Belinda Yuen
Anthony G.O. Yeh

Editors

High-Rise Living
in Asian Cities

with CD-ROM

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Editors
Belinda Yuen
Singapore
belyuen8@gmail.com

Anthony G.O. Yeh
Centre of Urban Studies and Urban Planning
The University of Hong Kong
Pokfulam Road
Hong Kong SAR
Anthony.Yeh@hku.hk

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Contributors

Stephen J. Appold Kenan-Flagler Business School, Kenan Institute of Private Enterprise, Kenan Center, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-3440, USA, appold@unc.edu

Andy T. Chan Department of Mechanical Engineering, The University of Hong Kong, Pokfulam, Hong Kong

K.W. Chau Department of Real Estate and Construction, The University of Hong Kong, Pokfulam, Hong Kong, hrrbckw@hku.hk

Rebecca L.H. Chiu Department of Urban Planning and Design, The University of Hong Kong, Pokfulam, Hong Kong, rlhchiu@hkucc.hku.hk

K. Lam Department of Mechanical Engineering, The University of Hong Kong, Pokfulam, Hong Kong

Stephen S.Y. Lau Department of Architecture, The University of Hong Kong, Pokfulam, Hong Kong, ssylau@hku.hk; laustephensy@gmail.com

S.K. Wong Department of Real Estate and Construction, The University of Hong Kong, Pokfulam, Hong Kong

Wah Sang Wong Department of Architecture, The University of Hong Kong, Pokfulam, Hong Kong, wswong@hkucc.hku.hk

Anthony G.O. Yeh Centre of Urban Studies and Urban Planning, The University of Hong Kong, Pokfulam, Hong Kong, Anthony.Yeh@hku.hk

Belinda Yuen Department of Real Estate, National University of Singapore, Singapore, belyuen8@gmail.com

Wenjian Zhu College of Architecture and Urban Planning, Shenzhen University, Shenzhen, China, zhuwenjian@hotmail.com

Chapter 1
Introduction: High-Rise Living in Asian Cities

Anthony G.O. Yeh and Belinda Yuen

Hong Kong and Singapore are two Asian cities that have often been compared in terms of their urban development. Hong Kong and Singapore have the highest urban densities in the world. They are also distinguished by their high-rise housing developments and expanding tradition of high-rise living. Living in super tall residential buildings of 60 or more storeys high is increasingly quite common in Hong Kong. Although the tallest residential building is presently 40-storey, Singapore is building 50- to 70-storey housing in its city centre. This book seeks to examine the high-rise living experience of Hong Kong and Singapore.

1.1 Compact City, High Density and High-Rise Housing

With increases in urban population, there is an urgent need to conserve land and reduce greenhouse gas emissions. Many urban analysts have advocated more compact urban living (see, for example, Clark, 2005; de Roo & Miller, 2000; Hall, 1996). Against growing dissatisfaction with urban sprawl, compact city policies are becoming a common development consideration in both the developed and developing countries (Jenks & Burgess, 2000; Jenks, Burton, & Williams, 1996; Salat & Majoor, 2005). Compact urban form is perceived to be a sustainable urban solution that can not only contain urban sprawl but also conserve the environment (Yeh & Li, 2000), and provide the necessary population threshold for the support of public transport (Newman & Kenworthy, 1989), especially mass transit railways. Compact cities are characterised by central area revitalisation, high-density development, mixed-use development and services and facilities such as hospitals, parks, schools, leisure and fun.

Most prescriptions for high density are based on skyscrapers. Even though many people associate higher densities in residential areas with noise pollution, crime, loss

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A.G.O. Yeh (✉)
Centre of Urban Studies and Urban Planning, The University of Hong Kong,
Pokfulam, Hong Kong
e-mail: Anthony.Yeh@hku.hk

of privacy and increased demand on infrastructure, Yeh (2000) has argued that high-rise high-density urban environment if properly planned and managed may offer "good" density. Better planning, design and management can reduce the impact of high density, making the living and working environment less crowded. Tall buildings can help to mitigate some of the negative effects of high density. Urban density is the number of people living in an area, often measured by persons per square area. Building density is the percentage of land occupied by buildings. Crowdiness which is the main problem of high-density living is more related to building density and liveable space. With a fixed density, the decrease in building density may be achieved by making the buildings taller to increase the extended shared space and reduce crowding of the environment with the same amount of living space per flat (Fig. 1.1). If there is a need to increase density, some of the negative effects of the increased density (e.g. feeling of crowding and withdrawal which are manifestations of the desire for more personal space) can be reduced by building taller buildings.

Theoretically, tall buildings and high density may not be directly related. The increase in the number of storeys in a building may not necessarily lead to a big increase in density if the floor area per dwelling unit increases proportionally with the increase in the number of storeys. However, most cities would increase the number of storeys without increase in dwelling area because of high land price and the need to increase urban density due to limited land. In some extreme cases such as Hong Kong there is also a decrease in dwelling area in order to make housing more affordable because of high land price. The resultant urban form is increased residential height and a big increase in the density. Clearly, not everyone is in support of increased residential height. There are debates on both the research and policy front to support and condemn taller building construction. Equally, much has been written about the myths and benefits of compact city development (see, for example, O'Toole, 2009).
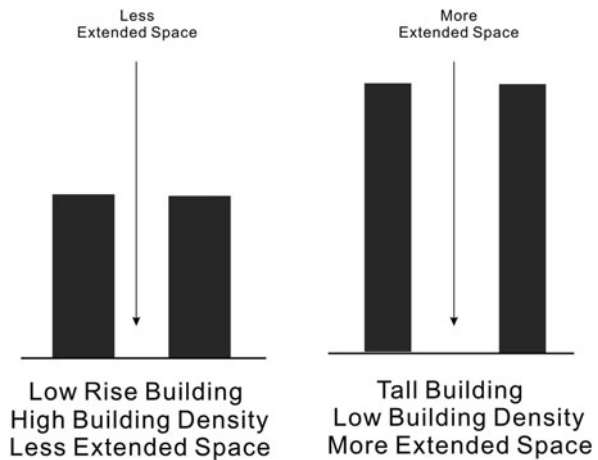
Fig. 1.1 Building height and building density with same population density

The research debate on high-rise housing largely involves investigation of the quality of life including social and health impacts of living in tall buildings. While some have pointed to the negative effects relating to concerns of children's safety and mental health (e.g. Costello, 2005; Jephcott & Robinson, 1971; Young, 1976), others have observed that high-rise living may bring positive benefits and satisfaction such as spectacular view, privacy and quietness (see Conway & Adams, 1977; Johnson, 2002; Yuen et al., 2006). With globalization, lifestyle and technological advancement, many more are revisiting the high-rise debate and agreeing with Church and Gale (2000) that

> It is . . . wrong to identify tower blocks as 'vertical slums' and insist that they should all be flattened. Many are clearly acceptable places to live for their residents (p. 19).

The policy debate, by contrast, is more concerned with strategic policy and alternatives. The debate has come full circle. It is punctuated by initial wide support for high-rise living – that it is the ultimate, ideal, modern dwelling form (see, e.g. Helleman & Wassenberg, 2004) to intense pressure to stop this construction following evidence-based research that high-rise living is harmful to its residents and resurgence in recent decades to once again include high-rise housing in urban agenda. In Asia, high-rise public housing development has been continually used by Hong Kong and Singapore in meeting their housing needs and making their high-density environment more liveable. In the United States and United Kingdom after the period of abandonment in the 1970s high-rise housing is once again now being built but largely by the private sector in prime urban locations. There is a similar trend in Europe and elsewhere (New South Wales Department of Planning, 2005; Turkington, Van Kempen, & Wassenberg, 2004). Whatever the desire, a change is happening; living in flats may and could increasingly become an urban norm for many more people in cities in the coming decades.

The definition of tall buildings by the Council of Tall Buildings and Urban Habitat is a building of 10 storeys or more. If we use this as the definition, then the residential buildings in Hong Kong and Singapore, which are increasingly 50 or more storeys high, can be considered to be "super tall" buildings. In this sense, Hong Kong and Singapore represent the extreme cases of tall residential building environment and high urban density. Equally, the perception of tall building is not so much by the height or number of storeys but in relative terms of tallness (Yusoff, Driscoll, & Beedle, 1986). In other words, human response is a central variable in the consideration of tallness and its receptivity. Yet, in many cities, the urban revolution of high-rise housing has largely proceeded with little explicit recognition or understanding of the social context in which this form of housing is delivered or its social outcomes (Helleman & Wassenberg, 2004; O'Toole, 2009). Although Hong Kong and Singapore both have "super tall" buildings, the height of these buildings is not the same. Hong Kong on average has more and higher tall buildings than Singapore. Thus, a comparative study of Hong Kong and Singapore's high-rise living experience can help us to better understand the development of tall buildings and high-density environment between the two cities, which have similar culture and density but different context of tall building development.

1.2 Hong Kong and Singapore – Highest Density and Tallest Living Environment in the World

Hong Kong and Singapore have the highest densities and largest amount of tall housing in the world. They offer natural settings for doing research on high-rise high-density development. The height of residential buildings in these cities has grown from the post-war 5–8 storey walkups to the present 60–70 storey buildings. Hong Kong is made up of the Hong Kong Island, Kowloon peninsular, New Kowloon, and the New Territories. The current total land area is 1,068 km^2 and the population is 6.9 million, giving an overall population density of 5,385 persons per km^2. However, because of the high concentration of people living in the urban areas along the northern coast of the Hong Kong Island, Kowloon, and New Kowloon, the overall population density has highly understated the population density in Hong Kong. In the New Territories where there is less population, the population density is 2,560 persons per km^2. But, on Hong Kong Island, Kowloon and New Kowloon where the population is mainly concentrated in the limited area, the population density is 26,950 persons per km^2. In the urban area, the density can be as high as 116,531 persons per km^2 such as in the Mongkok district. When the density is calculated at the street block level, some may be as high as 400,000–600,000 persons per km^2.

High-density development in Hong Kong is a result of its topography, historical development and land policy. Over 75% of Hong Kong's land consisted of hill slopes. A large proportion of the relatively flat areas are under private ownership, making development difficult (Chau, 1981). Most of the development is concentrated in Kowloon, New Kowloon, and Hong Kong Island where most of the flat land are obtained from hill levelling and land reclamation by the government. Population density in Hong Kong has increased tremendously immediately after the Second World War because of the sudden increase in population and economic activities. There was a large influx of refugees to Hong Kong after the change of regime in China in 1949. Hong Kong's population increased from 0.6 million in 1945 to over 2 million in 1951. This led to severe housing shortage, squatting, high density and poor living environment.

In terms of land policy, the government owns land in Hong Kong. Land is subdivided before leasing to the private developers through auction and tender. The government has full control over the timing, location and amount of land to be leased. The sale of land leases is one of the major sources of revenue of the government. During the property boom periods, revenue from land sales can be as high as 30% of the total revenue of the government. The control over the sale of land leases is one of the reasons for high land price in Hong Kong. The direct effect of high land price is high office and house prices, leading to high-density development and the construction of super tall residential buildings of over 60-storey.

As with Hong Kong, Singapore has embarked on a programme of high-rise living to address its housing needs in recent decades. Singapore and Hong Kong share several similarities in urban characteristics and strategies and are thus often compared in urban analysis (see, for example, Castells, Goh, & Kwok, 1990;

Ng & Hills, 2003). Singapore is a city-state with a land area of 700 km^2 and a current population of 5 million. The resultant population density stands at more than 6,000 people per km^2. The density of urban built-up area is however much higher, over 9,500 persons per km^2. Even though Singapore has over 50 islands within its territorial boundary (many are being used for industry and recreation, for example, Jurong Island and Sentosa respectively), the majority of its population is located on the main island of Singapore.

Against the context of limited land and increasing population, Singapore has in its urban development intensified density to meet the city's multiple needs. The intensification is perhaps best seen in its public-led housing strategy. In order to create a highly livable city with spaces for play, Singapore in its delivery of housing has made a conscious decision to build high-rise to increase its living space. In the public sector where the bulk of its housing stock is (over 80% of its 3.4 million resident population lives in public flats), high-rise is the common dwelling form. As Wong and Yeh (1985, p. 56) explain,

> Physical planning and design in the HDB [Housing and Development Board, the public housing authority in Singapore] context are strongly influenced by two major considerations. First is the need to optimize scarce land resources; second is the emphasis on providing a better housing environment than that from which the residents come.

Typically laid out in comprehensively serviced new towns where no more than half of the town's land is allocated to residential use, the gross new town density is generally in excess of 90 dwelling units per ha. Over time aided by technology advancement, building height in these towns has increased from 10-storey to more than 25-storey. However, in terms of building height, the similarity between Hong Kong and Singapore quickly evaporates. According to the Singapore Department of Statistics (2000), the majority of Singapore's residential buildings are 12-story and below (90% of public housing and 84% of private housing). Only 0.2% of public housing and 1.3% of private housing are 25-storey or higher. Construction of 30-storey public housing largely appeared in the 1990s. It is only in the past few years that construction of 40- and more storeys has started (Yuen et al., 2006). As of 2009, the tallest lived-in public housing in Singapore is 40 storeys.

1.3 High-Rise Living in Hong Kong and Singapore

This book brings together a collection of papers on Hong Kong and Singapore high-rise living written by urban scholars from the two cities. It attempts to illuminate the Hong Kong and Singapore high-rise development experience, in particular, the public sector-led development and contribute to the evolving evidence based literature on tall housing. While the public housing development of the two cities has received much documentation (see, for example, Castells et al., 1990; Wong & Yeh, 1985), few has focused on the significant issues surrounding the planning and development of high(er) rise.

This book first discusses the planning and design issues of tall residential buildings. It is then followed by discussions on the legislative, economic, liveability and community aspects of tall building living. Chapter 2 by Yeh and Yuen compares tall building living in Hong Kong and Singapore. The comparative study shows that people apparently adjust to living in super tall buildings through time. It seems that when the contextual building height environment is gradually predominated by very tall buildings, people are willing to live in them and willing to live higher. People may not be accustomed to tall building living if there is only one tall building in the city. If the findings in the extreme cases of Hong Kong and Singapore have any indication, the change in the contextual environment, the appearance of more tall buildings may help increase the receptivity of tall building living. However, the change in contextual environment is but one aspect of the perceived environment. It is unlikely to bear impact if the tall building compact environment is not carefully planned, designed and managed to minimize crowdiness and maximize sustainability. The physical environment of tall residential buildings is explored by Lau in Chapter 3. It examines the place of tall building in compact city development, the shape-making architecture and its impact with examples from Hong Kong.

A frequent argument in support of tall building is its role and contribution to urban sustainability. This aspect is elaborated in Chapter 4 by Zhu and Chiu. The sustainability theme is continued in Chapter 5 by Yuen who examines the opportunity at the micro scale for creating garden and ecology in high-rise development with examples from Singapore. Garden spaces provide settings for community interaction.

The important issue of legislation and safety of tall residential buildings is addressed by Wong in Chapter 6. Fire and building structural safety and reliability will continue to challenge high-rise designers and developers, especially as buildings go taller, not to mention energy and material conservation. The economics of tall residential buildings is examined in Chapter 7 by Chau et al. The value of clean air in high-density urban areas is illustrated with data from Hong Kong. A major premise behind high-rise high-density living and compact development is that people living in such neighbourhoods drive less and could reduce auto-related greenhouse gas emissions. Certainly, the onset of more efficient cars and alternative fuels cannot be ignored. While technology may improve auto-performance in terms of emissions reduction, a longstanding argument of urban planning is that planning and design of neighbourhoods can help to reduce dependence on the automobile and enhance quality of life.

The liveability of tall housing from a post-construction residents' perspective is examined by Yuen in Chapter 8. Residents are the most important factor in determining whether the high-rise housing solution works. They are the people who eventually have to live with the buildings that planners, architects and developers build. Their lived experiences and impressions are issues not to be neglected. Due to its shape, placement and surroundings, high-rise housing plays a key role in the city's built environment. Their damage and dysfunction can have profound effect on the residents and trigger ripple effect through the city (see the examples of Ronan Point and World Trade Centre). In many cases, there are building safety guidelines

and regulations such as that explored by Wong in this volume (Chapter 6). Denser neighbourhoods have often been held up as having a stronger sense of community. Chapter 8 by Appold examines community development in tall residential buildings with data from Singapore and the United States.

In the final chapter, In the March of High-rise, Yuen attempts to revisit some of the major themes and key lessons for cities in their future engagement with high-rise housing development as they reinterpret development options in changing and different times. Beyond the global urban norm, an open question for each city will be, what makes a tall housing specific to the time and place in which it is set.

This book is not intended to advocate that every city under population and land pressure should develop high rise building and high density environment like Hong Kong and Singapore. Rather, it demonstrates that if high density development is inevitable, good planning, development and management of high rise residential building would improve the quality of high density living. As mentioned, Hong Kong and Singapore are probably the extreme cases of high rise living. Not all cities should develop to such high densities of high rise buildings. However, appropriate increase in high rise buildings may help to make high density living more liveable.

There is still plenty of room for improvement in high rise residential buildings in Hong Kong and Singapore. For example, recently in Hong Kong, there are concerns about the visual and ventilation effects and heat island impacts of high rise buildings (Ng, 2001a, 2001b). There are also concerns of the wall effects of high rise buildings that were built very close together because of low minimum building separation distance. As a result, urban design guidelines (Planning Department, 2002) and building design guidelines (Environment Bureau, 2009) were developed to further improve the visual and ventilation design of high rise buildings, hoping to create a better high-rise high-density environment. Plot ratios were also lowered in some high density areas in order to address some of the concerns of society on extreme high density development. In other words, the search for better high-rise high-density living is still going on in the two cities, hoping it will provide further guidelines and insights on how to make high-rise environment become better in the future.

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Chapter 2
Tall Building Living in High Density Cities: A Comparison of Hong Kong and Singapore

Anthony G.O. Yeh and Belinda Yuen

2.1 Introduction

This Chapter seeks to examine the high-rise living experience of two high-density cities: Hong Kong and Singapore. The aim is to investigate the difference in residents' perception of tall building and tall building living between Hong Kong and Singapore to arrive at an understanding of: is there a relationship between how tall a person thinks a tall building is and his/her preference for life in high-rise buildings? The answer is pertinent to the debates on future urban density. Various urban scholars including Jacobs (1961) have long argued for proper density for urban dwellers. Ill-health, anxiety, isolation, for example, are some negative attributes of improper density ratios, commonly associated with high-rise living (Conway & Adams, 1977; Jephcott & Robinson, 1971). However, as explained in Chapter 1, tall buildings can help to mitigate some of the negative effects of high density.

High rise housing development has been used by Hong Kong and increasingly in Singapore to meet their housing needs and make their high density environment more liveable. Hong Kong and Singapore have the highest densities and largest amount of tall housing in the world. The height of their residential buildings has risen from the post-war 4-storey walkups to the present 40–70 storey buildings. Hong Kong and Singapore are probably the extreme cases of tall residential building environment and high urban density in the world. To set the discussion context, it is relevant to define a number of terms. Urban density is the number of people living in an area, often measured by persons per square area. Building density is the percentage of land occupied by buildings. Crowdiness which is the main problem of high-density living is more related to building density and liveable space. With a fixed density, the decrease in building density may be achieved by making the buildings taller to increase the extended shared space and reduce crowdiness of the environment with the same amount of living space per flat (see Fig. 1.1). In other

A.G.O. Yeh (✉)
Centre of Urban Studies and Urban Planning, The University of Hong Kong,
Pokfulam, Hong Kong
e-mail: Anthony.Yeh@hku.hk

words, if there is a need to increase density, some of the negative effects of the increased density (e.g. feeling of crowding and withdrawal which are manifestations of the desire for more personal space) can be reduced by building taller buildings.

2.2 Tall Buildings and High Density

Theoretically, tall buildings and high density may not be directly related. The increase in the number of storeys in a building may not necessarily lead to a big increase in density if the floor area per dwelling unit increases proportionally with the increase in the number of storeys. However, most cities increase the number of storeys without increase in dwelling area because of high land price and the need to increase urban density because of limited land. In some extreme cases, such as Hong Kong, there is also a decrease in dwelling area in order to make housing more affordable because of high land price. This leads to a big increase in the density.

Many studies on high-density living have been done in the 1960s following major advancement in construction technology, building services, and fire fighting technology in that period of time which allowed buildings to be built much taller than before. There were concerns whether high density living as a result of the increase in the construction of high buildings will lead to an unacceptable urban environment and social pathology. The relationship between density and social pathology has been mainly confirmed by experiments on animals in laboratory settings (Mercer, 1975). Human beings are more adaptable than animals and the relationship between human density and social pathology has however not been well established in non-experimental settings.

Many studies have shown that although high density is undesirable, there is little relationship between density and social pathology when other socio-economic variables are considered (Sundstrom, 1978). The perception of the environment, as well as the experience of crowdiness can be mediated by socio-economic status, cultural tradition, and the nature of activities performed in a given area (Stokols, Rall, Pinner, & Schopler, 1973). High density, though perceived as unpleasant, does not appear to have definite and consistent detrimental effects (Fischer, Baldassare, & Ofshe, 1975). Several researchers have disagreed that high urban density is associated with individual problems in health, social adaptation and pathological behavior (Baldassare, 1979; Patterson, Carson, & Hadden, 1996). There are many factors affecting social pathology in which density is just one of them. Other factors such as socio-economic background, education background, and health situation of individuals are more important variables than density in explaining social pathology (Millar, 1976; Sundstorm, 1978).

It is found that the relationship between density and social pathology is mainly through the intervening variable of crowding. Crowding is a psychological subjective response to density. Social pathology is a result of stress and social conflict caused by crowding. As crowdiness is a psychological subjective response, high density does not always lead to stress (Freedman, 1975; Mitchell, 1972; Sundstrom, 1978). The effects of high density on crowdiness may be mitigated by personal

background and interpersonal relationship. The perception of crowdiness depends on the duration of exposure to high density, expectation of the duration of the exposure, social interaction, the possibility of escaping to an external environment and the adaptation ability and tolerance of the persons concerned. The adaptation and tolerance of crowding depends on the socio-economic background, culture, age, education, and previous living environment of the individual.

For a fixed density, people who are used to live in a denser environment will feel less crowded than someone who is used to live in a more spacious environment. Different cultures also have different levels of adaptation and tolerance to crowdiness. Asians and Chinese were often found to have a high adaptation and tolerance to crowdiness (Anderson, 1972; Schmidt, Goldman, & Feimer, 1976), although tolerance to crowdiness was often involuntary, due to social and economic disadvantage, and having no choice (Loo & Ong, 1984).

There are two main types of density and their effect on crowding is different. They are personal space density and external space density which are related to Stokols' (1972) and Baldassare's (1979) concept of primary and secondary environment respectively. Personal space density is the measurement of density of the primary immediate working and living environment where the individual has more intimate contact with space for a relatively long time. It can be measured by the number of people per living/working space. External space density can be measured by the number of people in a certain area. The area can be measured by street blocks, neighbourhood, district, and the whole city. It is an expression of the secondary environment where space, facilities, and services are shared among the people within certain area. Because of the ease of measurement, it is one of the most commonly used indicators for density.

In a two-dimensional city, there is little difference between residential density (persons/site area) and household density (persons/house or flat). However, in a three-dimensional city with high rise buildings like Hong Kong where there can be hundreds of flats on a single site, residential density can be many times higher than household density and therefore residential density is not a good indicator of household density. In fact, in most cases, it has grossly overestimated household density. Crowded primary environments are more undesirable than crowded secondary environment (Stokols, 1972). The effect of density on crowding is mainly through personal space density rather than external space density. Crowdiness may not be felt if external space density is increased but not personal space density such as the adding of more flats to a building site without reducing the size of each flat.

The effect of density can be affected by the design, layout, open space, degree of sharing, traffic, and community facilities of the external and personal space. For external space, with a fixed density, people will feel less crowded if there are more open space, freer flow of traffic, and more community facilities. For personal space, with a fixed density, people will feel less crowded if there is a less degree of sharing and more privacy. The design and layout of rooms can make a room look more spacious. The subdivision and sound proofing of rooms can increase the privacy and reduce crowding. A small room can be made to appear larger by surrounding it with mirrored walls. A cluttered area will appear more crowded than one in which

physical objects are neatly arranged. In other words, a reduction of the effect of high density can be achieved through better planning and management of the urban space.

Hong Kong has the highest density in the world and therefore is a natural setting for carrying out research on high density development. Although Hong Kong has a much higher density than most Western cities where the relationship between high density and social pathology is studied most, similar to the findings of Western which have lower density, there is little evidence to find high density to be associated with social pathology. Mitchell (1972) found that emotional stress was not related to density. Stress was probably more influenced by inadequate income than density. He also found that forced social interaction between non-relatives as a result of flat-sharing tended to create stress and tensions. It was the degree of sharing that caused stress rather than density. Easy escape from each other by retreating outdoor could significantly assist in reducing such stress. He suggested that there should be more attractive and spacious external environment in high-density areas as a means of reducing pressure from overcrowding indoor with high degree of sharing.

Millar (1979) found that relationship between physical density and psychological problems was rather weak once socio-economic background had been taken into consideration. Many studies also showed that a substantial proportion of Hong Kong's urban population did not see high density as a problem (Millar, 1976; Richardson, 1977). On the contrary, many of them enjoyed being surrounded by a large number of people (Millar, 1976; Traver, 1976). Chinese traditions and the previous poor living conditions when they were refugees were some of the probable reasons to explain the tolerance of the Hong Kong people towards high densities and overcrowding (Schmitt, 1963).

Most of the above studies on high density living were done in Hong Kong when the density was the highest and there was a lack of urban planning and management. Even when the urban density and environment were at their worst in Hong Kong, there is no apparent evidence to support that high density is causing social pathology. The living environment has greatly improved since mid-1970s through better urban planning and management. Although improvements still remain, the negative effects of high density have been much mitigated with progressive improvement in design. With the progression, building height has increased. Studies in the 1970s on high density and tall buildings were done at the time when the buildings were mainly 20 storeys high which would be considered pretty low against present developments in Hong Kong and Singapore.

Most of these studies were concentrated on density rather than the living environment of tall buildings, especially the effect of building height on residential satisfaction. Very few studies have addressed this. It was found that for low-rise housing, people may prefer to live in higher floors. In a study of low-rise 5-storey student dormitories in Ankara, Turkey, the finding was that students on the highest floor perceived their rooms as larger, less crowded and were more satisfied with their rooms than residents of the lowest floor (Kaya & Erkip, 2001). This is because rooms in the upper floors were brighter and less noisy. But, the preference for living in high-rise buildings is different. In the study of height preference for high-rise building in United Kingdom, Conway and Adams (1977) found that if respondents were given a free choice of floor in a 24-storey block, over 30% of them would have

chosen the ground to second floors, another 15% the third to fifth floors, and only over 20% the twenty-first to twenty-third floors. This is mainly because the overall environmental setting is low rise housing.

Prior experience and cultural background are factors influencing how residents perceive high-rise housing. Williamson (1981) did an excellent study by examining how Germans living in high rises (6–28 storeys) in and around Cologne and Dusseldorf adjusted to their high-rise living environment. Using structured and open-ended questions in an interview format, the study addressed how independent variables such as age, sex, martial status, and social class affected resident's responses to the physical design, social networks, and adjustment of children in the high rise. Single people were aware of views offered from the windows of the high rise as well as the anonymity they experienced, whereas married people were conscious of balconies and their neighbours' backgrounds, and chose to live on the lower floors. Older respondents complained more about management, children, the cleanliness of neighbours, and other aspects. It was also found that men were more negative than women; however, women were more concerned with specific problems such as security. Compared to men, women were more conscious of the poor design of entryways, hallways, and stairs. Herlyn (1970) suggested that, generally, height has a relatively positive factor. Findings showed that only 5% of residents wished to be on a lower floor than they were, whereas a third would like to have been on a higher floor. Greenberg and Greenberg (1977) suggested that satisfaction is strongly related to the floor on which one lives, density within the apartment, and anticipated duration of residence.

Set against the high-rise development of Hong Kong and Singapore, most of these studies were done in relatively low-rise housing. In order to find out more about super tall building living, a study was carried out in Hong Kong and Singapore[1] respectively, trying to examine the influence of floor height on the perception of the living environment of tall buildings and whether there is a difference in the perception of tall buildings between Hong Kong and Singapore.

2.3 Super Tall Living in Hong Kong and Singapore

2.3.1 Methodology

To compare the tall building living experience between Hong Kong and Singapore, a study was carried out in Singapore first through a questionnaire survey. The study in Singapore was reported in detail in Yuen, Yeh, Appold, Earl, Ting, and Kwee (2006). A similar questionnaire was used in Hong Kong for comparative purpose. In Singapore, the living experience of a sample of 218 residents in the 30-storey block precinct of Toa Payoh new town was collected. The high-rise blocks ranged from 12 to 30 storeys. In Hong Kong, a sample of 961 residents was collected from the Wang Tau Ho/Wong Tai Sin urban district (426 samples) and the Fanling/Sheung Shui new town (535 samples). The height of the sampled residential buildings ranged from 34 to 44 storeys which represented some of the tallest buildings in

Table 2.1 Distribution of current floor levels of respondents

Current floor level	Hong Kong		Singapore	
	Number of respondents	Percentage	Number of respondents	Percentage
1–5 floor	111	11.6	29	13.3
6–10 floor	136	14.2	60	27.5
11–15 floor	129	13.4	46	21.1
16–20 floor	85	8.8	27	12.4
21–25 floor	164	17.1	32	14.7
26–30 floor	118	12.3	24	11.0
31–35 floor	124	12.9		0.0
36–40 floor	55	5.7		0.0
41 floor or above	39	4.1		0.0
Total	961	100.0	218	100.0

the districts. Care was taken to include residents living on various floors from the lowest through to the top floor of the building. The distribution of the samples in Hong Kong and Singapore is shown in Table 2.1.

2.3.2 Main Findings

The study in Singapore shows that perceptually, the residents are satisfied with their high rise living environment (Yuen et al., 2006). Similar satisfaction levels are found in Hong Kong. The studies show that high-rise living is a generally acceptable way of living in Hong Kong and Singapore and the residents are satisfied with the living environment. As found by Bonnes, Bonaiuto, and Ercolani (1991), the perception of crowdiness is a subjective reaction that is much related to the contextual spatiophysical features of the place that is being considered. Implicit in this type of inquiry is the notion that the height of nearby surrounding buildings has an impact on people's attitude and subjective interpretation of that environment. Since the contextual environment of super tall buildings in Hong Kong and Singapore differs somewhat, with the former higher than the latter, there may be differences in the perception of tall buildings in Hong Kong and Singapore. Thus, the main focus of this Chapter is to examine the difference in the perception of tall building and tall building living between Hong Kong and Singapore. In other words, is there a relationship between how tall a person thinks a tall building is and his/her preference for life in high-rise buildings?

2.3.2.1 (A) Satisfaction of Living Height

As shown by Table 2.2, sampled residents in the lower floors in Hong Kong and Singapore are less satisfied with the floor that they are staying as compared with