lifestyles for residents becomes an issue of sustainability for the community. While apartment architecture may respond to international design trends, buildings that relate culturally and climatically to their location increase sustainability and liveability. The purpose of the paper is to explore whether private and shared open spaces contribute to positive or negative perceptions of liveability of apartment buildings in a subtropical urban context.

First-hand resident evaluations of everyday experiences of residing in inner urban high-density environments in Brisbane, Australia are explored through a survey of 636 residents and interviews with 24 residents.

Private balconies are highly valued, but resident satisfaction would be enhanced by spaciousness for diverse activities, privacy and climate-responsive design. Communal spaces and facilities are used infrequently by many residents who prefer interactions with community outside the building.

Keywords: Apartments, liveability, multi-residential towers, private open space, shared open space, subtropical

In the framework of sustainability, a positive relationship between residents and their environment is a priority. Tall apartment buildings are making a dramatic impact on city skylines around the world (see Figure 1). As these buildings will impact the city environment for decades to come, it is imperative for these buildings to provide desirable liveable spaces for residents. However, what is thought to be desirable in apartment architecture tends to follow international trends; meanwhile buildings that relate culturally and climatically to their location are inherently more sustainable and liveable than models developed in other environments. The research described in this paper addresses the relationship between the subtropical climate and the role of outdoor spaces in apartment buildings from the resident's perspective. The paper explores whether occupants consider interaction with the external environment to be important, and whether these spaces contribute to positive or negative perceptions of liveability of apartment buildings in the subtropical city context.

A dwelling space is considered to be liveable by its occupant if it meets personal social and cultural preferences. Liveability expectations of a place are derived from pleasurable physiological and psychological experiences (Canter and Rees 1982). For example, perceived



Figure 1. City skyline, Brisbane Australia (Centre for Subtropical Design)

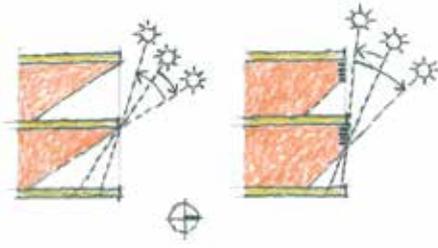


Figure 2. Sketch section. Subtropical conditions call for flexible and adaptable measures such as shading devices to account for welcoming the sun deeper in winter (left) or excluding sun in summer (right) (Source: Centre for Subtropical Design)

upkeep of shared facilities, indoor air quality and ventilation, and thermal comfort are indicators of a physically healthy residential environment, while indicators of psychologically healthy dwellings are availability of daylighting and view, freedom from annoying noises, a sense of spaciousness (as opposed to a sense of overcrowding) and the quality of collective areas that allow residents to control the intensity of interaction with their neighbors (Lee, Je and Byun 2011).

Private open spaces in the residential environment are an extension of the home and offer residents access to the external environment with some degree of privacy and territorial control. The success with which residents are able to enjoy this space undisturbed, yet at the same time have the possibility of engaging visually into adjacent public space, is important and is also significantly related to the concept of "neighborhood" attachment (Skjaeveland and Garling 1997). A sense of community is important for managing governance issues in multi-residential environments. In this sense, communal outdoor spaces in high-rise complexes are essentially places that enable residents to establish social interaction and recognition. Interactional spaces that enhance human experiences must have basic spatial prerequisites for casual contacts or "neighborliness" such as: inherent functionality; feeling of spaciousness combined with complexity, formal order and structure of enclosure (as in defined edge, screen or shelter); and aesthetic content particularly natural elements and upkeep quality (Skjaeveland and Garling 1997). However researchers consistently find social withdrawal rather than sociality in apartment building's open spaces (Huang 2006)¹.



Figure 3. Contemporary semi-enclosed outdoor living area in a subtropical Queensland detached house (Source: Centre for Subtropical Design)

A locality's climate can have a significant impact on the local residents' lifestyle and culture. For example the subtropical climate presents a combination of tropical and temperate climate characteristics at different times of the year, and sometimes at different times in the same day. While days can be warm to hot during autumn, winter and spring, overnight temperatures are often cool to cold. This hybrid climate requires deft application of different climate-responsive design principles simultaneously in the one building. Shade and air movement are necessary for comfortable temperatures in summer humidity; however "breeze" is associated with comfort, but "wind" is uncomfortable. During winter, cold westerly winds are best avoided, and sheltered sunny places are sought out. Structures which can be adjusted to suit occupation for a range weather conditions and social conditions are recommended to allow desirable degrees of interaction with the natural environment (Kennedy 2010) (see Figure 2).

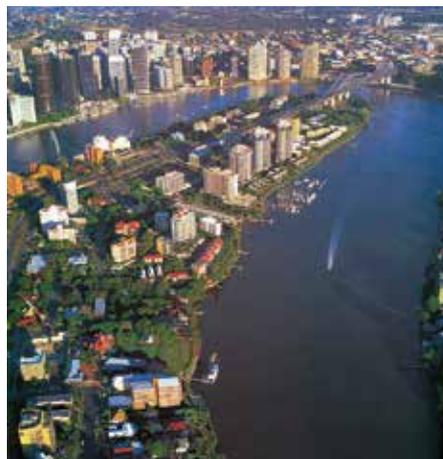


Figure 4. Apartments on Brisbane's post-industrial premium inner-city riverside sites enjoy lushly landscaped communal open spaces and balconies, taking advantage of expansive river views (Source: H Williamson)

The relationship between lifestyles and associated values and norms, and physical dwelling space is a broad, deep and well-researched topic in the fields of sociology and environmental psychology. However, as with trends in multi-storey apartment building design itself, much research into the links between architectural design and residents' satisfaction has emanated from countries situated in temperate climates where severe cold weather constrains access to outdoors much of the time. The findings of our research have the potential to provide evidence of benefits of certain outdoor spaces in apartment buildings in subtropical climates, and to create a bridge between research and design practice that values rather than marginalizes local knowledge.

Research Method and Participants Case Study

Brisbane, Queensland is the centre of an Australian metropolitan region located in the subtropical humid climate zone at latitude 27.5°S. The city's macro-climate is characterized by warm humid summers and cool winters. Ambient outdoor temperatures are within a comfortable range for most of the year (19-29°C in summer and 9-21°C in winter) though solar radiation and humidity are intense during summer (Bureau of Meteorology 1989). Nevertheless, the climate



Figure 5. The veranda has long been an integral feature of the residential architectural design vernacular in subtropical settlements (Source: Centre for Subtropical Design)

1: A notable exception is Bay's (2004) case study of high-rise living in Bedok Court Condominiums in Singapore, where spatial configuration of open galleries connected to private forecourts engendered a vibrant sense of community.

is conducive to an outdoor lifestyle year round, and shady verandas are deployed in residential buildings of all scales to act as environmental filters to reduce the intensity of heat and glare entering habitable interiors during summer and aid outdoor living activities (see Figure 3). During the mild subtropical winter, people often seek to sit out in the sun's warmth.

While some 10-story apartment buildings were constructed during the 1970s, significant construction only began in the 1990s with the post-industrial redevelopment of former wharfs on the inner-city reaches of the Brisbane River (Spearitt 2009). These buildings featured lushly landscaped communal open spaces and most dwellings enjoyed private outdoor spaces such as verandas, patios and balconies, taking advantage of expansive river views (see Figure 4). Although similar elements may be found in all latitudes, in the subtropics where favorable external environment conditions prevail, these outdoor spaces reflect a cultural preference for outdoor living and have long been an integral architectural feature of the vernacular housing (see Figure 5). However, housing designs are now widely seen as being interchangeable from place to place and capable of being built anywhere, regardless of the local climate or culture. As Brisbane transforms from a predominantly low-density low-rise city to a significantly denser and taller urban form and apartment towers occupy many locations other than premium riverside sites, generic designs that ignore the natural attributes of place are proliferating (see

Figure 6). In recent years, several concerning trends are emerging: transparent balustrades on balconies; extensively glazed facades with extremely limited private external space (no private balcony) and, rather than complementing private outdoor living space, communal open space is increasingly framed as a substitute for private balconies.

Quantitative and qualitative data were gathered on residents' perceptions of private and shared open space as part of an extensive study investigating the positive and negative social, environmental and economic impacts that residents associate with higher density (HD) living in a subtropical environment. See Buys and Miller (2012) and Kennedy, Buys and Miller (2015) for more results from the founding study. This paper focuses on a subset of the data exploring the presence, use of and importance to residents of gardens, balconies and shared recreational facilities; the importance of privacy (both aural and visual); the extent to which residents were aware of, or annoyed by noises or other pollution; the dwelling's suitability for subtropical climate; and any elements that they would change about their current accommodation.

Six inner-urban neighborhoods of Brisbane that already support residential densities greater than conventional Brisbane suburbs (based on 12-18 dwellings per acre compared to 5 dwellings per acre) were purposively selected for this study. Within each neighborhood, all multi-residential buildings four storeys or higher, and the total number of dwellings within each complex were identified, representing the higher density population

of the sample. A proportionate sampling technique was applied to select one third of the dwellings within each building, within each precinct. In total, 2311 questionnaires were delivered, and 636 completed questionnaires were returned by post (28% response rate). Follow-up semi-structured qualitative interviews were conducted with 24 residents.

Survey

The 140-item Living in the City questionnaire comprised open and closed survey questions designed to establish the nature of residents' current accommodation and their satisfaction with the dwelling, the building complex and neighbors and the neighborhood. Standard socio-demographic categories drawn from the Australian Bureau of Statistics (ABS) 2006 census were used to obtain relevant data on residents' personal characteristics. A variety of 5-point Likert scales, typically with alternatives ranging from (1) "not at all" to (5) "extremely", with (3) "fairly" being the midpoint on the scale, allowed residents to circle the appropriate response. Binary 'yes/no' responses were also included as were open-ended questions that allowed participants to add an extra response (a copy of the complete survey is available from the authors upon request). Analysis of the questionnaire was conducted using the Statistical Programme for Social Sciences (SPSS) with basic descriptive statistics such as frequencies, percentages and means calculated for all residents, as well as separately for each precinct. Open-ended questions were analyzed thematically to identify key terms that were regularly invoked by the residents.



Figure 6. Transparent glazed balustrades on balconies and fully glazed facades. Tropical Kuala Lumpur (left), Temperate Melbourne Australia (centre), and Subtropical Brisbane (right) (Source: R Kennedy)

Sample

Key characteristics of the survey sample were: females were the majority of respondents (60%, compared to 51% for Brisbane area); 43% were aged 25-44 years, 36% between 45-60 years, and 12% were over 65 years old. Most households consisted of two people (58%) or one person (31%); only 7% of households had children younger than 18 years. (Brisbane household types in the 2006 census were 21% one person, 69% family and 5% group). There was a varied ownership mix: the number of renters (44%) in the study sample was higher than the census data for Brisbane area (30%); others were owners (27%) or paying off a mortgage (28%). The average period of residency in their present dwelling was 3 years and 5 months, while the longest was 39 years, and the shortest was one month. Residents lived on various floor levels, up to the 19th floor with the majority located on floors 1-3 (68%). On average, dwellings comprised two bedrooms, two bathrooms, one living room (often combining dining kitchen), one private laundry, one car park and two outdoor spaces (for example, balconies).

Interviews

Interviews with 24 residents explored issues in more depth covering their likes and dislikes of their current dwelling and neighborhood, including social contacts within the building complex. Interviews were recorded and transcribed verbatim. Renter/owner split was 5/19; female/male split was 10/14. A thematic analysis identified key themes.

Results

Overall analysis of the questionnaire has previously been documented in Buys and Miller (2012) who found that residents indicated a high degree of satisfaction with both their neighborhood (50% "very much"; 23% "extremely") and dwelling (51% "very much"; 21% "extremely"). An overview of these findings relevant to the topic of this paper are: residential satisfaction depends on a specific set of dwelling and neighborhood attributes – primarily dwelling location/position, dwelling design characteristics (layout and spaciousness, low energy climatic comfort considerations), level of neighborhood noise and the safety of the local area (social contacts in the neighborhood, upkeep of area, and walkability).

When asked what they would change to increase satisfaction with their dwelling, the desire for more, larger, or better designed 'space' including outdoor space, was mentioned most frequently. Noise reduction was the next most mentioned design improvement; residents

described how they wanted better sound insulation between dwelling units to minimize the negative impact of neighbors' voices and activities, as well as noise mitigation strategies such as double-glazed doors on a balcony to reduce traffic noise (Buys and Miller 2012).

Balcony as an Extension of Home

Most residents surveyed had a balcony at their current location (89%) and most (87%) considered the physical and spatial design of the balcony to be an "important" to "extremely important" influence on their experiences of everyday living functions, spaciousness, privacy and control of indoor environment comfort. Only 16% had a private garden but most (83%) reported that this was not a priority in their choice of accommodation. The majority of residents (88%) spent, on average, one or more hours per week on their balcony and used it for a wide variety of social and non-social domestic activities. Entertaining (85%), eating meals and/or cooking meals (74%), growing and tending plants (66%) and drying laundry (62%) were the top four balcony uses. 19% also stored household goods on the balcony. Approximately one in five (21%) of residents used their balcony areas for other activities including: reading, relaxing, studying, keeping pets, or exercising. 8% desired more space on their balcony and 3% had enclosed their balconies. A small number wanted to add a balcony.

Design features that enhance resident control of indoor environment quality including thermal comfort, were very important to all participants, with 83% nominating that they were most likely to open the windows and doors when thinking about "climate control" in summer. Continuous air-conditioning was rarely desired by residents as a function of dwellings. While 78% of survey residents reported having air-conditioning (a/c), 61% reported using a/c on only a few days or nights when "really needed" in summer, while 9% used a/c throughout summer.

Interviews revealed that residents were strongly aware of the links between climate-responsive design for thermal comfort, actions for energy conservation, and availability of an external mediating space such as the balcony. Residents' knowledge of climate extended to the effect of diurnal and seasonal solar orientation on their dwelling. They desired the ability to have nuanced control over their dwelling's degree of exposure to the sun's heat and light and access to breezes, with the balcony acting as a kind of environmental buffer zone for climate modulation (capturing morning or afternoon

sun in winter; excluding sun in summer; capturing and controlling prevailing breezes; managing wind effects).

Lack of a balcony was considered to be an omission in good apartment design: "Otherwise we'd want a townhouse and a (private) courtyard where you could go and sit out. Especially with the climate we've got here" (#7) The affordance of natural ventilation, views and daylight were viewed as essential for the subtropical lifestyle for example: "I think it's one of the worst designs I've ever seen in my life. There's actually no outdoor living whatsoever, no balconies at all. You've got windows that you can just open the top. You're relying totally on air conditioning and a controlled environment. And I think that's bad" (#2) Winter usage of a/c was considered absurd.

Private open space was also considered a social buffer zone that residents used to manage visual and acoustic boundaries within the residence and externally. Residents remarked on how external private space contributed to a sense of spaciousness, and offered them an alternative place of occupation without necessitating social contact. Importantly, a private balcony allowed the resident to move to an outdoor space without leaving the residence. Visual privacy was considered "important to very important" by 75% of residents. Residents did not like "overlooking" their neighbors, nor to be "overlooked", and expressed a preference for balconies located on the more 'anonymous' street side rather than balconies overlooking communal courtyard spaces.

More residents (88%) considered aural privacy to be "important to very important". 42% of the sample found the sound of laughter and voices to be one of the major annoyances of HD living. Residents' outdoor activities can also generate noise that could bother their neighbors but interviews suggested that most were conscious of managing boundaries unobtrusively and moderating their behavior when outdoors.

Loss of outdoor amenity caused by placement of air-conditioning equipment (condensers that generate heat and noise) in the balcony space was also a source of annoyance to residents and neighbors. In some cases, building governance bodies (known as the Body Corporate in Australia's predominantly strata-titled apartment market) considered activities such as drying laundry or airing bedding to be unacceptable uses of balconies and requested these to be carried out indoors, as a resident explained: "We virtually have to dry everything because we have strict rules again, you shall not hang washing out on the balcony and that's common to most properties" (#16). Some residents

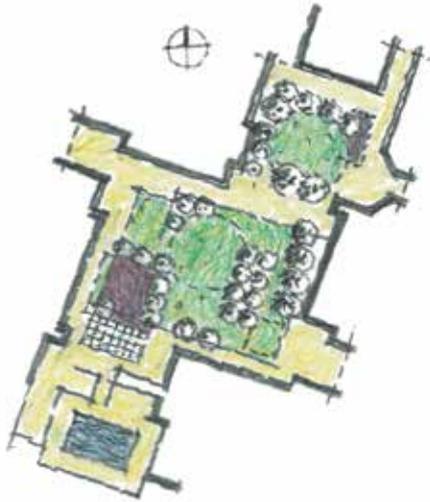


Figure 7. The communal courtyard is designed as a series of outdoor “rooms” structured by natural elements. The swimming pool is at the edge and does not dominate the space (Source: Kennedy, 2010)

appreciated access to an alternative private outdoor utility area: “I’ve got my washing and things out there” (#10).

Interaction Close to Home – People Prefer to Keep Their Distance

Communal spaces and facilities were used infrequently by many residents who preferred interactions in community open space external to the building. For example, more than two thirds of residents surveyed had a swimming pool in their complex, yet only 10% used it on a daily basis; 31% stated they never used the pool; 40% used the communal pool about once a month; and 19% used it weekly. Interviews revealed residents liked to keep to themselves and valued privacy in shared areas. Some attributed this to concerns about invading other people’s privacy or to others’ perceived territoriality. In addition, communal spaces could sometimes be poorly laid out or, climatically inhospitable - a no man’s land. Residents sometimes used a communal barbeque but retreated to their private dwelling to eat or entertain. They were mostly happy to maintain a sociable “hello” relationship with their neighbors yet did not want to feel pressure or obligation to engage more deeply.

Discussion

The results indicate clearly that private outdoor spaces offer residents social and environmental liveability benefits in the subtropics. It is less clear how well shared open spaces are contributing to liveability. Overall, it seems that unambiguous demarcation between public and private space is important. The low usage rate of communal facilities could be related to preferences for a level of anonymity in a setting where privacy

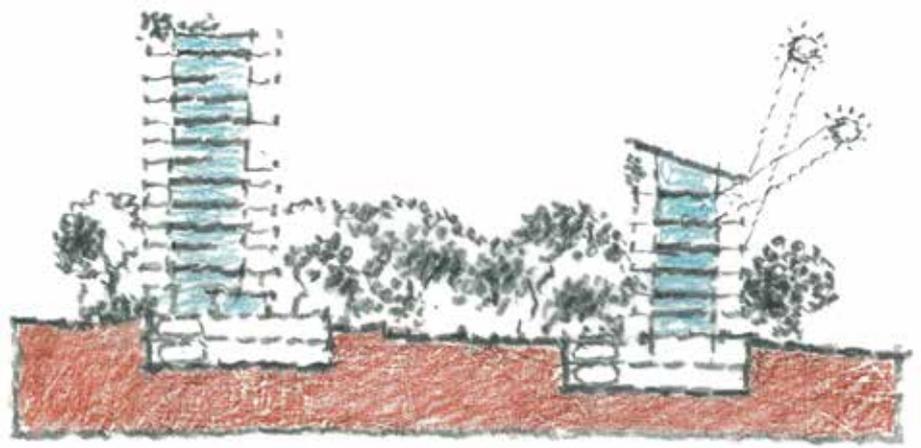


Figure 8. Large shade trees in communal space may provide privacy, a green outlook, and environmental cooling (Source: Kennedy, 2010)

is difficult to achieve due to physical proximity of neighbors (Skjaeveland and Garling 1997). While this research did not specifically gather objective data on the physical, material and spatial characteristics of outdoor spaces, subjective interview data indicated that poor quality contributed in some instances. The local planning scheme requires multi-residential developments to provide “high quality communal open space and covered private outdoor space” however compliance is interpreted quantitatively by both developers and planners. The amount of space, rather than fitness for purpose, is often the primary influence on layout.

Meanwhile, some communal facilities are high capital cost items that require owners’ ongoing expenditure on maintenance and energy, yet are not used frequently. Mid-block communal open spaces may have more potential for incidental social interactions if they are structured for multiple users and activities that contribute to quality of life, rather than being dominated by a single use (see Figure 7). Nevertheless, future research may investigate whether they can play a decisive role in the ways that the residents and the building interact with the environment. For example, substantial and well-planned subtropical vegetation could be prioritized in these spaces primarily as a stratagem for privacy between facing buildings that provides a desirable green outlook and the cooling effects of shade (see Figure 8).

In apartment buildings, a balcony is often a resident’s only access to private open space. It is usually located at the semi-public “front” of a dwelling where a high degree of transparency provides minimum privacy, lack of utility and exacerbates problems of perceived unsightliness by others, possibly leading to public perceptions of the low amenity of the buildings themselves. Rather than maximizing views and amenity, and having a positive effect on public space, extensive glazing actually inhibits residents’ use of balconies

by offering little sun protection, and aggravating other environmental mechanisms. While better design solutions that achieve visual and aural privacy, acoustic shielding from traffic noise, spaciousness, multi-purpose functionality, casual surveillance, and views are achievable, they are a low priority to developers who wish to present expansive views as the most desirable factor for potential residents. The glazed balustrade may have a high impact at point of sale but meets few other liveability attributes in the subtropics.

Implications

Already, some residents are compelled to use clothes dryers rather than natural drying due to the effect of glazing on perceptions of acceptability. Earlier analysis of this data (Buys and Miller 2012) found that residents desired participation in public life – specifically water conservation during a severe drought - and that aspects of apartment buildings presented



Figure 9. Brisbane’s landmark apartment building Torbreck, completed in 1961, features projecting balconies and verandas equipped with adjustable sun-control screens. Notably, the east and west façades employ blue steel adjustable aero-foil vertical louvered screens to utility verandas (Source: Centre for Subtropical Design)

perceived barriers for action. The ever-increasing extent of external glazing used in apartment buildings may lead inexorably to hermetically sealed dwellings in subtropical cities. More residents will need to use air-conditioning in their dwellings year round rather than at the time of their own choosing. Currently, electricity from coal-fired power stations is the primary source of energy for cooling in Queensland (97%) and will remain so for the immediate future. Buildings that are energy-dependent will hinder residents' participation in greenhouse gas emissions reduction, as well as their sense of connection to place.

As a starting point in speculating about what can happen to bring about positive change, the cultural perspective is extremely valuable, though it is only one amongst a host of issues to be addressed in practical architectural design. Balconies exert various influences on the environmental behavior of buildings, depending on their physical dimensions, whether they project from the structure, or are recessed, their height above ground and their disposition in relation to other projections or openings in the building (Papamanolis 2004). Good design needs to account for the ways that balconies influence: shading and natural daylighting; thermal transmission processes such as thermal bridging; wind loading and air flow across the

façade; acoustics and sound insulation; and maintenance and appearance. Due to daily and seasonal variations in air temperatures, the sun's path, wind velocity and direction, relative humidity and rainfall, and temporal noise levels, associated with different locations and contexts, there is no single ideal condition that offers all the requirements at one time. Architects' ingenuity and innovation in response to "place" is called for (see Figure 9), rather than generic designs that are not delivering positive responses to the subtropical climate.

Conclusion

This paper presents evidence that private outdoor spaces such as balconies are one of the most desirable features of apartment buildings in subtropical cities in Australia. They contribute to residents' perceptions of liveability and provide extra living space for a wide number of everyday domestic activities. Residents view these spaces as important alternative spaces that provide flexibility and a feeling of spaciousness with spatial and environmental qualities distinct from the indoor living environment. It is less clear how collective open spaces are contributing to perceptions of liveability, however, we are not suggesting that such space is not important. It

is more likely that the role of communal spaces is less-well understood, and they are provided in compliance with regulations rather than being well-integrated. That fact that resident satisfaction would be enhanced by accommodation for privacy and climate-responsive design is a good starting point for considering what is needed to enhance the contribution of collection open space to apartment liveability, and to counter the ever-increasing extent of external glazing used in apartment buildings' materiality.

Future research on the objective physical, material and spatial characteristics of private open spaces, and collective open spaces of apartment housing in Australia, is needed to investigate the ways practical design of public and private open space can contribute more positively to liveable and sustainable high density communities.

Acknowledgements

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References:

- Bay, Joo-Hwa. 2004. **"Sustainable community and environment in tropical Singapore high-rise housing: The case of Bedok Court condominium."** Architectural Research Quarterly 8 (3/4).
- Bureau of Meteorology, Australia. 1989. **"Climate of Australia"**, edited by Administrative Services. Canberra: Australian Government Publishing Service.
- Buyts, L and E Miller. 2012. **"Residential satisfaction in inner urban higher-density Brisbane, Australia: role of dwelling design, neighbourhood and neighbours."** Journal of Environmental Planning and Management 55 (3): 319-338. Accessed 12 March 2012. doi: <http://dx.doi.org/10.1080/09640568.2011.597592>.
- Canter, D and K Rees. 1982. **"A multivariate model of housing satisfaction."** Applied Psychology 31 (2): 185-207. <http://dx.doi.org/10.1111/j.1464-0597.1982.tb00087.x>. doi: 10.1111/j.1464-0597.1982.tb00087.x.
- Huang, Shu-Chun Lucy. 2006. **"A study of outdoor interactional spaces in high-rise housing."** Landscape and Urban Planning 78 (3): 193-204. <http://www.sciencedirect.com/science/article/pii/S016920460500099X>.
- Kennedy, R. 2010. **Subtropical Design in South East Queensland. A handbook for planners, developers and decision-makers Edited by Centre for Subtropical Design.** Brisbane: QUT, Brisbane City Council and the State of Queensland.
- Kennedy, Rosemary, Laurie Buyts and Evonne Miller. 2015. **"Residents' Experiences of Privacy and Comfort in Multi-Storey Apartment Dwellings in Subtropical Brisbane."** Sustainability 7 (6): 7741. <http://www.mdpi.com/2071-1050/7/6/7741>.
- Lee, Jaehyuk, Haeseong Je and Jeongsoo Byun. 2011. **"Well-Being index of super tall residential buildings in Korea."** Building and Environment 46 (5): 1184 - 1194. Accessed 14 March 2014. doi: <http://dx.doi.org/10.1016/j.buildenv.2010.12.010>.
- Papamanolis, N. 2004. **"An overview of the Balcony's contribution to the environmental behaviour of buildings."** Paper presented at the PLEA2004 - The 21st Conference on Passive and Low Energy Architecture, Eindhoven, The Netherlands, 19 - 22 September 2004. Accessed 8th May 2015. <http://alexandria.tue.nl/openaccess/635611/p0873final.pdf>.
- Skjaeveland, O and T Garling. 1997. **"Effects of interactional space on neighbouring."** Journal of Environmental Psychology (17): 181-198.
- Spearritt, P. 2009. **"The 200Km City: Brisbane, the Gold Coast and Sunshine Coast."** Australian Economic History Review 49 (1).