

Social Satisfaction, Commuting and Neighborhoods

Introduction

Social contact and interactions are critical factors in shaping the overall well-being and happiness of individuals (Helliwell and Putnam, 2004). Social isolation has been linked to increased mortality and lower levels of psychological and physical health (House et al. 1988). Furthermore, social interactions among residents of an urban area are crucial for sustaining the social and economic vibrancy of a city (Bramley and Power, 2009). Thus, the role of the urban environment in fostering or inhibiting social interactions has been the topic of contention in the literature – particularly in relation to neighborhood density, mixed-use, and walkable neighborhoods (e.g. Hanibuchi et al., 2012; Leyden, 2003; Wood et al., 2008). Proponents of compact developments assert that higher densities are more conducive to facilitating face-to-face interactions, or spontaneous interactions (Talen, 1999), while critics contend that higher densities may cause residents to withdraw from social contact and experience higher levels of stress (Brueckner and Largey, 2008). The empirical evidence remains mixed.

While the urban form of an individual's immediate neighborhood is one factor of the overall urban environment that holds the potential to impact social interactions, so too is his or her larger daily activity space within an urban area. A number of recent studies have looked into the relationship between transportation and time spent on social activities. This work has linked the automobile-dominated landscapes, that are largely present throughout North America, with a decline in the amount of time individuals spend on social activities (Farber and Paez, 2009; 2011; Besser et al., 2008) – thus connecting the larger transportation and land use system with individual social interactions.

Time-use or activity based studies have provided important insights on social activity trends, but their objectively-measured indicator of social interaction may overlook informal connections or ties that do not represent a distinct social activity. Furthermore, it is unknown whether or not a decline in the time spent participating in formal social activities translates to a decline in how satisfied individuals are with their social environment; perhaps social interaction needs are met at a workplace, via the proliferation of information and communication technologies (ICT), or possibly face-to-face or organized interactions may not be as important to individual's as they once were. As Umberson and Montez (2010) point out, it is both the quantity and quality of social contacts that matter to individuals. Thus, as an alternative to time-use or activity-based metrics, subjective measurements are aimed at capturing individual perceptions regarding the adequacy of their social interactions with family members, friends, neighbors, or co-workers, for example (Bonsang and van Soest, 2012).

The purpose of this paper is to assess the role of transportation – including commute times, public transit accessibility and level of service, and car ownership in explaining self-reported levels of satisfaction with one’s social contacts. Furthermore, to isolate these factors from other potentially confounding variables, we also examine characteristics of an individual’s neighborhood – including population density, as well as individual housing type, and personal characteristics. The study area of Vienna, Austria provides a complement to recent work linking longer commutes with declines in social interactions or activities in North America, given its dense population and extensive public transportation system. The remaining structure of the paper is as follows; in Section 2 the relevant literature is reviewed. Section 3 provides an overview of the data and methodology used in the study. Results are presented in Section 4 and a discussion and conclusions close the paper in Section 5.

1. Literature Review

Given that all individuals have identical daily time budget restraints (24 hours in a day), it is logical to deduce that as one spends a greater amount of time commuting to and from work, he or she will have less time to spend on other activities, including social interactions. Thus, it is unsurprising that several empirical time-use or activity-based studies have reached just that conclusion: as commute times increase, the amount of time spent on social activities or with spouses, children, and friends declines. Utilizing the American Time Use Survey from 2003-2010, Christian (2012) found that a 60 minute total commute time translated to a 21.8 minute decrease in the time that males spent with their spouse, a 18.6 minute decline in the time spent with children, and a 7.2 minute decrease in time spent with friends. The same commute duration for females lead to an 11.9 minute decline in time spent with friends, but resulted in no significant impact on the time spent with either spouses or children. Besser et al. (2008) utilized the 2001 National Household Travel Survey to investigate the link between socially-oriented trips and commute durations amongst Americans. Their study concluded that commute times greater than 20 minutes were linked with participating in no socially-oriented trips. The relationship was greatest for those with commute times of 90 minutes or longer. Finally, in a longitudinal time-use study of Canadians, Farber and Paez (2011) demonstrated that while commute times have risen significantly between 1992 and 2005, participation in discretionary activities have simultaneously declined. The authors further note a difference in commute mode and subsequent social participation; walking and transit users with shorter commutes devoted more time to social activities than automobile drivers with similar travel times. Each of these prior studies articulate that discretionary activities such

as social events are typically compromised first when commute times increase as individuals must still fulfill their necessary daily obligations. It should be noted that all of these previous works are North American-based and framed under the context of the coupled low-density land use and automobile dominated transportation system that characterizes urban landscapes throughout that continent. In his seminal work on the American decline of social capital, a more specific social construct related to community trust and cohesion, Putnam (2000) suggested that an additional 10 minutes of commuting predicts a 10 percent decline in social capital. This relationship was formulated based on the increasing number of automobile trips taken alone, and the growing separation between work and home locations. Farber and Paez (2011) formally express the social implications of a spatially expansive transportation and land-use system in time geographic theory.

In contrast to most North American urban areas, cities in other parts of the world, particularly in Europe, often feature more compact living environments interconnected with expansive public transit systems. In these situations, access to public transportation may have a direct impact on social satisfaction. The multifaceted notion of social exclusion addresses just this concern: individuals are unable to fully participate in society due to a lack of access to opportunities (social, employment, recreational, etc.) (Preston and Raje, 2007). Access in this framework can take on a number of dimensions, one of which is transport-related (Church et al., 2000). According to Cass et al. (2005), the formation and maintenance of social networks amongst individuals is increasingly vulnerable to transport-related exclusion given that social networks are more and more dispersed spatially and contain fewer overlapping affiliations than ever before (Axhausen, 2005; Urry, 2003). This reduction in overlapping social network affiliations has important implications as it connotes that individuals will have fewer opportunities for spontaneous, unplanned interactions with members of a social network. In other words, a greater amount of planning is necessary to facilitate social occurrences, often times over longer distances (Cass et al., 2005). Given these realities, ownership of an automobile may play a critical role in fostering and sustaining social relationships, even in regions with well-connected transit systems. Bannister and Bowling (2004) found both good local transit access and car ownership to be important factors in explaining participation in social activities in a European context.

The activity-based literature on social interactions has provided some evidence that the frequency or duration of interactions varies with personal characteristics. For example, females (Carrasco and Miller, 2006; Lu and Pas, 1999), older individuals (Carrasco and Miller, 2006; Farber and Paez, 2009; van den Berg et al., 2012), and those living with a partner (House et al. 1988, van den Berg et al., 2012) have been shown to have fewer and/or shorter formal social interactions, while more highly

educated individuals and those with a child at home have been linked with a greater number of social encounters (Besser et al., 2008; van den Berg et al., 2012).

In addition to transportation and time-use studies, a second relevant branch of literature has investigated the relationship between urban form, including neighborhood density, walkability, and land use mix and socialization. This body of work generally operates under the hypothesis that walkable, denser neighborhoods with mixed land uses will facilitate greater social interactions amongst residents, and subsequently foster social cohesion, sense of community, and/or capital (Bramley and Power, 2009; Talen 1999). The evidence, however, has been mixed. Freeman (2001), for example found no evidence that residential density was related to social ties amongst neighborhood residents. Similarly, Hanibuchi et al. (2012) found that 'walkability', defined by higher population density and proximity to destinations was not linked to indicators of social capital, leading the authors to conclude that the historical context of a neighborhood may have greater importance than simply its urban form. du Toit et al. (2007) and Wood et al. (2010) were likewise unable to find any evidence that greater walkability within one's neighborhood implied a greater degree of socialization.

Counter to these inconclusive studies, others have found supporting evidence for a link between neighborhood urban form and some measures of social capital or sociability. For instance, in a study in Galway, Ireland, Leyden (2003) found that those living in walkable neighborhoods were more likely to know their neighbors, participate politically, and be socially engaged as compared to those living in car-oriented suburbs. Lund (2003) was also able to make a connection between neighborhood form and social cohesion or sense of community. Finally, completing the spectrum of results on the subject, Brueckner and Largey (2008) provided evidence of a negative relationship between variables representing an individual's friendship and group-involvement and the population density of his or her neighborhood (Census Tract) and Nguyen (2010) concluded that high county-level population density and street accessibility were unfavorable toward social interactions. Clearly, the state of the literature on this subject is inconclusive. Beyond neighborhood form, other important variables identified as significant explanatory factors in neighborhood-level social interactions include the length of time one has resided in a particular location (Bramley et al., 2009; Hanibuchi et al., 2012) and the perception of neighborhood safety (Lund, 2002). Recently, Neutens et al. (2012) have suggested that the greatest potential for social interactions declines as distance from one's home to a city center increases, indicating that the most central locations offer the highest potential social interactions to occur. To an extent, this hypothesis counters the findings by Glaeser and Gottlieb (2006), who found that residing in a central city location translated to declines in four categories of social capital activities: church

attendance, community project participation, being a registered voter, and contacting a public official. Potential social interactions and social capital should, however, not be conflated as the latter implies a construct that goes beyond social interaction to include notions of trust, social cohesion, and holds the potential to stabilize a location (Putnam, 2000).

This current paper contributes to the literature in two ways. First, it provides an alternative, subjective metric for evaluating social interactions as compared to activity-based or time use studies. This will enable us to determine if individual perceptions and satisfaction with their social lives are impeded by elements of the urban environment. Second, it controls for both neighborhood and dwelling factors, which may influence a resident's ability to establish informal social ties with neighbors or members of a local community, and thereby positively impact his or her social satisfaction without participating in a formal social activity, in addition to transportation and commuting variables.

2. Data and Methods

2.1 Sample and Data Collection

The primary source of data for this study comes from a social-scientific basic research of residents of the city of Vienna on various aspects of their quality of life, living environments, and perceptions of the city at large (City government of Vienna, 2009). Quality of Life studies in general enable the identification of societal trends and social positions (incl. gender mainstreaming and diversity); this survey is part of city policy measures as it serves to help identify upcoming challenges for the city in terms of development. The generic term "Quality of Life" was divided into several thematic topics within this survey including: Living, Education, Work and Employment, Security, Health, Mobility, and Participation. The topics were selected to match fields of action by the city government of Vienna. The survey was authored by the University of Vienna Political Science Department and by the City of Vienna. It was designed to gain a representative sample of the population by district, age, gender, and form of living, and was therefore stratified across the city to achieve this representation. Finally, the survey was conducted over the phone to 8400 individuals in German and face-to-face for 300 individuals in the mother tongue of immigrants from Turkey and the former Yugoslavia. It is acknowledged that the non-Austrian (migrant) population is underrepresented in the survey given that it was primarily conducted in German, however, the sample was not weighted by nationality as the purpose was to gain a representative sample according to the aforementioned criteria; nationality was not explicitly asked as part of the survey. Samples were chosen by Random Digit Dialing (RDD) and included cell phone

numbers. Spatially, respondents were concentrated in neighborhoods within the core of the city itself, as well as some outer neighborhoods. Smaller districts received a greater concentration of samples in order to achieve the representation objective. The distribution of neighborhoods where one or more resident was surveyed is shown in Figure 1.

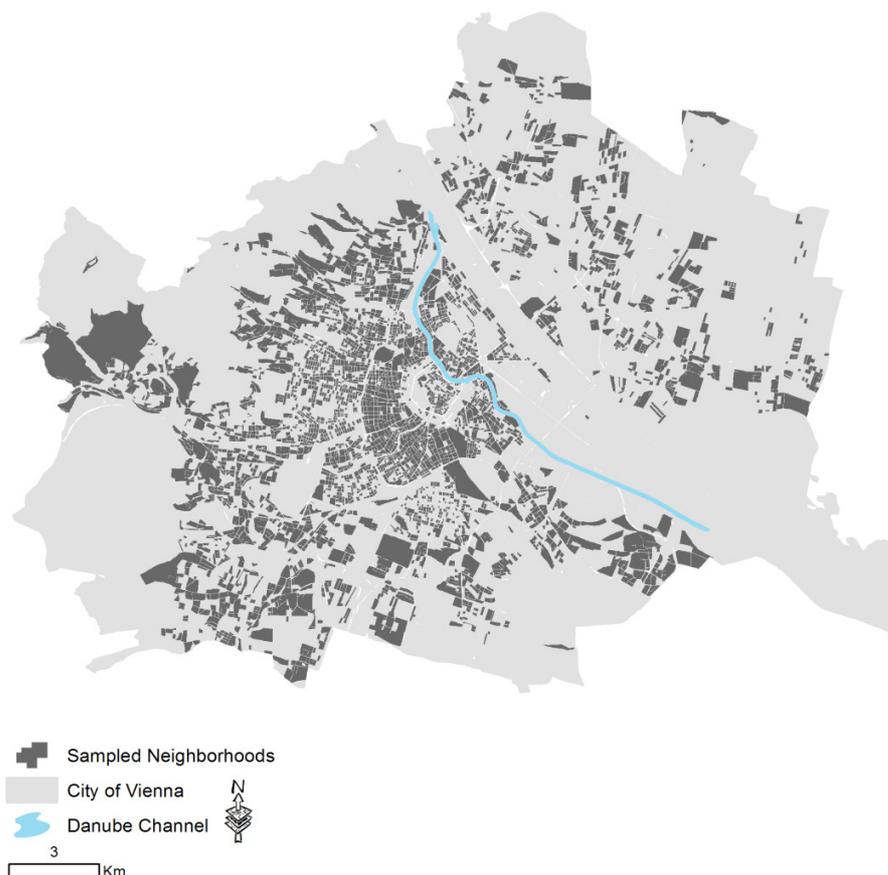


Figure 1. Spatial distribution of neighborhoods included in the Vienna Quality of Life Survey.

2.2 Variables included in analysis

The dependent variable used in this analysis is a Likert-scale response to the question ‘How satisfied are you with your social contacts’, with responses ranging from most satisfied (6) to least satisfied (1). Responses to the question were right-skewed, and given the scarcity of replies in the final two categories ($n = 45$ and 30 , respectively), we chose to consolidate the groups, resulting in 5 potential outcomes.

Explanatory variables are selected based on the literature review and grouped into 3 categories: (1) personal characteristics, (2) housing and residential neighborhood characteristics, and (3) commuting

and transportation variables. The personal category encompasses characteristics regarding an individual's age, gender, household structure (i.e. single, couple, couple with one or more children, or single with one or more children), whether or not the individual holds a university degree, and whether or not the individual works full time. Information on an individual's income is only available via a self-reported response to the question 'how satisfied are you with your financial situation', on a scale from 1 to 6. We additionally include a variable on the self-reported health of individuals (also ranging from 1 to 6).

The second category on housing and neighborhood characteristics includes dwelling information: whether or not the individual lives in an apartment as opposed to a detached or semi-detached home, the length of time an individual has lived in a particular neighborhood, and a self-reported score on the perceived safety of the neighborhood (ranked from 1 to 6). A measure of population density is also included (population per square meter), computed at the neighborhood block level. Finally, in the third category, we include information on commute time, whether or not the individual has access to at least one car in his or her household, public transit level of service, computed as the number of arrivals of any public service transport vehicle (including underground transit, tramway, and bus) per hour to the most optimal stop within a neighborhood, and a GIS-derived measure of public transit accessibility, calculated at the neighborhood block level. The latter public transit accessibility variable is a measure of travel time, via public transit, to seven locations around the city of Vienna. It is essentially a metric of urban centrality as locations close to the core of the city result in the lowest travel times while neighborhoods on the outer extents of the city have the highest travel times.

2.3 Analytical Approach

A multivariate statistical analysis is used to relate the selected independent variables with the dependent variable (self-reported rates of social satisfaction). As the outcome measure is ordinal in nature, an ordered probit regression analysis is employed. Although we technically have a multilevel data structure – individuals reside within neighborhood blocks, given the large number of blocks ($n = 4266$) for a final total of 6515 individuals (after omitting incomplete records), the number of individuals clustered within blocks is too small to utilize any mixed models for this analysis, and likely unnecessary, given the paucity of clustering¹. All statistical analyses are performed in the software SPSS 20.0.

¹ A Generalized Estimating Equations (GEE) model in SPSS 20.0 to account for clustering would not converge with so many second-level observations (neighborhoods). Nor would a random-effects ordinal regression run in the Ordinal Package of the statistical software R.

3. Results

Results of the ordinal probit regression model are presented in Table 1. Overall, the likelihood ratio test statistic rejects the null hypothesis that the coefficient of all parameters is equal to zero. The ordinal regression further assumes that the relationships between the independent and dependent variables is the same across all response categories. A test of this assumption fails to reject the null hypothesis that all slope coefficients are the same, rendering the model appropriate.

Whereas previous work measuring the number of duration of social activities have found differences according to age, gender, education, household structure, and employment situation when measuring how satisfied an individual is with his or her social life, we find no differences according to these factors; these variables are not even marginally significant in our model. We do find that the other self-reported personal satisfaction measures are very significant in explaining satisfaction with one's social contacts. An individual's perceived health and financial situation both positively impact his or her social satisfaction.

In terms of neighborhood and housing characteristics, living in an apartment as compared to a detached or semi-detached home has a significant negative relationship with perceived social satisfaction, supporting the argument that compact living situations do not lead to an improvement in one's social life. However, on the other hand, the variable representing the highest neighborhood population density is significantly, positively linked to social satisfaction. Given that the overwhelming majority of survey respondents are apartment dwellers, this variable may be reflective of affluence, given that we do not directly control for income. Finally, in coherence with prior studies on neighborhood interaction and social capital, we find that the length of time one has resided in a particular neighborhood has a positive and significant influence on his or her social satisfaction, as does the perception of safety in one's neighborhood.

For the transportation-related variables, the measures of urban centrality – by way of public transport – are not statistically significant at $p < 0.05$, although their signs are counter to expectation. Residing in a neighborhood with shorter travel times to destinations around the city, or the most central locations, have a negative coefficient, while low centrality has a positive coefficient. It should be noted that while there is some correlation between this variable and population density – it is not great enough to change the results; removing either one of the variables produces identical conclusions. In this case, of the two factors, residing in a neighborhood with a higher population density is a more important consideration than urban centrality. In terms of the quality of public transit service from a

neighborhood, living in proximity to a transit stop with the most number of departures per hour has a significant and positive relationship with social satisfaction. After controlling for these residential and public transportation factors, having a long commute (greater than 30 minutes) has a significant, negative effect on social satisfaction outcomes. Commutes of 10 minutes or less have a positive coefficient; however the variable is not statistically significant. Not having a commute at all does not register as significant in the model. Finally, having access to a car within a household, which was hypothesized to increase mobility in a time of increasingly dispersed social networks, has a positive and statistically significant relationship with the dependent variable.

Category	Variable	Beta	p
Age	25-64 (Reference)	-----	-----
	Under 25	-0.02	0.74
	Over 64	-0.04	0.34
Household Structure	Single (Reference)	-----	-----
	Couple with one or more children	-0.04	0.30
	Couple with no children	0.003	0.96
	Single with child	0.002	0.96
Gender	Female	-0.01	0.74
	Male (Reference)	-----	-----
Education	Has University Degree	0.04	0.39
Employment	Has Full-Time Job	-0.009	0.80
Public Transport Travel Time	Low (< 21 min.)	-0.08	0.06
	Medium (21 – 25 min.) (Reference)	-----	-----
	High (> 25 min.)	0.04	0.31
Transit Level of Service	Low (0-14)	0.05	0.27
	Medium (14-22) (Reference)	-----	-----
	High (14-22)	0.07	0.05
Car Ownership	1 or more cars in household	0.08	0.03
Commute Duration	Short (< 10 min.)	0.09	0.10
	Medium (11-29 min.) (Reference)	-----	-----
	Long (>30 min.)	-0.14	0.00
	No Commute	0.04	0.31
Dwelling	Lives in Apartment	-0.10	0.01
	Lives in House (Reference)	----	----
Residential Duration	Years Living in Neighborhood	0.004	0.00
Neighborhood Population Density	Low Density (<0.01 person/sq. Meter)	0.03	0.45
	Medium Density (0.01-0.04)	----	----

	person/sq. Meter) (Reference)		
	High Density (>0.04 person/sq. Meter)	0.08	0.03
Other Satisfaction	Satisfied with security of your neighborhood	0.08	0.00
	Satisfied with your health	0.25	0.00
	Satisfied with your financial situation	0.22	0.00
Threshold Values	1	1.18	0.00
	2	2.28	0.00
	3	3.07	0.00
	4	3.62	0.00
Summary Statistics	N	6515	
	Degrees of Freedom	23	
	-2 LL (Intercept Only)	13211.05	
	-2 LL Final Model	12391.96	
	Chi-Square	819.10	0.00
Pseudo R-squared	Nagelkerke	0.14	
	McFadden	0.06	

4. Discussion and Conclusions

This study has provided a complementary analysis to recent work examining the relationship between transportation and participation in or time spent on social activities. Rather than utilizing an objectively based metric of social participation, a subjective indicator of individual social satisfaction was employed. We began with the hypothesis that satisfaction was shaped by both neighborhood-level factors including urban form, density, or urban centrality as well as transport-related indicators, particularly time spent commuting. Utilizing a quality of life survey of residents of the city of Vienna, Austria, we found that controlling for all other factors, commuting time does have a significant impact on individual social satisfaction. Those with one-way commutes of 30 minutes or longer had significantly lower satisfaction scores, while those with commutes of 10 minutes or less had higher scores, although this latter relationship was not statistically significant. These results therefore provide accord with prior work which has linked longer commute times with less time spent on formal social activities or with family members (Besser et al., 2008; Christian, 2012; Farber and Paez, 2011). In this case, we find that longer commute time translates to reduced satisfaction with one's social contacts.

In addition to commute duration, we found that several transportation-related variables had a significant effect on social satisfaction. For example, residing in a neighborhood with a high public

transit level of service score had a significant and positive effect on the outcome variable as did household car ownership. Given that the city of Vienna is a dense urban area with an expansive transit network, residing in neighborhoods where access to this network is greatest likely affords individuals the ability to visit with friends or participate in social activities, and thus contributes to enhanced satisfaction with one's social network. Car ownership on the other hand, potentially provides residents extra mobility to travel outside of the city and socialize with others in a time of increasingly dispersed social networks (Cass et al., 2005; Urry, 2003). Thus, both forms of transport may be essential to foster or sustain social relationships. One caveat to this finding is that car ownership may be a proxy for personal wealth which was not explicitly controlled for in the study; therefore this relationship would benefit from further scrutiny in future studies.

In terms of the relationship between residential density and social satisfaction, this study was unable to provide much clarification to the mix of results currently occupying the literature. On the one hand, residing in a higher density type of dwelling – an apartment complex as compared to a detached or semi-detached home was negatively related to social satisfaction, while on the other hand, residing in neighborhoods of the highest population density was positively and significantly linked to social satisfaction. As with car ownership, it is feasible that the dwelling variable is simply a reflection of affluence, especially given that the large majority of those surveyed did reside in an apartment building. While high population density was positively associated with social satisfaction, a measure of urban centrality, as assessed by travel time to seven locations around Vienna by public transit, showed that greater centrality was negatively linked to satisfaction, although this variable was only marginally significant. This result therefore contrasts the work by Neutens et al. (2012) who posited that centrally located urban areas possess the greatest potential for social interactions to occur. In this study, we find that it does not lead to greater satisfaction with one's social contacts. This mixture of results on neighborhood characteristics and social satisfaction are suggestive that the relationship between urban form and social outcomes are more complex than simple indicators of the built environment can reveal. Indeed, additional measures of neighborhood socioeconomic composition, racial or ethnic mix, and crime rates, amongst others should be incorporated into future studies to better understand this connection.

Overall, the positive significance of transit level of service, car ownership, and commute times all emphasize the importance that transportation plays in self-reported social satisfaction scores. It therefore appears to be the case that any social benefit that comes from living in a more densely populated neighborhood can be offset by a longer commute or reduced mobility in terms of public

transportation access and personal car ownership. This finding fits well with the notion that social satisfaction is shaped by both the quantity and quality of social networks and contacts; higher density living may provide the opportunity for a greater number of contacts, while increased mobility may enable individuals to maintain and strengthen relationships that have become spatially dispersed. Expanding this study to include information on social networks and ties would provide a nice compliment to this work to further examine these hypotheses.

Finally, we found no discernible differences in reported levels of social satisfaction between different age groups, gender, household makeup, employment status, or educational attainment. However, social satisfaction was strongly linked to other self-reported factors in an individual's life including his or her health and satisfaction with one's financial situation. In agreement with other work on neighborhood conditions and social interactions or the development of social capital, we also found positive, significant relationships between perceived levels of neighborhood safety as well as the length of time one has resided in a neighborhood and social satisfaction. Caution should be taken when interpreting the influence of other self-reported variables on perceived social satisfaction; it is plausible that those who are more optimistic about one aspect of their lives tend to report higher scores in all other facets, while those with overall negative perceptions may similarly report persistent low scores. Therefore, disentangling any causality may be problematic; these relationships may suffer from endogeneity bias.

Social interactions are critical aspects in shaping the quality of life of individuals. This study has shown that where a person resides both within an urban area and in relation to his or her place of work play a significant role in shaping the social satisfaction of his or her life. The case study of Vienna, Austria provided an alternative vantage point from the North American-based literature that has related longer commute times with declines in participation in social activities; however, it would be interesting to compare a similar subjective measure of social satisfaction in both a North American context as well as in other countries around the world to see if comparable results are upheld. If so, it would provide further incentive to plan for less sprawling, more compact developments where commute times are minimized.

While this study has provided some initial conclusions on the relationship between social satisfaction, transportation, and neighborhood characteristics, it does suffer from a number of limitations that would benefit from further examination. First, the variable used to capture social satisfaction is limited in scope and admittedly selected on its availability as part of the Vienna Quality of Life Survey; more sophisticated metrics deliberately intended to capture this construct such as feelings

of isolation, networking, and loneliness, for example, would provide additional and deeper insights into these relationships. Second, this analysis would benefit from better measures of neighborhood urban form including land-use mix or walkability; this study has just touched upon the subject with density and centrality. Finally, additional variables on individual and neighborhood income and socio-economic status would strengthen the analysis.

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