

Article

Emerging Biophilic Urbanism: The Value of the Human–Nature Relationship in the Urban Space

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Abstract: The research presented in this article adopts an urban sociology perspective to explore the relationship between spaces designed with biophilic principles and people’s pro-environmental values and behaviors. The research hypothesized that biophilic design and planning promote connectedness with nature and are positively related to pro-environmental and more sustainable values and behaviors. The contemporary city asserts the need for new paradigms and conceptual frameworks for reconfiguring the relationship between the urban environment and the natural environment. In order to understand whether biophilic design, planning, and policies can meet the global challenges regarding the future existence on earth of humans, focus groups were conducted to investigate how people’s relationship with the built-up space and the natural landscape is perceived, and to what extent the inclusion of nature and its patterns at various levels of urban planning meets people’s expectations. The results suggest that biophilic design and planning can be considered a useful paradigm to deal with the challenges that are posed by the city of the future, also in terms of sustainability, by reinterpreting and enhancing the human–nature relation in the urban context.

Keywords: biophilic city; urbanism; human–nature relation; design; planning

1. Introduction

Since the 1990s, there has been growing awareness of the world as a single, integrated—yet fragile—system, and of the fact that most of the planet’s inhabitants live in cities. Demographic forecasts show that this trend is intensifying and estimate that by 2050, 70% of the global population will live in megacities and in regions of intense urbanization. At the same time, population growth and the consumption of natural resources are having an enormous impact on the environment. At this rate of growth, it is difficult to imagine that we can maintain the consumption and production levels of cities, without reformulating them to align with sustainable levels. Thus, it is in cities that the theme of sustainability plays out empirically and conceptually. As Parag Khanna states “the 21st century will not be dominated by America or China, Brazil or India, but by the city. In an age that appears increasingly unmanageable, cities rather than states are becoming the islands of governance on which the future world order will be built” [1] (p.122).

The interest in the issues of sustainability started in the early 1970s, when people also started to undermine the notion, typical of 19th-century political and economic philosophies, that science and technology could continue with a never-ending, linear development. These challenges became even more forceful in the 1990s, first with the Brundtland Report and subsequently with the philosophical rethinking of the relation between the human being and the environment. In other words, there was a reflection on whether humans were entitled to modify the environment around them, to manipulate it and exploit it, and, if so, with what limitations, or whether the environment is endowed with a moral relevance that gives it a value to be respected, such that human freedom is limited in dealing with it [2–4]. These positions have become the point of origin of new movements and contemporary

urban policies, thereby determining the transfer to the city of the concept of sustainability, which until then had been extraneous to urban culture. The fact is that cities have always consumed more resources than they have produced, in part thanks to the opportunities afforded by transport systems which, from the 19th century, enabled provisioning levels which until then had been unthinkable. Consequently, although we currently live in what Crutzen has defined the “Anthropocene era”, characterized by the dominance of humans over the ecosystem [5], sustainability has become one of the main themes of cities, emerging as the space in which our equilibrium with nature must be redefined and rebuilt.

It is clear that the limitations of what has become one of the main themes for the city is contemporary society’s resistance to changing lifestyles, production levels, and consumption to save the planet. In fact, it is the ecological and economic aspects of sustainability that have been emphasized the most, for example, through schemes to encourage energy-saving, whereas its shared social and cultural value—understood not only as a fair distribution of resources, but also as inclusion, accessibility, and quality of urban life—has been largely disregarded. The resulting debate swiftly turned from the rigor of science to political and everyday discourse. In this context, the social dimension of sustainability has often been neglected and is still today an under-represented aspect of city planning (one can think, for example, of the numerous cases of urban revitalization of neighborhoods or buildings that do not take into account the effects in terms of worsened quality of life for residents). In part, this is probably because the relationship between sustainability and urbanism involves the concepts “urban” and “ecological”, which, historically, have developed in opposition to each other, both theoretically and empirically, each invading the space of the other. The notion of coexistence is somewhat problematic and presupposes the natural environment to be a model, metaphor, and medium for a new way of designing cities.

At the same time, the specific interest that existing research from multiple disciplines shows for the analysis of the connections that individuals have with their urban environment at multiple scales is a feature of the contemporary world and has several intersections with the spatial turn that was instigated mainly by the thought of Soja, Cosgrove, and Jameson [6–8]. This phenomenon that characterizes contemporary cities cannot be regarded as an unequivocal phenomenon, since it manifests itself in forms and dimensions that are very diverse. Today, we are witnessing a divide between a more general focus on the green issues that have traditionally afflicted cities at a macroscopic level—e.g., the antithesis, in theoretical and design terms, between the compact city and the urban sprawl—and the contemporary focus on meso-spaces such as districts, or micro-spaces such as public and private parks, city allotments, green roofs, and “third landscapes”, that is to say the urban voids described by Clément in which grass, bushes, and flowers appear [9]. When we analyze the various levels, we see a widespread proliferation of the types of urban green space available that is not merely due to the fact that it has become essential to provide nature in cities, as previously occurred with culture and standards of comfort (in this respect, nature can be seen as a fashion, enhanced by powerful marketing campaigns aimed at the green way of life of the new millennium). In fact, the wider range and availability of green spaces are also due—and this is of considerable interest—to the drives for participation that traverse cities and have great political, sociological and community impact (e.g., metropolitan community centers and shared spaces that are not regulated and are enjoyed collectively). However, in this regard, we must stress that although contemporary metropolises are characterized by a type of urban planning and design that are geared towards including “nature” in the urban fabric (e.g., through vertical gardens, *jardin à partager*, or “agritectural” interventions—that is to say through forms of hybridization between agriculture and architecture like High Line in New York or urban agriculture on the rooftops of buildings in London or Paris—or urban farms, etc.), the use of these spaces is not accessible to everybody (one need only think, for example, about the semi-public green urban spaces that produce forms of social exclusion). However, these are interventions that aim at modifying urban living and the sense of community. After all, de Certeau already described daily practices as practices of “doing with”, i.e., the ways in which individuals carry out the experience of places in an adaptive way, but also as a dimension of being and living [10]. Thus, there are levels of attention and awareness regarding urban green spaces

that are very diverse but undeniably decisive for the development of all future metropolitan frameworks, especially in the possibility of thinking about space in a way that promotes social and cultural values at the heart of the human–nature relation and of urban living. This is the objective of biophilic design that reintegrates the natural dimension and transforms the imaginary of nature, promoting it, also with a view to rebuilding the social reality that is part of the individuals' daily life, by defining new practices of living.

It goes without saying that in this debate the relationship between humans and nature and the characteristics of the new urban form play a key role. Alongside these, the emergence of biophilic urbanism could be a non-rhetorical answer to the question of sustainability for three reasons. First, because it is based on integrating the natural world not only into the urban fabric (through, for example, the use of public green spaces), but also into the built environment—that is, the external shell of buildings and their internal space—through, say, the use of natural forms and materials. Second, because it places the relationship between humans and nature at the center of the approach to reconstruction, including as it applies to values and culture. Lastly, because it does not only consider nature as the physical plant world, but also as an organizational model made up of patterns and processes that can be transferred to the built environment and can improve the quality of urban life for individuals.

This article is situated in the research field that sees urban sociology engage with the relation that binds people, the built environment, and the lived space both on the macro scale of the city, and on the micro level of buildings and artifacts [11]. Through the distinction of space into three categories—perceived, understood, and lived—Lefebvre tried to demonstrate that space is never produced like “kilograms of sugar, sacks of coffee beans and meters of fabrics” [11] (p. 403), but it is always a representation, and as such it is the result of a correlation. If perceived space corresponds to a concrete practice and to appearance, the understood space is a representation—for example, those that the planners have—and the lived space is made up of the “spaces of representation” that are experienced by individuals through symbols and images. As a result, space is a social product that is constantly shaped through the daily experiences of individuals, spatial practices, and perceptions. According to Merleau-Ponty, space is the result of values, habitus (that is, the mental structure or the patterns through which people perceive, understand, and evaluate the world that surrounds them), tastes, practices, and expectations that pertain to the everyday lived experiences of individuals [12].

On the basis of these premises, biophilic design or planning can contribute, on the one hand, to positively define the relation that binds the understood space and the lived space, responding to the needs and desires of residents and, on the other, on the urban scale, to define and enrich with meanings, including spontaneous ones, the emerging biophilic urbanism, the modes of reappropriation of the city by their inhabitants. In other words, intervening in the urban socio-spatial structure can encourage different behaviors and a new urban way of life.

In this perspective, through the results of the focus groups that were carried out within the project *Exploring the benefits of biophilic design in urban settings*, the research presented in this article explores the relationship between spaces designed with biophilic principles and people's pro-environmental values and behaviors.

Space is conceived as the interface between the physical characteristics of the environment, its typical activities and behaviors, and the representations and evaluations of these activities and behaviors. Thus, the unit of analysis is conceptualized as the interface between the biophilic setting and the people that interact with it. The central question of the research is to explore the effects of biophilic setting on environmental values and behaviors. The research hypothesized that design that is inspired by biophilic principles promotes connectedness with nature and is positively related to pro-environmental and more sustainable values and behaviors.

As a starting point, we ought to summarize the key concepts (such as biophilia, biophilic design, and human–nature relation) that form the background to this article.

2. Theoretical Section

2.1. Biophilia Hypothesis

The term biophilia was first used in the field of psychology by Erich Fromm in the 1960s to describe the tendency of individuals to be attracted to all that is alive and vital. In 1984, the biologist Edward O. Wilson defined biophilia as “the innately emotional affiliation of human beings to other living organisms. Innate means hereditary and hence part of ultimate human nature” [13]. Thus, according to this definition, biophilia is both an evolutionarily adaptive characteristic (namely the ability to adapt to the conditions of the surrounding environment, an ability that has been handed down through a system of conventions consisting of symbols that are shared by the entire human race), and also an emotion that links individuals to the systems and processes of nature.

Applying this theory to the urban dimension means stating that the relationship between individuals and the surrounding environment is replaced by the capacity of spaces to facilitate a relationship with nature through interventions to foster direct contact (e.g., green spaces, plants, parks, hanging gardens, etc.) or indirect contact with nature (e.g., natural materials and essences), and by the use of patterns and processes of nature in the forms and functions of the built space. Thus, an initial definition of the biophilic city might be “a city that puts nature first in its design, planning and management, and, thus, recognizes the human need of daily contact with nature, as well as the environmental and economic values that nature provides” [14] (p.3). According to Kellert, there are two main dimensions of biophilic design. The first, defined as organic, refers directly, indirectly, or symbolically to nature. The second dimension is place-based and defines the relationship between the built environment or the landscape and the culture of a given region. The two dimensions are related to six biophilic design elements (environmental features, natural shape and forms, natural patterns and processes, light and space, place-based relationships, evolved human–nature relationships) which in turn are found in more than seventy biophilic design attributes [15,16]. These categories are by no means exhaustive or fully defined, but they have the merit of organizing for the first time an innovative approach with the aim of enhancing the concept of sustainability and defining the characteristics of the nascent field of biophilic urbanism (one may think of *14 Patterns of Biophilic Design* by Browning et al.) [17].

Beginning with this assumption, the study of the evolution of the biological, social, and psychological relationship humans have with nature has become a source of inspiration for numerous evidence-based projects that use the results of studies on the human–nature relationship to design artificial spaces that are in balance with the two main natural aspects that guide an individual’s perception of a space: coherence—that is, readability—and complexity—that is, mystery and discovery. Despite the growing number of studies that have appeared in recent years concerning biophilia, the relationship between individuals and space, and the ability of space to guide human perception and behavior, some doubts can be raised about the methodologies employed to obtain results—in some cases due to the complexity of this area of research—and occasionally also due to the lack of clarity. In particular, the various interpretations of the biophilia hypothesis are occasionally inconsistent or rather shaky [18], even though several studies confirm the effectiveness of evidence-based design in positively shaping the relation between individuals and the space that surrounds them and identify positive effects in psycho-physical, economic, and environmental terms [19,20]. It is, therefore, possible to identify a gap between the vagueness or the excessive breadth of the definitions of the biophilic construct, which will be analyzed in more detail in Section 2.3, and the scientific evidence of how it works in the different settings in which the influence of space on individuals has been explored and analyzed. In this respect, of the many that could be mentioned, we can refer to the studies by Salazaros on the possibility to predict the positive healing effects that space can produce on its users and, more generally, on the possibility to predict people’s response to a new building or to the built environment. These studies, resulting in the proposal for a biophilic healing index of the urban environment, represent applications of great interest for urban planning and for the ability of urban governments to connect planning with the quality of life of individuals according to a unified development [21]. As early as 1977, Alexander had indicated not so much the

plan, but the process as the methodology to restore the city's unified dimension, in order to be able to guarantee that any design action was related to the previous one. According to Alexander, the tool to reach this unified approach was a new type of language, in which the patterns he described (he identified a total of 250 divided into three groups: towns, buildings, and constructions) represent the words. The totality of these patterns makes up a language, an expression of recurring problems that are accompanied by the hypothesis of the transformation of the physical environment that are useful to resolve the problems and to allow for an urban design of higher quality by virtue of being characterized by a unitary origin and by a balance between its parts and the whole [22] (pp.89–90). Alexander's studies first and then those by Salinger aim at identifying the tools with which an adaptive and evolutionary design can be generated that can be verified in its effects on individuals through scientific evidence that could translate into the urban context the concept of "organized complexity" that was expressed by Jacobs in *The Death and Life of Great American Cities* [23].

After all, the relation that binds individuals to the space that surrounds them and, in particular, to the natural environment, is a very complex research field that involves several different dimensions (biological, social, economic, psychological, spatial, etc.) that in some cases overlap. The complexity of the concept refers both to its definition and to the relevant theoretical framework, and to the possibility to understand and measure the different ways in which individuals are connected to the natural environment. At the same time, the attention for the relation between people and place within green spaces is the focus of several studies that have shown both the ability of nature to promote social cohesion and a sense of community, and an improvement of individual well-being through urban practices like gardening that contribute to defining the relation between humans and the natural environment as a mesological and perceptive relation, in the sense given by Berque [24,25]. In other words, a growing number of studies have explored the potential connection between the human–nature relation and people's health, understood not only as the absence of illness, but also with reference to the quality of urban life, emotional well-being, and social inclusion.

2.2. Biophilic Design and the Role of the Social Sciences

The discussion on the human–nature relationship within the city and the possible role of biophilic hypotheses directly involves the social sciences with respect to two streams of analysis. On one hand, it evokes the long-running, controversial issue of architectural determinism that has characterized the relationship between sociology and urban planning since the 1960s. Here, the debate concerns the capacity of the built space to determine human behavior and, consequently, the designer's ability to control society. On the other hand, it contributes to defining nature's role in sustainable cities. Here, nature is not merely the green spaces within the urban fabric, but is also an attribute of the built space, an organizational framework or principle of the design on several levels and, above all, it is the nature-oriented literacy of its residents, based on an awareness of the world as a system of interrelationships and integrated spatial and temporal processes [26].

In general terms, it is within this two-fold perspective that biophilic theories must be considered when they are applied to the urban dimension, in order to determine whether they can act as a design variable that could mediate a positive relationship between humans and the surrounding environment, including the built environment; whether they improve the population's quality of urban life; and if they represent a completion of the concept of sustainability.

In the tradition of the great urban novel, from the second half of the 19th century to the first quarter of the 20th, green space was always described as a privilege, a luxury reserved for the elite. Just think of the dystopia described by Fritz Lang in *Metropolis*, where we see the forceful demands of workers who live in the belly of the Lower City so that the ruling class can live a life of leisure in the pleasure gardens of the Upper City. This connection between privilege and nature has changed little since the making of Lang's oeuvre. One example of this is the sustainable village of Poundbury in Dorset. The brainchild of the Prince of Wales, it was designed by Krier, one of the most influential theoreticians of New Urbanism. Another is Crespi d'Adda, the industrial village established amid a green landscape at the end of the nineteenth century by Cristoforo Benigno Crespi, a textile manufacturer from Busto Arsizio, and located along the middle course of the River Adda, near the

confluence with the River Brembo [27]. Reminiscent of garden cities in the English-speaking world, the village was, on the one hand, evidence of a certain philanthropic spirit on the part of the entrepreneur towards his workers, but on the other, it ensured his workforce was close to their place of employment and was designed in such a way as to direct the behavior and ambitions of workers towards optimal production yields at the plant.

In terms of the built environment, biophilic design is by no means a recent practice. Since ancient times, architectural designs have been inspired, at least in part, by forms from the animal and plant world and have sought solutions to bring nature and its patterns into the built world. Examples include everything from Japanese architecture, which uses fascinating forms and natural materials, to the organic architecture of Frank Lloyd Wright with his Fallingwater house and utopian Broadacre City, where it was intended that every resident would be provided with an acre of land so they would be self-sufficient [28]. We can also think of Burnham's City Beautiful Movement established in 1893 with the Chicago Columbian Exposition to promote the superiority of European archetypes and beauty as a driving force behind moral and civic virtues in urban populations and, more generally, as a promise of quality of urban life. Then, there is the harmony and joy of Fourier's phalanstères; the utopia of Howard's Garden City which was to have a vast green belt to connect urban life with rural life; and Le Corbusier, who offered the opposite vision with his vertical city of tall buildings surrounded by wide open spaces [29–31]. More recently, we find the studies of Cooper Marcus on the sometimes therapeutic role of urban green spaces [32] and the architecture of Ambasz which glorifies the dynamic consonance with nature and the steps involved in the architect's inventive process, which includes striving to reconcile the needs and desires of individuals with social demands and the limitations imposed by empiricism [33]. Ideas and projects that have fuelled the debate on what form the city should take in the future and which, while a few cases have not come to fruition, have corroborated the urgent need for a reorganization of the urban form. The biophilic city is the product of this tradition, although it presents a more inclusive and symbiotic relationship between the natural world and the urban world. It also stands as an alternative model, albeit rooted in a long tradition, of a society where people spend most of their working and everyday lives and their leisure time inside buildings or in built environments that ignore the importance of contact, whether direct or indirect, with nature.

In scientific terms, the idea that the design of the built environment can define the nature of social interactions and affects individual experience is already seen clearly in the research of Whyte, Jacobs, Newman, and Gehl [34–37]. Nevertheless, the issue has long been confined to mainly theoretical and philosophical studies, such as those by Bachelard or Casey, and Lefebvre on the architecture of enjoyment, which is seen as an alternative conceptual framework that shifted focus from urban thinking to a philosophy of dwelling [38–40]. Therefore, although the spatial dimension plays a central role in the study of the contemporary city, the empirical application of these theoretical paradigms is still not at the forefront of urban studies and international scholarship. How we should observe the relationship that is generated between the physical space and individuals, and how we should measure the effects on human behavior remain two areas of urban sociology that are as yet underexplored. The exception to this are Lynch's studies which, on one hand, analyze empirically the way inhabitants give meaning to and find expression in the city and, on the other, highlight the need for further investigation into the urban experience of individuals and how the built environment changes and defines that experience [41].

In fact, it was only with Wilson's studies in the 1980s and later with Ulrich's studies on the "soothing" green, and subsequently with Kellert's studies, that attention was placed on biophilic theories, that is, the study of the natural inclination of humans to engage with the systems and processes of nature [13,42,43]. At the same time, the last twenty years have seen an increasing awareness of the natural landscape and the urban landscape and its buildings as a crucial means of meeting the needs and the demand of individuals in cities and promoting urban quality of life [44].

In this regard, the model proposed by Kaplan and Kaplan on environmental preferences is based on the assumption that the needs of a person who interacts with a new environment are the understanding of the place and the possibility to explore it [45]. In an easy-to-understand place, it

will be easy for individuals to predict and maintain a solid ability to orient themselves and infer features of the place. In contrast, a place that is difficult to categorize will give rise to a series of negative sensations like frustration, stress, inadequacy, and rejection. The theory by Kaplan and Kaplan, founded on Berlyne's evolutionary theories, still represents the main theory of environmental preference today [46,47].

After all, the influence of the place or of the urban context has been defined by numerous studies as one of the key factors determining individuals' quality of life [48]. At the same time, however, one must also consider the various meanings that every person attaches to the physical and social characteristics of space [49]. As a result, both indoor and outdoor urban places can be investigated through a double construct, i.e., physical (the designed space) and social (the meanings, interpretations, perceptions) within a conceptual and empirical dialogue between the social sciences and design disciplines, in order to offer a contribution that can enhance the quality of design for the built environment and of green spaces. As Corburn argues, "a sense of place might invoke feelings of inclusion and connections with others while a lack of place might induce loneliness and depression. The qualities and meanings of place can also influence our performance, behaviours, and opportunity structures" [50] (p.94).

2.3. *Biophilia: Critical Aspects of the Approach*

The biophilia hypothesis is based on Wilson's original definition, which, however, presents several problematic issues. Wilson described biophilia as "the innate tendency to focus on life and life-like processes" [13] (p.14), a definition that is semantically ambiguous and lacks detailed conceptual analysis. His reference to belonging to the biological life and to that which is similar to the biological (life-like) with no explanation of the reasons is perhaps the most problematic aspect of Wilson's definition because it lends itself to areas of overlap of meaning and does not analyze the concepts in detail. Entering the debate and attempting to clear up the matter, albeit with dubious results, Milton says that "life-like" means everything that goes beyond the biological definition of life and includes everything that could be perceived as being alive or realistic [51]. In addition, the transition from the cognitive in Wilson (focus on life and life-like processes) to the conative in contemporary studies (affective affiliation with life) broadens the scope, perhaps even boundlessly, of biophilic theories and, at the same time, places them in a narrow framework linked primarily to evolutionary psychology [18]. These aspects highlight how the definition of biophilia itself allows for different interpretations.

Furthermore, although studies on biophilia and its application at different levels of urban planning have been praised enthusiastically, they have often involved research that empirically analyses the impact of biophilic-inspired planning. There are no solid studies on the constructs of biophilic hypotheses, in particular from the standpoint of social sciences, and it is difficult to separate the influence of place from that of the activities that occur there [52]. In particular, from the methodological point of view, the difficulty in determining the relation that occurs between the designed space and individuals (for example, in terms of value, of benefits for human health, or also of the ability of the environment to shape the experience in space of individuals) lies in the fact that it is not possible to conduct double-blind randomized controlled experiments (in which one can differentiate the groups according to just one variable). The reason is that the construction of a new artifact according to the principles of biophilic design, the creation of a therapeutic garden, or the refurbishing of an existing building do not involve only a design intervention that can be isolated, but are often accompanied by the use of new technologies, the presence of new staff, new furniture and equipment, new functions, or even new organizational models. In other words, the invariance of the stimulus on which the standardization of questionnaires is based can be disturbed by other environmental variables, by relational components, or by the different meanings that are attributed to the questions that are asked. Moreover, some results have been subject to very little empirical verification. It is also difficult to give a shared definition of the term "green space", and the metrics used to measure its impact on human behavior can vary from study to study, making comparison a very complex undertaking [53]. Lastly, some research restates the importance of identity in the

expression of environmental preferences and its ability to affect human behavior. In fact, it is somewhat bold to suggest that there is no correlation between the way humans perceive space and what they have learned from life, that is, their cultural influences [54]. At the same time, sociodemographic factors can also affect perceptions of the natural environment. Geographical location, socioeconomic factors, and even historical memories affect an individual's experience of space.

From the standpoint of urban sociology, the spatial turn in the social sciences has not sparked significant interest in the study of buildings and their architectures, and many research areas are as yet almost completely unexplored. In other words, the study of form and of function obscures the analysis of the social effects of architecture [55,56]. In contrast, discussing the social effects of architectures means keeping in mind on the one hand the intentions of the designer and on the other the structural outcomes, the procedures, and practices of use of the designed space. This is the gap, theorized by Herbert Gans, between the potential space—in the designer's mind—and the actual one created by the people who concretely live within the project [57]. As suggested by Hillier and Hanson, architecture “is not a social art simply because buildings are important visual symbols of society, but also because, through the ways in which buildings, individually and collectively, create and order space, we are able to recognise society: that it exists and has a certain form” [58] (p.2). However, while some disciplines have engaged in-depth with space (one could think of geographers, architects, or social psychologists), producing a substantial number of studies and consolidating research methodologies, sociology has not analyzed to a sufficient degree the relation that is created between individuals and the designed space. That is to say, sociology has been characterized by a sort of indifference towards the real spaces and times in which social phenomena manifest themselves [59] (p.34).

In this regard, Gieryn talks about a place-sensitive sociology, exactly to emphasize the importance of sociological inquiry in an area that is predominantly the reserve of geographers, architects, psychologists, or historians. As a matter of fact, the place is not only a background setting of the action or at any rate an external element, but one of the actors in determining the practices, the relations, and the mental representations that define social life. Gieryn argues that sociologists “could become more adept with maps, floor plans, photographic images, bricks and mortar, landscapes and cityscapes, so that interpreting a street or forest becomes as routine and as informative as computing a chi-square” [48] (pp.483–484).

In addition, although biophilic hypotheses and their applications in urban planning can be seen, in the places where these projects are implemented, a very promising step towards reviving interest in the new demand for cities, these studies also reveal the difficulty in implementing multidisciplinary and systematic analyses of the relationship between individuals and the designed space. Such analyses would take into consideration certain decisive variables and involve different disciplines, focusing specifically on the objective and subjective context, while imagining the individual as the object of physical or social influences belonging to different systems and, therefore, opportunely differentiated.

The main fallacy of the current approach lies precisely in considering space as a dependent variable, thereby conceptualizing places only through a set of quantitative variables, which are inevitably static, and overlooking the relationship that is created between the individual and the designed space, the various meanings people give to places, and the bidirectional relationships that are generated between two systems, namely the physical and the social. Conversely, the meanings and values people attribute to the environment and the relationships they establish with it are fundamental for understanding how places determine the quality of urban life of individuals.

3. Materials and Methods

The *Exploring the benefits of biophilic design in urban settings* project was launched in 2018 and is led by the Rome-based *ReLab – Studies for Urban ReEvolution* research laboratory in partnership with the “Dante Alighieri” University for Foreigners of Reggio Calabria, Italy. This paper uses some of the preliminary results that emerged from this project. The investigation was conducted using qualitative

methods (focus groups and participant observation) in order to focus on the perceptions of the relationship between the built space and the natural landscape.

The reflection on the human–nature relationship within the city and the value of biophilic hypotheses contribute to redefining the role of nature in the sustainable city, understood not only as the presence of green spaces in the urban fabric, but also as an attribute of the built space, as a blueprint or organizational principle of planning, adapted to the relevant scale [60].

In this regard, even though they originated from the architectural determinism that shaped the relationship between sociology and urban planning since the 1960s, the biophilia hypotheses mark a change in perspective: this is both because they are based on a reconnection of humans with nature (with its patterns, forms, and materials), and because they contribute to defining the contents of the green turn that characterizes the contemporary city with regard to the interventions on the urban fabric, i.e., of a theoretical and empirical approach in which the individual becomes the centerpiece of space and shapes it on the basis of his/her needs and city demands.

Against this background, the *Exploring the benefits of biophilic design in urban settings* project was carried out using qualitative methodologies (focus group and participant observation), in order to identify the ways in which the relationship between the built space and the natural landscape is perceived. The results that are presented in this article derive from 10 focus groups, each with between 8 and 14 participants aged 35–75 years (distribution of age: 62% <50 and 38% 50–75), who were not too similar in terms of age, educational background, and profession to enable the analysis of different stances (distribution of professional occupation: employees 45%, manager 14%, retired 27%, other 14%). The focus groups were held, between 2018 and 2019, in five Italian cities situated in different regions to obtain a representative picture of the situation in Italy. Recruitment was done through a questionnaire and participants were balanced by gender (distribution: 52% female and 48% male). There was an overall similarity in the focus group results from the different geographical areas studied.

The choice of the focus group has given the opportunity to understand more precisely the points of view of the individuals, the opinion formation process, and the ways in which the relationship between the built space and the natural landscape is perceived, or in any case the relevance of inserting nature and its patterns in urban planning on different scales vis-à-vis the expectations of the participants [61,62].

To this end, a default interview protocol was established, the data collection was conducted directly with questions that were clearly related to the topic, and the discussion was guided and managed by a moderator, who used simple and plain language to be understood by all participants. The saturation point (that is, when the participants do not detect the absence of new attributes or dimensions) was reached during the second focus group. The first part of the focus groups took place in a “neutral” environment that was not characterized by the presence of nature (neither directly nor indirectly due to forms or materials); in contrast, the second part took place within green spaces designed according to the principles of biophilic design and characterized by the direct and indirect presence of nature, e.g., through forms and materials. In both cases, indoor or outdoor environments were chosen that met the requirement of presence/absence of elements of biophilic design. In particular, the environments in which the first part of the focus groups took place were characterized by the absence of elements belonging to biophilic design. This stage concerned indoor and outdoor environments characterized by a design without elements belonging to the world of plants, or at any rate references to the shapes and materials of nature, or of a design that pays attention to the presence of natural light, ventilation, the sensory component, etc. As a result, the following were chosen: a meeting room, a cultural meeting center, a shopping mall, and two outdoor spaces with a prevalence of built environment in which the presence of green was marginal or spontaneous.

Conversely, the second part of the focus groups took place in predominantly outdoor environments characterized by the presence of elements belonging to biophilic design and at least two of the three categories identified by Browning et al., namely: (1) nature in the space (e.g., visual connection with nature, thermal and airflow variability, presence of water, natural lighting), (2) nature analog (e.g., biomorphic form and patterns, material connection with nature), and (3) nature

of the space (e.g., prospect, refuge) [17]. More specifically, the following were chosen: a therapeutic garden, an urban garden, two open-space offices, and an urban park.

Across the two stages, no difference was detected in the answers given by the participants between the indoor and outdoor environments. The element that seems to have determined a change in the participants' answers was the presence, or lack, of elements of biophilic design in the space.

The participants' verbal and non-verbal reactions were analyzed, and the comments and dialogues of the subjects during all stages of the interaction were transcribed according to a qualitative or ethnographic approach [61].

4. Results

4.1. Beyond Utility Value: Some Empirical Evidence

In order to explore the relationship between spaces designed with biophilic principles and people's pro-environmental values and behaviors, a qualitative investigation was conducted through 10 focus groups, each with between 8 and 14 participants aged between 35 and 75. The decision to use focus groups enabled a more accurate understanding of the participants' viewpoints; their opinion formation processes; how they perceived the relationship between the built space and the natural landscape; and, generally, the extent to which the inclusion of nature and its patterns into various levels of urban planning met the expectations of the participants [61,62]. For this, an interview protocol was designed and conducted directly through questions referring clearly to the theme and discussion was stimulated and coordinated by a moderator. The saturation point (that is, when there are no new themes or dimensions) was reached, for each geographical area, during the second focus group. The initial results of this study, which is still in progress, although still at an early stage, make an interesting contribution to the debate.

4.1.1. Three Main Categories

One of the first categories to emerge was "aesthetic value", namely, everything related to aesthetics and the pleasure people experience from the beauty of places. This includes perceiving and defining the space through criteria of satisfaction and enjoyment (cultural and aesthetic value, expression of social status, quality of urban life, etc.). The second category, "environmental value", demonstrates a high level of commitment and considers the ethical, social, and environmental implications of space and the human–nature relationship (including access, sustainability, and social equity). The third and largest category, "utilitarian value", views nature as subordinate to humans and as the source of the material goods that enable humans to meet their needs. This category sometimes features a form of aversion to or fear of nature. On this issue, it is useful to remember that, according to Van den Berg and ter Heijne [63] and Bixler and Floyd [64], the proximity of nature, especially for certain types of people, is seen as threatening (for example some natural environments can trigger a feeling of lack of control of the surroundings). This is probably also because these people are used to living mainly within a built environment which, unlike the natural environment, undoubtedly provides an illusion of control of the surrounding space. Nevertheless, even respondents from this last category seem to be aware of the social and cultural value of nature, even when the measures used to explain this dimension appear to be somewhat limited, especially with respect to the concepts of identity, culture, and belonging. Several respondents referred to the idea of sense of community ("You can never change things on your own", woman, 54; "sustainability means respect, education and common sense as the foundations for educating not only young people", man, 67), although most participants live in urban contexts with few relations between inhabitants and little sense of belonging. The responses given seemed to demonstrate sufficient awareness of or sense of responsibility towards the community they belong to, but significantly low levels of active participation and joint action. All categories, on the other hand, demonstrated a strong awareness of the urgency of the issues related to urban sustainability. City and nature are two closely related terms, although the characteristics of this relationship vary somewhat depending on the value that was attributed to nature. More specifically, the theme associated most frequently by participants

with the concept of sustainability was the quality of the environment, referring to both its aesthetic value and its ecological value; however, they defined environmental interventions as difficult to perceive because they were often far beyond the scope of their knowledge.

4.1.2. The Influence of Nature

For their part, the participants said they have adopted behaviors that were more respectful of nature in the last few years. Generally, most efforts related to upgrading the energy efficiency of their homes, waste separation, and greater use of local and/or organic produce. These actions or behaviors were chiefly the product of utilitarian attitudes and, to a lesser extent, emotional and affective responses. Thus, when the respondents spoke in abstract terms about their relationship with nature, what emerged were the three main categories already mentioned; however, their actual actions seemed to converge into one prevailing category, namely their “utilitarian” value. Similarly, the participants did not clearly perceive whether there was a lack of urban planning that might rebuild the human–nature relationship, but they did connect the greater awareness for environmental issues to, for example, the presence of gardens and parks for children and the elderly (“Parks and gardens are important vehicles for environmental awareness”, woman, 47). Here again, the value of the use of nature in the urban space was prevalent in the examples provided. Similarly, on the topic of sustainable cities, what stands out is a clear demand for city planners to meet the needs of the city’s inhabitants (“The sustainable city should be designed on a human scale, but it should guarantee a high quality of life and meet the real needs of the population”, man, 55. “Sustainability means limiting use of land and making more of the green spaces and the urban spaces that are meaningful to inhabitants”, woman, 38. “Urban green space increases the value of residential property”, man, 61). Sometimes, this demand revealed a pessimistic view of the current state of affairs (“There’s a lack of awareness of the importance of education about environmental protection”, woman, 42).

Yet, when placed in a green space designed according to biophilic principles (e.g., a view to elements of nature; auditory, haptic, olfactory, or gustatory stimuli; presence of water; furniture with organic shapes, and natural materials; etc.) the participants said they felt a sense of belonging, familiarity, or connection, regardless of the opinion they had expressed earlier (“When you’re surrounded by nature you feel a sense of tranquility and protection”, woman, 39; “The presence of greenery, plants, wood creates a welcoming atmosphere that facilitates reflection and helps you relate to others”, woman, 48). Many began to interact with nature through the senses (particularly touch and smell), while others preferred to observe the surrounding space. All said they felt a sense of well-being (“You can’t hear the noise of the traffic and you regain your awareness of the environment”, man, 55. “This is somewhere I’d like to live and work”, woman, 48. “It’s very comforting to be surrounded by plants and be able to touch them and smell their scent”, woman, 39). However, it should be emphasized that every participant attributed a different meaning to the word “well-being” (e.g., “Well-being is also breathing clean air”, woman, 45. “Well-being is whatever makes you feel good, gives you a feeling of happiness”, woman, 62. “Having a feeling of well-being makes you want to return to an active life”, man, 72. “Well-being is feeling safe and protected”, woman, 52. “Well-being means a reduction in stress and improved quality of life”, woman, 39). For all the participants, despite the socio-cultural heterogeneousness of the focus group, the sense of well-being they felt during their experience in a space designed according to biophilic principles, irrespective of the meaning they gave to that experience, corresponded to more attention to nature and a desire to connect with the surrounding environment.

Overall, the results of the group discussions thus appear to confirm Kellert’s hypothesis that the “natural inclination to affiliate with nature and the biological world constitutes a weak genetic tendency whose full and functional development depends on sufficient experience, learning and cultural support” [65] (p.6). However, it is clear that “biophilic sensibilities can atrophy and society plays an important role in recognizing and nurturing them” [66] (p.19). This is why it is important to talk about values, which all human beings possess, although their nature and adherence to them may differ. It should also be noted that, even if biophilia were only a human inclination influenced by learning, by the actual life and culture of individuals, it would still be important inasmuch as it would

contribute to the collective imaginary on “nature” and “landscape” and therefore, more generally, it would provide a solid basis on which to build environmental ethics suited to the challenges of the city of the future. In biophilic building design, spaces encourage not only the connection between people and the natural system, but also the interaction with it.

4.2. Three Findings

More specifically, the results of the focus groups show that the participants within the biophilic settings (indoor or outdoor) perceived the experience of nature in terms of enriching individual perspectives with reference to three main findings.

Firstly, the participants’ experience was clearly characterized by the perception of positive benefits, also in terms of contrast with the settings in which the first part of the focus groups took place, which were associated with normal urban life (“Often indoor environments are claustrophobic and formal”, woman, 44. “Contact with nature helps you to be more peaceful and calm, compared with what normally happens in the city”, man, 56. “Walking in nature and learning to recognise the various plants reconnects you with the natural world”, woman, 38. “If my office was full of natural light, I’d work better”, woman, 62. “Quality of air is really important”, man, 37).

Secondly, the direct or indirect experience of nature encouraged social interactions between two or more people compared with what was observed in the normal environments that characterized the first stage of the focus groups. These interactions were observed by the moderators while the second part of the focus groups were taking place. As a result, the experience of biophilic settings seems to confirm that connectedness with nature promotes social contacts, confidence, community cohesion, and an enrichment of life [67].

Thirdly, as already reported, the participants’ answers showed variation in the meaning attributed to the value of nature in the two alternative configurations of the settings in which the focus groups took place, and revealed that individuals’ pro-environmental behaviors are connected to the relationship they have with nature. The answers given by the participants in the biophilic settings allow us to define these spaces as “temporary places of escape” from the relationships and meanings that characterize everyday life and that seem to “confine” the participants in a precise social identity separated from nature and its life-giving benefits. As a consequence, the value of biophilic settings, more strongly connected to nature, seems to derive, at least partly, from an experience of space that is opposite to that of the customary social and cultural context. The implications of this finding do not concern so much the psycho-physical benefits deriving from an environment that is designed according to the principles of biophilic design (both on the micro scale and on the macro one of the city), but rather the value that emerging biophilic urbanism can have in terms of reinterpreting and enhancing the human–nature relation in the urban contexts by recreating appropriate sustainable conditions to ensure connectedness and interaction with nature.

Based on the findings, a design inspired by biophilic principles could assist in creating a shared vision and understanding of the role of nature in cities by fostering meaningful experiences.

5. Discussion

The group discussions provided useful insight into the interpretation and relevance of the human–nature relationship. In particular, two broad and interconnected areas of reflection emerged. The first was that the way individuals perceive the natural environment surrounding them, including through the senses, is not a static phenomenon that can be determined a priori. On the contrary, it is a multimodal experience, probably rooted in our evolutionary history, but also influenced by our ability to appraise the language of the surrounding environment and the visual patterns that recall the natural world and facilitate a sense of spatial orientation. The overall impression given by the results is that individuals respond in different ways to the properties of a space, even when these are inspired by biophilic design principles. Of course, technology has given humans the illusion that they can overcome the ecological and physiological limitations imposed by the environment. It is precisely this deep belief in the ability to dominate nature that emerges from group discussions, and often prevents individuals from perceiving clearly the real extent of the separation between humans and

the natural world. The western model of overconsumption and constant comfort has produced a value system based on the indifference of humans and an ever-increasing difficulty to recognize, nurture, and preserve our original relationship with nature. The consequences of this are more and more visible in the human habitat and range from growing levels of pollution to the gradual extinction of animal and plant species. While technology provides the opportunity for more targeted intervention, for example with regard to energy efficiency, our inability to reconnect with the natural world makes it difficult to implement the systematic changes in culture, value systems, and lifestyles needed for widespread understanding and assimilation of the principle of sustainability. This state of affairs is probably due to the limited ability of individuals to understand (it is easier to see and understand the immediately surrounding environment than to have a clear overall perception that includes the far-off or the apparently abstract), and also to a reduced capacity for critical evaluation and judgment which often restricts their perspective to the utilitarian and the functional.

Another consideration that emerged from the groups was that green spaces and natural patterns designed according to biophilic principles have a significant impact on the behavior of individuals—as is the case with the historical stratifications and memories of cities—within a context of continuity in space and time that fosters a sense of belonging and symbolic identification, and engender social interaction and respect for the environment. It is what we might call the “biophilic spirit”; in other words, a sensitivity that does not unquestioningly embrace the theories of environmental determinism and points to the existence of a shared value system that can uphold a rich and sustainable urban life. As Goldhagen proposes, human experience, “including its nonconscious and conscious cognitions, is situated in three dimensions.” These dimensions are

the human body and the natural world, each of which is a product of evolution. The third dimension, the social world, is less tethered to the dictates of our biological evolution in physical bodies inhabiting a physical world. Humans are also decidedly social beings. The individual and social world that we inherit and create are strongly influenced by the places where our engagements and interactions transpire. Places situate us as individuals among others, and places help us become and sustain ourselves as members of the many overlapping social groups through which we live our lives [44] (p.180).

The existence of a shared way of looking at the natural environment based on preferences that can be generalized certainly opens up a very exciting research field. The result of the focus groups seems to confirm that there exist spatial configurations, which in this case are characterized by the presence of elements of biophilic design, that carry their own specific meaning. These results admittedly confirm the theories on environmental preferences and the Attention Restoration Theory (ART) by Kaplan and Kaplan, according to which some characteristics of the environment determine preferences as a function of the individual’s need for rest and regeneration. Put differently, the results that come out of the research we have conducted tend to demonstrate the existence of landscapes, but also of indoor design objects or elements that influence the tastes, in the sense given by Bourdieu, and the reactions of individuals with nature and of individuals among them [45,68].

However, it does not seem possible to reduce the human–nature relation (even when it is seen through the lens of biophilic design) to a reaction that is strictly due to a stimulus or to a repetitive series of stimuli. Even though one can identify some convergence in the answers of the participants with regard to the biophilic environment, allowing us to confirm the existence of what we might define immediate and predictable attractions with reference to the surrounding space, these answers are not stereotypical or do not belong to a restricted set. In contrast, they express a variety of mindscapes that refer to the influence of the life lived by each individual, of culture, of the level of eco-literacy, of the sensory components, and of cognitive operations. In other words, places express meaning through our memories, our connections, and our dreams. The landscape is not only nature that reveals itself to the eyes of the individuals, but becomes a reality in the encounter between the external physical world and the ways in which people perceive it or imagine it, forever setting new

boundaries that cancel the traditional opposition between nature and culture because they are characterized by continuous “trespassings” [69,70].

The results of the focus groups that took place within biophilic settings reflect a variety of values that survive in the contemporary city, despite the prevalence of an instability in the human–nature relation that is due to scientific and technological development and to human-based production processes [71]. The contrast between the routine of daily life, mostly in office buildings, shopping malls, educational institutions or homes that are characterized by a separation from nature—also in terms of shapes and materials on the one hand, and the experience of biophilic settings on the other—clearly shows a situation of sensory deprivation, the repetitiveness, and homologation that characterize contemporary urban life. Biophilic design seems to trigger a stimulation of various senses in the participants, heightened attention in observing the surrounding space, a stronger inclination to social interaction, a wider presence of meanings and richness of information in the responses to external stimuli, and the possibility to define a different social identity. However, every individual expresses these values in different, but equally legitimate, ways because of the different influences of experience, education, beliefs, and culture.

In this context, the focus group results validate the idea of biophilic urbanism as an immediately available planning paradigm that can improve the quality of places and be used to engage city dwellers in activities to take care of and improve places. In other words, the spread within the city, through planning and design tools inspired by the biophilia hypotheses, of what at the moment we seem to be able to call “temporary places of escape” from the habitual urban living or refuges of intimacy and inwardness, as Mumford used to call them [72,73], can contribute to strengthening an environmental ethic, even though they seem to be founded on the premise of a personal interest in the quality of life and not on an altruistic tendency. In any case, they seem to produce a change of perspective and to represent a guide towards the promotion of a collective interest. This tool would integrate the ecological and protective functions with the social, recreational, and educational functions, and would raise the status of the human–nature relationship, for which, as things currently stand, a genuinely sustainable approach to urban planning still seems utopian.

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