



The Relationship Between Perceived Residential Environment Quality (PREQ) and Community Identity: Flow and Social Capital as Mediators

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Abstract

The wide-spread novel coronavirus disease (Covid-19) has posed severe challenges to people's life especially their life style. Due to the residential confinement contingency, people were restricted in their study, work and leisure within constrained residential community. The physical environment of residential community therefore became the main activity place and it thus played a significant role for facilitating inhabitants' daily activities and influencing community identity. Based on the eudaimonic identity theory, this study explored how the spatial dimensions of perceived residential environment quality (PREQ), activity experience (i.e., flow) and social capital, would impact on urbanities' residential community identity during Covid-19. Results from 508 Chinese residential inhabitants analyzed via structural equation modeling suggested that: a better degree in the spatial dimensions of PREQ would predict a stronger community identity; flow and social capital mediated the relationship between the spatial dimensions of PREQ and the inhabitants' community identity. The implications of such accounts for our understanding of community identity are then discussed, considering the important meaning of the relationships between people and the perceived physical properties of their residential place.

Keywords PREQ · Flow · Social capital · Community identity · Urban residential community

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1 Introduction

The wide-spread novel coronavirus disease (Covid-19) has posed severe and negative impact on people's life and way of living (i.e., lifestyles). In coping with Covid-19, which has brought physical and mental threats to residents, government has implemented a series of strict compulsory isolation measures, including a historic blockade of a big city in Wuhan, and subsequently other cities across China (Pagliaro et al., 2021; Ye et al., 2020). People were thus restricted within their residential neighborhood community. The present investigation therefore sought to discuss the impact of perceived physical environment on residents' quality of life and community awareness in this kind of urban daily experience restricted community. From the perspective of environmental psychology, in fact, the quality of neighborhood community environment is a powerful predictor of a neighborhood resident's well-being (Hartig & Kahn, 2016; Kim, 2010; Kim & Kaplan, 2004). Existing research on the effects of one's own residential neighborhood environment in China mostly focuses on its influence on well-being (Zhang & Zhang, 2017). Indeed, a perceived better neighborhood's built environment is linked with higher well-being (Toma et al., 2015), whereas a perceived poor neighborhood community is related to lower level of well-being (Roster et al., 2016). During Covid-19, when self-isolation and prescribed quarantine measures were adopted, neighborhood community had become the main place for its residents in order to conduct physical and social activities: it therefore played an extremely important role in shaping residents' life style. Moreover, according to the eudaimonic identity theory (EIT, Waterman, 1992), as the activities that are engaged in specific physical place (e.g., residential community) facilitate optimal enjoyment of flow and good sense of place such as perceived strong sense of place identity, the study of flow and place identity within a specific context (e.g., a residential neighborhood community) help better understanding one of the possible roots of an individual's well-being (Bonaiuto, Alves, et al., 2016; Bonaiuto, Mao, et al., 2016; Peng et al., 2021). In addition, the physical space is capable of generating flow and social capital (Hirao et al., 2012). For example, the aesthetic design of architecture, the proper accessibility of roads and the presence, as well as the quality and quantity of green areas, all help to contribute a better living place, where people can experience optimal enjoyment (i.e., flow, Csikszentmihalyi, 1975), obtain social network relationships (i.e., social capital, Putnam, 1993), and be more inclined to identify with their community (i.e., community identity, Puddifoot, 1996). However, the study of flow and community identity in light of the physical space has not yet been well documented, as only sparkling evidence can be traced within extant research records. For instance, studies from environmental psychology literature suggested that physical space (e.g., buildings aesthetics, green areas) influences inhabitants' attachment with their neighborhood community (Bonaiuto et al., 1999); the specific physical elements in the public space (i.e., park) predict the inhabitants' sense of belongingness (Main & Sandoval, 2015); large green spaces and parks, wide walking and cycling roads that are accessible to urbanities within the city, would make residents live happily and facilitate stronger sense of security toward their city (Hartig & Kahn, 2016); public spaces left between urban residential buildings are essential for promoting inhabitants' well-being (Ramaswami et al., 2016).

Regrettably, previous studies have not yet well addressed the quality of specific physical elements of their community, with respect to people's activity experience (i.e., flow) and social capital. Yet little is known how flow and social capital serve roles in building or strengthening residents' community identity. Yet prior works about the positive impact of perceived residential environmental quality (PREQ) on well-being and sense of place

conducted in China are mainly focused on the elderly (Zhang & Zhang, 2017). Therefore, in the present work, via a broader age range of participants, we attempted to further explore how inhabitants' perception of their physical environment qualities within residential neighborhood community relates to their sense of community such as community identity; and how the experience of both flow and social capital in the context of Covid-19, based on the eudaimonic identity theory, would play a role within such a relationship. This research sought to provide a novel perspective for policy makers and practitioners in improving urban residential community quality because of its positive impact on urban residents' flow, social capital and ultimately for their community identity.

2 Conceptual Framework, Literature Review and Hypotheses

2.1 Theories and Concepts

2.1.1 Perceived Residential Environment Quality (PREQ)

PREQ (Bonaiuto, 2004; Bonaiuto et al., 1999) refers to people's perception and evaluation of the quality of their own residential area and community environment. It is the study of people's affective and cognitive assessment towards the residential environment quality (i.e., house, residential community, urban city). Normally, urban residential environment quality is subjectively evaluated from various aspects: architectural and spatial, social, functional, contextual and so forth (Bonaiuto et al., 1999; Fornara et al., 2010). Thus, perceived residential environment quality is a multidimensional construct (Bonaiuto & Alves, 2012; Bonaiuto et al., 1999), including spatial, human, functional, and contextual aspects. The present study focuses only on the spatial dimensions of PREQ, in order to highlight the importance of the daily perceived physical environment of residents when the local living environment (especially housing, buildings and communities, in a wider context of cities, provinces and countries) becomes pervasive given a non-mobile human life style during Covid-19.

2.1.2 Eudaimonic Identity Theory (EIT)

Eudaimonic identity theory (EIT, Waterman, 1990, 1993), building on Aristotle's "Eudaimonia" (Ross, 1949; Ryff & Singer, 2008) and Erikson's theory of "identity" (Erikson, 1968), has been used in reference to achieving one's happiness and well-being through doing activities so as to develop the best of one's self for personal growth and flourishing (Díaz et al., 2015; Huta, 2012; Sharp et al., 2007). EIT proposes that people start to recognize elements of their own true self (i.e., goals, values, interests, talents, and abilities) via engaging in identity-related activities, it is "doing" rather than "having". For instance, doing everyday martial arts exercise within residential community may help residents building and maintaining community identity; in fact, engaging in favorite activities in one's own preferred place may facilitate and strengthen place identity (Bonaiuto, Alves, et al., 2016; Bonaiuto, Mao, et al., 2016; Peng et al., 2021). To this end, EIT provides a bridge between activity and identity in that doing an activity is positively and significantly associated with identity development and strength (Bonaiuto, Alves, et al., 2016; Bonaiuto, Mao, et al., 2016). EIT is also informative for understanding the features of an activity

experience in connection with flow, as every-day activities people engaged could facilitate enjoyable experience of flow.

2.1.3 Flow

Flow, introduced by Csikszentmihalyi (1975), is described as “*one of complete involvement of the actor with his activity*”, and is a mental state regarding happiness and the feeling of life as “*the state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it*” (Csikszentmihalyi, 1990). As a very complex and positive state of consciousness, it is characterized by deep participation, absorption and enjoyment (Csikszentmihalyi, 1990; Delle Fave et al., 2011). Flow is also “*a dynamic state which characterizes consciousness when experience is attended to for its own sake*” and flow occurs most frequently when one participates in creative activities, art, rituals and discipline, games and sports (Csikszentmihalyi & Massimini, 1985). Namely, flow occurs when an individual fully focuses with complete concentration, optimal enjoyment and interest, while engaging in an activity which is challenging for the given required skills of the specific person (Erhel & Jamet, 2019). Flow is used to express a person’s feelings during a creative activity, and the stronger the flow, the more fun the person is having (Yang & Hsu, 2020). In recent years, flow theory has been widely used in various contexts, such as the workplace (Rivkin et al., 2016; Xanthopoulou et al., 2017), education (Shernoff et al., 2003; Wu et al., 2020, 2021), marketing (Mao et al., 2020), sports (Jackson & Marsh, 1996), online activities (Wu & Chang, 2005; Yan et al., 2013), and quality of life (Hirao et al., 2012). Taken together, all these contexts may provide accumulating resources for forming social capital (Putnam, 1993).

2.1.4 Social Capital

Social capital is originally defined as: “*the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition*” (Bourdieu, 1986). Standing on this definition, later, social capital refers to a variety of different entities, rather than a single entity, which comprise two common elements: “*they are all consisted of some aspects of social structures, and they facilitate certain action of actors—whether persons or corporate actors—within the structure*” (Coleman, 1988). Subsequently, Baker (1990) proposed that social capital is “*a resource that the individuals derive from specific social structures and then use to pursue their interests; it is created by changes in the relationship among the individuals*”. Putnam (1993) then described social capital as “*features of social organizations, such as networks, norms, and trust that facilitate action and cooperation for mutual benefit*”. Though social capital is scholarly diversified across time, consensus on social capital can be divided into three dimensions: social network, social norms and social trust (Portela et al., 2013; van Oorschot & Arts, 2005). In our work, the study of social capital in the context of community is specified as kinds of social resources existing in the social network relationship in the residential community. Such resources are considered to be able to adjust the behavior of urban residents to achieve specific goals, so as to generate return on investment, such as community participation and community identity (Ruef & Kwon, 2016; Zhao et al., 2020).

2.1.5 Community Identity

Community identity is an aspect of place identity referring to a specific place such as residential community, based on Proshansky's (1978) theory of place identity: "*those dimensions of self that define an individual's personal identity in relation to the physical environment*". Therefore, community identity is a subordinate concept of place identity: it refers to residents' perception of and expression towards a particular place during specific time (Puddifoot, 1996). According to Twigger-Ross and Uzzell (1996), community identity is a means to distinguish from others, maintain continuity, establish positive self-esteem and create self-efficacy, as it comes from the behavior of positioning oneself in the environment (Pretty et al., 2003). Community identity has become an important concept in community psychology (Yang & Xin, 2016), pertaining to the cognitive and emotional connection with one's own community (Puddifoot, 2003), that is, the way a person connects the geographically located place with him/herself and his/her identity (Hummon, 1986; Williams & Vaske, 2003). It is also described as the sense by which people come to view themselves as a community member, and thus feeling emotionally connected with their community (Ren et al., 2016). Therefore, people form a sense of identity with their community during the process of social cohesion and identity (Yang et al., 2020).

2.2 Literature Review and Hypotheses

2.2.1 The Relationship Between the Perceived Residential Environment Quality and Community Identity

PREQ is considered as a subjective perception of the residential quality from the inhabitants' point of view, concerning different aspect of their living environment in an urban place and community. Prior research suggested the positive role of PREQ in predicting neighborhood attachment (Bonaiuto et al., 1999; Fornara et al., 2021; Mao et al., 2015). The more attachment toward a place, the more place identity (Bonaiuto, Alves, et al., 2016; Bonaiuto, Mao, et al., 2016; Twigger-Ross et al., 2003). For instance, it has been investigated that the identification of shared uses of architectural pattern may predict the community identity construction in the Chañarcito village community in La Rioja (Cahiza et al., 2018). It was also revealed that the specific physical, social and cultural elements of the park pose impacts on place identity in Los Angeles, U.S.A. (Main & Sandoval, 2015). Still, findings suggested that place identity exhibits positive influence on people's environmental attitude toward residential suburb (Lee et al., 2015). Studies indicated that place identity relating to an Australia park affects pro-environment behavioral intentions (Tonge et al., 2015). While the impact of the physical aspects of the park on identity is not fully verified, the present study focused on the effect about features of a place on the person's perceived identity—i.e., a psychological construct related to the place, and thus to a physical environment—rather than effects about physical features of a place.

Well-designed architectural and town-planning space (ATS) not only facilitates better environment quality that is good for living (Lall et al., 1991), but also affects people' well-being (Seresinhe et al., 2019). An investigation in the city of Amsterdam, Netherlands, suggested that the cultural attributes of architecture in touristic cities are vital to city image building, and to further help shaping city identity experiences (Dai et al., 2018) and reputation (Bonaiuto et al., 2018). A study using matrix of cultural

landscapes suggested that the cultural landscape of public urban space helps improve the quality of place identity (Ziyae, 2018). To this end, though little is known on the explicit direct effect of ATS on community identity, the literature above has provided some concrete evidence pointing to the positive effect of ATS on community identity.

Moreover, a very recent work demonstrated that, the organization of accessibility and roads (OAR), as an important part of the community, contributes facilitating easier life of people with mobility disabilities and protecting their right to health from infringement (Pinto et al., 2021). Better OAR has more positive impact on people's quality of life and well-being (Kingham et al., 2020). For instance, a survey of 561 residents from two inner city suburbs in Auckland, New Zealand found that inhabitants who enjoy living in their community, tend to value their community environment (i.e., roads, streets) a clean and healthy place and believe their community is unique, therefore develop a stronger identity (Lee et al., 2015). The roads and streets located within the public spaces that are socially and culturally decorated, provide people with sense of community identity (Lall et al., 1991).

In addition, the natural green elements such as green areas (GA) in urban cities have been found to greatly contribute to people's well-being (Hartig & Kahn, 2016), as open green space is important for building community identity through shared memory and community participation (Putra et al., 2019), and it is extremely important in residents' life in periods of urban expansion (Masoudinejad & Hartig, 2020; Peng et al., 2021). Previous work has found that gardens, green care farms, parks, urban woodlands, and neighborhood outdoor environments, positively impact on well-being and quality of life, for those who are living with dementia, and promote their place identity (Mmako et al., 2020). Findings from urban residents in two European cities (Edinburgh and Ljubljana) have demonstrated that participation in and appreciation of green space, have a positive and significant impact on one's own sense of place, including place identity (Žlender & Gemin, 2020). Investigation into a medium-sized Dutch city in the Netherlands also indicated that people who are more attached to GA, have better self-reported mental health (Zhang et al., 2015). A survey of 500 inhabitants in the city of Rome found that: the green areas of the community—as singled out by the urban planning and botanical disciplinary fields—are very important components in the psychological construction of their own residential place by the city dwellers (Bonnes et al., 1990). A survey of a Canadian community's mental health indicated that urban green space plays an important role in community members' sense of belonging (Rugel et al., 2019). To this end, all of the above-mentioned concrete evidences have proved that GA is beneficial for identity building (Rostami et al., 2015).

Taken together, we propose that the three above-mentioned dimensions of perceived residential environment quality (i.e., ATS, OAR, GA) are associated with residential community identity (H1). Specifically, on the basis of each PREQ dimension, we propose the following hypotheses:

- H1a:** Perception of architecture and town-planning space (ATS) quality is associated with community identity (CI);
- H1b:** Perception of organization of accessibility and roads (OAR) quality is associated with community identity (CI);
- H1c:** Perception of green areas (GA) quality is associated with community identity (CI).

2.2.2 Flow Mediates the Relationship Between PREQ and Community Identity

The direct relationship between PREQ and flow experience cannot be traced in the existing literature, insofar and to the best of our knowledge. However, implicit evidence contributes to support this relationship through a few research records. For instance, recent work on a group of older Chinese found that PREQ positively influences residents' subjective well-being and sense of community within one's own neighborhood (Peng et al., 2021), and sense of community would in turn influence life satisfaction (Zhang & Zhang, 2017). A study from a street in Christ church, New Zealand, showed that when the traffic is closed because of the street activities, the streets are used as places of entertainment that facilitate residents' happiness both behaviorally (i.e., walking on the streets happily) and emotionally (i.e., happy feeling), and that they have a better understanding and cognition of their neighbors (Kingham et al., 2020). In addition, a survey conducted in Oslo, Norway demonstrated that personal relationships satisfaction and perceived physical health of residents are higher in compact cities (vs. non-compact cities) (Mouratidis, 2019). Moreover, the visual appearance of the built environment influences people's happiness and life satisfaction (Seresinhe et al., 2019), the built environment and accessible transport infrastructure influence the quality of life and well-being of both the elderly and the disabled (Tennakoon et al., 2020). Another study from a group of residents living in different residential communities in Chongqing China found that PREQ is positively associated with residents' attachment to communities (Mao et al., 2015). Referring to the above-mentioned hypothesis H1 (H1a, H1b, H1c), and considering our prior findings on the positive relation between flow and place identity (Bonaiuto, Alves, et al., 2016; Bonaiuto, Mao, et al., 2016), we assume that flow contributes to bridge the gap between PREQ and place identity. Following this logic, we therefore propose that flow mediates the relationship between physical PREQ and community identity (H2). Specifically, we assume that,

H2a: Flow mediates the relation between architecture and town-planning space (ATS) and community identity (CI);

H2b: Flow mediates the relation between organization of accessibility and roads (OAR) and community identity (CI);

H2c: Flow mediates the relation between green areas (GA) and community identity (CI).

2.2.3 Social Capital Mediates the Relationship Between PREQ and Community Identity

An environment with walkable and mixed-use neighborhood facilitates higher levels of social capital compared with those car-oriented suburbs, because pedestrian-oriented, mixed-use neighborhood communities encourage enhanced levels of social and community engagement (Leyden, 2003). Such a finding suggests possible connections of the town planning and roads aspects of PREQ with social capital. Scholars also found that some physical features such as the presence of parks and green areas are correlated with social resources (French et al., 2014; Jacobs, 1961). These findings imply that physical characteristics are associated with the sense of place such as place identity, which, in turn, relate to social resources that served as social capital.

Investigation of a focus group of African American residents in the U.S.A. found that both social environment and built environment help influence inhabitants' health and

well-being, while the increase of social capital can improve well-being (Hayward et al., 2015). This finding emphasizes the importance of architectural environment in participants' well-being, and it suggests a potential connection between perceived architecture (being operationalized in terms of three PREQ dimensions) and social capital. Prior evidence also suggests that built environment, social capital, geographical distribution, all pose influence on mental health (Silva et al., 2016).

However, there is no systematic research on the relationship between the built environment and social capital. A survey conducted on a group residents found that the perceived neighborhood environment (both physical and social), which partly regarded as neighborhood social capital, is associated with residents' mental well-being (Dong & Qin, 2017). This seems to suggest an underlying relationship of both physical features and social capital with a positive outcome of the person-place transaction. Taken together, the literature above suggests a positive relationship between PREQ and social capital, and a positive outcome between the quality of the residential place and inhabitant who lives in it. Previous work also indicated that individuals who exhibit a greater sense of place identity will perceive greater social capital (Pitas et al., 2020): such a work provides evidence of the associations between place identity and social capital. Globally, considering the above-mentioned evidence, we propose that social capital works as a bridge between PREQ and community identity (H3). Specifically, we propose that,

H3a: Social capital (SC) mediates the relation between architecture and town-planning space (ATS) and community identity (CI);

H3b: Social capital (SC) mediates the relation between organization of accessibility and roads (OAR) and community identity (CI);

H3c: Social capital (SC) mediates the relation between green areas (GA) and community identity (CI).

2.2.4 The Relationship Between Flow and Social Capital

Prior research has demonstrated that both social capital and flow are associated with users' stable intention to social networking sites in China (Chang & Zhu, 2012). Flow mediates the influence of perceived social networking site credibility and social capital affinity (Barker, 2015). Flow is predictive for social capital within the work context, via the study of 3667 Swedish organizational employees (Fagerlind et al., 2013). Taken together, these findings show positive associations between flow and social capital, either in the context of a social network online community or within a work/organizational community. However, whether such a relationship can be applied to residential community, remains a puzzle. Thus, we propose that,

H4: Flow is positively associated with social capital (SC).

In conclusion, the comprehensive conceptual model of this study is indicated in Fig. 1.

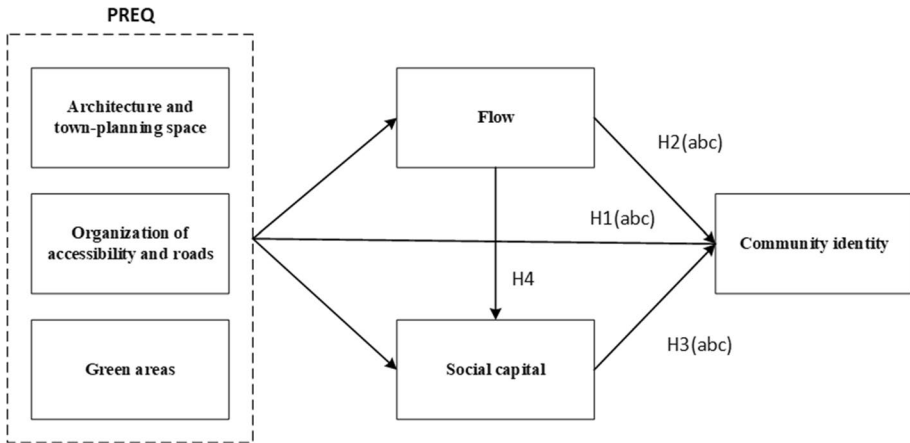


Fig.1 The conceptual model

3 Methods

3.1 Participants and Procedure

3.1.1 Participants

A total of 1000 residents living in urban communities within 13 districts with different distances from the city center of Chengdu, Sichuan Province in Southwest China were contacted for participating in our survey. It was worth noting that the choice of 13 districts in Chengdu as our sampling districts was based on two concerns: (1) according to a report on *China's Urban Comfortable Housing Index* from 2018 to 2019, Chengdu ranked first, becoming the most livable city in China, and these 13 administrative districts are the central regions of Chengdu under the construction and development at a comparable level and are well homogenized; and (2) the current study drawing on data from a larger project (Tools for Urban Environment Assessment; e.g., Peng et al., 2021) that aimed to evaluate the residential environment quality and community identity, was conducted in Chengdu. Though a total of 1000 residents were approached, due to the inconvenience brought from Covid-19, only 520 responded (response rate 52%), by excluding those who failed the attention check or lacked data on crucial study variables, the final sample consisted of 508 residents (50.8% completion rate). Participants were aged between 18 and 61, and among them 46.7% were men, 46.9% held bachelor's degree. Their length of residence ranged from 1 to 5 years, and a majority of them (61.2%) were the owner of the house.

3.1.2 Procedure

First, we recruited 13 urban residents (respectively from 13 sampling residential communities) who volunteered to participate in our interview under the assistance of community administrative staff. The interview questions like "How would you evaluate your community environment?", "Would you recommend your residential community to others to move in and live in?" Among all responses the most mentioned key words/factors

were selected as our study variables: architectural buildings, green space, roads, optimal experience (flow), social capital and identity.

Subsequently, we designed a questionnaire survey based on widely used scales regarding the above-mentioned variables. Followed by the translation and back translation procedure (Brislin, 1970), all questionnaire items were translated into Chinese language and put online for a pilot test, so as to assure that each item has the potential to tap into the same target construct in both the original English version and the Chinese language (Beins, 2013). According to the results of the pilot test, ambiguous and duplicate items were adjusted and deleted; therefore, a final questionnaire was formed. Then, in order to gain wide participation of the respondents, we sent the quick response code (QR code) together with survey link via WeChat and QQ (platforms similar to Skype) to reach potential urbanities resided within 13 districts in Chengdu (see Figs. 2 and 3). It was worth noting that for the young participants, they were required to scan the QR code presented at the gate of administrative office within residential community; while for the elderly, they were asked to respond our questions face-to-face via the collaboration of community's administrative staff.

All participants were recruited in exchange of a small gift. Consent was obtained prior to the survey, while the ethical approval was exempted by the first author's university ethical committee since the survey did not bring any psychological or physical harm to participants. Data collection started from March the 30th to June the 1st, 2020, when residents' life was restricted within their neighborhood community because of the government's implementation of forced-quarantine measures in coping with Covid-19.



Fig. 2 The sampling area in Chengdu, Sichuan Province within the map of China

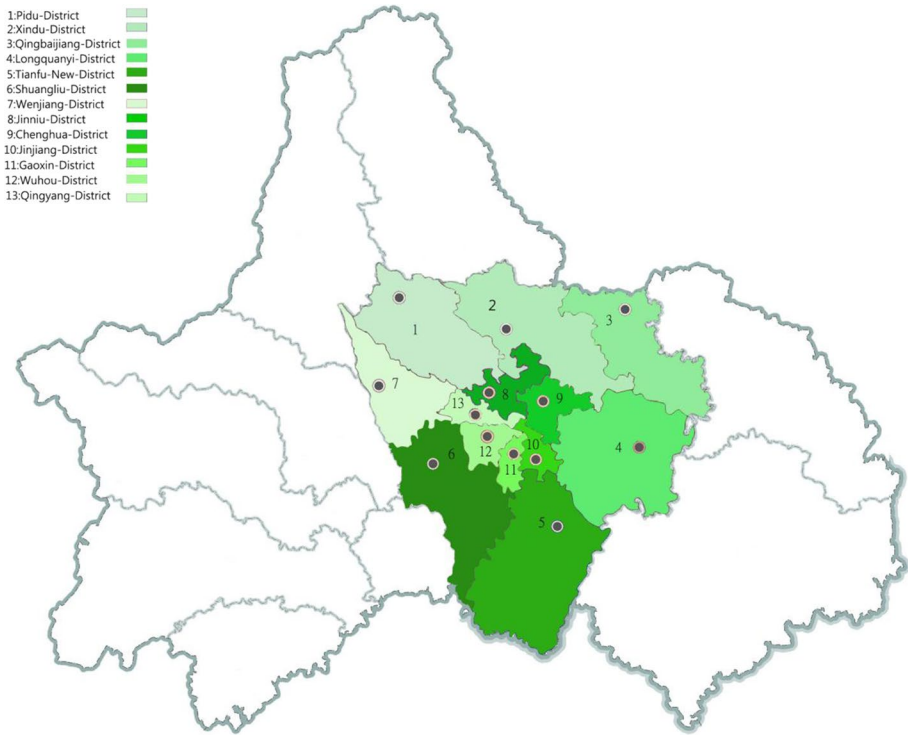


Fig. 3 Thirteen administrative districts within the sampling city of Chengdu

3.2 Measures

3.2.1 Social Capital

This 5-item social capital was used to measure the structural social capital of community residents (e.g., “*In the last 6 months, I am an active member of the following types of groups in my residential community*”). The scale was revised by De Silva et al. (2007) based on the Adapted Social Capital Tool (A-SCAT) developed by Harpham et al. (2002). Answers were registered on a 5-point Likert-type scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Cronbach’s α was 0.900.

3.2.2 Perceived Residential Environment Quality Indicators

Perceived residential environment quality indicators (PREQIs) are a set of indices measuring people’s affective and cognitive evaluation of the urban living environment quality pertaining to residential areas. As a specific instrument developed by Bonaiuto and colleagues (from Bonaiuto et al., 1999 onwards), it is aimed to test inhabitant’ perception of their residential environment quality. A selected list of 31 items from PREQIs were adopted to measure three selected dimensions of the perceived residential environment quality: architectural and town-planning space (e.g., “*The buildings in the community where I live are*

too dense”), organization of accessibility and roads (e.g., “*The parked cars in the community where I live blocked pedestrian traffic*”), and green areas (e.g., “*There are green belts for relaxing in my community*”). Ratings were based on a Likert-type scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Moreover, this tool has been validated in various countries and cultures, for instance, in European countries and languages (e.g., French, Spanish), in Near East countries (e.g., Iran), in Australia, in South America (e.g., in Quito, Ecuador), and in China (e.g., Chongqing) (Bonaiuto et al., 1999, 2003, 2015a, 2015b; Mao et al., 2015), in order to measure how residents view the quality of their urban living environment, especially at the level of a neighborhood residential place and community. Cronbach’s α regarding the three selected dimensions on the present sample was respectively 0.868, 0.803 and 0.889.

3.2.3 Community Identity

Community identity was assessed using a 6-item scale adapted from Williams and Vaske (2003): it was adopted to measure a sense of belonging for the residents within their residential community. Sample items include: “*I feel that the residential community I live is a part of me*”, “*I am very attached to the residential community I live*”. Responses were registered on a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The internal consistency (Cronbach’s α) regarding the present sample was 0.867.

3.2.4 Flow Experience

The 9-item flow state scale (Waterman et al., 2003, 2008) was adapted on the basis of flow theory (Csikszentmihalyi, 1975). Such a scale has been validated in Chinese context with good reliability and validity (Mao, Roberts, Pagliaro, et al., 2016b). In the current study, participants reported their perceived flow state when they regularly engage in a specific activity within their residential community (e.g., “*I feel I am competent enough to meet the high demands of the situation*”, “*I have a strong sense of what I want to do*”). Response to this measure was registered on a scale range from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach’s α was 0.757.

3.3 Data Analytic Strategy

Firstly, construct reliability was tested by Cronbach’s alpha. The Kaiser–Meyer–Olkin coefficient (KMO) with the Bartlett test (p value) was tested in order to ensure that CFA is feasible. Pearson bivariate correlations were also computed. All these tests were performed within SPSS (24.0). Data regarding all study variables were normally distributed.

Next, we performed confirmatory factor analysis (CFA) within AMOS (version 24) to test our measurement model considering the latent variables with their corresponding observed indicators: architectural and town-planning space (ATS), organization of accessibility and roads (OAR), green areas (GA), social capital (SC), flow (Flow) and community identity (CI). Then, we applied structural equation modeling approach via maximum estimation method to test the rationality of the relationship among variables in the proposed model (Ghasemi, 2012; Hu & Bentler, 1999). Specifically, a set of indices were considered for model fit: the root-mean-square error of approximation (RMSEA) with a cut-off value of 0.08 (Browne & Cudeck, 1993); the chi-square/degrees (χ^2/df) of freedom ratio falling

between 1 and 3, with upper limit of 5 (Carmines & McIver, 1981); the comparative fit index (CFI) greater than 0.95 (Bentler, 1990); incremental fit index (IFI) as well as Tucker-Lewis index (TLI) above 0.90 (Hsu et al., 2012).

Finally, we examined the mediating effect via SPSS (24.0) PROCESS (Hayes, 2013) followed by the bootstrap estimation procedure (a bootstrap sample of 5000): when zero was not contained within the 95% confidence interval, we would conclude that the indirect effects were significant.

4 Results

4.1 Descriptive Statistics and Correlation Analyses

The descriptive statistics and Pearson correlation coefficients among our study variables are showed in Table 1.

4.2 Reliability and Validity of the Measurement Model

As indicated in Table 2, the KMO value for ATS, OAR, GA, SC, and CI were all above 0.7 ($p < 0.001$), indicating that the questionnaire had a good structural validity (Kaiser & Rice, 1974). Furthermore, all study variables' Cronbach's alpha coefficients were higher than 0.7, and the value of composite reliability (CR) was greater than 0.6 indicating a good internal consistency of the measurement model (Bagozzi & Yi, 1988; Hair et al., 2011). Besides, all indicator loadings in the model were higher than 0.6, which showed the extracted common factor was highly representative of each variable, and the overall performance was good (Fornell & Larcker, 1981). Then, the average variance extraction (AVE) of ATS, OAR, GA, SC, CI were greater than 0.5, and the AVE value for flow was very close to 0.5, indicating that convergence effect was achieved (Fornell & Larcker, 1981). So, the reliability and validity of the measurement model used in this study were good.

4.3 Test of Hypotheses via Structural Equation Modeling

Table 3 presents the fitting indices used to evaluate our proposed structure model, which yielded a good fit to our data ($\chi^2/df=1.422$; CFI=0.984; NFI=0.948; TLI=0.979; RMSEA=0.029).

Table 1 Descriptive statistics and correlational indices among variables

Variables	Mean (SD)	ATS	OAR	GA	CI	Flow	SC
ATS	3.304 (0.906)	1					
OAR	3.207 (1.041)	0.422**	1				
GA	3.454 (0.951)	-0.021	0.268**	1			
CI	3.307 (0.856)	-0.034	0.117**	0.564**	1		
Flow	3.249 (0.782)	-0.061	-0.035	0.342**	0.602**	1	
SC	2.449 (1.017)	-0.283**	-0.246**	0.142**	0.361**	0.435**	1

** $p < .05$; ATS: architectural and town-planning space; OAR: organization of accessibility and roads; GA: green areas; Flow; SC: social capital; CI: community identity

Table 2 Survey items and factor loadings

Variable	Factor loading
Architectural and town-planning space (ATS)	
ATS1: The volume of buildings is too big in this neighborhood	0.655
ATS2: Buildings are too tall in this neighborhood	0.708
ATS3: Buildings are too large in this neighborhood	0.879
ATS4: The size of some buildings is excessive in this neighborhood	0.791
ATS5: In this neighborhood. Buildings are too tall compared to the width of streets	0.691
Fit indices: $\chi^2 = 16.247$; $df = 4$; $\chi^2/df = 4.062$; RMSEA = 0.078; NFI = 0.987; CFI = 0.990; Bartlett's Test = 0.000; KMO = 0.842; Cronbach's $\alpha = 0.868$; AVE = 0.561; C.R. = 0.863	
Organization of accessibility and roads (OAR)	
OAR1: Parked cars impede walking in this neighborhood	0.759
OAR2: It is dangerous to cycle in this neighborhood	0.694
OAR3: Parking places and parking lots are lacking in this neighborhood	0.694
OAR4: There is not enough space to walk in this neighborhood	0.699
Fit indices: $\chi^2 = 2.366$; $df = 2$; $\chi^2/df = 1.183$; RMSEA = 0.019; NFI = 0.996; CFI = 0.999; Bartlett's Test = 0.000; KMO = 0.797; Cronbach's $\alpha = 0.803$; AVE = 0.507; C.R. = 0.804	
Green areas (GA)	
GA1: There are green areas for relaxing in this neighborhood	0.801
GA2: There are enough green areas in this neighborhood	0.866
GA3: In this neighborhood green areas are in good condition	0.917
GA4: There is at least a garden/park where people can meet in this neighborhood	0.674
GA5: The green areas are well-equipped in this neighborhood (lighting, driveways, benches, waste bins, etc.)	0.674
Fit indices: $\chi^2 = 13.016$; $df = 5$; $\chi^2/df = 2.603$; RMSEA = 0.056; NFI = 0.991; CFI = 0.995; Bartlett's Test = 0.000; KMO = 0.868; Cronbach's $\alpha = 0.889$; AVE = 0.628; C.R. = 0.893	
Community identity (CI)	
CI1: I feel that the residential community I live is a part of me	0.587
CI2: The residential community I live is very special to me	0.691
CI3: I identify strongly with the residential community I live	0.750
CI4: I am very attached to the residential community I live	0.803
CI5: The residential community I live means a lot to me	0.817
Fit indices: $\chi^2 = 11.123$; $df = 3$; $\chi^2/df = 3.708$; RMSEA = 0.073; NFI = 0.991; CFI = 0.993; Bartlett's Test = 0.000; KMO = 0.827; Cronbach's $\alpha = 0.867$; AVE = 0.539; C.R. = 0.853	
Flow	
Flow1: I feel I am competent enough to meet the high demands of the situation	0.573
Flow2: I have a strong sense of what I want to do	0.810
Flow3: I have a good idea while I am performing about how well I am doing	0.748
Flow4: I am completely focused on the task at hand	0.539
Fit indices: $\chi^2 = 5.255$; $df = 2$; $\chi^2/df = 2.627$; RMSEA = 0.057; NFI = 0.909; CFI = 0.994; Bartlett's Test = 0.000; KMO = 0.749; Cronbach's $\alpha = 0.757$; AVE = 0.459; C.R. = 0.767	
Social capital (SC)	
SC1: In the last 12 months, I am an active member of the following types of groups in my residential community	0.798
SC2: In the last 12 months, I provided emotional help, economic help, and assistance to members in my residential community	0.720

Table 2 (continued)

Variable	Factor loading
SC3: In the last 12 months, I received help and support from my residential community, which included emotional help, economic help, and assistance	0.690
SC4: In the last 12 months, I joined with other community members to address a problem or a common issue raised within my community	0.882
SC5: In the last 12 months, I talked with a local authority or governmental organizations about problems existed in this community	0.840
Fit indices: $\chi^2=6.925$; $df=4$; $\chi^2/df=1.731$; RMSEA=0.038; NFI=0.996; CFI=0.998; Bartlett's Test=0.000; KMO=0.848; Cronbach's $\alpha=0.900$; AVE=0.623; C.R.=0.891	

Table 3 Test of the structural model

	χ^2	CFI	NFI	IFI	RMSEA	TLI	df	p	χ^2/df
Hypothesized model	1069.245	0.905	0.868	0.906	0.066	0.893	335	<0.001	3.192
Adjusted model	426.735	0.984	0.948	0.984	0.029	0.979	300	<0.001	1.422

Table 4 presents bootstrapping results of the structural equation model which takes physical PREQ indicators (OAR, ATS, GA) as predictors, CI as dependent variable, while flow and SC as mediating variables, with a 95% confidence interval.

Direct effects: As indicated in Fig. 4, significant pathways between GA and CI ($\beta=0.452$, $p<0.001$) confirmed our hypotheses H1c. Significant pathways between flow and SC ($\beta=0.401$, $p<0.001$) confirmed H4.

Mediation effects: Table 5 indicates the direct and indirect effects with their associated 95% confidence interval. As indicated in Table 5 and Fig. 4, OAR significantly and negatively predicted flow ($\beta=-0.186$, $p=0.008$), flow positively and significantly predicted CI ($\beta=0.436$, $p<0.001$), whereas OAR was not directly predictive for CI, thus yielded an indirect effect between OAR and CI via flow (-0.047, 95% CI: -0.088, -0.009), confirming that flow having full mediation effect in the relationship between OAR and CI (H2b). As presented in Table 5, GA significantly and positively predicted flow ($\beta=0.346$, $p<0.001$), flow positively and significantly predicted CI ($\beta=0.436$, $p<0.001$). Moreover, GA directly predicted CI ($\beta=0.452$, $p<0.001$), thus, the indirect association between GA and CI was via flow was attained (0.139, 95% CI: 0.093, 0.192), confirming that flow played a partial mediating effect between GA and CI (H2c). ATS significantly and negatively predicted SC ($\beta=-0.189$, $p<0.001$), SC positively and significantly predicted CI ($\beta=0.225$, $p<0.001$), whereas ATS was not directly predictive for CI, thus confirming an indirect relationship between ATS and CI via SC (-0.026, 95% CI: -0.047, -0.010), that being said, SC having full mediation effect in the relationship between ATS and CI (H3a). OAR significantly and negatively predicted SC ($\beta=-0.206$, $p<0.001$), SC positively and significantly predicted CI ($\beta=0.225$, $p<0.001$), whereas, OAR was not directly predictive for CI, thus, the indirect effect between OAR and CI via SC was obtained (-0.020, 95% CI: -0.037, -0.007), confirming SC played a full mediation effect between OAR and CI (H3b).

Table 4 Hypothesis test

Hypothesis	Path	Standardized Estimate	Non-standardized Estimate	S.E	C.R	Bias-corrected percentile		<i>p</i>	Decision
						Lower	Upper		
H1a	ATS → CI	0.108	0.100	0.044	2.289	-0.001	0.208	0.022	Rejected
H1b	OAR → CI	0.036	0.030	0.044	0.681	-0.064	0.125	0.496	Rejected
H1c	GA → CI	0.452	0.433	0.047	9.246	0.327	0.560	0.000	Supported
H2a	ATS → Flow → CI								Rejected
	ATS → Flow	-0.043	-0.029	0.043	-0.664	-0.152	0.079	0.507	
	Flow → CI	0.436	0.599	0.078	7.670	0.437	0.803	0.000	
H2b	OAR → Flow → CI								Supported
	OAR → Flow	-0.186	-0.114	0.043	-2.649	-0.225	-0.011	0.008	
	Flow → CI	0.436	0.599	0.078	7.670	0.437	0.803	0.000	
H2c	GA → Flow → CI								Supported
	GA → Flow	0.346	0.241	0.042	5.746	0.152	0.352	0.000	
	Flow → CI	0.436	0.599	0.078	7.670	0.437	0.803	0.000	
H3a	ATS → SC → CI								Supported
	ATS → SC	-0.189	-0.237	0.067	-3.560	-0.397	-0.085	0.000	
	SC → CI	0.225	0.167	0.033	5.082	0.098	0.237	0.000	
H3b	OAR → SC → CI								Supported
	OAR → SC	-0.206	-0.235	0.068	-3.456	-0.387	-0.088	0.000	
	SC → CI	0.225	0.167	0.033	5.082	0.098	0.237	0.000	
H3c	GA → SC → CI								Rejected
	GA → SC	0.059	0.077	0.061	1.259	-0.054	0.216	0.208	
	SC → CI	0.225	0.167	0.033	5.082	0.098	0.237	0.000	
H4	Flow → SC	0.401	0.745	0.114	6.556	0.515	1.041	0.000	Supported

5 Discussion and Conclusion

As the Covid-19 reshaped social life because of the strict self-quarantine and forced-quarantine measures (Pagliaro et al., 2021; Ye et al., 2020), people's daily activities are restricted within their residential communities. In order to understand how perceived residential environment quality facilitates urban dwellers' community identity, based on eudaimonic identity theory, we proposed and tested a conceptual model combining physical dimensions of PREQ indicators with flow and social capital. The reliability and validity of the constructs applied in the present work confirmed previous validation of such tools within the context of Chinese culture: specifically, PREQ indicators (Mao et al., 2015); social capital scale (Zhang et al., 2020), flow scale (Bonaiuto, Alves, et al., 2016; Bonaiuto, Mao, et al., 2016); community identity scale (Peng et al., 2021). Furthermore, four groups of hypotheses were confirmed in whole or in part, on the basis of a valid sample of 508 residents from 13 residential areas in our sampling city of Chengdu (Sichuan province in China).

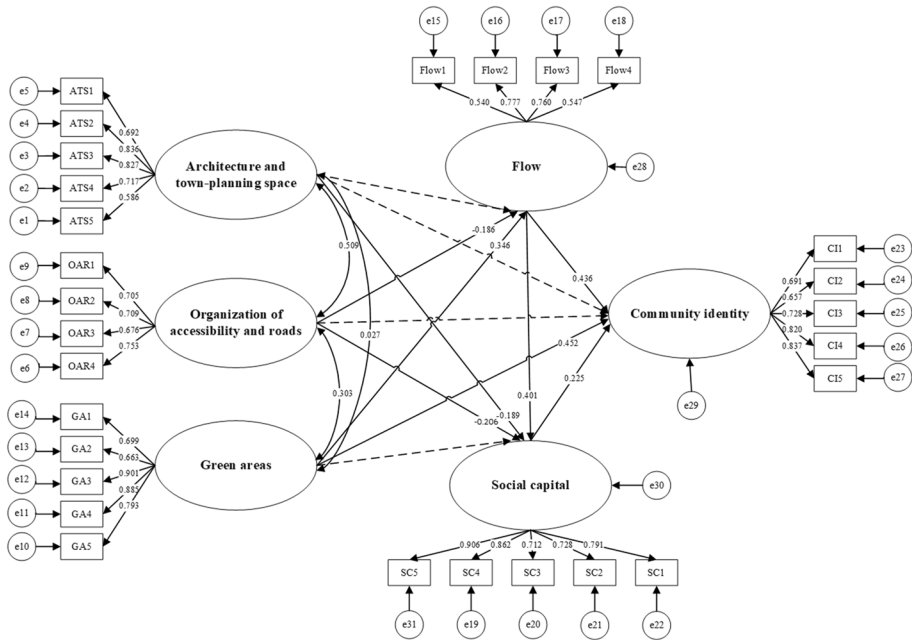


Fig. 4 Results of the adjusted model. Note: R^2 values: Flow: $R^2=0.124$; SC: $R^2=0.324$; CI: $R^2=0.665$

Table 5 Direct and indirect effects with 95% confidence intervals

Model pathways	Estimated effect	95% CI	
		Lower	Upper
<i>Direct effects</i>			
ATS → CI	0.015	-0.050	0.080
OAR → CI	0.046	-0.013	0.105
GA → CI	0.351	0.289	0.412
<i>Indirect effects</i>			
ATS → Flow → CI	0.002	-0.041	0.048
ATS → SC → CI	-0.026	-0.047	-0.010
OAR → Flow → CI	-0.047	-0.088	-0.009
OAR → SC → CI	-0.020	-0.037	-0.007
GA → Flow → CI	0.139	0.093	0.192
GA → SC → CI	0.006	-0.007	0.020

5.1 Discussion

5.1.1 The Direct Impact of PREQ Spatial Dimensions on Community Identity

The relation between the physical features of PREQ and community identity confirms our prior PREQ’s validation on a Chinese sample and their effects on attachment (Mao et al., 2015), which closely relates to identity. It also supports findings from similar recent

research conducted from a population of the Chinese elderly on the relationship between PREQ and sense of community such as community identity (Zhang & Zhang, 2017). Specifically, as for our hypothesis H1a that the perceived architecture and town-planning space (ATS) is associated with community identity (CI), results reject this hypothesis while also in contrast with prior findings from European countries (i.e., Amsterdam in the Netherlands; Dai et al., 2018) and American countries (i.e., Los Angeles in U.S.A; Cahiza et al., 2018). One possible explanation could be that, unlike architectural pattern in western countries that are culturally and historically diversified (Cahiza et al., 2018; Main & Sandoval, 2015), Chinese community buildings have more or less the same patterns, lacking of specialty, diversity, and cultural representation.

With regard to H1b that the perception of organization of accessibility and roads (OAR) is associated with community identity (CI), our findings reject this hypothesis and are contrast with previous studies from Oceania (i.e., Auckland in New Zealand; Lee et al., 2015) and South Asian countries (i.e., New Delhi in India; Lall et al., 1991). One possible interpretation could be that in the west, when the streets of the community are temporarily closed, residents may use it as a place for entertainment (Kingham et al., 2020). While on the contrary, in China, when the streets of the community are temporarily closed, residents are not allowed to stay outside on the streets but staying in their house instead, therefore, the limited outdoor space prevents community outdoor activities that could facilitate flow, and in turn contribute to community identity.

With regard to H1c, our findings are related to previous studies by showing that green areas are beneficial for a person's identity (Rostami et al., 2015). It also confirms prior work on the positive impact of green areas on community identity, as green space can serve as a place for memory and attachment (Mao et al., 2015; Zhang & Zhang, 2017), sense of belonging (Rugel et al., 2019), place attachment and identity (Bonaiuto et al., 1999; Putra et al., 2019); green areas also enrich the emotional connection of human life by providing important social and psychological benefits (Rostami et al., 2015; Žlender & Gemin, 2020), and they are also extremely important to residents' life in the period of urban expansion (Masoudinejad & Hartig, 2020). Such a finding—that the geographically located green space is conducive to community identity (Lee et al., 2015)—can be interpreted in terms of the natural green vegetated elements which can be found in gardens, green care farms, parks, community woodlands, and community outdoor environments: they are capable of positively affecting the quality of residents' life (Hartig & Kahn, 2016), thus, promoting their identity (Mmako et al., 2020). It has been well acknowledged that green areas within the community, which are singled out by the urban planning and botanical disciplinary fields, are very important components in the psychological construction of city dwellers (Bonnes et al., 1990).

5.1.2 The Mediating Role of Flow on Spatial PREQ and Community Identity

With regard our H2 that flow mediates the relation between perceived residential environment quality (PREQ) and community identity (CI), specifically, our innovative findings support two aspects of H2 (H2b, H2c) regarding the correlation between spatial PREQ and flow (which can be barely traced in previous limited records). Namely, our study indicates that flow experience fully mediates the relationship between organization of accessibility and roads (OAR) and community identity (CI) (H2b), flow partially mediates the relationship between green areas (GA) and community identity (CI) (H2c). As physical environment may bring community residents perceived physical health and satisfaction

(Mouratidis, 2019), our findings confirm in a broader sense that the perceived physical settings of the organization and accessibility of roads relate to the well-being of the elderly residents (Kingham et al., 2020; Tennakoon et al., 2020; Zhang & Zhang, 2016), and these hypotheses are also in contrast to the results of previous studies (i.e., flow positively affects well-being; Tse et al., 2020; Wu et al., 2021). In addition, the pathway from green area to flow experience confirms our recent work (Peng et al., 2021). Furthermore, in extending the prior findings on the relation between activity experience (e.g., flow) and identity (Bonaiuto, Mao, et al., 2016; Bonaiuto, Alves, et al., 2016; Mao, Roberts, Bonaiuto, et al., 2016a; Mao, Roberts, Pagliaro, et al., 2016b), the key points of eudaimonic identity theory, the pathway of flow to community identity—tested in the present work focused on geographically place-located community—also confirmed our recent findings (Peng et al., 2021). Since the core element of flow is the optimal enjoyment when engaging in activities that are meaningful for personal growth (Csikszentmihalyi, 1975, 1990), inhabitants who enjoy living in their community, will value their environment a clean and healthy place and think their community is unique, and they will tend to develop a stronger sense of identity toward their community (Lee et al., 2015). Such a finding enriches the EIT (Waterman, 1990, 1992; Waterman et al., 2008), by expanding the activity–identity relationship at the community level. That is, residents enhance their subjective identity experience (e.g., perceived community identity) by experiencing self-defining activities in residential communities that can promote flow. Therefore, discussing the relationship between flow and community identity in specific environments (such as residential communities) helps to better understand residents' well-being.

Our H2a that flow mediates the path from architectural and town-planning space (ATS) to community identity (CI), however, is rejected. Imagining that strolling on the community roads that is vegetated green, one may feel relaxed and recover from mental fatigue and work stress (Hartig & Kahn, 2016), thinking about engaging in physical or leisure activities with loved family/community members, the social interaction conducts within green areas planted in community roads, possibly helps to experience more intensified flow. On the contrary, architectural buildings that are highly and densely located within the residential community leaves limited open space, therefore, these high skyscrapers may dim the space, confine residents' social and physical activities, which may not facilitate residents' optimal enjoyment of flow that may contribute to community identity.

5.1.3 The Mediating Role of Social Capital on Spatial PREQ and Community Identity

With regard our H3 that social capital mediates the relation between the perceived residential environment quality (PREQ) and community identity (CI), our findings support H3a that social capital mediates the relation between architecture and town-planning space (ATS) and community identity (CI), and H2b that social capital mediates the relation between organization of accessibility and roads (OAR) and community identity (CI), which confirms previous studies (Hayward et al., 2015; Leyden, 2003). Specifically, residents living in pedestrian-oriented, mixed-use neighborhood will have more higher levels of social and community engagement (i.e., social capital), since they could have more opportunities to meet others and involve socially in the community (Leyden, 2003). Built characteristics of the presence of parks, town planning and roads (aspects of PREQ) provide residents' engagement connected to social capital (French et al., 2014; Jacobs, 1961). Such neighborhood's social capital (i.e., perceived neighborhood environment) is associated with residents' mental well-being and place identity (Dong & Qin, 2017; Pitas et al.,

2020), therefore, this may explain why architecture and roads have no direct impact on community identity, as they have indirect impact through the mediation of social capital. Our findings reject H3c on the proposed mediation of social capital between green area and community identity. The strong and direct prediction of green area to community identity from the present dataset, provides evidence on the significant role of green area in shaping residents' community life, as greater exposure to natural environments equipped with parks, trees, plants and woodland is positively related to better physical health and subjective well-being (Hartig & Kahn, 2016; White et al., 2019). That is, residents who are exposed to these green areas (i.e., walking in the park, Mmako et al., 2020; enjoying green plants, Žlender & Gemin, 2020) even without participating in any community activities, which promotes residents' identification toward their community.

5.1.4 The Influence of Flow on Social Capital

Our findings support H4 that flow has positive impact on social capital. The influence of flow on social capital has gone far beyond prior work on flow-social capital correlation (Barker, 2015; Huang, 2016), and has extended the research context from job organizations (Fagerlind et al., 2013) and online community (Chang & Zhu, 2012; Huang, 2016) to residential communities. Therefore, the residents' interpersonal interactions via various personal and social activities facilitate enjoyable flow experience, which leads to the increase of social capital. As long as there is positive life engagement (i.e., flow), community social capital can be flourished.

5.2 Conclusion

In conclusion, based on eudaimonic identity theory, our findings confirmed that the GA perceived spatial dimension of PREQIs has a positive direct impact on community identity, flow and social capital play mediating roles between perceived quality of spatial dimensions of PREQIs and inhabitants' community identity. In addition, flow also positively predicts social capital. The SEM model findings advance our knowledge of the relations among perceived residential environment quality and community identity, highlighting the importance of inhabitants' perception of the physical/spatial features of their residential environment for the residents' community identity, via flow experience and social capital provided to the inhabitants in the same neighborhood: over and above their direct relation, results show the importance of the mediating roles both of experiencing flow activities and of building a social capital. Both the inhabitants' flow experience and the social capital bridge spatial features perception by the inhabitants (as measured by PREQ indicators) to their community identity.

6 Implications

Our theoretical model contributes in predicting community identity on the basis of the existing literature by introducing perceived residential environmental quality indicators regarding the perception of the physical features of a residential place. Specifically, the strongest factor results to be green areas, which is capable, together with flow and social capital, to directly affecting the residents' community identity. This result is in good agreement with the literature, emphasizing the importance of a high quality of residential

environment in the development of the residents' community identity. Furthermore, the present study provides a new model for readers to promote our awareness of perceived residential environment quality on community identity. Our findings fill the gap of the key mediating roles of flow and social capital between the internal mechanism of the inhabitants' perceived environment quality and their community identity. Therefore, this study not only enriches the theory of flow and social capital in community research and provides support for extending the meaning of eudaimonic identity theory to the social field in residential community environments, but also puts forward innovation in the research direction of community identity. The research of community construction is able to increase the residents' community identity and subsequently to heighten their well-being of living.

The practical significance of the present study lies in offering implications for promoting residents' community identity from the physical features of PREQ. First of all, from the perspective of architectural and town-planning space, we can stress how architectural designing, constructing and maintaining a diversified, culturally, and historically-embedded residential community, is vital to community image building, and to further help shaping community identity experiences (Dai et al., 2018; Zhang & Zhang, 2017). Since a unique, beautiful, comfortable and clean residential environment helps to provide corresponding social activities and sports activities that can facilitate flow; we now know that this in turn helps the inhabitant's community identity too, in the end. Secondly, regarding the organization of accessibility and roads, our findings offer guidance for policy makers (or decision-makers) and practitioners (or designers) to take full considerations via the following aspects: constructing functional community roads, equipping hardware facilities (e.g., street light, chairs and tables), providing good walking space for community residents, especially for the elderly and the disabled residents, all these help improving their social interaction and increasing residents life of engagement (e.g., flow), and in the end to enhance the residents' community identity. Thirdly, with respect to green areas that can directly affect residents' community identity, integrating green elements such as parks, gardens, woodlands and natural green vegetation into the residential community, and making green space accessible for residents' outdoor social and recreational activities, such strategies help strengthen the residents' community identity, as green space not only has potential in building psychological resilience and promoting health (Hartig & Kahn, 2016; Peng et al., 2021), it also improves residents' sense of happiness and quality of life, and it enhances the emotional connection between people and living community (Dzhambov et al., 2019).

7 Limits and Future Research Direction

This work has limits that warrant notice. First of all, this study takes the urban residential community in the center of Chengdu as the research site, and there are certain geographical limitations, so it may not provide a good reference for the strongest factors affecting the community identity of participants in rural communities and other urban communities in China or in other parts of the world. Therefore, future research work will help to include more cities from other parts of China or other countries to generalize our findings; also, future work may benefit from cross-cultural studies by comparing results between China and other countries in the world. Secondly, our sample size may not be big enough due to the restricted access of our research collaborators to a limited number of community residents, as well as due to the self-isolated and quarantined residents during the Covid-19

period. Thus, further work may profit from larger samples of residents to increase the generalization of our findings. Finally, there are many factors affecting the community identity of urban community residents, not only the perception of physical place features considered in the present study, namely, architectural and town-planning space, organization of accessibility and roads, green areas (as well as the mediation played by flow experience and social capital). Therefore, more factors (i.e., social-cultural, economic, political, environmental) affecting community identity and their influencing paths need to be explored through structural equation modeling approach, and future work will continue to explore other possible factors via other methodological tools such as qualitative comparative analysis.

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References

- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 76–94. <https://doi.org/10.1007/BF02723327>.
- Baker, W. E. (1990). Market networks and corporate behavior. *American Journal of Sociology*, 96(3), 589–625. <https://doi.org/10.1086/229573>
- Barker, V. (2015). Investigating antecedents to the experience of flow and reported learning among social networking site users. *Journal of Broadcasting & Electronic Media*, 59(4), 679–697. <https://doi.org/10.1080/08838151.2015.1093481>
- Beins, B. C. (2013). Back translation. In: K.D. Keith (Ed.), *The encyclopedia of cross-cultural psychology* (pp. 117–118). <https://doi.org/10.1002/9781118339893.wbeccp041>.
- Bentler, P. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107(2), 238–246. <https://doi.org/10.1037/0033-2909.107.2.238>.
- Bonaiuto, M. (2004). Residential satisfaction and perceived urban quality. In C. D. Spielberger (Ed.), *Encyclopedia of applied psychology* (pp. 267–272). <https://doi.org/10.1016/B0-12-657410-3/00698-X>
- Bonaiuto, M., Aiello, A., Perugini, M., Bonnes, M., & Ercolani, A. P. (1999). Multidimensional perception of residential environment quality and neighborhood attachment in the urban environment. *Journal of Environmental Psychology*, 19(4), 331–352. <https://doi.org/10.1006/jevp.1999.0138>.
- Bonaiuto, M., & Alves, S. (2012). Residential places and neighborhoods: Toward healthy life, social integration, and reputable residence. In S. D. Clayton (Ed.), *The Oxford handbook of environmental and conservation psychology* (pp. 221–247). Oxford University Press.
- Bonaiuto, M., Alves, S., De Dominicis, S., & Petruccioli, I. (2016). Place attachment and natural hazard risk: Research review and agenda. *Journal of Environmental Psychology*, 48, 33–53. <https://doi.org/10.1016/j.jenvp.2016.07.007>
- Bonaiuto, M., Ariccio, S., De Dominicis, S., Fornara, F., Molinaro, E., Troffa, R., et al. (2018). City reputation indicators (CRIs): Measuring inhabitants' city representation/indicadores de reputación urbana: Midiendo la representación de una ciudad en sus habitantes. *Psycology*, 10(1), 31–87. <https://doi.org/10.1080/21711976.2018.1545348>.
- Bonaiuto, M., Fornara, F., & Bonnes, M. (2003). Indexes of perceived residential environment quality and neighbourhood attachment in urban environments: A confirmation study on the city of Rome. *Landscape and Urban Planning*, 65(1–2), 41–52. [https://doi.org/10.1016/S0169-2046\(02\)00236-0](https://doi.org/10.1016/S0169-2046(02)00236-0).
- Bonaiuto, M., Fornara, F., Alves, S., Ferreira, I., Mao, Y., Moffat, E., Piccinin, G., & Rahimi, L. (2015a). Urban environment and well-being: Cross-cultural studies on perceived residential environment quality indicators (PREQIs). *Cognitive Processing*, 16(1), 165–169. <https://doi.org/10.1007/s10339-015-0691-z>
- Bonaiuto, M., Fornara, F., Ariccio, S., Cancellieri, U. G., & Rahimi, L. (2015b). Perceived residential environment quality indicators (PREQIs) relevance for un-habitat city prosperity index (CPI). *Habitat International*, 45, 53–63. <https://doi.org/10.1016/j.habitatint.2014.06.015>

- Bonaiuto, M., Mao, Y., Roberts, S., Psalti, A., Ariccio, S., Cancellieri, U. G., et al. (2016). Optimal experience and personal growth: Flow and the consolidation of place identity. *Frontiers in Psychology*, 7, 1654. <https://doi.org/10.3389/fpsyg.2016.01654>.
- Bonnes, M., De Rosa, A. M., Ardone, R. G., & Bagnasco, C. (1990). Perceived quality of residential environment and urban green area. *Braun-Blanquetia*, 3, 54–62.
- Bourdieu, P. (1986). The forms of capital. In J. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). Greenwood.
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3), 185–216. <https://doi.org/10.1177/135910457000100301>
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Sage
- Cahiza, P., Di Cesare, M. L. I., Sabatini, G., & Ots, M. J. (2018). Architecture and materiality of social interaction in the village community of Chañarcito, Los Molinos, La Rioja. *Estudios Atacameños*, 57, 25–44. <https://doi.org/10.4067/S0718-10432018005000703>
- Carmines, E. G., & McIver, J. P. (1981). Analyzing models with unobservable variables. In G. W. Bohrnstedt & E. E. Borgatta (Eds.), *Social measurement current issues* (pp. 65–115). Sage.
- Chang, Y. P., & Zhu, D. H. (2012). The role of perceived social capital and flow experience in building users' continuance intention to social networking sites in China. *Computers in Human Behavior*, 28(3), 995–1001. <https://doi.org/10.1016/j.chb.2012.01.001>
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95–S120. <https://doi.org/10.1086/228943>
- Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. Jossey-Bass.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. Harper & Row.
- Csikszentmihalyi, M., & Massimini, F. (1985). On the psychological selection of bio-cultural information. *New Ideas in Psychology*, 3(2), 115–138. [https://doi.org/10.1016/0732-118X\(85\)90002-9](https://doi.org/10.1016/0732-118X(85)90002-9)
- Dai, T. C., Zhuang, T. Z., Yan, J., & Zhang, T. (2018). From landscape to mindscape: Spatial narration of touristic Amsterdam. *Sustainability*, 10(8), 2623. <https://doi.org/10.3390/su10082623>.
- De Silva, M. J., Huttly, S. R., Harpham, T., & Kenward, M. G. (2007). Social capital and mental health: A comparative analysis of four low-income countries. *Social Science & Medicine*, 64(1), 5–20. <https://doi.org/10.1016/j.socscimed.2006.08.044>
- Delle Fave, A., Massimini, F., & Bassi, M. (2011). Psychological selection and optimal experience. In A. Delle Fave (Ed.), *Psychological selection and optimal experience across cultures: Social empowerment through personal growth* (Vol. 2, pp. 39–58). Dordrecht: Springer.
- Díaz, D., Stavraki, M., Blanco, A., & Gandarillas, B. (2015). The eudaimonic component of satisfaction with life and psychological well-being in Spanish cultures. *Psicothema*, 27(3), 247–253. <https://doi.org/10.7334/psicothema2015.5>
- Dong, H. W., & Qin, B. (2017). Exploring the link between neighborhood environment and mental well-being: A case study in Beijing, China. *Landscape and Urban Planning*, 164, 71–80. <https://doi.org/10.1016/j.landurbplan.2017.04.005>
- Dzhambov, A. M., Hartig, T., Tilov, B., Atanasova, V., Makakova, D. R., & Dimitrova, D. D. (2019). Residential greenspace is associated with mental health via intertwined capacity-building and capacity-restoring pathways. *Environmental Research*, 178, 108708. <https://doi.org/10.1016/j.envres.2019.108708>.
- Erhel, S., & Jamet, E. (2019). Improving instructions in educational computer games: Exploring the relations between goal specificity, flow experience and learning outcomes. *Computers in Human Behavior*, 91, 106–114. <https://doi.org/10.1016/j.chb.2018.09.020>
- Erikson, E. H. (1968). *Identity: Youth and crisis*. Norton.
- Fagerlind, A. C., Gustavsson, M., Johansson, G., & Ekberg, K. (2013). Experience of work-related flow: Does high decision latitude enhance benefits gained from job resources? *Journal of Vocational Behavior*, 83(2), 161–170. <https://doi.org/10.1016/j.jvb.2013.03.010>
- Fornara, F., Bonaiuto, M., & Bonnes, M. (2010). Cross-validation of abbreviated perceived residential environment quality (PREQ) and neighborhood attachment (NA) indicators. *Environment and Behavior*, 42(2), 171–196. <https://doi.org/10.1177/0013916508330998>.
- Fornara, F., Scopelliti, M., Carrus, G., Bonnes, M., & Bonaiuto, M. (2021). Place attachment and environment-related behavior. In L. C. Manzo & P. Devine-Wright (Eds.), *Place attachment: Advances in theory, methods and applications* (2nd edn. pp. 193–207). Routledge.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–59. <https://doi.org/10.1177/002224378101800104>.

- French, S., Wood, L., Foster, S. A., Giles-Corti, B., Frank, L., & Learnihan, V. (2014). Sense of community and its association with the neighborhood built environment. *Environment and Behavior*, 46(6), 677–697. <https://doi.org/10.1177/0013916512469098>
- Ghasemi, V. (2012). *Structural equation modeling in social researches using Amos Graphics*. Jame-e-she-nasan Publication.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139–152. <https://doi.org/10.2753/MTP1069-6679190202>
- Hartig, T., & Kahn, P. H. (2016). Living in cities, naturally. *Science*, 352(6288), 938–940. <https://doi.org/10.1126/science.aaf3759>
- Harpham, T., Grant, E., & Thomas, E. (2002). Measuring social capital within health surveys: Key issues. *Health Policy and Planning*, 17(1), 106–111. <https://doi.org/10.1093/heapol/17.1.106>
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.
- Hayward, E., Ibe, C., Young, J. H., Potti, K., Jones, P., Pollack, C. E., et al. (2015). Linking social and built environmental factors to the health of public housing residents: A focus group study. *BMC Public Health*. <https://doi.org/10.1186/s12889-015-1710-9>.
- Hirao, K., Kobayashi, R., Okishima, K., & Tomokuni, Y. (2012). Flow experience and health-related quality of life in community dwelling elderly Japanese. *Nursing & Health Sciences*, 14(1), 52–57. <https://doi.org/10.1111/j.1442-2018.2011.00663.x>
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Huang, L. T. (2016). Flow and social capital theory in online impulse buying. *Journal of Business Research*, 69(6), 2277–2283. <https://doi.org/10.1016/j.jbusres.2015.12.042>
- Hummon, D. M. (1986). City mouse, country mouse: The persistence of community identity. *Qualitative Sociology*, 9(1), 3–25. <https://doi.org/10.1016/j.jbusres.2015.12.042>
- Huta, V. (2012). Linking peoples' pursuit of eudaimonia and hedonia with characteristics of their parents: Parenting styles, verbally endorsed values, and role modeling. *Journal of Happiness Studies*, 13(1), 47–61. <https://doi.org/10.1007/s10902-011-9249-7>
- Hsu, I. Y., Su, T. S., Kao, C. S., Shu, Y. L., Lin, P. R., & Tseng, J. M. (2012). Analysis of business safety performance by structural equation models. *Safety Science*, 50(1), 1–11. <https://doi.org/10.1016/j.ssci.2011.04.012>
- Jackson, S. A., & Marsh, H. W. (1996). Development and validation of a scale to measure optimal experience: The flow state scale. *Journal of Sport and Exercise Psychology*, 18(1), 17–35. <https://doi.org/10.1123/jsep.18.1.17>
- Jacobs, J. (1961). *The death and life of great American cities*. Random House.
- Kaiser, H. F., & Rice, J. (1974). Little jiffy, mark IV. *Educational and Psychological Measurement*, 34(1), 111–117. <https://doi.org/10.1177/001316447403400115>
- Kim, J. (2010). Neighborhood disadvantage and mental health: The role of neighborhood disorder and social relationships. *Social Science Research*, 39(2), 260–271. <https://doi.org/10.1016/j.ssresearch.2009.08.007>
- Kim, J., & Kaplan, R. (2004). Physical and psychological factors in sense of community: New urbanist Kentlands and nearby orchard village. *Environment and Behavior*, 36(3), 313–340. <https://doi.org/10.1177/0013916503260236>
- Kingham, S., Curl, A., & Banwell, K. (2020). Streets for transport and health: The opportunity of a temporary road closure for neighbourhood connection, activity and wellbeing. *Journal of Transport and Health*, 18. <https://doi.org/10.1016/j.jth.2020.100872>
- Lall, A. B., Pandit, M., Kulshreshta, N., & Appasamy, P. (1991). Climate and housing form—a case study of New Delhi. *Energy and Buildings*, 16(3–4), 837–849. [https://doi.org/10.1016/0378-7788\(91\)90079-i](https://doi.org/10.1016/0378-7788(91)90079-i)
- Lee, C. K. C., Levy, D. S., & Yap, C. S. F. (2015). How does the theory of consumption values contribute to place identity and sustainable consumption? *International Journal of Consumer Studies*, 39(6), 597–607. <https://doi.org/10.1111/ijcs.12231>
- Leyden, K. M. (2003). Social capital and the built environment: The importance of walkable neighborhoods. *American Journal of Public Health*, 93(9), 1546–1551. <https://doi.org/10.2105/ajph.93.9.1546>
- Main, K., & Sandoval, G. F. (2015). Placemaking in a trans local receiving community: The relevance of place to identity and agency. *Urban Studies*, 52(1), 71–86. <https://doi.org/10.1177/0042098014522720>
- Mao, Y., Fornara, F., Manca, S., Bonnes, M., & Bonaiuto, M. (2015). Perceived residential environment quality indicators and neighborhood attachment: A confirmation study on a Chinese sample in Chongqing. *Psych Journal*, 4(3), 123–137. <https://doi.org/10.1002/pchj.90>

- Mao, Y., Lai, Y., Luo, Y., Liu, S., Du, Y., Zhou, J., et al. (2020). Apple or Huawei: Understanding flow, brand image, brand identity, brand personality and purchase intention of smartphone. *Sustainability*, *12*(8), 3391. <https://doi.org/10.3390/su12083391>.
- Mao, Y., Roberts, S., & Bonaiuto, M. (2016a). Optimal experience and optimal identity: A multinational examination at the personal identity level. In L. Harmat, F. Ørsted Andersen, F. Ullén, J. Wright, & G. Sadlo (Eds.), *Flow experience: Empirical research and applications* (pp. 289–308). Springer International Publishing.
- Mao, Y., Roberts, S., Pagliaro, S., Csikszentmihalyi, M., & Bonaiuto, M. (2016b). Optimal experience and optimal identity: A multinational study of the associations between flow and social identity. *Frontiers in Psychology*, *7*. <https://doi.org/10.3389/fpsyg.2016.00067>.
- Masoudinejad, S., & Hartig, T. (2020). Window view to the sky as a restorative resource for residents in densely populated cities. *Environment and Behavior*, *52*(4), 401–436. <https://doi.org/10.1177/0013916518807274>.
- Mmako, N. J., Courtney-Pratt, H., & Marsh, P. (2020). Green spaces, dementia and a meaningful life in the community: A mixed studies review. *Health & Place*, *63*:102344. <https://doi.org/10.1016/j.healthplace.2020.102344>.
- Mouratidis, K. (2019). Compact city, urban sprawl, and subjective well-being. *Cities*, *92*, 261–272. <https://doi.org/10.1016/j.cities.2019.04.013>.
- Pagliaro, S., Sacchi, S., Pacilli, M. G., Brambilla, M., Lionetti, F., Bettache, K., Bianchi, M., Biella, M., Bonnot, V., Boza, M., Butera, F., Ceylan-Batur, S., Chong, K., Chopova, T., Crimston, C. R., Álvarez, B., Cuadrado, I., Ellemers, N., Formanowicz, M., ... Zubieta, E. (2021). Trust predicts COVID-19 prescribed and discretionary behavioral intentions in 23 countries. *PLoS ONE*, *16*(3), e0248334. <https://doi.org/10.1371/journal.pone.0248334>.
- Peng, C., Yuan, G., Mao, Y., Wang, X., Ma, J., & Bonaiuto, M. (2021). Expanding social, psychological, and physical indicators of urbanites' life satisfaction toward residential community: A structural equation modeling analysis. *International Journal of Environmental Research and Public Health*, *18*(1), 4. <https://doi.org/10.3390/ijerph18010004>.
- Pinto, A., Koptcke, L. S., David, R., & Kuper, H. (2021). A national accessibility audit of primary health care facilities in Brazil—are people with disabilities being denied their right to health? *International Journal of Environmental Research and Public Health*, *18*(6), 2953. <https://doi.org/10.3390/ijerph18062953>.
- Pitas, N., Mowen, A., & Powers, S. (2020). Person-place relationships, social capital, and health outcomes at a nonprofit community wellness center. *Journal of Leisure Research*, *52*(3), 1–18. <https://doi.org/10.1080/00222216.2020.1776652>.
- Portela, M., Neira, I., & Salinas-Jiménez, M. D. M. (2013). Social capital and subjective wellbeing in Europe: A new approach on social capital. *Social Indicators Research*, *114*(2), 493–511. <https://doi.org/10.1007/s11205-012-0158-x>.
- Pretty, G. H., Chipuer, H. M., & Bramston, P. (2003). Sense of place amongst adolescents and adults in two rural Australian towns: The discriminating features of place attachment, sense of community and place dependence in relation to place identity. *Journal of Environmental Psychology*, *23*(3), 273–287. [https://doi.org/10.1016/s0272-4944\(02\)00079-8](https://doi.org/10.1016/s0272-4944(02)00079-8).
- Proshansky, H. M. (1978). The city and self-identity. *Environment and Behavior*, *10*(2), 147–169. <https://doi.org/10.1177/0013916578102002>.
- Puddifoot, J. E. (1996). Some initial considerations in the measurement of community identity. *Journal of Community Psychology*, *24*(4), 327–336. [https://doi.org/10.1002/\(SICI\)1520-6629\(199610\)24:43.0.CO;2-R](https://doi.org/10.1002/(SICI)1520-6629(199610)24:43.0.CO;2-R).
- Puddifoot, J. E. (2003). Exploring “personal” and “shared” sense of community identity in Durham city, England. *Journal of Community Psychology*, *31*(1), 87–106. <https://doi.org/10.1002/jcop.10039>.
- Putnam, R. D. (1993). The prosperous community: Social capital and public life. *American Prospect*, *13*, 35–42.
- Putra, B. D., Horne, R., & Hurley, J. (2019). Place, space and identity through greening in kampung kota. *Journal of Regional and City Planning*, *30*(3), 211–223. <https://doi.org/10.5614/jpwk.2019.30.3.3>.
- Ramaswami, A., Russell, A. G., Culligan, P. J., Sharma, K. R., & Kumar, E. (2016). Meta-principles for developing smart, sustainable, and healthy cities. *Science*, *352*(6288), 940–943. <https://doi.org/10.1126/science.aaf7160>.
- Ren, Y., Kraut, R., & Kiesler, S. (2016). Applying common identity and bond theory to design of online communities. *Organization Studies*, *28*(3), 377–408. <https://doi.org/10.1177/0170840607076007>.
- Rivkin, W., Diestel, S., & Schmidt, K. H. (2016). Which daily experiences can foster well-being at work? A diary study on the interplay between flow experiences, affective commitment, and self-control

- demands. *Journal of Occupational Health Psychology*, 23(1), 99–111. <https://doi.org/10.1037/ocp0000039>.
- Ross, W. D. (1949). *Aristotle* (5th Edn.). Methuen.
- Rostami, R., Lamit, H., Khoshnava, S. M., Rostami, R., & Rosley, M. S. F. (2015). Sustainable cities and the contribution of historical urban green spaces: A case study of historical Persian gardens. *Sustainability*, 7(10), 13290–13316. <https://doi.org/10.3390/su71013290>.
- Roster, C. A., Ferrari, J. R., & Peter Jurkat, M. (2016). The dark side of home: Assessing possession “clutter” on subjective well-being. *Journal of Environmental Psychology*, 46, 32–41. <https://doi.org/10.1016/j.jenvp.2016.03.003>.
- Ruef, M., & Kwon, S. W. (2016). Neighborhood associations and social capital. *Social Forces*, 95(1), 159–190. <https://doi.org/10.1093/sf/sow053>.
- Rugel, E. J., Carpiano, R. M., Henderson, S. B., & Brauer, M. (2019). Exposure to natural space, sense of community belonging, and adverse mental health outcomes across an urban region. *Environmental Research*, 171, 365–377. <https://doi.org/10.1016/j.envres.2019.01.034>.
- Ryff, C. D., & Singer, B. H. (2008). Know thyself and become what you are: A eudaimonic approach to psychological well-being. *Journal of Happiness Studies*, 9(1), 13–39. <https://doi.org/10.1007/s10902-006-9019-0>.
- Seresinhe, C. I., Preis, T., MacKerron, G., & Moat, H. S. (2019). Happiness is greater in more scenic locations. *Scientific Reports*, 9(1), 4498. <https://doi.org/10.1038/s41598-019-40854-6>.
- Sharp, E. H., Coatsworth, J. D., Darling, N., Cumsille, P., & Ranieri, S. (2007). Gender differences in the self-defining activities and identity experiences of adolescents and emerging adults. *Journal of Adolescence*, 30(2), 251–269. <https://doi.org/10.1016/j.adolescence.2006.02.006>.
- Shernoff, D. J., Csikszentmihalyi, M., Schneider, B., & Shernoff, E. S. (2003). Student engagement in high school classrooms from the perspective of flow theory. *School Psychology Quarterly*, 18(2), 158–176. <https://doi.org/10.1521/scpq.18.2.158.21860>.
- Silva, M., Loureiro, A., & Cardoso, G. (2016). Social determinants of mental health: A review of the evidence. *European Journal of Psychiatry*, 30(4), 259–292.
- Tennakoon, V., Wiles, J., Peiris-John, R., Wickremasinghe, R., Kool, B., & Ameratunga, S. (2020). Transport equity in Sri Lanka: Experiences linked to disability and older age. *Journal of Transport and Health*, 18. <https://doi.org/10.1016/j.jth.2020.100913>.
- Toma, A., Hamer, M., & Shankar, A. (2015). Associations between neighborhood perceptions and mental well-being among older adults. *Health and Place*, 34, 46–53. <https://doi.org/10.1016/j.healthplace.2015.03.014>.
- Tonge, J., Ryan, M. M., Moore, S. A., & Beckley, L. E. (2015). The effect of place attachment on pro-environment behavioral intentions of visitors to coastal natural area tourist destinations. *Journal of Travel Research*, 54(6), 730–743. <https://doi.org/10.1177/0047287514533010>
- Tse, D. C. K., Nakamura, J., & Csikszentmihalyi, M. (2020). Living well by “flowing” well: The indirect effect of autotelic personality on well-being through flow experience. *Journal of Positive Psychology*, 37(7), 2286–2306. <https://doi.org/10.1080/17439760.2020.1716055>.
- Twigger-Ross, C., & Uzzell, D. L. (1996). Place and identity processes. *Journal of Environmental Psychology*, 16(3), 205–220. <https://doi.org/10.1006/jev.1996.0017>.
- Twigger-Ross, C., Bonaiuto, M., & Breakwell, G. (2003). Identity theories and environmental psychology. In M. Bonnes, T. Lee, & M. Bonaiuto (Eds.), *Psychological theories for environmental issues* (pp. 203–233). Ashgate, Ethnoscapes: Aldershot, UK.
- van Oorschot, W., & Arts, W. (2005). The social capital of European welfare states: The crowding out hypothesis revisited. *Journal of European Social Policy*, 15(1), 5–26. <https://doi.org/10.1177/0958928705049159>.
- Waterman, A. S. (1990). Personal expressiveness: Philosophical and psychological foundations. *Journal of Mind and Behavior*, 11(1), 47–74.
- Waterman, A. S. (1992). Identity as an aspect of optimal psychological functioning. In G. R. Adams, T. P. Gullotta, & R. Montemayor (Eds.), *Advances in adolescent development: Adolescent identity formation* (pp. 50–72). Sage Publications Inc.
- Waterman, A. S. (1993). Two conceptions of happiness: Contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment. *Journal of Personality and Social Psychology*, 64(4), 678–691. <https://doi.org/10.1037/0022-3514.64.4.678>.
- Waterman, A. S., Schwartz, S. J., & Conti, R. (2008). The implications of two conceptions of happiness (hedonic enjoyment and eudaimonia) for the understanding of intrinsic motivation. *Journal of Happiness Studies*, 9(1), 41–79. <https://doi.org/10.1007/s10902-006-9020-7>.
- Waterman, A. S., Schwartz, S. J., Goldbacher, E., Green, H., Miller, C., & Philip, S. (2003). Predicting the subjective experience of intrinsic motivation: The roles of self-determination, the balance

- of challenges and skills, and self-realization values. *Personality and Social Psychology Bulletin*, 29(11), 1447–1458. <https://doi.org/10.1177/0146167203256907>.
- White, M. P., Alcock, I., Grellier, J., Wheeler, B. W., & Fleming, L. E. (2019). Spending at least 120 minutes a week in nature is associated with good health and wellbeing. *Scientific Report*, 9(1), 7730. <https://doi.org/10.1038/s41598-019-44097-3>.
- Williams, D. R., & Vaske, J. J. (2003). The measurement of place attachment: Validity and generalizability of a psychometric approach. *Forest Science*, 49(6), 830–840.
- Wu, J. J., & Chang, Y. S. (2005). Towards understanding members' interactivity, trust, and flow in online travel community. *Industrial Management & Data Systems*, 105(7), 937–954. <https://doi.org/10.1108/02635570510616120>
- Wu, S. F., Lu, Y. L., & Lien, C. J. (2020). Detecting students' flow states and their construct through electroencephalogram: Reflective flow experiences, balance of challenge and skill, and sense of control. *Journal of Educational Computing Research*, 58(5), 073563312094408. <https://doi.org/10.1177/0735633120944084>.
- Wu, J., Xie, M., Lai, Y., Mao, Y., & Harmat, L. (2021). Flow as a key predictor of subjective well-being among Chinese university students: A chain mediating model. *Frontiers in Psychology*, 12, 743906. <https://doi.org/10.3389/fpsyg.2021.743906>.
- Xanthopoulou, D., Bakker, A. B., Oerlemans, W. G. M., & Koszucka, M. (2017). Need for recovery after emotional labor: Differential effects of daily deep and surface acting. *Journal of Organization Behavior*, 39(4), 481–494. <https://doi.org/10.1002/job.2245>
- Yan, Y., Davison, R. M., & Mo, C. (2013). Employee creativity formation: The roles of knowledge seeking, knowledge contributing and flow experience in Web 2.0 virtual communities. *Computers in Human Behavior*, 29(5), 1923–1932. <https://doi.org/10.1016/j.chb.2013.03.007>
- Yang, C. M., & Hsu, T. F. (2020). Integrating design thinking into a packaging design course to improve students' creative self-efficacy and flow experience. *Sustainability*, 12(15), 5929. <https://doi.org/10.3390/su12155929>.
- Yang, C., Wang, Y. L., Hall, B. J., & Chen, H. (2020). Sense of community responsibility and altruistic behavior in Chinese community residents: The mediating role of community identity. *Current Psychology*, 39(6), 1999–2009. <https://doi.org/10.1007/s12144-020-00667-7>.
- Yang, Z. X., & Xin, Z. Q. (2016). Community identity increases urban residents' in-group emergency helping intention. *Journal of Community & Applied Social Psychology*, 26(6), 467–480. <https://doi.org/10.1002/casp.2274>
- Ye, Z., Yang, X., Zeng, C., Wang, Y., Shen, Z., Li, X., et al. (2020). Resilience, social support, and coping as mediators between COVID-19-related stressful experiences and acute stress disorder among college students in China. *Applied Psychology Health and Well Being*, 12(4), 1074–1094. <https://doi.org/10.1111/aphw.12211>.
- Zhang, J., Lu, N., & Wang, W. (2020). Does education moderate the relationship between social capital and cognitive function among older adults? Evidence from Suzhou city, China. *International Journal of Environmental Research and Public Health*. <https://doi.org/10.3390/ijerph17186560>.
- Zhang, Y., Van Dijk, T., Tang, J., & Van Den Berg, A. E. (2015). Green space attachment and health: A comparative study in two urban neighborhoods. *International Journal of Environmental Research and Public Health*, 12(11), 14342–14363. <https://doi.org/10.3390/ijerph121114342>
- Zhang, Z., & Zhang, J. (2017). Perceived residential environment of neighborhood and subjective well-being among the elderly in China: A mediating role of sense of community. *Journal of Environmental Psychology*, 51(12), 82–94. <https://doi.org/10.1016/j.jenvp.2017.03.004>.
- Zhao, L., Liang, C. Y., & Gu, D. X. (2020). Mobile social media use and trailing parents' life satisfaction: Social capital and social integration perspective. *International Journal of Aging & Human Development*, 92(1):009141502090554. <https://doi.org/10.1177/0091415020905549>.
- Ziyace, M. (2018). Assessment of urban identity through a matrix of cultural landscapes. *Cities*, 74, 21–31. <https://doi.org/10.1016/j.cities.2017.10.021>
- Žlender, V., & Gemin, S. (2020). Testing urban dwellers' sense of place towards leisure and recreational peri-urban green open spaces in two European cities. *Cities*, 98. <https://doi.org/10.1016/j.cities.2019.102579>.