Environmental Tranquility: A Conceptual Framework and Urban Architectural Features

Farnoosh Minooei [a], Manouchehr Foroutan [b,*], Mohammadmehdi Soroush [c] Azadeh Aghalatifi [d]

[a] *Department of Architecture, Hamedan Branch, Islamic Azad University, Hamedan, Iran.*

[b] *Department of Architecture, Hamedan Branch, Islamic Azad University, Hamedan, Iran.*

[C] *Department of Architecture, Hamedan Branch, Islamic Azad University, Hamedan, Iran.*

[d] *Department of Architecture, Faculty of Architecture and Urbanism, Shahid Beheshti University, Tehran, Iran.*

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Abstract

Stressful life and reduced well-being have always been an issue of lifestyle in modern society. Constructing a multidisciplinary conceptual framework of environmental tranquility and quality of life is required for the field of architectural development, improved environmental quality, and enhanced human well-being. This paper reviews the main concepts of tranquility, environmental quality, and quality of life and presents examples of the relevant underlying conceptual models. Environmental tranquility has been researched quite broadly and therefore defined in a variety of ways. In this study, various definitions of the concept are reviewed and synthesized into a descriptive model based on the relationship among human needs, environment, and tranquility, depending on environmental, architectural, and urban features. The present study adheres to a qualitative exploratory design and uses content analysis based on an interpretive paradigm. For data collection, we employed a documentary and library method together with an argumentative approach to deepen the understanding of the issue and provide a descriptive model of environmental tranquility based on the theoretical grounds of tranquility in the fields of environmental psychology, social sciences, applied acoustics and landscape, and urban planning. The framework organizes the related concepts of environmental tranquility in relation to human needs in terms of spiritual, psychological, social, and physical environment features. Finally, the model of environmental tranquility is presented according to the authors' perception of previous models. In our suggested model, all environment types have reciprocal relationship with tranquility, and the highest type of tranquility is considered the *Reassured Soul and Genius Loci* that is more permanent and effective. Besides, the model depicts a multidimensional and conceptual definition of tranquility in relation to environment, human, and architectural-urban features. This study may offer helpful insights to stimulate new research, investigate multidimensionality, create operational definitions for quantitative studies, and guide semi-structured interviews for qualitative interdisciplinary studies.

Keywords: Environmental tranquility; Human needs; Architectural features; Urban features; Three-factor theory of emotions

1. Introduction

In the current world, materialistic tenets dominate all dimensions of human life. Some features of modern life include the dominance of physical needs, lack of belonging need, separation among individuals, lack of social interactions and tranquility, etc. As numerous scholars and philosophers frequently pointed out, tranquility plays an important role in different aspects of human life. Unfortunately, in modern architecture, this issue has been rarely addressed. Therefore, the present study intends to present a conceptual model that embraces the relationship between tranquility and different environment types (such as physical, psychological, sociological, and spiritual environments). We also explore the relevance of those concepts to architectural, environmental, and urban features to improve the quality of design. A large body of literature provides implicit definitions of the concepts. Based on the context or the choice of indicators, one has to conclude what meaning has been given to the concepts. Nevertheless, a broad variety of definitions has been identified for tranquility, quality of life, and environmental quality in the literature.

1.1 Tranquility

Tranquility refers to a psychological state characterized by peacefulness, quietness, calmness, and self-reflection (Kaplan & Kaplan, 1989). Despite being subjective in nature, this human experience can be observed objectively through effective connectivity between visual and auditory cortex and medial prefrontal cortex using neuro-imaging techniques (Hunter et al., 2010). Such interactions are stimulated when a person is within "tranquil environments", where natural sounds of water, wind, and birdsong (auditory components) dominate, and natural features such as vegetation, animals, and birds as well as geological and hydrological features are visible (visual components) (Watts et al., 2011). Conversely, in such places, anthropogenic source of noise is at a relatively low level (Watts & Pheasant, 2013). As a result, the primary construct of a tranquil space would be the sensory information received by the auditory and visual modalities (Watts & Marafa, 2017). Tranquillity is considered as a part of the "intrinsic characters" of the rural environment in the United Kingdom,

* Corresponding Author Email address: m.foroutan@iauh.ac.ir

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and, interestingly, the need for tranquil spaces even in urban areas is widely recognized, owing to stress and reduction in well-being experienced in city dwellers (Defra, 2000; Pearse, Watts, & Lim, 2013). Abundant previous evidence demonstrates that tranquil environments are restorative and can conribute to stress reduction, relaxation, longevity, and pain and anxiety relief (Takano et al., 2002; Ulrich et al., 1991; Van den Berg et al., 2015; Grahn, Stigsdotter, 2003; Lechtzin et al., 2010). Furthermore, according to the Attention Restoration Theory (ART) developed by Kaplan and Kaplan (1989), engaging in such natural environments is useful to respite from attentional demands and cognitive or sensory overloads of modern city life (Pheasant, Fisher, Watts, Whitaker, & Horoshenkov, 2010; Watts & Marafa, 2017). In addition, Ulrich (1984) demonstrated the link between natural settings and the improvement of well-being and recovery rate from illnesses. On the contrary, the lack of tranquillity as a result of alienation from nature causes higher rates of physical and emotional illnesses in adults and seriously limits the development of children in life (Louv, 2008). In this vein, Russell, in a series of studies, (Russell & Snodgrass, 1987; Russell, Ward, & Pratt, 1981) showed that tranquility and its synonyms are relatively independent from an excitement cluster of descriptors and are positively related to a pleasantness cluster. Likewise, the studies by Herzog and colleagues (Herzog & Barnes, 1999; Herzog & Bosley, 1992) reported that tranquility was positively related to, but distinct from, preference reactions. Ellison (2009) investigated possible relationships between religion and mental health. The frequency of religious attendance and the belief in an afterlife were inversely associated with feelings of anxiety and were positively associated with feelings of tranquility (Ellison et al., 2009). Calvert, Stein, and Spence (2004) suggested to investigate tranquillity by means of experimental control and manipulation of environmental features. In fact, several attempts have been made to quantify tranquillity in green areas, but perhaps the most-cited one is the Tranquillity Rating Prediction Tool (TRAPT) developed by the Bradford Centre for Sustainable Environments based on an empirical study of 34 sites (Pheasant et al., 2010; Watts et al., 2011). This tool objectively combines audio and visual stimuli using A-weighted sound pressure level (LAeq) and the percentage of natural and contextual features (NCF) in the visual scene (Pheasant et al., 2010). The cultural and contextual elements include monuments, landmarks, and religious-historic buildings, which are strictly natural features and fundamental to the construction of a tranquil space (Watts, 2018; Watts & Pheasant, 2013). This calculates the predicted tranquillity rating (TR) on a scale of 1-10, while 1 being the least tranquil and 10 the most. Variations in Lday, NCF, and TR are also illustrated by Watts and Pheasant (2013). On this scale, largers percentages of NCF correpond to higher sound level of Lday for the same TR (Figure 1). Interestingly, most of the variance in its rating is explained through quantifying visual and auditory stimuli within the environment, despite the fact that tranquillity is essentially a subjective experience (Hunter et al., 2010). The model was subsequently validated by Watts, Miah, and Pheasant (2013) using questionnaire surveys; it was also confirmed in a further study in Hong Kong on residents from diverse backgrounds (Watts & Marafa, 2017). The TRAPT, therefore, can be used by landscape managers and environmental planners (Watts, 2018). As auditory stimuli are indispensable parts to predict perceived tranquillity, knowledge derived from such studies could be crucial in understanding the factors of tranquillity affecting urban green spaces. Another important aspect of this study was to deepen the understanding of the tranquillity construct and determine its relations to the emotional responses of pleasantness, calmness, and control using (SAM) Self-Assessment Manikin[1] (Watts & Pheasant, 2015). This definitional diversity reflects the growing interest in tranquility and can be regarded as a progress in its theoretical development.

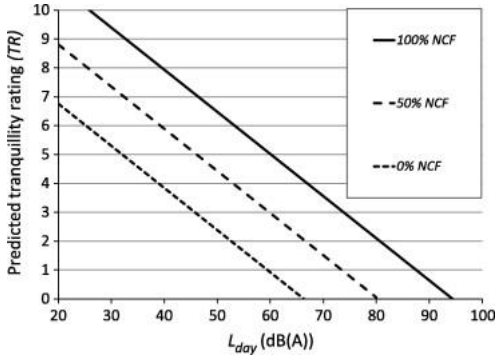

Fig. 1. Linear variation of TR with Lday at 3 levels of NCF (0, 50, and 100%) (Watts & Pheasant, 2013).

1.2 Quality of life

The starting point of the human communities is to have a correct realization of human needs and to monitor the accomplishments of the development (Ahadnejhad et al., 2016). The concept of quality of life has been interpreted in a variety of ways by different scholars. In a general definition, life quality is regarded as the degree of excellence and satisfaction in life, and how individuals enjoy a satisfactory life using objective factors and assess life and those factors by means of subjective perceptions (Szalai,1980). In a rather different interpretation, WHO-QOL Group (1993) regards life quality as the attitudes a person holds toward his/her own life in association with cultural expectations and personal objectives. In addition, others focused on the concept to life expectancy, enjoyment, and happiness (Raphael et al., 1996; Veenhoven, 1996). Similarly, Musschenga (1997)

[1] The Self-Assessment Manikin (SAM) is a non-verbal pictorial assessment technique devised by Hades et al. (1985) that directly measures the pleasure, arousal, and dominance (PAD) associated with a person's affective reaction to a wide variety of stimuli. These three emotional dimensions are known to be pervasive in organizing human judgements (Bradley & Lang, 1994).

highlighted the three elements of life quality including enjoyment (the hedonic component that includes positive mental states), satisfaction (the cognitive-evaluative component encompassing personal plans and conceptions in life), and excellence (aretic component which is related to the merits of the activities humans do in life). Cheung (1997) introduces the concept of good life that embraces four important components: 1) Hedonist life is related to affective factors such satisfaction and depression, 2) Dialectical life includes social and interpersonal interactions, 3) Humanist life is defined as individuals' capability of self-actualization and independence, and 4) Formalist life is associated with religious and moral aspects of life. Finally, quality of life can be further related to the factual material and immaterial equipment of life and its perception characterized by health, living environment and law and equity, work, family, etc. (RIVM, 2000). Hence, different aspects of life quality influence tranquility.

1.3 Environmental quality

Environmental quality is a complex issue involving subjective perceptions, attitudes and values which vary among groups and individuals (Porteous, 1971). Lansing and Marans (1969) stated that an environment of high quality conveys a sense of well-being and satisfaction to its population through characteristics that may be physical, social, or symbolic. Environmental quality results from the quality of constituting parts of a given region. Nonetheless, more than the sum of parts, it is the perception of a location as a whole. The constituting parts (nature, open space, infrastructure, built environment, physical environment amenities, and natural resources) each have their own characteristics and partial quality (RMB, 1996). In addition, environmental quality can be defined as an essential part of the broader concept of 'quality of life' and the basic qualities such as health and safety in combination with coziness and attractiveness (RIVM, 2002; workshop livability, 2002). Thus, diverse dimensions of environmental quality affect tranquility.
Researchers have highlighted different processes, places, and people involved in person–place bonding. However, these definitions remain scattered in the literature. Thus, the theoretical development of the concept has not yet been acknowledged, and no general definition of tranquility has been agreed upon. In this paper, we explore the commonalities across different permutations of tranquility and provide a conceptual framework.

2. Methodology

The present study adheres to a qualitative exploratory design and uses content analysis based on an interpretive paradigm. For data collection, we employed a documentary and library method together with an argumentative approach to deepen the understanding of the issue. To this aim, after gathering and studying notes, books, and papers, we provide a foundation based on which a two-step analysis is done.

In the first stage, theoretical grounds of tranquility in the fields of environmental psychology, social sciences, applied acoustics and landscape, and urban planning are collected, and then concepts are retrieved from essential architectural and urban features. Next, through summarization and classification of data obtained in the previous stage, a descriptive model of environmental tranquility is established. The framework organizes the related concepts of environmental tranquility in relation to human needs as well as spiritual, psychological, social, and physical environment types. Finally, the model of environmental tranquility is presented according to the authors' perception of previous models.

2.1 Conceptual approaches to Environmental Tranquility

In this survey, we try to clarify the concepts of tranquility and quality of life and living environment. This notion is not original, and others have remarked that livability has become a repository in which almost anything fits. Szalai (1980, 7-24) concludes that when we deal with a developing concept, the lack of uniformity is normal "... to attribute at first some vaguely circumscribed meaning to it that can be subsequently clarified and specified by more research and reflection". Others argue that uniformity in concepts is not per se necessary. It is believed that environmental tranquility is a container concept, and different theories relate to different aspects of environmental tranquility. Thus, the concept is multi-dimensional. Still, other scholars claim that it is not possible to define these multi-dimensional concepts: "It is like describing an onion. It appears simple on the outside, but it is deceptive, for it has many layers. If it is cut apart, there are just onionskins left and the original form has disappeared. If each layer is described separately, we lose sight of the whole. The layers are transparent so that when we look at the whole onion, we see not just the surface but also something of the interior" (Rybczynski, 1986, cited in Moore, 2000, p207–217).

2.2 Conceptual models

In the literature, a distinction is made between theoretical and empirical approaches. Theoretical models represent hypothetical relations among concepts. However, empirical models represent factual relations among different concepts. Ideally, both go hand in hand such that from a theoretical framework a conceptual model is formulated and empirically tested. In practice, some conceptual models are of such a high level of abstraction that their testing is not practically possible. Such cases are considered as 'thinking models'. At the other extreme, there are models that are empirically explorative, and more or less coincidental elements are combined into a framework. In the best case, these models can function as a point of departure for theory building and thus have heuristics value. A review of these different approaches is given without pretending to be exhaustive. The sequence of presentation is more or less arbitrary, but it generally moves from an abstract and broad level towards a narrow

and specific one. The diversity of models in the literature demonstrates that there are many ways to conceptualize the themes related to tranquility, quality of life, environmental quality, and 'kin' concepts. Therefore, very little consensus exists with regard to which conceptual framework should be employed. Against that background, we cannot automatically assume that authors who use the same term actually interpret it in the same way. This was already visible in the definitions and conceptual approaches. Indeed, extremely large differences can be discerned in the (implicit) meaning that is given to concepts. There seems to be a lack of consensus on the following fundamental questions:

How are the meta-concepts of 'tranquility', 'human needs', and 'environment' related to each other?

• Which environmental, architectural, and urban features are relevant to tranquility, quality of life, and quality of place?

Essential differences among models were also found in:

• Scale-level (individual versus aggregate).

• Referral to objective attributes and subjective perceptions.

• Constant or variable (in place, time, person, and culture).

• Determinants or indicators (causality).

2.2.1 Judgments of tranquility

Tranquility involves two related judgments. First, is the setting a quiet and peaceful place? Second, is it a good place to stay away from the demands of everyday life? The first question asks whether a certain cluster of feelings (calmness, serenity, and peace) is evoked by a setting., Russell and colleagues (Russell & Snodgrass, 1987; Russell, Ward, & Pratt, 1981) showed that tranquility and its synonyms, as an affective descriptor, are relatively independent of an excitement cluster of descriptors and are positively related to a pleasantness cluster. Likewise, the studies by Herzog and colleagues (Herzog & Barnes, 1999; Herzog & Bosley, 1992) concluded that tranquility is positively related to, but distinct from, preference reactions. The second question asks for a cognitive judgment about whether the setting is a good place to get away from life demands. That aspect of tranquility was inspired by ART. ART (Kaplan & Kaplan, 1989; Kaplan, 1995, 2001) holds that directed attention, which requires an effort, can become fatigued from prolonged use, leading to the inability to focus on attention voluntarily. Directed attention fatigue (known colloquially as mental fatigue) has several unfortunate consequences including performance errors, inability to plan, social incivility, and irritability. Restoration of directed attention capacity requires a setting that is different from the ones that led to fatigue (being away), has sufficient scope and organization to occupy one's mind (extent), holds attention without requiring an effort (fascination), and supports one's inclinations or purposes (compatibility). All of these four properties are essential for a successful restorative experience. ART notes that ordinary natural settings have all the features necessary for a restorative experience. The restorative merits of natural settings, as compared with urban settings, have been verified in a plethora of studies involving self-report and behavioral measures (e.g., Berman, Jonides, & Kaplan, 2008; Berto, 2005; Canin, 1992; Cimprich, 1993, 1999; Felsten, 2009; Hartig, Evans, Jamner, Davis, & Garling, 2003; Hartig, Mang, & Evans, 1991; Kaplan, 2001; Kuo, 2001; Kuo & Sullivan, 2001; Taylor, Kuo, & Sullivan, 2001, 2002; Tennessen & Cimprich, 1995; Wells, 2000).

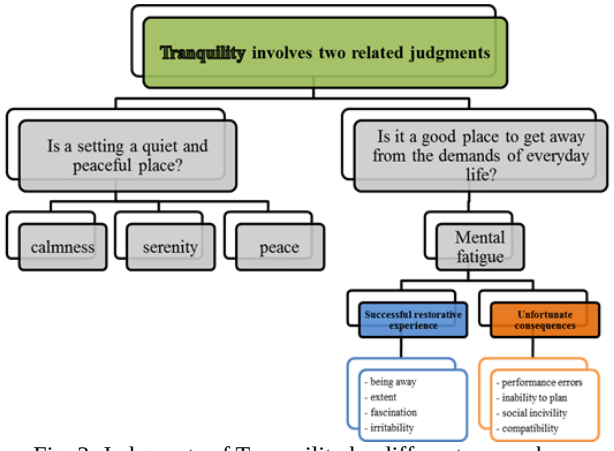

Fig. 2. Judgments of Tranquility by different researchers

2.2.2 Thematic categories associated with tranquility

The analyses of the qualitative data revealed a number of broad topics and themes associated with tranquility, as shown in Table 1 (sensu Braun & Clark, 2008). According to these views, as collated throughout the study, the themes are qualitatively or quantitatively informed and could be categorized. Views and their respective rankings were counted and totaled according to the topics. Then, the themes were calculated as percentages to help the interpretations of the models (Hewlett et al., 2017).

Table 1
Thematic categories associated with tranquility

Step 1. Topics	**Step 2. Thematic categories**	
Natural Human/ Mankind Natural and Human/ Mankind	Activity (participant or of others)	Sight
	Auditory	Smell
	Behavior (linked to mankind)	Space: Open/c ramped
	Coastal (seascape and resorts)	Spiritual
	Cognitive (inclusive of values, judgments, & memories)	State of Mind
	Time of day	Touch
	Mankind	Water (natural)
	Natural Environment (landscape and nature reserves)	Weather/climate
	Rural Environment (pastoral landscape)	Wild life
	Seasons	
(Hewlett et al., 2017)		

Results of this research are reported together with an interpretation of the models according to four distinct groups representing views of institutions and members of the public. Similar views are identified with tranquility amongst the groups that are commonly related to natural environments, whereas non-tranquility was primarily equated to seeing and hearing people and the products of human activity. Yet, distinctions are identified among the four groups that have important implications for those involved in determining local characteristics of tranquility (Hewlett et al., 2017).

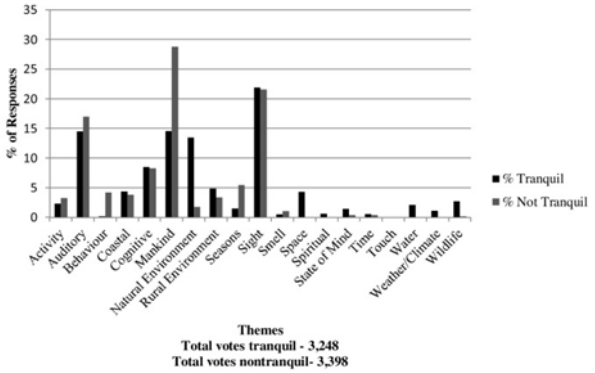

Fig.3. Tranquil and non-tranquil voting allocations − PACs: Institutions & residents. (Hewlett, et al., 2017)

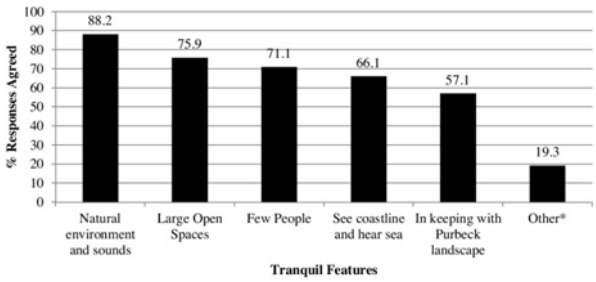

Fig. 4. Options provided to householders and their responses: Tranquil (Hewlett et al., 2017)

2.2.3 Categorization of tranquil environments

Surveys were carried out in two green open spaces in Hong Kong, namely Kowloon Park and Sha Tin Park, both of which are located within highly urbanized areas. Questions were designed to elucidate the importance of tranquility in the local culture and the factors that enhance or degrade the tranquility of a place. It was found that both low levels of man-made noise and abundance of natural features in the visual scene made a positive contribution to a tranquil environment. On the other hand, crowded conditions were as detrimental as amplified music. In terms of benefits, relaxation and stress reduction were among the most frequently mentioned factors. An analysis of individual differences revealed a statistically significant age effects on the importance that respondents attached to the provision of such spaces (Marafa et al., 2013).

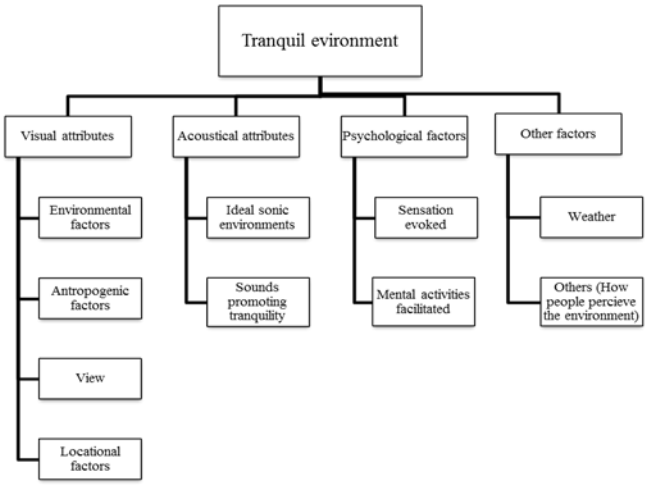

Fig. 5. Categorization of descriptions of tranquil environments (Marafa et al., 2013)

2.2.4 Three dimensional models of pleasure, arousal, and dominance

Human moods have been mostly measured by semantic differentiation. James Russel and Albert Mehrabian proposed an influential three-factor theory of emotions (Russel & Mehrabian, 1974, 1977; Mehrabian, 1976, 1980). They postulated that people react differently to the environment, which can be in the scales of pleasure/displeasure, arousal/non-arousal, and dominance/submissiveness. The arousal/non-arousal dimension is a combination of functionality (emotional and non-emotional) and consciousness (full consciousness vs. drowsiness). High arousal scores indicate improved functionality and consciousness. The dominance-submissiveness dimension shows two extremes, where one feels secure, free, and dominant on the one side and restrained, controlled, and insecure on the other side. The pleasure-displeasure dimension denotes the level of individual satisfaction. All these dimensions are independent from each other. More specifically, emotions may be modified in one dimension while remaining intact in the other. Different combinations of arousal, pleasure, and submissiveness lead to different emotional experiences. For instance, low pleasure and arousal with high dominance lead to fatigue, while low pleasure and dominance with high arousal result in anxiety. These dimensions can be used for explaining emotional variances (McAndrew, 1953). The original ideas of Mehrabian and Russell (1974) about pleasure, arousal, and dominance can be connected to the ABC psychology (Affect, Cognition, and Behavior) as well as the distinction between feeling, thinking, and acting, which have been used for ages and are still useful to describe environmental experiences. Both tripartite views take us back to the first models in environmental psychology that included the dominance dimension as well; however, now, there is a better understanding of all three dimensions. For this reason, it is better to replace the commonly used two-dimensional models with pleasure on the horizontal axe and arousal on the vertical axe (see

Figure 6) by means of a three-dimensional model with the dominance on the third axe (see Figure 7).

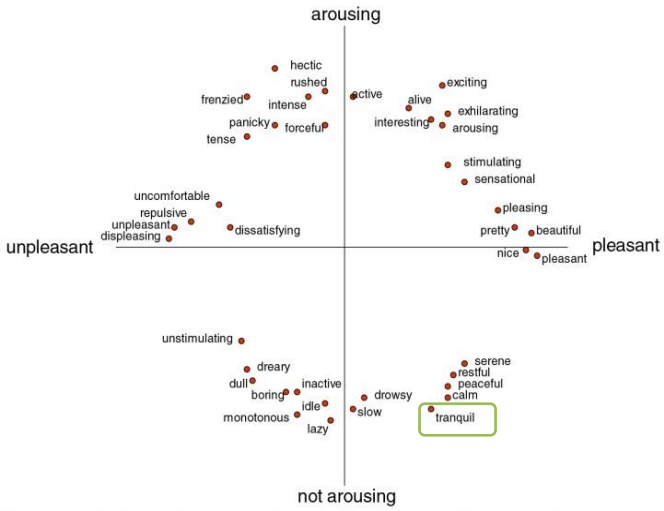

Fig. 6. Example of an environmental psychology model with two axes and adjectives for the level of pleasure (X-axis) and arousal (Y-axis) (Russell & Lanius, 1984)

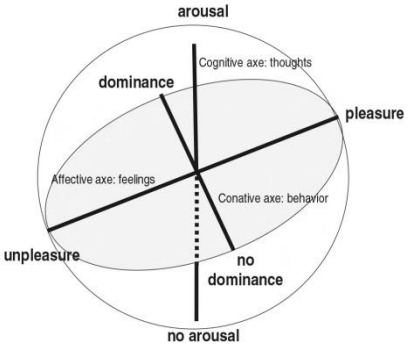

Fig. 7. Three-dimensional model of pleasure, arousal, and dominance as tripartite view of experience (Bakker & de Boon, 2012)

2.2.5 Abraham Maslow's hierarchy of needs

One of the most important humanists, Abraham Maslow (1908–1970), conceptualized personality in terms of a pyramid-shaped hierarchy of needs (Vazire, 2014) (see Figure 8). At the base of the pyramid lie the lowest-level motivations including hunger and thirst, safety, and belongingness. Maslow argued that only when people meet the lower-level needs are able to achieve the higher-level needs of self-esteem and eventually self-actualization, which is the motivation to develop one's innate potential fully.

Maslow studied how successful people including Albert Einstein, Abraham Lincoln, Martin Luther King Jr., Helen Keller, and Mahatma Gandhi had been able to lead such successful and productive lives. Maslow (1970) believed that self-actualized people are creative and spontaneous and love themselves and others. They tend to have a few deep friendships rather than many superficial ones and generally love privacy. He felt that these individuals do not need to conform to the opinions of others since they are very confident and thus free to express unpopular opinions. Self-actualized people are also likely to experience transcendent moments of tranquility or peak experiences accompanied by a strong sense of connection with others. One criticism of Maslow's hierarchy of needs is that individuals are not static. They are motivated by different needs at different times. For instance, sometimes, competing motives may exist at the same time. Additionally, growth in one area does not stop the growth in another (Haggerty, 1999). The stepwise progression of a pyramid also suggests a one-directional journey, which may not fully reflect the complexity of human motivation. Needs for recognition, for example, may take precedence over needs for personal safety. Maslow also focused on a small number of historically productive individuals that were subjectively identified as self-actualized (Smith, 1978) and thus drew overly optimistic conclusions about the capacity of people to achieve their full potential.

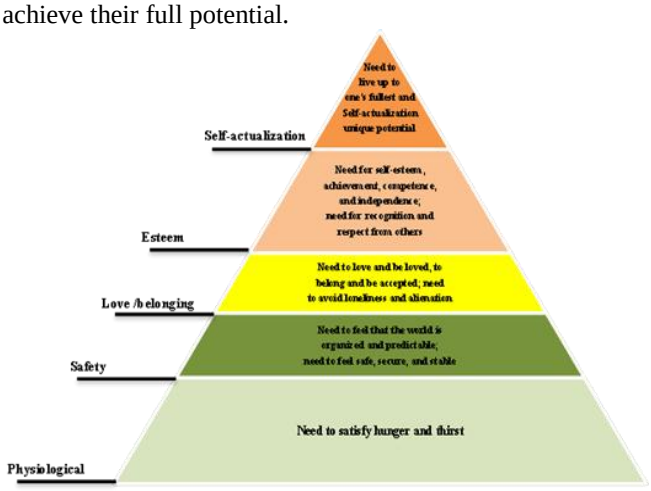

Fig. 8. Maslow's Hierarchy of Needs (Maslow, 1970): Abraham Maslow conceptualized personality in terms of a hierarchy of needs. The highest level of these motivations is self-actualization.

3. Results

The review of the literature shows that within the fields of environmental quality, quality of life, and tranquility, a broad variety of models and definitions is used, and the discussion about their applicability is an under-researched area. The concepts of tranquility, human needs, and environment overlap and refer to (aspects of) human-environment relationship.

3.1 Environment types

The word environment is a complex notion and is perceived differently by philosophers. John Lang (1987) postulates the concept as social (including individuals and institutes), behavioral (individual reactions to external stimuli), psychological (public perceptions), and physical (geographical places) phenomena. People and their surrounding environment usually influence each other so that there are types of mutual interaction between them. These interactions sometimes lead to emotional relationships, positive or negative, between people and places (Saadati, 2019); So, the term "human environment" not only refers to those characteristics that people have

constructed, modified, or perceived as components of human settlements but also to interpersonal relations and social organization that affect both physical and mental health and psychological well-being (Lawrence, 2002). Therefore, in the present study, a descriptive model of environmental tranquility is presented through using theoretical discussions of tranquility, which focuses on four types of environments based on Maslow's hierarchy of human Needs and concepts retrieved from interpretations of tranquility by different researchers (Table 2) including physical, social, psychological, and spiritual environments.

Environmental tranquility has a reciprocal relationship with all environment types (Figure 9).

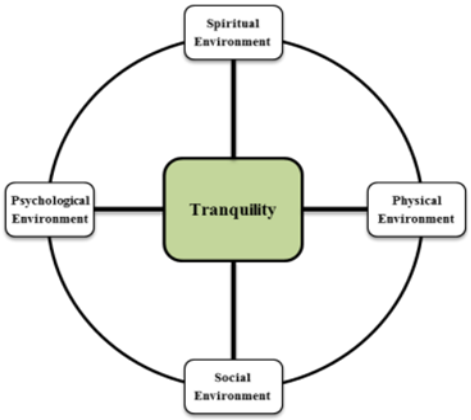

Fig. 9. Environmental tranquility has a reciprocal relationship with all environment types

3.1. Interpretations of tranquility

A review of international conventions and standards demonstrates that the concept of tranquility is open to different interpretations. In the field of **Environmental Psychology**, tranquil environments generate subjective interest and are restorative in comparison with subjectively fatiguing effect of sustained attention. Tranquility has been framed as a mental state emerging in a sensory context, i.e., a state of connection between sensory inputs and subjective experience (Kaplan & Kaplan, 1995, 2001; Berto, 2014; Herzog & Barnes, 1999; Ulrich et al., 1991; Hunter et al., 2010). Tranquility is positively related to, but distinct from, preference reactions (Herzog & Bosely, 1992). In the field of **Applied Acoustics**, tranquility is associated with the absence of overt human impact, urban development, roads, and traffic noise. Although tranquility is an essentially subjective experience, most of the variance in its rating can be explained by the quantification of visual and auditory features in the environment (Pheasant et al., 2008, 2011; Watts et al., 2011, 2013). In the field of **Social Science**, few studies have probed the links between religion and other important emotional states such as anxiety and tranquility, and the results of those investigations have been decidedly mixed (Ellison et al., 2009; Koenig et al., 2001; Shreve-Neiger & Edelstein, 2004; Bradley & Don, 1995). In the field of **Landscape and Urban Planning**, tranquility is related to either naturalness and remoteness or the emotional reactions of pleasantness, calmness, and control. In fact, tranquility is more closely related to emotional scales of pleasantness and calmness than wildness (Watts & Pheasant, 2014; Hewlett et al., 2017 ;Watts & Marafa, 2017) Table 2 summarizes the interpretations of tranquility provided by different researchers.

3.5. Environmental, architectural, and urban features

Numerous experts and researchers, either directly or indirectly, have noted the effects of architectural, environmental, and urban features on tranquility. However, the present study has mainly categorized those features in terms of the type of environment and human needs as well as the concepts extracted from corpus analyses related to tranquility.

In the field of **Phenomenology and Philosophy**, the existential purpose of building (architecture) is therefore to make a site become a place, that is, to uncover the meanings potentially present in the given environment. The sense of the place is a collection of anecdotes and individual or collective narratives that take place in association with the place; they play a role in developing social attachments to the place. This sense leads to the link between the individual and the place in which human being considers himself or herself as a part of the place and considers himself or herself a role in the place based on his or her experiences which are based on the signs, meanings, functions and character and the place will become respectable for them (Nazer Safavi & Khastou, 2017). Genius Loci is a Roman concept. According to ancient Roman beliefs, every 'independent' being has its genius and guardian spirit. This spirit gives life to people and places, accompanies them from birth to death, and determines their character or essence (Norberg-Schulz, 1980). Generally, humn prefers the places with genius loci (sense of place), coordination, harmony, and beauty (aesthetic) where they feel spiritually tranquil (Norberg-Schulz, 1980 ;Moughtin, 1999 ;Jackle, 1987; Bell, 2004; Cohn, 1981; Simmins, 2008; Baker, 2014; Scruton, 1979; Herzog et al., 2011)

According to the field of **Social and Environmental psychology**, by means of being in the nature, using natural environments, creating harmony and spatial order, and having a place for privacy and attachment, humans can feel psychologically tranquil (Park, Lee, 2016 ;Altman, 1975; Ching, 2007; Pallasmaa, 2005 ;Altman & Low, 1992; Giuliani, 2003).

According to the field of **Social and Legal Science**, many factors lead to sociological tranquility. Those factors mainly include conformance to common norms and neighborly relations with respect to others' rights, safe living places, spatial and personal territory, visual privacy in terms of the lack of visual proximity, hearing privacy in terms of the lack of audio pollution, and behavioral privacy in terms of the lack of manner disturbances (Chung & Rimal, 2016; Miller & Prentice, 2016; Westin, 1967; Boostrom, 1998; Altman, 1975; Lang, 1987).

According to the field of **Engineering and Technology**, quality of design and execution with regard to controlling and following engineering rules that is proportionate to current environment and technology paves the way for the essential facilities and flexibility in terms of change, harmony, and variety. This consequently results in comfort and ultimately physical tranquility in humans (Gallie, 1956; Janek, 1991; Kronenburg, 2007; Schneider & Till, 2005; Mulligan & Carruthers, 2011; Kasmaii, 2008; Givoni, 1969; Rappaport, 2008). Table3 summarizes the environmental, architectural, and urban features provided by different researchers.

Table 2
Interpretations of tranquility by different researchers

Fields		Author(s)	Concepts
Spiritual / Psychological Environment	Environmental psychology	Kaplan & Kaplan R.,1995, 2001; Berto, 2014; Herzog & Barnes, 1999; Herzog et al, 2011; Ulrich et al., 1991; Hunter et al. , 2010 ; Harvey, 1990 Lefebvre, 1991; Gusnard et al., 2001; Russell & Snodgrass, 1987; Ahmadi, 1374	• Self-reflection • Mental Health • Subjective interest • Sensory context • Psychological state • Recovery • Reduce anxiety • Away from life's demands • Restorative • Recreational • Reflection • Refreshing • Self-confidence • Pleasant • Preference • Peace • Reassured Soul
	Social science	Ellison et al., 2009; Koenig et al., 2001; Shreve-Neiger & Edelstein, 2004; Bradley& Don, 1995	• Stress reduction • Social factors • Belief in an afterlife • Religious • Economic benefits
Physical / Social Environment	Applied acoustics	Watts et al., 2011; Pheasant . et al., 2008; Watts et al., 2008 ;Watts, 2017; Pheasant, Horoshen,kov, & Watts, 2010; Watts et al, 2015; Mackrill, Cain., Jennings, 2013; Watts & Pheasant, 2013	• Peace • Quiet • Undisturbed by noise • Serenity • Silence • low levels of man-made noise • Independent of an excitement • Without noise intrusion • Undisturbed place
	Landscape / Urban planning	Hewlett et al., 2017; Watts & Pheasant, 2014; Watts, Miah, Pheasant, 2013; Marafa et al., 2013	• Contextual features • Geological features • Biological factors • Cultural features • Personal safety factors • Natural environments

It should be noted that main parts of our final model are a combination of the concepts presented in Figures 8 and 9 and Tables 2 and 3 and how they are associated with each other. Altogether, those analyses and explorations ultimately led to the final model suggested in the present study.

4. Discussion

This study aimed to enhance the approach of previous tranquility studies by developing methods for evaluating environmental tranquility.

The results of the correlation analysis identified that tranquility is not only related to naturalness and remoteness but also to the emotional reactions of pleasantness, calmness, and control (Watts & Pheasant, 2015). In Figure 10, the relationships among the three dimensions used by Mehrabian and Russell (1974) and the three factors suggested by Watts and Pheasant (2015) are depicted. Figure 11 illustrates the position of tranquility on the three-dimensional model of pleasure, arousal, and dominance.

Table 3
Environmental, Architectural, & Urban Features

Fields		Author(s)	Features
Spiritual / Psychological Environment	Phenomenology / Philosophy	Norberg-Schulz,1980; Moughtin, 1999; Jackle, 1987; Bell, 2004; Cohn, 1981; Simmins, 2008; Baker, 2014; Scruton, 1979; Herzog et al., 2011;	• Genius Loci (Sense of place) • Unity in Architecture • Sacred Place • Coordination • Harmony • Beauty (Aesthetic) • Preference
	Social / Environmental psychology	Park, Lee, 2016; Altman, 1975 ; Ching, 2007; Pallasmaa, 2005; Altman & Low, 1992; Giuliani, 2003	• Communication with nature • Proportion • Order • Rich Sensory • Personal Space • Place Attachment
Physical / Social Environment	Social / Legal science	Chung & Rimal,2016; Miller & Prentice, 2016; Westin, 1967; Boostrom,1998; Altman, 1975; Lang, 1987	• Common norms • Respect the rights of others • Neighborly relations • Safe spaces • Privacy(Spatial, Visual, Auditory, Behavioral) • Territory
	Engineering /Technology	Gallie,1956; Janek, 1991; Kronenburg, 2007; Schneider, Till, 2005 ;Mulligan, Carruthers, 2011; Kasmaii, 2008; Givoni, 1969; Rappaport, 2008	• Design quality • Quality of execution • Flexibility • Compatible with the climate • Facilities and amenities

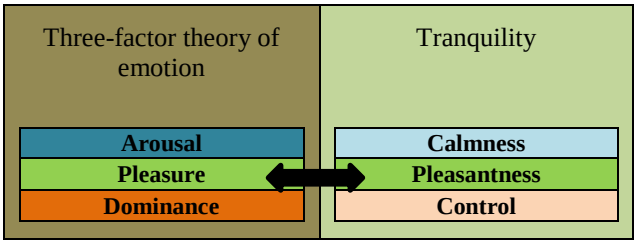

Fig. 10. Relationships among the three dimensions used by Mehrabian & Russell (1974) and the three factors suggested by Watts & Pheasant (2015)

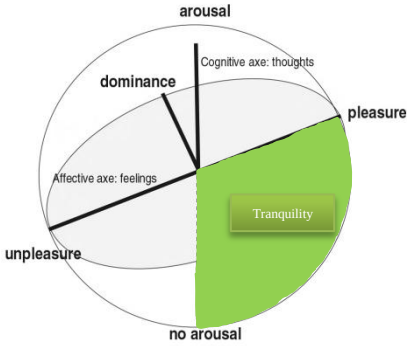

Fig. 11. Position of tranquility on the three-dimensional model of pleasure, arousal, and dominance

In terms of the relationship in the three-factor emotion theory of tranquility, it seems that pleasure is a subjective and mental phenomenon and depends on the person's expectations of the environment and its level of fulfillment. In simpler terms, in the spiritual and psychological environment, arousal as a person's reaction to environment, and in the physical environment, dominance as the relationship of a person with environment, influence all physical, social, psychological, and spiritual environments.

In Maslow's (1970) model, the fulfillment of human needs ranges from bottom to top, while in our tranquility model (Figure 12), all human needs are considered to be of equal importance. Yet, in the latter, the need to the reassured soul tends to be more permanent and effective in creating human tranquility. Moreover, in Maslow's framework, love/belonging lies within the third category of human needs. However, in our suggested model of tranquility, self- love and loving the world together with self-actualization ranks first in terms of helping humans to achieve tranquility.

5. Conclusion

In the present study, we aimed to develop and present a descriptive model of environmental tranquility based on a thorough review of the previous literature. So far, no specific model has been suggested in the realm of tranquility that has received insufficient attention in the literature. Therefore, our model provides a conceptual

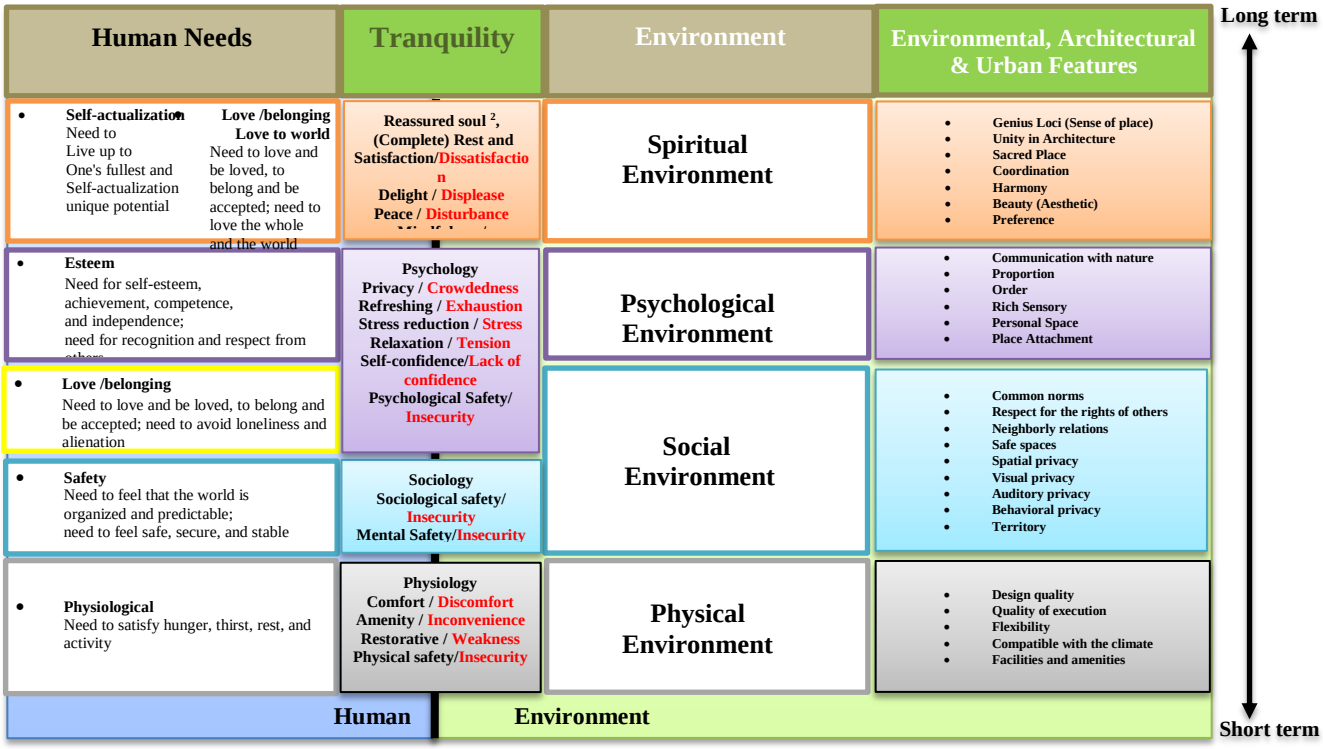

Fig. 12. Model of environmental tranquility

definition for tranquility based on all the dimensions, aspects, and areas related to environment, humans, and architectural-urban features, which is the major contribution of the present study. Within this model, there are two major categories, namely human needs and environment, which play important roles in evaluating tranquility. In simpler terms, tranquility is a complicated concept consisting of the relationship between human needs and environmental features. In this framework, spiritual, psychological, social, and physical environment types have all reciprocal relationships with tranquility ranging from longer to shorter period and vice versa. The last three factors have almost short-terms effects on tranquility, while the first category, spiritual environment, offers longer and more permanent effects. The other major category in the model tends to be human needs comprising of self-actualization, love/belonging, esteem, safety, and physiology. Love and belonging to the self and world ranks first among these needs corresponding to Reassured Soul[2] discussed in Holy Quran. It is believed that when humans reach the reassured soul, they leave their pains behind and feel more satisfied and assured. In such a case, the individual reacts against pain and happiness in a united way and attains satisfaction in the world. Theoretically and practically, he/she adores what God loves and chooses. In more specific terms, at this level, the individual prefers God's favors from among separation-unity and pain-cure dichotomies (whatever comes from a friend (God) is good). Thus, God is the only one who fosters him/her and shows them where to go, and what to choose. This stage is the summit of satisfaction, certainty, and tranquility in life (Ahmadi, 1995). Accordingly, this model suggests that tranquility highly depends on human needs and environment types and includes social, physical, psychological, and most importantly spiritual features in tandem. It should be noted that some environmental features also include contradictory concepts such as dissatisfaction, displease, and disturbance in the case of reassured soul, crowdedness, exhaustion, stress, lack of confidence, tension, and psychological insecurity in psychological environment, and finally discomfort, inconvenience, weakness, and physical insecurity in physical environment.

As Figure 12 (see Appendix) clearly depicts, tranquility, in the first place, is associated with physiological features such as comfort, amenity, restoration, and physical safety, all of which correspond to and satisfy the physiological needs including thirst, hunger, rest, and activity. Secondly, sociological and mental safety is related to humans' need to security, and releases from anxiety about threats of various kinds. Thirdly, within the model, tranquility depends on psychological aspects, namely privacy, refreshing, stress reduction, relaxation, self-confidence, and safety, and their roles in satisfying esteem (self-mastery and self-growth) and love/belonging to parents, friends, and other social groups. Finally, as the peak point of tranquility, the reassured soul including peace, satisfaction, and delight depicts the need for self-actualization through creative self-expression in personal and social achievements.

[2] The highest level of tranquility is referred to as the *Reassured Soul in* Holy Quran in Surah Fajr, Ayah 27

The last part of the model encompasses environmental, architectural, and urban features, which affect tranquility in different ways. In fact, these factors correspond to various environment types. The spiritual environment includes the features of unity in architecture, sacred place, genius loci (Sense of place)**,** coordination, harmony, beauty (Aesthetic) and preference of spiritual sites. Communication with nature, proportion, order, rich sensory, personal space, and place attachment are considered as the main features of the psychological environment. In the vein of sociological environment, common norms, respect for rights of others, neighborly relations, safe places, spatial, visual, auditory, behavioral privacy, and territory appear to be the most determining factors in tranquility. Lastly, the physical environment influences tranquility by means of design and execution quality, flexibility, compatibility with the climate, and facilities and amenities.

It is believed that all human needs should be satisfied and they separately pave the way to tranquility. There is an interdependence among the environment types in affecting tranquility, and all are believed to be effective. However, the most important type of tranquility tends to be the reassured soul and genius loci having more permanent and long-term effects.

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