

# A Tale of Two Scales: Evaluating the Relationship Among Life Satisfaction, Social Capital, Income, and the Natural Environment at Individual and Neighborhood Levels in Metropolitan Baltimore

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## Abstract

With the rapid growth of cities worldwide, there is a need to better understand factors contributing to life satisfaction in urban environments. Using data from a long-term study of the Baltimore metropolitan region, we build on existing social scientific literature to examine a suite of theoretical factors that have been proposed to explain higher life satisfaction. We find support for many previous theoretical arguments in the literature. Importantly, however, our findings reveal that these results are strikingly scale dependent. For individuals, higher incomes contribute to higher levels of satisfaction, yet social capital does not. For neighborhoods, more social

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capital strongly increases satisfaction, but higher incomes do not; and access to a clean natural environment always contributes to higher satisfaction, regardless of the scale of analysis. Given these findings, we conclude with the observation that future research must carefully match the “scale” of life satisfaction measurements with the explanatory variables used.

### Keywords

life satisfaction, neighborhood satisfaction, natural environment, social capital

Urbanization is a dominant demographic trend and an important economic, cultural, and environmental transformation occurring worldwide. The urban population on a global basis is projected by the United Nations to climb to 61% by 2030 and eventually reach a dynamic equilibrium of approximately 80% urban to 20% rural dwellers that will persist for the foreseeable future (Brand, 2006; Johnson, 2006). As concern about global climate change continues to grow, it is important to recognize that urbanization is critical to delivering a more ecologically sustainable and resource-efficient world because the per-person environmental impact of city dwellers is generally lower than people in the countryside, and it can be reduced still further (Brand, 2006; Grimm et al., 2008; Johnson, 2006).

Cities have begun to address the challenges and opportunities of global climate change in terms of policies, plans, and management. For example, on June 5th, 2005, mayors from around the globe took the historic step of signing the Urban Environmental Accords—Green City Declaration with the intent of building ecologically sustainable, economically dynamic, and socially equitable futures for its urban citizens ([www.urbanaccords.org](http://www.urbanaccords.org)). International associations such as *ICLEI-Local Governments for Sustainability* (<http://www.iclei.org/>) are developing and sharing resources to address these issues.

An important facet of the Urban Environmental Accords is the need to better understand which factors contribute to enhancing life satisfaction, particularly factors that may be associated with environmental quality and sustainability. In this article, using data from the Baltimore metropolitan region on the East Coast of the United States, we identify and examine a number of key factors that appear to lead to higher life satisfaction in urban environments.

Defining and describing what constitutes “the good life” for individuals and communities has been a vexing challenge for social scholars and a variety of terms have been developed (Ackerman, Kiron, Goodwin, Harris, & Gallagher, 1997; Bramston, Pretty, & Chipuer, 2002; Haas, 1999; Marshall, 1982). For example, the term “well-being” is often used to refer to the general state of

being healthy, happy, or prosperous (Ackerman et al., 1997; American Heritage College Dictionary, 1993). On the other hand, the term “life satisfaction”, which comes from the psychological literature, refers to the cognitive evaluation of one’s happiness or subjective well-being and involves comparing the fulfillment of individual needs, goals, and aspirations to a meaningful standard (Sirgy & Cornwell, 2002). “Subjective well-being” is another common psychological term, referring to both the cognitive and affective evaluations of one’s life which can be generalized to encompass both life satisfaction and happiness (Diener & Lucas, 1999). The term “human welfare” is based largely on personal income and is most closely associated with economic theory (Ackerman, 1997; Goodwin, 1997; van Praag & Frijters, 1999).

In this study, we focus on the concept of life satisfaction for two reasons. First, questions using the term *satisfaction* are common in the peer-reviewed literature, have well-documented reliability across respondents, and have been used since research began on this topic (Andrews & Withey, 1976; Atkinson, 1982). For example, in our review of the literature we were able to find a number of previous studies that used individual life satisfaction and neighborhood life satisfaction questions that are similar to the questions used in this article (Cummins, Eckersley, Pallant, Davern, & Misajon, 2001; Inglehart, 2000; Sirgy & Cornwell, 2002; Widgery, Podkopaeva, Novak, & Niemi, 2002). Second, the concept of life satisfaction provides insight into how individuals judge their own life circumstances, rather than relying solely on external indicators such as annual income. In this manner, the life satisfaction construct captures the critical role of perceptual context as a determinant of human satisfaction (Frank, 1989).

We include income in our analysis to test the conventional neoclassical economic model of material well-being. Income is conventionally used in the economic literature as a proxy for human welfare because it is traditionally assumed that increased ability to consume desired goods and services leads to increased levels of personal utility (Kiron, 1997). Thus, the measurement of a person’s annual income is a key means for us to test the contribution of material well-being to life satisfaction in an urban environment.

The conceptual link between the individual and his or her community is also important because much of the literature on life satisfaction is drawn from the field of psychology and economics where the primary focus has tended to be on the *individual* rather than the *social* scale of analysis (Ackerman et al., 1997). In this article, we propose that the concept of life satisfaction can be effectively identified as operating at two distinct scales of analysis within the city—the individual and the neighborhood (Cook, 1988). On the one hand, individual life satisfaction is centered primarily on the factors that contribute to an individual’s psychological well-being. On the other

hand, neighborhood satisfaction is associated with events occurring in the places where people live and through which they interact with society. In the following analysis, *neighborhood* is defined as the city block or street that people currently live on, and several blocks or streets in each direction.<sup>1</sup>

Building on the aforementioned logic, we adopt an empirically grounded definition of social capital and tie it to life satisfaction through an individual's reported experiences with their neighborhood. Although a variety of approaches have been used to describe social capital (Bourdieu, 1983; Coleman, 1988; Fukayama, 1995; Ostrom, 1999), there is an emerging consensus across the social sciences that empirical measurement and observation is the preferred approach (Dasgupta & Serageldin, 1999; Gottdiener & Hutchinson, 2001; Onyx & Bullen, 2000; Pretty & Ward, 2001; Putnam, 2001). Thus, social capital here refers to *the shared knowledge, norms, rules and networks that facilitate collective experience* within a neighborhood (Coleman, 1988; Ostrom, 1999; Putnam, 2001; Woolcock, 2001). This definition implies that social capital is not something lodged within individuals themselves, rather, it is best understood as a relational construct—something that is embedded in common understanding and collective action. In our analysis, we use empirical research to examine whether social capital is related to life satisfaction.

Building on previous research (Kaplan, 1985; Kaplan & Kaplan, 1989), we explicitly explore the role of the natural environment and its contribution to life satisfaction in the city. Previous studies of individual life satisfaction have tended to ignore the natural environment as a domain of life satisfaction research, focusing instead on material well-being, health, productivity, intimacy, safety, community, and emotional well-being (Argyle, 1996; Cummins, 1996; Michalos, 1986). Similarly, evaluations of neighborhood satisfaction tend to focus primarily on physical features, social features, economic features, and safety within the neighborhood, not the natural environment specifically (Amerigo & Aragonés, 1997; Christakopoulou, Dawson, & Gari, 2001; Cook, 1988; Martínez, Black, & Starr, 2002; Sirgy & Cornwell, 2002).

In this analysis, we include both subjective and objective measures of environmental quality in our analysis because previous researchers in the field of environmental psychology have found that the natural environment can positively impact human health and well-being (Hartig, Mang, & Evans, 1991; Kaplan & Kaplan, 1989; Ulrich et al., 1991). For example, Kaplan and Kaplan (1989) document that people with access to nearby parks tend to be healthier, and over the long-term, they have increased levels of life, job, and home satisfaction (Kaplan, 1985; Kaplan & Kaplan, 1989). Similarly, where empirical studies do address the impact of the natural environment (i.e., vegetation, parks, trees, nature) on neighborhood satisfaction, most find that

the existence of and ease of access to nature has a positive impact on neighborhood satisfaction (Vemuri, 2004).

### *Research Questions*

Based upon our review of the literature, we ask the following questions: (a) What is the significance of personal income and social capital to life satisfaction? (b) What is the significance of subjective and objective measures of environmental quality to life satisfaction? And (c) Are the predictors of life satisfaction the same in relative significance at both the individual and neighborhood scale of analysis?

### **Method**

Urban ecosystems are strikingly heterogeneous and scale dependent (Pickett et al., 2001). To capture this variability, in 2003 the research team conducted a spatially stratified, randomized telephone survey of 4,880 households located in the Baltimore metropolitan region of Maryland.

### *The Study Site*

The Baltimore Metropolitan Region, Maryland, includes over 2.5 million people. Baltimore City proper has experienced extensive demographic and economic changes over the past 50 years, with its city's population declining from nearly 1.2 million in the 1950s to its current level of approximately 614,000 people (Burch & Grove, 1993). At the same time, the Baltimore Metropolitan Region has had one of the highest rates of deforestation in the northeastern United States because of urban sprawl (Horton, 1987).

The survey results presented in this article are part of a larger ongoing scientific effort within the Baltimore Ecosystem Study (BES)—a Long Term Ecological Research project funded by the National Science Foundation (<http://beslter.org>). The interdisciplinary team of researchers on the BES project work together to collect new data and synthesize existing information about how the social, ecological, and engineered systems of the Baltimore metropolitan region interact over time (Cadenasso, Pickett, & Grove, 2006; Pickett & Cadenasso, 2006; Pickett et al., 2001).

BES researchers have focused on the social and ecological dynamics of neighborhoods because neighborhood location establishes a collective interest among individuals (Grove, Burch, & Pickett, 2005). For instance, people who have “bought” into the same neighborhood share a quality of public services and, through these forms of collective consumption, residents have a common

stake in an area's future. Individuals are not only mutually dependent in terms of what goes on inside their neighborhood including "compositional effects"; they are affected by what goes on outside it as well. The status of one neighborhood in relation to another neighborhood creates conditions that its residents experience in common (Logan & Molotch, 1987). Research from BES has already demonstrated that neighborhood lifestyle characteristics, such as household education, income, occupation, race/ancestry, family composition, and housing, are better predictors of the distribution of vegetation cover and vegetation structure than population density or socioeconomic status (Grove et al., 2006; Troy, Grove, O'Neil-Dunne, Cadenasso, & Pickett, 2007).

### *Sample Selection*

The approach used for the BES survey was a spatially stratified probability sampling of the entire metropolitan area (Frankel, 1983). The final stratified sample list of respondents used in the BES survey was purchased from Claritas, a professional marketing firm. Attributes associated with each sample unit included a telephone number, PRIZM code (Potential Rating Index for Zipcode Markets), and location information: street address, latitude/longitude, and Census Block Group. The PRIZM code for each sampling unit was used to develop a stratified sampling strategy along two dimensions: urbanization and socioeconomic status (Frankel, 1983; Sudman, 1983). Segmentation of these two dimensions produced a matrix of 15 mutually exclusive classes (Weiss, 1988, 2000).

In this analysis, equal probability for selection was given to households within each of the 15 PRIZM classes. A target completion rate of 100 interviews was established for 11 of the 15 classes ( $n = 1,100$ ), a target completion rate of 150 interviews for the 2 most populous classes in the Baltimore region ( $n = 300$ ), and a target completion rate of 50 interviews for the 2 least populous classes in the Baltimore region ( $n = 100$ ). A sample list of approximately 9,000 primary sampling units was generated in order to complete the specified 1,500 interviews. In aggregate, survey responses were weighted to match the natural proportions in the Baltimore population. As a result, we were able to achieve full coverage of the Baltimore metropolitan region as well as sample sizes sufficiently large for comparisons among PRIZM clusters.

### *Survey Administration and Response Rates*

The research team used Computer Assisted Telephone Interviewing (CATI) techniques to contact sample households and administer the questionnaire to

a stratified sample of  $n = 4,880$  individuals living in the Baltimore Metropolitan statistical region. The use of a CATI system facilitated stratified probability sampling of the metropolitan area, centralized data collection, standardized interviewer training, and reduced the overall cost of primary data collection (Fowler & Mangione, 1990; Groves, 1990).

Our choice of a telephone mode of administration required conscious action to improve response rates (Schwarz, Strack, Hippler, & Bishop, 1991) because of nationwide declines in telephone survey response rates due to over saturation by marketing research (DeMaio, 1980; Groves, 1990; Reichhardt, 2004). Two techniques to increase response rates were used: a personalized advance postcard and repeat callbacks with optimal call scheduling (Biemer, Groves, Lyberg, Mathiowetz, & Sudman, 1991; Dillman, 2000; House & Nicholls, 1988; Lyberg & Dean, 1992).

Drawing from the original sample pool of 4,880, contact was made with 4,179 in-scope households where an appropriate person over the age of 18 was identified to take the survey. From this group, a total of 1,508 telephone interviews were completed and analyzed, representing an overall response rate of 36.1%. Only 147 of in-scope interviews were documented as incomplete (3.5%) while 2,524 respondents who were contacted by telephone refused outright to complete the survey questionnaire (60.4%).<sup>2</sup>

### *BES Telephone Survey Questionnaire Design*

The survey questionnaire was modeled after previous surveys used by the BES project team within the Baltimore study area in 1999 and 2000 (<http://beslter.org>). In revising the questionnaire for the current study, the project team worked closely with Baltimore City's Parks & People Foundation (<http://www.parksandpeople.org/>). Two focus groups with a total of 29 community representatives from the Baltimore area were conducted at the Parks & People Foundation in June of 2003 to test the effectiveness and clarity of proposed survey questions, resulting in improved questionnaire wording and flow. Finally, in August of 2003, a pretest with a subsample of 15 randomly selected households was conducted prior to final implementation of the CATI system. These pretest interviews were audiotaped and highlighted the need for final wording changes in the questionnaire.

Table 1 presents an overview of the variables used in this study, including question wording and response options for the telephone survey variables and a description and rating levels for the field-based environmental variables.

**Table 1.** Variables Used in the Analysis

Variable	Question Wording/Description	Response Options/ Ratings
Neighborhood life satisfaction <sup>a</sup>	Thinking about the situation in your neighborhood generally, how satisfied are you with life in your neighborhood? <sup>a</sup>	0, <i>very dissatisfied</i> to 10, <i>very satisfied</i> <sup>b</sup>
Individual life satisfaction <sup>c</sup>	Thinking about your own life and personal circumstances, how satisfied are you with your life as a whole?	0, <i>very dissatisfied</i> to 10, <i>very satisfied</i> <sup>b</sup>
Income	Is the total annual income of all members of your household. . .	Less than 15,000; 15-25,000; 25-35,000; 35-50,000; 50-75,000; 75-100,000; 100-150,000; or over 150,000
Education	What is the highest grade of school you have had the opportunity to complete?	Less than high school, high school graduate, some college, college graduate, or postgraduate work
Age	What is your current age?	under 35, 35 to 44, 45 to 54, 55 to 64, 65 and over?
Ethnicity	Do you consider yourself to be. . .	White Caucasian or other: African American, Hispanic, or Asian
Own or rent	Do you own or rent where you live?	Own, rent or other
Marital status	Are you married, or living with someone as a couple, or are you single?	Married couple or single
Social capital index <sup>d</sup>	How strongly would you agree or disagree with the following five statements about your neighborhood: people in the neighborhood are willing to help one another; this is a close knit neighborhood; people in this neighborhood can be trusted; there are many opportunities to meet neighbors and work on community problems; and churches, temples and other volunteer groups actively support the neighborhood?	1, <i>strongly disagree</i> to 5, <i>strongly agree</i>

(Continued)

**Table 1.** (continued)

Variable	Question Wording/Description	Response Options/ Ratings
Number of trees	Approximately how many trees would you estimate are visible from windows in your residence?	None, less than 10, 10-50, 51-100, or over 100
Environment satisfaction <sup>e</sup>	How satisfied are you with the quality of the natural environment in your neighborhood?	0, <i>very dissatisfied</i> to 10, <i>very satisfied</i>
Canopy cover <sup>f</sup>	An estimate of the amount of tree cover in each census block group based on USGS data	Percent canopy cover, 0-100%
Benthic IBI <sup>g</sup>	An estimate of water quality based on characteristics of the benthic assemblage at a site. Data were obtained from MD DNR	1, very poor, to 5, very good

a. The neighborhood satisfaction variable was adapted from the national satisfaction question in the Australian Unity Well-Being Index and is similar to questions in other smaller studies (Cummins et al., 2001; Inglehart, 2000; Sirgy & Cornwell, 2002; Widgery et al., 2002).

b. Following Inglehart (2000), a 10-point scale was selected for all satisfaction questions to give each respondent the optimum level of specificity in delineating their range of satisfaction.

c. The individual life satisfaction variable is the same as the one used in the Australian Unity Well-Being Index (Cummins et al., 2001) and is similar to questions used in numerous other major studies (Andrews & Withey, 1976; Inglehart, 2000).

d. The social capital index represents a new 5-item scale based on individual question items derived from previous literature (Putnam, 2001; Sampson, Raudenbush, & Earls, 1997). Following exploratory analysis, the scale yielded an alpha reliability coefficient of .805 and is used here to represent a single factor item in the following analysis.

e. The environment satisfaction variable was adapted from the national-scale environment question in the Australian Unity Well-Being Index (Cummins et al., 2001).

f. To capture empirical measures of environmental quality, a canopy cover variable was coded from the tree canopy layer of the 2001 National Land Cover Database, Zone 60 available from the U.S. Geological Survey. This database is based on remote-sensing images collected from 1999 to 2001 and is of medium spatial resolution (~30 m). The data from the tree canopy layer were clipped to the study area using ArcGIS and the percent canopy cover was generated for each census block group.

g. To capture water quality, the benthic index of biotic integrity (benthic IBI) was obtained from the Stream Waders Program of the Maryland Department of Natural Resources (Boward, 2004). Specific benthic IBI scores were determined by comparing the benthic assemblage at each site to those found at minimally impacted reference sites. Benthic IBI values were associated with each of the respondent locations by attributing the benthic IBI value of the closest water quality site to each of the respondent locations (usually ~2 miles away).

## Results

The socioeconomic characteristics of the BES survey sample are presented in Table 2. The comparison group for the sample is drawn from the 2000 United

**Table 2.** Socioeconomic Characteristics of the Survey Sample and Washington–Baltimore CMSA

	Female	Income >50,000	White Caucasian	College Grad +	Employed	Married	Own Home
BES Survey	64%	59%	73%	43%	65%	57%	74%
Wash-Balt MSA	51%	57%	63%	37%	57%	52%	65%

**Table 3.** Correlations With Individual and Neighborhood Life Satisfaction

	Income	Educate	Ethnicity	Owner	Social Capital	Env. Sat	No. Trees	Benthic IBI	Tree Cover
Individual	.273**	.205**	.074*	.141**	.077*	.276**	.088**	.086**	.140**
Neighborhood	.201**	.226**	.195**	.129**	.339**	.413**	.174**	.148**	.190**

\*Pearson's  $r$  significant at .05.

\*\*Pearson's  $r$  significant at .001.

States Census Bureau, Washington-Baltimore CMSA. Based on this comparative baseline, we can see that more females and White Caucasians answered our survey than are in the general population of the region, 64% versus 51%, and 73% versus 63%. The median household income for the Washington-Baltimore CMSA is US\$57,291 with 57% of the population making over US\$50,000. The survey results showed a very similar percent of people reporting incomes over US\$50,000. As Table 2 further shows, the level of education of the BES survey sample is a bit higher (43%) than that of the region where 37% of people have college or postgraduate degrees. As seen in Table 2, BES respondents are also slightly more likely to be employed, married and own their own home than is the population in the Washington-Baltimore CMSA as a whole.

### Correlations

Table 3 shows individual bivariate correlations for key significant explanatory variables. As expected, these results suggest that both life satisfaction and neighborhood satisfaction are closely associated with income, education, ethnicity, home ownership, social capital, and environmental quality. Table 3 shows that both higher levels of income and more social capital have a positive relationship with life satisfaction for survey respondents, providing a preliminary answer to our first research question posed at the outset of this article. Similarly, both perceived and observed measures of environmental quality appear to have a positive and significant relationship with life satisfaction in the Baltimore region.

Yet, importantly the results also suggest that for some variables, anticipated linear relationships change as we move from an individual to a neighborhood

scale of analysis. Thus, in preliminary response to our third research question we can see that the correlation data in Table 3 show that income has a stronger relationship with *individual* life satisfaction than with *neighborhood* satisfaction while social capital shows a stronger and more significant relationship with neighborhood satisfaction than individual satisfaction.

This scale-dependency further plays out for the environmental quality variables. Higher levels of perceived environmental quality appear to have a stronger relationship with neighborhood life satisfaction than individual life satisfaction. The same relationship holds for the number of trees, mean canopy cover, and benthic IBI (see Table 1 for definition of terms) correlations.

In addition, the influence of ethnicity appears to operate differently at different scales of analysis, showing that whites have only moderately higher levels of *individual* life satisfaction in the Baltimore region, but that White *neighborhoods* have significantly higher levels of neighborhood satisfaction. In contrast, education has a strong and positive relationship with life satisfaction whether it is measured at the individual or neighborhood sale of analysis.

### **Regression Analyses**

Based on the exploratory results presented above, we constructed two alternative multivariate logistic regression models using individual life satisfaction and neighborhood life satisfaction as dependent variables, controlling for key explanatory variables identified in the literature. To facilitate the regression analysis, each 10-item variable was re-coded so that 0 to 5 represented “low” life satisfaction and 6 to 10 represented “high” life satisfaction. For each scale of analysis—neighborhood and individual—two binomial logistic models were analyzed. The first model includes a “full” suite of descriptive variables that we expect to influence life satisfaction based on previous research and theory as well as availability in our data. For comparison, a second model was restricted to variables which represent more conventional demographic predictors of life satisfaction.

### **Individual Life Satisfaction**

The full predictive model for individual life satisfaction is presented in Table 4. Results indicate that the specified logistic regression explains approximately 23% of the variance in observed responses to individual life satisfaction questions by Baltimore residents. As the table shows, five independent variables included in the model were found to be significant predictors of an individual’s life satisfaction: income, level of education, whether individuals own or rent their residence, overall satisfaction with the natural environment in their neighborhood, and the number of trees visible from the windows of their residence.

**Table 4.** Full Regression Model for Individual Life Satisfaction

Variable	B	Standard Error	Odds Ratio
Income	0.294***	.066	1.342
Education	0.182*	.085	1.200
Age	-0.083	.071	0.921
Marital status	0.069	.108	1.071
Ethnicity	-0.224	.207	0.799
Ownership	0.528*	.211	1.695
Social capital index	-0.075	.093	0.928
Environment satisfaction	0.276***	.514	1.317
Number of Trees	-0.228*	.100	0.796
Canopy cover	0.005	.006	1.005
Benthic IBI	0.276	.037	1.156
Constant	-1.330**	.514	0.265

Note:  $X^2 = 163.090$ ,  $df = 11$ ,  $p < .000$ , Nagelkerke  $R^2 = .232$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Consistent with the correlation data presented earlier, the multivariate analysis clearly shows that Baltimore residents with higher levels of income are 1.3 times as likely to express satisfaction with their individual lives as are respondents with lower levels of income. Individuals with higher levels of education are also 1.2 times more likely to express high levels of life satisfaction than respondents with lower levels of education. Contrary to expectation however, the data in Table 4 does not appear to support our hypothesis that social capital would have significant bearing on individual life satisfaction.

As expected, respondents who perceive the quality of their natural surroundings to be high are 1.3 times more likely to express satisfaction, and residents who own their own homes are over 1.5 times more likely to state a high level of life satisfaction. However, contrary to expectation, objective measures of environmental quality do not appear to have significant independent bearing on individual life satisfaction in the anticipated direction once perceived environmental quality is controlled for.

The reduced socioeconomic model includes five demographic variables. As Table 5 shows, only about 14% of the variance in individual life satisfaction is explained by the reduced model. According to the model output, two socioeconomic variables were significant in predicting an individual's life satisfaction: income and education.

While less variance is explained with this reduced model, the results presented in Table 5 further confirm the significant contribution of income to individual life satisfaction for residents in the Baltimore region. Similarly, education

**Table 5.** Socioeconomic Regression Model for Life Satisfaction

Variable	B	Standard Error	Odds Ratio
Income	0.323***	.059	1.381
Education	0.250**	.080	1.285
Age	0.089	.061	1.093
Marital status	0.142	.098	1.152
Ethnicity	-0.139	.187	0.870
Constant	-0.863	.335	0.422

Note:  $X^2 = 99.224$ ,  $df = 5$ ,  $p < .000$ , Nagelkerke  $R^2 = .140$ .

\*\* $p < .01$ , \*\*\* $p < .001$ .

appears to play a consistently strong and positive role in boosting individual residents' perception of life satisfaction. Also consistent with the full model results reported in Table 4, neither age, marital status, nor ethnicity appear to differentiate respondents with higher levels of life satisfaction from those with lower levels.

Taken together, the results reported above clearly support expectations from the literature that both income and subjective measures of environmental quality significantly contribute to an individual's life satisfaction in the City, thereby providing partial answers to our first and second research questions posed at the outset of this analysis. Surprisingly, the data do not appear to support our expectation that social capital or objective measures of environmental quality independently contribute to individual life satisfaction once other factors such as income, education, and subjective measures of environmental quality are controlled for in a multivariate context, which suggests that these factors contribute to life satisfaction in very different ways.

### *Neighborhood Life Satisfaction*

Two regression analyses were constructed using neighborhood satisfaction as the dependent variable. The full model presented in Table 6 was found to be significant and explains approximately 36% of the variance in observed neighborhood satisfaction. Again, five variables were found to be significant: level of education, age of respondent, ethnicity of respondent, social capital, and satisfaction with the natural environment in the neighborhood.

In marked contrast to the individual life satisfaction results discussed earlier, Table 6 shows that income drops out as a significant predictor of neighborhood life satisfaction for Baltimore residents. Conversely, social capital comes to the foreground as a significant predictor of neighborhood life satisfaction with respondents who perceive high levels of social capital in their

**Table 6.** Full Regression Model for Neighborhood Satisfaction

Variable	B	Standard Error	Odds Ratio
Income	-0.007	.057	0.993
Education	0.358***	.078	1.430
Age	-0.134*	.064	0.874
Marital status	0.108	.096	1.114
Ethnicity	0.507**	.183	1.661
Ownership	-0.037	.198	0.964
Social capital index	0.623***	.084	1.865
Environment satisfaction	0.352***	.036	1.422
Number of Trees	-0.067	.092	0.935
Canopy cover	0.006	.006	1.006
Benthic IBI	0.076	.121	1.079
Constant	-4.759***	.512	0.265

Note:  $X^2 = 319.738$ ,  $df = 11$ ,  $p < .000$ , Nagelkerke  $R^2 = .362$ .

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

community almost twice as likely to report high levels of satisfaction with life in their neighborhoods. At the neighborhood scale, education also significantly contributes to satisfaction. Respondents who report higher levels of education are 1.4 times more likely to express satisfaction with their neighborhoods than those who did not. Also appearing in this multivariate analysis is the fact that White Caucasians are 1.6 times more likely to express satisfaction with the quality of life in their neighborhoods than are members of all other ethnic minority groups—African American, Hispanic, or Asian.

Consistent with earlier findings, *perceived* environmental satisfaction appears to contribute significantly to neighborhood life satisfaction, with respondents who report satisfaction with the quality of the natural environment in their neighborhoods 1.4 times more likely to express satisfaction with their neighborhoods than those who did not. Yet again, however, objective measures of environmental quality do not appear to have significant independent bearing on neighborhood satisfaction once perceived environmental quality is controlled for, suggesting that relative rather than absolute levels of environmental quality are better able to predict life satisfaction.

As Table 7 shows, the reduced socioeconomic model was found to be significant yet only able to explain 11% of the variance in observed neighborhood satisfaction. The model had two significant variables: education and ethnicity.

In contrast to the individual life satisfaction analysis, income does not appear to contribute in a statistically significant way to high levels of satisfaction with neighborhood life in the Baltimore region. However, consistent with earlier findings, respondents with higher levels of education do appear

**Table 7.** Socioeconomic Regression Model for Neighborhood Satisfaction

Variable	B	Standard Error	Odds Ratio
Income	0.091	.048	1.095
Education	0.313***	.067	1.367
Age	0.054	.053	1.055
Marital status	0.116	.081	1.123
Ethnicity	0.643***	.152	1.903
Constant	-1.115	.287	0.328

Note:  $X^2 = 94.009$ ,  $df = 5$ ,  $p < .000$ , Nagelkerke  $R^2 = .114$ .

\*\*\* $p < .001$ .

to report higher levels of satisfaction with life in their neighborhood. And consistent with findings reported in Table 7, White Caucasians do appear to be almost twice as likely to express satisfaction with their neighborhoods as respondents from minority ethnic groups.

In sum, while all of the regression models for individual and neighborhood satisfaction were statistically significant, the full logistic regression models provide a better fit of the data. Moreover, the neighborhood regression results support our expectation that social capital and environmental satisfaction would contribute to life satisfaction and again provide partial answers to our research questions posed at the outset of this article. Contrary to expectation and in a manner distinctly different from our analysis of individual life satisfaction, however, income appears to drop out as a predictor of neighborhood life satisfaction once other factors are controlled for in a multivariate context.

## Conclusion

Our analyses provide support for both conventional utilitarian theories of human welfare as well as domain theories of life satisfaction. Support for human welfare theory is seen since increasing levels of income do appear to result in consistently higher reported levels of life satisfaction for individual metropolitan Baltimore residents. Support for life satisfaction domain theory is evident in the individual life satisfaction regression model where multiple variables including income, age, home ownership, and perceived environmental satisfaction are all found to contribute significantly to life satisfaction.

Considering the first research question posed at the outset of this analysis, the results presented in this article show that even when controlling for other factors, higher incomes appear to result in a higher perceived quality of life for individuals in our sample. This finding holds consistently for bivariate

correlation analysis and when we statistically control for other explanatory factors in both the full and reduced regression models presented herein<sup>3</sup>.

Contrary to expectation, however, we found that higher levels of perceived social capital in one's community do not appear to contribute directly to higher reported levels of individual life satisfaction for metropolitan Baltimore respondents. Rather, it appears that in addition to income, human capital factors like level of education and home ownership contribute more substantively to life satisfaction for individuals.

When we turn to consider the factors that improve satisfaction in the *neighborhoods* in which respondents live, however, we find that the observed relationship between income, social capital, and satisfaction wholly reverses. When asked to consider life in their neighborhood, income is not an explanatory factor while indicators of social capital strongly come to the foreground. This finding holds consistently for both the full regression and reduced regression models presented above. This result strongly supports the conclusion that social capital is fundamentally a relational construct that relates to the shared knowledge and networks that facilitate collective experience within the neighborhood (Coleman, 1988; Ostrom, 1999; Putnam, 2001; Woolcock, 2001).

Responding to the third question posed at the outset of the article, we therefore conclude that there is strong empirical evidence that theoretical predictors of life satisfaction—income and social capital—do indeed appear to explain higher levels of life satisfaction in urban areas, but they operate at very different scales. On the one hand, income clearly operates consistently within theoretical expectations at the individual scale of analysis while on the other hand social capital operates consistently within theoretical expectations at the neighborhood scale of analysis.

Turning to consider our second research question, and in contrast to the findings reported for both income and social capital, satisfaction with environmental quality significantly appears to contribute to life satisfaction at both the individual and neighborhood scale of analysis. Thus, consistent with expectation, we conclude that higher levels of subjective environmental quality in urban communities consistently lead to higher levels of life satisfaction regardless of whether it is measured at the individual or neighborhood scale of analysis. This finding appears to strongly support the notion that the perceived existence of and ease of access to natural surroundings has a positive impact on individual and neighborhood satisfaction throughout the urban environment.

## Discussion

With the rapid growth of urbanization worldwide, we have argued that there is a pressing need to better understand which factors contribute to life satisfaction

for people living in urban areas. In this article, using data from a long-term study of the Baltimore metropolitan region, we have built on the social scientific literature to examine a suite of key theoretical factors that predict higher life satisfaction in the city. In doing so, we found that overall many of the previous theoretical arguments in the literature were supported, yet specific results were highly dependent on the scale of analysis used.

For example, on the one hand utilitarian economic theory can be used to explain one key determinant of higher life satisfaction for *individuals* in Baltimore—higher incomes result in higher satisfaction. On the other hand, we have also found that income does not do a sufficient job explaining life satisfaction at the *neighborhood* scale of analysis where sociological theories emphasizing social capital appear to come to the foreground. Finally, we have seen that environmental psychology theories emphasizing the experience of living in a high quality natural environment consistently predict higher life satisfaction both for individuals and for neighborhoods—perceiving that one lives in a clean and green urban environment always makes a positive difference.

While our findings support previous positions articulated in the social scientific literature, the results presented here also point out that predictive relationships are strikingly scale-dependent. Given this, we caution future researchers to carefully match the scale of life satisfaction measurement with the explanatory variables they are using in order to avoid Type II errors. We further caution against the temptation to apply a single explanatory framework—income, social capital, natural environment—to explain life satisfaction in an urban setting. Rather, our work suggests using explanatory frameworks linked in a complimentary fashion across scales to explain what constitutes the good life in the city.

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## Notes

1. We chose to define the term *neighborhood* in the text of the survey to ensure that all respondents used a similar geographic scale when answering the neighborhood questions. We recognize that this is a departure from some of the neighborhood satisfaction literature in which the term neighborhood has not been defined and respondents are instead allowed to interpret the term as they choose (Allen, Bentler, & Gutek, 1985; Lee & Guest, 1983; Marans & Rodgers, 1975; Parkes, Kearns, & Atkinson, 2002). We felt that a defined neighborhood area would simplify interpretation of neighborhood satisfaction results but acknowledge that a respondent defined area may have increased the personal relevance of the neighborhood satisfaction results.
2. The BES survey response rate and high rate of refusal is consistent with response rates reported for contemporary telephone surveys, particularly those conducted in urban settings and is not likely to significantly decrease the explanatory power of our results. For example, Reichhardt (2004) reports that only about 35% of people reached by phone during the 2000 presidential campaign actually answered pollster's questions. Keeter et al. (2000) found that attitudes held by easy-to-reach and hard-to-reach survey respondents were similar. Keeter and colleagues obtained a response rate of 36% in their standard (easy-to-reach) study and a rate of 60.6% in their rigorous (hard-to-reach) study, but the statistically significant differences between the two surveys were generally on demographic items (Keeter, Miller, Kohut, Groves, & Presser, 2000).
3. As even the full individual regression model only explains approximately 23% of the variance in observed responses, we anticipate that including measures of intimacy, health, and emotional well-being would improve the explanatory power of such an analysis in the future (Cummins, 1996).

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**William R. Burch Jr.** has held research and management positions with the USDA Forest Service, USAID, and the Connecticut Department of Environmental Protection. In 2000, he was awarded a John Eadie fellowship by the Scottish Forest Trust to work with colleagues and institutions in the United Kingdom on community forestry/urban ecology issues. His community forestry work began in 1988 through the Baltimore Ecosystem Study. His work in institutional development has included technical training and higher education curriculum development in South and Southeast Asia. Another area of research and application has been in developing a unified ecosystem management approach that fully includes human behavioral variables.