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MULTIDIMENSIONAL PERCEPTION OF RESIDENTIAL ENVIRONMENT QUALITY AND NEIGHBOURHOOD ATTACHMENT IN THE URBAN ENVIRONMENT¹

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Abstract

This study tests a path model in which residential satisfaction, operationalized in terms of multidimensional perceived residential environment quality (PREQ), predicts neighbourhood attachment considered as the final criterion. Socio-demographic (age, sex, socio-economic level) and residential (length of residence both in the neighbourhood and in Rome, number of persons living together) variables are also included in the theoretical model as predictors of both PREQ and neighbourhood attachment. Using a multidimensional questionnaire for the measurement of PREQ and a unidimensional scale for the measurement of neighbourhood attachment, the study focuses on a sample of 497 inhabitants from 20 different neighbourhoods in the city of Rome. The multidimensional PREQ questionnaire comprises 20 different scales covering four main areas: architectural and town-planning features (six scales); social relations features (three scales); punctual and in-network services (six scales); context features (five scales). First, the path model is tested separately in each area using structural equation analysis. Then, the best predictors emerging from each area, together with all socio-demographic and residential variables, are included in a final model. This model shows both the relevance of predictors from all four areas in predicting attachment, and also a hierarchy between the areas in the power of the prediction (context area giving the most powerful predictors, services giving the weakest ones, architectural and town-planning, and social relations having intermediate importance). Length of residence in the neighbourhood and socio-economic level are the most relevant of the residential and socio-demographic variables. Results are discussed with reference to the multicomponential nature of the process of neighbourhood attachment.

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Introduction

The present work focuses on the relationship between inhabitants' perceptions of residential quality concerning different aspects of their neighbourhood, and attachment to the neighbourhood. In particular, the study aims at verifying the relevance of residential satisfaction, operationalized in terms of multidimensional perception of residential quality, for the development of attachment to one's own residential environment, in a large urban environment such as the city of Rome.

Both residential satisfaction and residential attachment are considered as important constructs in environmental psychology (e.g. Tognoli, 1987;

Altman & Low, 1992; Sundstrom *et al.*, 1996). Both are founded on a relevant tradition of theoretical considerations and empirical research aimed at clarifying the relationship between people and their residential environment (whether considered at the level of the home, the neighbourhood, or the city).

However, the two constructs have seldom been considered as mutually relevant and, particularly, the theoretical and empirical links between the two have never been approached in a systematic way. Some of the relevant aspects of both residential satisfaction and residential attachment will be reviewed briefly in order to clarify the background for the specific hypothesis of the present work. We will focus on residential environment at a medium level (i.e., the neighbourhood), rather than at the

level of smaller or larger scale places (e.g., the home or the city).²

The problem of satisfaction with and perception of residential environment — and specifically with the neighbourhood — is one of the most traditional topics in environmental psychology (e.g. Carp & Carp, 1982; Fried, 1982; Canter, 1983; Fried, 1984; Altman & Wandersman, 1987; Tognoli, 1987; Francescato *et al.*, 1989; Carvalho *et al.*, 1997; Garcia-Mira *et al.*, 1997; for a brief review of recent works, see Sundstrom *et al.*, 1996). However, as other authors (e.g. Weidemann & Anderson, 1985) have noted, traditionally this topic has been characterized by: (1) attention to very specific and fragmented aspects of the residential environment, e.g. the tendency to contrast spatial-physical aspects with social-relational ones; and (2) neglect of the temporal and affective component of the residential experience.

These tendencies are explicitly criticized by the 'transactional and contextual approach' to environmental psychology (Altman & Rogoff, 1987; Stokols, 1987), which stresses the following two points: (1) focusing on molar units of analysis such as 'place' when studying people-environment transactions (e.g. Canter, 1977; Stokols & Shumaker, 1981; Russell & Ward, 1982; Proshansky *et al.*, 1983; Holahan, 1985; Altman, 1986; Moore, 1987); and (2) recognizing the important role played by affective and temporal dimensions in the environmental experience, as a constitutive element of the person-place transactional unit (Rapaport, 1977; Stokols & Shumaker, 1981; Rapaport, 1982; Werner *et al.*, 1985; Altman & Rogoff, 1987; Werner, 1987).

In a previous study (e.g. Bonnes, 1991; Bonnes *et al.*, 1991a, b), we attempted to reconcile these different emphases. For example, we paid attention to the fact that residential satisfaction is a multidimensional construct focusing on different specific aspects of a place (spatial features, human features, functional features; similarly to other studies such as in Canter, 1983), which became integrated at the level of people's place-evaluation. We also showed that residential satisfaction is significantly positively related to different aspects of people's temporal experience in the residential place (both linear time as length of residence in the neighbourhood, and cyclic time as daily budget of time spent in the neighbourhood). In another study (Bonnes *et al.*, 1997), we focused more on the issue of residential satisfaction's multidimensionality, preparing a Residential Satisfaction Scale (RSS) articulated in 20 dimensions, covering specific aspects of spatial, social, functional, and contextual features. In that

instrument, residential satisfaction was operationalized in terms of a large set of very specific items, each one addressing a single feature of the neighbourhood, rather than directly asking for a single general evaluation of satisfaction with the neighbourhood. Thus, compared to other studies (e.g. Amérigo & Aragonés, 1990), our operationalization of residential satisfaction was aimed at measuring subjects' perception of their residential environment (i.e. subjective indicators of urban quality), rather than measuring global residential satisfaction (e.g. 'How satisfied are you with your neighbourhood?' or 'How would you define your neighbourhood as a place to live?').

As far as studies of residential attachment are concerned, 'research is increasingly focused on psychological attachment to places, often in the context of home and neighbourhood' (Sundstrom *et al.*, 1996, p. 493). Residential or place attachment has become a central construct for environmental psychology during recent years, attracting a number of contributions (e.g. Fried, 1982; Giuliani, 1991; Altman & Low, 1992; Giuliani & Feldman, 1993; Feldman, 1996; Twigger-Ross & Uzzell, 1996). The aim is to understand the way people establish affective bonds with specific places of their residential environment, which can become a part of their place identity (Proshansky *et al.*, 1983; Low & Altman, 1992). Place attachment tends to involve willingness to maintain spatial-physical stability as well as feelings of 'grief' (Fried, 1982), in the case of forced spatial detachment from places; and, especially at the beginning, this approach focused on the relationship between attachment and residential mobility (e.g. Feldman, 1990; Fuhrer *et al.*, 1993). Several authors suggested place attachment should be viewed as a set of related phenomena, rather than a singular phenomenon, as well as a phenomenon strictly linked to such factors as time (Low & Altman, 1992). Therefore, within a wider framework, '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 socio-physical environment. These bonds provide a framework for both individual and communal aspects of identity and have both stabilizing and dynamic features' (Brown & Perkins, 1992, p. 284). Altman and Ginat (1992) stressed place attachment research can adopt different definitions, all equally important, for example, in terms of 'process' or 'outcome'. Outcome definitions refer to abstractions and feelings about the environment (i.e. feeling attached); while process

definitions refer to social and/or psychological processes occurring between the person and the place (i.e. reasons for attachment).

Following this theoretical perspective, in a previous study (Bonnes *et al.*, 1997), we created a neighbourhood attachment scale (NAS) comprising different aspects, i.e. inhabitants' desires to not change their present residential place and to positively evaluate it, as well as their feelings of affective bonds toward their neighbourhood and the relevance of the residential place for the person's identity. In this sense, such a scale can be considered to tap both outcome (items 127, 130, 131, 132 in Appendix 2) and process (items 128 and 129 in Appendix 2) definitions of place attachment. However, empirical results (Bonnes *et al.*, 1997) showed such a measure of place attachment to work as a unidimensional construct.³ Thus, while theoretically we can agree to conceive neighbourhood attachment as a multidimensional construct, empirically we think better instruments are still needed in order to be able to properly measure such a multidimensional character of the construct.

Therefore, research has been dedicated both to residential satisfaction in terms of perceived residential environment quality and to neighbourhood attachment; however, the links between the two constructs have scarcely received any empirical attention in environmental psychology. An exception is offered by a study by Amérigo and Aragonés' (1990) carried out on a sample of women living in council housing in Madrid. Their results show that global evaluations of residential satisfaction are related to both neighbourhood attachment and perception of specific features of the residential environment (social, spatial, and functional features). Recently, on a slightly different parallel line, Harris *et al.* (1996) showed the ease of privacy regulation within one's own family's home can enhance home attachment, via the enhancement of both the quality of family interactions and the sense of control in the home.

However, some kind of tie between residential satisfaction or perceived residential environment quality and attachment is generally accepted (e.g. Sundstrom *et al.*, 1996, pp. 491, 492, 493). The reciprocal relevance of these constructs should have specific psychological significance because it represents a link between two different levels of people's psychological experience of residential places. In fact, on the one hand, perceived residential environment quality traditionally focused more on problems of perception of specific aspects of urban environmental quality; on the other hand, residential attachment traditionally focused more on molar aspects

of the person-environment relationship. Moreover, while the first tradition tends to work at the level of people's perceptions and cognitive evaluations of the specific items of the residential environment, the second approach tends to study people's affective bonds with their residential environment as a whole.

Given the lack of empirical studies — and particularly of longitudinal ones — addressing the relationship between these two psychological aspects of people-place transaction, it is difficult to establish an *a priori* causal hypothesis between the two constructs. Obviously there are good theoretical reasons for favouring both causal directions. For example, as Amérigo and Aragonés (1990) noted, residential satisfaction itself has sometimes been considered as a criterion with respect to residential quality and other times as a predictor of moving or other behaviours. Moreover, a circular and bidirectional relationship between the two constructs can easily be envisaged. However, due to practical considerations, in this preliminary study perceived residential environment quality will be taken as the predictor, and residential attachment as the criterion. In fact, we conceptualize perceived residential environment quality as a multidimensional construct, articulated into many different specific and partly independent evaluative features. On the contrary, we define residential attachment in terms of a unidimensional construct, referring to a global relationship of people's identity and affective evaluations with their residential environment. Therefore, the objective is to discover which of the many dimensions of neighbourhood quality perception/satisfaction are most relevant for the development of inhabitants' neighbourhood attachment, taken as a unique and final criterion synthesizing a general relevance of the place-neighbourhood for inhabitants' place identity.

On this basis, we tested a path model in which socio-demographic (gender, age, and socio-economic level) and residential (number of persons living together, length of residence in the city, and length of residence in the neighbourhood) variables are the exogenous variables predicting perceived residential environment quality indexes. These, in turn, predict a neighbourhood attachment index considered as the final criterion. The main aim was to verify the relative predictive power of these different variables for inhabitants' attachment to their neighbourhood in order to test whether the development of strong affective bonds with the neighbourhood depend on the perceived quality of particular features of the residential environment (spatial, social, functional,

and contextual features), taking into account the residents' socio-demographic and residential experience characteristics. The specific hypothesis is that neighbourhood attachment, as a global affective evaluation of inhabitants-residential place transaction, can be predicted by a multidimensional set of variables, referring to different specific domains of neighbourhood urban quality. Therefore, socio-demographic and residential variables, although not specifically relevant for the main hypothesis, were included on the basis of previously quoted studies showing their relevance both for perceived residential environment quality and attachment. However, we expect perception of environmental quality variables would play the major role in predicting neighbourhood attachment, mediating the role of classical socio-demographic and residential variables.

Method

Sample

All items were administered to a sample of 497 inhabitants living in 20 different neighbourhoods in Rome. The definition of neighbourhood was left up to each respondent; in fact, the term used in the items was '*quartiere*' (translated as 'neighbourhood' in the items reported in Appendices 1 and 2). This is the usual, popular term used in Italian urban toponymy, even if it does not necessarily correspond to the present administrative subdivision of Rome (i.e. '*circonscrizione*', or district). Table 1 shows the sample breakdown according to socio-demographic and residential variables. A sample of about 25 residents was selected in each neighbourhood. They had different length of residence (from at least 4 years) and they were equally subdivided according to sex and age. The various neighbourhoods (listed in Table 2 and represented in Figure 1) were chosen in order to represent the maximum variety based on their architectonic and town planning features, population density, and geographical location within the city area.

Tools and procedure

A 126-item perceived residential environment quality (PREQ) scale was used (for details on scale construction and analysis, see RSS Bonnes *et al.*, 1997). Items refer to four general and 11 specific content areas derived from exploratory interviews

(see Appendix 1): architectural and town-planning features: (1) architectural and town-planning space (19 items), (2) organization of accessibility and roads (14 items), (3) green areas (12 items). Social relations features: (4) people and social relations (22 items). Punctual and in-network (non punctual) services: (5) punctual social-health-assistance services (11 items), (6) punctual cultural-recreational services (13 items), (7) punctual commercial services (5 items); (8) non-punctual (in-network) services (transportation, 5 items). Context features: (9) lifestyle (7 items), (10) pollution (6 items), (11) maintenance/care (12 items). The different number of items in each content area matches the richer or poorer articulation of each area, as observed in the preliminary interviews. Content categories about functional facilities (services) match analytic categories used by urban-planners.

A 6-item neighbourhood attachment scale (NAS) was also developed to measure the individual's degree of attachment to the neighbourhood he/she is living in (see Appendix 2). This scale mainly refers to inhabitants' feelings of positive affective orientation toward their neighbourhood and to their desire to not change their present residential place; but it also addresses the relevance of the place-neighbourhood for the person's identity. This scale was intended to measure a unidimensional construct.

All items were prepared on small cards and presented to the respondent individually and in random order by the interviewer. The respondent answered each item using a 4-point agreement-disagreement scale. When necessary, item scores were subsequently recoded so that high scores indicate environment quality or neighbourhood attachment for all items.

The following socio-demographic and residential variables were also measured (see Table 1): age, sex, socio-economic level (SEL), number of persons living together (NPLT), length of residence in the neighbourhood (LRN), and length of residence in Rome (LRR). SEL was estimated by the interviewer using a 4-point scale (low, medium-low, medium-high, and high). Information about educational level and occupation was also gathered, but was not used in the analyses.

Measures

The first-order factor(s) underlying the items in each one of the 11 conceptual domains of the PREQ scale were identified through 11 first-order Principal Component Analyses. In this way, 20 specific PREQ indexes were derived. They are

TABLE 1
Sample breakdown according to socio-demographic and residential variables

Variable	Levels	<i>F</i>	<i>F</i> %
<i>Gender</i>	Men	247	49.7
	Women	250	50.3
	Total	497	100.0
<i>Age</i>	16–24 years	101	20.3
	25–34 years	100	20.1
	35–54 years	106	21.3
	55–65 years	99	19.9
	over 65 years	91	18.3
	Total	497	100.0
<i>Estimated socio-economic level</i>	Low	25	5.0
	Medium-low	185	37.2
	Medium-high	247	49.7
	High	40	8.0
	Total	497	100.0
<i>Education</i>	Primary school	63	12.7
	Junior high school	93	18.7
	Senior high school	258	51.9
	Degree	45	9.1
	Missing	38	7.6
	Total	497	100.0
<i>Occupation</i>	Housewife/retired/student	280	56.3
	Unskilled worker	8	1.6
	Skilled worker	8	1.6
	Tradesman/agent	35	7.0
	Craftsman/self-employee	14	2.8
	White-collar worker/teacher	82	16.5
	Manager/professional	25	5.0
	Entrepreneur/industrialist	1	0.2
	Other	44	8.8
	Total	497	100.0
<i>Number of persons living together</i> (respondent not included)	1	96	19.3
	2	102	20.5
	3	172	35.0
	4	79	16.0
	5	19	3.8
	6 or more	9	1.8
	Missing	20	4.0
	Total	497	100.0
<i>Length of residence in Rome</i>	0–6 years	1	0.2
	7–9 years	26	5.2
	10–20 years	59	11.9
	Over 20 years – Native	408	81.1
	Missing	3	0.6
	Total	497	100.0
<i>Length of residence in the neighbourhood</i>	0–6 years	11	2.2
	7–9 years	79	15.9
	10–20 years	167	33.6
	Over 20 years – native	237	47.7
	Missing	3	0.6
	Total	497	100.0

TABLE 2

List of the neighbourhoods where inhabitants were sampled

Reference in the map (Figure 1)	Name of neighbourhood
Q.I	Flaminio
Q.IV	Salario
Q.V	Nomentano
Q.VII	Prenestino – Labicano
Q.VIII	Tuscolano
Q.XIX	Appio-Latino
Q.X	Ostiense
Q.XI	Portuense
Q.XXI	Pietralata
Q.XXII	Collatino
Q.XXV	Appio Claudio
Q.XXIX	Ponte Mammolo
Q.XXXII	Europa – Eur
Q.XXXIV	Lido di Ostia (Levante)
R.XIV	Borgo
R.XXI	San Saba
S.X	Trionfale
Z.IV	Casal Boccone
Z.XIII	Torre Angela
Z.XXXI	Mezzocammino
Z.XXXIV	Casal Palocco
Z.L	Ottavia
Z.LIV	Giustiniana

synthetically listed in Table 3 (for details on factor structure and factor loadings, see Bonnes *et al.*, 1997).

Architectural and town-planning features. In the Architectural and town-planning space area (three correlated factors, Oblimin rotation, 51.7% of explained variance), 6 items referring to aesthetics, beauty, or harmony of the buildings loaded on the first factor labelled 'buildings' aesthetic pleasantness' ($\alpha=0.80$); 3 items, 2 of which refer to contrast and heterogeneity between buildings, loaded on the second factor labelled 'buildings' aesthetic contrast' ($\alpha=0.61$); 5 items referring to negative aspects of building size loaded on the third factor labelled 'buildings' excessive and repetitive volume' ($\alpha=0.66$).

In the organization of accessibility and roads area (two factors, 52.3% of explained variance), 6 items referring to road usability in the neighbourhood loaded on the first factor labelled 'internal practicability' ($\alpha=0.73$); 3 items referring to neighbourhood links with the centre or with other parts of the city loaded on the second factor labelled 'external connections (with the city)' ($\alpha=0.76$).

In the green area (one factor, 51.6% of explained variance), 11 items referring to lack of parks or to bad conditions of green areas loaded on one factor

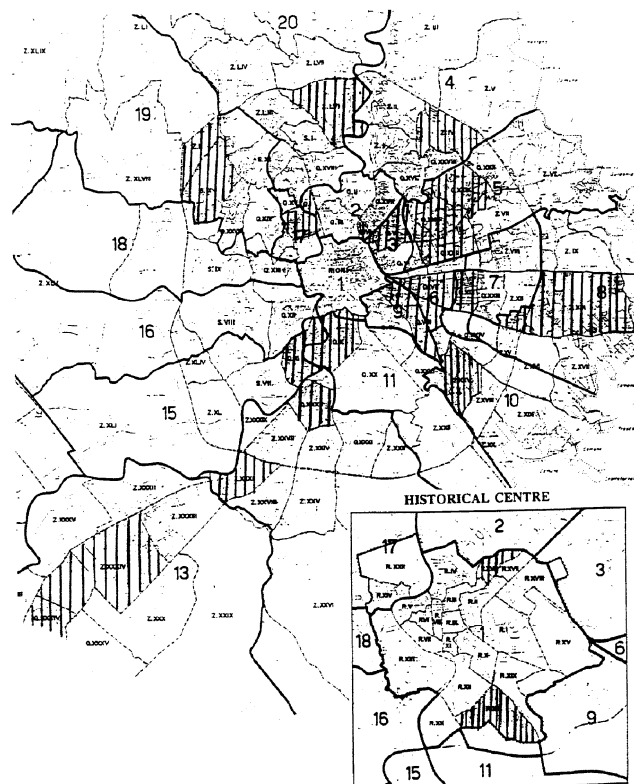


FIGURE 1. Map of Rome with neighbourhoods included in the sample marked by vertical lines (source of map: Municipality of Rome, Toponymic and Statistics Office. Roman numbers refer to the old administrative neighbourhoods' subdivision, in terms of *Rioni* and *Quartieri*; Arabic numbers refer to the actual administrative districts' subdivision, in terms of broader *Circoscrizioni*). - - -, limits of the *Circoscrizioni*; —, limits of the neighbourhoods.

labelled 'lack of green areas (presence and care)' ($\alpha=0.90$).

Social relations features. In the people and social relations area (three correlated factors, Oblimin rotation, 45.6% of explained variance), 8 items referring to the dangerousness of certain kinds of persons loaded on the first factor labelled 'threatening people' ($\alpha=0.76$); 5 items referring to the possibility of genuine social relationships between neighbours loaded on the second factor labelled 'presence of social relationships' ($\alpha=0.74$); 3 items referring to intrusiveness and lack of tolerance and moderation loaded on the third factor labelled 'intrusiveness/intolerance' ($\alpha=0.57$).

Punctual and in-network services. In the punctual social-health-assistance services area (two correlated factors, Oblimin rotation, 43.3% of explained variance), 7 items referring to health and social services loaded on the first factor labelled 'adequacy of social and health services' ($\alpha=0.69$);

TABLE 3
Summary of principal components for PREQ (for details on factor structures, see Bonnes et al., 1997)

Principal component with short label in parentheses	Loaded items (≥ 0.45) with sign	Per cent of explained variance	α	Generative content-area
Buildings' aesthetic pleasantness (BUILPLEA)	14, 13, 12, 4, 38, -15	21.8	0.80	Architectural/town-planning space
Buildings' aesthetic contrast (BUILCONT)	2, 3, 36	13.4	0.61	Architectural/town-planning space
Buildings' excessive and repetitive volume (BUILVOL)	19, 1, 20, 8, -18	15.2	0.66	Architectural/town-planning space
Internal practicability (INTPRAC)	-33, 34, -31, 26, 30, 25	28.5	0.73	Organization of accessibility and roads
External connections (with the city) (EXTCON)	24, 21, -23	23.5	0.76	Organization of accessibility and roads
Lack of green areas (presence and care) (LACKGREE)	-43, 41, 46, -49, 48, 50, 40, -44, 47, 42, 45	51.6	0.90	Green
Threatening people (THREPEOP)	61, -60, 51, -7 71, -70, 64, 68	17.9	0.76	People and social relations
Presence of social relationships (SOCRELA)	-76, 75, -74, -77, 73	15.6	0.74	People and social relations
Intrusiveness/intolerance (INTRINTO)	81, 79, -80	11.1	0.57	People and social relations
Adequacy of social and health services (ADEQSOC)	112, 121, -111, 100, 107, 99, 101	23.3	0.69	Punctual social-health- assistance services
Inadequacy of educational services (INADEDUC)	-93, -91, 92, 90	19.9	0.70	Punctual social-health- assistance services
Inadequacy of sport services (INADSPOR)	-125, -123, 124, 126	24.6	0.70	Punctual cultural-recreational services
Inadequacy of cultural activities and meeting-places (INADCULT)	115, -113, 120 117, 116	20.7	0.58	Punctual cultural-recreational services
Commercial assortment (COMASS)	105, 102, -103, 106	56.1	0.72	Punctual commercial services
Inadequacy of public transport services (INADTRAN)	94, -96, 98, 97	52.8	0.70	Non-punctual (in-network) services: transportation
Lack of opportunities (LAKOPPO)	87, 86, 88, -89	27.4	0.63	Lifestyle
Quiet (QUIET)	84, -83, 82	26.7	0.68	Lifestyle
Pollution (POLLUTION)	54, 57, 52, -55, 56, 53	58.2	0.85	Pollution
Lack of macro-upkeep in public services or spaces (LACKCARE)	-109, 110, 59, -108, 32, 35	20.3	0.64	Care/upkeep
Presence of micro-upkeep in private spaces or activities (PRESCARE)	11, -9, -72, 10, 78	19.5	0.65	Care/upkeep
Neighbourhood attachment (NEIGHATT)	130, 132, 128, -131, 127, 129	59.2	0.86	Neighbourhood attachment Scale

4 items referring to schools and quality of education loaded on the second factor labelled 'inadequacy of educational services' ($\alpha = 0.70$).

In the punctual cultural-recreational services area (two factors, 45.3% of explained variance), 4 items referring to spaces and structures for sports activities loaded on the first factor labelled 'inadequacy of sport services' ($\alpha = 0.70$); 5 items referring to places for cultural activities in general and to meeting places for young people loaded on the second factor labelled 'inadequacy of cultural activities and meeting places' ($\alpha = 0.58$).

In the punctual commercial services area (one factor, 56.1% of explained variance), 4 items referring to shop variety and local markets loaded on one factor labelled 'commercial assortment' ($\alpha = 0.72$).

In the network services: transportation area (one factor, 52.8% of explained variance), 4 items referring to frequency and quality of public transport and buses loaded on one factor labelled 'Inadequacy of public transport services' ($\alpha = 0.70$).

Context features. In the lifestyle area (two factors, 54.1% of explained variance), 4 items referring to lack of opportunities and facilities in the neighbourhood loaded on the first factor labelled 'lack of opportunities' ($\alpha = 0.63$); 3 items referring to neighbourhood quiet and liveability loaded on the second factor labelled 'quiet' ($\alpha = 0.68$).

In the pollution area (one factor, 58.2% of explained variance), 6 items referring to air and noise pollution loaded on one factor labelled 'pollution' ($\alpha = 0.85$).

In the maintenance/care area (two correlated factors, Oblimin rotation, 40.5% of explained variance), 6 items referring to poor levels of upkeep in the public services and spaces (that is, garbage and street cleaning services, lighting, roads, and abandoned spaces) loaded on the first factor labelled 'lack of macro-upkeep in public services or spaces' ($\alpha = 0.64$); 5 items referring to upkeep in small spaces due to people's activities loaded on the second factor labelled 'presence of micro-upkeep in private spaces or activities' ($\alpha = 0.65$).

A single first-order factor resulted from the Principal Component Analysis carried out on NAS. All 6 items, referring to degree of individual attachment to the neighbourhood lived in, loaded on one factor (59.2% explained variance; $\alpha = 0.86$) labelled 'neighbourhood attachment'. Thus, a unidimensional index of neighbourhood attachment was derived (Table 3; for details on factor structure and factor loadings, see Bonnes *et al.*, 1997).

Levels for sex, age, estimated socio-economic level, number of persons living together, length of residence in Rome, and length of residence in the neighbourhood were measured as reported in Table 1.

Statistical analyses

Correlations matrices were preliminarily calculated between PREQ indexes, attachment index, and socio-demographic and residential variables.

Links between socio-demographic variables, PREQ indexes and the neighbourhood attachment index were analysed using a path analysis model tested by a structural equation approach and LISREL (Bollen, 1989; Joreskog & Sorbom, 1993). Due to the high number of variables and possible links involved, we considered each of the four general areas separately, i.e. architectural and town-planning features, social relations features, punctual and non-punctual (in-network) services, and context features. In each of the four models taken separately, socio-demographic variables predicted PREQ indexes which, in turn, predicted the neighbourhood attachment index. Thus, the aim of the theoretical model was to predict people's neighbourhood attachment on the basis of the degree of their neighbourhood PREQ. Finally, the PREQ indexes which were the best predictors (path coefficient ≥ 0.15) of neighbourhood attachment in each general area, were selected and included in a final model together with all socio-demographic variables. This procedure is conservative and it aims to preserve a good ratio between number of subjects and estimated parameters (which is also of major concern when using structural equation models). One of the major factors negatively influencing the reliability of the parameter estimates, and more generally affecting the fit of the model, is the estimation of a relatively large number of parameters given the sample size (Tanaka, 1987). The choice of including only the best predictors for each area would dramatically reduce the number of estimated parameters, therefore producing more reliable values, everything else being equal.⁴

Results

Table 4 synthesizes significant correlations between socio-demographic and residential variables and PREQ and neighbourhood attachment indexes. It shows that PREQ and neighbourhood attachment indexes have only a few weak significant correlations with sociodemographic and residential

TABLE 4

Correlations of socio-demographic and residential variables with perceived residential environment quality and neighbourhood attachment indexes

	Age	Number of persons living together	Length of residence in neighbourhood	Socio- economic level	Gender	Length of residence in Rome
PREQ						
Buildings' aesthetic pleasantness				0.17		
Buildings' aesthetic contrast			0.16			
Buildings' excessive and repetitive volume			-0.26			
Internal practicability				0.18		
External connections				-0.16		
Lack of green areas				-0.25		
Threatening people				-0.19		
Presence of social relationships						
Intrusiveness/intolerance						
Adequacy of social and health services						
Inadequacy of educational services						
Inadequacy of sport services						
Inadequacy of cultural activities and meeting-places				-0.20		
Commercial assortment		-0.16				
Inadequacy of public transport services						
Lack of opportunities						
Quiet						
Pollution						
Lack of macro-upkeep						
Presence of micro-upkeep				0.21		
NAS						
Neighbourhood attachment	0.16	-0.13	0.21	-0.09	0.03	0.08

Note: For PREQ, only correlations above 0.15 (all significant at $p < 0.001$) are reported.

variables, mostly with estimated socio-economic level or length of residence in the neighbourhood (Table 4).

The correlation matrix of PREQ indexes and attachment index included in the following analyses is presented in Table 5.

The path analysis model for architectonic and town-planning features (see Figure 2) shows the excellent global fit of the model: GFI (Goodness of Fit Index) = 0.99, Adjusted GFI = 0.97, CFI (Comparative Fit Index) = 0.99, Chi-Square (30) = 38.95 ($p = 0.13$). Five out of the six indicators of urban quality play a significant role in predicting neighbourhood attachment: buildings' aesthetic pleasantness (0.26), buildings' excessive and repetitive

volume (-0.17), lack of green areas (-0.16), internal practicability (0.11), and external connections (0.086). Together with three residential or socio-demographic variables directly predicting neighbourhood attachment—namely, length of residence in the neighbourhood (0.17), estimated socioeconomic level (-0.17), number of persons living together (-0.13)—they explain 30 per cent of the neighbourhood attachment variance ($r^2 = 0.30$). Buildings' aesthetic contrast has no relevant influence on it.

Moreover, buildings' aesthetic pleasantness is predicted ($r^2 = 0.038$) by estimated socio-economic level (0.16) and age (0.12); buildings' aesthetic contrast is predicted ($r^2 = 0.047$) by length of residence in the

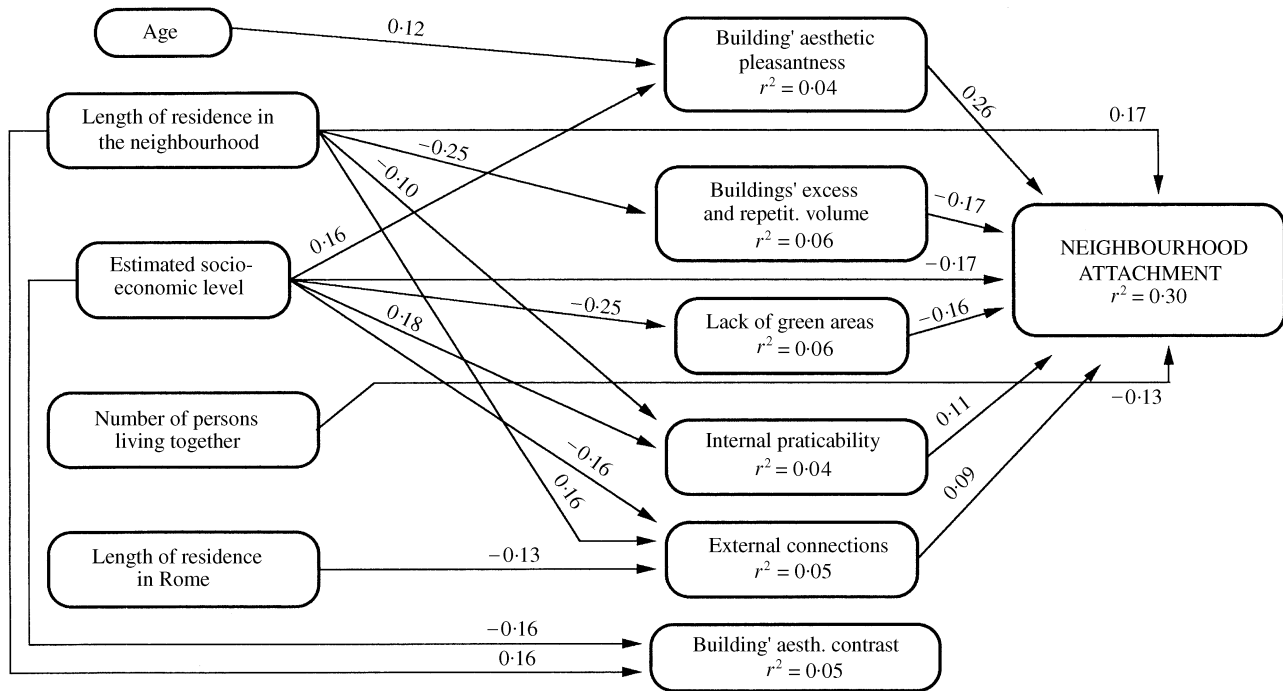


FIGURE 2. Path analysis model for architectural and town planning features area. GFI=0.99, Adjusted GFI=0.97, CFI=0.99, Chi-Square (30) = 38.95 ($p=0.13$).

neighbourhood (0.16) and estimated socio-economic level (-0.16); buildings' excessive and repetitive volume is predicted ($r^2=0.065$) by length of residence in the neighbourhood (0.25); internal practicability is predicted ($r^2=0.043$) by estimated socio-economic level (0.18) and length of residence in the neighbourhood (-0.096); external connections are predicted ($r^2=0.050$) by length of residence in the neighbourhood (0.16), estimated socio-economic level (-0.16) and length of residence in Rome (-0.13); lack of green areas is predicted ($r^2=0.062$) by estimated socio-economic level (-0.25).

The path analysis model for social relations features (see Figure 3) shows rather satisfying fit indexes: GFI (Goodness of Fit Index) = 0.98, adjusted GFI = 0.96, CFI (Comparative Fit Index) = 0.94. Although Chi-Square (30) = 32.14 ($p=0.0023$), the Critical n ($n=428.31$) is close to the actual n of the sample, therefore showing the goodness of the model. Two out of the three indicators of urban quality play a significant role in predicting neighbourhood attachment: threatening people (-0.33) and presence of social relationships (0.31). Together with one residential and one socio-demographic variable directly predicting neighbourhood attachment—namely, length of residence in the neighbourhood (0.20), estimated socio-economic level (-0.12)—they

explain 25 per cent of the neighbourhood attachment variance ($r^2=0.25$). Intrusiveness/intolerance has no relevant influence on it.

Moreover, threatening people is predicted ($r^2=0.040$) by estimated socio-economic level (-0.20); presence of social relationships is predicted ($r^2=0.020$) by number of persons living together (-0.14); intrusiveness/intolerance ($r^2=0.024$) by age (-0.14) and estimated socioeconomic level (-0.085).

LISREL for punctual and non-punctual (in-network) services (see Figure 4) shows the worse fit indexes: GFI (Goodness of Fit Index) = 0.96, adjusted GFI = 0.86, CFI (Comparative Fit Index) = 0.82, Chi-Square (24) = 141.59 ($p=0.0$). Even the Critical n is much lower than the actual sample size ($n=151.57$), therefore showing that the model is not a good predictor. Five out of the six indicators of urban quality play a significant role in predicting neighbourhood attachment: inadequacy of cultural activities and meeting places (-0.26), inadequacy of sport services (-0.22), commercial assortment (0.096), adequacy of social and health services (0.085), and inadequacy of education services (-0.082). Together with three residential or socio-demographic variables directly predicting neighbourhood attachment—namely, length of residence in the neighbourhood (0.20), age (0.11), estimated

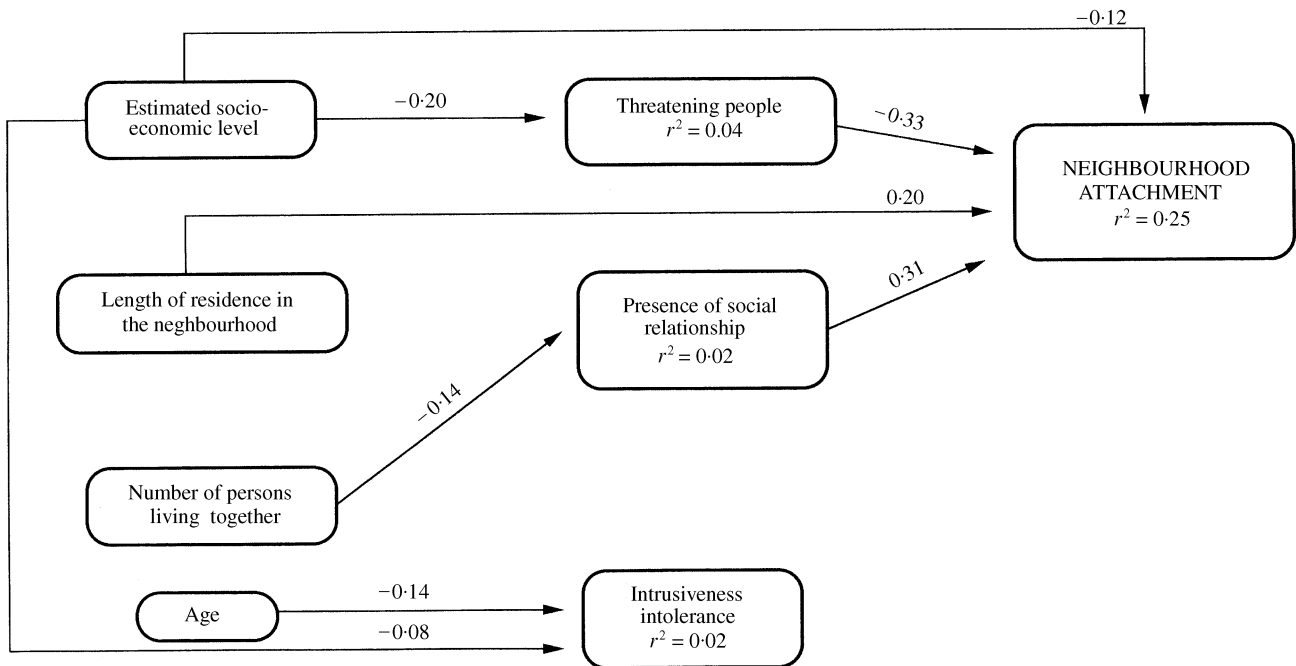


FIGURE 3. Path analysis model for social relations features area. GFI=0.98, adjusted GFI=0.96, CFI=0.94, Chi-Square (30) = 32.14 ($p=0.0023$).

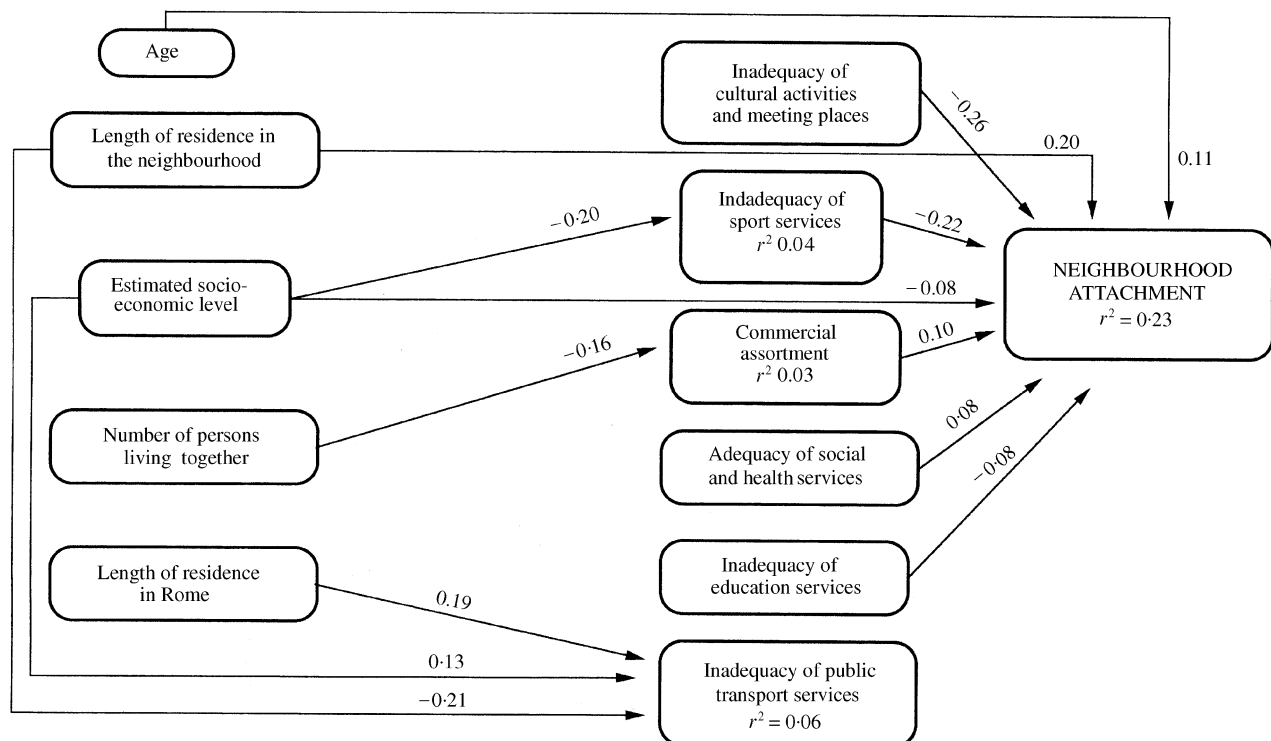


FIGURE 4. Path analysis model for punctual and non-punctual (in-network) services area. GFI=0.96, adjusted GFI=0.86, CFI=0.82, Chi-Square (24) = 141.59 ($p=0.00$).

socio-economic level (-0.084)—they explain 23 per cent of the neighbourhood attachment variance ($r^2=0.23$). Inadequacy of public transport services has no relevant influence on it.

Moreover, inadequacy of sport services is predicted ($r^2=0.040$) by estimated socio-economic level (-0.20); commercial assortment ($r^2=0.026$) by number of persons living together (-0.16); inadequacy of public transport services ($r^2=0.062$) by length of residence in the neighbourhood (-0.21), length of residence in Rome (0.19) and estimated socio-economic level (0.13).

The path analysis model for context features (see Figure 5) shows rather good fit indexes: GFI (Goodness of Fit Index)=0.99, adjusted GFI=0.95, CFI (Comparative Fit Index)=0.98. Although Chi-Square (21)=43.00 ($p=0.0031$), the Critical n ($n=450.07$) is very close to the actual n of the sample. Three out of the five indicators of urban quality play a significant role in predicting neighbourhood attachment: lack of opportunities (-0.37), quiet (0.26), presence of micro-upkeep (0.15). Together with two residential variables directly predicting neighbourhood attachment—namely, length of residence in the neighbourhood (0.22), number of persons living together (-0.10)—they explain 34 per cent of the neighbourhood attachment variance ($r^2=0.34$).

Pollution and lack of macro-upkeep have no relevant influence on it.

Moreover, lack of opportunities is predicted ($r^2=0.023$) by length of residence in Rome (0.16) and length of residence in the neighbourhood (-0.13); quiet is predicted ($r^2=0.0100$) by length of residence in the neighbourhood (-0.100); pollution ($r^2=0.042$) by length of residence in the neighbourhood (0.12), number of persons living together (-0.12), age (-0.11) and estimated socio-economic level (-0.11); lack of macro-upkeep is predicted ($r^2=0.017$) by length of residence in Rome (0.097) and number of persons living together (-0.096); presence of micro-upkeep ($r^2=0.054$) by estimated socio-economic level (0.19), length of residence in the neighbourhood (-0.10) and age (-0.092).

From the above four models, ten residential satisfaction indexes were selected as the best predictors (≥ 0.15) of attachment: buildings' aesthetic pleasantness, buildings' excessive and repetitive volume, and lack of green areas for architectonic and town-planning features; threatening people and presence of social relationships for social relations features; inadequacy of cultural activities and meeting-places and inadequacy of sport services for punctual and non punctual (in-network) services; lack of opportunities, quiet and presence of micro-upkeep for

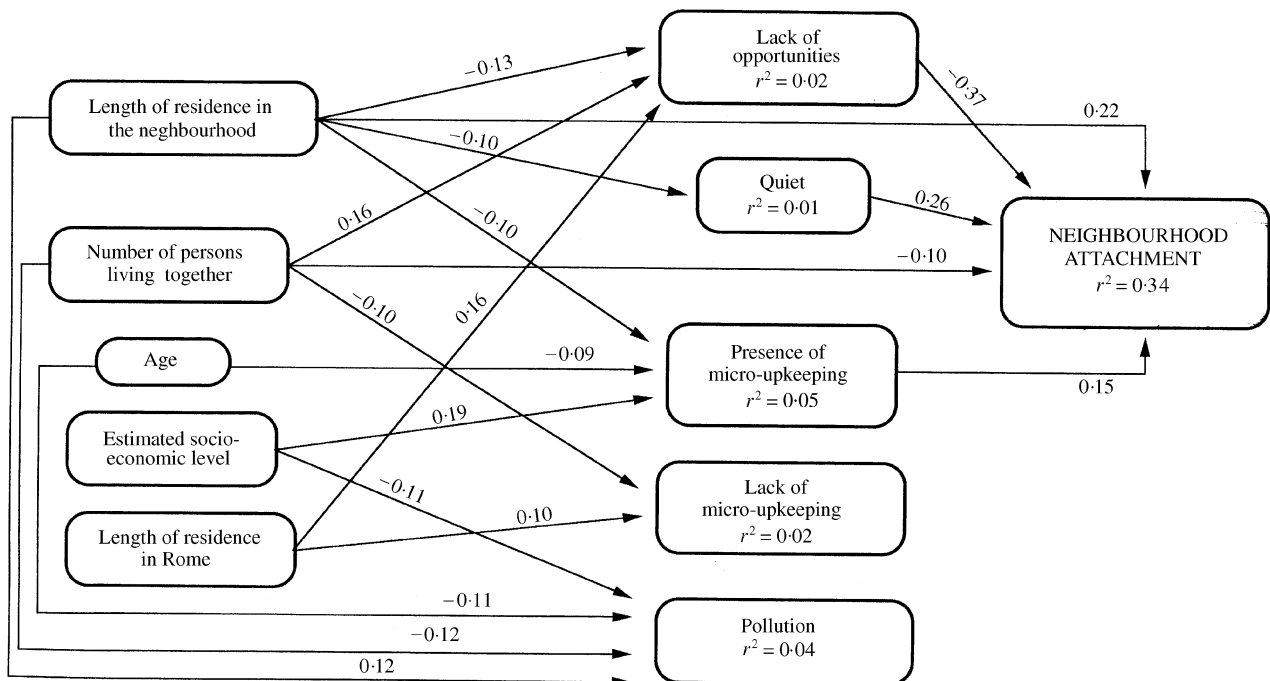


FIGURE 5. Path analysis model for Context features area. GFI = 0.99, adjusted GFI = 0.95, CFI = 0.98, Chi-Square (21) = 43.00 ($p=0.0031$).

context features. Together with all residential and socio-demographic variables they were included in the final path analysis model (see Figure 6), which shows excellent fit indexes: GFI (Goodness of Fit Index)=0.99, adjusted GFI=0.97, CFI (Comparative Fit Index)=0.99, Chi-Square (20)=25.91 ($p=0.17$); with a Critical $n=720.07$. Six out of the ten indicators of urban quality play a significant role in predicting neighbourhood attachment: lack of opportunities (-0.25), quiet (0.20), buildings' aesthetic pleasantness (0.17), presence of social relationships (0.15), lack of green areas (-0.084), inadequacy of cultural activities and meeting places (-0.082). Together with one socio-demographic and two residential variables—length of residence in the neighbourhood (0.20), estimated socio-economic level (-0.12), and number of persons living together (-0.084)—they explain 39 per cent of the neighbourhood attachment variance ($r^2=0.39$).

Buildings' excessive and repetitive volume, threatening people, inadequacy of sport services, and presence of micro-upkeep have no relevant influence on it. As evident in Table 5, each of these four indicators is somehow correlated with neighbourhood attachment (-0.30 , -0.30 , -0.21 , and 0.31 respectively). However, their correlations with other

stronger predictors of the same criterion can account for their lack of significant relevance in the final model.⁵

Moreover, in the final model, lack of opportunities is predicted ($r^2=0.025$) by length of residence in Rome (0.15) and length of residence in the neighbourhood (-0.15); quiet ($r^2=0.015$) by length of residence in the neighbourhood (-0.12); buildings' aesthetic pleasantness ($r^2=0.021$) by estimated socio-economic level (0.15); presence of social relationships ($r^2=0.016$) by number of persons living together (-0.13); lack of green areas ($r^2=0.054$) by estimated socio-economic level (-0.23); inadequacy of cultural activities and meeting places ($r^2=0.0067$) by estimated socio-economic level (0.08).

Discussion

As far as residential and socio-demographic variables are concerned, although they showed several direct significant paths on perceived urban quality indicators, they showed only a few significant direct paths on the neighbourhood attachment index.

Among residential variables, length of residence in the neighbourhood was always a positive direct

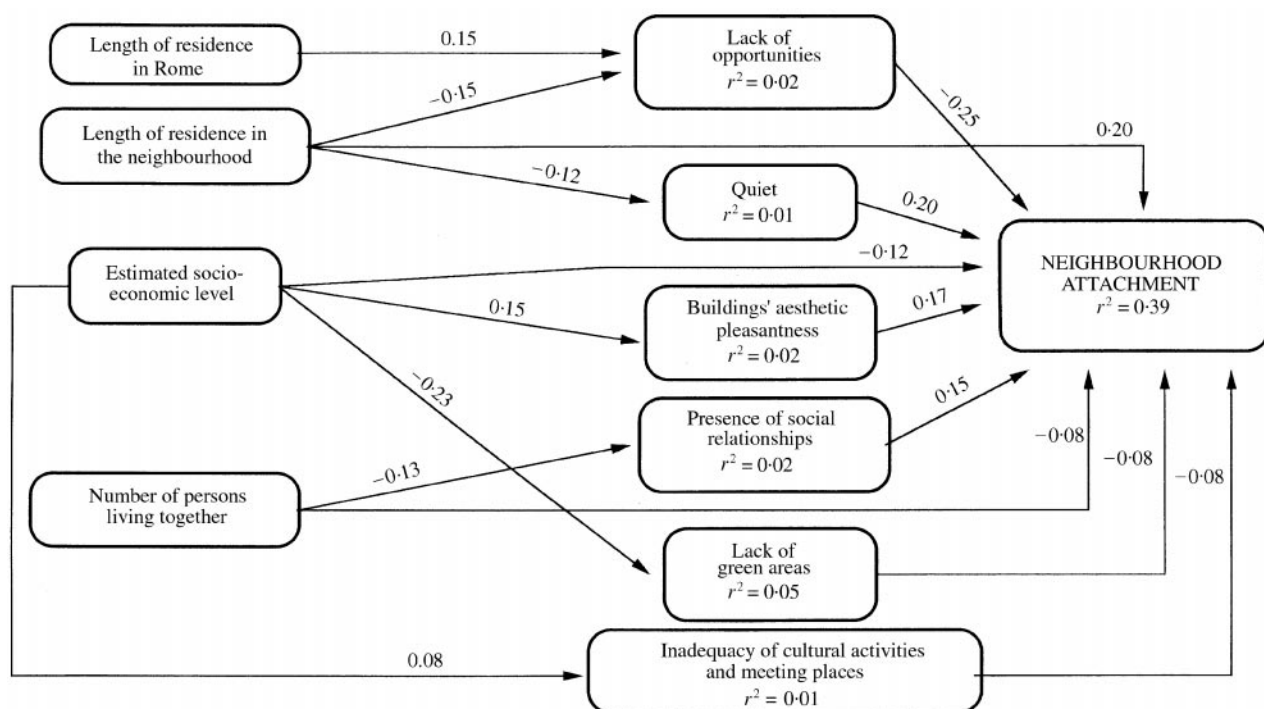


FIGURE 6. Final path analysis model including the best predictors (≥ 0.15) from each one of the four content areas. GFI=0.99, adjusted GFI=0.97, CFI=0.99, Chi-Square (20)=25.91 ($p=0.17$).

predictor of neighbourhood attachment (in all five tested models; 0.20 in the final one); while number of persons living together was a negative direct predictor (though a weaker one) of neighbourhood attachment (in the first, fourth and final models; -0.08 in the final one), and length of residence in Rome was never a significant direct predictor of neighbourhood attachment.

Among socio-demographic variables, estimated socio-economic level was the best direct predictor of neighbourhood attachment (negatively in the first, second, third, and final model; -0.12 in the final one); while age was a positive direct predictor of neighbourhood attachment only in the third model (-0.11), and gender was never a significant direct predictor of neighbourhood attachment.

Thus, on the whole, neighbourhood attachment tends to be higher especially with length of residence in the neighbourhood. To a lesser extent, neighbourhood attachment also tends to be higher for people living with few persons and for people belonging to lower socio-economic levels. Neighbourhood attachment tends also to be higher with age. However, socio-demographic and residential variables have other indirect influences on neighbourhood attachment through the direct effects they exert on the various aspects of PREQ.

Length of residence in the neighbourhood and estimated socio-economic level showed a preeminent role among residential and socio-demographic variables in predicting PREQ indexes, both in terms of the pervasiveness (the range of variables they are able to affect) and magnitude (the power expressed by their path coefficients) of their effects.

Among residential variables, increasing length of residence in the neighbourhood is positively associated with perception of urban quality for volume, external connections, opportunities; and it is negatively associated with that pertaining to internal practicability, quiet, and presence of micro-upkeep. Length of residence in Rome is never positively associated with perception of urban quality; rather, it is negatively associated with satisfaction with external connections, public transport services, opportunities, and macro-upkeep. Number of persons living together is positively associated with perception of urban quality for macro-upkeep; and it is negatively associated with that pertaining to social relationship, commercial assortment, and opportunities.

Among socio-demographic variables, estimated socio-economic level is positively associated with the perception of urban quality for buildings' aesthetic pleasantness, green areas, internal practic-

ability, social threats, sport services, micro-upkeep, and pollution; and it is negatively associated with that pertaining to external connections. Age is positively associated with the perception of urban quality for buildings' aesthetic pleasantness, social tolerance; and it is negatively associated with that pertaining to micro-upkeep. Gender never affects perception of urban quality.

Overall, the main relationships that emerged reproduce results typically found in environmental psychology literature and also in our previous studies (e.g., Carp & Carp, 1982; Carp, 1987; Bonnes *et al.*, 1991b, for age and length of residence; Bonnes *et al.*, 1991a, for socioeconomic level). Specifically, these results emphasize the role of length of residence in the neighbourhood both in terms of pervasiveness and magnitude of effects; in parallel, they reduce the importance of other demographic predictors, like age and gender, both in magnitude and pervasiveness. In fact, most demographic predictors have a weak direct relation with neighbourhood attachment (see Table 4). This direct relation is generally even weaker when psychological variables are included: PREQ indexes seem to mediate by and large demographic predictors' relations with neighbourhood attachment. A clear exception is length of residence in neighbourhood: its relation with neighbourhood attachment is not mediated by other variables. Therefore, from these results we can infer that length of residence in the neighbourhood influences attachment to that neighbourhood, irrespective of other evaluative aspects concerning the same neighbourhood (e.g. quietness, lack of opportunities).

On the other hand, perceived residential quality indicators showed several significant direct effects on neighbourhood attachment.

In particular, the model involving architectural and town-planning indicators offers the best prediction of people's neighbourhood attachment, which is greater with buildings' aesthetic pleasantness, internal practicability, and external connections, and smaller with buildings excessive and repetitive volume, and lack of green areas.

Then, the model involving indicators of context features is a good predictor of neighbourhood attachment, which is greater with quiet, and presence of micro-upkeep, and smaller with lack of opportunities.

The model involving indicators of social relations features offers a discrete prediction of people's neighbourhood attachment, which is greater with presence of social relationships, and smaller with threatening people.

On the contrary, the model involving services indicators does not globally fit with the data and provides a weak prediction of neighbourhood attachment, which is slightly greater with commercial assortment, and adequacy of social and health services, and is slightly smaller with inadequacy of sport services, inadequacy of educational services, and inadequacy of cultural activities and meeting places.

The final model, which included the best predictors of attachment emerging from the four previous models, showed that each area is somehow important in determining neighbourhood attachment. In fact, the six predictors which emerged as significant out of the best ten belong to the four different areas: two from architectural and town-planning features, one from social relations features, one from services features, and two from contextual features. That is, neighbourhood attachment is significantly greater with quiet, buildings' aesthetic pleasantness, and presence of social relationships, and smaller with lack of opportunities, inadequacy of cultural activities and meeting-places and lack of green areas. This result underlines the composite nature of neighbourhood attachment, confirming our preliminary analyses of the various specific residential facets which may be associated with a global evaluation of the residential environment (see the second-order factor analysis of RSS and NAS in Bonnes *et al.*, 1997). However, the final model also clearly details differences in the relative importance of these indicators. In fact, context features play the most relevant role: lack of opportunities and quiet in the neighbourhood are the two most powerful predictors (-0.25 and 0.20 respectively). Then, two indicators have a less powerful but still consistent influence on neighbourhood attachment: buildings' aesthetic pleasantness and presence of social relationships (0.17 and 0.15 , respectively). Finally, two indicators have weak predictive power: lack of green areas and inadequacy of cultural activities and meeting places (0.084 and 0.082 respectively). With respect to neighbourhood attachment, context features seem to contribute more; then, architectural and town-planning features and social relations features; service features play only a minor role. The lack of significance of the other four indicators included in the final model (i.e., buildings' excessive and repetitive volume, threatening people, inadequacy of sport services, and presence of micro-up-keep) seems due to their correlations with stronger predictors of attachment.

Indicators of the perceived quality of architectural, social, and contextual features emerge as

relevant predictors of neighbourhood attachment; in comparison, service features seem less important. On the one hand, the relative lack of importance of functional features with respect to the neighbourhood attachment index should not be interpreted as a general lack of relevance of these indicators. Rather, they may prove to be relevant predictors of other variables. On the other hand, the inter-place perspective to explain inhabitants' neighbourhood activities and use of services—pointed out in our previous studies on urban pragmatics (e.g. Bonnes *et al.*, 1990; Bonaiuto & Bonnes, 1996)—can be taken into account here. In fact, most neighbourhood residents are generally characterized by a multiplace system of activities, in which they also use services and facilities located in other parts of the city (i.e. the centre and periphery).

On the whole, the satisfying test of the final path model confirmed the hypothesis of the study, stressing the multicomponential nature of the process of establishing positive affective relationships with the residential neighbourhood. The positive evaluation of different aspects of the residential environment—as far as the contextual, architectural, social, and service features are concerned—underlies feelings of neighbourhood attachment. Furthermore, the variety of perceived residential environment qualities, which resulted to be significant predictors of neighbourhood attachment, suggests a multicomponential nature of the process of place attachment. This is somehow coherent with three main psychological functions attributed to place attachment (e.g. Fried, 1982; Altman & Low, 1992; Fuhrer *et al.*, 1993): regulation of personal/social identity, social contact, and the regulation of emotions. Moreover, these results shows that there are significant links among two different levels of people environmental experience (as usually theoretically stated; e.g. Sundstrom *et al.*, 1996, pp. 491–493): perceptions and cognitive evaluations of specific molecular aspects of the neighbourhood, on the one side; and global affective bonds with the same place, on the other side. Therefore, they represent an empirical bridge which fills the gap among two traditionally separated research areas within environmental psychology; namely, perceived residential environment quality and residential satisfaction, on the one side, and place attachment, on the other side.

In terms of more general interdisciplinary implications, these results can represent guidelines for orienting policies aimed to selectively intervene on neighbourhood environmental features in order to foster inhabitants' attachment to their own neighbourhood. However, such applied implications

suggests an explicit causal direction from environmental management, to perceived residential environment quality (or residential satisfaction), to neighbourhood attachment: while compatible with the presented results, it would need to be empirically verified via a quasi-experimental research design.

Notes

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(1) Preliminary versions of this paper were presented at the International Workshop on Population and Environment in Developed Societies, C.N.R., Rome, 28–29 October, 1996; and at The British Psychological Society Social Psychology Section Annual Conference 1997, University of Sussex, 17–19 September, 1997 (Symposium: 'Identity and Place: Identifying Places and Locating Selves').

(2) This choice is primarily justified by the general research project within which the present study is framed, i.e. the U.N.E.S.C.O.-M.A.B. Rome Project, a pluridisciplinary research programme on urban systems which focused particularly on neighbourhood residential environments in the city of Rome (Giacomini, 1981; Bonnes, 1987, 1991, 1993). This multidisciplinary research programme on the urban environment had two main aims: (1) to increase knowledge and understanding of psychological processes involved in the perception of urban quality, particularly at the level of the neighbourhood; (2) to develop knowledge and tools which might be useful for other non-psychological disciplinary fields (such as town-planners, plant ecologists, etc.) participating in the M.A.B.-Rome Project, in order to promote and achieve a pluridisciplinary approach to the city (e.g. Bonnes & Bonaiuto, 1995).

(3) In a further study, as yet unpublished, we developed an extended 16-item NAS, which comprises new and better balanced items referring to rootedness and positive evaluations, as well as to affective bonds, personal, and social identity. Principal component analysis shows again all items are highly loaded in only one component, in a very clear and reliable manner which psychometrically supports a single construct solution, rather than a multidimensional one.

(4) Moreover, when considering a given set of variables, a variable which does not significantly affect another variable in general can only become even less important when other variables are added to the starting set, except for rare occasions when spurious effects are present (see Bagozzi & Baumgartner, 1994). In other words, if x_1 is not influencing y when considering x_2 , x_3 , and x_4 , it will not increase its influence on y when we further include x_5 , x_6 , and x_7 . Indeed, its influence on y will generally be either equal or lower.

(5) In fact (see Table 5), buildings' excessive and repetitive volume has medium correlations with buildings' aesthetic

pleasantness (–0.32) and lack of opportunities (0.37); and it is slightly correlated with inadequacy of cultural activities and meeting places (0.18), quiet (–0.14), lack of green areas (0.13), and presence of social relationships (–0.10). It also correlates with some other non-significant predictors: threatening people (0.31) and presence of micro-upkeep (–0.21). Threatening people has strong correlations with quiet (–0.58) and buildings' aesthetic pleasantness (–0.53); medium correlations with lack of green areas (0.37); and it is slightly correlated with lack of opportunities (0.21), and inadequacy of cultural activities and meeting places (0.18). It also correlates with the other non-significant predictors: presence of micro-upkeep (–0.61), buildings' excessive and repetitive volume (0.31) and inadequacy of sport services (0.24). Inadequacy of sport services has strong correlations with lack of green areas (0.67); medium correlations with buildings' aesthetic pleasantness (0.34); and it is slightly correlated with lack of opportunities (0.28) and quiet (–0.12). It also correlates with the other non-significant predictors: threatening people (0.24) and presence of micro-upkeep (–0.36). Presence of micro-upkeep has strong correlations with buildings' aesthetic pleasantness (0.61) and lack of green areas (–0.52); medium correlations with quiet (0.36) and lack of opportunities (–0.32); and it is slightly correlated with inadequacy of cultural activities and meeting places (–0.19) and presence of social relationships (0.14). It also correlates with the other non-significant predictors: threatening people (–0.61), inadequacy of sport services (–0.36) and buildings' excessive and repetitive volume (–0.21).

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3. In the neighbourhood there is a contrast between very high-class buildings and horrible buildings.
 36. When I look out of the window I feel oppressed by the buildings nearby.
- 1.3. *Building excessive and repetitive volume (BUILVOL)*
1. In this neighbourhood there are only buildings that are all the same.
 8. In the neighbourhood there are residential buildings that seem like barracks.
 18. In this neighbourhood the blocks are smaller than they are elsewhere.
 19. In this neighbourhood the buildings are often too high.
 20. It is an oppressive neighbourhood because of the size of the buildings.
- Items with factor loadings < 0.45
5. In the neighbourhood there are buildings which are too lower class.
 6. It is a neighbourhood without architectural and artistic merits.
 16. The buildings in this neighbourhood are generally comfortable and functional.
 17. The apartments in the neighbourhood often have walls that are too thin.
 37. There is too much cement in this neighbourhood.

Appendix 1

Items of the Residential Satisfaction Scale (RSS) from item 1 to item 126, grouped according to the 4 general and 11 specific generative content-areas (within each specific generative content-area, items are grouped according to the factors resulted from each principal component analysis; from Bonnes *et al.*, 1997).

Architectonic and town-planning features

1. Architectural and town-planning space

1.1. *Buildings' aesthetic pleasantness (BUILPLEA)*

4. The styles of the different buildings are harmonious.
12. It is a pleasant neighbourhood because of the colour of the buildings.
13. The buildings in the neighbourhood are well-built with regard to form and details.
14. It is a beautiful neighbourhood to see with beautiful buildings.
15. It is a neighbourhood developed without any architectural plan.
38. In this neighbourhood the open spaces and built areas are well-balanced.

1.2.. *Building aesthetic contrast (BUILCONT)*

2. There is a great difference in the neighbourhood between old and new buildings.

2. Organizations of accessibility and roads

2.1. *Internal practicability (INTPRAC)*

25. The streets in this neighbourhood are wide enough.
26. The streets in this neighbourhood permit easy movement.
30. This neighbourhood is well-suited even for handicapped people.
31. The parked cars impede walking.
33. In this neighbourhood parking places and parking lots are almost totally lacking.
34. There is good availability of parking spaces in the neighbourhood.

2.2. *External connections (EXTCON)*

21. The centre can be reached easily from this neighbourhood.
23. This neighbourhood is too cut off from the rest of the city.
24. This neighbourhood is well connected with important parts of the city.

Items with factor loadings < 0.45

22. It is easy to go out of the city from this neighbourhood.
27. In this neighbourhood one is often forced to go around in circles even to reach places nearby.
28. The presence of a high speed road in the neighbourhood reduces livability.
29. The sidewalks in the neighbourhood are often too narrow.
85. Unfortunately, in the neighbourhood people move more in cars than on foot.

3. Green

3.1. *Lack of green areas (both presence and care) (LACKGREE)*

40. There should be more green areas in the neighbourhood.
41. To go to a park it is necessary to go to other areas of the city.
42. By increasing the number of homes, green areas have almost completely disappeared.
43. In the neighbourhood there are green spaces for walking and relaxing.
44. In the neighbourhood there is garden/park where people can meet.
45. There are few trees in the neighbourhood.
47. There would be green areas but for the most part they are unusable or closed to the public.
48. The green spaces in the neighbourhood cannot be frequented because they are poorly kept.
49. The green areas in the neighbourhood are in good condition.
50. The usable green areas in the neighbourhood are only the private ones because the public ones are too poorly kept.

Items with factor loadings < 0.45

39. Construction continues in this neighbourhood and the little existing green is destined to disappear.

Social relations features

4. People and social relations

4.1. *Threatening people (THREPEOP)*

7. It is a rather high-class neighbourhood.
51. The green areas of the neighbourhood are dangerous because of those who frequent them.
60. In comparison with other areas this neighbourhood is not too crowded.
61. This neighbourhood is too crowded.
64. There are too many working class inhabitants in the neighbourhood.
68. There are people in the neighbourhood who deal, rob, and take drugs.
70. The people in this neighbourhood have a look of serenity and well-being.
71. Going around the neighbourhood in the late evening there is often the risk of bad encounters.

4.2. *Presence of social relationships (SOCRELA)*

73. The people in this neighbourhood are generally very cordial.
74. The people in this neighbourhood are generally not very sociable.
75. Neighbours are often acquainted in this area.
76. There are only very formal relationships between inhabitants of this neighbourhood.
77. Above all the people in the neighbourhood think about themselves and have little interest in others.

4.3. *Intrusiveness/intolerance (INTRINTO)*

79. There are intolerant people in the neighbourhood.

80. The people are generally civil and discreet.

81. Here one often has the impression that others are watching him.

Items with factor loadings < 0.45

62. The population of this neighbourhood is a mixture of all kinds of people.
63. The neighbourhood has the advantage of having inhabitants homogeneous for social class.
65. There are too many gypsies and third world foreigners in the neighbourhood.
66. Too often this neighbourhood is invaded by non-residents (for work, shopping, tourism, etc.).
67. There are too many elderly in the neighbourhood.
69. There are too many disoriented young people in the neighbourhood.

Punctual and non punctual (in-network) services

5. Punctual social-health-assistance services

5.1. *Adequacy of social and health services (ADEQSOC)*

99. There is a hospital that can be easily reached from the neighbourhood.
100. The local health office in this area offers better services compared with others.
101. The neighbourhood is well-equipped for medical tests and outpatient services.
107. The municipal offices in the area respond adequately to the needs of the neighbourhood.
111. Services for assisting the elderly are lacking in the neighbourhood.
112. The neighbourhood is well-furnished with social services.
121. The neighbourhood has a centre for the elderly that functions well.

5.2. *Inadequacy of educational services (INADEDUC)*

90. Schools and nurseries in the neighbourhood are often held in unsuitable places.
91. The neighbourhood is well-equipped for scholastic services.
92. Often children and young people of the neighbourhood are forced to live in the area for school.
93. The neighbourhood schools are generally good.

6. Punctual cultural-recreational services

6.1. *Inadequacy of sport services (INADSPOR)*

123. This neighbourhood is well-equipped with sports grounds (sports fields, gymnasium, swimming pools).
124. If you like bicycle riding or jogging, the neighbourhood is not very suitable.
125. There are areas in the neighbourhood where it is possible to do sport activities outside.
126. Sports grounds are few and only at high price.

6.2. *Inadequacy of cultural activities and meeting-places (INADCULT)*

- 113. The already functioning cultural centres satisfy the needs of this neighbourhood.
- 115. There are really very few cultural initiatives in this neighbourhood.
- 116. The neighbourhood should have more movie theatres.
- 117. The existence of a meeting place would get many of the young people of the neighbourhood off the streets.
- 120. The lack of a meeting place does not allow young people to spend their free time in the neighbourhood.

Items with factor loadings < 0.45

- 114. If you want a book you must go and look for it in book stores or libraries in other areas.
- 118. You can always find a place to spend free time in this neighbourhood.
- 119. Only some bars are open in the evening in this neighbourhood.
- 122. There are many parish social activities in the neighbourhood.

7. Punctual commercial services

7.1. *Commercial assortment (COMASS)*

- 102. This is a very commercial area, well-furnished with stores.
- 103. Special things are lacking in the stores in this neighbourhood.
- 105. There are all kinds of stores in the neighbourhood, which permit finding anything in the area.
- 106. The neighbourhood has a convenient local market.

Items with factor loadings < 0.45

- 104. The stores in the neighbourhood are also meeting places for the inhabitants.

8. Non-punctual (in-network) services: transportation

8.1. *Inadequacy of public transport services (INADTRAN)*

- 94. There is not enough choice of public transportation in the neighbourhood.
- 96. The existing public transportation guarantees good connections with other parts of the city.
- 97. The existing bus service should be more frequent.
- 98. The buses in the area are often too inconvenient.

Items with factor loadings < 0.45

- 95. The buses in this neighbourhood are almost always overcrowded.

Context features

9. Lifestyle

9.1. *Lack of opportunities (LAKOPPO)*

- 86. This neighbourhood is only a dormitory.

- 87. Very few things can be done in this neighbourhood.
- 88. Young people tend to flee from this neighbourhood.
- 89. It is a neighbourhood with many points of interest.

9.2. *Quiet (QUIET)*

- 82. Compared with the chaos in the centre this neighbourhood is still livable.
- 83. This is a neighbourhood with too much activity.
- 84. There is a peaceful rhythm of life in the neighbourhood.

10. Pollution

10.1. *Pollution (POLLUTION)*

- 52. The air in the neighbourhood is not clean and breathable.
- 53. The exteriors of the buildings show signs of air pollution.
- 54. The air in the neighbourhood is often unbreathable.
- 55. It is a silent and peaceful neighbourhood.
- 56. There is really too much noise in the neighbourhood.
- 57. The intensity of the traffic in this neighbourhood is really annoying.

11. Maintenance/care

11.1. *Lack of macro-upkeep in public services or spaces (LACKCARE)*

- 32. The streets are not adequately kept.
- 35. There are too many abandoned areas in the neighbourhood.
- 59. Too often there is trash around.
- 108. This neighbourhood is well-equipped for recycling and differentiated trash pick-up.
- 109. The trash collection service is efficient.
- 110. Street lighting is often insufficient.

11.2. *Presence of micro-upkeep in private spaces or activities (PRESCARE)*

- 9. Many buildings in the neighbourhood are in poor condition.
- 10. There is good upkeep of the buildings in the neighbourhood.
- 11. This neighbourhood is rich with terraces and well-kept gardens.
- 72. There are too many signs of vandalism on the streets of the neighbourhood.
- 78. People show interest and care for the neighbourhood.

Items with factor loadings < 0.45

- 58. The streets and sidewalks of the neighbourhood are clean enough.

Appendix 2

Items of the Neighbourhood Attachment Scale (NAS), from item 127 to item 132 (from Bonnes *et al.*, 1997).

Attachment area

127. This is the ideal neighbourhood to live in.
128. Now this neighbourhood is a part of me.
129. There are places in the neighbourhood to which I am very emotionally attached.
130. It would be very hard for me to leave this neighbourhood.
131. I would willingly leave this neighbourhood.
132. I would not willingly leave this neighbourhood for another.