



## Neighbourhood planning improvement: Physical attributes, cognitive and affective evaluation and activities in two neighbourhoods in Rome

Antonio Aiello<sup>a,\*</sup>, Rita Grazia Ardone<sup>b</sup>, Massimiliano Scopelliti<sup>c</sup>

<sup>a</sup> Department of Psychology, University of Cagliari, Via Is Mirrionis 1, 09123 Cagliari, Italy

<sup>b</sup> Faculty of Psychology 2, "La Sapienza" University, Via dei Marsi 78, 00185 Rome, Italy

<sup>c</sup> Libera Università Maria Ss. Assunta (Lumsa), Piazza delle Vaschette, 101, 00193 Rome, Italy

### ARTICLE INFO

#### Article history:

Received 16 November 2008

Received in revised form 30 September 2009

Accepted 25 October 2009

#### Keywords:

Environmental planning and improvement

Place theory

Residential quality evaluation

Affective quality

Urban activities

### ABSTRACT

This study proposes a psychological analysis of the relationships between people and their residential environment in two neighbourhoods in Rome, within the theoretical framework of place theory. The analysis was aimed at getting indications for neighbourhood improvement, which can lead to residential satisfaction and neighbourhood attachment. We considered both constructs as the result of the relationships between the physical attributes of the environment, the cognitive perceptions and the affective appraisals of residents, and the activities they carry out. The role of socio-demographic and residential variables was also considered. Theoretical implications of results and indications for neighbourhood improvement are discussed. Residential satisfaction and neighbourhood attachment have a different pattern of predictors, emerging from all the dimensions of analysis we considered. Using hierarchical linear models, cognitive, affective and behavioural variables emerged as significant first-level predictors of both criterions, and physical attributes were found to be significant second-level predictors. In addition, the joint analysis of objective neighbourhood features and residents' experience within a place-specific framework showed to be an effective approach to identify relevant domains for neighbourhood improvement. Commercial and leisure facilities can contribute to make the neighbourhood more lively; building density and green areas have inverse effects on the prevalence of social activities.

© 2009 Elsevier Ltd. All rights reserved.

### 1. Introduction

Neighbourhood planning management, revitalization and improvement are basic needs in residential environments. Far from being an issue of aesthetics alone, neighbourhood regeneration was included in many programmes for social inclusion in disadvantaged areas (IDeA, 2005; Sullivan, 2002), and showed to influence community health (Blackman, Harvey, Lawrence, & Simon, 2001; Parry, Laburn-Pearl, Orford, & Dalton, 2004); in addition, a number of studies highlighted the impact of neighbourhood design on health and health-related activities (Huang, 2006; Michael, Green, & Farquhar, 2006; Nielsen & Hansen, 2007; Sugiyama & Thompson, 2007).

Urban renewal policies involving a resident-based approach have been largely debated (Fraser & Lepofsky, 2004; Meegan & Mitchell, 2001), and community participation in local planning has

been applied as a method to increase residential quality. The community's experience can be a fundamental starting point in the process of creating sustainable environments, which can be more responsive to needs and preferences of residents (Romice, 2000). As a consequence, neighbourhood improvement should be based on the analysis of how residents use and experience their residential environment, and what makes them satisfied.

The present work aimed at analysing the relationships between inhabitants and their residential environment in order to have guidelines for neighbourhood improvement coming from the community point of view. To this goal, we referred to the psychological approach proposed by *place theory* (Canter, 1977). According to place theory, environments are conceived as psychological constructs, to which meanings are ascribed as the result of the relationships between different components: the physical attributes of the setting, the goal-directed and organized actions occurring there, and the evaluations of those activities. The model emphasises the importance of both the physical and evaluative (or representational) dimension of a place, as well as place-specific behaviours in person–environment transactions. Russell and Ward (1982, p. 652) argue that "behavior is caused by

\* Corresponding author. Tel.: +39 070 6757518.

E-mail addresses: [antonio.aiello@unica.it](mailto:antonio.aiello@unica.it) (A. Aiello), [ritagrazia.ardone@uniroma1.it](mailto:ritagrazia.ardone@uniroma1.it) (R.G. Ardone), [m.scopelliti@lumsa.it](mailto:m.scopelliti@lumsa.it) (M. Scopelliti).

the situation in which it occurs. [...] This place-specificity of behavior is the fundamental fact of environmental psychology”.

In research practice, however, the joint analysis of the three components of place theory has remained mostly unexplored. The perception of places and their attributes was studied assuming that there are different types of processes underlying the evaluation outcomes, such as subjective evaluations of socio-physical characteristics and affective appraisals. Different research lines in environmental psychology focused on subjective evaluations (or perceptions) of urban residential quality (Amérgo & Aragonés, 1990; Carp & Carp, 1982) and affective response to environments (Russell & Pratt, 1980; Ward & Russell, 1981). Bonnes and Secchiaroli (1995, p. 126) point out that “a more accurate understanding of the connection between the affective and the cognitive dimensions of places is needed, (because both) components are always involved in the process of environmental evaluation”. Finally, research attention was also turned to activities, which play an important role in the general meaning of places (Genereux, Ward, & Russell, 1983) and, more specifically, in person-residential environment relationships (Bonaiuto & Bonnes, 1996; Bonaiuto, Bonnes, & Continisio, 2004; Bonnes, Mannetti, Secchiaroli, & Tanucci, 1990).

An overview of literature on these topics is presented in the following sections. Finally, a model of person–environment transactions, simultaneously taking into consideration the three components proposed by Canter (1977) is presented.

### 1.1. Residential satisfaction and neighbourhood attachment

The quality of residential environments is embedded in the relationships between two different components: the objective characteristics of the neighbourhood (facilities, public transport, crime, noise, upkeep, etc.) and the living unit (housing type, housing size, etc.), and the subjective perceptions of these attributes, depending on the attributes themselves, but also on personal characteristics (gender, age, income, tenure, length of residence, etc.).

The literature on residential satisfaction investigated the subjective evaluations of residential quality taking into account different dimensions of analysis (Altman & Wandersman, 1987; Amérgo & Aragonés, 1997; Carp & Carp, 1982). Specific tools (Perceived Environmental Quality Indices—PEQIs) were developed and applied in order to measure these environmental properties (Carp & Carp, 1982; Christensen & Carp, 1987; Craik & Zube, 1976). Canter (1983) identified three main components of the residential environment which play a role in people’s evaluation of their neighbourhood: namely, spatial features (e.g. architecture and town-planning elements), human features (e.g. social relations) and functional features (e.g. services and facilities). A fourth dimension, regarding context features (neighbourhood lifestyle, environmental pollution, and residential upkeep/care) was empirically confirmed by Bonaiuto, Aiello, Perugini, Bonnes, and Ercolani (1999), who developed the Perceived Residential Environmental Quality tool (PREQ) in order to investigate residential satisfaction within a multifaceted perspective. The structural and psychometric properties of the PREQ scales have been recently confirmed by Bonaiuto, Fornara, and Bonnes (2003). Many studies tried to identify the best predictors of residential satisfaction and urban quality among perceived variables. Along with other predictors, the role of aesthetics (Anthony, Weidemann, & Chin, 1990; Weidemann, Anderson, Butterfield, & O’Donell, 1982), spaciousness and natural areas (Amérgo & Aragonés, 1990; Garcia-Mira, Arce, & Sabucedo, 1997), social interaction (Amérgo & Aragonés, 1990; Bruin & Cook, 1997; Weidemann et al., 1982), safety (Bruin & Cook, 1997; Cook, 1988; Weidemann et al., 1982), services and facilities (Amérgo & Aragonés, 1990), upkeep

(Amérgo & Aragonés, 1990; Anthony et al., 1990; Garcia-Mira et al., 1997; Weidemann et al., 1982), noise (Amérgo & Aragonés, 1990) emerged.

Beyond these, also socio-demographic characteristics of residents and objective measures of neighbourhood attributes have been considered in an integrative framework explaining residential satisfaction. Empirical studies found that being older and home owners, and having higher income are related to higher levels of satisfaction (Galster & Hesser, 1981; Lu, 1999). Parkes, Kearns, and Atkinson (2002) underlined the key role of perceived variables, such as general appearance, social relationships, facilities, crime and noise. Socio-demographic and residential variables were found to have a significant, but limited importance, being the area type the most relevant. In fact, some factors emerged as more important in different areas. This finding suggests the need for a place-specific approach to the study of residential satisfaction (Cook, 1988). Christensen, Carp, Craz, and Wiley (1992) showed that some objective indicators of housing quality (e.g. upkeep) are predictive of subjective evaluations. Sirgy and Cornwell (2002) found empirical support to the different role of physical and social attributes of the residential environment in predicting satisfaction. A comprehensive model of the relationships between objective and subjective indicators of residential quality, also taking into consideration personal characteristics was proposed by Marans (2003).

Residential satisfaction was frequently studied in relation with *place attachment*, emphasizing the affective dimension of person–environment transactions (Altman & Low, 1992; Feldman, 1996; Fried, 1982; Giuliani, 2003). A connection between the two concepts is generally accepted (Sundstrom, Bell, Busby, & Asmus, 1996) even though differences are not always clearly identified. According to Brown and Perkins (1992), place attachment “involves positively experienced bonds, sometimes occurring without awareness, that are developed over time from the behavioural, affective, and cognitive ties between individuals and/or groups and their sociophysical environment” (p. 284). Amérgo and Aragonés (1990) found that global evaluations of residential satisfaction are related to both neighbourhood attachment and the perception of specific characteristics of the environment (e.g., infrastructures, upkeep, social relationships). Bonaiuto et al. (1999) tested the hypothesis that neighbourhood attachment, as a global affective evaluation, can be predicted by residential satisfaction, considered as a multidimensional variable referring to different domains of urban residential quality. Socio-demographic (gender, age, etc.) and residential (length of residence in the place, number of people living together, etc.) variables were also included in the model. In the path model, socio-demographic and residential variables predict the dimensions of perceived urban quality, and these, in turn, predict neighbourhood attachment, considered as the final criterion. Among neighbourhood features, presence of facilities, quiet, buildings’ pleasantness and social relationships emerged as the best predictors of neighbourhood attachment.

### 1.2. Affective appraisals of urban places

Affective appraisals of places represent another central topic in the study of person–environment transactions. Ittelson (1973) claims the importance of “the first level of response to the environment, that is affective: the direct emotional impact with the situation [...] governs the directions taken by subsequent relations with the environment” (p. 16).

Russell (1978) showed that the emotional experience in a place can be described through a circumplex model having two main bipolar orthogonal dimensions – “pleasant/unpleasant” and “arousing/sleepy” – and two additional bipolar dimensions –

“exciting/gloomy and “relaxing/distressing”. In this model, adjectives expressing emotions towards places are organized in a circular mode. Subsequent research supported this model (Russell & Pratt, 1980; Russell, Weiss, & Mendelsohn, 1989; Ward & Russell, 1981). The circumplex model was applied to the study of residential environments (e.g., Corraliza & Aragonés, 1988), and significant relationships between emotional response and cognitive evaluations (Hanyu, 1997, 2000), or behaviours (Hanyu, 1993) were found.

Different studies showed the cross-cultural validity of the model (Russell, 1983; Russell, Lewicka, & Niit, 1989), as well as context-related specificities. With reference to the Italian language, Perugini, Bonnes, Aiello, and Ercolani (2002) found that excitement and relaxation, the secondary dimensions found by Russell (1978), are the main ones, while the opposite emerged for pleasure and arousal.

### 1.3. Urban behaviour

Urban behaviour is considered a relevant component in understanding people–environment transactions, and meanings attributed to places (Canter, 1977, 1983). Moore (1979) underlined that environmental cognition is based on life experiences, and activities represent a key component of those experiences. Geneux et al. (1983) found that people discriminate different places on the basis of associated behaviours. Despite these theoretical and empirical suggestions, research on person–environment relationships in the residential environment has dealt much more with the evaluation of environmental quality than with people’s activities. Some exceptions are worth noting. Bonnes et al. (1990) addressed the issue of “urban pragmatics”, by which “the purposive and organized character that the individual activities have in the socio-physical environment in general and in the urban environment in particular” (p. 39) was analysed. The authors assumed a multi-place perspective, by considering the relationships between the activities performed in different “sub-places” (city-centre, neighbourhood, periphery). In the same direction, Bonaiuto and Bonnes (1996) found both similarities and differences in urban behaviours between people living in cities of different size (Rome vs. Lecce): residents living in the small city were found to show a more integrated pattern of urban activities between the neighbourhood, the city-centre and the periphery; in addition, a higher relevance of socialisation activities and a lower level of isolation emerged. On the whole, these studies underlined the importance of main transactions between people and their residential environment, which can be synthesised in the following pragmatics: purchasing behaviour (e.g. daily shopping at the market, window shopping, etc.), socialisation (e.g. meeting friends, relatives, etc.), cultural activities (e.g. visiting a museum, visiting monuments), sporting activities (e.g. running, playing tennis, etc.), leisure/entertainment (e.g. going to the cinema, etc.).

Some studies suggest that activities performed in the neighbourhood and perceived environmental quality are related. Skjaeveland and Gärling (1997) showed that the perception of positive properties of the residential environment (e.g. spaciousness) is an important predictor of neighbouring. Aragonés, Amérigo and Sukhwani (as cited in Amérigo & Aragonés, 1997) found that participation in neighbourhood activities and frequent visits to neighbours increase satisfaction. More recently, Bonaiuto et al. (2004) found that different people–environment transactions are associated with specific evaluations of the residential environment: people showing a lower level of involvement with their neighbourhood expressed a higher level of satisfaction with facilities; functional aspects were scarcely appreciated by residents showing a deeper interaction with the everyday environment, probably because they became aware of actual inadequacies.

In this respect, it should be noted that a preliminary analysis of the objective features of specific urban environments can provide a more effective framework to understand people’s evaluations of the residential settings in which they live (Marans, 2003).

## 2. Place theory in context

The objective attributes of the residential environment, the subjective evaluation of its quality, the affective reactions to everyday places and the activities performed in the urban settings are all aspects of person–environment relationships which have to do with the construct of *place* (Canter, 1977). Surprisingly, despite the key role of this construct in environmental psychology, there is a lack of studies simultaneously considering all these components of place experience.

Following a multi-faceted and place-specific approach, this study focused on person–environment relationships in two neighbourhoods in Rome. The analysis of residential satisfaction and neighbourhood attachment was developed within the theoretical framework of place theory (Canter, 1977, 1983). A model in which these constructs were considered as the result of the relationships between the objective attributes of the urban environment, the way in which it is cognitively perceived and affectively evaluated, and the activities performed in the neighbourhood was proposed. The role of socio-demographic variables (gender, age, educational level) and neighbourhood experience (length of residence, time daily spent in the neighbourhood) was also taken into consideration (see Fig. 1). The same set of predictors was employed in order to explain both residential satisfaction and neighbourhood attachment. However, both similar and different predictors were expected to be associated with the two constructs, because we assume only a partial overlap between them.

The neighbourhood was taken as a unit of analysis of person–environment transactions, conceptualised as the combination of both physical and psychological aspects (Bonnes & Secchiaroli, 1995; Stokols, 1987).

## 3. The study

### 3.1. Objectives and hypotheses

The main aim of this exploratory study was to analyse the relationships between people and their residential environment by taking as a theoretical framework the construct of *place* (Canter, 1977, 1983), in order to get indications for neighbourhood improvement coming from real experiences of residents. In particular, we hypothesised that residential satisfaction and neighbourhood attachment can be predicted not only by cognitive evaluation of the urban environment, but also by the affective response to residential places and by the typology of activities

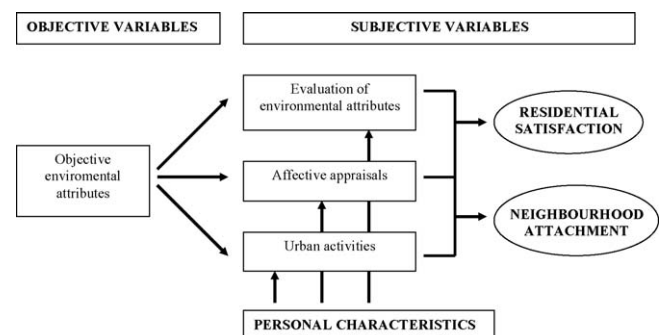


Fig. 1. Model of residential satisfaction and neighbourhood attachment.

people perform there. At a higher level, cognition, affect and behaviour are hypothesised to be connected to the objective attributes of the socio-physical environment.

We also hypothesised a place-specific experience of residents in different neighbourhoods, based on their evaluations, affective responses and activities. A place-specific analysis of person-environment transaction is highly relevant for neighbourhood improvement, because it can provide grounded guidelines for a sustainable development of the residential environment.

Another aim was to explore similarities and differences between the constructs of residential satisfaction and place attachment by analysing the pattern of predictors for each of them. Specific predictors from each set considered in the model were expected to be related to each criteria. In keeping with the literature, we hypothesised that aesthetics, presence of facilities and absence of noise would emerge as important predictors of residential satisfaction, and global affective appraisals as predictors of neighbourhood attachment. Social interaction was expected to be a good predictor of both constructs. We had no hypotheses about the relationship between other typologies of activities and the two constructs, because of a lack of empirical studies on this issue.

The analysis was developed in two neighbourhoods in Rome. Attention was also focused on the influence of socio-demographic and residential variables on the relationships between inhabitants and the residential environment.

## 3.2. Method

### 3.2.1. The residential areas

Two neighbourhoods in Rome were considered for the study: *Prenestino-Labicano* (N1) is situated about halfway between the city centre and the periphery of Rome; *Torre Angela* (N2) is situated on the outskirts of the city. The neighbourhoods were selected in order to have two different examples of “place” to investigate the relationships between cognitions, affect and behaviour in a residential context. N1 and N2 show a quite different situation with reference to both socio-demographic and residential indicators (see *Appendix A*). In addition, being both areas not included in the central – and best equipped – part of Rome, an analysis of the residential environment aimed at identifying indications for improvement seemed to be useful.

As to socio-demographics, residents in N1 and N2 show a similar – and rather low – educational level, and a high percentage of unemployment. Beyond similarities, N1 is characterised by smaller families, and an older population. Among architectural and town-planning features, the two neighbourhoods are characterised by a similar extension of green areas per resident, while N1 shows a very high level of building density. With respect to services, N1 is substantially more equipped with commercial, sporting and recreational facilities. Crime and security indicators show that N2 is somewhat safer than N1.

### 3.2.2. Sample and procedure

Subjects were contacted at different places in the neighbourhood (e.g. urban parks, cinemas, supermarkets, etc.) and asked to participate in the study. Because of the relevance of the temporal dimension in the development of place attachment and an adequate knowledge of the residential environment, we decided to consider only those inhabitants who had been living in the neighbourhood for ten years or more. After a brief presentation of the research, respondents were asked to fill a pen-and-pencil questionnaire about their neighbourhood. If the person agreed to participate, the questionnaire was consigned and his/her address was registered in order to get it back directly at the respondent's house in a couple of days.

We contacted 498 people. A total amount of 244 residents in the two neighbourhoods accepted to participate in the study. In N1 respondents were 130 (66 females, 64 males; mean age: 36.78); in N2 they were 114 (58 females, 56 males; mean age: 36.82).

### 3.2.3. Tools

A questionnaire composed of three main sections was administered.

In Section A the PREQ and NAS tools (Bonaiuto et al., 2003) were used to investigate the perception of residential quality and neighbourhood attachment. The PREQ tool was articulated in 11 specific content areas referring to four general macro-areas for a total amount of 150 items. The NAS scale was composed of 8 items (see *Table 3*). Subjects were asked to express their agreement/disagreement with each statement using a bipolar scale ranging from 0 (“I completely disagree”) to 6 (“I completely agree”). Finally, residential satisfaction was measured on a seven-point scale, ranging from 0 (“totally unsatisfied”) to 6 (“totally satisfied”) (“On the whole, how satisfied are you with the neighbourhood in which you live?”).

Section B investigated the affective quality of places, by asking subjects to indicate a maximum of three places in the neighbourhood for each of the eight affective qualities identified by the circumplex model (Russell & Pratt, 1980). The categories were Pleasant, Unpleasant, Relaxing, Distressing, Arousing, Sleepy, Exciting, Gloomy.

Section C investigated the prevalent activities carried on in the neighbourhood, by asking the subjects to freely associate a maximum of three places in the neighbourhood to five specific categories of activities whose importance in person-neighbourhood transactions emerged in previous studies (Bonaiuto & Bonnes, 1996; Bonnes et al., 1990): purchasing activities, encounter/socialisation, cultural activities, sporting activities, leisure/entertainment.

Three versions of the questionnaire with item randomisation were used. In the final section, socio-demographic (e.g. gender, age, educational level, etc.) and residential experience (length of residence in Rome and in the neighbourhood, time spent daily in the neighbourhood) data were collected.

### 3.2.4. Statistical analyses

Analyses were performed with the two-fold purpose of inter-neighbourhood and intra-neighbourhood evaluation, in relation to perceptions of residential quality, affective qualities and activities performed by residents.

Exploratory Factor Analyses (Principal Component Analyses—PCAs) were carried out on PREQ and NAS scales. In particular, 12 PCAs were performed—11 on the areas of the PREQ tool, and one on the NAS scale. Confirmatory Factor Analyses (CFAs) were then run on aggregate scores of original items.

A series of univariate ANOVAs was carried out to analyse the effects of socio-demographic (gender, age, educational level) and residential variables (neighbourhood, length of residence in the neighbourhood, time daily spent in the neighbourhood) on PREQ indicators emerging from CFAs, affective qualities and urban activities. Age, length of residence and time daily spent in the neighbourhood were recoded into categorical variables. Indexes of the eight main affective qualities proposed in the circumplex model – pleasant (PLEAS), unpleasant (UNPLEAS), relaxing (RELAX), distressing (DISTRES), arousing (AROUS), sleepy (SLEEP), exciting (EXCITE), gloomy (GLOOM) – were calculated, according to the number of places (ranging from 0 to 3) people associated to each adjective. The more the number of indications for a specific affective quality, the higher the index of this quality (e.g. three places in the neighbourhood mentioned as “relaxing” correspond to a “relaxing index” equal to 3). The same procedure was used in

order to obtain indexes of the five urban behaviours considered—purchasing behaviour (PURCH), socialisation (SOCIAL\_B), cultural activities (CULT), sporting activities (SPORT), leisure/entertainment (LEIS). Bonferroni test ( $p < .05$ ) was employed for post hoc analyses.

Given the nested nature of our data, hierarchical linear models – HLM – (Bryk & Raudenbush, 1992) were then applied in order to understand first and second order relationships among the variables, referring to both subjective variables and structural neighbourhood attributes. Separate analyses were performed for residential satisfaction and neighbourhood attachment. Neighbourhoods peculiarities were also considered, in keeping with the place-specific approach we adopted. In this respect, even though HLM is usually employed to control for the impact of one relevant variable (e.g., the neighbourhood) when the relationships between some predictors and a criterion are of interest, we used it indirectly to show the differences between the two neighbourhoods. In fact, HLM does not compute a general regression model, but separate models for the neighbourhoods, by estimating the differences in beta values. We can compute the interclass correlation coefficient, which is related to the values of within and between variance and, as a consequence, we can have the proportion of variance which is explained by the differences between the two neighbourhoods (Hox, 1995).

## 4. Results

### 4.1. Dimensions of PREQ and NAS

PCAs performed on PREQ and NAS scales yielded 18 dimensions of perceived residential quality and one dimension of neighbourhood attachment (ATTACH). Subsequent CFAs showed good fit indexes for all the final models (see Appendix B).

With respect to architectural and town-planning features, 5 dimensions referring to building aesthetics and spaciousness among buildings (BUI\_AESTH), building size (BUI\_SIZE), connection with the rest of the city (CONNECT), internal accessibility (ACCESS), and availability of green areas (GREEN) emerged. Concerning social relations, 3 factors, namely perceived insecurity (INSECUR), sociality and affability (SOCIAL), tact and politeness (POLITE) were confirmed. As to functional features, 6 dimensions, related to educational (EDUC\_SERV), social/health (HEAL\_SERV), sport (SPOR\_SERV), leisure/cultural (LEIS\_SERV), commercial (COMM\_SERV) and public transportation (TRANSP\_SERV) services, were shown. Finally, with reference to context features, 4 factors referring to chaos and disorder in the urban setting (CHAO\_LIFE), monotony in neighbourhood lifestyle (MON\_LIFE), environmental pollution (POLLUT), and care/upkeep of the residential environment (UPKEEP) emerged. These indicators of urban residential quality were used for subsequent analyses.

### 4.2. Effects of neighbourhood of residence, socio-demographic and residential variables on PREQ and NAS indexes

At the first level of analysis, the influence of neighbourhood of residence, socio-demographic (gender, age, educational level) and residential variables (length of residence in the neighbourhood, time daily spent in the neighbourhood) on PREQ and NAS indexes was considered.

A significant effect of neighbourhood of residence was found with reference to a variety of PREQ indexes. A higher perception of the indexes BUI\_AESTH ( $F_{(1,195)} = 8.87, p < .01$ ), BUI\_SIZE ( $F_{(1,195)} = 50.76, p < .001$ ), CONNECT ( $F_{(1,195)} = 182.97, p < .001$ ), GREEN ( $F_{(1,195)} = 151.62, p < .001$ ), EDUC\_SERV ( $F_{(1,195)} = 18.08, p < .001$ ), SPOR\_SERV ( $F_{(1,195)} = 66.95, p < .001$ ), COMM\_SERV ( $F_{(1,195)} = 100.78, p < .001$ ), TRANSP\_SERV ( $F_{(1,195)} = 75.57,$

**Table 1**

PREQ indexes (only significant effects are presented): Means and standard deviations in N1 and N2.

PREQ index	N1		N2	
	Mean	SD	Mean	SD
Building aesthetics and spaciousness among buildings (BUI_AESTH)	2.44	.96	2.09	.95
Building size (BUI_SIZE)	3.32	1.14	2.37	1.11
Connection to the rest of the city (CONNECT)	3.85	.84	2.27	.96
Presence and care of green areas (GREEN)	3.70	1.22	2.02	.90
Insecurity (INSEC)	2.93	1.06	3.33	1.13
Sociality and affability (SOCIAL)	3.17	.79	3.41	.92
Educational services (EDUC_SERV)	3.94	1.04	3.40	.99
Sports services (SPOR_SERV)	2.84	1.07	1.79	1.95
Commercial services (COMM_SERV)	4.05	.99	2.84	1.03
Public transportation (TRANSP_SERV)	3.04	1.08	1.84	1.03
Monotonous lifestyle (MON_LIFE)	2.94	1.03	3.67	.93
Pollution (POLLUT)	3.88	1.04	3.18	1.05
Care and upkeep (UPKEEP)	2.54	.77	2.16	.81

$p < .001$ ), POLLUT ( $F_{(1,195)} = 28.30, p < .001$ ) and UPKEEP ( $F_{(1,195)} = 13.88, p < .001$ ) emerged in N1. A higher level of indexes INSECUR ( $F_{(1,195)} = 8.96, p < .01$ ), SOCIAL ( $F_{(1,195)} = 4.97, p < .05$ ), MON\_LIFE ( $F_{(1,195)} = 14.22, p < .001$ ) emerged in N2 (see Table 1).

A significant effect of gender was found on the index INSECUR ( $F_{(1,195)} = 5.31, p < .05$ ). Women ( $M = 3.45, SD = 1.11$ ) show a higher perception of insecurity in the residential environment than men ( $M = 2.77, SD = 1.00$ ).

A significant effect of age was found on some PREQ indexes. In particular, a significant difference between age groups emerged for BUI\_AESTH ( $F_{(3,195)} = 2.72, p < .05$ ), BUI\_SIZE ( $F_{(3,195)} = 2.82, p < .05$ ), GREEN ( $F_{(3,195)} = 5.96, p < .01$ ), HEAL\_SERV ( $F_{(3,195)} = 6.63, p < .001$ ), SPOR\_SERV ( $F_{(3,195)} = 4.45, p < .001$ ), LEIS\_SERV ( $F_{(3,195)} = 3.71, p < .05$ ), COMM\_SERV ( $F_{(3,195)} = 3.91, p < .05$ ), CHAO\_LIFE ( $F_{(3,195)} = 2.96, p < .05$ ). Post hoc analyses showed that adults and elderly people generally have a worse perception on all indexes considered (see Table 2).

A significant effect of length of residence was found on the indexes HEAL\_SERV ( $F_{(2,195)} = 9.47, p < .001$ ), and LEIS\_SERV ( $F_{(2,195)} = 3.27, p < .05$ ). Post hoc analyses showed that people who have been living in the neighbourhood for less than 20 years showed a better perception of these functional features than residents who have been living there for more than 20 years (see Table 3).

No significant main effect of educational level and time daily spent in the neighbourhood on the PREQ indexes, or any interaction between the variables we considered emerged.

### 4.3. Effects of neighbourhood of residence, socio-demographic and residential variables on affective qualities of places

At the first level of analysis, the influence of neighbourhood of residence, socio-demographic and residential variables on affective qualities was also evaluated.

A significant effect of neighbourhood of residence was found with reference to the indexes PLEAS ( $F_{(1,184)} = 5.58, p < .05$ ), AROUS ( $F_{(1,184)} = 6.75, p < .01$ ) and SLEEP ( $F_{(1,184)} = 8.20, p < .01$ ). N1 emerged as more pleasant and arousing than N2; N2 was found to be more sleepy than N1 (see Table 4).

A significant effect of length of residence was found on the indexes RELAX ( $F_{(2,184)} = 6.63, p < .01$ ) and GLOOM ( $F_{(2,184)} = 4.97, p < .01$ ). Post hoc analyses showed that people who have been living in the neighbourhood for more than 20 years perceived a higher presence of relaxing places; residents for more than 30 years perceived a higher presence of gloomy places (see Table 5).

A significant effect of time daily spent in the neighbourhood was found on the indexes GLOOM ( $F_{(2,184)} = 3.62, p < .05$ ) and

**Table 2**

PREQ indexes (only significant effects are presented): Means and standard deviations for Age Groups.

PREQ index	Age group	N	Mean	SD
Building aesthetics and spaciousness among buildings (BUI_AESTH)	15–25 years	61	2.47 <sup>a</sup>	.99
	26–35 years	59	2.39 <sup>a</sup>	.91
	36–45 years	62	2.11 <sup>b</sup>	1.03
	>45 years	62	2.13 <sup>b</sup>	.91
Building size (BUI_SIZE)	15–25 years	61	2.66 <sup>b</sup>	1.16
	26–35 years	59	2.67 <sup>b</sup>	.98
	36–45 years	62	3.00 <sup>a</sup>	1.21
	>45 years	62	3.14 <sup>a</sup>	1.24
Presence and care of green areas (GREEN)	15–25 years	61	3.31 <sup>a</sup>	1.37
	26–35 years	59	2.99 <sup>b</sup>	1.40
	36–45 years	62	2.64 <sup>c</sup>	1.41
	>45 years	62	2.74 <sup>c</sup>	1.20
Health/social services (HEAL_SERV)	15–25 years	61	2.52 <sup>a</sup>	.77
	26–35 years	59	2.68 <sup>a</sup>	.71
	36–45 years	62	2.04 <sup>b</sup>	1.11
	>45 years	62	2.55 <sup>a</sup>	.87
Sports services (SPOR_SERV)	15–25 years	61	2.64 <sup>a</sup>	1.23
	26–35 years	59	2.45 <sup>a</sup>	1.16
	36–45 years	62	2.13 <sup>b</sup>	1.12
	>45 years	62	2.16 <sup>b</sup>	.99
Leisure and cultural services (LEIS_SERV)	15–25 years	61	1.96 <sup>a</sup>	1.12
	26–35 years	59	2.01 <sup>a</sup>	1.00
	36–45 years	62	1.54 <sup>b</sup>	.89
	>45 years	62	1.63 <sup>b</sup>	.84
Commercial services (COMM_SERV)	15–25 years	61	3.18 <sup>c</sup>	1.15
	26–35 years	59	3.78 <sup>a</sup>	1.36
	36–45 years	62	3.52 <sup>b</sup>	1.12
	>45 years	62	3.47 <sup>b</sup>	.98
Chaotic lifestyle (CHAO_LIFE)	15–25 years	61	2.74 <sup>b</sup>	1.07
	26–35 years	59	2.68 <sup>b</sup>	1.08
	36–45 years	62	3.17 <sup>a</sup>	1.12
	>45 years	62	3.02 <sup>a</sup>	.99

Note: the letters a–c refer to significant differences between groups.

**Table 3**

PREQ indexes (only significant effects are presented): Means and standard deviations for Length of Residence.

PREQ index	Length of residence	N	Mean	SD
Health/social services (HEAL_SERV)	10–20 years	87	2.64 <sup>a</sup>	.73
	21–30 years	91	2.20 <sup>b</sup>	.93
	>30 years	66	2.23 <sup>b</sup>	1.02
Leisure and cultural services (LEIS_SERV)	10–20 years	87	2.00 <sup>a</sup>	1.09
	21–30 years	91	1.69 <sup>b</sup>	.99
	>30 years	66	1.63 <sup>b</sup>	.97

Note: the letters a,b refer to significant differences between groups.

**Table 4**

Affective qualities (only significant effects are presented): Means and standard deviations in N1 and N2.

Affective quality	N1		N2	
	Mean	SD	Mean	SD
Pleasant (PLEAS)	1.81	1.09	1.61	1.04
Arousing (AROUS)	1.20	1.18	.78	.92
Sleepy (SLEEP)	.90	1.09	1.18	.91

SLEEP ( $F_{(2,184)} = 4.20, p < .05$ ). Post hoc analyses showed that people spending a larger amount of time in the neighbourhood perceived a higher presence of both gloomy and sleepy places (see Table 6).

**Table 5**

Affective qualities (only significant effects are presented): Means and standard deviations for Length of Residence.

Affective quality	Length of residence	N	Mean	SD
Relaxing (RELAX)	10–20 years	87	1.37 <sup>b</sup>	1.10
	21–30 years	91	1.71 <sup>a</sup>	1.03
	>30 years	66	1.65 <sup>a</sup>	.95
Gloomy (GLOOM)	10–20 years	87	1.02 <sup>b</sup>	1.10
	21–30 years	91	1.25 <sup>b</sup>	1.07
	>30 years	66	1.76 <sup>a</sup>	1.05

Note: the letters a–c refer to significant differences between groups.

**Table 6**

Affective qualities (only significant effects are presented): Means and standard deviations for Time spent in the neighbourhood.

Affective quality	Time daily spent in the neighbourhood	N	Mean	SD
Gloomy (GLOOM)	0–6 hours	74	1.05 <sup>b</sup>	1.01
	7–10 hours	90	1.47 <sup>a</sup>	1.19
	>10 hours	80	1.36 <sup>a</sup>	1.08
Sleepy (SLEEP)	0–6 hours	74	.76 <sup>b</sup>	.86
	7–10 hours	90	1.14 <sup>a</sup>	1.08
	>10 hours	80	1.16 <sup>a</sup>	1.03

Note: the letters a,b refer to significant differences between groups.

No significant main effect of gender, age and educational level on the affective indexes, or any interaction between the variables we considered emerged.

#### 4.4. Effects of neighbourhood of residence, socio-demographic and residential variables on urban activities

At the first level of analysis, we finally investigated the effect of neighbourhood of residence, socio-demographic and residential variables on activities.

A significant effect of neighbourhood of residence was found with reference to the indexes PURCH ( $F_{(1,184)} = 4.65, p < .05$ ), SOCIAL\_B ( $F_{(1,184)} = 7.47, p < .01$ ) and SPORT ( $F_{(1,184)} = 40.18, p < .001$ ). Residents in N1 were found to use places in the neighbourhood for shopping and for playing sports more than people in N2; residents in N2 indicated a larger number of places for socialisation than people in N1 (see Table 7).

A significant effect of gender emerged on the index PURCH ( $F_{(1,184)} = 7.23, p < .01$ ). Women ( $M = 1.95, SD = .70$ ) were found to use a larger number of places for purchasing activities than men ( $M = 1.67, SD = .85$ ).

A significant effect of age was found with reference to the indexes SPORT ( $F_{(3,184)} = 3.56, p < .05$ ) and LEIS ( $F_{(3,184)} = 3.31, p < .05$ ). Post hoc analysis showed that residents younger than 35 found a larger amount of places for playing sports in the neighbourhood than the over 45 age group; younger people (less than 25) also indicated a higher amount of places for leisure activities than the other three groups, and a significant difference also emerged between the middle-aged residents (26–45 years) and the over 45 age group (see Table 8).

**Table 7**

Urban behaviour (only significant effects are presented): Means and standard deviations in N1 and N2.

Urban behaviour	N1		N2	
	Mean	SD	Mean	SD
Purchasing activities (PURCH)	1.92	.66	1.69	.90
Socialisation (SOCIAL_B)	1.60	.73	2.02	.92
Sporting activities (SPORT)	1.39	.76	.72	.73

**Table 8**

Urban behaviour (only significant effects are presented): Means and standard deviations for Age Groups.

Urban behaviour	Age Group	N	Mean	SD
Sporting activities (SPORT)	15–25 years	61	1.28 <sup>a</sup>	.82
	26–35 years	59	1.25 <sup>a</sup>	.76
	36–45 years	62	1.11 <sup>a,b</sup>	.73
	>45 years	62	.68 <sup>b</sup>	.84
Leisure/entertainment (LEIS)	15–25 years	61	1.69 <sup>a</sup>	.90
	26–35 years	59	1.47 <sup>b</sup>	.84
	36–45 years	62	1.50 <sup>b</sup>	.91
	>45 years	62	1.29 <sup>c</sup>	1.03

Note: the letters a–c refer to significant differences between groups.

**Table 9**

Urban behaviour (only significant effects are presented): Means and standard deviations for Educational level.

Urban behaviour	Educational level	N	Mean	SD
Cultural activities (CULT)	Low	78	.40 <sup>b</sup>	.75
	Middle	112	.60 <sup>a,b</sup>	.78
	High	54	.96 <sup>a</sup>	.74

Note: the letters a,b refer to significant differences between groups.

Finally, a significant effect of educational level emerged with respect to the index CULT ( $F_{(2,184)} = 3.21, p < .05$ ). Post hoc analyses showed that residents with a higher educational level indicated a larger amount of places in the neighbourhood in order to carry out cultural activities than people with a lower educational level (see Table 9).

No significant main effect of length of residence and time daily spent in the neighbourhood on urban behaviour, or any interaction between the variables we considered emerged.

#### 4.5. A multivariate and multilevel approach to residential satisfaction and neighbourhood attachment

At a higher level of analysis, residential satisfaction (SATISF) and neighbourhood attachment (ATTACH) were considered, within the theoretical framework of place theory (Canter, 1977), as final criterion in two hierarchical linear models (Bryk & Raudenbush, 1992). Socio-demographic (age, educational level), residential (length of residence, time spent daily in the neighbourhood), cognitive, affective and behavioural variables were included as I level, and neighbourhood objective attributes as II level variables.

A correlation analysis between socio-demographic, residential and psychological variables was preliminarily carried out in order to avoid collinearity problems. Length of residence in Rome was excluded from subsequent analyses because of a high correlation ( $r = .767$ ) with age. No further problematic values of correlation coefficient emerged. The highest correlation was between the variables CONNECT and TRANSP\_SERV ( $r = .651$ , 42% of variance in common).

##### 4.5.1. Relations between neighbourhood objective attributes, socio-demographic, residential and psychological (cognition, affect and behaviour) variables, and residential satisfaction

We first tested the null model, predicting no significant difference in SATISF between the two neighbourhoods. Results showed a significant difference in SATISF ( $Chi-Square = 19.31, p < .001$ ), with a higher level in N1 ( $M = 3.50, SD = 1.09$ ) than in N2 ( $M = 2.86, SD = 1.20$ ). The null model was rejected, and the role of I level (Table 10, Model 1) and II level (Table 10, Model 2) variables in explaining SATISF was analysed.

As in Model 1 the variables COMM\_SERV ( $Chi-Square = 4.19, df = 1, p < .05$ ) and MON\_LIFE ( $Chi-Square = 7.24, df = 1, p < .01$ ) showed a significant random effect, second-level variables from

**Table 10**

HLM Model of Residential Satisfaction (SATISF) with I level (Model 1) and II level variables (Model 2).

Variables included					
<i>Model 1—I Level</i>					
Socio-demographics					
Residential variables					
PREQ indexes					
Affective qualities					
Urban activities					
<i>Model 2—II Level</i>					
Objective attributes					
<b>Model 1</b>					
Fixed effect	Coefficient	SE	t-ratio	p	
Neighbourhood	3.239	.052	61.218	<.001	
<b>I Level</b>					
COMM_SERV	.286	.060	4.744	<.001	
CHAO_LIFE	-.374	.063	-5.970	<.001	
MON_LIFE	-.350	.134	-2.600	<.05	
PLEAS	.127	.055	2.270	<.05	
PURCH	.227	.087	2.613	<.05	
LEIS	.205	.067	3.048	<.05	
<b>Model 2 (Final)</b>					
Fixed effect	Coefficient	SE	t-ratio	p	
Neighbourhood	3.239	.052	61.218	<.001	
<b>I Level</b>					
CHAO_LIFE	-.376	.051	-7.383	<.001	
PLEAS	.145	.056	2.580	<.05	
PURCH	.236	.070	3.348	<.05	
LEIS	.167	.061	2.749	<.05	
<b>II Level</b>					
STRUCT_COMM	.195	.089	2.191	<.05	
STRUCT_LEIS	.256	.081	3.153	<.01	
Random effect	SD	Variance component	df	Chi-Square	p
Neighbourhood	.073	.005	1	1.627	ns
COMM_SERV	.001	.014	1	4.197	<.05
MON_LIFE	.167	.027	1	7.239	<.01
R	.796	.634			
Random effect	SD	Variance component	df	Chi-Square	p
Neighbourhood	.003	.000	1	.594	ns
COMM_SERV	.005	.000	0	.217	ns
MON_LIFE	.002	.000	0	.261	ns
R	.803	.644			

the structural attributes of the neighbourhoods were included. The amount of commercial services (STRUCT\_COMM:  $t = 2.19, p < .05$ ) and the amount of leisure services (STRUCT\_LEIS:  $t = 3.15, p < .01$ ) emerged as significant predictors of the subjective variables COMM\_SERV and MON\_LIFE, respectively, making the random effects no longer significant in the final model (Table 10, Model II).

##### 4.5.2. Relations between neighbourhood objective attributes, socio-demographic, residential and psychological (cognition, affect and behaviour) variables, and neighbourhood attachment

We first tested the null model, predicting no significant difference in ATTACH between the two neighbourhoods. As a significant difference ( $Chi-Square = 19.31, p < .001$ ) emerged, with a higher level of ATTACH in N1 ( $M = 3.38, SD = 1.19$ ) than in N2 ( $M = 2.95, SD = 1.25$ ). The null model was rejected, and the role of I level (Table 11, Model 1) and II level (Table 11, Model 2) variables in explaining SATISF was analysed.

As in Model 1 the variables PLEAS ( $Chi-Square = 6.63, df = 1, p < .01$ ) and SOCIAL\_B ( $Chi-Square = 4.99, df = 1, p < .05$ ) showed a significant random effect, second-level variables from the struc-

**Table 11**

HLM Model of Neighbourhood Attachment (ATTACH) with I level (Model 1) and II level variables (Model 2).

Variables included					
<i>Model 1—I Level</i>					
Socio-demographics					
Residential variables					
PREQ indexes					
Affective qualities					
Urban activities					
<i>Model 2—II Level</i>					
Objective attributes					
Model 1					
Fixed effect	Coefficient	SE	t-ratio	p	
Neighbourhood	3.239	.052	61.218	<.001	
I Level					
HOURS	.043	.013	3.325	<.01	
BUI_AESTH	.326	.067	4.886	<.001	
SOCIAL	.313	.080	3.896	<.001	
POLITE	.163	.069	2.492	<.01	
COMM_SERV	.151	.048	3.107	<.01	
PLEAS	.339	.074	4.561	<.001	
GLOOM	-.206	.051	-4.046	<.001	
AROUS	.156	.068	2.318	<.05	
SOCIAL_B	.286	.087	3.265	<.01	
LEIS	.146	.060	2.427	<.05	
Model 2 (Final)					
Fixed effect	Coefficient	SE	t-ratio	p	
Neighbourhood	3.148	.053	59.668	<.001	
I Level					
HOURS	.042	.013	3.281	<.01	
BUI_AESTH	.325	.059	5.517	<.001	
SOCIAL	.302	.068	4.419	<.001	
POLITE	.180	.056	3.225	<.01	
COMM_SERV	.162	.049	3.332	<.01	
GLOOM	-.204	.051	-3.977	<.001	
AROUS	.147	.056	2.625	<.05	
LEIS	.149	.060	2.481	<.05	
II Level					
STRUCT_GREEN	.151	.061	2.475	<.05	
STRUCT_B_DENS	-.119	.049	-2.429	<.05	
Random effect	SD	Variance component	df	Chi-Square	p
Neighbourhood	.073	.005	1	1.627	ns
PLEAS	.137	.019	1	6.633	<.01
SOCIAL_B	.154	.024	1	4.986	<.05
R	.796	.634			
Random effect	SD	Variance component	df	Chi-Square	p
Neighbourhood	.003	.000	1	.474	ns
PLEAS	.002	.000	0	.017	ns
SOCIAL_B	.003	.000	0	.041	ns
R	.781	.610			

tural attributes of the neighbourhoods were included. The amount of green areas (STRUCT\_GREEN:  $t = 2.48$ ,  $p < .05$ ) and the building density (STRUCT\_B\_DENS:  $t = 2.43$ ,  $p < .05$ ) emerged as significant predictors of the subjective variables PLEAS and SOCIAL\_B, respectively, making the random effects no longer significant in the final model (Table 11, Model II).

## 5. Discussion

The analysis of people–environment transactions in two residential areas in Rome, within the place-specific approach proposed by Canter (1977), was aimed at getting potential indications for neighbourhood improvement. Perception of urban

quality, affective response to the neighbourhood and activities of residents were jointly taken into consideration in a comprehensive framework in order to explaining residential satisfaction and neighbourhood attachment, thus going beyond previous research addressing these topics separately (Bonaiuto et al., 1999, 2003, 2004).

### 5.1. The place-specific nature of people–environment transactions

#### 5.1.1. Perception of urban residential quality

A variety of urban quality indicators, referring to architectural and town-planning, social, functional and contextual features emerged, substantially confirming previous research (Américo & Aragonés, 1990; Bonaiuto et al., 1999, 2003; Carp & Carp, 1982; Weidemann et al., 1982). With reference to these variables, place-specific people–environment transactions in the two neighbourhoods were found. In N1 (*Prenestino-Labicano*) the perception of architectural and town-planning features, functional features and context features (less monotony) was better; in N2 (*Torre Angela*) building size was perceived as being less overwhelming, social relationships more positive, and environmental pollution lower. These results mirror structural attributes of the two neighbourhoods (see Appendix A). N1 is better equipped than N2 in terms of services and facilities, presumably connected to the perception of monotony in the environment. N2 is far from the city centre, and probably pollution is not a relevant concern of residents. Finally, it is possible to speculate that the perception of better social relationships in N2 may be somehow associated with the characteristics of families, leading to experience of social exclusion mainly in N1. Interestingly, a different perception of urban green areas between the two neighbourhoods emerged, notwithstanding the similar structural data. This apparently surprising result may be explained by considering that in N1 there are fewer urban parks, but they are larger than in N2.

Socio-demographic characteristics of residents were found to influence the evaluation of urban quality. Surprisingly, the higher the age of residents, the worse is the perception of a variety of urban quality indicators. This result is in opposition with previous findings showing a positive relationship between age and perceived urban quality (Carp & Carp, 1982; Christensen & Carp, 1987; Christensen et al., 1992). One possible explanation can be found in a lack of some basic requirements for adults and elderly people (e.g., presence and/or location of facilities). This supports the relevance of a place-specific approach to plan *ad hoc* interventions to satisfy the needs of residents.

The influence of length of residence on the evaluation of urban quality was far lower: long-time residents gave worse evaluations of health and leisure services only. This confirms previous findings on the relationships between urban activities and perceived residential quality (Bonaiuto et al., 2004). Gender differences emerged only for perceived insecurity, being the residential environment more insecure for women than for men (Smith, Torstensson, & Johansson, 2001).

#### 5.1.2. Affective appraisals

The affective response to the neighbourhood was found to be place-specific as well. Relaxing qualities were indicated in both neighbourhood to the same extent, even though with reference to different places: usually green areas in N1 and home in N2. Distressing qualities were associated in both areas with traffic and crowded places (e.g. supermarkets). Pleasant and arousing qualities were more frequently identified in N1 than in N2, again in respect to green areas. Conversely, a higher level of the sleepy quality emerged in N2 than in N1. This result may be related to the lack of leisure services and infrastructures, also emerging from the analysis of perceived urban quality. Residential variables proved to



influence affective appraisals: the more the length of residence and the time daily spent in the neighbourhood, the more the perception of some negative affective qualities (e.g. gloomy and sleepy). This further suggests that a longer experience in the urban environment may lead people to focus the attention on the negative aspects of the neighbourhood (Bonaiuto et al., 2004). Contrary to this view, relaxing places were more easily identified by long-time residents. However, green areas and domestic environment represent the most frequent indications, so sketching out the small variety of places having such a characteristic.

### 5.1.3. Urban behaviour

With reference to urban behaviour, purchasing and sporting activities emerge as more likely to occur in N1, while socialisation seems to be a fundamental activity in N2. These findings support both objective and subjective data previously discussed. It should be emphasised that the differences in resident–neighbourhood transactions we found in the two areas are similar to the pattern emerging from the comparison between a large and a small town (Bonaiuto & Bonnes, 1996): the centrality of home and socializing activities and the need to go elsewhere to buy specific goods for the residents of N2 can all be read in this light.

Socio-demographic variables showed an interesting influence on urban behaviour. Women were found to use the neighbourhood for purchasing activities more than men; the more people grow old, the less likely they indicate places in the neighbourhood for playing sports or carrying out leisure/entertainment activities; finally, people with a higher educational level indicate places to perform cultural activities to a greater extent. However, it is not easy to disentangle whether differences in urban practices depend on actual lacks in the neighbourhoods or on habits/behavioural patterns of specific groups of residents. As a consequence, it seems more difficult to identify clear strategies to improve residential quality in this respect.

### 5.2. An integrative framework for neighbourhood improvement: the analysis of residential satisfaction and neighbourhood attachment

According to the theoretical framework we adopted, all these results can be better understood with reference to place theory (Canter, 1977), explaining in a comprehensive model how all these variables relate to each other in influencing residential satisfaction and neighbourhood attachment, and thus suggesting directions for intervention to develop a more sustainable environment.

Satisfaction is explained by predictors referring to the three components proposed by place theory. It depends on the perception of functional features of the neighbourhood, namely the availability of commercial services, and some context features, namely the lack of monotony and chaos/disorder in the residential environment, confirming our hypotheses and empirical studies on urban quality (Amérgo & Aragonés, 1990; Parkes et al., 2002; Weidemann et al., 1982). Another aspect of satisfaction has to do with an affective connotation of places, referring to aesthetic value and pleasantness (Anthony et al., 1990; Weidemann et al., 1982). The final aspect is essentially behavioural, in that satisfaction increases as people find places in the neighbourhood to buy what they need; in addition, leisure behaviour contributes to an increase in residential satisfaction. Interestingly, social interaction did not emerge as an important predictor of residential satisfaction, disconfirming our hypothesis and previous findings (Aragonés, Amérgo & Sukhwani, as cited in Amérgo & Aragonés, 1997); however, the relevance of leisure activities, which can have a social value, can be read in accordance to our expectations. Some of significant predictors of satisfaction (the perceived presence of commercial facilities and the monotony in the residential environment) show a different predictive pattern in the two

neighbourhoods, which can be explained, at a higher level, by structural features of N1 and N2, the actual availability of shops and leisure services, respectively. In other words, those perceived variables depend on structural variables, which show a significant difference between the two neighbourhoods. This result suggests the need for a place-specific facilities improvement. Facilities should not be merely considered as a “cold” service to be provided, but as a material and immaterial good which can afford stimulation opportunities and enhance the responsiveness of the neighbourhood to residents' expectancies.

Similarly, neighbourhood attachment is embedded in the relationships between physical, cognitive, affective and behavioural aspects of people–residential environment transactions (Giuliani, 2003). The cognitive component of neighbourhood attachment is multi-faceted, being related to architectural, social and functional features: the aesthetic value of buildings, the social relationships with neighbours and the perception of their politeness, and the availability of commercial facilities (Bonaiuto et al., 1999). The second aspect of attachment is affective, because its level increases with an increase of pleasant and arousing places, and the decrease of gloomy places in the neighbourhood. The third aspect is behavioural, and has to do with the possibility to find places for socialisation and leisure activities. The role of social interaction and affective bonds with the neighbourhood is in line with our hypotheses. Moreover, attachment is positively predicted by the time people spend in the neighbourhood, emphasising the role of the temporal dimension in person–environment transactions (Altman & Rogoff, 1987). The presence of pleasant places and places for socialisation shows a different predictive pattern in N1 and N2, which can be accounted, at a higher level, by structural features of the two neighbourhoods, the presence of green areas and the building density (both higher in N1), respectively. This confirms the importance of greenery in the urban residential experience, emerging from previous research in the city of Rome (Bonnes, 1987; Bonnes, Aiello, & Ardore, 1995). N1 is characterised by the highest building density in Rome, and little space is probably left for the development of meeting places, thus affecting socialisation. A similar relationship between physical features (spaciousness) and human behaviour (neighbouring) was found by Skjaeveland and Gärling (1997). Also these results give suggestion for neighbourhood improvement: in N1 it suggests the need for open spaces helping smooth the skyline and promote socialisation; in N2, where social interaction is a key resource for residents and a perceived lack of green areas was found, the development of accessible parks can be in line with people's needs.

From a theoretical perspective, these results can contribute to a better understanding of the differences and relationships between residential satisfaction and neighbourhood attachment, which have been presented in literature according to different models (Amérgo & Aragonés, 1990; Bonaiuto et al., 1999; Sundstrom et al., 1996). One aspect refers to the temporal dimension of the residential experience (Altman & Rogoff, 1987): with increasing length of residence and time daily spent in the neighbourhood the perception of some indicators of urban quality decreases; conversely, attachment is enhanced.

Both residential satisfaction and neighbourhood attachment are predicted by the perceived presence of commercial facilities (an evaluative variable), the availability of pleasant places (an affective variable) and the possibility to carry out leisure activities (a behavioural variable). Nonetheless, beyond this similarity, the pattern of predictors is substantially different for the two constructs.

Residential satisfaction is also predicted by the perception of context features (lack of monotony and disorder in the neighbourhood); to a lesser extent, by the opportunity to buy some goods in the neighbourhood. In turn, perceived variables are predicted by

the actual availability of facilities. Briefly, this concept seems to be related to practical everyday personal–environment transactions.

Beyond common predictors, attachment mainly depends on social relationships and an affective bond with the neighbourhood based on the presence of arousing places and the absence of gloomy ones. Green areas represent the main source of pleasant places in the residential environment, while building density represents a structural obstacle to the availability of places promoting socialisation. In other words, neighbourhood attachment is mainly related to social and affective aspects of person–environment transactions. The different connotation of the two constructs can be also recognised by evaluating the predictive power of common predictors: commercial facilities are a better predictor of residential satisfaction than neighbourhood attachment, while the inverse is true for the availability of pleasant places.

## 6. Lesson learned

Beyond the analysis of residential satisfaction and attachment from a theoretical point of view, a major aim of the study was to evaluate the place-specific nature of person–environment relationships in order to get indications for neighbourhood improvement. We hypothesised that a general pattern of relationships between physical attributes, cognitive, affective and behavioural components in place experience would emerge from both neighbourhoods, but we also expected that *different* physical, cognitive, affective and

behavioural variables would play a key role in each of them; and peculiarities in the two areas were clearly outlined.

A place-specific analysis of person–environment relationships has practical implications, because it allows to highlight which aspects of the residential experience are more important for people's satisfaction. In addition, it can provide clues to identify the specific environmental features which are unable to meet the residents' needs and expectations, thus suggesting what can be improved in the residential area. Finally, beyond the idea of a "general resident", the identification of specific needs expressed by a group of residents (by gender, age, educational level or residential experience) can lead to more focused actions.

Some shortcomings of the study should be considered, and help identify directions for future research. A general model of residential satisfaction and neighbourhood attachment undoubtedly requires to analyse person–environment transactions by taking into account a larger amount of neighbourhoods, in order to control the effect of specific areas. So any generalization to different contexts should be taken with caution. However, we discussed the relevance of the place-specific analysis performed in this study. In addition, the residents in our neighbourhoods are mainly from a medium-low class, and this probably affects the choice of the residential environment, their cognitions, affect, and activities. Future research should consider the role of this variable, which seems to be highly relevant within a place-specific approach to neighbourhood improvement.

## Appendix A

### Neighbourhood objective attributes.

Variables and related acronyms	Prenestino Labicano–N1	Torre Angela–N2	Rome <sup>a</sup>	
			Min	Max
<b>(1) Socio-demographic indicators</b>				
Persons living together (Mean scores) (PER_TOG)	2.2	2.6	1.9	2.6
Families composed by one member (%) (MON_FAM)	40.7	27.1	27.1	60.4
Families composed by four members or more (%) (PLUR_FAM)	18.7	30.6	10.2	30.6
Widows/widowers (%) (WIDOW)	8.5	5.1	5.1	10.4
High school and degree (%) (HIGH_EDUC)	31.3	21.7	21.7	58.4
Unemployed people (%) (UNEMPL)	20.7	25.9	13.1	25.9
Dependence index <sup>b</sup> (DEP_IND)	44.1	38	35	53.5
Old age index <sup>c</sup> (OLD_IND)	163.4	60.8	60.8	271.8
People daily working away from the neighbourhood (%) (WORK_AWAY)	72.9	62.1	51.8	74.9
<b>(2) Residential urban quality indicators</b>				
<b>(2a) Architectural and town-planning features</b>				
Green areas: sq. m./inhabitant (STRUCT_GREEN)	2.8	2.7	1.1	64
Apartments on urban ground (per hectare) (STRUCT_B_DENS)	116.8	29	20.6	116.8
<b>(2b) Services/facilities</b>				
Home assisted old people/1000 old people (HOME_AS)	6.6	9.4	4.9	9.4
Market places/10000 inhabitants (MARKET)	0.6	0.2	0.2	0.8
Commercial services/10000 inhabitants (STRUCT_COMM)	15.9	9.7	6.7	28.7
Libraries: total amount of books (LIBRAR)	29000	20000	12000	72000
Recreational services/10000 inhabitants (STRUCT_LEIS)	1.5	0.1	0.1	3.8
Sport services/10000 inhabitants (STRUCT_SPOR)	13.4	10.4	10.4	27.3
Restaurants/10000 inhabitants (RESTAUR)	5.6	4.8	4.8	28.2
<b>(2c) Crime and security</b>				
Crimes/100 inhabitants (CRIMES)	2.5	0.8	0.6	14.9
Pick-pocketing and bag-snatching/1000 inhabitants (PICK_P)	3.1	1	0.5	71.8
Car burglaries/1000 inhabitants (CAR_BUL)	8.5	2.7	1.8	13
Car accidents/1000 inhabitants (CAR_ACC)	15	10.8	9.1	47.5
Intentional murders/10000 inhabitants (MURD)	0.4	0.2	0	0.5
Arrests and denunciations/1000 crimes (ARR_DEN)	101.8	132.5	12.1	142.9

<sup>a</sup> Indicators of Prenestino-Labicano and Torre Angela are compared to the same indicators of neighbourhoods with the lowest (Min) and highest (Max) values in Rome.

<sup>b</sup> This index is represented by the ratio: people younger than 14 and older than 65/people ranging from 15 to 64.

<sup>c</sup> This index is represented by the ratio: people older than 65/people younger than 14.

## Appendix B

## Confirmatory Factor Analyses for PREQ and NAS scales: Fit indexes.

PREQ Generative content area	Component	RMSEA	SRMR	NNFI	CFI
Architectural and town-planning features					
Architectural and town-planning space	Buildings' aesthetic pleasantness and spaciousness among buildings (BUI_AESTH) Buildings' excessive volume (BUI_SIZE)	.045	.031	.96	.97
Organization of accessibility and roads	External connections to the city (CONNECT) Internal accessibility (ACCESS)	.034	.028	.97	.98
Green areas	Presence and care of green areas (GREEN)	.012	.008	.99	.99
Social relations features					
People and social relationships	Insecurity (INSECUR) Sociality and affability (SOCIAL) Tact and politeness (POLITE)	.048	.030	.97	.98
Services/facilities					
Social and health-related assistance services	Educational services (EDUC_SERV) Social and health services (HEAL_SERV)	.042	.034	.98	.99
Cultural and recreational services	Sports services (SPOR_SERV) Leisure and cultural services (LEIS_SERV)	.040	.027	.97	.98
Commercial services	Commercial services (COMM_SERV)	.008	.003	1.00	1.00
Transportation	Public transportation (TRANSP)	.010	.006	.99	.99
Context features					
Psychological "climate"	Chaotic lifestyle (CHAO_LIFE) Monotonous lifestyle (MON_LIFE)	.037	.025	.96	.97
Environmental health	Pollution (POLLUT)	.013	.009	.99	.99
Care and upkeep	Care and upkeep (UPKEEP)	.021	.015	.99	1.00
NAS Generative content area	Component	RMSEA	SRMR	NNFI	CFI
Neighbourhood attachment	Neighbourhood attachment (ATTACH)	.036	.021	.99	1.00

## References

- Altman, I., & Low, S. (Eds.). (1992). *Place attachment*. New York: Plenum Press.
- Altman, I., & Wandersman, A. (Eds.). (1987). *Neighbourhood and community environments*. New York: Plenum Press.
- Altman, I., & Rogoff, B. (1987). World views in psychology. Trait, interactional, organismic and transactional perspectives. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (pp. 7–40). New York: Wiley.
- Amérgio, M., & Aragonés, J. I. (1990). Residential satisfaction in council housing. *Journal of Environmental Psychology*, 10, 313–325.
- Amérgio, M., & Aragonés, J. I. (1997). A theoretical and methodological approach to the study of residential satisfaction. *Journal of Environmental Psychology*, 17, 47–57.
- Anthony, K. H., Weidemann, S., & Chin, Y. (1990). Housing perceptions of low-income single parents. *Environment and Behavior*, 22(2), 147–182.
- Blackman, T., Harvey, J., Lawrence, M., & Simon, A. (2001). Neighbourhood renewal and health: Evidence from a local case study. *Health & Place*, 7, 93–103.
- Bonaiuto, M., Aiello, A., Perugini, M., Bonnes, M., & Ercolani, A. P. (1999). Multidimensional perception of residential environment quality and neighbourhood attachment in the urban environment. *Journal of Environmental Psychology*, 19, 331–352.
- Bonaiuto, M., & Bonnes, M. (1996). Multi-place analysis of the urban environment: A comparison between a large and a small Italian city. *Environment and Behavior*, 28(6), 699–747.
- Bonaiuto, M., Bonnes, M., & Continisio, M. (2004). Neighborhood evaluation within a multiplace perspective on urban activities. *Environment and Behavior*, 36(1), 41–69.
- Bonaiuto, M., Fornara, F., & Bonnes, M. (2003). Indexes of perceived residential environment quality and neighbourhood attachment in urban environments: A confirmation study on the city of Rome. *Landscape and Urban Planning*, 65, 41–52.
- Bonnes, M. (Ed.). (1987). *Urban ecology applied to the city of Rome*. UNESCO-MAB Project n 11 Progress report n 3. Rome: MAB-Italy.
- Bonnes, M., Aiello, A., & Ardore, R. (1995). Urban residents' representation of the natural features of the environment. In L. Graumann-Kruse (Ed.), *Societal dimensions of biosphere reserves for people* (pp. 13–24). Bonn: MAB.
- Bonnes, M., Mannetti, I., Secchiaroli, G., & Tanucci, G. (1990). The city as a multi-place system. An analysis of people-urban environment transactions. *Journal of Environmental Psychology*, 10, 37–65.
- Bonnes, M., & Secchiaroli, G. (1995). *Environmental psychology: A psycho-social introduction*. London: Sage.
- Brown, B., & Perkins, D. (1992). Disruption in place attachment. In I. Altman & S. Low (Eds.), *Place attachment* (pp. 279–304). New York: Plenum Press.
- Bruin, M. J., & Cook, C. C. (1997). Understanding constraints and residential satisfaction among low-income single-parent families. *Environment and Behavior*, 29(4), 659–698.
- Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models: Applications and data analysis methods*. Newbury Park, CA: Sage.
- Canter, D. (1977). *The psychology of places*. London: Architectural Press.
- Canter, D. (1983). The purposive evaluation of places: A facet approach. *Environment and Behavior*, 15, 659–698.
- Carp, F. M., & Carp, A. (1982). Perceived environmental quality of neighbourhoods: Development of assessment scales and their relation to age and gender. *Journal of Environmental Psychology*, 2, 295–312.
- Christensen, D. L., & Carp, F. M. (1987). PEQI-based environmental predictors of the residential satisfaction of older women. *Journal of Environmental Psychology*, 7, 45–64.
- Christensen, D. L., Carp, F. M., Cranz, G. L., & Wiley, J. A. (1992). Objective housing indicators as predictors of the subjective evaluation of elderly residents. *Journal of Environmental Psychology*, 12, 225–236.
- Cook, C. C. (1988). Components of neighborhood satisfaction. Responses from urban and suburban single-parent women. *Environment and Behavior*, 20, 115–149.
- Corraliza, J. A., & Aragonés, J. I. (1988). Assessment of emotional environmental dimension: The affective quality attributed to several places in Madrid. In D. Canter, J. Correia Jesuino, L. Sockza, & G. M. Stephenson (Eds.), *Environmental social psychology—NATO ASI Series* (pp. 160–170). Dordrecht: Kluwer Academic Publishers.
- Craik, K. H., & Zube, E. H. (1976). The development of perceived environmental quality indices. In K. H. Craik & E. H. Zube (Eds.), *Perceiving environmental quality: Research and applications*. New York: Plenum Press.
- Feldman, R. M. (1996). Constancy and change in attachment to types of settlements. *Environment and Behavior*, 28, 419–445.
- Fraser, J., & Lepofsky, J. (2004). The uses of knowledge in neighbourhood revitalization. *Community Development Journal*, 39(1), 4–12.
- Fried, M. (1982). Residential attachment: Sources of residential and community satisfaction. *Journal of Social Issues*, 38, 107–119.
- Galster, G., & Hesser, G. W. (1981). Residential satisfaction. Compositional and contextual correlates. *Environment and Behavior*, 13, 735–758.
- García-Mira, R., Arce, C., & Sabucedo, J. M. (1997). Perceived quality in a city in Northwest Spain: An individual differences scaling approach. *Journal of Environmental Psychology*, 17, 243–252.
- Genereux, R. L., Ward, L. M., & Russell, J. A. (1983). The behavioral component in the meaning of places. *Journal of Environmental Psychology*, 3, 43–55.
- Giuliani, M. V. (2003). Theory of attachment and place attachment. In M. Bonnes, T. Lee, & M. Bonaiuto (Eds.), *Psychological theories for environmental issues* (pp. 137–170). Aldershot: Ashgate.
- Hanyu, K. (1993). The affective meaning of Tokyo: Verbal and non-verbal approaches. *Journal of Environmental Psychology*, 13, 161–172.

- Hanyu, K. (1997). Visual properties and affective appraisal in residential areas after dark. *Journal of Environmental Psychology*, 17, 301–315.
- Hanyu, K. (2000). Visual properties and affective appraisals in residential areas in daylight. *Journal of Environmental Psychology*, 20, 273–284.
- Hox, J. J. (1995). *Applied multilevel analysis*. Amsterdam: TT-Publikaties.
- Huang, S.-C.L. (2006). A study of interactional spaces in high-rise housing. *Landscape and Urban Planning*, 78, 193–204.
- IDeA. (2005). *Neighbourhood renewal and social inclusion. A councillor's guide*. Improvement and Development Agency, Layden House, 76–86 Turnmill Street, London EC1M 5LG.
- Ittelson, W. H. (1973). *Environment and cognition*. New York: Academic Press.
- Lu, M. (1999). Determinants of residential satisfaction: Ordered logit vs. regression models. *Growth and Change*, 30, 264–287.
- Marans, R. W. (2003). Understanding environmental quality through quality of life studies: The 2001 DAS and its use of subjective and objective indicators. *Landscape and Urban Planning*, 65, 73–83.
- Meegan, R., & Mitchell, A. (2001). It's not community round here, it's neighbourhood: Neighbourhood change and cohesion in urban regeneration policies. *Urban Studies*, 38(12), 2167–2194.
- Michael, Y. L., Green, M. K., & Farquhar, S. A. (2006). Neighborhood design and active aging. *Health & Place*, 12, 734–740.
- Moore, G. T. (1979). Knowing about environmental knowing: The current state of theory and research on environmental cognition. *Environment and Behavior*, 11, 33–70.
- Nielsen, T. S., & Hansen, K. B. (2007). Do green areas affect health? Results from a Danish survey on the use of green areas and health indicators. *Health & Place*, 13, 839–850.
- Parkes, A., Kearns, A., & Atkinson, R. (2002). What makes people dissatisfied with their neighbourhoods? *Urban Studies*, 39(13), 2413–2438.
- Parry, J., Laburn-Pearl, K., Orford, J., & Dalton, S. (2004). Mechanism by which area-based regeneration programmes might impact on community health: A case study of the new deal for communities initiative. *Public Health*, 118, 497–505.
- Perugini, M., Bonnes, M., Aiello, A., & Ercolani, A. P. (2002). Il modello circonflesso delle qualità affettive dei luoghi: sviluppo di uno strumento valutativo italiano [The affective quality of places' circumplex model: Development of an Italian evaluative tool]. *Testing Psicometria Metodologia*, 9(4), 131–152.
- Romice, O. (2000). New developments in and reflections on, the use of visual literacy and environmental evaluation for the participation of community groups in design. *Geojournal*, 51, 311–319.
- Russell, J. A. (1978). Evidence of convergent validity on the dimensions of affect. *Journal of Personality and Social Psychology*, 36, 1152–1168.
- Russell, J. A. (1983). Pancultural aspects of the human conceptual organization of emotions. *Journal of Personality and Social Psychology*, 45(6), 1281–1288.
- Russell, J. A., Lewicka, M., & Niit, T. (1989a). A cross-cultural study of a circumplex model of affect. *Journal of Personality and Social Psychology*, 5, 848–896.
- Russell, J. A., & Pratt, G. (1980). A description of the affective quality attributed to environment. *Journal of Personality and Social Psychology*, 38, 313–322.
- Russell, J. A., & Ward, L. M. (1982). Environmental psychology. *Annual Review of Psychology*, 33, 651–688.
- Russell, J. A., Weiss, A., & Mendelsohn, G. A. (1989b). Affect grid: A single-item scale of pleasure and arousal. *Journal of Personality and Social Psychology*, 57(3), 493–502.
- Sirgy, M. J., & Cornwell, T. (2002). How neighborhood features affect quality of life. *Social Indicators Research*, 59, 79–114.
- Skjaeveland, O., & Gärling, T. (1997). Effects of interactional space on neighbouring. *Journal of Environmental Psychology*, 17, 181–198.
- Smith, W. R., Torstensson, M., & Johansson, K. (2001). Perceived risk and fear of crime: Gender differences in contextual sensitivity. *International Journal of Victimology*, 8(2), 159–181.
- Stokols, D. (1987). Conceptual strategies of environmental psychology. In Stokols, D., & Altman, I. (Eds.), *Handbook of environmental psychology*. Vol. 1 (pp.41–70). New York: Wiley.
- Sugiyama, T., & Thompson, C. W. (2007). Outdoor environments, activity and the well-being of older people: Conceptualising environmental support. *Environment & Planning A*, 39(8), 1943–1960.
- Sullivan, H. (2002). Modernization, neighbourhood management and social inclusion. *Public Management Review*, 4(4), 505–528.
- Sundstrom, E., Bell, P. A., Busby, P. L., & Asmus, C. (1996). Environmental psychology 1989–1994. *Annual Review of Psychology*, 47, 485–512.
- Weidemann, S., Anderson, J. R., Butterfield, D. J., & O'Donell, P. M. (1982). Residents perception of satisfaction and safety: A basis for change in multifamily housing. *Environment and Behavior*, 14, 695–724.
- Ward, L. M., & Russell, J. A. (1981). The psychological representation of molar physical environment. *Journal of Experimental Psychology: General*, 110, 121–152.

**Antonio Aiello** PhD is Associare Professor of social psychology at the University of Cagliari (Italy). His main scientific activities follow the perspective of evaluative interdisciplinary research framing relevant social themes. He authored and co-authored up to 60 papers in International and Italian scientific journals and volumes.

**Ritagrazia Ardone** is Full Professor of clinical and social psychology at “Sapienza” University of Rome (Italy). Her main scientific interests fall in the field of social psychology and evaluative research. She authored and co-authored up to 100 papers in Italian and International psychological literature.

**Massimiliano Scopelliti** PhD is Assistant Professor in social and environmental psychology at LUMSA University of Rome, Italy. He is author (or co-author) of up to 30 scientific manuscripts (articles, book chapters). His main research topics are the evaluation of the restorative potential of environments; the evaluation of urban quality and residential satisfaction; the use/acceptability of new technologies by elderly people at home; the assessment of environmental humanization and legibility in the hospital environment; the perception of environmental quality and satisfaction in the workplace.