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## Living environment and quality of life in Hong Kong

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### ABSTRACT

Population growth and urbanization have resulted in the emergence of mega cities in recent decades. While compact urban fabrics and high residential density imply intensive interactions between man and environment, the living environment may be one of the most important factors affecting quality of life (QOL) of city dwellers. With this in mind, this paper seeks to understand the manners in which the residents relate themselves to the places they live and how they derive neighborhood and QOL, in such way that the relationship between living environment and QOL can be understood. A random telephone survey ( $N=1,114$ ) was conducted in Hong Kong. Results showed that different levels of neighborhood satisfaction varied in residents of different housing types and living environment was a significant predictor of resident's QOL. Other than the architecture of housing, this paper highlights the importance of services and facilities for the development of social relations and community building. This paper may supplement to the Western QOL studies and provide reference for urban planning initiatives for Asian cities.

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### KEYWORDS

Living environment; quality of life (QOL); neighborhood; housing; compact city

## Introduction

Quality of life (QOL) has been one of the most popular research topics in Western societies since the 1970s (Diener et al. 1999; Sirgy, Rahtz, and Samli 2003). It is an arena for researchers from various disciplines, such as sociology, psychology, social work, geography, politics, communication, and philosophy. In the past decade, QOL has also received increasing research attention in Asian countries because of the rapid development of the continent (Shek, Chan, and Lee 2005). Asia is the most populous continent which sustains 4.3 billion inhabitants, accounting for approximately 60% of the world population (United Nations 2015). Instead of Western-styled urban sprawl, Asian cities generally are developed in the form of compact city that intensifies interactions between man and man, and man and living environment (Jenks, Burton, and Williams 1996; Chan 1999; Shucksmith, Cameron, and Merridew 2006). In an area of 1,104 km<sup>2</sup> sustaining a total population of more than seven million, the population

density of Hong Kong stood at 6,620 persons per km<sup>2</sup>, and the most populous district achieved a density of 56,200 persons per km<sup>2</sup> in 2012 (Information Services Department 2013). Facing the problem of land shortage, high-rise, and compact residential buildings are developed in order to fulfill the relentless demand for housing (Yuen and Yeh 2011). Given that living environment (i.e. the quality and condition of the residence and surrounding areas) is believed to be one of the most important factors affecting QOL of city dwellers (Nakanishi, Sinclair, and Lintern 2013), there are very limited efforts examining relations between living environments and QOL in Hong Kong (Ng 2005; Shek and Lee 2007). The lack of prospective studies prevents conclusions about the direction of causality. However, specific characteristics of urban environment related to QOL need to be identified to guide planners and decision makers to create pleasant urban environment for the well-being of Hong Kong society.

To fill the knowledge gap, this paper analyses the first-hand data from a representative sampling survey conducted in 2011. Specifically, this paper seeks to understand the manners in which the residents derive life and neighborhood satisfaction as a result, in the hope that the role of living environment played in the construct of QOL can be better understood. The survey sampled 1,114 residents who lived in the Sham Shui Po (SSP) which is an old district in Hong Kong. With a long developmental history, many typical urban designs and fabrics, neighborhoods, and communities can be found in SSP. Therefore, the district is suitable to study the QOL of residents living in different neighborhoods that vary in terms of physical and social settings. It is noted that similar empirical data have not been collected and analyzed in any systematic and rigorous manner by previous studies. This paper may provide reference, not only for the further QOL studies conducted in the Western societies or other regions around the world, but also for a better urban planning initiatives for Asian cities.

## Theoretical framework

### *QOL, living environment, and neighborhood*

QOL refers to a person's overall sense of well-being, including all aspects contributing to his or her subjective satisfaction towards life (Campbell, Converse, and Rogers 1976; Diener and Suh 1997; Diener et al. 1999; Cummins 2000). A review of the literature reveals that QOL is a multi-faceted or multidimensional phenomenon. Important domains may include: (1) physical health, (2) mental health, (3) family, (4) social life, (5) economic status, (6) work, and of course (7) living environment (Wan and Wong 1991; Spilker 1992; Doward and McKenna 2004; Chow 2005; Low, Stimson, and Chen, 2017).

There are mainly two approaches to study QOL. One approach is based on "objective measures" (such as demographics and economics) but another pursues "subjective measures" (such as satisfaction and perception), respectively (Diener and Suh 1997; Angur, Widgery, and Angur 2015). The former argues that the objective measures are appropriate because it is the reality, while the latter assumes that QOL basically is a subjective experience. Both of these approaches no doubt have complementary value in assessing QOL (Angur, Widgery, and Angur 2015). There are complex nonlinear relationships between objective and subjective QOL and in some cases, they are poorly correlated (Stipak 1977).

A large number of literatures indicated that QOL and many social indicators (both objective and subjective measures) displayed specific geographical patterns. For example, Wilson (1987) identified the geographical “concentration of poverty” in Chicago after the 1970s. Some geographical “hot spots” of negative indicators were characterized by the concentration of multiple disadvantages. These studies pointed to the idea of “neighbourhood effects” that living in deprived neighborhoods has a more negative effect on residents’ QOL as well as their individual characteristics and development (Brooks-Gunn, Duncan, and Aber 1997; Sampson, Morenoff, and Gannon-Rowley 2002). Similar observations were also found in Europe (Dangschat 1994) and Asia (Delang and Lung 2010). To a lesser extent, a few studies focused on the positive influences of affluent neighborhood, rather than the concentrated disadvantages of deprived neighborhoods. For example, Rohe and Stewart (1996) indicated that there was a significant association between home ownership and residential stability. Carpiano, Lloyd, and Hertzman (2009) summarized the positive influences of neighborhood as “concentrated affluence” for human development.

Because a human is a being of physical existence and the living environment is the space or venue where the life is articulated. Some studies (e.g. Evans 2003; Evans, Wells, and Moch 2003; Robin, Matheau-Police, and Couty 2007) indicated that prolonged exposure to risky and pathological environment could result in behavioral restraints, diminished control, overloading of human sensory systems, insecure feeling, resources competition and conflict, reduced privacy, social withdrawal, and sense of helplessness. Sirgy and Cornwell (2002) emphasized the importance of living environment to residents’ QOL. While the majority of QOL studies were conducted in Western countries which are characterized by relatively low rise, low-density urban environments, there are very limited studies conducted in the compact cities in Asia. Western urban fabrics typically involve detached houses or low-to-medium rise apartment buildings, the form of social interaction mainly is followed in the horizontal dimension. There are contrasts with Asian cities in terms of urban fabrics, residential density, and social network (Forrest, La Grange, and Yip 2002; Appold 2011). In Hong Kong, the high-compact urban fabrics may have impacts on five aspects of the neighborhood, namely environmental quality, security, transportation, infrastructure, and urban renewal (Hong Kong Institute of Asia-Pacific Studies 2012).

In Hong Kong, the living environment and neighborhood features are largely defined by the type of housing. Because each housing type is characterized by its own physical and social settings, the concept of “housing classes,” developed by Rex and Moore (1967), was widely used in the spatial analysis of various social issues in Hong Kong. For example, housing type was identified as a significant predictor of smoking behavior of primary school children (Peters et al. 1995), the mental health of the elderly (Lam and Boey 2005) and the academic performance of students (Downing et al. 2007; Downing et al. 2009). However, the spatial patterning of QOL (also other social indicators) must be cautiously interpreted because the difference in QOL may be due to compositional reasons. In other words, the geographical clustering is due to the fact that similar people (e.g. similar in terms of demographics such as economic status) tend to aggregate within geographical proximity (Curtis and Jones 1998). Therefore, adopting a subjective approach to QOL, this paper intends to closely examine the relations among living environment, neighborhood

satisfaction, and QOL (Figure 1), with respect to the housing type. It is expected that the findings of this paper can supplement to Western QOL studies.

### Housing types in Hong Kong

This study focused on three types of housing, namely public housing, private housing, and *Tong Lau* in Hong Kong. Because these housing types represent three distinctly different living environments and neighborhood, they are suitable vehicles to study the relations between living environment and the residents' QOL. The following paragraphs provide an introduction to these three housing types from the perspectives of environmental quality, security, transportation, infrastructure, and urban renewal.

Public housing may refer to public rental housing (Figure 2) and subsidized sale flats, e.g. Home Ownership Scheme housing), although the number of the former outweighs that of the latter (Transport and Housing Bureau 2017). About half (44.8%) of Hong Kong residents are now living in public housing estates (Transport and Housing Bureau 2017). The history of public housing in Hong Kong can be dated back to the 1950s when the Hong Kong Government decided to provide affordable homes for those on low incomes. Public rental housing is not for sale. Families are eligible to lease a unit if their household incomes are below the prescribed limit. The tenant is required to pay the rent which is equivalent to a portion of current market price. The space allocation is mainly based on the household size and, at present, the minimum internal floor area (IFA) standard for public rental housing is 5.5 m<sup>2</sup>/person (Housing Department 2002). Hong Kong Government serves as both the landlords and property managers of the estates. Facilities and services include security guide at the entrance of building, public transportation and open space for recreation (Yeung and Wong 2003). Nevertheless,

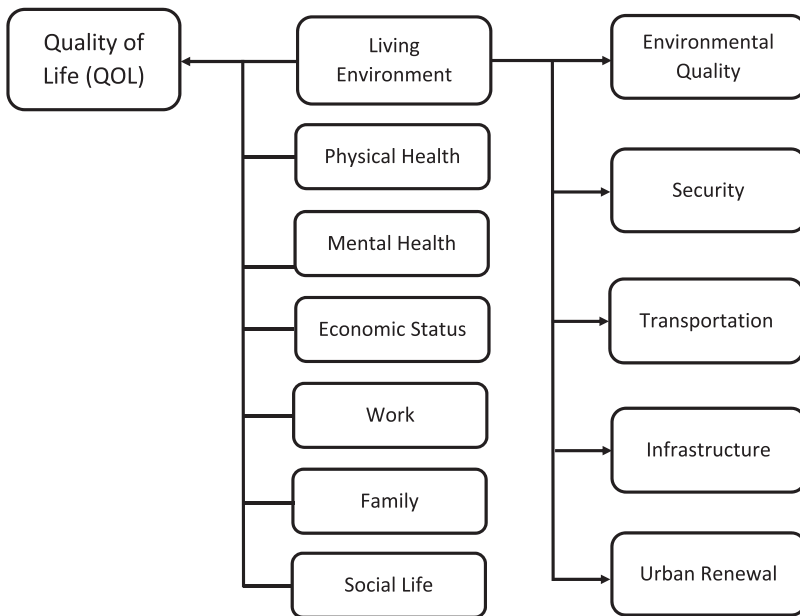


Figure 1. Theoretical framework of the paper.



**Figure 2.** A public housing estate in Sham Shui Po.

the provision of facilities and services is relatively basic when comparing with private housing. Although the public housing program is successful to provide affordable and quality housing for the low-income population, spatial concentration of poverty seems to be inevitable (Massey and Kanaiaupuni 1993; Holloway, Bryan, and Chabot 1998; Delang and Lung 2010).

Private housing is the counterpart of public housing, which serves 54.6% of the Hong Kong population (Transport and Housing Bureau 2017). These properties are built by real estate developers (usually listed companies) and open for sale in the market. Because of the high land price and limited supply of new home, the price of recently built private housing is prohibitively expensive that can be afforded by middle-income class or above (Ahuja and Porter 2010). While private buildings are usually high-rise blocks, with more than 30 floors (Figure 3), the residential density may be denser than that of public housing. Nevertheless, the design of private estate is professionally articulated and integrated. Not only comfort (e.g. ventilation and light penetration, etc.) and esthetics (e.g. color and decoration of the premise, landscaping garden, etc.) are taken into consideration, but also professional estate management and enhanced facilities (e.g. swimming pool, in-door parking lot, clubhouse, etc.) are available (Chan, Tang, and Wong 2002; Lam 2008). Some private estates may provide exclusive shuttle services for the convenience of residents. Furthermore, the buildings are erected on the podium, which is not open to public, so that security and privacy can be secured (Lange and Carlow 2015).

*Tong Lau* (literally means “Chinese building”) was a legacy of private housing development. They refer to a small percentage of old private buildings built before the 1950s (Hong Kong University 2003). These are single premises, not more than eight floors,



**Figure 3.** A private estate in Sham Shui Po.

and absence of escalator. Nowadays the majority of *Tong Lau* has been towed down, but small isolated patches still survive in some inner city neighborhoods of Hong Kong. They are usually located along the main roads, with a mixed residential, commercial, and even industrial land uses. The ground floor portion is usually occupied by small businesses such as grocery stores and food vendors. The upper floors usually are for residential use (Figure 4). Facilities provided for *Tong Lau* are quite limited and primitive because the planning standards and requirements were low when these buildings were built. Although electricity and water are provided, town gas is not available. Residents buy fuel, either liquefied petroleum gas or kerosene, from local grocery store for their daily uses. Not only it is inconvenient, but also it poses safety problem. Because of lacking maintenance and property management, *Tau Lau* is often accused of various environmental and social problems such as sanitation and hygiene, law and order, hawking activities, and even prostitution and drug trafficking (Cheng 2013).

## Methods

### *Sampling procedure*

A telephone survey was started in July 2010 and was completed in April 2011. The random sample of addresses was drawn from the SSP district. In line with the research using housing type as a metaphor of neighborhood, we set a target of completing at least 120 successful cases from three typical types of housing, namely public housing, private housing, and *Tong Lau*, in SSP. After random addresses had been selected, one qualified



**Figure 4.** A block of *Tong Lau* in Sham Shui Po.

household member was sampled from each address by using the Kish Grid. This member was then invited to a telephone interview by a trained interviewer. A total of 1,114 cases had been completed and scrutinized as valid and successful. Among them, 659 cases (59.2%) were female and 455 cases (40.8%) were male. There were 655 cases (58.8%) from public housing, 323 cases (29%) from private housing, and 136 cases (12.2%) from *Tong Lau*. The response rate was 45.5%, comparable to other social studies in Hong Kong.

### Survey measures

Besides some demographic variables, three groups of question items were asked, including QOL, various life domains, and neighborhood satisfaction.

First, QOL was measured by the Satisfaction with Life Scale (SWLS) (Diener, Emmons, and Griffin 1985). The five-item SWLS has been widely used in the QOL research globally and shown to be a reliable and valid method to reflect the satisfaction level of individual's general life (Pavot and Diener 1993; Diener 1994). The questions items included: "In most ways my life is close to my ideal"; "The conditions of my life are excellent"; "I am satisfied with my life"; "I have gotten the important things I want in life"; and "I would change almost nothing if I could live my life over". Respondents were requested to indicate their self-evaluation at interval scale, ranging from 1 (= "totally disagree") to 4 (= "totally agree"). A composite score based on the 5-item SWLS was computed to represent the QOL. A higher score represents higher level of QOL. The scale reliability is satisfactory and yielded a Cronbach alpha of 0.82.



Second, respondents were asked to evaluate seven domains of their life, including physical health, mental health, economic status, work, family, social life, and living environment. These domains were selected according to their coverage, measurability, representativeness, and importance to QOL. Respondents were requested to indicate their self-evaluation at an interval scale, ranging from 1 (very dissatisfied) to 4 (very satisfied).

Third, questions regarding residents' neighborhood satisfaction were also asked to evaluate five aspects of their neighborhoods, namely: environmental quality, security, transportation, infrastructure, and urban renewal. Respondents were requested to indicate their self-evaluation at an interval scale, ranging from 1 (very dissatisfied) to 4 (very satisfied).

## Statistical analysis

All valid data were input to SPSS 22.0 for statistical analyses. Analysis of variance (ANOVA) and cross-tabulations were used to describe the QOL, satisfaction towards neighborhood and various life domains among the residents of three housing types. Ordinary least-squares (OLS) regression models were constructed to explore the determinants of respondents' QOL and satisfaction towards living environment.

## Results

### Respondent profile

Demographics of respondents ( $N=1,114$ ) living in three housing types are listed in Table 1. Independent  $t$ -test and analysis of variance (one-way ANOVA) had been conducted to identify the demographical differences among three housing residents. Except gender, the demographics of age, income, education, and employment status were found to be significantly different among respondents living in the three housing types (Table 1).

The residents living in private housing were relatively rich (44.0% households earned more than HK\$30,000 per month) and well educated (37.8% received tertiary or post-graduate education). The employment rate (64.1%, including full-time and part-time jobs) of them was also higher than the other two groups. On the other hand, the residents of public housing and *Tong Lau* were relatively poor (more than half households earned less than HK\$10,000 per month) and acquired limited education (approximately 10% received tertiary education or above). There were also more senior residents living in public housing and *Tong Lau* (over two-third were aged above 40). Results indicated that demographics of respondents in public housing were similar to those in *Tong Lau*, but those of private housing stood out from the others.

### Living environment and neighborhood satisfaction

Table 2 lists the mean values of respondents' satisfaction towards living environment and neighborhood. Significant differences had been found in the satisfaction levels of living environment ( $F=12.727$ ,  $df=2$ ,  $p<.001$ ), environmental quality ( $F=15.062$ ,  $df=2$ ,  $p<.001$ ), security ( $F=4.471$ ,  $df=2$ ,  $p<.01$ ), and urban renewal ( $F=19.274$ ,  $df=2$ ,  $p<.001$ )

**Table 1.** Demographics of respondents.

Demographics	Attributes	Housing type			$\chi^2$ (df)
		Public (n = 655)	Private (n = 323)	Tong Lau (n = 136)	
Gender	Male	39.2	41.5	46.3	2.44 (2)
	Female	60.8	58.5	53.7	
Age	<20	14.0	0.6	3.7	42.17 (6)***
	20–39	25.8	42.7	28.9	
	40–59	37.5	35.8	43.7	
	>60	34.6	20.9	23.7	
Household monthly income (HK\$)	<10,000	51.4	16.7	59.6	193.28 (6)***
	10,000–19,999	29.3	24.4	25.5	
	20,000–29,999	12.9	14.8	9.6	
	> 30,000	6.4	44.0	5.3	
Education	Primary or below	39.5	17.4	31.9	138.64 (6)***
	Secondary	50.7	44.4	55.6	
	Tertiary	9.8	37.8	12.6	
Employment situation	Engaged (full time)	31.8	55.0	32.4	51.42 (4)***
	Engaged (part time)	12.2	9.0	12.5	
	Unemployed	56.0	36.0	55.1	
Marital status	Single	25.0	23.8	18.7	21.35 (6)*
	Married	62.4	67.8	62.7	
	Divorced/separated	4.8	4.4	12.7	
	Spouse dead	7.8	4.1	6.0	

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

**Table 2.** ANOVA of satisfaction towards living environment and neighborhood among respondents of three housing types.

Housing Type	Living Environment	Mean (S.D)				
		Neighborhood				
		Environmental quality	Security	Transportation	Infrastructure	Urban renewal
Public	2.88 <sub>a</sub> (1.009)	2.81 <sub>ab</sub> (1.267)	2.98 <sub>a</sub> (1.29)	3.18 (1.25)	3.26 (1.83)	5.78 <sub>a</sub> (2.69)
Private	2.90 <sub>a</sub> (0.932)	2.47 <sub>a</sub> (1.293)	2.91 <sub>a</sub> (1.47)	3.20 (0.86)	3.06 (1.75)	5.25 <sub>a</sub> (2.86)
Tong Lau	2.42 <sub>b</sub> (1.202)	2.27 <sub>b</sub> (1.094)	2.61 <sub>b</sub> (1.23)	3.17 (0.60)	2.96 (1.76)	4.19 <sub>b</sub> (2.98)
F value	12.727***	15.062***	4.471**	0.048	2.373	19.274***

Note: \*\* $p < .01$ ; \*\*\* $p < .001$ . Figures bearing same letters are not statistically different (Scheffe *post hoc* test after ANOVA,  $\alpha > .05$ ).

among residents from three housing types. The *post hoc* test indicated that residents of *Tong Lau* gave significantly low level of satisfaction towards living environment when comparing with those of public and private housing.

In order to examine both living environment and neighborhood satisfaction among all respondents, ordinary least-squares (OLS) regression models were established after controlling the demographics such as gender, age, education, and household income. Results indicated that residents of public housing did not feel their living environment significantly worse than residents of private housing ( $\beta = -0.014$ , n.s.) (Table 3). They gave better evaluation on the environmental quality ( $\beta = 0.296$ ,  $p < .001$ ) but they felt less satisfied with the transportation ( $\beta = -0.206$ ,  $p < .001$ ) when comparing with residents of private housing. On the other hand, residents living in *Tong Lau* gave significant negative evaluation on living environment ( $\beta = -0.489$ ,  $p < .001$ ), neighborhood security ( $\beta = -0.233$ ,  $p < .001$ ), and urban renewal of the SSP district ( $\beta = -0.654$ ,  $p < .001$ ). The finding generally was consistent with that of ANOVA (Table 2).

**Table 3.** Coefficients of regression for demographics, housing type on satisfaction towards living environment and neighborhood.

Predictors	Living environment	Neighborhood				
		Environmental quality	Security	Transportation	Infrastructure	Urban renewal
<i>Demographics</i>						
Gender (male = 1)	-.100*	.001	.048	.026	.046	.028
Age	.077***	.087***	.085***	.017	.037*	.030
Education (tertiary = 1)	-.002	.018	.020	-.003	-.111	-.277**
Household income (high = 1)	.216**	.028	-.073	-.099	-.096	-.062
<i>Housing type (reference group = private)</i>						
Public (yes = 1)	-.014	.296***	.089	-.206***	.017	.116
<i>Tong Lau</i> (yes = 1)	-.489**	-.139	-.233**	.053	-.130	-.654***
Constant	2.463***	1.878***	2.228***	3.061***	2.451***	2.394***
F value	17.036***	16.105***	12.122***	5.246***	3.633***	14.000***
R <sup>2</sup>	.113	.108	.085	.038	.029	.190

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

### Living environment and QOL

Table 4 lists the mean values of respondents' QOL and satisfaction towards various life domains. Significant differences had been found in the QOL ( $F = 4.248$ ,  $df = 2$ ,  $p < .05$ ), and satisfaction towards living environment ( $F = 12.727$ ,  $df = 2$ ,  $p < .001$ ), economic status ( $F = 7.72$ ,  $df = 2$ ,  $p < .001$ ), and social life ( $F = 3.219$ ,  $df = 2$ ,  $p < .05$ ) among residents of three housing types. The *post hoc* test indicated that there was a significant QOL difference between residents of *Tong Lau* and those of public and private housing.

One may argue that the results expected as QOL of affluent respondents (i.e. those live in private housing) should be higher than that of poor ones (i.e. those in public housing and *Tong Lau*). In order to examine the relationship between living environment and QOL, three OLS regression models were constructed to specify the effects of housing type, living environment, and other life domains on QOL (Table 4). In the first OLS regression model, after controlling the demographics such as gender, age, education, and household income, residents of *Tong Lau* had a significantly low QOL ( $\beta = -0.325$ ,  $p < .001$ ). While in comparison between public housing residents and those living in private housing, there was no significant difference in QOL ( $\beta = -0.070$ , n.s.). The finding generally was consistent to that of ANOVA (Table 4).

In the second OLS regression, the satisfaction towards living environment was included in the model as a predictor. After controlling the housing type as well as the demographics, the living environment was positively correlated with QOL ( $\beta = 0.344$ ,  $p < .001$ ) but living in *Tong Lau* was no longer a significant factor ( $\beta = -0.143$ , n.s.). The results indicated that the difference of QOL among respondents was significantly due to the contrast in living environment.

In the third OLS regression, various life domains were also included in the model. Living environment remained a significant predictor of QOL ( $\beta = 0.169$ ,  $p < .001$ ). The other life domains significantly influential to QOL were financial status ( $\beta = 0.249$ ,  $p < .001$ ), and work ( $\beta = 0.080$ ,  $p < .05$ ) and family life ( $\beta = 0.188$ ,  $p < .001$ ). The results revealed a general picture about the impacts of various life domains, including living environment, on QOL of Hong Kong residents (Table 5).

**Table 4.** ANOVA of QOL and satisfaction towards life domains among respondents of three housing types.

Housing type	Mean (S.D)							
	QOL	Life domain						
		Living environment	Physical health	Mental health	Economic status	Work	Family	Social Life
Public	3.18 <sub>a</sub> (1.162)	2.88 <sub>a</sub> (1.009)	2.84 <sub>a</sub> (0.876)	2.93 <sub>a</sub> (0.899)	2.73 <sub>a</sub> (1.268)	3.03 <sub>a</sub> (1.284)	3.07 <sub>a</sub> (1.03)	3.38 <sub>a</sub> (1.74)
Private	3.09 <sub>a</sub> (0.939)	2.90 <sub>a</sub> (0.932)	2.87 <sub>a</sub> (0.586)	2.98 <sub>a</sub> (0.784)	2.96 <sub>b</sub> (1.00)	2.96 <sub>a</sub> (0.892)	3.04 <sub>a</sub> (0.716)	3.10 <sub>b</sub> (1.203)
<i>Tong Lau</i>	2.40 <sub>b</sub> (1.087)	2.42 <sub>b</sub> (1.202)	2.88 <sub>a</sub> (0.935)	3.00 <sub>a</sub> (0.943)	2.51 <sub>a</sub> (1.204)	3.12 <sub>a</sub> (1.451)	2.99 <sub>a</sub> (1.301)	3.20 <sub>ab</sub> (1.943)
<i>F</i> value	4.248*	12.727***	0.276	0.506	7.72***	0.502	3.42	3.219*

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ . Figures bearing same letters are not statistically different (Scheffe *post hoc* test after ANOVA,  $\alpha > 0.05$ ).

**Table 5.** Coefficients of regression for demographics, housing type and life domain on QOL.

Predictors	Life satisfaction		
	Model 1	Model 2	Model 3
<i>Demographics</i>			
Gender (male = 1)	-.121*	-.076	-.087*
Age	.066**	.038	.047**
Education (tertiary = 1)	.044	.063	.025
Household income (high = 1)	.236***	.105	.082
<i>Housing type (reference group = private)</i>			
Public (yes = 1)	-.070	-.096	-.045
<i>Tong Lau</i> (yes = 1)	-.325***	-.143	-.045
	$\Delta R^2 = .146^{***}$		
<i>Life domain</i>			
Living environment		.344***	.169***
		$\Delta R^2 = .183^{***}$	
Physical health			-.083
Mental health			.013
Economic status			.249***
Work			.080*
Family			.188***
Social life			.072
			$\Delta R^2 = .168^{***}$
Constant	2.387***	1.571***	.559**
<i>F</i> value	9.980***	24.403***	26.052***
<i>R</i> <sup>2</sup>	.146	.316	.478

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

## Discussion

### *Housing type and neighborhood satisfaction*

Residents of public housing did not feel that their living environment was significantly worse than that of private housing ( $\beta = -0.014$ , n.s.). Furthermore, residents of the public housing gave better evaluation on the environmental quality ( $\beta = 0.296$ ,  $p < .001$ ). The result may be explained by the fact that the housing cost and expectation are different between these two groups of residents. In the recent decades, Hong Kong has already become one of the places with highest property price and room rent around the world (Liu 2014; Bertaud 2014). It is normal for private housing residents to hold higher

expectation as millions of dollars are required for purchasing a flat, or at least, thousands of dollars for the rent. In contrast, public housing residents are able to rent a flat by paying only a portion of the current market price. Therefore, they may hold lower expectation than residents of private housing. In some instances, some public housing residents are re-settled from *Tong Lau*. An even more positive evaluation would have resulted because of their prior *Tong Lau* experience. Nevertheless, transportation of public housing ( $\beta = -0.206, p < .001$ ) needed to be improved.

Comparing with residents who live in private housing, those in *Tong Lau* gave significant negative evaluation on living environment ( $\beta = -0.489, p < .001$ ), neighborhood security ( $\beta = -0.233, p < .001$ ), and urban renewal ( $\beta = -0.654, p < .001$ ). While buildings are old, wore out and without proper maintenance, the living environment is far from satisfactory. Furthermore, property management is not common in old buildings. When there is no security guard at the building entrance, security is always a primary concern. *Tong Lau* residents' perception towards safety eventually may exert an impact on social integration within the community, or even worse, withdrawal from community life (Li 2009). The acute problem of urban decay in the inner city neighborhoods of Hong Kong prompted the necessity of urban renewal. Many residents living in *Tong Lau* look for urban renewal, in such way they can be re-settled and moved to public housing. However, multiple property ownership and complex land leases make urban renewal a very difficult task (Ng 1998; Hui, Wong, and Wan 2008). Furthermore, private developers are not interested in redevelopment of old neighborhoods because the financial cost for land resumption or compensation is extremely high (Adams and Hastings 2001). These reasons explain why *Tong Lau* residents gave significant negative evaluation on urban renewal.

### Living environment and QOL

The ANOVA indicated that there was a difference of QOL among residents of three housing types ( $F = 4.248, p < .001$ ). While demographics and housing type were controlled, the difference of QOL can be explained by the contrast in living environment ( $\beta = .344, p < .001$ ). When various life domains were also included in the model, living environment remained a significant predictor of QOL ( $\beta = .169, p < .001$ ). It can be concluded that living in a pleasant environment can result in better QOL.

Other significant predictors included economic status ( $\beta = .249, p < .001$ ), work ( $\beta = .080, p < .05$ ) and family ( $\beta = .188, p < .001$ ). In light of the high living costs in Hong Kong, it is not surprising that respondents with better economic status and higher job satisfaction are more satisfied with life (Union Bank of Switzerland 2015). Satisfaction with family is positively associated with QOL because family is the basic unit in the Chinese society (Fan 2000). It is interesting that physical health and mental health are not statistically associated with QOL, probably due to the fact that Hong Kong residents have relatively low health awareness (Department of Health 2006). A territory-wide survey indicated that, even though most people experienced sub-health symptoms, more than half still believed that they were in good health and overlooked the body's warning signs (Hong Kong University's Public Opinion Programme 2013). Media appealed to stop neglecting mental health issues in Hong Kong (South China Morning Post 2015).

Referring to the living environment, its importance should not be underestimated. Living environment serves as a physical framework that enables its users to attain certain level of living quality (Sirgy and Cornwell 2002). The physical layout of urban fabrics can create a user-friendly space that generates many advantages (Parakh 2016). For example, a walkable and accessible community enhances public access to social infrastructure, such as medical facilities and sports ground that has been proven to yield better physical health outcomes (Vries, Verheij, and Groenewegen 2003; Wang, Chau, and Ng 2016). Green and open space provides many ecological and social functions, such as formal and informal recreation and conservation of natural environment (Chiesura 2004). Some environmental designs can even enhance security by reducing the incidence of certain types of criminal activity (Newman 1972; Stanley 1977). Environmental architecture and design strategies can enhance ventilation and illumination, and reduce energy and waste production (Kruger and Seville 2012; Elotefy et al. 2015). Furthermore, living environment can regulate social interactions, foster the articulation of social networks, help develop a sense of identity, and provide opportunities for local education, employment and participation in community-bonding domestic activities (Sassi 2006). Consequently, residents are more capable of handling psychological distress and maintaining mental health (Evans 2003). All these advantages of living environment may facilitate a pleasant living experience (Alberti 2000).

Because of Hong Kong people's strong desire for a better QOL, architecture and layout have been emphasized in both public and private housing in the recent years, in order to meet the growing expectation and quest for convenient and pleasant living environment (Wan and Wong 1991; Ng 2005). Specifically, more environmental features (e.g. ventilation, greening, power saving, etc.) are found in the recently built housing (Lau 2011). Other than the architecture and layout, good provision of services and facilities is equally important because it can enhance the development of social relations and community building (Yuen and Yeh 2011). Either the Hong Kong Government or commercial developers allocate extensive resources on providing services and facilities for the convenience of the residents (Yeung and Wong 2003). Because thousands of residents actually create large demands, high usage rates imply promising profit that in turn guarantees the business to be sustainable. Of course, affordability makes the difference between private and public housing. While security guard, playground, and open space are considered to be basic requirements for modern living, they are available in public housing estates. More integrated facilities such as clubhouse, restaurant, and swimming pool are only equipped in the private housing so that residents may find their living environment more decent and comfortable (Chan, Tang, and Wong 2002; Lam 2008). In an absolute sense, based on the general facilities and services provided by different housing types, it is unfair to directly compare the "quality" of private and public housing because these two types of housing actually are targeting two different sectors of people who hold different expectations. Nevertheless, *Tong Lau* deserves more attention because of the problem of urban decay. Both the condition of these old buildings and the surrounding environment are far from satisfactory. To address the problem and improve the living conditions of residents in dilapidated urban areas, urban renewal perhaps is the best solution (Chan and Lee 2008; Development Bureau 2011).

## Conclusions

QOL is a multi-faceted complex that involves many life domains. Does living environment affect the QOL? This paper provides hints to answer this question. It examines the subjective neighborhood satisfaction as well as QOL among 1,114 residents in Hong Kong. While different levels of satisfaction towards neighborhood and living environment varied in residents of three housing types, subjective satisfaction towards living environment was found to be a significant predictor of resident's QOL. It should be noted that subjective measures reflect only the subjective experience of respondents and the relationships between objective and subjective QOL are complex and nonlinear. Findings of this paper may provide reference for the urban planning and social development of Hong Kong in the future. Yet, it is necessary to further identify and examine the social processes or mechanisms associated with the living environment. However, the inflexibility of structural questionnaire limits our scope and hinders us to have such understanding. It is hoped that this shortcoming may be supplemented by focus group discussion or non-structural in-depth interviews in the future studies.

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