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Predicting Neighborhood Attachment in Germany

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Abstract

Neighborhood attachment is an important and influential concept in environmental psychology. Yet, there is a lack of quantitative research that allows predictions to be made. Additionally, whereas neighborhood attachment is influenced by various variables, most studies only have assessed a few predictors. A quantitative study with cross-sectional design was conducted in order to create a comprehensive predictive model. A sample of 334 German speaking residents was assessed. In an exploratory approach, multiple socio-demographic, socio-relational, architectural and town-planning, functional, and contextual features were examined as predictors of neighborhood attachment in a linear regression model. Whereas most of the basic relationships were replicated according to the state of research, only sociability, building aesthetics, stimulating versus boring, length of residence, friends' propinquity, socio-cultural activities, and homeownership significantly predicted neighborhood attachment. The present study emphasizes both the multiplicity of variables being directly and indirectly related to neighborhood attachment and the assumption that the underlying mechanisms of attachment can only be captured by combining individual and environmental characteristics.

Keywords: Neighborhood attachment, residential environment, environmental psychology, prediction, model.

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Predicting Neighborhood Attachment in Germany

Rents and home prices are skyrocketing due to short supply of apartments and building land. The housing market is tight (Forouzande & Motallebi, 2012). Globalization led to increased mobility and migration (Bailey et al., 2012; Jean, 2016). As if that were not enough, the climate crisis demands for changes in design and construction of residential environments (Azizibabani et al., 2021; Jabareen, 2006; Uzzell et al., 2002). Housing is the social issue of our time (Gilroy, 2008; Jabareen, 2006). Most often, attempts are made to solve these problems by creating vast amounts of affordable housing (Gilroy, 2008). This is, however, at the expense of human development, since stakeholder focus is usually too narrow, concentrating on architecture while neglecting the extraordinary value that residential environments represent to humans (Adriaanse, 2007; Fried, 1982; Gilroy, 2008; Kaplan, 1985; Proshansky et al., 1983). Housing is not only the largest consumption item in most people's lifetime, but also a place where one can find rest, refuge, and satisfaction (Lu, 1999). It determines inhabitants' well-being and is the main setting for daily social and economic life, such as socialization or even reproduction (Anderson & Baldwin, 2017; Gilroy, 2008). Besides creating sustainable and affordable housing, the main challenge has to be developing housing which enhances quality of life and supports culture, social interaction, and comfort (Azizibabani et al., 2021). Hence, a rethink is needed in the construction industry (Forouzande & Motallebi, 2012). Especially psychological research has proven itself to be able to provide impetus for the design of living environments and its effects (Adriaanse, 2007; Gilroy, 2008; LaGrange & Yau, 2021; Riazi & Emami, 2018). It can offer planners and architects knowledge about users' needs and perceptions and thus reduce the likelihood of residents to relocate or even entire housing projects to fail (Amerigo & Aragonés, 1990; Lu, 1999; Riazi & Emami, 2018; Salleh, 2008). In environmental research, after long being neglected, neighborhood attachment has become a central construct due to its significant

impact on individuals' quality of life (Bonaiuto et al., 1999; Proshansky et al., 1983; Oktay et al., 2009). It enriches life with meaning and values, and thus contributes to defining a unique identity (Bailey et al., 2012; Giuliani, 2003; Ruiz et al., 2011). Neighborhood attachment can increase pride, mental health, and well-being and it provides a sense of security (Bailey et al., 2012; Brown et al., 2003; Giuliani, 2003; Jean, 2016; Ruiz et al., 2011). Attached residents also tend to refuse high-impact environmental changes and behave more ecologically, sustainably, and healthy (Comstock et al., 2010; Vorkinn & Riese, 2001). It was furthermore found to be a valuable indicator of social cohesion and appears to be a key factor in reducing crime rates and antisocial behavior at community level (Górny & Toruńczyk-Ruiz, 2014; LaGrange & Yau, 2021). Therefore, it is an essential issue to explore why people bond with their residential environment (Bonaiuto et al., 1999; Gilroy, 2008). Hereby, the level of the neighborhood is of special interest, since it resembles a unique intermediate level of analysis, connecting people's perceptions and behavior concerning the private and the public environment (Bonaiuto & Bonnes, 1996; Bonaiuto et al., 2003; Bonaiuto et al., 2006). Furthermore, it is impossible to fully distinguish between the individual home and the surrounding physical and social environment, such as neighbors, public structures, and the environment's functionality or aesthetics (Bonaiuto et al., 2003; Rioux & Werner, 2011). Whereas early research was mostly based on qualitative methods or correlational design, quantitative research on attachment has increased recently (Fornara et al., 2010; Ruijsbroek et al., 2017; Ruiz et al., 2011). Yet, the high number of identified influences and the resulting lengths of questionnaires made it impossible to conduct comprehensive studies (Fornara et al., 2010). Hence, scholars have often focused solely on measures of place or socio-demographic characteristics (Adriaanse, 2007; Fleury-Bahi et al., 2008). Studies assessing the *Perception of Residential Environment Quality indicators* (PREQIs) have been the most comprehensive research to date (e.g., Bonaiuto et al., 2003). However, even these only

captured satisfaction with the residential environment while neglecting other variables. The underlying mechanisms cannot be fully captured by focusing only on residential or environmental attributes, but they need to be combined (Ruijsbroek et al., 2017; Woolever, 1992). The present study hence tries to fill the gap of comprehensive quantitative research, by creating a regression model to predict neighborhood attachment assessing personal, social, and environmental factors. This study is thus the first to combine such a variety of influencing factors. After delineating neighborhood attachment from residential satisfaction, the introduction concludes by presenting the current state of research regarding the various factors which are assumed to influence neighborhood attachment.

Residential satisfaction

With the rise of cognitive psychology, the theory of residential satisfaction (RS) emerged based on psychological construct theory and the theory of place (Canter, 1977; Galster, 1985; Riazi & Emami, 2018). RS describes the individual's relationship to their living conditions and the resulting experiences (Canter, 1977; Bonaiuto et al., 2003; Galster, 1985; Riazi & Emami, 2018). If the living conditions are approximately congruent with an individual’s needs and aspirations, feelings of contentment or gratification arise (Amole, 2009; Davoodi & Dagli, 2019; Galster, 1985; Galster & Hesser, 1981; Riazi & Emami, 2018). Incongruence between actual housing and mental reference leads to dissatisfaction (Galster, 1985; Lu, 1999; Riazi & Emami, 2018). Hence, RS is the degree of satisfaction that results from residents' assessment of the extent to which their current home and living environment meet their expectations and satisfy their individual needs (Bonaiuto et al., 2006; Galster & Hesser, 1981; Riazi & Emami, 2018). RS, being defined as a psychological construct of attitude, consists of three components, namely cognition, affection, and behavior (Bonaiuto et al., 2003; Bonaiuto et al., 2006; Fornara et al., 2007; Rosenberg & Hovland, 1960). The cognitive component describes residents' thoughts, knowledge, or beliefs of

particular and general aspects of residential quality (Fornara et al., 2007; Kyle et al., 2004; Rosenberg & Hovland, 1960). The behavioral component refers to activities that take place in a spatial context and is only rarely mentioned in the literature (Fornara et al., 2007; Kyle et al., 2004). The affective component is thought to consist of two facets, namely affective quality of the residential place and residential attachment (Bonaiuto & Fornara, 2004; Fornara et al., 2007; Guiliani, 2003; Kyle et al., 2004; Rosenberg & Hovland, 1960). However, the relationship between RS and residential attachment has not been undisputed in research. While some authors have emphasized attachment as an affective component of RS (Bonaiuto et al., 2003; Bonaiuto et al., 2006), some authors have used both concepts interchangeably (Fried, 1982). Recent findings suggested that residential attachment and RS manifest as completely distinct phenomena (LaGrange & Yau, 2021). Therefore, the present study focuses on attachment research.

Neighborhood attachment

Neighborhood attachment (NA) is based on the theory of attachment, originally proposed by Bowlby in 1988, defining attachment as an affective and emotional pattern relating individuals to places (Bonaiuto et al., 2006; Fornara et al., 2010; Giuliani, 2003). This theory was later extended by Brown and Perkins in 1992 to include the three basic aspects of every psychological construct of attitude, that is affection, cognition, and behavior (Bonaiuto, 2004; Fornara et al., 2010; Rosenberg & Hovland, 1960). This so-called concept of place attachment was therefore described as positive affective feelings, cognitive thoughts and behavioral intentions that are not static but develop over time and bind humans with their specific socio-physical environment in which they are born, grow up, and live (Bonaiuto & Fornara, 2004; Bonaiuto et al., 1999; Brown & Perkins, 1992; Corcoran, 2002; Low & Altman, 1992; Vorkinn & Riese, 2001).

Based on this, NA can be defined as positive affective, cognitive, and behavioral bond between an individual and their respective neighborhood (Bonaiuto et al., 2006; Fornara et al., 2007; Górny & Torunczyk-Ruiz, 2014; La Grange & Yau, 2021; Low & Altman, 1992). Affective components include a deeply rooted emotional connection to the neighborhood (Bonaiuto et al., 2006; Fornara et al., 2007). The cognitive component, on the other hand, involves beliefs, thoughts, or knowledge about the neighborhood, such as the tendency to express beneficial evaluations (Bonaiuto et al., 2006; Fornara et al., 2007; Low & Altman, 1992). The behavioral component describes actions such as the reluctance to move away, or improving the neighborhood (Bonaiuto & Fornara, 2004; Bonaiuto et al., 2006; Fornara et al., 2007; Górny & Torunczyk-Ruiz, 2014; LaGrange & Yau, 2021; Low & Altman, 1992). This threefold structure could recently be supported by empirical evidence (LaGrange & Yau, 2021). Although NA is a multidimensional construct, it was often used primarily as a person's affective relationship to their living environment, resembling a strong emotional tendency (Bailey et al., 2012; Bonaiuto & Fornara, 2004; Comstock et al., 2010; Oktay et al., 2009). In research, NA was mostly operationalized as general affective relationship between individuals and overall features of their residential environment and often involved both neighborhood and home (Bonaiuto et al., 2003; 2006; Fornara et al., 2007; Fornara et al., 2010; Ruiz et al., 2011). Despite the multidimensionality, it is assumed that NA can be condensed into a one-dimensional construct, even if it is measured with an instrument consisting of different dimensions (Bonaiuto et al., 1999; Fornara et al., 2007; Fornara et al., 2010).

However, there is no consensus in the environmental psychology literature regarding naming and definition (Jean, 2016). Research on NA is characterized by conceptual and terminological ambiguity and it overlaps with a number of similar constructs (Fornara et al., 2010; LaGrange & Yau, 2021; Ruiz et al., 2011), such as place identity (LaGrange & Yau,

2021; Lalli, 1992; Livingston et al., 2010; Proshansky et al., 1983; Ruiz et al., 2011), neighborhood identification (Fleury-Bahy et al., 2008), place dependence (LaGrange & Yau, 2021; Livingston et al., 2010), sense of belonging (LaGrange & Yau, 2021), sense of place (Jorgensen & Stedman, 2001), or communality (Carson et al., 2010). Nevertheless, all these concepts emphasize positive affective and cognitive attachment to social and physical residential environments (Vorkinn & Riese, 2001).

Influencing neighborhood attachment

NA develops over time and derives from accumulated experiences within the social and physical residential environment and from the progressive embedding of people in their place of residence through the development of a comforting sense of familiarity and functional or social relationships (Bailey et al., 2012; Bonaiuto & Fornara, 2004; Mesch & Manor, 1998). These can be daily encounters with neighbors, individualization of the residential environment, or feelings towards the neighborhood (Ruiz et al., 2011). This complex process is shaped by a broad variety of factors and perceptions and can sometimes even occur subconsciously (Bonaiuto et al., 1999; Comstock et al., 2010; Fischer et al., 1977; LaGrange & Yau, 2021; Woolever, 1992). It was observed that people develop stronger bonds towards a place, if it meets their objective or psychological needs or goals (Livingston et al., 2010). People are attached to places if these match their lifestyle and support their self-identity (Livingston et al., 2010). Therefore, besides individual attributes, such as socio-demographics, the development of attachment is also dependent on the experienced social and physical context (Livingston et al., 2010; Woolever, 1992). Hence, the following sections first present the socio-demographic, then the socio-relational, architectural, functional, and finally the contextual factors which were reported to be related to NA.

Sociodemographic features

Already early in environmental psychology research, socio-demographic variables were found to have a direct influence on NA (Bonaiuto et al., 1999). New literature still confirmed that neighborhood evaluations are explained by sociodemographic predictors to a certain degree (Ruijsbroek et al., 2017). In this study, age, gender, socio-economic status, homeownership, length of residence, and household size are considered, which are described in more detail below.

Age. Age was repeatedly found to be a strong direct predictor of NA (Bailey et al., 2012; Bonaiuto et al., 1999; Goudy, 1982; Lewicka, 2010). Residents' age influenced the plans to move from deprived areas (Andersen, 2008). Although most studies suggested that NA increased with age (Woolever, 1992; Hidalgo & Hernandez, 2001), other studies reported that NA was stronger in both older and younger residents compared to middle-aged ones (Bonaiuto et al., 1999; Fornara et al., 2010). Yet, attachment seemed to be higher in older individuals than in young ones, even when controlling for length of residence (Hidalgo & Hernandez, 2001; Mridha, 2020; Woolever, 1992). Therefore, it was believed that older residents generally feel higher levels of NA, whereas younger individuals feel a stronger attachment to their city and their place of residence as a whole (Hidalgo & Hernandez, 2001; Scharf et al., 2003; Woolever, 1992). Therefore, it was hypothesized that age and NA are positively related.

Gender. A demographic predictor only rarely mentioned in the literature is gender. Although no relationship between gender and NA was found in the past (Bonaiuto et al., 1999), evidence for it was growing in more recent research. Thus, higher levels of attachment were found in women than in men (Bailey et al., 2012; Hidalgo & Hernandez, 2001; Mridha, 2020). Hereby, women showed higher levels of attachment to the house, the neighborhood, and the city (Hidalgo & Hernández, 2001). One possible explanation was based on the

tendency for women to have higher levels of domestic responsibility and, consequently, greater involvement in neighborhood networks (Hidalgo & Hernandez, 2001). Therefore, it was assumed that the level of attachment is higher in women than in men.

Socio-economic status. The socio-economic status was also observed to impact NA and was considered to be one of the most influential predictors (Bonaiuto et al., 1999). Low-income people showed higher attachment levels towards their residential place (Amérigo & Aragonés, 1990). Similarly, Bonaiuto and colleagues reported that NA was negatively impacted by the estimated socio-economic level of residents and even found that it was the best direct predictor of NA among socio-demographic variables (1999). Yet, socioeconomic status, measured as educational level, was positively associated with NA in a number of studies (Comstock et al., 2010; Hidalgo & Hernandez, 2001; Mesch & Manor, 1998; Taylor, 1996; Woolever, 1992). There was also a positive influence of education on taking pride in the neighborhood (Mesch & Manor, 1998). However, this relationship may not be universal. Few studies showed that especially in deprived areas, higher education lowered NA (Andersen, 2008; Lewicka, 2005). This could be explained by the assumption that individuals gained more mobility through higher education (Lewicka, 2005).

Homeownership. Multiple studies suggested that homeowners were more attached to their respective neighborhoods (Austin & Baba, 1990; Brown et al., 2003; Carson et al., 2010; Hidalgo & Hernandez, 2001; Lewicka, 2010; Oh & Kim, 2009; Oktay et al., 2009; Ringel & Finkelstein, 1991; Woolever, 1992). Moreover, this influence was found to be independent of ethnicity (Oh, 2004). Accordingly, neighborhoods with a higher proportion of homeowners were found to have higher overall levels of NA (Brown et al., 2003). Homeownership also predicted the social participation of residents and therefore additionally increased NA indirectly (Austin & Baba, 1990). Homeowners were more likely to have more local social connections, which in turn influenced sentiments about the neighborhood (Mesch

& Manor, 1998). Hence, it was assumed that the impact of ownership on NA partially acted through increased participation in neighborhood-based social activities (Comstock et al., 2010).

Length of residence. Length of residence in particular had a major impact on NA and was considered to be one of the most relevant predictors (Bailey et al., 2012; Bonaiuto et al., 1999; Forouzande & Motallebi, 2012; Goudy, 1982; Lewicka, 2010). A large number of studies has examined this relationship and found a clear result: the levels of attachment towards a residential place were stronger for individuals living for a longer time in their respective housing (Austin & Baba, 1990; Bailey et al., 2012; Bonaiuto et al., 1999; Brown et al., 2003; Carson et al., 2010; Comstock et al., 2010; Forouzande & Motallebi, 2012; Goudy, 1982; Kasarda & Janowitz, 1974; Lewicka, 2010; Livingston et al., 2010; Oh & Kim, 2009; Oktay et al., 2009; Sampson, 1988). A similar relationship was also found between the length of residence and the concept of neighborhood identification, which is related to NA (Fleury-Bahi et al., 2008). The influence seemed to be moderated by the upkeep of the neighborhood to a certain extent (Livingston et al., 2010). However, as parts of the effect were mediated by social participation, the length of residence appeared to have an indirect impact as well (Austin & Baba, 1990). Hereby, length of residence was a crucial factor in the development of social ties, promoting contacts within the local community (Kasarda & Janowitz, 1974).

Household size. NA was also positively related with the number of persons living together. The larger the household, the higher the probability of having more social and functional ties to the neighborhood and thus higher levels of attachment (Mincer, 1978). Especially the number of children within a household was said to be an influential factor. Having children resulted in more functional connections and larger social networks in the neighborhood (Bailey et al., 2012). In addition, children provided a restriction of the household's mobility, since especially young children are limited to the local geographic

environment regarding socialization (Bailey et al., 2012; Mesch & Manor, 1998). Thus, a household with more children shows a stronger interest and attachment to the neighborhood (Bailey et al., 2012; Mesch & Manor, 1998).

Socio-relational features

Additionally, socio-relational variables have been repeatedly found to predict attachment to a great extent (Bonaiuto et al., 1999; Brown et al., 2003; Ringel & Finkelstein, 1991). Some research even suggested social features to be the most important predictors (Bonaiuto et al., 1999; Hidalgo & Hernández, 2001; Mesch & Manor, 1998). In this section, safety, discretion, sociability, friends' propinquity, and diversity are presented.

Security. The general sense of security within the neighborhood was repeatedly found to be one of the most important factors impacting NA (Brown et al., 2003, 2004; Fornara et al., 2007; Livingston et al., 2010; McGuire, 1997; Sampson, 1988). Accordingly, various studies reported fear of crime diminishing NA (Andersen, 2008; Austin & Baba, 1990; Markowitz et al., 2001; Livingston et al., 2010; Ross et al., 2002; Taylor, 2002). The danger of experiencing threatening individuals or vandalism within the neighborhood influenced NA negatively (Bonaiuto et al., 1999). The resulting dissatisfaction was among the main reasons for residents to move away from their neighborhoods (Andersen, 2008). Additionally, in neighborhoods with a high turnover of residents, NA was reduced as trust and feelings of security decreased (Livingston et al., 2010). Vice versa, place attachment was higher for residents having to deal with fewer incivilities and having less fear of crime within their neighborhood (Brown et al., 2003).

Discretion. Intrusiveness was reported to be another significant predictor in models focusing on socio-relational predictors of NA (Bonaiuto et al., 1999). Other studies additionally emphasized the importance of privacy regulation within a residential

environment as a predictor of attachment (Harris et al., 1996; Kyle et al., 2004). As control over privacy increased, so did respondents' attachment to the environment (Kyle et al., 2004).

Sociability. Early on, research identified an important effect of social integration on attachment (Austin & Baba, 1990; St John et al., 1986). Being able to locally connect and interact, with for example neighbors, was observed to be crucial in understanding why residents stay (Clark et al., 2017). Accordingly, participating within the neighborhood and more generally being able to build a strong social network resulted in stronger attachment even within deprived residential areas (Livingston et al., 2010; Ruijsbroek et al., 2017). Moreover, friendliness, quality of interactions, social cohesion, and more generally sociability within the neighborhood were related to place identification and consistently positively predicted NA (Bonaiuto et al., 1999; Fleury-Bahi et al., 2008; Thomas et al., 2008).

Friends' propinquity. However, not only being able to create strong and meaningful social networks was found to be an important indicator of NA (Bonaiuto et al., 1999; Livingston et al., 2010; Ruijsbroek et al., 2017). Having strong social relationships within the neighborhood, such as friends and relatives, also significantly reduced the motivation to move away and was strongly related to attachment (Andersen, 2008; Clark et al., 2017; Goudy, 1982). Close friends in particular, as well as good neighbors and acquaintances living nearby, significantly strengthened neighborhood attachment (Mesch & Manor, 1998; Sampson, 1988).

Perceived diversity. Several studies found that social heterogeneity reduced social cohesion and place attachment (Górny & Toruńczyk-Ruiz, 2014; Livingston et al., 2010; Markowitz et al. 2001; Sampson & Groves, 1989; Taylor et al. 1985). Accordingly, native residents were less satisfied that their neighborhood was becoming more ethnically diverse and therefore felt less attached (Dekker & Bolt, 2005). Some factors that promoted

connectedness, such as trust in neighbors, friendships, or local cooperation, were also lower in ethnically mixed neighborhoods (Putnam, 2007). However, the negative association between ethnic diversity and NA was found to be moderated by interethnic ties, as NA was not lower among residents with intercultural ties (Górny & Toruńczyk-Ruiz, 2014). When mediated by a high level of neighborhood excitement, NA was even increased by ethnic diversity (Toruńczyk-Ruiz, & Lewicka, 2016). Hence, it appeared that ethnic diversity was related to NA negatively, but dependent on the social and cultural contexts (Toruńczyk-Ruiz & Lewicka 2016).

Architectonic and town-planning features

As mentioned above, the neighborhood's physical features were often reported to create attachment (Forouzande & Motallebi, 2012; LaGrange & Yau, 2021; Ringel & Finkelstein, 1991; Sam et al., 2012). Architectonic and town-planning features directly predicted NA in particular (e.g., Bonaiuto et al. 1999; LaGrange & Yau, 2021; Mesch & Manor, 1998; Ringel & Finkelstein, 1991). In the following, the influence of satisfaction with building aesthetics, building density, building volume, and green areas on NA are presented.

Building aesthetics. Many times, building aesthetics was reported to be a significant predictor of NA (e.g., Bonaiuto et al., 1999; St. John et al., 1986; Thomas et al., 2008). Individuals rating their residential environment's general physical appearance to be more pleasant or satisfying, were significantly more attached (Bonaiuto et al., 1999; Thomas et al., 2008; St John et al., 1986). Hereby, building aesthetics was found to be a consistent influence and one of the most important predictors of NA (Bonaiuto et al., 1999).

Building density. Another factor of visual impression of the neighborhood is buildings' density (Bonaiuto et al., 2003). Dissatisfaction regarding the density of the neighborhood significantly decreased residents' NA (Ruijsbroek et al., 2017; Woolever, 1992). Vice-versa, individuals rating higher levels of satisfaction reported higher aesthetic

levels and hence improved ratings of attachment (Bonaiuto et al., 2003). Nevertheless, residents' satisfaction with the building density also predicted attachment to the neighborhood directly (Woolever, 1992).

Building volume. The volume of the buildings was also observed to significantly predict NA (Bonaiuto et al., 1999). However, including volume as predictor in statistical models yielded non-significant results for density and aesthetics, which might be explained by a high overlap with the two features mentioned above (Bonaiuto et al., 1999; Bonaiuto et al., 2003). To further illuminate the effect on NA and the relationships with other buildings' characteristics, building volume is included in the analysis.

Green areas. One of the most researched variables is green space, which has long been suggested to support basic human functioning (Kaplan, 1985; Kyle et al., 2004; Thomas et al., 2008). Whereas the lack of green areas repeatedly decreased NA, satisfaction with local green areas positively predicted NA (Andersen, 2008; Bonaiuto et al., 1999; Thomas et al., 2008). Open natural spaces with trees and good landscaping were directly related to residents' pride in their neighborhood and further increased NA (Kaplan, 1985; Mesch & Manor, 1998; Ruijsbroek et al., 2017). Places like well-landscaped parks or even wilderness had an additionally effect via increasing the appeal of common areas and thereby offering an environment for creating social and individual experiences, hence indirectly predicting NA (Bonaiuto et al., 1999; Kaplan, 1985; Kyle et al., 2004; Livingston et al., 2010; Ruijsbroek et al., 2017). Those places increased neighborhood dependence by offering opportunities for relaxation, personal reflection, solitude, and improving physical exercise and health (Kyle et al., 2004). Besides community gardens, smaller, individual gardens have also strengthened the sense of community and NA by allowing residents to build relationships with each other and their neighborhoods, while being accessible and affordable to most people (Bonaiuto et

al., 1999; Comstock et al., 2010; Kaplan, 1985; Ruijsbroek et al., 2017). In summary, green natural areas generally appeared to have both direct and indirect effects on NA.

Functional features

Although not well researched yet, functional features, defined as punctual and non-punctual services, were reported to significantly predict NA ratings as well (Bonaiuto et al., 1999; Sam et al., 2012). However, they appeared not to be as strong as other indicators mentioned above (Bonaiuto et al., 1999).

Social care, school, and sport services. Both adequacy of social care services and school services predicted NA (Bonaiuto et al., 1999). The adequacy of sport services within the neighborhood affected NA in a similar way (Bonaiuto et al., 1999; Kaplan, 1985). Furthermore, the effect of these services on NA could be replicated within a Chinese sample (Mao et al., 2015).

Socio-cultural activities. Another functional feature is the neighborhood's offering of socio-cultural activities. Residents' dissatisfaction with these activities decreased NA significantly (Bonaiuto et al., 1999; Mao et al., 2015). Also, an indirect effect was suggested, since, as mentioned above, social interaction and social networks influenced NA to a great extent (Fleury-Bahi et al., 2008; Livingston et al., 2010). Accordingly, the residents' participation in socio-cultural activities within the neighborhood was observed to significantly enhance levels of NA (Ruijsbroek et al., 2017).

Commercial services. Residents' satisfaction with commercial services in terms of assortment, availability and distribution was also observed to promote NA (Bonaiuto et al., 1999; Kaplan, 1985). This relation was replicated in China as well, suggesting the influence to be culturally independent (Mao et al., 2015).

Means of transport. Since the use of the private car has been the dominant mode of transportation, the resulting traffic, noise, and pollution lead to residents' dissatisfaction

(Andersen, 2008; Kaplan, 1985; Marcheschi et al., 2022). For example, noise was directly related to the residents' feeling of pride towards the neighborhood (Mesch & Manor, 1998). In fact, new research has shown that car-free or car-reduced neighborhoods had various positive effects, such as increasing environmental and individual health, but most importantly enhancing NA (Marcheschi et al., 2022). Reducing automobile traffic in the neighborhood is made possible through solutions such as creating possibilities to walk or cycle, and good public transportation. Accordingly, walkability not only enhanced environmental and public health but also positively influenced NA (Khabiri et al., 2020; Sugihara & Evans, 2000). In addition, internal functionality, defined as a combination of possibilities to walk and cycle, and traffic infrastructure was found to enhance NA (Bonaiuto et al., 1999). The comfort, frequency and quality of public transport and the neighborhood's connection to the rest of the city further impacted NA positively (Bonaiuto et al., 1999; Bonaiuto et al., 2003). The residents' resulting experience of how cut off their home is, as well had an effect on NA (Bonaiuto et al., 1999). To summarize, mobility solutions that bypass the use of the car, internal functionality, and external connection enhanced NA.

Context features

Contextual factors emerged as some of the strongest indicators in previous research (Bonaiuto et al., 1999; Fornara et al., 2010; Mao et al., 2015). To establish affective bonds to the neighborhood, contextual features appeared to be more important than spatial features (Sam et al., 2012). This section presents the influences of the dimensions relaxing versus distressing and stimulating versus boring, environmental health and upkeep on NA.

Relaxing versus distressing. The experience of the neighborhood being relaxing or distressing was not only found to influence NA, but appeared to be one of the most important contextual predictors (Bonaiuto et al., 1999; Mao et al., 2015). If the neighborhood was perceived as relaxing or quiet, residents showed significantly higher levels of attachment.

This relationship furthermore appeared to be culturally independent, since it was replicated in both China and Iran (Bonaiuto et al., 2015; Mao et al., 2015).

Stimulating versus boring. Another dimension that predicted NA significantly is stimulating versus boring (Bonaiuto et al., 1999; Bonaiuto et al., 2015). The less opportunities the neighborhood offered the residents, the lower were the reported levels of NA (Bonaiuto et al., 1999). Vice-versa, neighborhood excitement was strongly positively related with NA (Fornara et al., 2010; Mao et al., 2015; Toruńczyk-Ruiz & Lewicka 2016). This influence also seemed to be culturally independent (Bonaiuto et al., 2015; Mao et al., 2015).

Environmental health. Not only green areas within the neighborhood, but also the environmental health was reported to impact NA (Bonaiuto et al., 1999). Being satisfied with the environment of the neighborhood was found to be an important and strong predictor of NA (Austin & Baba, 1990; Bonaiuto et al., 1999; Bonaiuto et al., 2015). Accordingly, living within a clean, silent, and healthy environment impacted attachment positively (Andersen, 2008; St John et al., 1986). Finally, environmental health also strengthened residents' pride in their neighborhoods (Mesch & Manor, 1998).

Upkeep. The presence of micro-upkeep was directly positively associated with NA (Bonaiuto et al., 1999). Conversely, dirt, decay, lack of maintenance or graffiti were major sources of residents' dissatisfaction (Andersen, 2008; Kaplan, 1985). Hence, attachment was either significantly weaker in deprived neighborhoods or even completely absent (Bailey et al., 2012; Livingston et al., 2010). But besides the upkeep of the neighborhood, also residents' immediate housing conditions were important factors in deciding to move away (Andersen, 2008). Hereby, living in sub-standard housing decreased attachment significantly (Woolever, 1992). However, research also suggested indirect influences of upkeep. Thus, deprived neighborhoods led to weaker social relationships and increased residents' turnover,

hence additionally lowering cohesion, interaction and feelings of trust and safety (Bailey et al., 2012; Bonaiuto et al., 1999; Livingston et al., 2010). Some research even suggested that neighborhood deprivation might be a leading predictor of turnover, cohesion, and security (Bailey et al., 2012).

The current study

The state of research has suggested that the process of bonding to the neighborhood is complex and shaped by a broad variety of factors (Bonaiuto et al., 1999; Comstock et al., 2010; Fischer et al., 1977; LaGrange & Yau, 2021; Woolever, 1992). As presented above, scholars identified multiple variables from various areas, that is socio-demographic, socio-relational, architectural and town-planning, functional, and contextual features, being related to NA directly or indirectly (e.g., Fornara et al., 2010). However, the presented variables have never been assessed combinedly before, since most previous studies only assessed either socio-demographic characteristics, or social and physical environmental features (Adriaanse, 2007; Fleury-Bahi et al., 2008; Livingston et al., 2010; Woolever, 1992). Therefore, this study pursues an exploratory approach to examine the complex network of direct, indirect, or even unclear influences on NA. Hereby, the goal is to investigate the direct influence of each predictor variable on NA and how well the constructs previously identified in the research predict NA.

Hence, it is hypothesized that age, female gender, educational level, homeownership, length of residence, household size, number of children, level of security, level of discretion, sociability, friends' propinquity, satisfaction with building aesthetics, satisfaction with building density, satisfaction with building volume, satisfaction with green areas, satisfaction with social care services, satisfaction with school services, satisfaction with sport services, satisfaction with socio-cultural activities, satisfaction with commercial services, satisfaction with traffic density, walkability, satisfaction with transport services, internal functionality,

external connection, neighborhood's relaxation, neighborhood's stimulation, environmental health, satisfaction with upkeep positively predict NA. Additionally, income and ethnic diversity are hypothesized to negatively predict NA.

Method

Participants

The sample consisted of both persons from the author's personal network and strangers. Since the assessment was done fully anonymously, it was not possible to distinguish between known and unknown participants. In total N = 483 individuals participated in the survey of which n = 149 had to be excluded from the analysis due to incomplete assessment or faulty filling of the survey. Finally, a sample of n = 334 participants was used for analysis. Of these participants, 57.5% were female (n = 192), 41.6% were male (n = 139), 0.6% identified as diverse (n = 2) and 0.3% (n = 1) preferred not to state their gender. Age ranged from *Min* = 17 years to *Max* = 86 years (M = 33.67 years; SD = 14.25 years). The most common age was *Mo* = 25 years (n = 34). 29.9% of the participants reported their highest education to be a Master's degree (n = 100), whereas 29.6% stated that they have accomplished a Bachelor's degree (n = 99). 20.4% indicated that they had a high school diploma (n = 68). 15.9% of the participants have completed vocational training (n = 53). Only 4.2% percent reported having completed a doctoral degree (n = 14). The average net income of the respondents was M = 2001.29 Euros, with a standard deviation of SD = 1665.19 Euros (*Min* = 0 Euros; *Max* = 10,000 Euros). The most frequently mentioned value was *Mo* = 0 Euros (n = 30). The participants came from a total of n = 188 postal code areas. Most mentioned area is the German post code 79100 (n = 51), followed by 69115 (n = 20), which cover parts of the areas Freiburg Vauban and Heidelberg Bahnstadt.

Measures

Self-constructed items

Age, post code, length of residence, monthly net income, number of individuals living together with, number of children living together with, and friends' propinquity were assessed by using self-created open questions. The latter one has been used similarly before by Sampson (1988) to assess *Local friendship ties* and asked the participants which percentage of friends could be reached within 15 minutes by foot. Participants could state if their current home is *owned by themselves, rented,* or *something else* via multiple choice. In this way they could also indicate their gender (*male, female, diverse,* or *prefer not to say*) and highest educational degree (*high school degree, vocational training, Bachelor's degree, Master's degree,* or *Promotion*). To assess perceived neighborhood diversity, participants could rate how diverse they experience their neighborhood to be on a 5-point Likert scale, ranging from *not at all* to *very much*. Furthermore, satisfaction with walkability and traffic density were assessed by using a 5-point Likert scale, ranging from *very unsatisfied* to *very satisfied*.

Abbreviated PREQIs and NA

To assess the residents' perception of their respective neighborhood and their attachment to their neighborhood, the abbreviated version of the Perception of Residential Environment Quality (PREQ) and Neighborhood Attachment (NA) indicators were used (Fornara et al., 2010). A German translation was done, since to the author's knowledge no translated version existed in the literature. This abbreviation by Fornara, Bonaiuto and Bonnes (2010) marked the latest development of the Residential Satisfaction Scale (RSS) and the Neighborhood Attachment Scale (NAS) originally proposed by Bonnes et al. in 1997. The PREQIs and NA indicators have been developed in over 40 years of research and always showed stable structures (Bonnes et al., 1997; Bonaiuto et al., 1999; Bonaiuto et al., 2003;

Bonaiuto & Fornara, 2004; Bonaiuto et al., 2006). The abbreviated version provides good fit indices to the known factorial structure, comprised out of four main (architectural and town-planning features, socio-relational features, functional features, and context features) and 19 content areas (building aesthetics, building density, building volume, internal functionality, external connection, green areas, security, discretion, sociability, school services, social care services, sport services, socio-cultural activities, commercial services, transport services, relaxing versus distressing, stimulating versus boring, environmental health, and upkeep), which have been confirmed multiple times before (Bonaiuto et al., 2003; Bonaiuto et al., 2006; Fornara et al., 2010). This factor structure could be maintained in Australia, Iran, and China, which makes it usable in different cultural settings (Bonaiuto et al., 2015; Mao et al., 2015; Walton et al., 2008). The abbreviated version is a self-reporting questionnaire comprising 66 items, of which four were used to describe NA. The NA-scale assesses feelings towards the neighborhood, evaluations and behavioral intentions and thereby satisfies the broad definition of NA (Bonaiuto et al., 1999). Despite being a multifaceted construct, the scale provides a validated measure to assess NA as a one-dimensional concept (Bonaiuto et al., 1999; Fornara et al., 2007). The questionnaire achieves convergent and discriminant construct validity criteria and appears to be well suited for research focusing on environmental quality of residential places (Fornara et al., 2010). A 5-point Likert-type scale was used (ranging from *totally disagree* to *totally agree*). In this study, the 19 PREQIs and one NA indicators showed low to high internal consistencies, ranging from $\alpha = .58$ to $\alpha = .90$, being in 16 cases above $\alpha = .70$. All internal consistency values can be found in table 1.

Table 1

Internal consistencies for assessed indices.

Index	*α*	*Items*	*Exemplary Items**
Neighborhood Attachment	.839	4	This neighborhood is part of me.
Building Aesthetics	.728	3	Buildings are beautiful in this neighborhood.
Building Density	.902	3	Buildings are too close together in this neighborhood.
Building Volume	.770	3	Buildings are too tall in this neighborhood.
Internal Functionality	.582	3	Parked cars impede walking in this neighborhood.
External Connection	.871	3	This neighborhood is too cut off from the rest of the city.
Green Areas	.816	4	There are green areas for relaxing in this neighborhood.
Security	.781	3	Acts of vandalism happen in this neighborhood.
Discretion	.675	3	People gossip too much in this neighborhood.
Sociability	.886	3	In this neighborhood, it is easy to get to know people.
School Services	.846	3	This neighborhood has good school facilities.
Social Care Services	.660	3	Elderly care services are lacking in this neighborhood.
Sport Services	.846	3	You can do various sports in this neighborhood.
Socio-Cultural Activities	.730	3	In the evening, this neighborhood offers various attractions.
Commercial Services	.874	4	There are all kinds of stores in this neighborhood.
Transport Services	.795	4	Bus stops are well distributed in this neighborhood.
Relaxing v. Distressing	.708	3	There is a calm atmosphere in this neighborhood.
Stimulating v. Boring	.857	3	This neighborhood is full of activity.
Environmental Health	.831	4	This neighborhood is generally not polluted
Upkeep	.595	4	Streets are regularly cleaned in this neighborhood.

Note. n = 334. *Assessed in German; English items by Fornara et al., 2010 are quoted for comprehension purposes. The German translation can be found in Appendix A.

Procedure

The abbreviated PREQIs and NA scales were translated into German by a bilingual person. The German translation was then submitted to several native German speakers for proofreading. Subsequently, the translated version was translated back into English to test translation equivalence (Berry, 1989). To investigate the factor-structure of the German translation of the abbreviated PREQIs and NA indicators, a factor analysis was used. With a pre-fixed set of 19 factors and a Varimax-rotation, the results of the rotated solution showed that the original factor structure could be generally replicated within the German version. All items with a loading of > .40 were included in a factor. However, it was found that the subscales of socio-cultural activities and commercial services loaded on the same factor in the German version. Furthermore, a few items also loaded on other factors than their primary. Since these problems were considered minor, it was decided to keep the original dimensions. Participants were recruited using several ways of advertisement. First of all, the study was advertised with posters in restaurants, cafés, shops, and medical offices in Freiburg Vauban (Appendix B). Subsequently, 2000 flyers were distributed to residents in Freiburg Vauban as well as in Heidelberg Bahnstadt (Appendix B). The questionnaire was also promoted via social media, such as Facebook and LinkedIn. The assessment took place between April 4th, 2022, and May 16th, 2022. Hence, a non-randomized, convenience sample was collected. As survey design a quantitative study was chosen. Because each person was surveyed once, this study was executed in a cross-sectional design. Data collection was conducted online using the Qualtrics' questionnaire tool. The questionnaire took about 15 minutes to complete. At the beginning of the survey, participants were asked to provide details about their socio-demographic background and basic information about their housing, namely length of residence, ownership, and household size. Subsequently the abbreviated PREQIs and NA scales were assessed. Finally, satisfaction with neighborhood characteristics, diversity, and

friends' propinquity were queried. The structure of the questionnaire remained the same for all participants. As there was no risk of psychological or physical harm to the participants and no manipulations were conducted, the study complied with Swedish laws and regulations on research ethics. Sensitive personal data was not assessed. All participants were informed about the research topic, that participation is voluntary and anonymous, and that the assessment could be terminated at any time at their own request. In addition, they were given an opportunity to express concerns and questions.

The collected data was analyzed by using IBM SPSS Statistics version 27. This was preceded by cleaning of the data, during which incomplete and erroneous data sets were excluded. Inverted items were adjusted. The exploratory hypotheses were tested by calculating a linear multiple regression. Prior to this, the statistical prerequisites were reviewed. To test whether there was a significant relationship between the predictor variables and NA, several Pearson product-moment correlations were conducted. For level of education, a Spearman correlation was calculated since the data was ordinally scaled. The relationships of gender and homeownership with NA were tested by using *t*-tests for unrelated samples. The linearity of these relationships was furthermore checked by visual assessment of the partial regressions' scatterplots. Only indicators being significantly related in a linear manner were to be included in the regression model. Multicollinearity was analyzed by using VIF-analysis. To review residual independency, a Durbin-Watson test was used. Homoscedasticity and normal distribution of the residuals were checked visually by using a scatterplot and a histogram.

Results

The mean values, standard deviations, median-values, minimum- and maximum-values of the indicators used for analysis are presented in table 2. Additionally, the correlations between all assessed variables are presented in Appendix C.

Table 2

Descriptive parameters.

Variable	*M*	*SD*	*Mdn*	*Min*	*Max*
Length of Residence	7.73	10.15	3.00	0.00	86.00
Household Size	1.67	1.50	1	0	10
Children	0.26	0.64	0	0	4
Traffic Density	9.66	1.87	10	6	12
Walkability	10.66	1.50	10	6	12
Ethnic Diversity	3.05	1.25	3	1	5
Friends' Propinquity	20.57	25.69	10	0	100
Building Aesthetics	11.20	2.32	12.00	5.00	15.00
Building Density	9.93	3.33	10.00	3.00	15.00
Building Volume	12.32	2.29	13.00	3.00	15.00
Internal Functionality	10.96	2.52	11.00	4.00	15.00
External Connection	12.56	2.73	13.00	3.00	15.00
Green Areas	15.68	3.76	16.00	5.00	20.00
Security	11.85	2.47	12.00	3.00	15.00
Discretion	11.06	2.41	11.00	3.00	15.00
Sociability	9.43	2.99	9.00	3.00	15.00
School Services	11.33	2.77	12.00	3.00	15.00
Social Care Services	10.67	2.39	11.00	3.00	15.00
Sport Services	10.80	3.02	11.00	3.00	15.00
Socio-Cultural Activities	8.22	2.86	8.00	3.00	15.00
Commercial Services	12.24	4.24	13.00	4.00	20.00
Transport Services	15.58	3.52	16.00	4.00	20.00
Relaxing vs Distressing	12.43	2.30	13.00	4.00	15.00
Stimulating vs Boring	8.40	3.04	8.00	3.00	15.00
Environmental Health	15.26	3.37	16.00	4.00	20.00
Upkeep	15.53	2.63	16.00	7.00	20.00
Neighborhood Attachment	12.67	4.08	13.00	4.00	20.00

Testing for relationships with NA

After conducting a Pearson product-moment correlation, age and NA was found to correlate positively to a medium extent, $r(332) = .35$, $p < .001$. A *t*-test for independent samples showed no significant differences between women and men, $t(329) = 1.02$, $p > .05$. Hence, gender was not included as a predictor in the regression model. A second Pearson correlation found income and NA to correlate positively, $r(331) = .25$, $p < .001$, contrary to the expectations. However, as there was a significant relationship, income was included in the regression. Individuals with higher education also reported higher NA, $r(332) = .18$, $p < .001$. Analysis showed a significant difference of NA between home owners and tenants, $t(303) = -7.81$, $p < .001$. Homeowners reported higher values of NA than renters. Length of residence and NA correlated positively to a medium extent, $r(332) = .31$, $p < .001$. Size of household and NA correlated positively, $r(332) = .15$, $p < .01$. Number of children and NA correlated positively, $r(332) = .23$, $p < .001$. Security and NA correlated also positively, $r(332) = .31$, $p < .001$. Further product moment correlations found both discretion ($r(332) = .11$, $p < .05$) and sociability ($r(332) = .56$, $p < .001$) to be correlated positively with NA. Also, a positive correlation between friends' propinquity and NA, $r(332) = .32$, $p < .001$ was found. Ethnic diversity and NA were observed to be negatively correlated ($r(332) = -.12$, $p < .05$). Building aesthetics correlated positively with NA, $r(332) = .49$, $p < .001$. Also, both building density ($r(332) = .26$, $p < .001$) and building volume ($r(332) = .22$, $p < .001$) were correlated positively with NA. Satisfaction with green areas and NA correlated positively, $r(332) = .32$, $p < .001$. Further product-moment correlations also found significant correlations of satisfaction with social care services ($r(332) = .21$, $p < .001$), school services ($r(332) = .34$, $p < .001$), sport services ($r(332) = .24$, $p < .001$), and socio-cultural activities ($r(332) = .31$, $p < .001$) with NA. Only the assumed correlation between commercial services and NA was found to be non-significant ($r(332) = .09$, $p > .05$). The correlation between

satisfaction with traffic density and NA was also significant ($r(332) = .22$, $p < .001$). Both walkability ($r(332) = .27$, $p < .001$) and satisfaction with transport services ($r(332) = .14$, $p < .01$) and NA correlated positively. Further correlations revealed positive correlations between internal functionality ($r(332) = .28$, $p < .001$), external connection ($r(332) = .18$, $p < .001$), relaxing vs. distressing ($r(332) = .40$, $p < .001$), stimulating vs. boring ($r(332) = .28$, $p < .001$), environmental health ($r(332) = .34$, $p < .001$), and upkeep ($r(332) = .37$, $p < .001$). After testing for the existence of relationships between the assessed variables and NA, all but gender and satisfaction with commercial services were included as predictors in the linear multiple regression model.

Prerequisites of linear multiple regression

In addition to the found correlations presented above, scatterplots of the partial regressions suggested linear relationships. The dependent variable, NA, was metrically scaled. Since one data point was found to be outside of three standard deviations, it was excluded from the regression for being an outlier. However, the value of a studentized excluded residual exceeded the threshold of three standard deviations, so this data point was also removed from the regression. Due to high leverage of another data point (.29), it was also removed following thresholds of Huber (1981), Velleman and Welsch (1981), namely .20 and .26. No data point exceeded the cutoff value for Cook distances. The premise of multicollinearity could be accepted, since all VIF-values ranged between 1.242 and 3.086. The VIF-values of all included variables can be found in table 3. No autocorrelation of residuals could be found in the Durbin-Watson test (2.263). The normal distribution of residuals could be accepted by using a histogram and a P-P-plot. The final premise of heteroscedasticity was also accepted since the scatterplot showed approximately similar scattering across the horizontal axis.

Linear multiple regression predicting NA

The multiple coefficient of determination was found to be $R^2 = .61$ and hence indicating a high goodness-of-fit according to Cohen (1988). The $R^2_{Adjusted} = .58$ suggested the same. The model was found to statistically significant predict NA, $F(29, 301) = 16.54$, $p < .001$. Of the twenty-nine variables included in the regression, only seven were found to contribute to the model significantly, namely length of residence ($\beta = .15$, $p < .01$), homeownership ($\beta = .09$, $p < .05$), sociability ($\beta = .23$, $p < .001$), friends' propinquity ($\beta = .15$, $p < .001$), building aesthetics ($\beta = .23$, $p < .001$), socio-cultural activities ($\beta = .11$, $p < .05$), and stimulating versus boring ($\beta = .21$, $p < .001$). Hence, the strongest predictors of NA are sociability and building aesthetics. These are followed by stimulating versus boring, length of residence, friends' propinquity, socio-cultural activities and finally homeownership. The coefficients of all variables included in the linear multiple regression can be found in table 3. Hence, the final model to predict NA was:

NA = (.23*Sociability) + (.23*Building Aesthetics) + (.21*Stimulating versus Boring) + (.15*Length of Residence) + (.15*Friends' Propinquity) + (.11*Socio-Cultural Activities) + (.09*Homeownership).

Table 3

Summary of linear multiple regression predicting NA (n = 331).

Variable	*B*	*SE B*	*β*	*p*	CI_{lower}*	CI_{upper}*	*VIF*
Age	< .001	.02	< .001	.998	-.03	.03	2.812
Income	< .001	<.001	.08	.079	< 0.01	< 0.01	1.672
Education	< .001	.15	< .001	.987	-0.29	0.29	1.503
Length of Residence	.07	.02	.15	.005	0.02	0.12	2.303
Homeownership	.58	.28	.09	.040	0.03	1.12	1.543
Household Size	-.10	.11	-.04	.396	- 0.32	0.13	1.383
Children	.50	.29	.08	.081	- 0.06	1.06	1.566
Security	.16	.09	.10	.071	- 0.01	0.34	2.365
Discretion	.01	.07	< .001	.922	- 0.13	0.15	1.411
Sociability	.31	.06	.23	< .001	0.19	0.44	1.705
Friends' Propinquity	.02	.01	.15	< .001	0.01	0.04	1.242
Ethnic Diversity	-.02	.14	< .001	.916	- 0.29	0.26	1.370
Building Aesthetics	.39	.09	.23	< .001	0.22	0.57	1.944
Building Density	.10	.06	.08	.069	- 0.01	0.21	1.661
Building Volume	-.06	.08	-.03	.467	- 0.20	0.09	1.412
Green Areas	< .001	.05	< .001	.959	- 0.10	0.10	1.681
Social Care Services	-.08	.08	-.05	.274	- 0.23	0.07	1.522
School Services	.09	.07	.06	.185	- 0.04	0.22	1.582
Sport Services	-.02	.06	-.01	.785	- 0.14	0.11	1.647
Socio-Cultural Activities	.16	.08	.11	.039	0.01	0.31	2.312
Traffic Density	-.10	.11	-.05	.181	- 0.31	0.11	1.840
Walkability	.17	.12	.06	.181	- 0.08	0.41	1.600
Transport Services	-.04	.06	-.04	.458	- 0.15	0.07	1.870
Internal Functionality	-.01	.08	-.01	.904	- 0.16	0.14	1.722
External Connection	.12	.07	.08	.113	- 0.03	0.26	1.897
Relaxing vs Distressing	.13	.11	.08	.221	- 0.08	0.35	2.961
Stimulating vs Boring	.28	.07	.21	< .001	0.14	0.43	2.398
Environmental Health	.10	.08	.08	.188	- 0.05	0.25	3.086
Upkeep	-.04	.08	-.02	.646	- 0.18	0.11	1.842

Notes. *95% Confidence intervals for *B.*

Discussion

Theoretical implications

Besides gender, income, and commercial services, the present study was able to replicate all assumed basic relationships with NA. Hence, it has supported the current state of literature in terms of the multitude of variables being related to NA (Bonaiuto et al., 1999; Comstock et al., 2010; Fischer et al., 1977; LaGrange & Yau, 2021; Woolever, 1992). However, only seven constructs were found to be direct predictive influences on NA, that is length of residence, homeownership, sociability, friends' propinquity, building aesthetics, socio-cultural activities, and stimulating versus boring. Therefore, this study emphasizes the suggestion that the underlying mechanisms of NA cannot be grasped without combining individual attributes and environmental indicators (Ruijsbroek et al., 2017; Woolever, 1992). Socio-demographic features (length of residence and homeownership), socio-relational features (sociability, friends' propinquity), architectural features (building aesthetics), functional features (socio-cultural activities), and contextual features (stimulating versus boring) jointly predict NA (Bonaiuto & Fornara, 2004).

Socio-demographic features

Homeownership. Homeownership has been found to be a small but significant predictor of NA. Hence, the findings of this study are in line with previous research suggesting that homeowners show higher levels of attachment to their neighborhoods (Austin & Baba, 1990; Brown et al., 2003; Carson et al., 2010; Hidalgo & Hernandez, 2001; Lewicka, 2010; Oh & Kim, 2009; Oktay et al., 2009; Ringel & Finkelstein, 1991; Woolever, 1992). Since a German-speaking sample was assessed in this study, the assumption that this effect is ethnically independent could also be further confirmed (Oh, 2004). Previous literature often assumed that the effect of homeownership is indirect through increased social participation of residents in the neighborhood. By also assessing sociability, friends'

propinquity, and socio-cultural activities, this study suggests that homeownership also has a unique direct impact on NA (Austin & Baba, 1990; Comstock et al., 2010; Mesch & Manor, 1998).

Length of residence. The observed results regarding the relationship between NA and length of residence support the classical findings suggesting length of residence being an important and constant predictor of NA (Austin & Baba, 1990; Bailey et al., 2012; Bonaiuto et al., 1999; Brown et al., 2003; Carson et al., 2010; Comstock et al., 2010; Forouzande & Motallebi, 2012; Goudy, 1982; Kasarda & Janowitz, 1974; Lewicka, 2010; Livingston et al., 2010; Oh & Kim, 2009; Oktay et al., 2009; Sampson, 1988). Moreover, the effect was significant even though age and several social variables were also included in the regression model (Austin & Baba, 1990). Also, no correlation between length of residence and friends' propinquity was found in this study. Even the found correlation between length of residence and sociability was only small. This is especially interesting in front of the research suggesting indirect effects, mediated by social participation and a larger local social network (Austin & Baba, 1990; Kasarda & Janowitz, 1974). Hence, the influence on NA appears to be mostly independent of social interaction.

Non-significant predictors. The results regarding age show that NA is indeed higher in older individuals and suggest that younger people might only be more attached to the city or their residential place in general (Hidalgo & Hernandez, 2001; Scharf et al., 2003). However, as mentioned in research before, age could not be found to predict NA (Bailey et al., 2012; Bonaiuto et al., 1999; Goudy, 1982; Lewicka, 2010). This might be due to the generally young sample assessed for this study. However, contrary to newer research there was no attachment difference between male and female participants. Due to the low average age the explanation of domestic responsibilities linking females to their neighborhood might be outdated (Hidalgo & Hernandez, 2001). Therefore, gender seems to be neglectable as a

modern predictor of NA (Lewicka, 2010). Contrary to the previous research, this study found that higher income correlates positively with NA, as well as higher education. These findings suggest that with higher income and education residents are more likely to be able to choose their neighborhood (Lewicka, 2005). This voluntary choosing seems to be a stronger predictor of NA than having no possibility to move due to limited possibilities (Amérigo & Aragonés, 1990; Lewicka, 2005). Nevertheless, the socio-economic status could not be found to be a predictor of NA, contrary to research (e.g.: Bonaiuto et al., 1999; Comstock et al., 2010). Whereas household size and number of children correlated positively to NA, they did not predict it. This might be explainable by the generally young sample assessed. Additionally, the findings also suggest the theory of having more local relationships and restrictions to move away and therefore only an indirect effect (Bailey et al., 2012; Mesch & Manor, 1998; Mincer, 1978). Yet, due to the young sample, the results can only be generalized to a limited extent.

Socio-relational features

Sociability. In this study, sociability was found to be one of the strongest predictors of NA. This is consistent with previous research findings and emphasizes the constant and direct impact on NA (Austin & Baba, 1990; Bonaiuto et al., 1999; Clark et al., 2017; Fleury-Bahi et al., 2008; Lewicka, 2010; Livingston et al., 2010; St John et al., 1986; Thomas et al., 2008). A welcoming social environment and the ability to socially integrate within the neighborhood again have proven themselves to be crucial factors of bonding with the residential environment (Clark et al., 2017).

Friends' propinquity. Friends' propinquity predicted NA, replicating initial observations made by Sampson in 1988. This finding further emphasizes the importance of neighborhood ties and a strong social environment (Bonaiuto et al., 1999; Lewicka, 2010; Livingston et al., 2010; Ruijsbroek et al., 2017). The presence of strong social ties within the

neighborhood actively seems to reduce the residents' motivation to move away and hence to increase NA (Andersen, 2008; Clark et al., 2017; Goudy, 1982; Mesch & Manor, 1998; Sampson, 1988). Therefore, the importance of formal and informal local interaction and relationship building within residential environments is further emphasized (Clark et al., 2017; Ruijsbroek et al., 2017).

Non-significant predictors. Contrary to the importance suggested in current literature, security is not predicting NA (Brown et al., 2003, 2004; Fornara et al., 2007; Livingston et al., 2010; McGuire, 1997; Sampson, 1988). This might be explainable by the participants living in maintained and sizable neighborhoods, in which security issues might not be present. This suggestion is further emphasized by the high educational level observed within the sample. Since a majority of participants are from either newly developed neighborhoods or rural areas the predictive influence of security and discretion might have been further underestimated (Bonaiuto et al., 1999; Harris et al., 1996; Kyle et al., 2004). Whereas ethnical diversity did correlate with NA, it did not predict NA. As suggested by previous research, the effects of social mix are mediated by social and contextual features (Górny & Toruńczyk-Ruiz, 2014; Toruńczyk-Ruiz, & Lewicka, 2016). The results found suggest that the relationship between ethnic diversity and NA may be mediated to an even larger extent than previously thought.

Architectonic and town-planning features

Building aesthetics. The strong predictive effect of building aesthetics on NA re-emphasizes the importance of architectural features (Bonaiuto et al. 1999; LaGrange & Yau, 2021; Lewicka, 2010; Mesch & Manor, 1998; Ringel & Finkelstein, 1991). Furthermore, the unique predictive influence of building aesthetics could be confirmed and hence the suggestion of being one of the most important and consistent predictors of NA further underpinned (Bonaiuto et al., 1999; St. John et al., 1986; Thomas et al., 2008).

Non-significant predictors. Neither building density, building volume, nor green areas predicted NA, contrary to the current state of research (e.g., Bonaiuto et al., 2003; Ruijsbroek et al., 2017). This again could be due to participants living in modern neighborhoods and rural areas. Nevertheless, despite showing medium level correlations with building aesthetics and density, no issue of multicollinearity could be found regarding building volume. However, since volume did not show any significant effects, the assessment of building volume should be questioned in future research. Though, it is still surprising that green areas did not predict NA, due to their central role suggested by previous results (Andersen, 2008; Bonaiuto et al., 1999; Kaplan, 1985; Kyle et al., 2004; Thomas et al., 2008). However, the correlations found with several other constructs, such as sociability, walkability, sport services and internal functionality might suggest that indirect influences of green spaces as meeting, relaxation, and activity spots within the neighborhood might be predominant (Comstock et al., 2010; Kaplan, 1985; Kyle et al., 2004; Livingston et al., 2010; Ruijsbroek et al., 2017).

Functional features

Socio-cultural activities. Due to the significant predictive influence of socio-cultural activities on NA, this study highlights the special role of these activities in creating NA, as they provide experiences that make people bond with the neighborhood (Bonaiuto et al., 1999; Forouzande & Motallebi, 2012; Mao et al., 2015).

Non-significant predictors. Besides commercial services, all functional features were found to be correlated to NA according to the literature. This might be explainable by the high correlation of commercial services with public transport, suggesting that residents are able to reach commercial services outside of the neighborhood easily. Also, the correlation of the subscales socio-cultural activities and commercial services found in the factor-analysis might have led to a distortion of the results. The lack of predictive influence of the functional

features on NA, however, contradicts previously done research (Bonaiuto et al., 1999; Kaplan, 1985; Mao et al., 2015). Yet, as assumed by Bonaiuto and colleagues before, this might be due to more indirect effects on NA (Bonaiuto et al., 1999). The satisfaction with school services, for example, was previously found to reflect deeper societal needs and concerns (LaGrange & Yau, 2021). This explanation is supported by the great number of correlations with other variables assessed. Some research even assumed that place identity, which is related to NA, and local services are fully independent (Fleury-Bahi et al., 2008).

Context features

Stimulating versus boring. The dimension stimulating versus boring strongly predicted NA in accordance with prior research (Bonaiuto et al., 1999; Bonaiuto et al., 2015; Fornara et al., 2010; Mao et al., 2015; Toruńczyk-Ruiz & Lewicka 2016). Hence, it can be assumed that an exciting and stimulating neighborhood provides the residents with the experiences they need to bond (Fornara et al., 2010; Toruńczyk-Ruiz & Lewicka 2016). Furthermore, the obtained results extend the cultural independence of this relationship, adding a German sample to the previously assessed Italian, Chinese, and Iranian samples (e.g., Bonaiuto et al., 2015; Mao et al., 2015).

Non-significant predictors. Besides stimulating versus boring, the observation of contextual factors being some of the strongest indicators of NA, could not be reproduced (Bonaiuto et al., 1999; Bonaiuto et al., 2015; Fornara et al., 2010; Mao et al., 2015; Sam et al., 2012). Although especially relaxing versus distressing was reported to strongly influence NA, it did not predict NA in the present study (Bonaiuto et al., 1999; Mao et al., 2015). Since the previous research found correlations of context features with other predictors of NA, the obtained results are to a certain extent according to research (Austin & Baba, 1990; Bonaiuto et al., 1999). For example, upkeep was found to reduce place attachment indirectly by lowering social interaction and decreasing feelings of safety (Livingston et al., 2010). The

large number of medium to high correlations of the context factors with other variables found in this study, again suggests the predominance of indirect influences.

Limitations

First of all, this study needs to be criticized in terms of population validity. Since the sample is generally very young, the reported results might not be representative of older individuals. Although students and employed residents were found to be similar in terms of attachment, they still differed from retired and unemployed inhabitants (Oktay et al., 2009). Furthermore, only German speaking individuals were assessed. Generalizing the results to other cultures must be done carefully. It also needs to be mentioned that due to the size and the complexity of the online questionnaire, people with disabilities might have been excluded, which further decreases the population validity and might have distorted the results. Because of the cross-sectional design, the development and change of NA could not be included. Thus, longitudinal studies could contribute to the current state of research with important findings regarding the dynamic development of NA. Since the questionnaire was assessed online, the circumstances of the assessment could not be controlled. Possible distractors could therefore have distorted the results. In addition, an increased social desirability could have biased the data due to other persons being present during the assessment. Due to convenience sampling also within the author's social network, the effects of social desirability might have further been increased. The questionnaire was presented in a non-randomized constant order, which might have led to bias due to fatigue. However, questionnaires with different methodologies were placed in such a way that fatigue should not occur. Another methodological issue might have arisen due to the problematic concept of neighborhood itself (Corcoran, 2002). Since no clear definition of neighborhood was provided, confusion reportedly arose amongst participants during the assessment. A clear definition is hence not only beneficial but crucial for future studies. Although this study

includes multiple different variables assumed to impact NA, not every influence identified in research could be examined (Andersen, 2008; Górny & Torunczyk-Ruiz, 2014). Some examples are intercultural ties, size of the community, restricted mobility, or resident turnover (Bonaiuto et al., 1999; Fried, 1982; Górny & Torunczyk-Ruiz, 2014; Lewicka, 2005; Livingston et al., 2010). Furthermore, qualitative variables such as early experiences within the neighborhood, housing history, degree of integration, traditions, or future expectations were also reported to impact NA (Fornara et al., 2007; Livingston et al., 2010; Oktay et al., 2009). Future research not only has to include large numbers of quantitative variables, but also needs to conduct mixed method studies (Riazi & Emami, 2018). As mentioned above, some items were newly created in advance of the study itself. Reliability and validity of these items can thus be criticized. To the author's knowledge, this study is the first to assess the abbreviated PREQIs and NA scales translated in German. Thus, no comparisons for validity and reliability can be made. Furthermore, correlations between the items of the scales commercial service and socio-cultural activities might have confounded the results. Furthermore, the NA scale used in this study, assesses primarily general feelings towards the respective neighborhood. Such items, however, were found to create overlap between NA and other similar constructs and enhance ambiguity (Ruiz et al., 2011). If the current definition of NA should be refined in the future, the present study must be replicated with adapted measures. Furthermore, the methodology of the present study has to be criticized, since the linear regression was based on the assumption of direct relationships between the predictor variables and NA. However, the association might have been fully mediated by unknown variables. Additionally, due to the close relationship between correlations and regressions, the direction of the effects can also only be assumed based on theoretical hypotheses. This is especially important in front of the background of conflicting research regarding the direction of relationship between RS and NA (e.g., Bonaiuto et al.,

1999; Fleury-Bahi et al., 2008). Future research using other methodologies, such as structural equation modelling, could provide further important insights.

Future research

One crucial issue to resolve with future research is the ambiguity regarding the relationship between place attachment and residential satisfaction. Using these constructs as sub-components of each other or interchangeably is problematic for creating conclusive theories, especially since recent research indicated that NA and RS are manifested as distinct phenomena (LaGrange & Yau, 2021). Therefore, future research must especially focus on the fine nuances of both constructs (Amérigo & Aragonés, 1990; LaGrange & Yau, 2021). A similar research gap concerns the overlap of NA with various other concepts, which hinders research progress (Fornara et al., 2007; Ruiz et al., 2011). However, there have been first endeavors of clarifying the distinctions between NA and other variables, such as place identity, in which it could be confirmed that maintaining place attachment as individual construct in regard of place identity is appropriate (Proshansky et al., 1983; Ruiz et al., 2011). Still, future research is heavily needed to clarify the distinctions and hence resolve the ambiguity of these overlapping constructs. Interdisciplinary approaches are also required here, since the residents' attachment with their respective neighborhood not only occupies scientists from psychology, but also sociologists, political scientists, urban planners, and architects. Therefore, it should be an important goal to develop unified theory and methodology between disciplines as well. Additionally, most research assesses attachment affectively and cognitively. The behavioral aspect is only seldomly researched (Bonaiuto et al., 2006; Livingston et al., 2010). The multi-dimensionality of NA is even more emphasized in terms of the variety of variables influencing NA directly and indirectly. Particularly in this area, the need for more research is evident. Besides research examining the direct influences on NA, especially the research on indirect effects yields interesting results. Abbreviated

scales as the one used in this study enable researchers to assess larger numbers of possible predictor (Fornara et al., 2010). However, since the used German translation of the abbreviated PREQIs and NA indicators showed problematic factor structures, future refinements are needed. Finally, it must be noted that although this study can provide information on the prediction of NA, no valid causalities can be established without experimental manipulations. Nevertheless, these studies will be particularly challenging in the field of environmental psychology, yet they are needed.

Conclusion

As the primary setting for daily social and economic life, the neighborhood inherits extraordinary value to people's lives (Adriaanse, 2007; Anderson & Baldwin, 2017; Fornara et al., 2007; Fried, 1982; Gilroy, 2008; Kaplan, 1985; Proshansky et al., 1983). However, not much is known about the predictors and underlying processes that make residents bond with their neighborhood (Lewicka, 2010; Ruijsbroek et al., 2017; Woolever, 1992). This study advanced research in its endeavor to cover this gap of research by conducting a comprehensive study examining multiple variables and their predictive influence on NA (Fornara et al., 2010; Gilroy, 2008; Jabareen, 2006). The replicated multitude of factors being related to NA emphasizes the complex and multi-dimensional nature of NA (Bonaiuto et al., 1999; Livingston et al., 2010; Woolever, 1992). Variables from various fields such as socio-demographic features, architectural and town-planning features, socio-relational features, functional features, and contextual features all combinedly create NA. Yet, most of the influences on NA appear to be indirect. Only few indicators directly predicted NA, namely length of residence, homeownership, building aesthetics, sociability, friends' propinquity, socio-cultural activities, and stimulating versus boring. Furthermore, the obtained results suggest that there are possibilities for architects and town planners to actively support the cultivation of NA. The results additionally stress the need for practitioners to considerate

scientific research to create better residential environments and thus reduce the likelihood of residents to relocate or housing projects to fail (Amérigo & Aragonés, 1990; Anderson & Baldwin, 2017; Brown et al., 2003; Riazi & Emami, 2018; Salleh, 2008). In fact, creating aesthetically pleasing neighborhoods with spaces allowing for social interaction and cultural events to happen seems to be an influential factor in making residents attach to their neighborhood. The challenge is also to develop living environments that can adapt to their inhabitants and allow them to live and thrive in them for a long time.

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Appendix A

German translation of abbreviated PREQIs and NA. Abgekürzte Skala für wahrgenommene Qualität des Wohnumfelds (PREQ) und Nachbarschaftsbindung (NA).

Variable	*Item Bezeichnung*	*Item*
1. Gebäude Ästhetik	BA1	Die Gebäude in diesem Viertel sind schön.
	BA2	Es ist angenehm, diese Nachbarschaft zu sehen.
	BA3a	In diesem Viertel haben die Gebäude unangenehme Farben.
2. Gebäudedichte	BD1a	In diesem Viertel stehen die Gebäude zu dicht beieinander.
	BD2	In diesem Viertel gibt es genügend Platz zwischen den Häusern.
	BD3a	In diesem Viertel gibt es nur wenig Platz zwischen den Gebäuden.
3. Gebäudevolumen	BV1a	Die Dimension der Gebäude ist in diesem Viertel erdrückend.
	BV2a	Das Volumen der Gebäude ist in diesem Viertel zu groß.
	BV3a	In diesem Viertel sind die Gebäude zu hoch.
4. Interne Funktionalität	IP1a	Geparkte Autos behindern das Gehen in diesem Viertel.

	IP2	In diesem Viertel gibt es ein gutes Angebot an Parkplätzen.
	IP3	In diesem Viertel kann man gut mit dem Fahrrad unterwegs sein.
5. Externe Anbindung	EC1	Das Stadtzentrum ist von diesem Viertel aus leicht zu erreichen.
	EC2	Dieses Viertel ist gut mit den wichtigsten Teilen der Stadt verbunden.
	EC3a	Dieses Viertel ist zu sehr vom Rest der Stadt abgeschnitten.
6. Grünflächen	GA1	In dieser Nachbarschaft gibt es Grünflächen zum Entspannen.
	GA2	In diesem Viertel gibt es genügend Grünflächen.
	GA3a	In einen Park zu gehen bedeutet, in andere Teile der Stadt zu fahren.
	GA4	In diesem Viertel sind die Grünflächen in gutem Zustand.
7. Sicherheit	Se1a	In dieser Nachbarschaft kann man auf böse Menschen treffen.
	Se2a	Vandalismus kommt in dieser Nachbarschaft vor.
	Se3a	Hier besteht in der Nacht die Gefahr von gefährlichen Begegnungen.

8. Diskretion	Di1a	In dieser Gegend wird zu viel getratscht.
	Di2a	In dieser Nachbarschaft fühlt man sich beobachtet.
	Di3	In dieser Nachbarschaft sind die Menschen nicht aufdringlich.
9. Kontaktfreudigkeit	So1a	In dieser Nachbarschaft ist es schwierig, Freundschaften zu schließen.
	So2	In diesem Viertel ist es leicht, Menschen kennen zu lernen.
	So3a	In dieser Nachbarschaft sind die Menschen eher isoliert.
10. Bildungsangebot	SS1	Dieses Viertel verfügt über gute schulische Einrichtungen.
	SS2	Schulen sind in diesem Viertel leicht zu Fuß zu erreichen.
	SS3	Die Schulen in diesem Viertel sind im Allgemeinen gut.
11. Wohlfahrt	SC1a	Die sozialen Dienste sind in diesem Viertel unzureichend.
	SC2a	In diesem Viertel fehlt es an Dienstleistungen für ältere Menschen.
	SC3a	Das örtliche Gesundheitssystem ist in diesem Viertel unzureichend.
12. Sportangebot	Sp1	Man kann in diesem Viertel verschiedene Sportarten ausüben.

	Sp2	Dieses Viertel ist gut mit Sportplätzen ausgestattet.
	Sp3	In diesem Viertel gibt es Bereiche, in denen man Sport im Freien treiben kann.
13. Sozio-kulturell	SA1a	In diesem Viertel fehlt es an Unterhaltungsangeboten für die Bewohner.
	SA2	Am Abend bietet dieses Viertel verschiedene Attraktionen.
	SA3a	Dieses Viertel ist für kulturelle Veranstaltungen nicht gut ausgestattet.
14. Dienstleistungen	CS1	In diesem Viertel gibt es alle Arten von Geschäften.
	CS2	In den Geschäften des Viertels kann man alles finden.
	CS3	Dieses Viertel ist gut mit Geschäften versorgt.
	CS4a	Die Geschäfte sind in diesem Viertel nicht gut verteilt.
15. Transportangebot	TS1	In diesem Viertel sind die öffentlichen Verkehrsmittel gut mit dem Rest der Stadt verbunden.
	TS2	In diesem Viertel ist die Frequenz der öffentlichen Verkehrsmittel für die Bedürfnisse der Bewohner ausreichend.
	TS3a	Die Busse sind in diesem Viertel zu unbequem.

	TS4	Die Bushaltestellen sind in diesem Viertel gut verteilt.
16. Entspannend versus beunruhigend	RD1	Es herrscht eine ruhige Atmosphäre in diesem Viertel.
	RD2	Verglichen mit dem Chaos in anderen Gegenden ist dieses Viertel noch lebenswert.
	RD3a	Das Leben in dieser Nachbarschaft ist ziemlich belastend.
17. Anregend versus langweilig	SB1	In diesem Viertel herrscht ein reges Treiben.
	SB2	Jeden Tag gibt es etwas Interessantes in diesem Viertel.
	SB3a	In dieser Nachbarschaft passiert nichts.
18. Umwelt und Gesundheit	EH1	Die Luft in diesem Viertel ist sauber.
	EH2	Diese Nachbarschaft ist im Allgemeinen nicht verschmutzt.
	EH3	Dies ist eine leise Nachbarschaft.
	EH4a	Die Gesundheit der Anwohner ist durch die Umweltverschmutzung in diesem Viertel gefährdet.
19. Instandhaltung	Up1	In diesem Viertel werden die Straßen regelmäßig gereinigt.
	Up2	Die Straßenschilder sind in diesem Viertel gut erhalten.

	Up3	Die Anwohner kümmern sich um ihre Nachbarschaft.
	Up4a	Es gibt zu viele Löcher in den Straßen des Viertels.
Nachbarschaftsbindung	NA1	Dieses Viertel ist ein Teil von mir.
	NA2	Es würde mir sehr schwerfallen, diese Nachbarschaft zu verlassen.
	NA3	Das ist die ideale Nachbarschaft für mich.
	NA4a	Ich fühle mich in dieser Nachbarschaft nicht integriert.

Appendix B

Advertisement material to recruit participants.

Ihre Meinung zählt!

Bitte nehmen **Sie** sich nur **5 Minuten** Zeit und unterstützen Sie uns bei unserer Studie zur Entwicklung nachhaltigerer und sozialerer Wohnräume.

Herzlichen Dank!

https://lundpsychology.eu.qualtrics.com/jfe/form/SV_1M3Zq0dEC8RlAPk

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Appendix C

Intercorrelations of the assessed variables.

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1.	NA	1																												
2.	Age	.35**	1																											
3.	Length of Residence	.31**	.64**	1																										
4.	Income	.25**	.50**	.13*	1																									
5.	Household Size	.15**	-.01	.03	-.05	1																								
6.	Children	.24**	.22**	.08	.23**	.43**	1																							
7.	Sociability	.56**	.32**	.21**	.24**	.15**	.27**	1																						
8.	Security	.31**	.02	.06	.04	.09	.07	.22**	1																					
9.	Discretion	.11*	.03	-.06	.07	-.04	.07	.03	.19**	1																				
10.	Ethnic Diversity	-.12*	-.12*	-.12*	-.02	-.03	-.09	-.12*	-.36**	.13*	1																			
11.	Friends' Propinquity	.32**	.17*	.18**	-.05	.17**	.11*	.23**	.03	.11	.02	1																		
12.	Building Aesthetics	.49**	.18**	.14*	.11*	.07	.04	.27**	.45**	.18**	-.25**	.11	1																	
13.	Building Density	.26**	.03	.16**	.02	.10	.05	.20**	.39**	-.01	-.17**	-.03	.41**	1																
14.	Building Volume	.22**	.11	.16*	.07	.08	.11	.20**	.28**	.07	-.16**	.05	.39**	.38**	1															
15.	Internal Functionality	.28**	.12*	.15**	.10	.07	.11	.33**	.37**	-.01	-.14*	.05	.24**	.37**	.24**	1														
16.	Green Areas	.32**	.17**	.14*	.09	.11*	.13*	.33**	.18**	.05	-.14*	.05	.31**	.22**	.19**	.35**	1													
17.	Traffic density	.22**	.17**	.16**	.09	.04	.17**	.29**	.28**	-.10	-.22**	-.04	.30**	.26**	.23**	.43**	.28**	1												
18.	Walkability	.27**	.09	.08	.06	.06	.10	.27**	.23**	.06	-.08	.10	.22**	.15**	.14*	.37**	.40**	.43**	1											
19.	External Connection	.18**	.04	-.02	.03	.02	-.07	.14*	-.12*	.15**	.15**	.18**	.06	-.19**	-.05	-.05	.08	-.06	.09	1										
20.	Transport Services	.14*	.03	-.01	-.03	.08	< .001	.07	-.03	.20**	.11*	.12*	.19**	-.12*	.05	-.01	.23**	.05	.19**	.55**	1									
21.	Social Care Services	.21**	.09	.12*	.05	.06	.03	.20**	.20**	.12*	-.05	.12*	.16**	-.01	.04	.10	.14*	.04	.24**	.38**	.38**	1								
22.	School Services	.34**	.17**	.16**	.12*	.09	.17**	.22**	.16**	-.05	-.07	.22**	.24**	< .001	.08	.14*	.28**	.03	.18**	.35**	.33**	.36**	1							
23.	Sport Services	.24**	< .001	.09	-.02	.07	.11	.21**	.23**	-.04	.03	.16**	.19**	.07	.03	.32**	.40**	.19**	.36**	.10	.27**	.31**	.32**	1						
24.	S.-c. Activities	.31**	.06	-.06	.08	.06	-.05	.19**	-.11	.18**	.17**	.20**	.15**	-.24**	-.05	-.12*	.11	-.13*	.05	.48**	.35**	.33**	.25**	.16**	1					
25.	Commercial Services	.09	.05	-.02	.04	.14*	.01	-.01	-.20**	.17**	.21**	.21**	-.03	-.28**	-.09	-.13*	.09	-.15**	.01	.51**	.43**	.30**	.31**	.09	.56**	1				
26.	Relaxing Distress	.40**	.12*	.14	.08	.14*	.14**	.32**	.63**	.24**	-.26**	.09	.53**	.41**	.38**	.38**	.37**	.41**	.37**	-.03	.08	.22**	.20**	.29**	-.08	-.17**	1			
27.	Stimulating Boring	.28**	.09	-.03	.06	.09	.04	.24**	-.30**	.11*	.28**	.26**	-.02	-.23**	-.15**	-.10	.03	-.16**	.05	.39**	.31**	.14**	.17**	.09	.64**	.54**	-.25**	1		
28.	Environ. Health	.34**	.10	.14**	.08	.11*	.15**	.32**	.62**	.02	-.31**	.06	.44**	.41**	.33**	.42**	.36**	.49**	.31**	-.14**	-.03	.15**	.20**	.30**	-.17**	-.22**	.71**	-.35**	1	
29.	Upkeep	.37**	.11*	.12*	.05	.10	.13*	.36**	.38**	.06	-.17**	.14**	.41**	.19**	.15**	.38**	.36**	.37**	.27**	.15**	.28**	.27**	.30**	.31**	.16**	.07	.45**	.04	.49**	1

Notes. n = 334. Two-tailed significance test; * p < .05; ** p < .01.