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Quality of Life in Montevideo

by

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Abstract[*]

This paper analyzes various dimensions of the quality of life in Montevideo. The paper finds that satisfaction with various public goods and services at the neighborhood level play a minor role in the overall reported well-being of individuals and in the satisfaction of life domains, such as leisure, social life, family, health, housing, neighborhood economic situation and work. This is in spite the fact that there are significant disparities in a wide range of indicators among those living in different areas of the city. The results further suggest that differences in overall happiness and in domain satisfaction are mostly due to differences in individual outcomes like education, health, labor situation and housing quality.

[*] This working paper was undertaken as part of the Latin American Research Network Project "Quality of Life in Urban Neighborhoods in Latin America and the Caribbean."

1. Introduction

Starting in 1999, the Uruguayan economy was hit by a serious recessionary period with a strong contraction of the real economy that anticipated the 2002 economic crisis, which was caused by internal factors in combination with external negative shocks. This kind of events highlights the relevance of regional and international scenarios in a Uruguayan sustainable growth strategy. Since then, the Uruguayan economy has enjoyed a period of significant growth, with an average GDP growth rate of 6.7 percent between 2002 and 2006, and a historical record of 11 percent between 2004 and 2005. In this scenario, it is critical to be able to accurately assess and monitor the population's quality of life (QoL) as a measure of the country's capacity to improve life standards for all.

Montevideo is the country's capital, largest city and chief port. Given the fact that it is more than twice as large as any other city in Uruguay, it is considered the principal city. Montevideo's current population is estimated at 1,349,000, representing roughly 44% of the country's population.

The general purpose of this study is to provide updated estimates of satisfaction with life as a whole and satisfaction in several life domains (leisure, social life, family, health, economic situation, work, housing and neighborhood) for the city of Montevideo and to study their determinants and how these determinants affect rental values. In order to do so we use data from the 2006 Household Survey, and we conduct a special survey with national coverage. The paper proceeds as follows. In Section 2 we present the main data sources. Sections 3 and 4 present a descriptive analysis of secondary sources and of our neighborhood survey, respectively. The descriptions of differences in socioeconomic indicators by neighborhood of these two sections serve as background analyses for the measures of quality of life introduced in the following sections. Section 5 presents a brief descriptive analysis of the main focus of our neighborhood survey: how people enjoy and use their leisure time. Section 6 deals with the econometric methodology needed to present the main results in Section 7. Finally, Section 8 concludes, and Section 9 discusses policy implications.

2. Data Sources

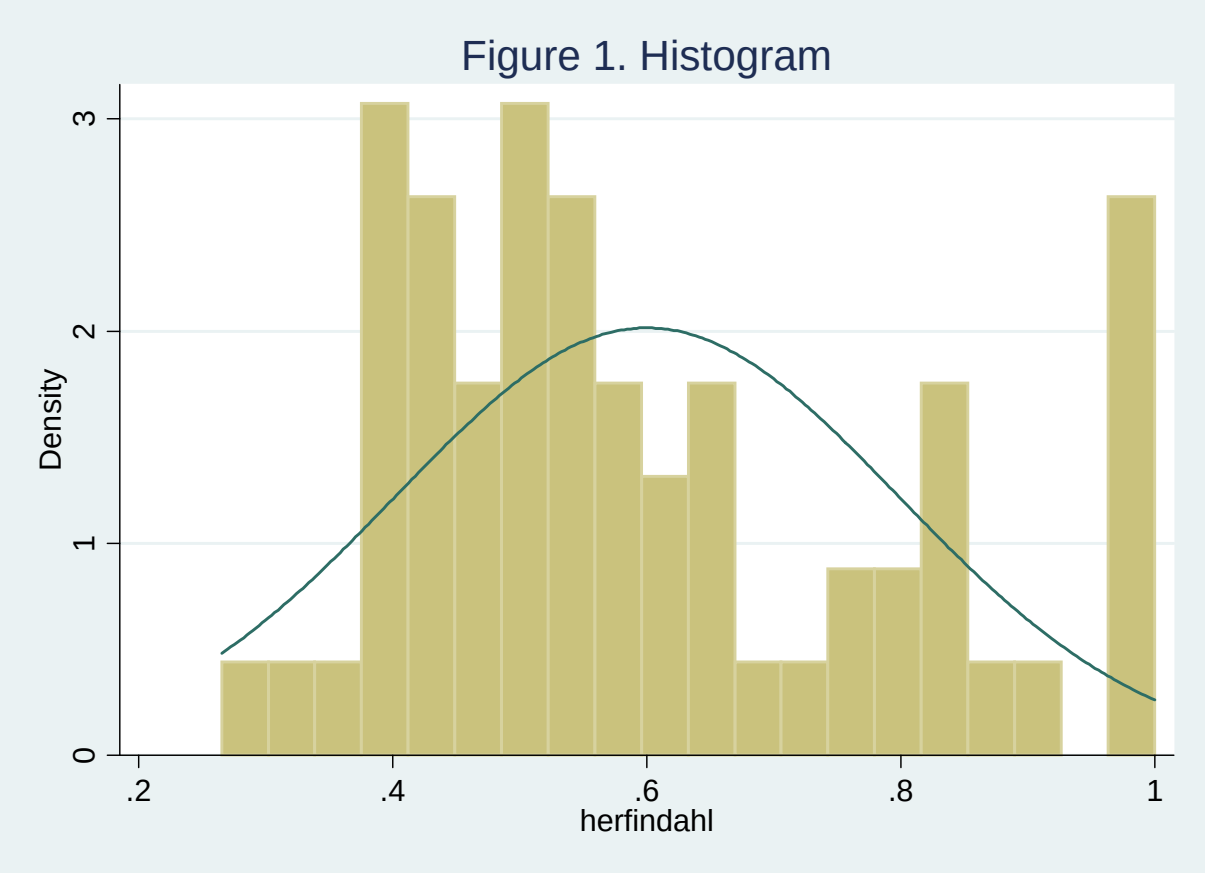
2.1 Secondary Data (Household Surveys)

Based on the 2006 Household Surveys information on household income and unemployment rate, the National Statistical Institute (INE) classifies every city censal segment using a four-category socioeconomic indicator: low, medium-low, medium-high and high.

Consequently, the whole population of households is assigned to one of these four strata according to the location of their dwellings. All household members within the censal segment receive the same socioeconomic level classification, independently of their personal income and/or employment condition.

The city of Montevideo is divided into 62 different neighborhoods; each of these is inhabited by a different composition of socioeconomic strata, as can be seen in Table 1. In addition, Montevideo's neighborhoods display marked segregation by stratum. In half of the 62 neighborhoods, inhabitants of only one stratum make up more than 70 percent of the population.

Using concentration indexes it is possible to provide a more sophisticated picture of the degree of neighborhood segregation. The share of each stratum in the population of neighborhoods can be used to compute Herfindahl concentration indexes. With four strata, the Herfinahl index varies between 0.25 and 1 corresponding respectively to the maximum level of integration (25 percent of each stratum in the neighborhood) and maximum segregation (only population of one stratum). Figure 1 shows the histogram of this concentration index vis-à-vis a normal density curve. Clearly, there are very few neighborhoods with a similar share of individuals of all four strata. In comparison with the normal distribution, the histogram is skewed to the left. The skewness is produced by a concentration of neighborhoods with Herfindahl values between 0.4 and 0.6. This corresponds to neighborhoods where 60 to 75 percent of the population are of the same stratum. So, although the histogram shows a lower segregation than what is implied by a normal distribution, the segregation level is still high. Moreover, the histogram presents a mass concentration point of fully segregated neighborhoods with Herfindahl values of 100 percent.



Source: Authors' compilation based on INE 2006 Household Survey.

Table 1. Neighborhood Composition (% of households of each stratum)

Source: Authors' compilation based on INE 2006 Household Survey.

	STRATUM					STRATUM			
BARRIO	Low 1	Medium-Low 2	Medium-High 3	High 4	BARRIO	Low 1	Medium Low 2	Medium High 3	High 4
Aguada	0.00%	11.17%	**86.25%**	2.58%	Larrañaga	0.00%	0.00%	**72.59%**	27.41%
Aires Puros	41.45%	9.16%	**49.40%**	0.00%	Las Acacias	26.35%	**65.86%**	7.79%	0.00%
Atahualpa	0.00%	25.48%	**51.59%**	22.93%	Las Canteras	16.50%	37.97%	**45.53%**	0.00%
Barrio Sur	0.00%	0.00%	**100.%**	0.00%	Lezica, Melilla	**54.23%**	25.37%	20.40%	0.00%
Bañados de Carrasco	44.80%	**52.80%**	2.40%	0.00%	Malvín	0.00%	0.00%	15.14%	**84.86%**
Belvedere	0.00%	46.94%	**53.06%**	0.00%	Malvín Norte	0.00%	0.00%	**100%**	0.00%
Brazo Oriental	0.00%	14.12%	**79.71%**	6.18%	Manga	**89.96%**	10.04%	0.00%	0.00%
Buceo	0.00%	0.00%	**62.11%**	37.89%	Manga, Toledo Chico	**77.65%**	20.34%	2.02%	0.00%
Capurro, Bella Vista	22.93%	**34.53%**	17.40%	25.14%	Maroñas, Guaraní	43.88%	**45.70%**	10.42%	0.00%
Carrasco	0.00%	0.00%	0.00%	**100 %**	Mercado Modelo,Bolivar	26.74%	7.52%	**58.50%**	7.24%
Carrasco Norte	0.00%	39.68%	11.11%	**49.21%**	Nuevo París	46.74%	**49.59%**	3.67%	0.00%
Casabó, Pajas Blancas	**89.72%**	10.28%	0.00%	0.00%	Palermo	0.00%	39.47%	**50.75%**	9.77%
Casavalle	**100%**	0.00%	0.00%	0.00%	Parque Batlle, Villa Dolores	0.00%	0.00%	**59.20%**	40.80%
Castro, Castellanos	8.28%	**76.07%**	15.64%	0.00%	Parque Rodó	0.00%	38.76%	15.50%	**45.74%**
Centro	0.00%	0.00%	**82.37%**	17.63%	Paso de la Arena	**90.62%**	8.90%	0.48%	0.00%
Cerrito	**44.26%**	24.47%	28.30%	2.98%	Paso de las Duranas	0.00%	0.00%	**91.75%**	8.25%
Cerro	21.34%	**71.27%**	7.40%	0.00%	Peñarol, Lavalleja	21.82%	**70.39%**	7.79%	0.00%
Ciudad Vieja	0.00%	**72.07%**	27.93%	0.00%	Piedras Blancas	42.48%	**57.52%**	0.00%	0.00%
Colon Centro, Colón Noroeste	25.65%	**62.66%**	11.69%	0.00%	Pocitos	0.00%	0.00%	5.29%	**94.71%**
Colon Sureste, Abayubá	**53.66%**	27.75%	18.59%	0.00%	Prado, Nueva Savona	0.00%	10.80%	**52.78%**	36.42%
Conciliación	38.71%	**58.27%**	3.02%	0.00%	Punta Carretas	0.00%	0.00%	0.00%	**100 %**
Cordón	0.00%	33.26%	**57.66%**	9.08%	Punta De Rieles, Bella Italia	**76.04%**	23.96%	0.00%	0.00%
Figurita	0.00%	**45.41%**	23.39%	31.19%	Punta Gorda	0.00%	0.00%	0.00%	**100 %**
Flor de Maroñas	26.54%	**55.76%**	17.70%	0.00%	Reducto	0.00%	23.10%	**68.23%**	8.66%
Ituzaingó	17.94%	**71.47%**	10.59%	0.00%	Sayago	0.00%	9.83%	**90.17%**	0.00%
Jacinto Vera	0.00%	25.00%	**53.33%**	21.67%	Tres Cruces	0.00%	0.00%	12.26%	**87.74%**
Jardines Del Hipodromo	**71.98%**	21.39%	6.64%	0.00%	Tres Ombues, Pueblo Victoria	**73.15%**	16.08%	10.77%	0.00%
La Blanqueada	0.00%	0.00%	20.25%	**79.75%**	Unión	0.00%	30.34%	**62.86%**	6.80%
La Comercial	0.00%	21.16%	**78.84%**	0.00%	Villa Española	11.25%	**67.68%**	21.07%	0.00%
La Paloma, Tomkinson	**93.94%**	6.06%	0.00%	0.00%	Villa García, Manga Rural	**68.37%**	31.63%	0.00%	0.00%
La Teja	0.00%	**70.87%**	29.13%	0.00%	Villa Muñoz, Retiro	0.00%	**67.08%**	32.92%	0.00%

Based on the information in Table 1, we have aggregated the censal segments to approximate real neighborhood areas in the city of Montevideo and have assigned each of the 62 existing neighborhoods to one of the four socioeconomic strata.[1]

Another interesting observation that can be inferred from Table 1 is that stratum four (the highest) is the most highly concentrated, almost fully covering four different neighborhoods, even though this stratum is the smallest one. This could be reflecting a certain tendency for members of this stratum to isolate themselves from the rest of the population, monopolizing certain areas. This process is not done through an explicit discrimination but merely through the cost of living in those places, which can only be reached by people of that stratum. The idea will be reaffirmed later in the analysis of housing services on the block, as its abundance or scarcity could have a direct effect on the price of living there.

2.2 New Data (Montevideo QoL Neighborhood Survey, 2007)

In addition to using available data on household characteristics, we crafted a population survey to obtain critical data on QoL neighborhood-specific characteristics. The survey was applied in three geographic areas in Montevideo: (1) one poor, low-QoL area, (2) one rich, high-QoL zone and (3) a comparison group, composed of surveys conducted in the rest of the city.

The neighborhoods were selected to represent low and high-income city areas that allowed for enough dispersion to reflect possible differences in QoL dimensions, but avoiding the tails of the distribution (lowest and highest socioeconomic areas).[2] In the tables we will refer to the low and medium-low area and to the high and medium-high areas.

The selected low QoL area includes two traditional neighborhoods located in the southwest side of the city: El Cerro and Tres Ombúes-Pueblo Victoria (Figure 4). According to Table 1, the strata composition (low, medium-low, medium high and high respectively) of these two neighborhoods is: 21.3 percent, 71.3 percent, 7.4 percent and 0 percent for Cerro, and 73.2 percent, 16.1 percent, 10.8 percent and 0 percent for Tres Ombúes-Pueblo Victoria. These two neighborhoods were created with an important contingent of European immigrants during the development of the meat industry in the first half of the twentieth century, which gave rise to a sizeable local working class and to the Uruguayan union movement. In this context the population developed a strong neighborhood identity and neighborhood cohesion that, although

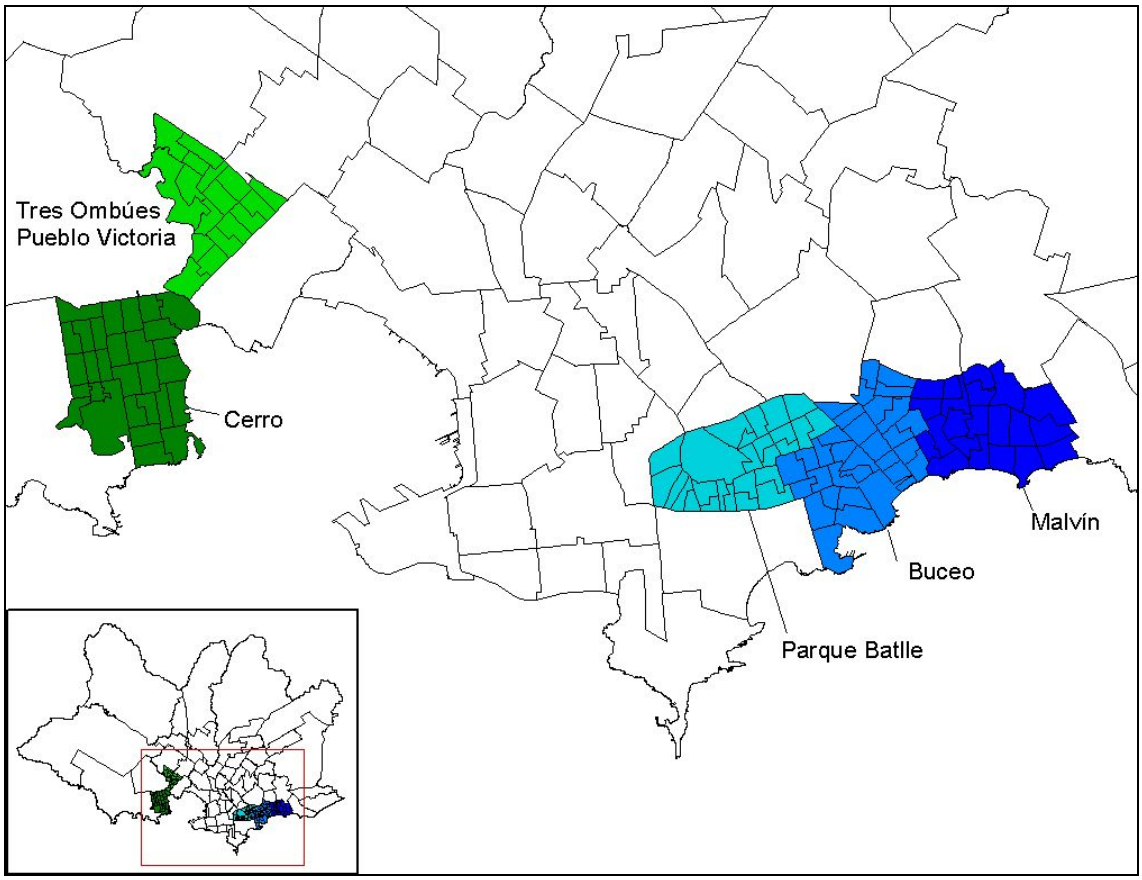
[1] For details on this procedure see Gandelman and Piani (2007).

declining, we can still find in the social and cultural life of El Cerro and Tres Ombúes-Pueblo Victoria. In the mid-1950s the industrial crisis greatly affected the population of these two neighborhoods; places of employment closed, leaving huge unemployment and changing the neighborhood's composition and lifestyle. A long period of declining industry, high unemployment rates, low salaries, social segregation and environmental damage has produced striking effects in this area. Today, the social imagination of this area combines its flourishing industrial and working-class origin with a long period of economic decline and social segregation. The sub-neighborhood "Cerro Norte" (not included in the survey) is well known as a "red zone" area, which has caused the whole neighborhood to be portrayed as a marginal zone and its inhabitants stigmatized by high reported rates of crime and delinquency.

The selected high-QoL area includes three different neighborhoods: Buceo, Malvín and Parque Batlle, which are residential areas with high population density. Buceo and Malvín are located in the southeast side of the city, along the Promenade (a popular scenic walkway along the Rio de la Plata). Formerly resorts, they were incorporated into the city as residential neighborhoods as Montevideo expanded southward in the twentieth century. Parque Batlle (which takes its name from the main city park, which it surrounds) is located in a central area close to Downtown Montevideo (see Figure 2). According to Table 1, the strata composition (low, medium-low, medium high and high respectively) of these three neighborhoods is 0 percent, 0 percent, 62.1 percent and 37.9 percent, for Buceo, 0 percent, 0 percent, 15.1 percent and 84.8 percent for Malvín, and finally, 0 percent, 1 percent, 59.2 percent and 40.8 percent for Parque Batlle.

[2] For more information regarding the neighborhood selection refer to Appendix A.

Figure 2. QoL in Selected Montevideo Neighborhoods



Source: Authors' compilation based on Montevideo QoL Neighborhood Survey Sample (2007).

The research team was in charge of designing, organizing and conducting the neighborhoods survey, which was fielded as a module of the 2007 International Social Survey Program (ISSP) [3] survey on the topic "Leisure Time and Sports."

The sampling design combined the ISSP methodological requisites for a general population representative survey with a representative sample of the two selected areas in Montevideo. The survey is representative of the population aged 18 years and older, and the questionnaire was answered by a randomly selected member of the dwelling in order to avoid the self-selection bias.

[3] The ISSP is a continuing annual program of cross-national collaboration on surveys covering topics important for social science research. Since 1983 it brings together pre-existing social science projects and co-ordinates research goals, thereby adding a cross-national, cross-cultural perspective to the individual national studies.

The interviews were conducted using a face-to-face paper and pencil method. The fieldwork was implemented from October 2007 to March 2008, and the effective number of obtained interviews was 801, according to the following distribution: 380 in the low QoL area, 328 in the high QoL area and 93 cases in the rest of the city (Others).

The resulting Total Response Rate (number of complete interviews with reporting units divided by the number of eligible reporting units in the sample) in Montevideo is 64.9 percent. As expected, respondents in the low-QoL area were significantly more likely to cooperate than their counterparts in the high-QoL area (with respective response rates of 77.5 percent and 54.7 percent). The Total Refusal Rate (number of refusals divided by the interviews (complete and partial) plus the non-respondents (refusals, non-contacts, and others) plus the cases of unknown eligibility) is 16.4 percent. And the Total Cooperation Rate (number of complete interviews divided by the number of interviews (complete plus partial) plus the number of non-interviews that involve the identification of and contact with an eligible respondent (refusal and break-off plus other) is 79.5 percent.[4]

3. Descriptive Analysis of Secondary Sources

3.1 Housing Materials

To study the quality of the materials used in Montevideo's houses we analyzed the INE's household surveys results and, after sorting them according to habitability and hygiene, we constructed Table 2.

As shown in the table, Stratum 1 houses use almost twice as many poor materials in the construction process (walls, roofs and floors) as the rest of Montevideo's houses. Not surprisingly, this proportion is also maintained in the global house material variable, which has been created by considering as good only those houses that were constructed using only good quality materials in its three bases (floor, roof and walls), once again according to criteria of hygiene and habitability.

[4] Source: The American Association for Public Opinion Research. 1998. Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for RDD Telephone Surveys and In-Person Household Surveys. Ann Arbor, Michigan: AAPOR.

Table 2. Housing materials			
Quality		Poor	Good
Walls	Stratum 4	0.00%	100.00%
	Stratum 3	0.45%	99.55%
	Stratum 2	1.29%	98.71%
	Stratum 1	3.38%	96.62%
Roof	Stratum 4	0.50%	99.50%
	Stratum 3	2.44%	97.56%
	Stratum 2	10.02%	89.98%
	Stratum 1	21.12%	78.88%
Floor	Stratum 4	0.18%	99.82%
	Stratum 3	1.24%	98.76%
	Stratum 2	4.56%	95.44%
	Stratum 1	12.73%	87.27%
Global House Materials	Stratum 4	0,63%	99.37%
	Stratum 3	3.04%	96.96%
	Stratum 2	12.12%	87.88%
	Stratum 1	26.91%	73.09%

Source: Authors' compilation based on INE 2006 Household Survey.

3.2 Housing Quality

We created a house quality index based on a series of questions regarding 12 possible problems in a house. The problems considered were: moisture in the roof, leak, wall fissures, problems in doors or windows, floor fissures, problems with wall or roof plaster, problems with the ceiling, lack of natural light, lack of ventilation, flooding when it rains, risk of collapse, moisture in the foundation.

Table 3. Housing Problems				
Amount of Problems	Stratum 4	Stratum 3	Stratum 2	Stratum 1
0	59.35%	42.22%	30.63%	21.50%
1	18.10%	18.37%	17.94%	15.96%
2	9.20%	13.12%	14.10%	13.28%
3	6.53%	8.34%	10.55%	11.45%
4	3.76%	6.53%	8.41%	9.29%
5	1.09%	4.30%	6.42%	8.78%
6	0.99%	3.66%	4.42%	6.94%
7	0.59%	1.75%	2.82%	5.19%
8	0.30%	1.01%	2.14%	3.67%
9	0.10%	0.58%	1.65%	2.11%
10	0.00%	0.05%	0.53%	1.28%
11	0.00%	0.05%	0.19%	0.52%
12	0.00%	0.00%	0.19%	0.04%
Total	100%	100%	100%	100%
Mean	0.899	1.660	2.316	3.032

Source: Authors' compilation based on INE 2006 Household Survey.

The analysis concludes that Stratum 1 houses have a mean number of problems more than three times greater than Stratum 4 houses, and 30 percent more problems than the overall mean for Montevideo. On average, then, Stratum 1 houses have almost one problem more than the average house in Montevideo.

One factor that may be narrowing the difference is the fact that none of these problems have received an adequate weight. For this reason we have developed an alternative index where the importance of different problems was considered following Casacuberta (2006). In Table 4 the differences between poor Montevideo and the rest of the population widen, generating opposed distributions. While medium values are similar, the lowest and highest have differences of around 50 percent.

The results consequently support with the intuition stated above. The problems confronted by poorer strata are of a greater magnitude, even if they are the same in number as the problems of others. It is therefore necessary to properly evaluate and differentiate the risks posed by each problem.

Table 4. Weighted Housing Problems				
Variable	Stratum 4	Stratum 3	Stratum 2	Stratum 1
No Problems	59.35%	42.22%	30.63%	21.50%
Slight Problems	3.76%	4.57%	4.59%	4.59%
Moderate Problems	24.23%	32.71%	37.53%	33.87%
Serious Problems	12.66%	20.50%	27.32%	40.05%
Total	100%	100%	100%	100%

Source: Authors' compilation based on INE 2006 Household Survey

3.3 Housing Services on the Block

Table 5 is based on INE household surveys and expresses the number of services available on the block where the house is located for each stratum in Montevideo. The services considered were: electricity network, running water, sewerage, piping access to gas, daily garbage disposal service, street garbage container, pavement, sidewalks in good condition, storm sewerage and street lights.

By analyzing the means it can be clearly observed that poorer strata have fewer services available in their surroundings. In addition, the marginal effect of belonging to a higher stratum increases at a decreasing rate.

Table 5. Public Services on Block				
Amount of Services	Stratum 4	Stratum 3	Stratum 2	Stratum 1
0	0.00%	0.00%	0.00%	0.12%
1	0.00%	0.16%	0.49%	2.08%
2	0.00%	0.27%	3.07%	9.74%
3	0.99%	1.06%	6.33%	17.21%
4	0.59%	2.07%	10.71%	25.04%
5	3.26%	8.50%	19.61%	24.88%
6	24.43%	40.57%	32.46%	14.54%
7	56.48%	37.17%	22.77%	5.55%
8	13.65%	9.67%	4.38%	0.76%
9	0.59%	0.53%	0.19%	0.08%
Total	100%	100%	100%	100%
Mean	6.78	6.40	5.57	4.31

Source: Authors' compilation based on INE 2006 Household Survey.

While almost no one reaches the top of the index, the Stratum 4 population seems to be more than two services ahead of the poorest population, clearly showing the effect of income in the allocation decisions and consequently in the services made available for each house.

3.4 Appliances and Other Comfort Elements

In regard to comfort elements, Table 6 presents an index constructed with the information collected by INE household surveys, referring to the number of electrical appliances, communication devices and transport facilities owned by surveyed dwellings. The overall housing comfort index adds 1 point for each appliance owned. The appliances considered were: water heater, instant water heater, refrigerator, TV, cable TV, video, washing machine, dishwasher, microwave, PC, motorcycle, automobile, land line phone and cell phone.

Observing the differences between means, we conclude that each stratum tends to have almost 1 comfort element more than the stratum below. This result is made clear by analyzing the accumulated distributions and the apparent lags between them. These results may underestimate the differences due to the fact that comfort elements have not been weighted by their value (e.g., a motorcycle has the same value as a car).

Table 6. Comfort Elements in the House				
Number of comfort elements	Stratum 4	Stratum 3	Stratum 2	Stratum 1
0	0.08%	0.31%	1.10%	2.40%
1	0.18%	0.76%	2.26%	4.43%
2	0.43%	1.71%	4.49%	8.88%
3	1.05%	3.57%	7.24%	12.57%
4	4.33%	8.59%	11.21%	13.64%
5	6.03%	12.39%	14.45%	14.01%
6	9.23%	12.87%	14.57%	12.33%
7	11.16%	13.89%	12.73%	11.31%
8	12.48%	13.32%	11.51%	8.31%
9	12.78%	12.05%	8.65%	6.11%
10	16.51%	11.21%	7.00%	3.64%
11	17.26%	7.31%	3.80%	1.87%
12	8.03%	1.97%	0.99%	0.45%
13	0.48%	0.04%	0.01%	0.03%
Total	100%	100%	100%	100%
Mean	8.57	7.17	6.20	5.22

Source: Authors' compilation based on INE 2006 Household Survey.

4. Descriptive Analysis of Montevideo QoL Neighborhood Survey (2007)

Tables 7 to 10 present summary statistics of several variables that, according to the literature, are expected to affect the QoL of individuals. All results are presented disaggregated by the low-medium and high-medium strata plus a comparison group of "Others" that corresponds to surveys conducted in the rest of Montevideo. The main picture resulting from these tables is that those individuals living in low-medium strata areas have worse average indicators, both for individual and neighborhood-level characteristics.

Table 7 shows several individual level variables that may affect happiness. As mentioned above, the response rate in high-QoL neighborhoods was significantly lower than in low-QoL neighborhoods. This is reflected in the larger percentage of females in our sample in this area (working males are more reluctant to answer these type of surveys or are simply more difficult to for interviewers to find). Apparently, there are no significant differences in age and cohabitation status between both groups.

Human capital dimensions are generally considered very important in personal satisfaction. We present several indicators of education and health that convey the same idea.

Those in high-QoL areas have on average four more years of schooling and a much higher rate of secondary and university complete education. Private health care coverage in high-strata areas is 86 percent, compared to 50 percent in low-strata areas. The survey instrument asked whether the individual felt ill in the last 30 days. Responses do not show significant differences across strata (30 percent in high-QoL areas vs. 27 percent in low-QoL areas).

In order to take a closer look at the health status of the population, we constructed a Body Mass Index (BMI) that might also be important to explain the kind of relationships that a person establishes with others and therefore might be relevant in explaining social life or even work satisfaction.[5]

The labor market indicators considered show that a larger share of individuals in the lower strata are unemployed compared to those in the higher strata (12.4 percent vs. 9.5 percent, respectively). Another labor problem—and one not so often stressed—is the percentage of individuals who must work more than 40 hours per week (in one or more jobs) in order to *make their living*. Defining overworked workers as those who work more than 60 hours per week, we find that 21 percent of people living in low-strata areas have this problem vs. only 9 percent of individuals in high-strata neighborhoods. Nonetheless, if we look at a more subjective indicator, we find that 37 percent of the respondents in the higher strata "often" and "very often" find themselves "thinking about work" vs. 32 percent in the lower strata. This result might be reflecting the different responsibility levels involved in the labor positions.

With respect to housing, although there are no significant differences in the share of home ownership between both groups, in the lower strata it is much more common to see families living in houses without formal property rights. The quality of materials used in the construction of the houses and the amount of comfort appliances also reflect the differences in personal and household income between groups.

As expected, the reported household and individual income are significantly higher in the high-QoL area compared to the low-QoL area and "Others."

As for social capital, the low stratum and the "Others" show a similar behavior in the dimensions "sociable" and "trustful." Comparing the different strata, we find that people living in the high-strata area are much more sociable and trustful than those living in the low-strata

area and "Others" (76 percent vs. 66 percent, respectively, in the sociable dimension, and 47 percent vs. 22 percent, respectively, in the trustful dimension).

Table 7. Variables Expected to Explain Differences in QoL: Individual Level

			Low-Medium low	High-Medium high	Others	Total
Demographics	Sex	% female	56.3	62.8	57.0	59.1
	Age	Mean	46.9	47.4	45.9	47.0
		Std. Deviation	18.4	19.0	17.8	18.6
	Partner - married	%	34.7	40.4	33.3	36.9
	Partner- not married	%	18.4	9.8	19.4	15.0
Human Capital: education	Years of Schooling	Mean	8.2	12.4	9.2	10.1
		Std. Deviation	3.5	3.6	3.6	4.1
	Completed Secondary	%	12.8	16.5	18.3	15.0
	Completed University	%	2.9	27.8	8,7	13.9
Human capital: health	Private health care coverage	%	49.7	86.0	62.4	66.0
	Felt sick	%	26.8	29.6	19.4	27.1
	Physical activity	%	35.8	60.7	41.9	46.7
	Body mass index	% Overweight (BMI>=25)	57.9	64.4	69.6	61.8
		% Obese (BMI>=30)	35.5	31.8	30.4	33.5
Labor market – use of time	Employed full time	%	48.9	50.3	52.7	49.9
	Unemployed/subemployed	%	12.4	9.5	15.1	11.5
	Overworked	%	20.9	9.8	28.1	17.1
	Not in the labor force	%	31.6	30.8	28.1	30.8
	Hours of leisure in the last weekend	Mean	14.8	16.1	13.0	15.1
		Std. Deviation	7.8	7.6	8.3	7.9
	Hours worked weekly	Mean	43.8	39.7	47.4	42.5
		Std. Deviation	19.4	14.6	17.7	17.5
	Workaholic	%	32.1	37.8	37.6	35.1

[5] The BMI is a measure of the weight of a person scaled according to height and is defined as the body weight (in kilograms) divided by the square of their height (in meters). According to the World Health Organization a BMI above 25 is considered overweight and above 30 is considered obese.

Table 7 (cont.)						
Income	Household income	Mean	12016	23853	13465	16857
		Std. Deviation	10884	17603	10147	14964
	Per capita family income	Mean	4662	10323	6551	7117
		Std. Deviation	4249	7827	7439	6810
	Individual income	Mean	6282	13639	8433	9470
		Std. Deviation	5975	15734	7944	11624
Housing	Distance to the Promenade (in minutes)	Mean	28.1	12.3	33.4	22.1
		Std. Deviation	18.9	10.2	21.0	18.3
	Overcrowding*	%	12.1	14.9	11.8	13.2
	Housing tenure	% Owners	54.5	56.4	55.9	55.4
		% Renters	14.7	27.4	15.1	20.0
		% Occupants	30.8	16.2	29.0	24.6
	Construction materials of good quality	% Walls	93.7	100.0	95.7	96.5
		% Roof	89.2	98.5	92.5	93.4
		% Floor	92.9	100.0	94.6	95.9
	Rooms	Mean	3.22	3.61	3.26	3.38
		Std. Deviation	1.30	1.43	1.33	1.37
	Bathrooms	Mean	1.08	1.41	1,19	1.23
		Std. Deviation	0.34	0.70	0.42	0.55
	Utilities (comfort index)	Mean	9.1	12.5	9.9	10.6
		Std. Deviation	4.1	4.1	3.3	4.3
Social Capital	Sociable	%	66.3	75.9	64.5	70.0
	Trustful	%	21.8	46.6	23.7	32.2
	Religious	%	11.3	11.9	7.5	11.1

Note: *More than 2 people per room
Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Tables 8, 9 and 10 present several dimensions in our neighborhood survey questionnaire on the neighborhood environment and number of public services. Again, the situation in low-strata areas is considerably worse than in high-strata zones. The two groups have particularly large differences in regard to drug trafficking, rubbish in the streets, water pollution, vandalism, presence of gangs and air pollution. The only dimension that ranked higher in high-strata neighborhoods was noise pollution (15 percent vs. 8 percent).

Table 8. Variables Expected to Explain Differences in QoL: Neighborhood Characteristics							
		Very serious	**Serious**	**Not very serious**	**Not a problem**	**No answer**	**Total**
Vandalism	Low-Medium low	28.2	26.8	17.6	26.6	0.8	100.0
	High-Medium high	16.5	23.5	26.5	32.3	1.2	100.0
	Others	22.6	19.4	24.7	33.3	0.0	100.0
	Total	22.7	24.6	22.1	29.7	0.9	100.0
Car theft or damage	Low-Medium low	21.8	22.6	21.1	31.3	3.2	100.0
	High-Medium high	16.5	34.1	29.9	14.6	4.9	100.0
	Others	20.4	26.9	18.3	34.4	0.0	100.0
	Total	19.5	27.8	24.3	24.8	3.5	100.0
Speeding and dangerous driving	Low-Medium low	27.4	25.5	16.3	28.7	2.1	100.0
	High-Medium high	27.4	29.3	23.2	15.2	4.9	100.0
	Others	26.9	20.4	16.1	34.4	2.2	100.0
	Total	27.3	26.5	19.1	23.8	3.2	100.0
People who you feel unsafe	Low-Medium low	24.2	31.1	18.7	23.4	2.6	100.0
	High-Medium high	18.3	31.7	29.0	18.9	2.1	100.0
	Others	31.2	26.9	15.1	25.8	1.1	100.0
	Total	22.6	30.8	22.5	21.8	2.2	100.0
Presence of gangs	Low-Medium low	22.6	24.2	20.8	30.8	1.6	100.0
	High-Medium high	12.8	22.0	24.1	36.9	4.3	100.0
	Others	17.2	11.8	18.3	52.7	0.0	100.0
	Total	18.0	21.8	21.8	35.8	2.5	100.0
Drug trafficking or drug sales	Low-Medium low	36.8	23.9	12.4	17.9	8.9	100.0
	High-Medium high	17.4	22.9	15.2	27.7	16.8	100.0
	Others	28.0	12.9	16.1	32.3	10.8	100.0
	Total	27.8	22.2	14.0	23.6	12.4	100.0
Rubbish in the streets	Low-Medium low	21.1	19.5	18.2	40.3	1.1	100.0
	High-Medium high	6.7	17.1	20.4	55.2	0.6	100.0
	Others	23.7	19.4	9.7	45.2	2.2	100.0
	Total	15.5	18.5	18.1	46.9	1.0	100.0
Graffiti	Low-Medium low	4.2	10.8	18.4	63.4	3.2	100.0
	High-Medium high	2.4	7.6	24.4	64.3	1.2	100.0
	Others	5.4	7.5	17.2	66.7	3.2	100.0
	Total	3.6	9.1	20.7	64.2	2.4	100.0
Air pollution	Low-Medium low	16.6	14.5	14.5	52.9	1.6	100.0
	High-Medium high	7.3	12.5	20.4	57.6	2.1	100.0
	Others	7.5	23.7	12.9	55.9	0.0	100.0
	Total	11.7	14.7	16.7	55.2	1.6	100.0
Water pollution	Low-Medium low	16.6	12.6	10.5	58.4	1.8	100.0
	High-Medium high	5.2	5.2	11.3	76.8	1.5	100.0
	Others	7.5	6.5	3.2	81.7	1.1	100.0
	Total	10.9	8.9	10.0	68.7	1.6	100.0
Noise pollution	Low-Medium low	7.6	10.8	16.6	64.2	0.8	100.0
	High-Medium high	14.6	13.4	23.8	47.9	0.3	100.0
	Others	8.6	9.7	16.1	64.5	1.1	100.0
	Total	10.6	11.7	19.5	57.6	0.6	100.0

Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Table 9 shows variables at the neighborhood level with a focus on the provision of public goods. In these questions the possible answers were only "Yes" or "No," except for "Satisfaction with police service, where the respondents were provided with the following scale: "Very satisfied," "Satisfied," "Not very satisfied" and "Not at all satisfied" ("Very satisfied"+"Satisfied" = "Yes" and "Not very satisfied"+"Not at all satisfied" = "No"). The only two dimensions in which people in the lower strata seem to be more satisfied than individuals in high-strata neighborhoods are access to "daily garbage collection" and feeling safe to "walk at night in their neighborhood." According to the respondents, the provision of other public goods is worse in low-strata areas, including sidewalks and pedestrian ways, public parks and green areas, sports infrastructure, police service, access to sewerage, street pavement and street lighting. The two areas with the most sizeable differences are satisfaction with public parks and green areas and the condition of sidewalks.

Table 9. Variables Expected to Explain Differences in QoL: Neighborhood Characteristics (cont.)

		Yes	No	No answer	Total
Feel safe and secure	Low-Medium low	52.1	43.9	3.9	100.0
	High-Medium high	48.2	48.2	3.7	100.0
	Others	51.6	48.4	0.0	100.0
	Total	50.4	46.2	3.4	100.0
Satisfied with public transportation	Low-Medium low	74.2	22.1	3.7	100.0
	High-Medium high	75.6	20.4	4.0	100.0
	Others	75.3	24.7	0.0	100.0
	Total	74.9	21.7	3.4	100.0
Satisfied with public parks and green areas	Low-Medium low	53.4	43.4	3.2	100.0
	High-Medium high	84.5	15.2	0.3	100.0
	Others	45.2	54.8	0.0	100.0
	Total	65.2	33.2	1.6	100.0
Satisfied with sports infrastructure	Low-Medium low	38.2	55.0	6.8	100.0
	High-Medium high	57.3	34.8	7.9	100.0
	Others	38.7	55.9	5.4	100.0
	Total	46.1	46.8	7.1	100.0
Satisfied with police service	Low-Medium low	31.1	62.4	6.6	100.0
	High-Medium high	44.2	43.0	12.8	100.0
	Others	43.0	53.8	3.2	100.0
	Total	37.8	53.4	8.7	100.0
Access to sewerage	Low-Medium low	86.1	13.7	0.3	100.0
	High-Medium high	99.4	0.6	0.0	100.0
	Others	83.9	16.1	0.0	100.0
	Total	91.3	8.6	0.1	100.0

Table 9. Variables Expected to Explain Differences in QoL: Neighborhood Characteristics (cont.)					
		Yes	**No**	**No answer**	**Total**
Access to daily garbage collection	Low-Medium low	20.3	79.2	0.5	100.0
	High-Medium high	19.2	78.0	2.7	100.0
	Others	40.9	58.1	1.1	100.0
	Total	22.2	76.3	1.5	100.0
Access to waste disposal	Low-Medium low	85.0	15.0	0.0	100.0
	High-Medium high	96.6	3.4	0.0	100.0
	Others	67.7	32.3	0.0	100.0
	Total	87.8	12.2	0.0	100.0
Street pavement	Low-Medium low	83.9	16.1	0.0	100.0
	High-Medium high	98.2	1.5	0.3	100.0
	Others	84.9	15.1	0.0	100.0
	Total	89.9	10.0	0.1	100.0
Sidewalks in good condition	Low-Medium low	48.4	50.8	0.8	100.0
	High-Medium high	85.7	14.3	0.0	100.0
	Others	53.8	46.2	0.0	100.0
	Total	64.3	35.3	0.4	100.0
Access to drainage pipe	Low-Medium low	75.0	23.7	1.3	100.0
	High-Medium high	96.0	3.4	0.6	100.0
	Others	86.0	14.0	0.0	100.0
	Total	84.9	14.2	0.9	100.0
Street lighting	Low-Medium low	85.5	14.2	0.3	100.0
	High-Medium high	97.6	2.1	0.3	100.0
	Others	89.2	10.8	0.0	100.0
	Total	90.9	8.9	0.2	100.0

Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Finally, we tried to complement respondents' subjective assessments of their neighborhood with a more objective evaluation. The questionnaire asks the interviewer to rate a number of neighborhood variables. Table 10 shows some of the most striking results. Respondents' stated lack of satisfaction with conditions in lower-strata areas matches the perceptions of objective evaluators. Our interviewers verified that street lighting was more available in higher-strata neighborhoods. Interviewers additionally confirmed respondents' impressions of higher-strata vs. lower-strata neighborhoods for the following variables: less garbage in the streets, good paved sidewalks, higher number of trees and higher traffic.

Table 10. Variables Expected to Explain Differences in QoL: Neighborhood Characteristics (cont.) as Identified by Interviewer				
		Yes	**No**	**Total**
Street lights	Low-Medium low	87.6	12.4	100.0
	High-Medium high	99.7	0.3	100.0
	Others	83.9	16.1	100.0
	Total	92.1	7.9	100.0
Garbage in the street	Low-Medium low	15.0	85.0	100.0
	High-Medium high	9.5	90.5	100.0
	Others	26.9	73.1	100.0
	Total	14.1	85.8	100.0
Good paved sidewalks	Low-Medium low	13.0	87.0	100.0
	High-Medium high	54.1	45.9	100.0
	Others	21.5	78.5	100.0
	Total	30.8	69.2	100.0
Good paved streets	Low-Medium low	45.9	54.1	100.0
	High-Medium high	87.2	12.8	100.0
	Others	55.9	44.1	100.0
	Total	64.0	36.0	100.0
Many trees	Low-Medium low	33.2	66.8	100.0
	High-Medium high	53.7	46.3	100.0
	Others	37.6	62.4	100.0
	Total	42.1	57.9	100.0
Constant Traffic	Low-Medium low	12.1	87.9	100.0
	High-Medium high	36.3	63.7	100.0
	Others	25.8	74.2	100.0
	Total	23.6	76.4	100.0

Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

5. Free Time Activities and Reported Satisfaction with Free Time

In this section we briefly introduce some descriptive statistics on free time activities, satisfaction with free time and factors that prevent respondents from engaging in free time activities that they would like to do.

Table 11 shows respondents' reported satisfaction with their amount of free time disaggregated by the three sample strata (Low, High and "Others"). We can clearly see that there are no meaningful differences in the reported satisfaction between low-strata and high-strata groups (60 percent vs. 61 percent, respectively, are "Satisfied" and "Very satisfied" with the amount of free time that they currently have).

Table 11. Reported Satisfaction with Current Amount of Free Time					
	Very satisfied	Satisfied	Not very satisfied	Not at all satisfied	NA
Low-Medium low	13.7	45.5	25.8	14.7	0.3
High-Medium high	14.6	46.3	28.4	10.7	0.0
Others	8.6	47.3	24.7	19.4	0.0

Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Table 12 gives us an idea of what people do in their free time. Respondents were asked to report how often they engage in each of the listed free time activities.

Table 12. Frequency of Free Time Activities						
		Daily	Several times a week	Several times a month	Several times a year or less often	Never
Watch TV, DVD, Videos	Low-Medium low	71.8	17.6	4.5	1.6	4.5
	High-Medium high	63.7	23.2	8.2	3.0	1.8
	Others	66.7	16.1	10.8	4.3	2.2
Go to the movies	Low-Medium low	0.0	0.3	2.6	20.3	76.6
	High-Medium high	0.0	1.2	15.5	47.0	36.3
	Others	0.0	0.0	8.6	22.6	68.8
Go out shopping (for pleasure)	Low-Medium low	1.1	5.5	20.8	22.9	49.7
	High-Medium high	0.9	7.9	29.6	30.2	31.1
	Others	4.3	6.5	24.7	17.2	47.3
Read books	Low-Medium low	11.1	10.3	9.5	15.5	53.4
	High-Medium high	19.8	16.5	15.2	24.1	23.8
	Others	9.7	12.9	5.4	20.4	51.6
Attend cultural events	Low-Medium low	0.0	1.3	5.8	21.6	70.8
	High-Medium high	0.0	3.0	12.2	45.4	39.3
	Others	0.0	0.0	6.5	29.0	64.5
Get together with friends	Low-Medium low	8.2	18.7	29.7	18.2	25.3
	High-Medium high	7.0	23.8	39.3	21.0	8.8
	Others	12.9	11.8	26.9	19.4	29.0
Play cards or board games	Low-Medium low	2.9	7.4	12.4	17.1	60.0
	High-Medium high	1.2	6.4	16.8	22.3	53.4
	Others	2.2	5.4	10.8	19.4	62.4
Listen to music	Low-Medium low	70.3	13.2	5.5	3.7	7.1
	High-Medium high	60.1	23.5	9.8	2.4	4.0
	Others	62.4	21.5	7.5	6.5	2.2
Take part in physical activities	Low-Medium low	11.6	15.0	10.0	5.5	57.6
	High-Medium high	14.6	29.3	14.6	10.4	31.1
	Others	10.8	16.1	8.6	8.6	55.9
Attend sporting events	Low-Medium low	0.3	4.2	11.8	14.5	69.2
	High-Medium high	0.3	4.3	11.0	23.8	60.7
	Others	0.0	1.1	11.8	18.3	67.7
Do handicraft	Low-Medium low	3.9	5.0	6.1	9.7	75.3
	High-Medium high	4.6	7.0	8.8	16.2	63.4
	Others	1.1	4.3	6.5	12.9	75.3
Spend time on the internet/PC	Low-Medium low	4.2	5.0	7.9	3.4	79.5
	High-Medium high	18.9	11.0	12.5	8.5	48.8
	Others	4.3	6.5	5.4	3.2	80.6

Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

According to our respondents, the two most popular free time activities are: watching TV, DVD and Videos and listening to music, with almost no differences among strata. In all other free time activities, the percentage of respondents in the high neighborhood is higher compared to the other two strata (low and "Others").

Table 13. Extent to which Conditions Impede Desired Free Time Activities

		Very much	To a large extent	To some extent	Not at all	NA
Lack of facilities nearby	Low-Medium low	18.2	24.2	21.8	34.5	1.3
	High-Medium high	8.5	10.1	26.5	54.3	0.6
	Others	21.5	18.3	24.7	35.5	0.0
Lack of money	Low-Medium low	32.6	34.7	15.3	16.8	0.5
	High-Medium high	14.9	25.0	34.8	24.4	0.9
	Others	28.0	37.6	12.9	21.5	0.0
Personal health, age or disability	Low-Medium low	10.3	9.2	11.1	67.6	1.8
	High-Medium high	7.6	8.5	17.1	65.9	0.9
	Others	7.5	8.6	11.8	71.0	1.1
Need to take care of someone	Low-Medium low	10.3	9.2	11.1	67.6	1.8
	High-Medium high	7.6	8.5	17.1	65.9	0.9
	Others	7.5	8.6	11.8	71.0	1.1
Lack of time	Low-Medium low	21.3	17.9	19.7	40.5	0.5
	High-Medium high	22.6	22.9	18.3	35.4	0.9
	Others	33.3	21.5	11.8	32.3	1.1

Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Finally, Table 13 explores the conditions that prevent respondents from doing the free time activities that they would like to do. Lack of money is the major reported cause in the low socioeconomic strata (33 percent vs. 15 percent), followed by lack of facilities nearby (18 percent vs. 9 percent). Lack of time was also mentioned as an inhibiting factor by 21 percent of low-strata and 23 percent of high-strata respondents.

6. General Econometric Strategy

In this paper we use rent information and subjective valuations of life domains to estimate the effect of individual features and neighborhood characteristics. The typical housing hedonic regression is:

$$Ln\, p_{ij} = \alpha + \beta' H_i + \gamma'\, Z_j + v_{ij} \qquad (1)$$

where p_{ij} is the rental price of house i located in neighborhood j, H_i is a vector of individual house features (number of rooms, quality of construction, square meters, etc.), Z_j is a vector of neighborhood j amenities (crime rate, green space, etc.), and v_{ij} is the composite error term which

is a combination of a neighborhood-specific error component, and a house-specific error component $v_{ij} = d_j + \eta_i$.

The city-specific error component (d_j) is common to all houses in the neighborhood and represents systematic uncontrolled differences in amenity characteristics across sub-city areas. But it also may capture systematic uncontrolled differences in housing quality across neighborhoods. Any of these two factors would imply that the composite error term across houses within the same sub-city area will be correlated, implying a downwards bias to the OLS-based standard errors (Moulton, 1987) that need to be corrected using clustered standard errors.

Personal or family characteristics like marital status, schooling, and children's education gap are dimensions of QoL that affect the overall well-being of the population and many QoL domains but are likely not reflected in housing prices. The evaluation of overall happiness and other life domains such as leisure time, social life, economic situation, family, work, health, neighborhood, and housing is undertaken through questions with phrasing such as "In general, would you say that you are very satisfied, satisfied, not very satisfied or not satisfied at all with your leisure time?" By construction, the questionnaire information gathered in this way has a discrete distribution that may take four or five values according to the options given to the respondent. Running a linear regression as in (1) will not be correct. The traditional approach is then to postulate a latent equation of the following form:

$$QoL^{d*}_{ij} = constant + \beta' H_i + \gamma' Z_j + \delta' X_i + v_{ij} \qquad (2)$$

where QoL^{d*} is a quality of life domain indicator and X_i is a vector of individual socioeconomic characteristics (schooling, health condition, etc.). The true valuation of the domain cannot be observed. For instance, the measure of happiness will take four values (not happy at all, somewhat not happy, somewhat happy, very happy), and it is assumed implicitly that those individuals whose happiness level is below a certain threshold μ_1 will be not happy at all, those between that value and a larger μ_2 will be somewhat not happy, those between μ_2 and an even larger μ_3 will be somewhat happy and finally those individuals with happiness level above μ_3 will answer very happy.

$$
\begin{aligned}
&Qol^{d}{}_{i} = 1 \text{ if } Qol^{d^{*}}_{i} \le \mu_1 && \text{Not happy at all}\\
&Qol^{d}{}_{i} = 2 \text{ if } \mu_1 \le Qol^{d^{*}}_{i} \le \mu_2 && \text{Somewhat not happy}\\
&Qol^{d}{}_{i} = 3 \text{ if } \mu_2 \le Qol^{d^{*}}_{i} \le \mu_3 && \text{Somewhat happy}\\
&Qol^{d}{}_{i} = 4 \text{ if } Qol^{d^{*}}_{i} \ge \mu_3 && \text{Very happy}
\end{aligned}
\qquad (3)
$$

Assuming that the error term is normally distributed across observations we have an order probit model that implies the following probabilities:

$$
\begin{aligned}
&\text{Prob}(QoL^{d}{}_{i} = 1) = \Phi\left(\mu_1 - \beta' H_i + \gamma' Z_j + \delta' X_i\right),\\
&\text{Prob}(QoL^{d}{}_{i} = 2) = \Phi\left(\mu_2 - \beta' H_i + \gamma' Z_j + \delta' X_i\right) - \Phi\left(\mu_1 - \beta' H_i + \gamma' Z_j + \delta' X_i\right),\\
&\text{Prob}(QoL^{d}{}_{i} = 3) = \Phi\left(\mu_3 - \beta' H_i + \gamma' Z_j + \delta' X_i\right) - \Phi\left(\mu_2 - \beta' H_i + \gamma' Z_j + \delta' X_i\right),\\
&\text{Prob}(QoL^{d}{}_{i} = 4) = 1 - \Phi\left(\mu_3 - \beta' H_i + \gamma' Z_j + \delta' X_i\right)
\end{aligned}
\qquad (4)
$$

where $\Phi(\ )$ is the normal cumulative distribution function.

Van Praag and Ferrer-i-Carbonell (2008) argue that even in an order probit estimation there is to a certain extent an implicit cardinalization of the variable under study. Expanding on this idea, he proposes a Probit Adapted OLS (POLS) method that is based on a transformation of the data that allows discrete choice variables as if they were distributed on the whole real line. The transformation consists first of deriving the values of a standard normal distribution that correspond to the cumulative frequencies of the ordinal dependent variable

$$
\begin{aligned}
&\Phi(\mu_1) = p_1\\
&\Phi(\mu_2) = p_1 + p_2\\
&\Phi(\mu_3) = p_1 + p_2 + p_3\\
&\Phi(\mu_4) = p_1 + p_2 + p_3 + p_4
\end{aligned}
\qquad (5)
$$

where p_i is the proportion whose domain lines in the *i*-th bracket. The final step in the POLS methodology is the estimation of the conditional means for the variables under study.

The main advantage of POLS is that it requires less computing time and allows the application of more complex methods (systems of equations, fixed effects, etc.). The drawback is that for POLS a harsher normality assumption is needed. The results reported in van Praag and Ferrer-i-Carbonell (2008) suggest that POLS and OP shield almost the same effect except for a multiplication factor.

In order to facilitate comparison with other papers in this project we follow the POLS approach for all discrete choice domain satisfaction variables.

7. Results

7.1 Domain Satisfaction

7.1.1 Satisfaction Distribution

Table 14 reports the distribution of overall happiness and satisfaction with the following specific life domains: economic situation, family, social life, current work, health, leisure, housing and neighborhood (according to the respondent's subjective definition).

Table 14. Quality of Life Domains

		Very happy	Fairly happy	Not very happy	Not at all happy	No answer	
Overall Happiness	Low-Medium low	26.8	47.6	20.5	4.5	0.5	
	High-Medium high	31.4	56.4	11.0	0.6	0.6	
	Others	35.5	47.3	12.9	4.3	0.0	
	Total	29.7	51.2	15.7	2.9	0.5	
		Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied	No answer
Economic situation	Low-Medium low	3.2	29.7	21.1	31.8	14.2	0.0
	High-Medium high	5.5	40.2	21.6	25.0	7.3	0.3
	Others	5.4	32.3	24.7	22.6	15.1	0.0
	Total	4.4	34.3	21.7	28.0	11.5	0.1
Family	Low-Medium low	28.7	52.4	10.5	7.4	0.5	0.5
	High-Medium high	36.9	52.1	7.0	3.7	0.0	0.3
	Others	31.2	57.0	6.5	2.2	3.2	0.0
	Total	32.3	52.8	8.6	5.2	0.6	0.4
Social life	Low-Medium low	18.9	55.3	15.0	7.6	1.8	1,4
	High-Medium high	24.7	51.5	16.5	5.8	.6	0.9
	Others	11.8	60.2	18.3	7.5	2.2	0.0
	Total	20.5	54.3	16.0	6.9	1.4	0.9
Work	Low-Medium low	10.0	54.0	17.6	13.0	5.4	0.0
	High-Medium high	16.3	55.3	14.0	10.7	3.7	0.0
	Others	17.9	50.0	17.9	5.4	8.9	0.0
	Total	13.5	54.1	16.1	11.2	5.1	0.0
		Excellent	Very good	Good	Fair	Poor	No answer
Health	Low-Medium low	12.4	20.3	40.3	22.4	4.7	0.0
	High-Medium high	14.3	31.4	38.7	12.5	3.0	0.0
	Others	12.9	22.6	49.5	11.8	3.2	0.0
	Total	13.2	25.1	40.7	17.1	3.9	0.0

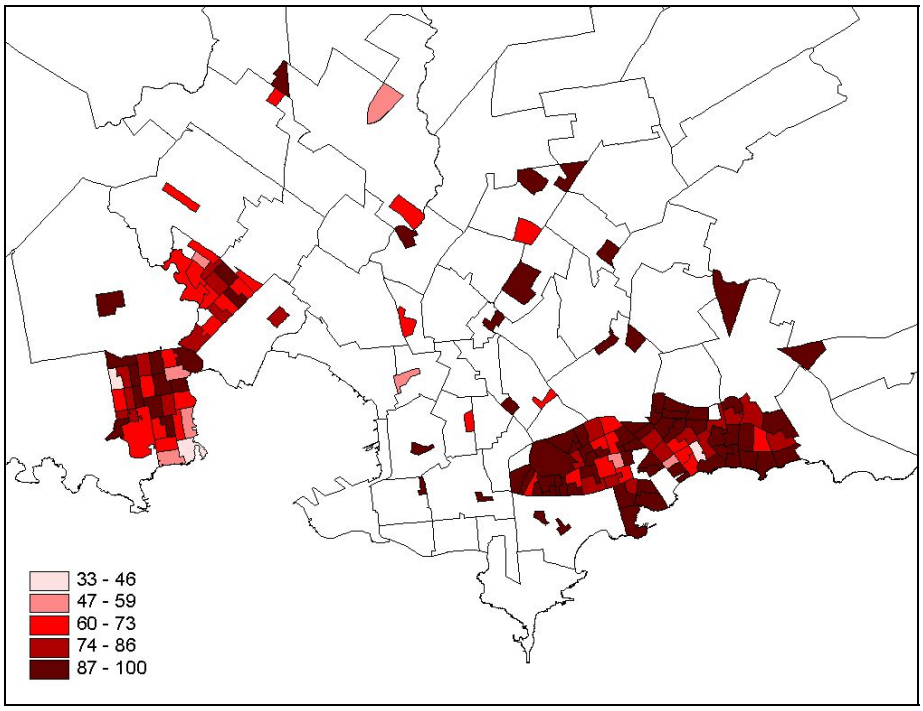
Table 14. (cont.)						
		Very satisfied	Satisfied	Not very satisfied	Not at all satisfied	No answer
Leisure	Low-Medium low	13.7	45.5	25.8	14.7	0.3
	High-Medium high	14.6	46.3	28.4	10.7	0.0
	Others	8.6	47.3	24.7	19.4	0.0
	Total	13.5	46.1	26.7	13.6	0.1
Housing	Low-Medium low	24.7	47.6	21.3	6.1	0.3
	High-Medium high	39.6	44.8	12.5	3.0	0.0
	Others	31.2	53.8	9.7	5.4	0.0
	Total	31.6	47.2	16.4	4.7	0.1
Neighborhood	Low-Medium low	25.0	48.9	18.4	7.1	0.5
	High-Medium high	44.8	46.6	6.1	2.1	0.3
	Others	18.3	51.6	21.5	8.6	0.0
	Total	32.3	48.3	13.7	5.2	0.4

Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Looking at Table 14, we can see that in general respondents in the high QoL area tend to be more satisfied with all the life dimensions measured in the survey ("very satisfied" and "satisfied"). The dimensions that present the more striking differences are: satisfaction with the neighborhood, health condition and housing. On the other hand leisure, social life and current work show the lower differences between high and low neighborhoods.

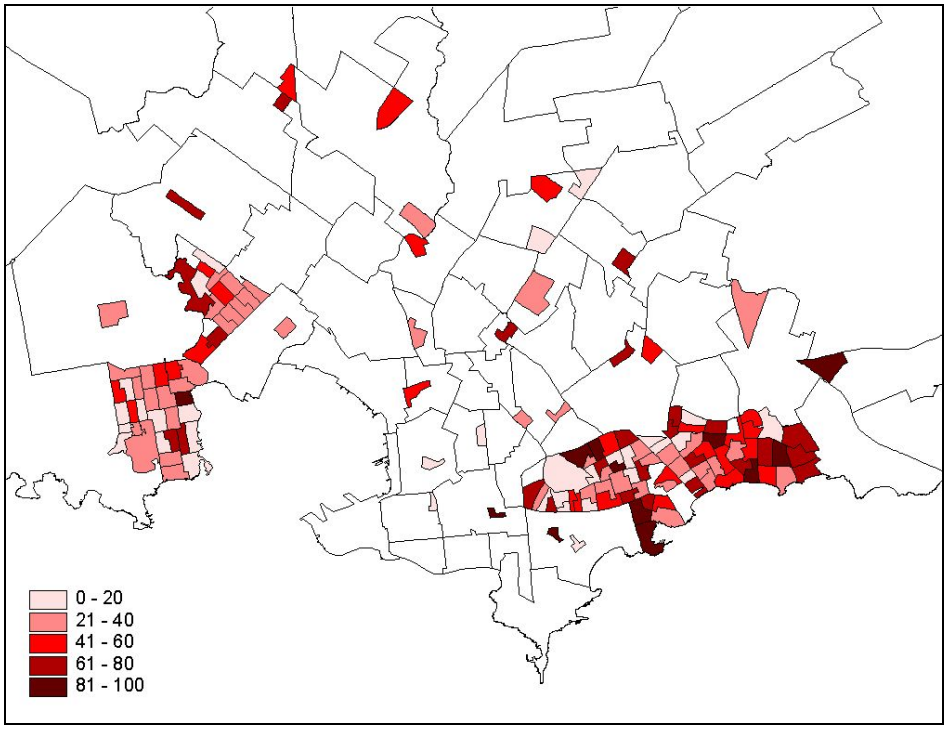
Figures 3 to 11 show the Zoom Window presented in Figure 4, and help us to graphically "grasp" the results described above. In order to being able to graphically show the data on maps, we had to calculate the percentage of "very satisfied" and "satisfied" per censal segment. Darker colors indicate higher percentage of satisfaction with the measured dimensions. In general, we can see that dark red is the predominant color in the high QoL area, while red and pink are more salient in the low QoL area. These differences are more easily seen in the following dimensions: Satisfaction with neighborhood and satisfaction with housing.

Figure 3. Overall Happiness (% of "Very satisfied" and "Satisfied" per censal segment)



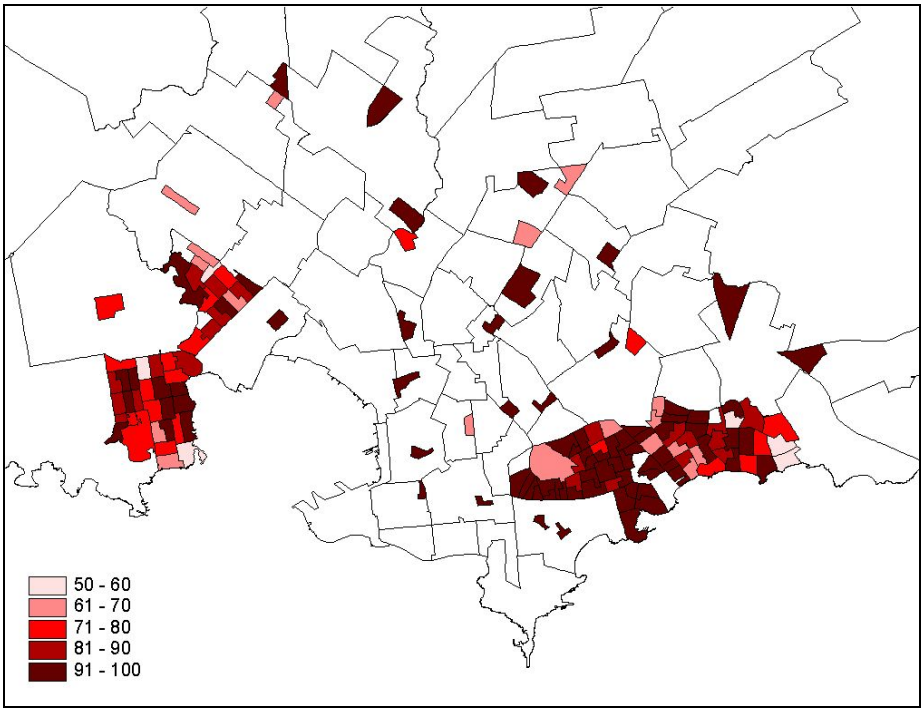
Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Figure 4. Satisfaction with Economic Situation
(% of "Very satisfied" and "Satisfied" per censal segment)



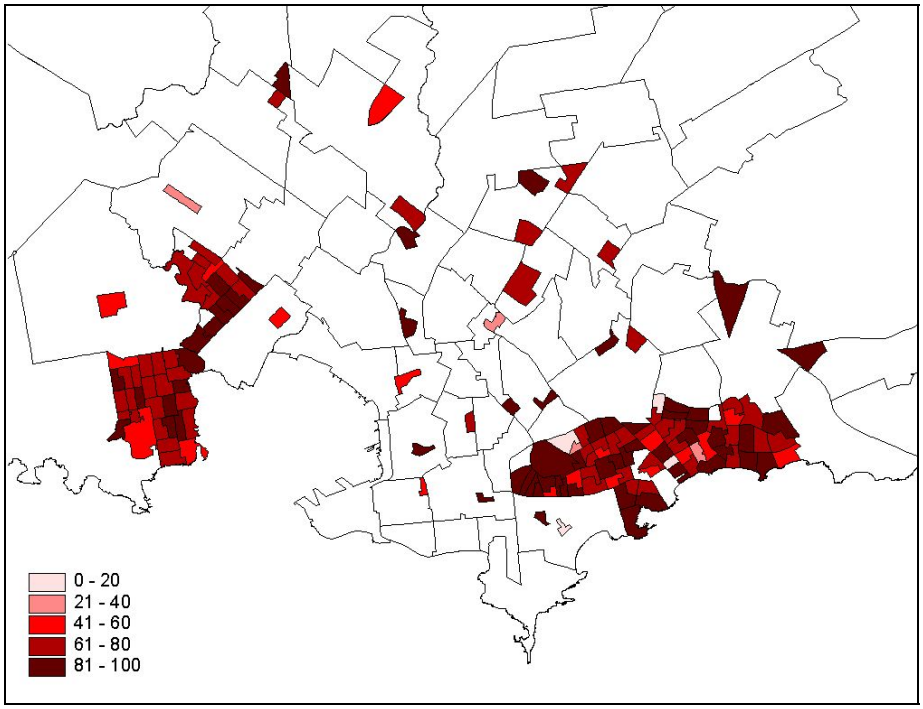
Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Figure 5. Satisfaction with Family Life
(% of "Very satisfied" and "Satisfied" per censal segment)



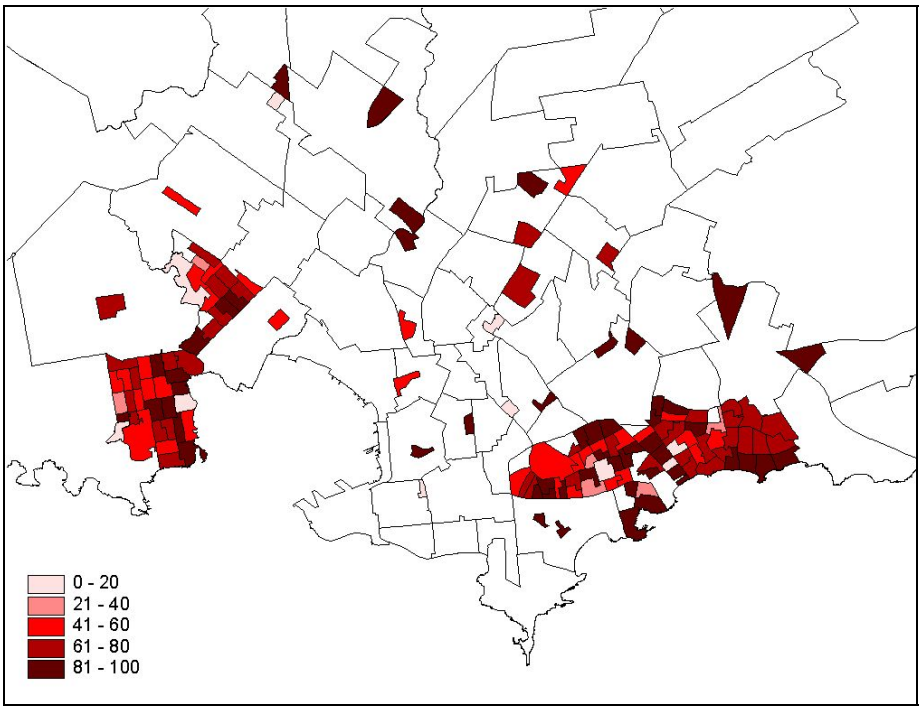
Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Figure 6. Satisfaction with Social Life
(% of "Very satisfied" and "Satisfied" per censal segment)



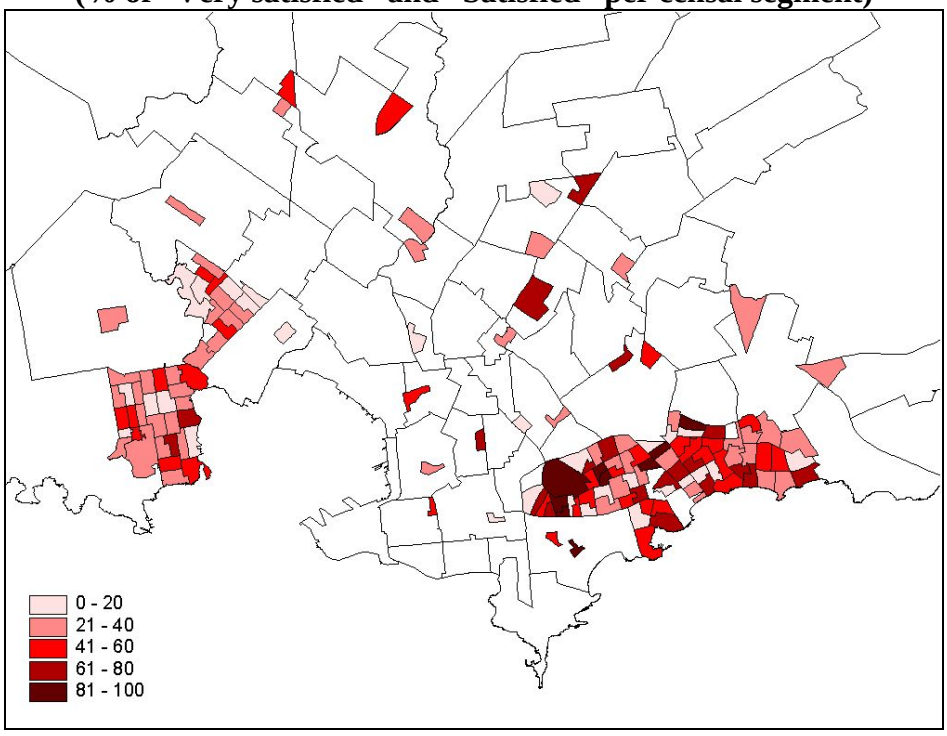
Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Figure 7. Satisfaction with Work Situation
(% of "Very satisfied" and "Satisfied" per censal segment)



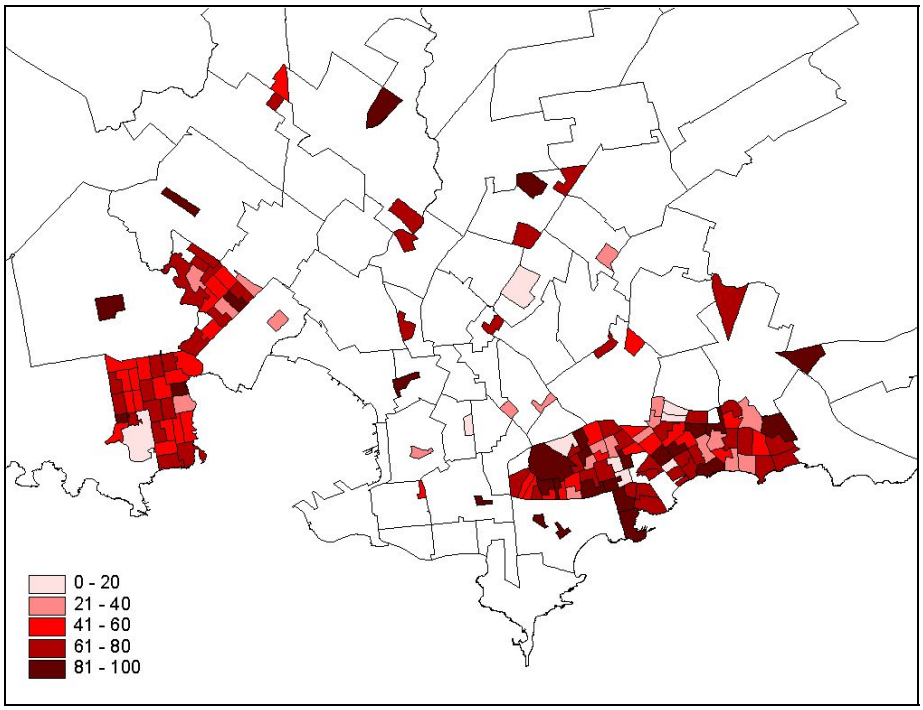
Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Figure 8. Satisfaction with Health
(% of "Very satisfied" and "Satisfied" per censal segment)



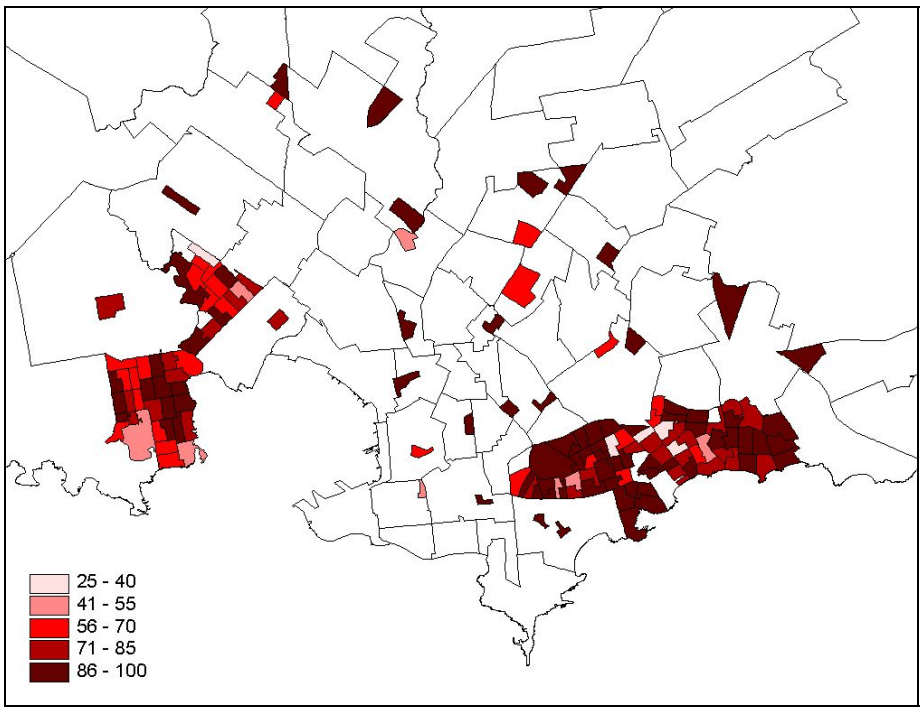
Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Figure 9. Satisfaction with Leisure Time
(% of "Very satisfied" and "Satisfied" per censal segment)



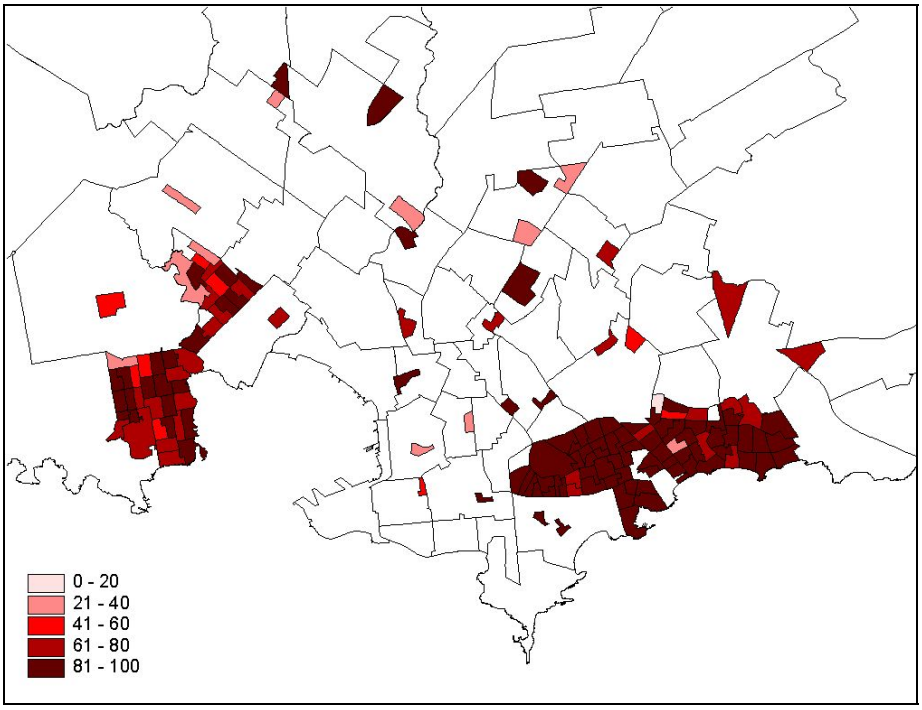
Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Figure 10. Satisfaction with Housing
(% of "Very satisfied" and "Satisfied" per censal segment)



Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

Figure 11. Satisfaction with Neighborhood (% of "Very satisfied" and "Satisfied" per censal segment)



Source: Authors' compilation based on Montevideo QoL Neighborhood Survey (2007).

The question of what dimensions of day to day life impact the most on happiness cannot be explained by the simple descriptive analysis based on cross tables presented in this section, but instead needs to be addressed using econometric techniques.

7.1.2 Determinants of Life Domains

We tried when possible to use a common set of explanatory variables in all domain regressions, but in the disjunctive between a better fit or a common structure we favored the first criterion. That is why in some regressions we included squared terms and in others did not. Domain satisfaction regressions are reported in Table 15.

We found age to be a significant determinant of all life domains. Starting at 18 years old, as people get older they tend to be less satisfied with their life. In three regressions—leisure, family and work—we included a squared term that allowed us to estimate for these two a turning point for the age effect. The minimum satisfaction level is achieved at age 39 with respect to leisure, 46 with respect to family and 37 with respect to work.

The coefficient estimate of gender is negative in all regressions but statistically significant only for health and economic situation. This result is consistent with past research. Despite the fact that women live longer, they tend to report worse health than men.[6]

Also in line with the previous literature, we found positive effects of living with a partner with respect to the individual's evaluation of their family and of their health. Interesting, the positive impact on family satisfaction is produced by those that are married with their partner while those that live with a partner out of wedlock do not have a statistically significant different family satisfaction than single individuals. Family size was also found to significantly affect leisure satisfaction (negatively), family satisfaction (positively) and economic situation (negatively).

With respect to education, we found that more educated people tend to be less satisfied with their economic situation but more satisfied with their health. Given the results in the labor economics literature on education returns, we expected to find positive effects on work and economic situation. One possible interpretation for the negative and non-significant coefficients is that the subjective valuation of work and economic situation are more affected by a sort of relative income (in relation to some expected income level given their education level) than by income in pure monetary terms as used in Mincerian regressions.

For the health regressions we included two special terms: BMI and a dummy if the individual has access to private health care. As expected, we found that the larger the value of BMI the worse health satisfaction. Individuals that have access to a private health institution tend to be more satisfied with their health status.

We defined a series of individual characteristics that may affect various life domains. We classified a person as sociable when she prefers to spend most of her free time with other people or at least prefers to spend more of her free time with other people than alone. We considered someone to be workaholic when frequently or very frequently in his spare time he thinks about their work. We find that being sociable improves satisfaction with social life and the satisfaction with family. On the contrary, being workaholic is associated with worse leisure, social life, economic situation and work satisfaction. People that participate in sports tend to have a better leisure, social life and health satisfaction.

[6] See for instance Verbrugge (1985) and Ross and Bird (1994).

Leisure hours and work hours have the expected effects. Those individuals that in the last weekend had more hours of leisure were more satisfied with their leisure and social life dimensions of life, while those individuals that work more hours a week tend to have a better economic situation and work satisfaction. In the work satisfaction regression, we obtained a negative and statistically significant square term that, in line with basic microeconomic theory, implies a decreasing marginal effect of an extra working hour.

With respect to income we find, as expected, a positive effect on leisure, social life, family and economic situation satisfaction. Also, those individuals with a greater per hour salary tend to be more satisfied with their work. We found no income effect on health satisfaction.

Finally, we experimented with the inclusion of various variables that could reflect neighborhood externalities and the effects of public goods but found disappointing results. In Table 15 we report the effect of proximity to the Promenade, quality of green areas and public sports infrastructure. The distance from the Promenade was only significant for leisure satisfaction. Satisfaction with public parks and green areas is associated with better health, and satisfaction with public sports infrastructure is associated with better leisure satisfaction.

To control for other neighborhood effects we included a dummy variable for respondents of high and medium-high strata neighborhoods and for respondents from other control areas. The dummy variables should therefore be interpreted in relation to the individuals living in the poor and medium-poor neighborhoods studied. These variables inform us that in general, there are no systematic neighborhood effects that are not captured by the other variables included in the regressions.

Table 15. Domain Satisfaction

Source: Authors' calculations based on Montevideo QoL Neighborhood Survey (2007).

	Leisure satisfaction	Social life satisfaction	Family satisfaction	Health satisfaction	Economic situation satisfaction	Work satisfaction
ln(Age)	-9.344	-0.354	-1.911	-0.582	-0.564	-6.753
	(1.452)***	(0.078)***	(1.087)*	(0.069)***	(0.093)***	(1.743)***
ln(Age)^2	1.274		0.250			0.937
	(0.194)***		(0.156)*			(0.235)***
Turning point	39		46			37
Woman	-0.025	0.035	0.058	-0.150	-0.163	-0.019
	(0.052)	(0.068)	(0.046)	(0.086)*	(0.060)***	(0.093)
Partner	0.039	0.013		0.191		
	(0.045)	(0.053)		(0.065)***		
Partner*Married			0.350			
			(0.072)***			
Partner*(1-Married)			0.169			
			(0.124)			
ln(family size)	-0.188	-0.037	0.113	-0.060	-0.442	
	(0.099)*	(0.075)	(0.057)*	(0.092)	(0.067)***	
ln(years education)	-0.048	0.016	-0.049	0.137	-0.156	-0.040
	(0.054)	(0.148)	(0.072)	(0.047)***	(0.070)**	(0.148)
Body Mass Index				-0.023		
				(0.009)**		
Access to private health care				0.179		
				(0.088)**		
Sociable	0.016	0.224	0.125	-0.020		0.098
	(0.071)	(0.067)***	(0.055)**	(0.083)		(0.090)
Workaholic	-0.272	-0.252	-0.116	-0.057	-0.140	-0.175
	(0.082)***	(0.094)**	(0.091)	(0.065)	(0.055)**	(0.089)*
Practice sports	0.108	0.228		0.259		
	(0.057)*	(0.055)***		(0.046)***		
ln(hours of leisure)	0.219	0.093	0.043	0.042		
	(0.029)***	(0.034)***	(0.038)	(0.028)		
ln(work hours)			-0.011		-0.045	1.254
			(0.016)		(0.020)**	(0.566)**
ln(work hours)^2						-0.132
						(0.080)*
ln(monthly home income)	0.093	0.088	0.176	0.023	0.458	
	(0.035)**	(0.042)**	(0.061)***	(0.037)	(0.057)***	
ln(per hour salary)						0.226
						(0.055)***

Table 15. (cont.)						
	Leisure satisfaction	Social life satisfaction	Family satisfaction	Health satisfaction	Economic situation satisfaction	Work satisfaction
Ln (Distance to Promenade)	-0.127	-0.036		-0.045		
	(0.041)***	(0.063)		(0.054)		
Satisfaction with public parks and green areas	-0.010	-0.027		0.108		
	(0.075)	(0.069)		(0.053)**		
Satisfaction with public sports infrastructure	0.154	0.024				
	(0.060)**	(0.054)				
High and medium-high stratum area	-0.152	-0.052	0.111	-0.022	-0.031	0.068
	(0.050)***	(0.045)	(0.060)*	(0.080)	(0.090)	(0.066)
Other areas	-0.065	-0.173	0.076	0.118	0.027	0.124
	(0.112)	(0.093)*	(0.102)	(0.086)	(0.103)	(0.119)
Constant	16.181	0.218	1.565	2.053	-0.997	8.168
	(2.766)***	(0.665)	-1.817	(0.727)***	(0.407)**	(3.523)**
Observations	703	700	728	679	750	475
R-squared	0.19	0.10	0.11	0.19	0.20	0.09

Clustered standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

7.2 Housing and Neighborhood

In Table 16 we present the evaluation of housing and neighborhood determinants. The first three columns present the results of the hedonic regressions (equation 1) where the explanatory variable is the log of the rental value. The following two columns present the result of the housing and neighborhood domain satisfaction.

In the first hedonic regression we considered individual household characteristics. Whenever possible the regressors were also included in logs. Given this log-log functional formed used, the estimated coefficients are interpreted as elasticities. For instance the 0.349 coefficient for rooms means that a house with twice the number of rooms (an increase of 100 percent) implies a rent that is 34.9 percent higher. This elasticity seems to be rather low. In contrast, the price-bathroom elasticity is much larger, implying that a house with twice as many bathrooms is associated with 85.3 percent higher rent. This specification can also be interpreted in terms of compensating differentials. An increase in the number of rooms implies higher rent unless it is accompanied by a decrease in the number of bathrooms. In order not to alter the rent, our estimation suggests that $0.349\Delta \ln(Rooms) + 0.853\Delta \ln(Bathrooms) = 0$ or

$\Delta \ln(Rooms) = -\frac{0.853}{0.349}\Delta \ln(Bathrooms) = -2.444\Delta \ln(Bathrooms)$. Considering infinitesimal changes we obtain the room-bathroom-rent elasticity of –2.444.

House location was also found to be statistically significant. The farther away from the Promenade, the cheaper the rent. The distance variable is the log of the time it takes to get to the Promenade. The -0.096 elasticity implies that living at twice the distance from the Promenade implies 10 percent lower rent.

With respect to construction and conservation of the house, we found that the houses with problems in their walls or floors have a statistically significant lower rent. Finally, having a kitchen for the exclusive use of the household (i.e., not having to share it with anybody) is also associated with higher rent value.

The second column of Table 16 focuses on block and neighborhood-level public goods and amenities. Some public goods, such as access to running water and access to sewerage, were found to increase real estate prices. Sidewalks in good condition and public street lighting are associated with larger rental value. On a negative side, rental value of houses in neighborhoods with garbage problems and with problems with the public transportation system tends to be lower.

We additionally included a series of other problems that people may suffer in their neighborhoods. These are dummy variables that take the value of 1 when the mentioned problem is considered to be a serious or very serious problem by the interviewee. The results of this regression are disappointing: we found no significant effects for vandalism, gangs or pollution.

The third column of Table 16 includes both the regressors of the first two columns. Of the house characteristics, roof condition is the only house characteristic that loses its statistical significance, but the effects of public goods and neighborhood externalities practically vanish.

As in the previous table, we report the effect of two dummies to control for other neighborhood effects. Interesting, there are large and significant price differentials that remain unexplained in our regressions. Even after including the house and neighborhood variables, we find that houses in high and medium-high strata neighborhoods are associated with 50 percent higher rental values.

These results suggest that most variation in housing prices is determined by housing features. In order to obtain a more precise estimate we proceed to make a traditional analysis of

variance (ANOVA)[7] but in order to reduce the number of regressors in the ANOVA we first perform a principal component analysis for the housing and neighborhood variables. The variables considered are those of Table 16.

In particular, the housing variables are: the log of the distance to the promenade, the log of the number of rooms, the log of the number of bathrooms a dummy if the walls are not in good condition, a dummy if the roof is not in good condition, a dummy if the floor is not in good condition, a dummy if there is a kitchen for the exclusive use of household, a dummy if there is a heater. The neighborhood variables are all dummy variables that reflect: access to running water system, access to sewerage, access to drainage pipe, sidewalks in good condition, public street lighting, abundance of trees in the block, vandalism being a problem in the neighborhood, gangs being a problem in the neighborhood, garbage problems, water, air and sound pollution, satisfaction with public parks and green areas, satisfaction with public transportation, and satisfaction with public sports infrastructure. We perform two exercises with respect to the area dummies (high-medium and other). It could be argued that these area dummies are capturing neighborhood effects that we are unable to measure with our long list of neighborhood variables, and in this case it make sense to include them in the principal component analysis among the neighborhood variables. But since these variables are a measure of ignorance rather than knowledge it also makes sense to treat them separately in the analysis of variance.

Columns A through D in Table 17 report the results of the analysis of variance and its sensitivity to the inclusion of up to four principal components for housing and neighborhood characteristics. It shows moderate gains of the inclusion of more than two components. Besides the traditional division of the total variance between the part actually explained by the model and the residuals, we disaggregate the part explained by the model in the part of the variance that is explained by each term and the part that depends on the cross terms.

In exercise 1 we included the area dummies as part of the neighborhood principal components. Columns B, C and D show that the model is able to capture more than 50 percent of total price variations. According to column B, 51 percent of this variation can be attributed directly to housing features and 20 percent to neighborhood characteristics (according to columns C and D, 41 percent can be attributed to housing and 22 percent to neighborhood

[7] See Appendix B for details on how the ANOVA is computed.

components). The rest of the variation is due to cross terms of housing and neighborhood components.

In exercise 2 the area dummies are not included in the neighborhood principal component analysis but are included as independent regressors. Again there are minor gains of including more than two principal components, and the regressions explain more than 50 percent (and close to 60 percent) of the variation in rental prices. The main difference with the previous exercise is that the neighborhood components capture now only between 1 and 2 percent of total price variation. The comparison between the much larger variations attributed to neighborhood components in the first exercise points out that, although there are sizeable neighborhood effects, we are unsuccessful in identifying and measuring them in this paper.

In the housing and neighborhood satisfaction regression (Table 16) we included, besides the house, public goods and neighborhood characteristics, several variables to control for individual characteristics as in the other domain regressions. With respect to age, satisfaction with the neighborhood and with the house shows a U shape similar to satisfaction with leisure and work. From 18 years old the satisfaction in these two domains decreases with age until 36 and 43, respectively, when the relationship is reversed. The sex of the respondent turned out to be not significant in these regressions either.

Similar to the hedonic regressions we find that individuals living in houses with more rooms and without construction problems are associated with better house satisfaction. Since house satisfaction is not measured in logs, the coefficients cannot be interpreted as elasticities (they are sometimes called semi-elasticities) but the room-bathroom compensation analysis can be performed. Interpreting Table 16 as indifference curves implies that house satisfaction remains constant when room and bathroom changes are compensated for in such a way that $0.315\Delta\ln(Rooms) + 0.217\Delta\ln(Bathrooms) = 0$. Considering infinitesimal changes, the room-bathroom elasticity is –0.69 lower than what we obtained in the hedonic regression. The location of the house with respect to the promenade was found to significantly affect the satisfaction with the house with a semi-elasticity of about 0.075.

We found that public goods like public parks and public transportation have a positive effect on neighborhood satisfaction and housing satisfaction. The number of trees on the block has an effect on the neighborhood domain but no effect on housing satisfaction. Neighborhood problems like vandalism, gangs, garbage problems and pollution have a negative impact on

neighborhood satisfaction. Pollution also acts as a negative externality decreasing housing satisfaction.

The dummies included to capture other neighborhood effects are significant. All other things equal, individuals in high and medium-high strata neighborhoods have better neighborhood satisfaction but worse housing satisfaction level than individuals in low and medium-low strata neighborhoods.

Table 16. Housing and Neighborhood Regressions

	Hedonic regressions (lnrent)			Housing satisfaction	Neighborhood satisfaction
	House characteristics	Public goods / neighborhood externalities	Total		
ln(Age)				-4.792	-3.139
				(2.348)**	(1.681)*
ln(Age)^2				0.639	0.438
				(0.322)*	(0.229)*
Turning point				43	36
Woman				0.026	-0.002
				(0.035)	(0.033)
ln(family size)				-0.361	0.046
				(0.077)***	(0.095)
ln(monthly home income)				0.227	0.038
				(0.029)***	(0.025)
Ln (distance to Promenade)	-0.097		-0.106	-0.075	
	(0.029)***		(0.024)***	(0.023)***	
ln(Rooms)	0.355		0.365	0.315	
	(0.038)***		(0.035)***	(0.054)***	
ln(Bathrooms)	0.854		0.801	0.217	
	(0.159)***		(0.177)***	(0.184)	
Walls not in good condition	-0.311		-0.447	-0.432	
	(0.065)***		(0.077)***	(0.130)***	
Roof not in good condition	-0.149		-0.103	-0.098	
	(0.066)**		(0.088)	(0.154)	
Floor not in good condition	-0.378		-0.367	-0.202	
	(0.051)***		(0.057)***	(0.082)**	
Kitchen exclusive for the	0.206		0.160	0.156	
	(0.091)**		(0.056)***	(0.221)	
Access to running water		0.456	0.042	0.130	0.198
		(0.254)*	(0.110)	(0.414)	(0.286)
Access to sewerage		0.374	0.030	-0.098	-0.122
		(0.056)***	(0.052)	(0.124)	(0.089)
Access to drainage pipe		0.034	0.061	-0.026	0.124
		(0.052)	(0.050)	(0.107)	(0.116)
Sidewalks in OK condition		0.156	0.047	0.059	0.049
		(0.070)**	(0.032)	(0.100)	(0.059)
Public street lighting		0.175	0.008	-0.209	-0.083
		(0.070)**	(0.066)	(0.115)*	(0.090)
Many trees in block		0.062	0.035	0.046	0.204
		(0.043)	(0.030)	(0.057)	(0.062)***
Vandalism in neighborhood		0.050	0.044	-0.126	-0.119
		(0.042)	(0.032)	(0.114)	(0.042)***
Gangs in neighborhood		0.037	-0.021	0.046	-0.228
		(0.047)	(0.042)	(0.063)	(0.087)**
Garbage problems in the neighborhood		-0.075	-0.048	0.087	-0.142
		(0.042)*	(0.037)	(0.062)	(0.064)**

Table 16. (cont.)

	Hedonic regressions (lnrent)			Housing satisfaction	Neighborhood satisfaction
	House characteristics	Public goods / neighborhood externalities	Total		
Pollution in the neighborhood		0.014	0.004	-0.149	-0.120
		(0.043)	(0.035)	(0.052)***	(0.061)*
Satisfaction with public parks and green areas		0.113	0.079	0.094	0.239
		(0.069)	(0.055)	(0.056)*	(0.064)***
Satisfaction with public		-0.183	-0.107	0.151	0.206
		(0.058)***	(0.050)**	(0.049)***	(0.076)**
Satisfaction with public sports infrastructure		-0.014	0.035	-0.019	0.123
		(0.052)	(0.025)	(0.064)	(0.076)
High-Medium and high	0.583	0.683	0.491	-0.150	0.227
	(0.051)***	(0.077)***	(0.043)***	(0.082)*	(0.120)*
Other areas	0.230	0.275	0.224	0.076	-0.120
	(0.068)***	(0.098)***	(0.063)***	(0.110)	(0.183)
Constant	7.061	6.910	7.047	6.798	4.551
	(0.092)***	(0.252)***	(0.204)***	(3.965)*	-3.093
Observations	651	609	589	647	667
R-squared	0.61	0.43	0.63	0.18	0.19

Clustered standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

Source: Authors' calculations based on Montevideo QoL Neighborhood Survey (2007).

Table 17. Analysis of Variance, Hedonic Regressions				
Exercise 1. Area dummies included in the Neighborhood components				
Source of Variation	**A**	**B**	**C**	**D**
Total	278.0	278.0	278.0	278.0
Residual	207.7	128.6	122.6	122.4
Model	70.3	149.4	155.4	155.6
Total Housing	22.3	76.6	63.4	63.1
First pca housing	22.3	18.2	15.4	14.9
Second pca housing		58.4	47.4	47.3
Third pca housing			0.7	0.8
Forth pca housing				0.0
Total Neighborhood	21.6	29.4	33.7	33.9
First pca neighborhood	21.6	18.1	17.8	17.9
Second pca neighborhood		11.3	11.7	11.7
Third pca neighborhood			4.2	4.1
Forth pca neighborhood				0.2
Cross terms	26.4	43.4	58.3	58.6
R squared	0.253	0.537	0.559	0.560
Exercise 2. Area dummies included as independent variables				
Source of Variation	**A**	**B**	**C**	**D**
Total	278.0	278.0	278.0	278.0
Residual	172.3	114.2	111.9	111.8
Model	128.6	163.8	166.1	166.2
Total Housing	8.5	68.9	60.6	59.2
First pca housing	8.5	12.6	12.5	12.5
Second pca housing		56.3	47.5	46.0
Third pca housing			0.6	0.6
Forth pca housing				0.0
Total Neighborhood	0.6	2.0	3.5	3.6
First pca neighborhood	0.6	0.8	1.0	1.0
Second pca neighborhood		1.2	1.4	1.5
Third pca neighborhood			1.1	1.1
Forth pca neighborhood				0.1
Area dummies	53.8	33.6	27.6	27.6
High-Medium and high stratum area	48.3	29.2	23.7	23.7
Other areas	5.5	4.4	3.8	3.9
Cross terms	119.5	92.9	102.0	103.5
R squared	0.463	0.589	0.598	0.598

7.3 Overall Satisfaction Determinants

Besides the various life domains we are interested in a summary variable of life as a whole. This general satisfaction measure should intuitively be the result of satisfaction with the various life domains, but before addressing the problems associated with the aggregation approach we can proceed to estimate a model where the explanatory variables are the regressors of the domain satisfaction estimations. In Table 18 we may be capturing the direct effect of these variables on overall satisfaction or an indirect impact that is channeled through a domain satisfaction. We included in the overall satisfaction regression all the regressors of the domains equation of Tables 15 and 16.

As people become older, they tend to be less satisfied with their overall situation. Although women were more dissatisfied with their health and economic situation, we found no significant gender effects on overall well being. With respect to family, having a partner significantly improves overall satisfaction, but we found no effects of family size.

In the domain regressions, education was associated with better health satisfaction but with worse economic situation satisfaction. Overall, more educated people tend to be more satisfied with their life.

The sign and statistical significance of sociable and workaholic people are in line with the domain results. Lonely people and people that even in their spare time continue to think and to worry about work issues tend to be less happy. Nonetheless, the hours dedicated to leisure and to work that were significant in the domain satisfaction regressions had no significant effect on overall satisfaction.

The significance of the variables included for the house and neighborhood domains is, as before, weak. With respect to housing characteristics, the number of rooms and the quality of the walls and floor have a significant impact. With respect to public goods and neighborhood externalities, we found that access to a running water system, and public street lighting are associated with happier individuals. It is puzzling, however, that individuals in neighborhoods that suffer more from vandalism problems are also more satisfied with their life.

In spite of the popular saying “money cannot buy happiness,” we found that the larger the monthly income the larger the overall satisfaction with life. The significance of the income variable allows us to measure the contributions of other variables in the regression in monetary terms. Thinking again in terms of compensating differentials, an increase in an individual’s

education needs to be done at the expense of a decrease in his income in order not to change his overall satisfaction. Our results suggest $0.218\Delta\ln(\textit{years of education}) + 0.089\Delta\ln(\textit{monthly home income}) = 0$ which implies an income education elasticity of -2.4. An increase in 10 percent in education years must come at the expense of a reduction of 24 percent in income.

The same procedure can be used to value housing and neighborhood characteristics. The income-room elasticity is –2.4. According to Table 7 the average house in our data has 3.4 rooms. One extra (or less) room implies an increase (decrease) of about 30 percent in the number of rooms. Changes in the number of rooms are valued as much as 70 percent of household income.

For dummy variables a similar procedure can be used. To estimate the increase in the income level to compensate someone for from moving from a house without a running water system, we can consider the following equation: $0.089\ln(\textit{income})_{\text{No water}} = 0.089\ln(\textit{income})_{\text{Water}} + 0.830$. Therefore the percentage change in income that compensates someone for not having access to running water equals $\frac{0.830}{0.089} = 9.3\%$. Similarly, street lighting on the block is valued at 3.7 percent of monthly home income.

Table 18. Overall Satisfaction			
	All	Workers	Non workers
ln(age)	-0.506	-0.501	-0.523
	(0.106)***	(0.100)***	(0.140)***
Woman	-0.025	-0.049	0.016
	(0.040)	(0.043)	(0.055)
Partner	0.352	0.354	0.330
	(0.090)***	(0.090)***	(0.099)***
ln(family size)	-0.278	-0.267	-0.190
	(0.194)	(0.190)	(0.223)
ln(years education)	0.218	0.229	0.207
	(0.093)**	(0.084)***	(0.125)
Body Mass Index	0.005	0.004	0.003
	(0.007)	(0.007)	(0.011)
Access to private health care	0.001	0.008	-0.122
	(0.048)	(0.052)	(0.085)
Sociable	0.139	0.143	0.137
	(0.078)*	(0.078)*	(0.053)**
Workaholic	-0.202	-0.201	-0.271
	(0.052)***	(0.061)***	(0.056)***
Practice sports	0.118	0.105	0.106
	(0.076)	(0.075)	(0.089)
ln(hours of leisure)	-0.026	-0.035	0.024
	(0.053)	(0.053)	(0.056)
ln(work hours)		0.096	
		(0.137)	
ln(work hours)^2		-0.026	
		(0.031)	
ln(monthly home income)	0.089	0.088	0.092
	(0.042)**	(0.040)**	(0.061)
ln(distance to Promenade)	0.000	0.000	0.009
	(0.049)	(0.048)	(0.049)
ln(Rooms)	0.215	0.213	0.205
	(0.105)**	(0.110)*	(0.118)*
ln(Bathrooms)	0.006	0.009	-0.144
	(0.216)	(0.224)	(0.171)
Walls not in good condition	-0.553	-0.551	-0.495
	(0.218)**	(0.219)**	(0.320)
Roof not in good condition	0.087	0.078	0.046
	(0.062)	(0.067)	(0.080)
Floor not in good condition	-0.100	-0.097	-0.009
	(0.047)**	(0.044)**	(0.059)
Kitchen exclusive for the household	-0.423	-0.399	-0.353
	(0.490)	(0.488)	(0.480)

Table 18. (cont.)			
	All	Workers	Non workers
Access to running water system	0.830	0.843	0.961
	(0.407)**	(0.416)*	(0.632)
Access to sewerage	-0.171	-0.180	-0.076
	(0.171)	(0.171)	(0.220)
Access to drainage pipe	-0.010	0.001	-0.225
	(0.093)	(0.092)	(0.119)*
Sidewalks in OK condition	-0.058	-0.064	0.008
	(0.091)	(0.090)	(0.135)
Public street lighting	0.330	0.331	0.321
	(0.148)**	(0.151)**	(0.162)*
Many trees in block	-0.120	-0.121	-0.097
	(0.106)	(0.108)	(0.127)
Vandalism in neighborhood	0.113	0.113	0.045
	(0.060)*	(0.062)*	(0.073)
Gangs in neighborhood	0.026	0.036	-0.022
	(0.066)	(0.067)	(0.075)
Garbage problems in the neighborhood	-0.039	-0.028	-0.023
	(0.066)	(0.067)	(0.064)
Pollution in the neighborhood	-0.063	-0.072	-0.030
	(0.071)	(0.072)	(0.072)
Satisfaction with public parks and green areas	-0.034	-0.039	-0.070
	(0.075)	(0.071)	(0.084)
Satisfaction with public transportation	0.094	0.095	-0.091
	(0.065)	(0.065)	(0.068)
Satisfaction with public sports infrastructure	0.087	0.088	0.088
	(0.070)	(0.070)	(0.076)
High-medium and high stratum area	0.025	0.020	0.026
	(0.075)	(0.076)	(0.058)
Other areas	0.166	0.165	0.291
	(0.095)*	(0.097)*	(0.117)**
Constant	-0.200	-0.214	-0.100
	(0.772)	(0.784)	(0.657)
Observations	608	605	414
R-squared	0.19	0.19	0.19

Clustered standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Source: Authors' calculations based on Montevideo QoL Neighborhood Survey (2007).

As mentioned before, overall satisfaction may be considered the result of aggregating many different domains. The interest in this aggregation approach is that not all of the domains may have the same weight and that there are implicit tradeoffs by which a worse situation in one domain can be compensated for by an improvement in another. Therefore this exercise has potentially very interesting monitoring and policy implications.

Unfortunately, there is a methodological problem. One may be tempted to use POLS and regress overall evaluation on a list of domain satisfactions, but the results may be influenced by individuals' general optimism or pessimism. Column 1 of Table 19 shows that people with better leisure, social life, family, health, economic situation satisfaction tend to have better overall life satisfaction. The only non-signficant terms are family and economic situation satisfaction for the subset of non-workers. Although it sounds reasonable that those people that are satisfied with various domains of their life tend to have a better evaluation of life as a whole, it also may be that this result is produced by a common psychological factor.

To control for this endogeneity problem, we follow three approaches. Van Praag and Ferrer-i-Carbonell (2008) suggest including a variable that could capture the common psychological trait. This variable is constructed applying principal component analysis to the covariance matrix of the domain satisfaction regression errors of Tables 15 and 16. The significance of the domains terms remains high. Including this endogeneity control, we only lose the significance of leisure for workers and economic situation for the whole database. Somewhat disappointingly, we found that the additional term turned out to be non-significant, and therefore we must wonder how appropriate it is to keep that term in the regression.

The second approach is similar in spirit to that of Van Praag and Ferrer-i-Carbonell (2008) but constructs the additional term in a different way. In Table 18 we present the estimation of the effect of various variables on overall satisfaction. If the regression is well specified and there are no other unobservable variables, the common psychological trait must remain in the error term. In the third set of regressions of Table 19 we report the aggregation regression including the residuals from the regressions reported in Table 18. We find in the three regressions that this term is positive and statistically significant, as the impact of the common psychological factor is expected to be. The overall fit of these regressions is (not surprisingly) the best, with R-squared values of 90 percent but what is most interesting is that some of the domains remain statistically significant. According to our results, for the whole database,

family, health and economic situation satisfaction and housing are associated with greater overall satisfaction.

The third and final approach attempting to control for endogeneity is the classical instrumental variables technique where the instruments are the regressors of Tables 15 and 16 not included as independent variables in Table 19. For the whole database we found a positive association between leisure, family and health with overall satisfaction.

Looking at the three alternatives in controlling for endogeneity, one should note that family and health satisfaction have the most robust positive association with overall life satisfaction. In contrast, neighborhood satisfaction plays no role in overall satisfaction in any of our alternative procedures.

It may be argued that the effect of the socio-economic variables included in Table 19 (age, gender, family size, income and area dummies) is included in the domain satisfaction variables. Table 20 in Appendix B replicates the analysis of Table 19 without including these variables as independent regressors. The results remain unchanged.

Table 19. The Aggregation of Satisfaction: Alternatives to Control for Common Psychological Traits

				Control for Endogeneity- Van Praag (pca to domain satisfaction residuals)			Control for Endogeneity (residuals of overall Satisfaction)			Instrumental Variables		
	All	Workers	Non workers	All	Workers	Non workers	All	Workers	Non workers	All	Workers	Non workers
ln(age)	-0.162	-0.137	-0.111	-0.188	-0.128	-0.191	-0.356	-0.355	-0.437	-0.245	-0.092	-0.259
	(0.113)	(0.100)	(0.182)	(0.112)	(0.073)*	(0.291)	(0.039)***	(0.034)***	(0.055)***	(0.164)	(0.184)	(0.279)
woman	0.027	0.014	0.114	-0.014	0.011	0.030	-0.050	-0.059	0.008	-0.001	0.037	0.111
	(0.029)	(0.036)	(0.069)	(0.029)	(0.047)	(0.092)	(0.015)***	(0.021)***	(0.038)	(0.065)	(0.064)	(0.204)
ln(family size)	0.132	0.074	0.184	0.112	0.077	0.085	0.033	0.008	0.133	-0.013	0.071	0.004
	(0.081)	(0.043)*	(0.230)	(0.114)	(0.107)	(0.341)	(0.024)	(0.030)	(0.067)*	(0.128)	(0.103)	(0.416)
ln(monthly household income)	0.012	0.004	-0.013	0.060	-0.022	0.084	0.167	0.192	0.106	0.002	-0.012	-0.062
	(0.045)	(0.030)	(0.071)	(0.074)	(0.109)	(0.158)	(0.028)***	(0.016)***	(0.038)***	(0.094)	(0.063)	(0.152)
Leisure	0.129	0.056	0.245	0.093	0.048	0.198	0.018	0.023	0.039	0.187	0.152	-0.095
	(0.024)***	(0.028)*	(0.052)***	(0.025)***	(0.043)	(0.097)*	(0.012)	(0.014)	(0.018)**	(0.089)**	(0.100)	(0.289)
Social life	0.176	0.169	0.182	0.178	0.185	0.188	0.022	0.031	0.008	-0.197	0.214	-0.216
	(0.041)***	(0.026)***	(0.082)**	(0.036)***	(0.057)***	(0.073)**	(0.014)	(0.019)	(0.025)	(0.159)	(0.144)	(0.271)
Family	0.167	0.225	0.075	0.162	0.226	0.067	0.049	0.058	0.032	0.686	0.332	0.472
	(0.028)***	(0.043)***	(0.068)	(0.046)***	(0.075)***	(0.080)	(0.012)***	(0.016)***	(0.024)	(0.113)***	(0.119)***	(0.209)**
Health	0.171	0.126	0.223	0.164	0.134	0.194	0.037	0.042	0.018	0.422	0.184	0.424
	(0.039)***	(0.053)**	(0.063)***	(0.042)***	(0.047)***	(0.109)*	(0.021)*	(0.028)	(0.025)	(0.137)***	(0.170)	(0.257)
Economic situation	0.104	0.119	0.070	0.073	0.156	-0.017	0.030	0.035	-0.000	-0.067	0.046	0.044
	(0.042)**	(0.038)***	(0.091)	(0.051)	(0.044)***	(0.145)	(0.015)*	(0.020)*	(0.023)	(0.163)	(0.137)	(0.284)
Work		0.071			0.102			-0.006			0.143	
		(0.038)*			(0.087)			(0.019)			(0.090)	
House	0.046	0.056	0.012	0.054	0.071	0.044	0.022	0.014	0.030	0.101	0.064	0.455
	(0.027)*	(0.028)*	(0.060)	(0.052)	(0.077)	(0.096)	(0.011)**	(0.015)	(0.021)	(0.165)	(0.161)	(0.351)
Neighborhood	0.049	0.013	0.125	0.043	0.017	0.110	-0.007	-0.002	-0.016	-0.076	-0.187	0.267
	(0.051)	(0.046)	(0.098)	(0.047)	(0.058)	(0.121)	(0.012)	(0.010)	(0.033)	(0.127)	(0.076)**	(0.281)
First Principal Component				0.028	-0.035	0.045						
				(0.054)	(0.115)	(0.187)						
Overall satisfaction residuals							0.949	0.928	0.948			
							(0.018)***	(0.023)***	(0.018)***			
High-Medium-high area stratum area	0.084	0.051	0.198	0.070	-0.002	0.243	0.102	0.071	0.074	0.036	0.084	0.016
	(0.046)*	(0.059)	(0.071)***	(0.059)	(0.067)	(0.088)**	(0.029)***	(0.034)**	(0.032)**	(0.072)	(0.098)	(0.154)
Other areas	0.200	0.286	0.136	0.230	0.295	0.229	0.195	0.193	0.289	0.125	0.312	-0.027
	(0.087)**	(0.091)***	(0.148)	(0.090)**	(0.091)***	(0.182)	(0.032)***	(0.033)***	(0.062)***	(0.135)	(0.115)**	(0.277)
Constant	0.255	0.337	0.075	-0.057	0.585	-0.394	-0.315	-0.512	0.419	0.871	0.312	1.477
	(0.597)	(0.533)	(0.845)	(0.719)	(0.943)	(0.871)	(0.287)	(0.220)**	(0.348)	(0.954)	-1.036	-1.194
Observations	737	481	256	598	390	191	601	407	191	598	407	191
R-squared	0.31	0.33	0.33	0.32	0.34	0.35	0.91	0.90	0.93	0.03	0.27	

Clustered standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

Source: Authors' calculations based on Montevideo QoL Neighborhood Survey (2007).

8. Conclusion

In this paper we analyze various dimensions of the quality of life of people living in Montevideo. Besides the official household surveys we conduct a specially designed neighborhood survey to address these issues. We found that satisfaction with various public goods and services at the neighborhood level plays only a minor role in the overall reported well-being of individuals and in the satisfaction of life domains, such as leisure, social life, family, health, housing, neighborhood economic situation and work. This is not to say that individuals in low and high socioeconomic areas of the city enjoy the same quality of life. Quite the contrary, there are significant disparities in a wide range of indicators. Our results suggest that the differences in overall happiness and in domain satisfaction between individuals living in different areas are mostly due to differences in individual outcomes like education, health, labor situation and housing quality. Public goods, such as those provided at the neighborhood level, were found to significantly affect the satisfaction with the neighborhood and to a lesser extent to improve rental values, but no other life dimension.

9. Some Policy Implications

Although we have found that satisfaction with the measured public goods and services at the neighborhood level plays only a minor role in the overall reported well being of individuals and in the satisfaction of life domains, we would nonetheless recommend to pay special attention to the following variables: public street lighting and vandalism. These two neighborhood level variables resulted significant in the Overall Satisfaction models and are believed to be related to public safety.

According to a number of public opinion polls conducted in Montevideo, feeling insecure is perceived as one of the most serious problems.[8] In this direction, we would suggest monitoring a specific set of variables to capture these subjective feelings at the neighborhood level.

[8] Public Opinion Poll conducted by Interconsult and published in the mewspaper *Ultimas Noticias*, May 2008

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Appendix A. Montevideo QoL Neighborhood Survey (2007): Sampling Design

One of the main advantages of conducting the QoL survey as a module of the 2007 ISSP survey is the synergies in the sample design. The research team designed and implemented a sample strategy that is a compromise between the two studies and that meaningfully captures:

1. Country-level averages (Montevideo vs. Rest of the country)[9]
2. City of Montevideo level averages, and
3. Variations across main sub-city areas in Montevideo

The sample design combines the ISSP methodological requisites for a general population representative sample (representative of the Montevideo and Rest of the country) with the QoL survey requirement to field the questionnaire in at least two neighborhoods: one poor, low-QoL area and the other in a rich, high-QoL zone.

Based on the 2006 Household Surveys information on household income and unemployment rate, the National Statistical Institute (INE) classifies every censal segment in Montevideo using a 4-category socioeconomic indicator:

1) Low
2) Medium-Low
3) Medium-High
4) High

Every household is assigned to one of these four strata according to the location of the dwelling. All household members receive the same socioeconomic level classification, independently of their individual income and/or employment condition. Based on this procedure the National Statistical Institute has aggregated censal segments to match "real" neighborhood areas in the city of Montevideo, and a total of 62 neighborhoods were identified.

Based on this secondary data, we redefined the map of neighborhoods in Montevideo to obtain bigger representative areas (extended neighborhoods). We aggregated censal segments in approximately 20 sub-city areas with a mean population of 60 thousands each. The new classification was conducted using cluster analysis, being the censal segments the unity of analysis. The key clustering variables were selected from the 2006 Household Survey; each

[9] In this paper we use data only for the City of Montevideo.

variable seeks to represent some of the most relevant dimension of QoL (dwelling characteristics, subsistence capacity, health and education):

1) Segment average rent or implied rent (for owners).
2) Segment average per capita income
3) Segment unemployment rate
4) Percentage of people with health insurance per segment
5) Household educational level (head of household average years of education completed + partner average years of education completed) per segment

From this resulting classification we selected two representative areas (that included more than one neighborhood): one close to the first quartile and the other close to the third quartile of the per capita income and unemployment distributions. With this procedure we tried to avoid the selection of neighborhoods in both tails of the distribution.

The sample frame was the 2004 Population Census and the population universe was all adults (aged 18 years old or more) living in urban areas (cities with at least 5,000 inhabitants).

Once the two areas were selected, we selected an independent random sample of 385 cases in each plus 100 cases split in the rest of the city (Others). The effective sample size of 2007 ISSP survey will be around 1,500 cases in total: 770 cases in two representative areas of Montevideo, 100 in the rest of Montevideo (Others), 110 in Montevideo Metropolitan area and 520 in the Rest of the Country.

The design is a multi-stage stratification. Three major domains are represented:

1. Two areas in Montevideo
2. Metropolitan Area (Montevideo surroundings) and
3. Rest of the Country (cities with at least 5,000 inhabitants)

The re-classified neighborhoods in Montevideo plus three additional sub-city areas in the Metropolitan zone were the Primary Sampling Units (PSUs) in the first sampling stage. In a second stage two areas were selected in Montevideo and one sub-city area in the Metropolitan zone. This procedure allows us to gain representative sample of the two selected neighborhoods in Montevideo and Metropolitan Area as well.

In the third sampling stage, we implement the following procedure for each of the three selected PSU in Montevideo and Metropolitan Area:

1. Census zones (usually blocks) were selected by a systematic probability proportional to size (PPS) scheme ("size" being the population of each block).
2. Four households were selected in each block.
3. At the final sampling stage, only one respondent was selected among all eligible household members using the approximately random rule of the "next birthday."

In the Rest of the Country, 12 cities were selected via systematic PPS sampling (size being the population living in each city). Census Zones, households and the final respondent was selected in the same way as in Montevideo and Metropolitan Area.

Assuming an efficiency similar to that obtained with a simple random sample, this sample achieves a confidence interval of +/- 5, with an approximate confidence level of 95 for a population proportion close to 0.5, in all mentioned domains.

The survey was applied by professional interviewers, who were selected among the permanent team of the survey organization and were trained in the specific objectives and characteristics of this study. The coordinators of this project were in charge of selecting, training and supervising the interviewers. Finally, the survey instrument was applied using a face to face, paper and pencil mode.

Appendix B. Analysis of Variance, Table 17

The traditional analysis of variance decomposes the variation of the dependent variable in terms of deviation from its means.

Recall from equation (1) the traditional hedonic regression has the following form

$$Ln\, p_{ij} = \alpha + \beta' H_i + \gamma'\, Z_j + v_{ij} \qquad (1)$$

where p_{ij} is the rental price of house i located in neighborhood j, H_i is a vector of individual house features, Z_j is a vector of neighborhood j amenities, and v_{ij} is a error term.

Using principal component analysis, it is possible to reduce the dimensionality of this problem capturing those characteristics of the data that contribute most to its variance by keeping lower-order principal components and ignoring higher-order ones. Considering only the first principal component for housing and neighborhood characteristics we have

$$y_{ij} = \alpha + \beta h_i + \gamma z_j + \varepsilon_{ij} \qquad (2)$$

where to simplify notation we denoted the log or prices with the letter y and h and z are the first component of the housing and neighborhood variables.

Variation of the dependent variable can be defined in terms of deviation from its mean $\left(y_{ij} - \bar{y}\right)$.[10] The total variation of the dependent variables is the sum of the squared deviation:

$$SST = \sum_{i,j}\left(y_{ij} - \bar{y}\right)^2 \qquad (3)$$

that can be decomposed in the variation explained by the regression model and the part of the variation that remains in the error term.

$$\underbrace{\sum_{i,j}\left(y_{ij} - \bar{y}\right)^2}_{SST} = \underbrace{\sum_{i,j}\left(\hat{y}_{ij} - \bar{y}\right)^2}_{SSR} + \underbrace{\sum_{i,j}\hat{\varepsilon}^2}_{SSE} \qquad (4)^{11}$$

were $\hat{y}_{ij}$ is the predicted value using the estimated parameters $(\hat{\alpha}, \hat{\beta}, \hat{\gamma})$. The traditional R-squared statistic that is used to evaluate the fit of the model is the ratio between the regression sum of squares (SSR) and the total sum of squares (SST).

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[10] $\bar{y} = \hat{\alpha} + \hat{\beta}\bar{h} + \hat{\gamma}\bar{z}$

The part of the variation that is captured by the model can be divided between the part that is captured by each variable and by a set of cross terms. With only two independent variables, as in equation (2), it turns out that

$$\left(\hat{y}_{ij} - \bar{y}\right)^2 = \left[\hat{\beta}\left(h_{ij} - \bar{h}\right) + \hat{\gamma}\left(z_{ij} - \bar{z}\right)\right]^2 \qquad (5)$$

It is straightforward to show that the regression sum of squares is:

$$SSR = \sum_{i,j}\left(\hat{y}_{ij} - \bar{y}\right)^2 = \hat{\beta}^2 \sum_{i,j}\left(h_{ij} - \bar{h}\right)^2 + \hat{\gamma}^2 \sum_{i,j}\left(z_{ij} - \bar{z}\right)^2 + 2\hat{\beta}\hat{\gamma}\sum_{i,j}\left(h_{ij} - \bar{h}\right)\left(z_{ij} - \bar{z}\right) \quad (6)$$

From the derivation it is clear that, as more independent terms are included in the regression, there are more cross terms and potentially a lower fraction of the model's total variance that can be directly attributed to its regressors.

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[11] $\hat{y}_{ij} = \hat{\alpha} + \hat{\beta}h_{ij} + \hat{\gamma}z_{ij}$

Table 20. The Aggregation of Satisfaction: Alternatives to Control for Common Psychological Traits

				Control for Endogeneity- Van Praag (pca to domain satisfaction residuals)			Control for Endogeneity (residuals of overall Satisfaction)			Instrumental Variables		
	All	Workers	Non workers	All	Workers	Non workers	All	Workers	Non workers	All	Workers	Non workers
Leisure	0.104	0.056	0.210	0.089	0.035	0.211	-0.008	0.015	0.017	0.144	0.138	-0.121
	(0.024)***	(0.026)**	(0.048)***	(0.026)***	(0.041)	(0.071)***	(0.016)	(0.016)	(0.022)	(0.086)	(0.098)	(0.203)
Social life	0.190	0.170	0.212	0.224	0.177	0.309	0.038	0.049	0.039	-0.189	0.136	-0.108
	(0.038)***	(0.024)***	(0.089)**	(0.050)***	(0.038)***	(0.107)***	(0.012)***	(0.018)**	(0.034)	(0.130)	(0.116)	(0.216)
Family	0.178	0.228	0.098	0.218	0.218	0.190	0.068	0.089	0.016	0.610	0.367	0.352
	(0.027)***	(0.041)***	(0.069)	(0.038)***	(0.050)***	(0.131)	(0.013)***	(0.014)***	(0.041)	(0.102)***	(0.101)***	(0.176)*
Health	0.199	0.140	0.246	0.220	0.138	0.311	0.099	0.084	0.097	0.568	0.230	0.479
	(0.026)***	(0.051)***	(0.054)***	(0.027)***	(0.054)**	(0.058)***	(0.016)***	(0.029)***	(0.030)***	(0.093)***	(0.130)*	(0.121)***
Economic situation	0.113	0.130	0.050	0.122	0.162	0.034	0.102	0.119	0.018	-0.022	0.085	0.013
	(0.036)***	(0.035)***	(0.063)	(0.037)***	(0.034)***	(0.068)	(0.010)***	(0.021)***	(0.036)	(0.127)	(0.119)	(0.136)
Work		0.071			0.088			-0.008			0.106	
		(0.032)**			(0.064)			(0.022)			(0.069)	
House	0.046	0.058	0.032	0.091	0.066	0.125	0.036	0.031	0.062	0.101	0.082	0.405
	(0.024)*	(0.029)*	(0.054)	(0.039)**	(0.047)	(0.076)	(0.013)***	(0.022)	(0.027)**	(0.167)	(0.113)	(0.280)
Neighborhood	0.045	0.002	0.130	0.056	-0.002	0.128	-0.002	-0.005	-0.026	-0.099	-0.184	0.214
	(0.047)	(0.043)	(0.084)	(0.044)	(0.054)	(0.096)	(0.023)	(0.020)	(0.049)	(0.108)	(0.076)**	(0.192)
First Principal Component				-0.076	-0.010	-0.184						
				(0.052)	(0.066)	(0.104)*						
Overall satisfaction residuals							0.907	0.874	0.894			
							(0.023)***	(0.029)***	(0.022)***			
Constant	0.006	0.034	-0.080	0.000	0.045	-0.116	-0.004	0.040	-0.073	-0.022	0.043	-0.013
	(0.021)	(0.029)	(0.050)	(0.027)	(0.038)	(0.075)	(0.029)	(0.027)	(0.034)**	(0.022)	(0.051)	(0.092)
Observations	781	501	280	598	390	191	601	407	191	598	407	191
R-squared	0.30	0.31	0.32	0.30	0.32	0.34	0.86	0.86	0.86			

Clustered standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

Source: Authors' calculations based on Montevideo QoL Neighborhood Survey (2007).