

Research Paper

Investigating Dimensions of People-Urban Space Interaction and its Influence on Design Priorities: Perspectives from Urban Squares in Tehran

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Abstract

Urban squares are pivotal in 21st-century cities, serving as communal hubs where individuals experience a genuine sense of belonging and community. However, recent redesigns of several squares in Iran have fallen short of expected quality standards. This inadequacy may stem from the prevalent reliance on design ideas shaped by casual observations and designers' personal experiences. While these observations and experiences hold significance, they lack the depth required to comprehend the intricacies of a successful urban square. A profound understanding of the relationship between a space's social and physical aspects and the activities therein necessitates tapping into the community's attitudes toward these spaces. Hence, the central aim of this study is an in-depth exploration of the multi-dimensionality inherent in people/space interaction, considering it as an attitude concept. To accomplish this, a meticulously chosen sample of five urban squares in Tehran serves as the focal point. Employing a 12-item scale, the study seeks to elucidate individuals' interactions with these urban squares and discern the features that resonate most strongly with them. Rigorous testing on a sample of 411 citizens who regularly utilize these Tehran urban squares ensures the scale's reliability and validity. The analysis of the data unveiled three discernible constructs governing individuals' interaction with urban squares, constituting their attitude concept: affective, cognitive, and conative. However, a nuanced hierarchy emerged, with the affective and cognitive constructs assuming higher importance compared to the moderately significant behavioral construct. Additionally, there were moderate correlations observed among these constructs. In the exploration of established psychological models on place, structural equation modeling (SEM) was instrumental. The Higher-Order model emerged as fitting, effectively capturing the intricate interplay between individuals and urban spaces. These findings bear significant implications for the design and management of urban squares. The key takeaway is the necessity of formulating tailored outreach policies and plans that prioritize elements resonating with users on an affective and cognitive level, shifting away from a sole reliance on instrumental responses tied to practical needs.

Keywords: Place attitude, Place attachment, Place identity, Place dependence, Urban Square, Tehran.

1. INTRODUCTION

Acknowledging the importance of individuals' values, interpretations, and dispositions towards their living environments is crucial for the strategic development and arrangement of these spaces to ensure effective administration. Research findings, as

exemplified by investigations into the connections between local residents' place meanings and desired management outcomes in managed landscapes (Smith et al., 2011; Smith et al., 2012), residents' sense of place and initiatives for natural resource management (Larson, Freitas, and Hicks, 2013), residents' sense of place in relation to the conservation of coastal areas

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(Sakurai, Ota, and Uehara, 2017), place attachment and its correlation with residential satisfaction (Hesari et al., 2019), people's sense of place and the planning and management of peri-urban areas (Zlender and Gemin, 2020), potential associations between exposure to specific urban facilities and the sense of place (Westerholt, Acedo, and Naranjo-Zolotov, 2022), emotional attachment to enhance restoration priorities (Hawthorne et al., 2022), and visitors' attachment to a park and their intention to revisit (Nursyamsiah and Setiawan, 2023), all underscore the significance of comprehending and integrating people's values and perceptions in the design, planning, and management processes of environments. This understanding is crucial for environmental decision-making to ensure the sustainable future of these areas and has become increasingly imperative. Regarding urban green spaces, Fischer et al. (2020) and Teixeira et al. (2022) have emphasized the utility of such studies in discerning the factors that drive people's acceptance or support for specific strategies. These findings also contribute to informing and coordinating decisions and approaches concerning the design, planning, and management of urban green spaces. Based on the review of prior studies, two noteworthy observations deserve emphasis.

Upon reviewing previous research, two notable points emerge. Firstly, the majority of studies have predominantly concentrated on natural environments, natural resources, and green spaces. However, there is a growing acknowledgment that all public spaces are vital assets warranting academic and professional attention (Duivenvoorden et al., 2021). These spaces represent a physical manifestation of the public realm and public sphere, reflecting the values of the citizenry (Mehta and Palazzo, 2020, p. 2). While to a lesser extent, squares, similar to parks, can serve as contexts for social and communal activities and restorative places for relaxation (Lang and Marshall, 2017, p. 4). They function as a community's living room, bringing people together, fostering relationships, and creating a healthy sense of community (Crowhurst Lennard, 2019; Talen, 1999, as cited in Subiza-Pérez, Vozmediano, and Juan, 2020). Despite the profound positive impacts these spaces have on citizens' lives across various dimensions (health, social, economic, and environmental) (Carmona, 2019), there is limited knowledge about the extent of people/space bonding, its potential dimensions, and their formation. Additionally, little is known about how the social and physical attributes of urban squares influence people's activities. Secondly, despite a considerable number of spatial studies on people/place bonding across different scales (from city to neighborhood and natural spaces), there is an absence of universal agreement

among scholars regarding the definition, operation, and interpretation of this concept.

Considering these factors, the initial section offers a comprehensive review of research conducted on the subject of place-related concepts and introduces the concept of people/space interaction as a fundamental element. The subsequent segment aims to present significant and tangible implications for urban planners and administrators that can be applied in the design process of urban squares. This particular part focuses on exploring the various dimensions involved in people's interactions with urban squares in a multi-dimensional manner.

2. LITERATURE REVIEW

2.1. Multiplicity of place-related concepts

In the domains of psychology, social sciences, and environmental sciences, various concepts have been employed to illuminate the intricate facets of the correlation between an individual and their environment. Each of these concepts is thoroughly expounded within a broader theoretical context. Consequently, as Lewicka (2011) contends, it is not uncommon for scholars and writers with disparate theoretical perspectives to present these concepts and their interrelationships in varying forms, sometimes even appearing incompatible with one another (Lewicka, 2011, p. 208). Notable concepts such as place attachment, place identity, place dependence, and sense of place serve to conceptualize various aspects of an individual's relationship with the environment, offering insights into their psychological connection with the surroundings from diverse vantage points. Despite the substantial proliferation of studies and research dedicated to these concepts, a fundamental challenge within this domain persists - the lack of clarity in articulating their descriptions, specifications, distinctive facets, and interrelationships (Hidalgo & Hernandez, 2001, p. 273; Hernandez et al., 2007, p. 311; Pretty, Chipuer & Bramston, 2003, p. 274; Lewicka, 2011, p. 208; Antonsich, 2010, p. 122; Devlin, 2018, p. 10). For instance, a notable source of contention lies in the relationship between two key concepts, place attachment, and place identity. While Brown and Werner (1985) posit place attachment and place identity as equivalent, Hernandez and colleagues (2007) assert that these two concepts represent distinct and separate components. Additionally, Droseltis and Vinales (2010) recognize place attachment as a component of place identity, while Kyle, Graefe, and Manning (2004) assert that place dependence constitutes a multidimensional structure encompassing

place identity. Furthermore, some scholars perceive place identity and place dependence as dimensions within a broader concept known as Sense of Place (Jorgensen & Stedman, 2001; Pretty, Chipuer, & Bramston, 2003). Compounding the challenges in delineating relationships between these concepts is a significant overlap in their defining factors. For instance, Cuba and Hummon (1993) regard emotional ties and place affiliation as dimensions and facets of identity, while Altman & Low (1992) employ these factors to define place attachment in terms of behavioral commitment and emotional bonding (Pretty, Chipuer, & Bramston, 2003, p. 274). Thus, the blurring of conceptual boundaries underscores the absence of precision essential for establishing practical definitions to study these concepts effectively (Table 1).

In the context of this investigation, the comprehensive notion of interaction is construed as a multifaceted phenomenon, wherein its diverse dimensions are delineated in accordance with the attitude structure approach.

2.2. Interaction with urban space as an attitude

As previously mentioned, despite the extensive and varied research conducted on psychological concepts related to the interaction with the environment, such as attachment, identity, and dependence, the conceptual boundaries, distinctions, and relationships among them remain ambiguous. In addressing this issue, Jorgensen and Stedman (2006) propose a more comprehensive framework, specifically an attitude theory that integrates cognitive, affective, and behavioral responses to the environment. Within this framework, attitude is defined as an individual's response to an external event, object, or stimulus (Fishbein and Ajzeen, 1975, as cited in Jorgensen and Stedman, 2001), comprising behavioral, affective, and cognitive domains directed toward an attitude object. Importantly, the spatial setting itself can be considered as an attitude object.

From this perspective, the concepts of place identity (Proshansky et al., 1983), place attachment (Moore & Graefe, 1994; Riley, 1992), and place dependence (Stokols & Shumaker, 1981) can be fundamentally considered as cognitive, affective, and conative variables, respectively (Jorgensen & Stedman, 2006, p. 317). Furthermore, it is recommended to employ the affective, cognitive, and conative domains of attitude theory to define the structural relationships among place attachment, place identity, and place dependence (Nielsen-Pincus et al., 2010, p. 443; Jorgensen & Stedman, 2001, p. 233). In this context, place attachment can be understood as the emotional bond between an individual and a specific place (Altman &

Low, 1992); place identity, as the belief in the extent to which a place represents an individual's characteristics (Jorgensen & Stedman, 2001); and place dependence, as the degree to which a place facilitates the achievement of individual goals compared to alternative places (Nielsen-Pincus et al., 2010, p. 443; Jorgensen & Stedman, 2006, p. 317). Additional studies, including those conducted by Jorgensen & Stedman (2001), Nielsen-Pincus et al. (2010), and Jorgensen & Stedman (2006), have similarly applied attitude theory to delineate the dimensions of sense of place as a comprehensive attitude encompassing three distinct components (Attachment, Identity, and Dependence). In this study, interaction with place is conceptualized as a generalized attitude toward the environment, with its various components considered as specific attitudes. This approach facilitates a more precise definition and examination of the intricate relationships between the experience of a place (interaction with it) and its characteristics, especially when compared to approaches that do not distinguish between cognitive, emotional, and behavioral domains. As proposed by Jorgensen and Stedman (2001), employing attitude theory in place research offers benefits in terms of (1) organizing concepts, (2) establishing connections with existing literature, and (3) aligning with established research methods (Jorgensen & Stedman, 2001, p. 233).

Based on comprehensive reviews and considering attitude theory, the fundamental components of an individual's interaction with a specific environment can be classified into three constructs: affective, cognitive, and conative (refer to Fig.1). In this framework, place attachment aligns with the emotional component, place identity corresponds to the cognitive component, and place dependence is synonymous with the conative component, as labeled by Jorgensen and Stedman (2006).

In the affective construct, an individual's emotions regarding a specific place are formed and given significance. The cognitive construct emphasizes one's perspectives, ideas, and understandings of the place (concerning the definition of "self"), especially in connection with their own identity. In contrast, the conative construct concentrates on an individual's desires, needs, and expectations, and how well these are met within the place compared to similar locations.

These three components are used as the criteria for investigating the interaction of people (individuals) with places in the operational model of this research. In other words, the benchmarks for assessing and evaluating the relationship of individuals with urban spaces (case studies) are formulated based on these three interaction components.

It is analyzed through individuals' responses. These responses are categorized according to their affective, cognitive, and conative nature. (Gifford, 2016, 94). In such cases, the interaction between individuals and their surroundings cannot be directly observed or assessed; instead, it can be deduced from their reactions. These reactions can be categorized based on their affective, cognitive, and conative nature.

2.2.1. constructs of attitude

• Place attachment (affective construct)

In the mid-1970s, the exploration of emotional ties to geographic spaces gained substantial attention in influential research, notably in the seminal works of Tuan (1974) and Relph (1976) within the field of human geography. Since the late 1970s, the term "attachment" has become increasingly prevalent in the specialized literature of various disciplines related to the environment. The growing concern about societal and neighborhood degradation, coupled with the displacement of individuals, has played a pivotal role in elevating the significance of emotional bonding with

the environment and the emergence of the concept of place attachment (Giuliani & Feldman, 1993, p. 267-268). It is crucial to note that emotional bonding or place attachment extends beyond residential concepts, encompassing various facets of the people-place connection (Scannell & Gifford, 2010a, p. 6). Numerous studies underscore that the affective component, represented by place attachment, is not only non-negligible in one's interaction with a place but is often deemed the most crucial component (Scannell & Gifford, 2010 a; Hidalgo & Hernandez, 2001; Manzo, 2003, 2005; Riley, 1992). The establishment of emotional bonds to the environment fosters a predominantly long-term connection, characterized by a propensity to remain in that place (Hernandez et al., 2007, p. 310; Nielsen-Pincus et al., 2010, p. 444), feelings of peace and happiness (Hidalgo & Hernandez, 2001, p. 274; Nielsen-Pincus et al., 2010, p. 444; Antonsich, 2010, p. 122), a sense of safety and security (Scannell & Gifford, 2010a, p. 5; Hernandez et al., 2007, p. 310; Antonsich, 2010, p. 122), a sense of belonging (Antonsich, 2010, p. 122), and satisfaction of psychological needs (Scannell and Gifford, 2016, p. 17). Importantly, it contributes to the enduring nature of an individual's connection to the place.

Table 1. Lack of clarity in defining concepts linked to the individual's interaction with place

No.	Researcher	Main concept	Equivalent concept	Constructs
1	Brown & Werner (1985)	Place attachment	Place identity	
2	Droseltis & Vignoles (2010)	Place identity		Place attachment
3	Kyle, Graefe & Manning (2004)	Place attachment		Place identity
4	Jorgensen & Stedman (2001)	Sense of place		Place attachment & Place identity
5	Cuba & Hummon (1993)	Place identity		Emotional ties & affiliation with place
6	Altman & Low (1992)	Place attachment		Emotional ties & affiliation with place
7	Jorgensen & Stedman (2006); Nielsen-Pincus, Hall, Force, & Wulforth (2010)	Sense of place		Place attachment, Place identity & Place dependence

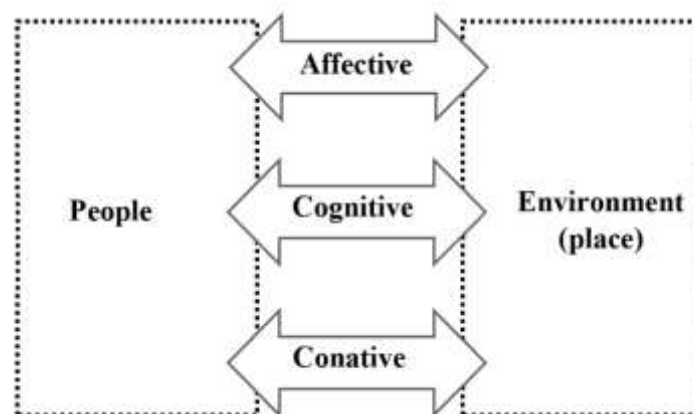


Fig 1. Different components of the people-place interaction

- *Place identity (cognitive construct)*

Individuals establish connections with specific places based on the experiences within those environments and the memories associated with them. Essentially, the memories, beliefs, and knowledge elicited by particular places imbue them with personal significance. This dimension of the relationship with a place can profoundly influence the most intimate level, specifically the definition of self (Scannell & Gifford, 2010a, p. 3). It can be argued, therefore, that in numerous instances, individuals engage with a specific environment or place as a means to enhance and uphold their self-identity processes. Given that place identity is considered a facet of one's overall identity, interacting with a particular place involves the act of defining oneself as belonging to that place or its community. In such scenarios, the place assumes a symbolic and indicative role in representing one's social status (Hernandez et al., 2007, p. 311; Appleyard 1979, p. 150).

The cognitive component encompasses an individual's thoughts, knowledge, perceptions, and beliefs related to the place (Jorgensen & Stedman, 2001, p. 237; Kyle, Mowen & Tarrant, 2004, p. 439). This concept can be effectively operationalized as "place identity." This operationalization and adaptation align with Proshansky's (1978) depiction of place identity within the context of cognitive communication, establishing a connection between the individual and the environment.

As validated by Droseltis and Vignoles (2010) in their study, which assesses the sense of continuity, belonging, security, and social processes associated with religious places and narratives, it can be argued that identification with a place is not solely an individual process but also a social one (Droseltis & Vignoles, 2010, p. 32). To gauge place identity in individuals, one can examine the expressions they use in describing their connection with the place, particularly instances where they use terms like "I" and "for me" in reference to the place. In other words, adjusting one's position in relation to a place and establishing a connection with it implies an incorporation of the place into one's identity structure (Pretty, Chipuer, & Bramston, 2003, p. 275).

- *Place dependence (conative construct)*

The third component of the people-place interaction is the behavioral aspect. While certain researchers emphasize behavioral intentions and commitments, not necessarily actual behaviors (Jorgensen & Stedman, 2001, p. 237), others consider

the entirety of behaviors and activities occurring in the place (Kyle, Mowen & Tarrant, 2004, p. 439). Nonetheless, the essence of this component lies in the establishment of interaction through action. For instance, to characterize the behavioral dimension as the third facet of place attachment, Scannell and Gifford (2010) define it as the expression of attachment through behavior (Scannell & Gifford, 2010a, p. 4).

In this context, a place is construed as the backdrop for purposeful behaviors and desired activities of an individual: the more conducive conditions are provided to support and guide specific goals or interests, the more individuals become reliant on the place. This type of interaction and connection with space is commonly defined and explored in numerous studies as place dependence. As a form of behavioral dependence, place dependence underscores the significance of a place in facilitating conditions that support and guide specific objectives or desired activities (Williams & Vaske, 2003, p. 831; Nielsen-Pincus et al., 2010, p. 444). This component is user-oriented, distinguishing it from the other two components—the cognitive component (place identity) and the affective component (place attachment). Stokols and Shumaker (1981) emphasize that place dependence can be gauged and assessed by comparing the quality of a place with that of other places (alternatives), as well as by the availability of social and physical resources to fulfill targeted behaviors and create conditions for arbitrary activities. In essence, place dependence is a form of communication facilitated by the place, providing access to specific objectives and behaviors in comparison to other places (Pretty, Chipuer & Bramston 2003, p. 275; Scannell, Gifford 2010a, p. 6).

The conative component, place dependence, represents the capability of a place to fulfill an individual's requirements by providing the necessary context for desired activities (Kudryavtsev, Stedman, & Krasny, 2012, p. 231). In essence, it reflects the place's responsiveness to the individual's conative values and motivations. As a result, individuals are inclined to utilize other spaces less for their specific activities. This component manifests itself in the inclination to stay in proximity to a place or revisit it, engage in its reconstruction, or relocate to similar places (Scannell & Gifford, 2010a).

In summary, the interaction between an individual and a place involves a intricate network of connections among the affective, cognitive, and conative components, warranting further scrutiny. Beyond exploring the connections among these components, it is essential to acknowledge their distinctions.

Research indicates that place attachment, representing the affective component, emerges relatively quickly in the interaction with the environment. Conversely, place identity undergoes a more intricate and time-consuming development process (Hernandez et al., 2007, pp. 310, 312; Lewicka, 2011, p. 216). Subsequently, the foundational concept of people-place interaction and various models depicting the interrelationship among its components will be analyzed.

2.2.2. Theoretical models of people-urban space interaction as an attitude

It is important to note that none of the aforementioned constructs is considered in isolation; instead, they are collectively viewed as a whole, emphasizing the significance of the interrelationships among them in the fundamental concept of people-place interaction. As suggested by Jorgensen and Stedman (2006), the patterns of correlation between these components and the general factor can vary, sometimes presenting intricate relationships (Jorgensen & Stedman, 2006, p. 317). For instance, the affective component, or attachment to specific social and physical attributes of a place, contributes to the enhancement of place identity (Scannell & Gifford, 2010a, p. 6; Stedman, 2003, p. 676). Furthermore, social bonds and attachment to people in a given place contribute to the distinctiveness of the social group and, consequently, the 'distinctiveness' of the place in comparison to other locations—an aspect closely aligned with the concept of place identity (Scannell & Gifford, 2010a, p. 5).

Utilizing the definition of attitude as a multidimensional concept and examining responses to an attitude object in terms of its components, numerous studies have been conducted to explore and quantify the relationships among these three components (e.g., Jorgensen & Stedman, 2001; Nielsen-Pincus et al., 2010). Drawing from various investigations, four distinct models (Unidimensional (single-factor) model, Tripartite (three-factor) model, Higher-order model, G+Group factor model) can be considered to provide a comprehensive understanding of the interrelationships within the concept of people-place interaction and its multiple components (affective, cognitive, and conative). These models have also been employed in other studies to assess the concept of sense of place (Jorgensen & Stedman, 2001) and the concept of place bonding (Nielsen-Pincus et al., 2010).

In the single-factor model (Fig. 2 (a)), there is no discrimination among the various components. Essentially, all three components become inseparable,

and their individual interpretations merge into a unified concept (Jorgensen & Stedman, 2001, p. 238). This model aligns more closely with studies focusing on place bonding or sense of place, as well as with approaches such as phenomenology (Stokowski, 2002) and literature (Stegner, 1992). In the tripartite model (Fig.2 (b)), it is posited that all three components are present, with each representing a distinct construct potentially correlated with the others. This model is grounded in the assumption that the affective, cognitive, and conative constructs are highly distinguishable among different individuals (Jorgensen & Stedman, 2001, p. 238). It proves to be most suitable for research investigating the interaction of people with places, especially in contexts where specific behavioral activities are highly measurable (Nielsen-Pincus et al., 2010, p. 445).

The high-order model (Fig. 2 (c)) operates under the assumption that the correlations among the initial constructs (affective, cognitive, and conative) are explained through a more abstract concept. In this framework, Identity, Attachment, and Dependence are designated as mediating constructs positioned between the overarching concept of people-place interaction and the observed responses. This model allows each construct to retain a degree of unique differences that are not encapsulated by the general concept (Jorgensen & Stedman, 2001, p. 239; Nielsen-Pincus et al., 2010, p. 446).

In the G+Group factor model (Fig. 2 (d)), the affective, cognitive, and conative constructs are not interrelated, neither with the general concept of people-place interaction nor with one another. They function independently. Consequently, while the overall notion of people-place interaction is assessed by criteria falling into the affective, cognitive, and behavioral categories, these components do not exhibit internal correlations, and the concept of interaction holds a broader scope of influence than the group factors (Jorgensen & Stedman, 2001, p. 239). In this model, none of the components has either a conceptual or empirical relationship with each other. The concept is represented in the form of affective, cognitive, and conative responses but remains independent of the three components, namely Place Identity, Place Attachment, and Place Dependence.

While each of these models can be employed to predict people-place interaction, their distinctions lie in their interpretations. As discussed earlier, the first model characterizes an individual's interaction with a place as a single-component response. In this framework, the criteria for assessing people-place interactions are not categorized into separate classes, unlike other models that emphasize the

multidimensionality of this concept. According to this model, the general concept comprises three independent components that cannot be amalgamated collectively. In the second model, the emphasis is on the correlation among the three components, whereas in the third and fourth models, the three components play almost independent roles. However, in the fourth model, even though a set of criteria is adopted for each independent component, the general concept (people-place interaction) holds a broader scope of influence than the group of components (Jorgensen & Stedman, 2001, pp. 237-240; Nielsen-Pincus et al., 2010, pp. 444-446).

It is noteworthy that individuals function as part of a broader social group with a shared collective perception of the place. The comprehension of the environment within cultural networks is derived from the shared beliefs of one's social group (Eisenhauer et al., 2000, p. 422). In essence, individuals from different cultures perceive, experience, and assess the environment in distinct ways, forming entirely different relationships with it based on their cultural perspectives and knowledge. They attribute value to elements in alignment with their cultural norms and values (Strang, 1997, p. 276; Kyle & Johnson, 2008, p. 109).

Hence, as highlighted by Moore (1979), it becomes evident that diverse cultural and social groups engage with and interpret space through varied expressions, ranging from overt behavioral manifestations to symbolic ones (Moore, 1979, p. 54). Consequently, people's interactions within different socio-cultural contexts are not universally identical in every instance and necessitate individual examination.

Moreover, the three components of the attitude object can exhibit varying intensities (magnitudes). For instance, a place may serve as a suitable context for specific behaviors and activities, yet it might not significantly contribute to one's identity processes or sense of belonging to that place. As emphasized in Kyle et al.'s study (2004), the study's context shapes how concepts of interaction with a place are formulated and organized. The subsequent sections of this paper entail a scrutiny of attitude structure models, the exploration of the presence or absence of each of the three components, and the correlations between them in observed responses concerning five plazas and 411 citizens of Tehran.

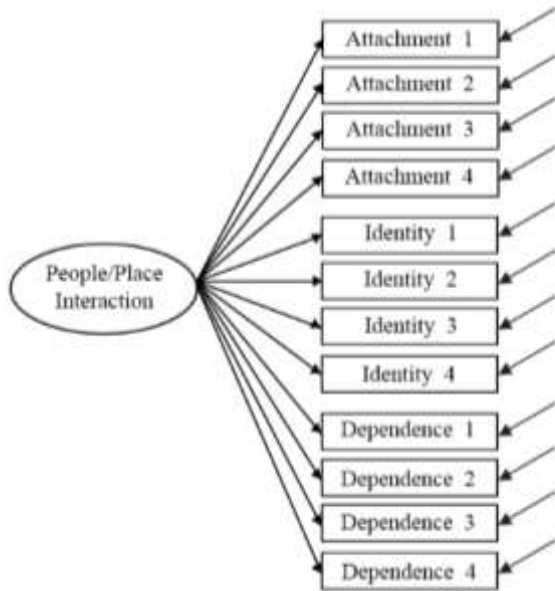
In light of the aforementioned points, the components of an individual's interaction with a place can be delineated as three distinct components

grounded in attitude theory. It is plausible for someone to harbor emotional attachment to a specific place, while cognitively, that place may play a secondary role in defining their identity and might not hold significant sway in terms of behavior. Subsequently, the nature of the relationships among the three components and the concept of place interaction is scrutinized through a consistency test of the model.

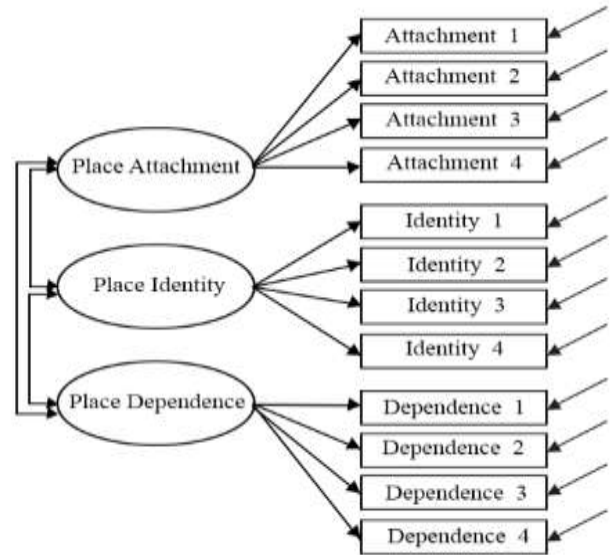
3. METHOD

3.1. The setting

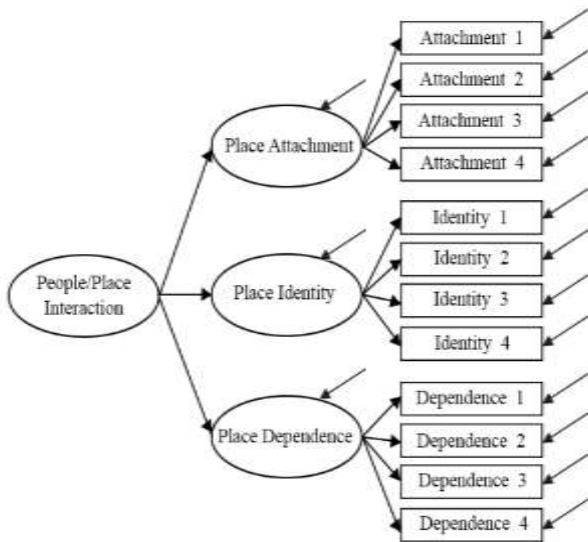
The Tehran Metropolis comprises 400 squares distributed across 22 municipal districts. These squares are classified into four types—city, district, residential quarter (sub-districts/nahiyeh), and neighborhood—based on their physical attributes and functional roles (ParsBoom consultant, 2017). For the current study, samples were drawn from 47 squares of city and district types, which serve as significant communal spaces (Crowhurst Lennard, 2019) and social hubs facilitating engagement with urban community life. A panel of 25 experts, including urban designers and planners, associated with 23 consulting engineers (covering 22 districts and one major district) for Tehran's Comprehensive Plan and Detailed Plan, evaluated these 47 squares according to their perceived value as desirable destinations for the general public, fostering a sense of community.



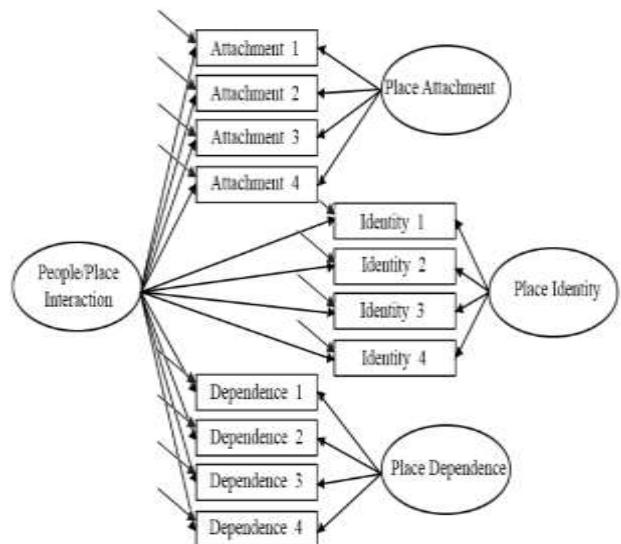
2a



2b



2c



2d

Fig 2. Theoretical models of People/ Place Interaction (Nielsen- Pincus et al. 2010 ;Jorgensen & Stedman, 2001)

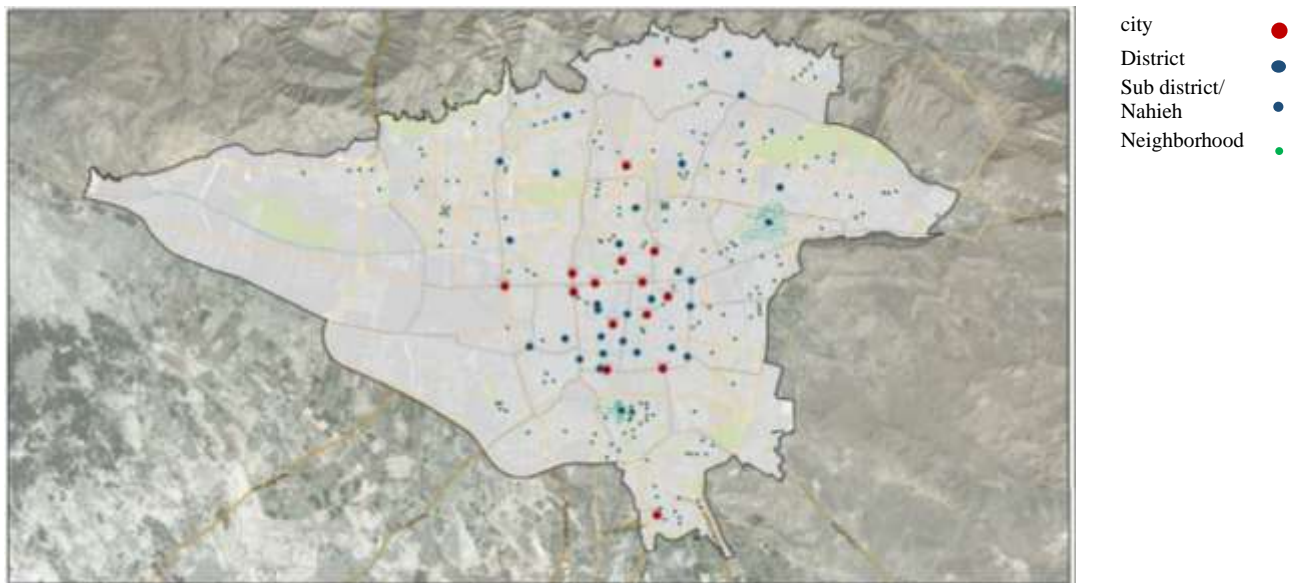


Fig 3. Distribution of Tehran Urban Squares (Pars Boom consultant, 2017)

Eventually, five squares were selected based on the experts' ratings and their appropriate distribution in the city (North, East, Central, West and South greater areas in Tehran) (Fig.3):

Study Area 1- Tajrish Square (North of Tehran) (Fig.4(e))

Study area 2- Vali'asr Square (Center of Tehran) (Fig.4(b))

Study Area 3 - Sadeghiyeh Square (West of Tehran) (Fig.4(d))

Study Area 4- Nabovvat square (Haft Hoz) (East of Tehran) (Fig.4(a))

Study Area 5 - Shahr-e-Rey Square (South of Tehran) (Fig.4(c))

All the selected samples are vibrant urban squares, a categorization made by Lang and Marshall (2017) that focuses on the operational aspects of squares.

3.2. Participants

Research participants were selected through simple random sampling from individuals who routinely visit and utilize squares in their daily lives, with the selection criteria constrained by specific variables:

Participants were required to (1) reside in the city of Tehran; (2) frequent the designated place at least once a month; (3) fall within the sixth life stage (21 to 40 years old) as per Eric Ericson's stages of psychosocial development; (4) have a residency history in Tehran exceeding 20 years; (5) have a minimum of 5 years of residency in close proximity to the specified place.

Residing in Tehran establishes a shared foundation for experiencing the city and ensures equal access to

its urban spaces. The environmental experiences of city residents play a pivotal role in discerning the significance and preferences of specific places. To qualify as purposeful and informed, a minimum number and frequency of visits to a place must be established. In this context, visiting the place at least once a month is considered the requisite minimum frequency. Within the specified age range, individuals encounter fewer constraints regarding their presence in urban sites and public life. They face fewer physiological limitations, fostering a more comfortable sense of presence in urban public spaces. Additionally, this demographic is inclined to exhibit greater autonomy in deciding which spaces to frequent. Moreover, having been raised in Tehran minimizes cultural diversity to some extent. While various cultures and subcultures coexist in a metropolis like Tehran, youth who have grown up or spent the majority of their active lives in the city are presumed to share similar expectations from urban spaces. A residency of at least five years in the city, coupled with frequent visits to a specific place, contributes to the development of a relatively comprehensive cognitive map of that environment. Hence, a total of 100 self-administered paper questionnaires were distributed at various times in each location, resulting in a cumulative distribution of 500 questionnaires. However, 89 questionnaires were excluded due to incomplete information, leaving an average of 80 participants per space and a total of 411 assessments for analysis (refer to Table 2).

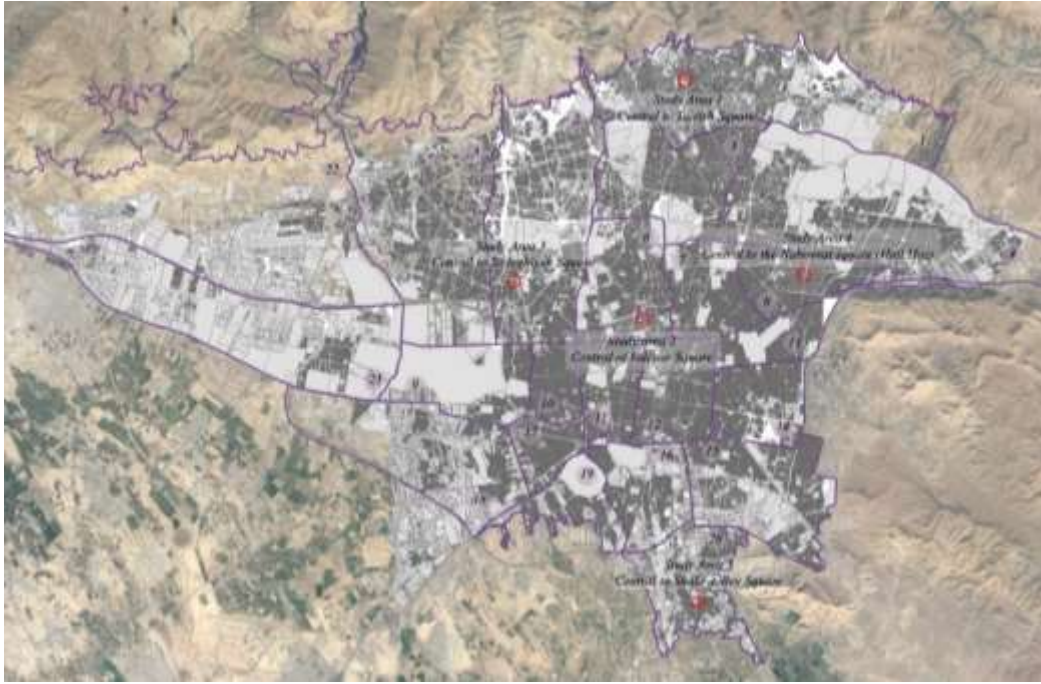
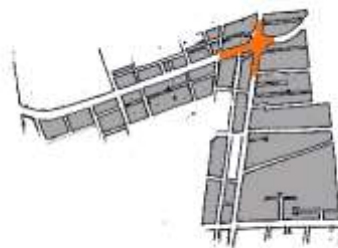


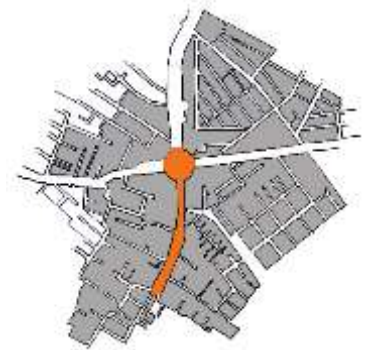
Fig 4. location of five selected urban squares



a. Nabovvat (Haft-Hoz) Square



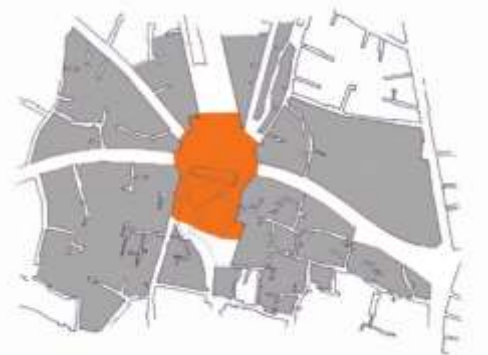
b. Vali 'Asr Square



c. Shahr-e-Rey Square



d. Sadeghiyeh Square



e. Tajrish Square

Fig 5. Layout of the five urban plazas

Table 2. Demographic characteristics of research participants

Characteristics	N= 411
Age (M. S.D.)	32.75, 9.399
Sex	
	Female 53.3%
	Male 46.7%
Marital status	
	Single 47.4%
	Married 52.6%
Education	
	Undergraduate 34.3%
	Bachelor 46.2%
	Master and upper level 19.2%
Employment status	
	Employed 56.2%
	Unemployed
	Housekeeper/Retired 21.7%
	University student 22.1%
Length of residence in Tehran (M., S.D.)	28.81, 10.662
Length of familiarity and using the place (M., S.D.)	11.82, 8.704

3.3. Design and instrument (measure)

Our comprehension of how individuals engage with their physical environment within the context of attitude structure remains incomplete when relying solely on direct observation. Instead, we can deduce this interaction through the criteria being assessed. To precisely define the constructs associated with the cognitive, affective, and conative aspects of people/place interaction, a set of Likert-scaled statements was utilized as a measurement tool.

In this study, the three components of interaction with the place were evaluated using twelve self-report items. These items were adapted from similar previous research (Zlender, Gemin, 2020; Jorgensen & Stedman, 2001, 2006; Nielsen-Pincus, 2010) but were refined and adjusted to the context to ensure clarity for the participants. A pilot test of 40 questionnaires was initially conducted for the five selected places. Feedback from the pilot test identified errors, confusing questions, or ambiguities, which were then addressed. The wording was subsequently refined to ensure clear communication of the original concept to the respondents (Table 3). Each item was measured on a five-point Likert scale ranging from "strongly agree" to "strongly disagree".

The reliability of the questionnaire was assessed using Cronbach's α , which yielded a value of 0.859. A coefficient exceeding 0.7 indicates good reliability and internal consistency of the questionnaire's questions. To mitigate the potential inflation of the alpha value with an increased number of questions (12 questions in this study), reliability was also estimated using the bisecting method. The Guttman's

coefficient ($G = 0.76$) was calculated, indicating a good level of reliability for the questionnaire.

The participants' scores on various interaction components were recorded using a five-point Likert scale. Statistical analyses were conducted for all five places, both individually and collectively, utilizing SPSS and LISREL software. Correlation analysis tests between the three interaction components, variance analysis, and Tukey tests were employed to assess and analyze the distinct roles and significance of these components. Additionally, the variations between the five places concerning the three interaction components were interpreted, and the most suitable model for the research was identified.

Factor Analysis was applied to investigate the presence of the three components of people-place interaction in this study. Structural Equation Modeling (SEM) was also employed to determine the most appropriate and consistent model among the four presented in Fig. 1. Fit indices, including χ^2 , χ^2/df , Bentler-Bonnet Normed Fit Index, Bentler Comparative Fit Index, and RMSEA (Root Mean Squared Error of Approximation), were calculated. The chi-square test indicates disparities or differences between the model and the sample data. A higher chi-square value suggests greater variance and, consequently, a weaker model. It's worth noting that chi-square is sensitive to a substantial sample size, so it is divided by the degrees of freedom. Kline (2005) suggests that a relative value of 3 or less for this index indicates a well-fitting model. Some other experts even consider a value of 2 or less as acceptable (Tabachnick & Fidell, 2007).

The Comparative Fit Index assesses the extent to which the model fits better than an independence model. Models with values exceeding 0.95 are considered to have an ideal fit (Hu & Bentler, 1999). The RMSEA evaluates the model fit of the sample covariance matrix, considering the model's complexity (degrees of freedom), and is calculated within a 90 percent confidence interval. Standard practice suggests that RMSEA values of 0.06 or 0.08 are acceptable if the upper bound on the RMSEA confidence interval is below 0.10 (Nielsen-Pincus et al., 2010, p. 448). The NFI (Normed Fit Index) of 0.95 indicates that the model of interest improves the fit by 95% relative to the null model (Cornell Statistical Consulting Unit) (Table 5).

The KMO & Bartlett's test was conducted to assess the adequacy of the data, yielding a value of 0.87. This result indicates that the data are highly adequate and suitable for Factor Analysis (Table 4).

4. RESULTS AND DISCUSSION

The respondents for the selected places were almost evenly distributed between women (53.3%) and men (46.7%). Their average age was 33 years, and they had resided in Tehran for an average of 29 years. More than half of them (56%) were full-time employees. On average, the respondents visited the corresponding places over the past 12 years, at least 2 times a week, and approximately 2 hours per each visit. Excluding the number of missing data, 410 samples remain valid. Based on the scores provided by

respondents for the items of each interaction component, the four previously discussed models were tested to identify the appropriate model for this study. In the following, the connection between the components is elaborated according to the adopted model.

4.1. Model goodness of fit

Each of the four models discussed offers a distinct interpretation of the concept of people-place interaction. In this section, the alignment and agreement of the models were examined in relation to the data collected from the statistical population (model fit) (Table 6).

In the initial assessment, it is evident that the single-factor model exhibits the least alignment with the data from this study among the four models. This conclusion is drawn from the model's relatively low Comparative Fit Index (CFI) value of 0.761, where a CFI of 0.9 or higher is considered indicative of acceptable model fit. Additionally, this model yielded the highest RMSEA value at 0.142, while values less than 0.1 are generally deemed acceptable.

The rejection of the initial model signifies the influence of three concepts—cognitive, affective, and behavioral—on the interaction between individuals and their environment, refuting the idea of a singular interaction concept. Among the three remaining models, only the Higher-Order Model aligns seamlessly with the predefined thresholds in the desired indices (as illustrated in Figure 6).

Table 3. Items used in the people-place interaction scale

Hypothesized factor: attitude component	Item label	Item Description
Place attachment	PA1	This space means a lot to me.
	PA2	I feel happiest when I am here.
	PA3	I really miss this place when I'm away from it for too long.
	PA4	I feel a strong sense of belonging to this place and its settings/facilities.
Place identity	PI1	This place is a reflection of me.
	PI2	I feel I can really be myself when I'm here.
	PI3	I see similarities between myself and the people who come into this place.
	PI4	This place reflects the type of person I am.
Place dependence	PD1	I prefer this place to other settings/facilities, meeting my goals and needs.
	PD2	This place is the best place for doing the things that I enjoy the most.
	PD3	I enjoy visiting this place more than any other urban space.
	PD4	For meeting my goals and needs, I could not imagine anywhere better than the setting and facilities provided by this place.

Table 4. KMO and Bartlett

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.876
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Table 5. Fit indices and their acceptable thresholds

Fit Index	Threshold	
RMSEA	Values less than 0.07 A stringent criterion	Steiger, 2007:897
NFI	Values greater than 0.95 Cutoff criteria	Hu and Bentler, 1999
CFI	Values greater than 0.95 Cutoff criteria	Hu & Bentler, 1999
Relative X ² (X ² /df)	Values less than 2	Tabachnik & Fidell, 2007
	Values less than 3	Kline, 2005

Table 6. Model goodness of fits statistics

Model	X ²	X ² /df	NFI	CFI	RMSEA
1	498.11 54	9.22	0.741	0.761	0.142
2	187.69 51	3.68	0.903	0.927	0.081
3	77.89 42	1.85	0.960	0.981	0.046
4	187.69 51	3.68	0.983	0.927	0.081

In this model, it is posited that the affective, cognitive, and conative constructs serve as mediators between people-place interaction and the observed responses. Additionally, each of these components - affective, cognitive, and conative - may encompass distinct emotions, beliefs, and behaviors that are independent of the broader people-place interaction.

Hence, based on the findings of this examination, it can be asserted that a meticulous and precise analysis of individuals' interaction with selected urban spaces in Tehran reveals the existence of three distinct cognitive, emotional, and behavioral components. Consequently, the theoretical framework positing the tripartite nature of people-place interaction, comprising cognitive, emotional, and behavioral elements, is corroborated by the empirical analysis of field data. It's worth noting, however, that this tripartite pattern concerning place interaction may not universally apply to all cases. For instance, Jorgensen and Stedman's (2001) study did not validate the presence of a triple pattern involving distinct cognitive, emotional, and behavioral components for residents in Wisconsin (Jorgensen & Stedman, 2001, p. 242).

The subsequent question pertains to the nature and strength of the correlations between these components. Pearson's correlation test was employed to examine the relationships among affective, cognitive, and conative constructs, revealing a positive and moderate correlation between these components (Table 7).

The analysis of the relationships between components indicates that an increase in each

component has a positive (direct) effect on the others, meaning that as one component increases in value, the others also increase. The intensity of these relationships is highest between the emotional and cognitive components ($r = 0.561$) and lowest between the cognitive and behavioral components ($r = 0.415$). All three coefficients fall within the range of 0.35 to 0.65, indicating that approximately 25% of the variations are shared, and these components mutually influence each other.

4.2. The importance of the three interaction components

Once the existence of the three distinct affective, cognitive, and conative components of people-place interaction has been confirmed, it is essential to demonstrate that the significance and value of each component are not necessarily the same. The average scores of the three interaction components for participants are presented in Table 8. The results reveal a very small difference between the mean scores of the distinct affective, cognitive, and conative components. Specifically, with a slight difference, the emotional component ($M = 3.73$, $SD = 0.86$) is rated highest, followed by the cognitive component ($M = 3.68$, $SD = 0.75$), and finally, the conative component ($M = 3.36$, $SD = 0.81$) as rated by the participants (Table 8).

Considering the possible range for the mean score of each component as proportional to the Likert scale of the questionnaire (ranging from one to five), we can assess the intensity and significance of the

components based on their mean scores at five levels. A mean score of 4.2-5 indicates extreme importance, 3.4-4.19 means high importance, 2.6-3.39 signifies medium importance, 1.8-2.59 reflects low importance, and 1-1.79 indicates very low importance. Analyzing the data with this spectrum, it can be inferred that the emotional component (M = 3.7317, SD = 0.86052) and the cognitive component (M = 3.6810, SD = 0.75779) are of high importance in interacting with selected urban spaces. On the other hand, the

conative component (M = 3.3625, SD = 0.81073) is at a lower level and considered of moderate importance (Table 9, Fig. 6).

Enhancing the connection and engagement of citizens with urban spaces necessitates due consideration for all three components. Moreover, recognizing the heightened significance of the emotional and cognitive aspects in contrast to the conative component emphasizes the need for a more focused attention to these elements.

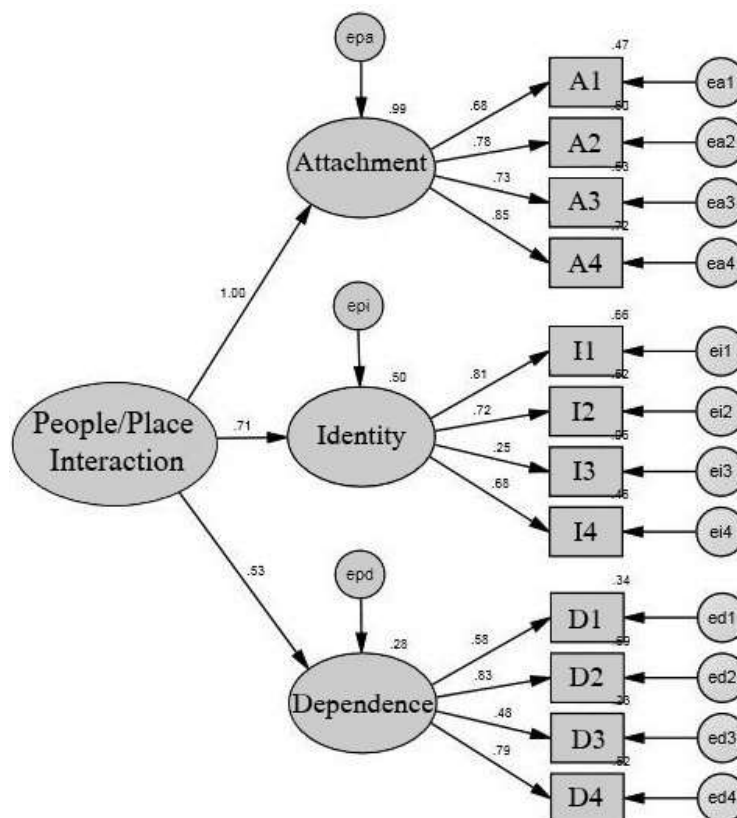


Fig 6. The model of People-Place Interaction appropriate to the research data and based on standardized data

Table 7. The correlation coefficient for the three interaction components

	Affective construct	Cognitive construct	Conative construct
Affective construct	1	0.561 (**)	0.519 (**)
Cognitive construct		1	0.415 (**)
Conative construct			1

** Correlation is significant at the 0.01 level (2-tailed).

Table 8. The mean score of the three interaction components for the five selected spaces

		Affective	Cognitive	Conative
Numbers	Valid	410	406	411
	Missing	1	5	0
Mean		3.7317	3.6810	3.3625
Std. Deviation		0.86052	0.75779	0.81073

Table 9. Mean score analysis of the three interaction components in the Tukey test

Interaction components	Numbers	Subset for alpha =0.05	
		Group 1 (high importance)	Group 2 (relatively high importance)
Affective	410	3.73	--
Cognitive	406	3.68	--
Conative	411	--	3.36
Significance level		0.644	1.000

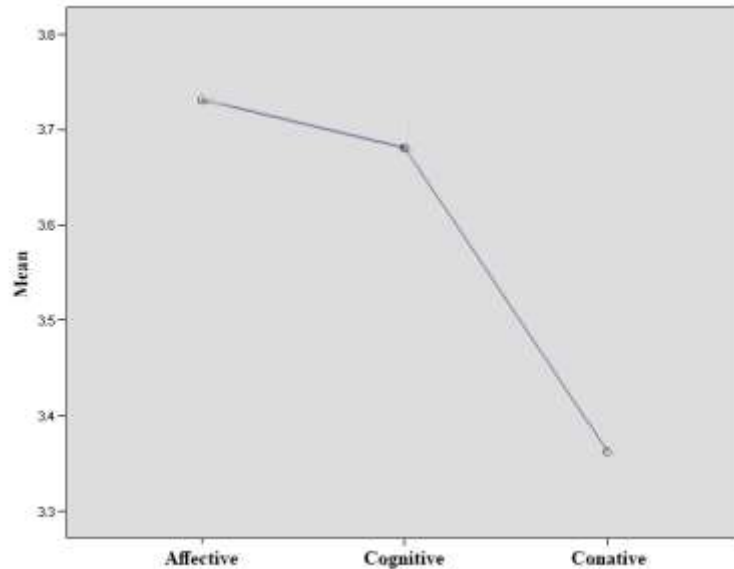


Fig 7. Mean scores for the three interaction components

Theoretically, it is posited that people-place interaction, particularly in the context of urban plazas in this study, constitutes a multidimensional concept. Rooted in attitude theory, this concept encompasses three discernible components: affective, cognitive, and conative. However, the presence and intricate interplay of these components necessitate careful examination and adjustment when evaluating individuals' interactions with diverse places within various socio-cultural contexts. The findings of this examination, which explores citizens' interactions with urban spaces in Tehran, affirm the existence of these three distinctive components. Consequently, it can be asserted that individuals' engagement with urban places involves an emotional attachment, establishing the place as an integral element of their identity, ultimately supporting their objectives and activities in comparison to alternative spaces. As proposed by Scannell and Gifford (2010), the selection and interaction with a particular space are influenced by two primary axes: purpose or intention and value (Scannell & Gifford, 2010b, p. 295). Essentially, people gravitate toward spaces that align with their goals and simultaneously embody their cherished values, stemming from both emotional and cognitive dimensions.

Hence, a comprehensive examination of people's interaction with urban spaces demands due consideration of all three components. Nevertheless, it is essential to acknowledge that the quality and significance of these components are not necessarily uniform. The outcomes of this study, evaluating individual interactions with selected urban places, reveal relatively similar mean scores for the three components. With slight distinctions, both the emotional and cognitive components demonstrate high importance, while the behavioral component exhibits moderate importance. This finding aligns with the conclusions drawn by Misra and Stokes (2012), who, in comparing individuals' connections with real and virtual environments, identify the recognition and fulfillment of socio-emotional needs as the primary motivations concerning the real environment (Misra & Stokols, 2012, p. 315). Moreover, the results are consistent with other studies that emphasize the paramount importance of the emotional component (Scannell & Gifford, 2010a; Manzo, 2003; 2005) as the predominant aspect in an individual's relationship with the environment, often contributing to the formation of enduring bonds. The negligible difference in mean scores between the emotional component and the other components in this

study can be attributed to the limited opportunities and inadequate contextual diversity for individuals to engage with and experience the designated places (Fig. 8 (a, b, c)). Typically, the emotional facet of an individual's connection with the physical environment develops relatively swiftly, but its intensity and culmination, encompassing both physical and social dimensions, require a considerable amount of time (Lewicka, 2011, p.215). Varied experiences in the environment and the diverse memories formed therein contribute to enriching this relationship. However, in Tehran's urban spaces, opportunities for diverse engagement and the formation of distinct social or individual memories are constrained. This limitation is partly attributed to legal, religious, and customary regulations in Iran, prohibiting or socially disapproving of certain activities and behaviors in open urban spaces, such as dancing, busking, open-air concerts, playing musical instruments, and singing. Furthermore, most group activities necessitate an official license for control. Additionally, there are restrictions on public displays of affection, socially accepted behaviors, and the activities of women in public spaces. Another contributing factor is the undesirable and inappropriate design of these spaces. Consequently, it is plausible to assume that people's emotional attachment to public spaces in Tehran is less likely to reach its zenith.

Moreover, the interdependence among the three interaction components is evident. Pearson's correlation coefficient between these components reveals a positive and direct relationship. For instance, the emotional connection that individuals feel towards a space or the people within it enhances the specificity of the social group or the distinctiveness of the space for the individual. In other words, the emotional component of interaction positively influences the cognitive component. The success of individuals in pursuing and fulfilling their goals and needs, based on their experiences and the frequency of such interactions, shapes their emotional connection with the space. Therefore, it is reasonable to assert that the positive correlation between the interaction components should be recognized in the ongoing nature of an individual's interaction with a place, as reinforcing one component can contribute to the enhancement of another component. This perspective aligns with the findings of studies conducted by Shumaker and Taylor (1983) and Scannell and Gifford (2010a). The interconnectedness of components, their respective roles, and their significance in an individual's interaction with a place are both interpretable and predictable.



a. Playing chess in Nabovvat (Hatf-Hoz) Square



b. Greetings and conversation, passive contacts in Sadeqiyeh Square



c. Resting and people-watching in Tajrish Square

Fig 8. Optional social activities in urban spaces

5. DISCUSSION AND CONCLUSIONS

In the initial section of the paper, the challenges stemming from the lack of consensus on the definitions and operationalization of various concepts describing the connection between individuals and their surroundings, such as place attachment, place identity, sense of place, place dependency, were underscored. This inconsistency poses difficulties for empirical studies. To address this, a proposed solution involves leveraging attitude theory. Consequently, the concept of interaction, encompassing affective, cognitive, and conative constructs, was scrutinized in-depth to unravel the intricacies of how individuals engage with urban squares in Tehran.

After a meticulous examination and fitting of various models derived from attitude theory, particularly concerning the concept of interaction and its three constructs, it has been ascertained that citizens' engagement with selected urban squares encompasses all three constructs. However, it is crucial to highlight that these constructs do not hold equal significance and ranking. Among the examined urban squares, participants rated the emotional construct ($M = 3.73$, $SD = 0.86$) as the most prominent factor, closely followed by the cognitive construct ($M = 3.68$, $SD = 0.75$), with the behavioral construct ($M = 3.36$, $SD = 0.81$) assuming a more moderate level of importance in their interaction with these spaces. Hence, it can be inferred that both the emotional and cognitive constructs play pivotal roles, while the behavioral construct holds a comparatively moderate level of importance in shaping people's interactions with the study areas.

The results highlight two significant aspects. Firstly, when aiming to enhance the quality of urban spaces in Tehran, particular attention should be given to the emotional and cognitive components of citizens' interaction with these areas. Identifying attributes within the desired space that foster these connections between individuals and places is crucial. Secondly, the marginal difference between the scores of the emotional and conative components suggests an inadequacy in the diversity of spatial experiences. Consequently, the value of the emotional component has only slightly increased over time. Therefore, creating a context that facilitates diverse and desired experiences for citizens and improving motivations for engagement in urban and social domains should be prioritized. In this context, urban spaces should be perceived as sites rich in history, memory, emotional, and symbolic meanings for citizens. Urban management strategies should reflect on these values when working with urban spaces.

5.1. Limitation and Research Implications

Although the methodology utilized in this study was precise in explicating the findings, it is imperative to recognize the limitations associated with the sample of respondents, particularly in terms of age and number, when interpreting the data. Therefore, future research endeavors could enhance the robustness of their findings by incorporating a more extensive and diverse sample size. Additionally, forthcoming studies may find value in delving deeper into the examination of the social and physical attributes of urban squares that contribute to the emotional, cognitive, and behavioral dimensions of the bond between individuals and public spaces.

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