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Sense of Community and the Perception of the Socio-Physical Environment: A Comparison Between Urban Centers of Different Sizes Across Europe

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Abstract

Embedded in the strand of research on the community determinants of sense of community (SoC), the study was designed to verify whether: (1) the size of the urban context was inversely related to residents' SoC; (2) the size of the urban centers affected some of the correlates of SoC, namely the perception of social support, the residential environmental satisfaction, the residential social climate satisfaction, and the perceived reliability of local services in the areas of health, transport, administration, education, and security. The sample comprised 1254 individuals residing in a variety of towns/cities of different sizes in Southern and Northern Europe. Analyses revealed that the larger the town/city, the lower the SoC expressed by the inhabitants. They also showed that the residential environmental and social climate satisfaction, as well as perceived social support, were associated with an increase in SoC, but that there were variations in the patterns of associations according to towns/cities' size.

Introduction

Sense of community (henceforth SoC) is a multidimensional construct that captures the subjective sense of belonging to an organized collectivity, the expectations of having one's needs fulfilled by the community and individuals' psychological investment and active contributions to the social system. SoC has been most frequently studied in territorial communities, although research shows that it applies to a variety of other domains, such as work organizations (Peterson et al. 2008a), schools (Vieno et al. 2005) and virtual environments (Blanchard 2007, 2008; Obst et al. 2002). In the mid-eighties, McMillan and Chavis (1986) proposed a four-component model that, despite the ongoing debate on the measures developed to attest its empirical validity, remains the most accomplished and sound theoretical model in the field. This model includes four components, namely membership (i.e., a sense of belonging that marks the boundary between those who belong to a community and those who do not), influence (i.e., a sense of having an effect on the community), integration and need fulfillment (i.e., the expectations regarding the possibility of having one's needs fulfilled by a community) and shared emotional connection (i.e., the feeling of being deeply involved in collective experiences).

Research has fundamentally emphasized the positive outcomes associated with SoC at the individual and collective levels, particularly with regard to a variety of participatory behaviors (see the meta-analysis by Talò et al. 2014), namely community engagement (Brodsky et al. 1999; Chavis and Wandersman 1990; Florin and Wandersman 1984) and political commitment (Davidson and Cotter 1989; Xu et al. 2010), but also wellbeing (Albanesi et al. 2007; Davidson and Cotter 1991; Farrell et al. 2004; Mak et al. 2009; Obst and Stafurik 2010),

life satisfaction (Hombrados Mendieta et al. 2013; Prezza et al. 2001; Prezza and Costantini 1998), and quality of life (Gattino et al. 2013; Hombrados-Mendieta et al. 2009; Rollero et al. 2014).

The Community Determinants of SoC

The literature on the community determinants of SoC in territorial communities has documented the existence of a relationship between SoC and a variety of features of the physical and social environment. Among the social aspects, research has explored the association between SoC and population density (Brodsky et al. 1999; Sagy et al. 1996), but much more research has been developed to analyze the effect of the community physical characteristics, so that at present there is a general consensus that the urban and architectural characteristics of neighborhoods, towns, and cities affect SoC (Vick and Perkins 2013). Starting from the groundbreaking study by Plas and Lewis (1996), which showed a connection between the architectural characteristics of the town, and residents' SoC, later studies have basically confirmed the importance of urban planning in facilitating or even creating a sense of belonging and connection among residents. Overall, SoC seems to be promoted by urban environments which are planned to facilitate the residents' interactions, and in which the mobility of people is valued more than the mobility of cars or other transport lines (Lund 2002; Wood et al. 2012; Tsai 2014). The availability and accessibility of urban green areas (Kearney 2006; Kim and Kaplan 2004; Nasar and Julian 1995), as well as of public spaces (Francis et al. 2012), have also been identified as characteristics that enhance residents' satisfaction for the environment's quality of life, their sense of belonging, and their willingness to invest in the community in which they live.

Much less attention has been given to the effects of the community/population size on SoC, which is the focus variable of the current study. According to Prezza and Costantini (1998), who echo Puddifoot's (1995) findings, the size of the urban context inversely influences SoC. The two researchers gathered their data in three territorial communities: a small town (1600 inhabitants), a small city (20,000 inhabitants), and a big city neighborhood (50,000 inhabitants). Their study revealed that in the small town residents were likely to show higher levels of SoC, along with more life satisfaction, greater perceived social support and greater satisfaction with services provided by the community. In the same vein, Gattino et al. (2013), found that living in a small town and having a greater psychological SoC enhance the perceived environmental quality of life.

In general, what is known on the effect of the size of the urban centers on SoC, or on the variations of SoC across urban centers of different magnitude, is definitely insufficient, and needs more research.

Aims of the Study

Our study had two main goals. The primary goal was to find additional and sounder evidence that the size of the urban context is inversely related to SoC, as posited by Prezza and Costantini (1998), and to test the stability of such a relationship across a range of towns/cities in a variety of European countries. The secondary goal was to verify whether the urban center's size affected also some of the community correlates of SoC, such as perceived social support, residential social climate satisfaction, residential environmental satisfaction, and the perceived reliability of local services. Indeed, based on the literature that has attested a positive association between SoC and social support (Bishop et al. 1997; Chiessi et al. 2010; Cowman et al. 2004; Mak et al. 2009; Pretty et al. 1996), SoC and satisfaction with services (Prezza and Costantini 1998), and SoC and residential satisfaction, meant both as residential environmental satisfaction (Chavis and Wandersman 1990; Jorgensen et al. 2010; Prezza et al. 2001; Smith 2001) and residential social climate (Adriaansse 2007), we aimed at exploring whether variation would occur in these associations according to the size of the urban centers.

Method

Participants

The current study is based on the data collected in 2014, between March and July, for the Credits4Health (C4H) project. C4H is a research program funded by the European Commission, which is aimed at developing and testing a sustainable, scalable and evidence-based model for engaging people in the adoption of personalized wellness paths and healthy life-styles. For the current study only a small portion of the variables included in the C4H survey was used, though the sample on which the analyses have been performed is larger than the one planned for C4H.

Participants involved in the project were citizens living in 289 towns/cities across 12 European countries (Italy, France, Spain, Portugal, Greece in the South; Denmark, Germany, Norway, UK, Austria, Belgium, and Estonia in the North). The sample comprised 1254 individuals (60.8% female) aged between 18 and 90 years (M = 40.17, S.D. = 14.53), residing in a variety of towns/cities in Southern (79.4%) and Northern Europe (20.6%). 508 participants (40.5%) lived in small towns (less than 50,000 inhabitants), 276 (22.0%) in medium-sized towns (between 50,000 and 250,000 inhabitants), and 444 (36.2%) in large towns (over 250,000 inhabitants). Regarding the level of education (calculated as the number of years of formal education), 48% of participants had studied more than 17 years, 28% from 14 to 17 years, 16.4% from 10 to 13 years, 6.1% from 6 to 9 years, and 1.6% less than 5 years. As for the length of residence in the place where they currently lived, 56.1% of the sample had uninterruptedly resided in the same place for more than 20 years, 15.2% for 11–20 years, 13.5% for 5–10 years, 11.7% for 1–4 years, and 3.5% for less than 1 year.

Procedures

Within each town/city, participants were selected according to a non-proportional quota sample by age and gender. They were recruited on site according to a snowball sampling procedure, and asked to complete an online questionnaire in their own language. The questionnaire included a variety of measures covering three areas: section A addressed the perception, assessment, and satisfaction with the community of residence (perceived reliability of local agencies and institutions, satisfaction with the urban environment; assessment of community assets, psychological sense of community, perceived urban safety, perception of the community members and community future, perceived social support, anomie, and values). Section B addressed attitudes and behaviors related to diet, physical activities, and health. Section C was designed to collect participants' backgrounds and sociodemographic characteristics.

Measures

The following measures included in section A were used for the analyses.

Psychological Sense of Community The Brief Sense of Community Scale (BSCS) by Peterson et al. (2008b), was used. This 8-item scale has four response modalities (from 1 = strongly disagree to 4 = strongly agree) to measure four first-order factors (i.e., needs fulfillment, group membership, influence, and emotional connection) and one second-order factor (i.e., sense of community). We asked participants to refer to the place where they live, intended as a community of people residing in the same territory. The following are examples of items: "I can get what I need in this community" (needs fulfillment); "I feel like a member of this community" (membership); "I have a say about what goes on in my community" (influence); "I feel connected to this community" (emotional connection).

Perceived Social Support Social support was measured by the Multidimensional Scale of Perceived Social Support (MSPSS) by Zimet et al. (1988). Items were adapted so as to refer to the support received by "People around me: family, friends, colleagues, neighbors, and

acquaintances" (e.g., "I can count on them when things go wrong"; "I feel they are close to me"; "They are willing to help me make a decision"). Items were rated on a range from 1 (not at all) to 4 (very much).

Residential Satisfaction Residential social climate satisfaction was measured by five ad hoc items created to assess the degree (1 = not at all, 4 = very much) to which participants perceived their community co-members as deluded, competent, angry, desperate, and resigned. The score of the items expressing negative qualities was reversed, so that the scale's total score assessed the overall positive perception of the community social climate. Environmental residential satisfaction was measured by asking residents to rate their satisfaction (1 = not at all satisfied, 4 = very satisfied) as to the quality of primary urbanization (sidewalks, roads, sewers, water mains), sports facilities, and green areas, and as to the beauty of the urban and architectural environment and the urban landscape.

Perceived Reliability of Local Services Participants were asked to rate the reliability of local services, namely public transport, healthcare services, police, schools, public administration, and companies. Response modalities ranged from 1 = not at all to 4 = very much.

Socio-demographic Characteristics Finally, participants were asked to indicate their age, gender and place of residence (nation/country, state/region, city/town, and district/neighborhood), level of education (calculated by the number of years of formal education), and years of residence in the place where they currently lived.

Analyses

Confirmatory factor analyses (CFA with weighted least squares estimator) and Cronbach's alpha were used to verify the structure and the reliability of the measures, respectively.

In order to evaluate the relationship of both the geographical context and the town/city size with the psychosocial variables considered, a set of comparisons (by Linear models) was planned. In this case, we first considered a two-level factor (South Europe grouping Italy, France, Spain, Portugal, and Greece; and North Europe grouping Denmark, Germany, Norway, UK, Austria, Belgium, and Estonia) and then a three-level factor (small towns <50,000 inhabitants; medium-sized towns 50,000–250,000 inhabitants; and large towns >250,000 inhabitants).

To test the interaction between town size and SoC with the psychosocial variables considered (perceived social support, residential social climate satisfaction, residential environmental satisfaction, and perceived reliability of local services), a second set of analyses was performed. Given the multilevel nature of the data, we used mixed-effects models to evaluate the effect of psychosocial variables (fixed effects) and the size of towns/cities (random effects) on sense of community. For this purpose, we used "lme4" (Bates et al. 2015) package for R. Mixed-effects models describe a relationship between a response variable and some of the covariates that have been measured or observed along with the response. In mixed-effects models at least one of the covariates is a categorical covariate representing experimental or observational "units" in the data set. The categorical covariates are observed at a set of discrete levels. Parameters associated with the specific levels of a covariate are sometimes called the "effects" of the levels. If the set of possible levels of the covariate is fixed and reproducible, we model the covariate using fixed-effects parameters. If the levels that we observe represent a random sample from the set of all possible levels, we incorporate random effects in the model (Bates 2010). In this case we used a model with variable intercepts and variables slopes.

One of the most critical issues of mixed effects is how to calculate the p value associated with the estimated parameters. The issue is quite complex because of the difficulties to determine precisely the degrees of freedom of the model. Among the alternatives, the procedure proposed by Kuznetsova et al. (2016) returns a data frame with values of Chi-square statistics and corresponding p values of likelihood ratio tests. We adopted this procedure.

Results

Reliability of Measures and Correlations Between the Variables

Confirmatory factor analysis on the SoC scale confirmed the structure with four first-order factors and one second-order factor ($\chi 2$ [1254, 16] = 220.23; p = <.001; CFI = .98; TLI = .96; RMSEA = .07 [.05; .09], p = .01; SRMR = .03). The monofactorial structure was confirmed for the measures of perceived social support ($\chi 2$ [1254, 20] = 308.20; p = <.001; CFI = .97; TLI = .96; RMSEA = .08 [.07; .10], p = .01; SRMR = .02), residential social climate satisfaction ($\chi 2$ [1254, 5] = 298.19; p = <.001; CFI = .98; TLI = .97; RMSEA = .06 [.05; .09], p = .06; SRMR = .03), residential environmental satisfaction ($\chi 2$ [1254, 5] = 315.29; p = <.001; CFI = .97; TLI = .95; RMSEA = .07 [.05; .09], p = .05; SRMR = .05), and perceived reliability of local services ($\chi 2$ [1254, 9] = 51.86; p = <.001; CFI = .98; TLI = .96; RMSEA = .05 [.04; .07], p = .22; SRMR = .02).

All scales showed acceptable reliability indexes (Cronbach's α): overall SoC (α = .83); perceived social support (α = .92); residential social climate satisfaction (α = .73); residential environmental satisfaction (α = .79); perceived reliability of local services (α = .77).

Regarding the correlations between the variables (Table 1), age correlated positively with gender (r = .21) and negatively with perceived social support (r = −.16) and residential environmental satisfaction (r = −.11), while gender correlated positively with perceived social support (r = .11), residential social climate satisfaction (r = .07), residential environmental satisfaction (r = .06), and perceived reliability of local services (r = .08). Education correlated positively, but weakly, with perceived social support (r = .10) and perceived reliability of local services (r = .06). The size of the town/city (referred to as the number of inhabitants) was positively, but weakly, correlated with education (r = .12), perceived social support (r = .09), residential social climate satisfaction (r = .06), and negatively associated with sense of community (r = −.08). To summarize, all the socio-demographic variables, as well as the town/city size, showed very feeble associations with the psychosocial variables considered. Instead, the psychosocial variables were more clearly interdependent. SoC correlated positively with perceived social support (r = .21), residential social climate satisfaction (r = .27), residential environmental satisfaction (r = .35), and perceived reliability of local services (r = .31). Finally, even more robust was the interconnection between the residential social climate satisfaction on the one hand, and the residential environmental satisfaction (r = .44) and the perceived reliability of local services (r = .45) on the other, and also the correlation between the last two variables (r = .53).

Table 1 Correlations between the variables

	1	2	3	4	5	6	7	8
Age	–							
Gender	.21**	–						
Population	.02	.00	–					
Education	−.05	.05	.12***	–				
SoC	.01	.03	−.08**	−.00	–			
PSS	−.16***	.11***	.09**	.10***	.21***	–		
RSCS	−.02	.07**	.06*	.05	.27***	.13***	–	
RES.	−.11***	.06*	.04	.03	.35***	.12***	.44***	–
PSR	−.04	.08**	.07*	.06*	.31***	.17***	.45***	.53***

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

Gender, 0 = f and 1 = m; Population, number of inhabitants of cities; SoC, sense of community; PSS, perceived social support; RSCS, residential social climate satisfaction; RES, residential environmental satisfaction; PSR, perceived services reliability

Comparisons Between Geographical Areas and Size of Towns/Cities

Table 2 shows the average scores and the Linear models of the five psychosocial variables by geographical area (North and South Europe) and size of the towns (small, medium-sized, large). Regarding the geographical area, significantly higher scores of residential environmental satisfaction, residential social climate satisfaction, and reliability of local services were detected in respondents of Northern Europe compared to those of Southern Europe. No difference for SoC and perceived social support was found.

Table 2 Average scores and Linear models by geographical area and size of the towns

	South EU	North EU	$F(df)$; p	R^2
SoC	20.45	20.09	1.48 (1, 1252)	.001
PSS	25.88	25.53	1.01 (1, 1252)	.000
RSCS	11.37	14.29	238.66 (1, 1252)***	.160
RES	12.27	14.24	77.81 (1, 1252)***	.058
PSR	15.42	16.75	41.54 (1, 1252)***	.032

	Small towns	Medium towns	Large towns	$F(df)$; p	R^2
SoC	20.69^{a}	20.47	19.92^{a}	4.08 (2, 1225)*	.006
PSS	25.24^{a}	25.77	26.50^{a}	7.31 (2, 1225)***	.012
RSCS	11.56^{a}	11.49^{b}	12.72^{ab}	23.68 (2, 1225)***	.037
RES	12.31^{a}	12.30^{b}	13.25^{ab}	11.62 (2, 1225)***	.019
PSR	15.38^{a}	15.42^{b}	16.16^{ab}	9.60 (2, 1225)***	.015

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

The superscripts [a] and [b] indicate significant comparisons

As for the size of the towns/cities, the Linear models revealed that residents in small towns reported significantly higher scores of sense of community and significantly lower scores of

perceived social support, residential social climate satisfaction, residential environmental satisfaction, and perceived reliability of local services compared to those residing in large towns. Respondents living in medium-sized towns showed significantly lower scores of residential social climate satisfaction, residential environmental satisfaction, and perceived reliability of local services compared to respondents living in large towns. An interesting fact is that no difference between small and medium-sized towns was found for any of the variables considered.

Table 3 shows the parameters of the mixed effects model with variable intercepts and slopes. This model (AIC = 6777.6 and BIC = 6869.6) was significantly better than the model without fixed effects (AIC = 7016.6 and BIC = 7032.0; $\chi 2$ [15] = 269, $p < .000$) and than the model only with variables intercepts (AIC = 6858.6 and BIC = 6994.4; $\chi 2$ [11] = 4.99, $p = .022$). This proves that the SoC was best explained by the interaction between psychosocial variables and the size of the city.

Table 3 Mixed effects model

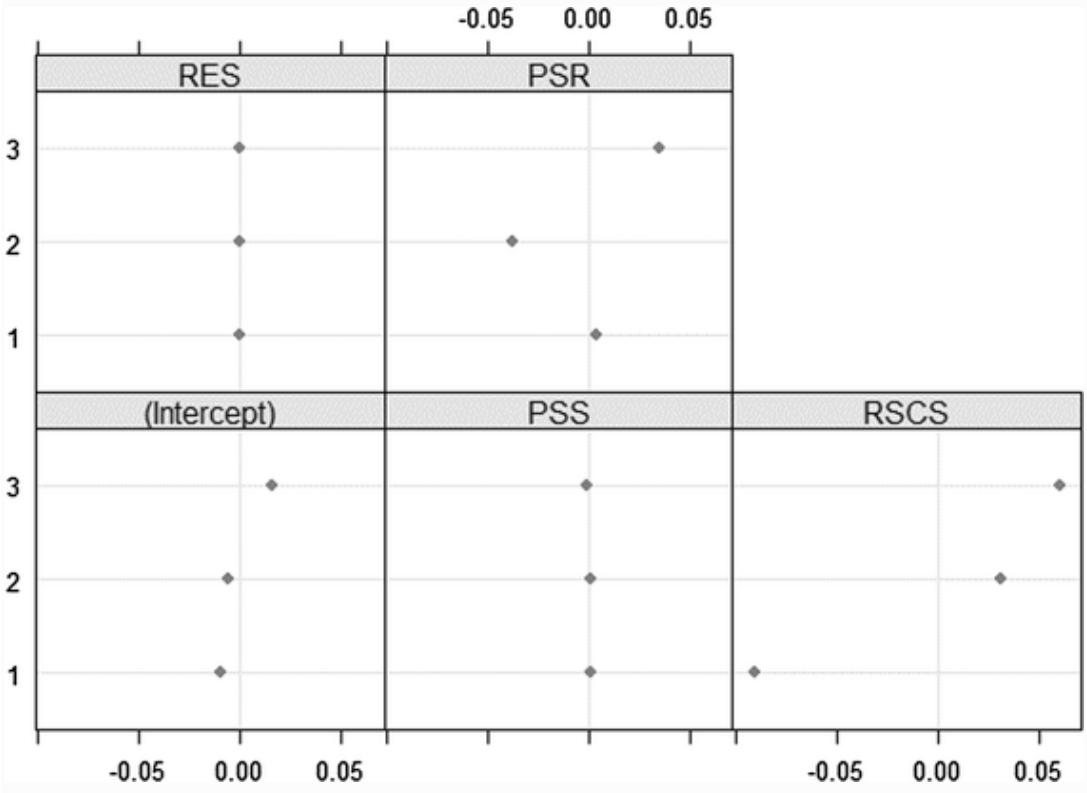
	Estimate	SE	t value
Fixed effects			
PSS	.14	.02	6.53*
RSCS	.18	.07	2.55*
RES	.31	.04	7.63***
PSR	.15	.05	2.96*

	Small towns		Medium towns		Large towns	
	Intercept	β	Intercept	β	Intercept	β
Random effects						
PSS	−.01	.01	−.01	.01	.02	−.01
RSCS	1.73	−.09	−.58	.03	−1.13	.06
RES	.02	−.01	.02	−.01	−.04	.01
PSR	−.10	.01	1.10	−.04	−1.02	.03

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

Regarding fixed effects, the four variables considered showed a significant positive relationship with SoC. In particular, residential environmental satisfaction was the variable with the strongest relationship with SoC ($\beta = .31$). Table 3 and Fig. 1 show the random effects. As we explained in the Analyses section, we adopted the likelihood ratio test on random effects (Kuznetsova et al. 2016) to calculate the p values. Table 4 shows the values of $\chi 2$ statistics and corresponding p values. Regarding perceived social support and residential environmental satisfaction, no substantial difference for the three town sizes was found. As for residential social climate satisfaction, the relationship was negative for small towns, while it was positive for medium and large towns, with higher betas in the latter. As for the perceived reliability of local services, the association with SoC was virtually irrelevant in small towns, negative in medium-sized towns and positive in large towns.

Fig. 1



Graphic of random effects

Table 4 Analysis of random effects

	χ^2	*df*	*p* value
PSS * size of towns	.001	3	1.000
RSCS * size of towns	8.301	3	.040
RES * size of towns	.001	3	1.000
PSR * size of towns	8.401	3	.038

Discussion

The study compared urban centers of different sizes on SoC and on residents' satisfaction for some of the physical (i.e., urban environment), functional (i.e., local services), and social (i.e., social climate and social support) dimensions of the community of residence. The comparisons revealed that while SoC was higher in small towns, and in the area of Southern Europe, the perception of the above mentioned characteristics of the community was more positive in large towns, and in the urban centers located in Northern Europe. On the one hand, this finding partially contrasts with Prezza and Costantini's (1998) results, as they found that in small towns residents do not only develop higher levels of SoC compared to residents living in large towns, but they also perceive greater social support and greater satisfaction with local services. On the other hand, our results confirmed what the same authors suggested in a later study (Prezza et al. 2001), in which they compared two more small cities (17,000 and 28,000

inhabitants) and one different big city neighborhood (28,000 inhabitants), and found that sense of community was related to life satisfaction in all the three urban contexts.

The primary goal of our study was to generate evidence that the size of the urban context was inversely related to SoC, as suggested by a few previous studies. Our results confirmed this relationship and showed that the greater the size of the town/city, the lower the SoC expressed by the inhabitants who were involved in the survey. Though from a statistical point of view the significant difference was between urban areas with less than 50,000 residents and urban areas with more than 250,000, the SoC mean value in residents of medium-sized towns was lower than the one observed in small towns and higher than the one observed in large towns. Such a finding supports the credibility of a stable inverse relationship between the size of the urban centers and SoC developed by residents. It may be argued that, though statistically significant, such differences are so small that they do not correspond to conspicuous social differences in towns/cities. However, our findings outlined a trend.

The secondary goal was to detect possible variations across a range of towns/cities between the residents' satisfaction for some social, functional, and physical dimensions of the community (i.e., social support, social climate, urban environment, and services) and residents' SoC. In all towns/cities surveyed, we found that all four variables were positively associated with SoC, as expected according to literature. In particular, residential environmental satisfaction was the variable for which the strongest relation was observed in our data. We also found variations in the patterns of associations when considering urban areas of different sizes. Interestingly, while no differences were found between small, medium-sized and large towns in perceived social support and residential environmental satisfaction, the patterns of associations of the other two variables varied. Residential social climate satisfaction was associated to an increase in SoC only in medium-sized and large towns, but not in small towns, where the reverse was true. Perceiving local services as reliable was also a factor associated to an increase in SoC only in large towns, while it was irrelevant in small towns and associated to a decrease in SoC in medium-sized urban centers. Hence, such findings revealed that the hypothesized positive association between the subjective satisfaction for the socio-physical features of the community of residence and SoC was empirically supported only for the large town, and only partially confirmed for medium-sized and small towns, thereby questioning the notion that SoC stems directly from a positive perception of the community in which people live. The clearest indication emerging from the study's results is that research should thoroughly investigate the factors that are likely to affect the relationship between the extent to which residents are satisfied with their community, and the feelings of community belonging, sharing, and influence (i.e., SoC) that they can develop.

At the policy level, the main indication emerging from the study, regardless of the size of towns/cities, is the call for implementing or strengthening urban regeneration policies. Indeed, our study confirmed what a consistent amount of studies had already highlighted, i.e., that the quality of the urban built environment is a key factor for promoting residents' SoC. The availability and quality of the works of primary urbanization (sidewalks, roads, sewers, water mains), sports facilities, and green areas, as well as the pleasantness of buildings, squares, and neighborhoods can promote a sense of belonging, care and investment in the community, which in turn is likely to trigger further virtuous social effects, such as increased citizen participation (Talò et al. 2014) and increased wellbeing (Albanesi et al. 2007; Mak et al. 2009; Obst and Stafurik 2010) and life satisfaction (Prezza et al. 2001; Prezza and Costantini 1998). Additionally, health and social policies could plan programs and interventions aimed at increasing the amount of social support available in the community. More social support would not only result in increased SoC, but, again, also in increased wellbeing (Siedlecki et al. 2013). Though in our study we focused only on informal social support, i.e., the support provided by personal social networks, and not on the formal support provided by services and agencies, social and health policies would increase their efficacy if they were able to improve

not only the quality of services, but also the capacity of social networks to help individuals who cope with health and social problems.

The study had two main limitations that must be acknowledged and that invite caution. The most important one concerns the nature and composition of our sample, which did not grant a sufficiently balanced representativeness of the different countries surveyed. Indeed, cultural differences might have accounted for our results over and above the urban centers' size, although our sample did not allow straight cross-cultural comparison between countries. Moreover, the number of respondents in each town/city greatly varied. Above all, it must be acknowledged that the sample was self-selected, as participants were likely to be motivated by medical reasons, to be individuals who valued their health and wellbeing, and who had easy access to digital technologies. Such characteristics limit the conclusions of the study. The second limitation is that the study took into account only a few dimensions of the community, and captured such dimensions by using quantitative measures: these elements could not convey the complexity of the multifaceted nature of communities.

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