

Review

People needs in the urban landscape: Analysis of *Landscape And Urban Planning* contributions

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Abstract

The articles published in *Landscape and Urban Planning* during the past 16 years provide valuable insights into how humans interact with outdoor urban environments. This review paper explores the wide spectrum of human dimensions and issues, or human needs, addressed by 90 of these studies. As a basis for analysis, the major themes tapped by the findings were classified into two overarching groups containing three categories each. The Nature needs, directly linked with the physical features of the environmental setting, were categorized in terms of contact with nature, aesthetic preference, and recreation and play. The role of the environment is less immediate in the Human-interaction group, which includes the issues of social interaction, citizen participation in the design process, and community identity. Most significantly, the publications offer strong support for the important role nearby natural environments play in human well-being. Urban settings that provide nature contact are valuable not only in their own right, but also for meeting other needs in a manner unique to these more natural settings. In addition, although addressed in different ways, remarkable similarities exist concerning these six people requirements across diverse cultures and political systems. Urban residents worldwide express a desire for contact with nature and each other, attractive environments, places in which to recreate and play, privacy, a more active role in the design of their community, and a sense of community identity. The studies reviewed here offer continued evidence that the design of urban landscapes strongly influences the well-being and behavior of users and nearby inhabitants.

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Landscape and Urban Planning (LUP) has served as a key source of insights regarding the importance of the natural environment in human well-being. The purpose of this paper is to identify major themes that cut across a subset of these individual studies. More specifically, we selected 90 empirical articles that were published in *LUP* between 1991 and 2006 that focus on how people interact with the urban environment.

The 16-year period of our review marks the time that J.E. Rodiek has carried the mantle as editor of *LUP*. For 16 years before that E.A. Weddle was at the helm of what became *LUP*. Under Rodiek's leadership, the journal has grown substantially in terms of number of volumes and articles published, the range of topics, and international visibility of the underlying issues.

With the world evermore urbanized, a focus on meeting human needs in the urban context is vital. With urbanization evermore threatening the availability of nature, a focus on the vital role that nature plays in human well-being is urgent. The themes that emerge from this analysis provide important mandates for city planning, landscape design, and environmental decision making. These themes are central to a very important aspect of what *LUP* has been about.

1. Method

1.1. Criteria for selection of articles

The period of analysis is in volumes 20–78, appearing in 1991–2006. Criteria for inclusion in the database included the context, method, and issues. The context had to focus on some aspect of the urban outdoor environment. The method had to be empirical, in other words drawing on original data involving surveys, interviews, observations, or case studies. The issues, broadly defined, entail human needs, preferences, attitudes, and activities. These were generally addressed by the design or function of the setting.

Any decision about how to bound our study necessarily also is a decision about what is excluded from the analysis. In terms of context, excluded are articles with a focus on rural environments, non-urban forests, or many other settings that are not essentially urban. Methods not included were all those that do not focus on original data, for example, literature reviews, policy comparisons, recommendations for methodologies or approaches. We also excluded articles whose major emphasis is on testing or comparing methods of presenting the environment (e.g.,

virtual approaches) or on the development of assessment tools per se.

A total of 90 articles are included in our analysis. Table 1 shows the distribution of these articles across the time span under review. While these constitute a small percent of *LUP* publications, the table shows a marked increase in the number of empirical articles with an urban emphasis. While the journal published 26% more articles in the most recent 4 years as opposed to the initial 4 years in this analysis, the same periods show an 83% increase in articles included in our analysis.

1.2. Method of analysis

Each article was summarized and categorized in terms of several dimensions. For descriptive purposes, and to examine the breadth of empirical work in this area, tabulations included the country where the study was conducted, type of site (e.g., brownfield, greenway, public open space), and research methods that were used.

Articles were also examined in terms of the type of issues or human dimension reported in the findings. The initial listing of these categories was drawn from the publications and used as the basis for further analysis. Through an iterative process of examining similarities in content and questions addressed by the studies the categorization evolved into identification of major themes tapped by the studies. Development of these themes was a collaborative process based on the initial tabulations of the studies. The final thematic areas, discussed in the next section, are not intended as a definitive categorization system, nor are they exhaustive of the topics addressed. The major purpose of the analysis was rather to gain a larger picture that sheds light on this vast body of research. Before turning to these issues, we

Table 1
Articles included in the study and years of publication

Four-year period	Total articles published in LUP	Articles included in this study	Percent of total
1991–1994	265	7	3
1995–1998	311	20	6
1999–2002	307	22	7
2003–2006	360	41	11
	1243	90	7

first discuss the breadth of the articles in terms of country, sites, and methods.

2. Results: description of studies

2.1. Geographic representation

The 90 studies were conducted in 23 different countries, almost equally divided between North America and the rest of the world. The North American studies included 8 in Canada and 38 in the United States. In addition to 5 studies in the UK, there were 16 in Europe, 1 of which was conducted in two countries (Netherlands [3], Finland [2], Germany [2], Sweden [2], Switzerland [2], Belgium [1], Greece [1], Italy [1], Norway [1], Spain [2]). Twelve studies were conducted in Asia, including Japan (6), China (3), Singapore (2), and Taiwan (1). The Middle East was represented by Turkey (3), Saudi Arabia (2), and Jordan (1). Australia had three studies and South America (Brazil) had one study.

2.2. Urban nature context

The environmental contexts range in scale from rooftop gardens to greenbelts and greenways as well as urban stream corridors and forests. They include hospital grounds and assisted living facilities, a corporate campus, residential neighborhoods, parks and school yards, and even derelict lands. The environments in some studies are represented through graphic means. In other cases, the environment is viewed through a window, or is the actual setting of the study. Though the studies represent a great diversity of settings, residential neighborhoods were the most frequent context.

2.3. Empirical methods

Over a quarter of the studies (27%) used surveys as a key data gathering tool. The other two approaches that were most widely used were interviews (24%) and case studies (24%). Observation was included in 16% of the studies and 12% relied on preference ratings. Nine percent of the studies relied on existing data sources, including, for example, the selling price of residences or hotel room prices as the basis for hedonic and economic models (Jim and Chen, 2006b; Lange and Schaeffer, 2001; Luttkik, 2000; Morancho, 2003; Tyrväinen, 1997), state accident data (Mok et al., 2006), and information from major regional newspapers (Luymes, 1997).

Some of the studies used a mixture of these methods. In particular, the studies that used focus groups or workshops all incorporated at least one of the other methods mentioned. Each of the four studies that used both surveys and interviews included one additional method as well.

3. Results: categories of human needs

There are many bases for categorizing these studies. The studies address a wide spectrum of human dimensions and purposes, which we refer to here as “human needs.” We have organized the

studies into six major categories, and further divided these into two overarching groups. The major distinction between the two groups is in the centrality of the physical environment in serving the set of needs. The *Nature needs* are more directly linked with the physical features of the environmental settings, while for the *Human-interaction needs*, the role of the environment is less direct. As will be seen the majority of the studies concern several of these categories.

3.1. Nature needs

The Nature needs designation refers to the wide range of ways in which human needs or purposes are met by the natural environment. This is a major, overarching grouping that includes 92% of the studies in the database. As shown in Table 2, three categories are included in this grouping. As is readily apparent in the table, many of the studies can be categorized in terms of more than one of the three Nature needs. In fact, the studies are about equally divided between those designated as falling in a single category (48%) and those reflecting multiple categories.

3.1.1. Contact with nature

This category reflects a variety of ways in which the studies incorporated contact with nature, natural elements, and qualities of nature, including views of such settings and/or experiences with them. The studies addressed contact with nature in terms of concerns such as emotional, mental, and physical health, as well as the sense of satisfaction with and livability of one’s social and physical environment. They document the broad range of ways in which contact with nature contributes to improved quality of life, even if the encounter is only a brief opportunity to escape the urban bustle, relax, and possibly contemplate or enjoy the time in nature. More than two-thirds (70%) of the studies addressing Nature needs are included in the contact with nature category.

Across these studies the importance of contact with the natural environment is shown to hold across a wide range of urban contexts. These include larger areas, such as greenways (Gobster, 1995; Shafer et al., 2000), parks (Chiesura, 2004; Jim and Chen, 2006a; Oguz, 2000; Özgüner and Kendle, 2006), stream corridors (Asakawa et al., 2004), and urban forests (Coles and Bussey, 2000; Kaplan and Austin, 2004; Roovers et al., 2002; Simson, 2000). Smaller areas are also included among the studies, for example, gardens within assisted living facilities (Rodiek and Fried, 2005) or hospital gardens and grounds (Barnhart et al., 1998; Sherman et al., 2005), rooftop gardens (Yuen and Hien, 2005), school play yards containing natural landscape elements (Herrington and Studtmann, 1998) and streetscapes designed to incorporate vegetation (Antupit et al., 1996; Mok et al., 2006). Derelict lands overgrown with vegetation (Pauleit et al., 2005), naturalistic and more obviously designed landscapes, such as botanical gardens, provide the many benefits of nature contact for local residents (Özgüner and Kendle, 2006).

In addition to specific sites, the benefits of contact with nature were also manifested at the larger scale of landscaped portions of a community. For example, the “green” residential atmosphere

Table 2
Studies that include Nature-based needs

Type of site	Type of human need			Location (country)	Researchers
	Contact with nature (64%) ^a	Aesthetic preference (50%) ^a	Recreation/play (37%) ^a		
Assisted living facilities	×	×		United States	Rodiek and Fried (2005)
Assorted urban and rural sites	×	×		Spain	Carles et al. (1999)
Corporate campus grounds	×	×		Canada	Hands and Brown (2002)
	×			United States	Kaplan (1993)
Derelict lands		×	×	Canada	De Sousa (2003)
	×	×	×	Greece	Damigos and Kaliampakos (2003)
	×			United Kingdom	Pauleit et al. (2005)
Green open spaces—residential neighborhoods	×			United States	Austin (2004)
Green open spaces—urban	×			Canada	Balram and Dragičević (2005)
Greenways	×		×	Brazil	Frischenbruder and Pellegrino (2006)
	×	×		Canada	Quayle (1995)
	×				Taylor et al. (1995)
	×		×	Germany	Von Haaren and Reich (2006)
	×		×	Italy	Toccolini et al. (2006)
	×			Japan	Yokohari et al. (2006)
	×		×	Singapore	Tan (2006)
	×	×	×	United States	Gobster (1995)
	×		×		Lindsey (1999)
	×		×		Shafer et al. (2000)
		×		Yabes et al. (1997)	
Hospital grounds	×	×		Canada	Barnhart et al. (1998)
	×		×	United States	Sherman et al. (2005)
Municipal public spaces			×	United States	Owens (1997)
Parks	×	×	×	China	Jim and Chen (2006a)
	×		×	The Netherlands	Chiesura (2004)
	×		×	Turkey	Oguz (2000)
		×		United Kingdom	Jorgensen et al. (2002)
	×	×			Özgüner and Kendle (2006)
			×	United States	Gobster (1998)
	×		×		Gobster (2001)
				United States	Nasar and Kang (1999)
Residential neighborhoods	×		×	Australia	Syme et al. (2001)
		×		China	Jim (1993)
	×	×	×		Jim and Chen (2006b)
	×			Japan	Ge and Hokao (2006)
	×			Jordan	Abu-Ghazze (1996)
	×	×		The Netherlands	Luttik (2000)
		×		Saudi Arabia	Saleh (1999)
	×			Spain	Morancho (2003)
		×		Sweden	Berg (2004)
	×			Taiwan	Huang (2006)
	×	×		Turkey	Dökmeçi and Berköz (2000)
		×	×		Türkoğlu (1997)
			×	United Kingdom	Pacione (2003)
	×	×	×	United States	Crow et al. (2006)
	×	×			Ellis et al. (2006)
	×				Hull et al. (1994)
	×	×			Kaplan and Austin (2004)
×				Lucy and Phillips (1997)	
×	×			Martin et al. (2004)	
×				Naderi and Raman (2005)	
	×			Owens (1993)	
	×			Sullivan (1994)	
	×	×		Vogt and Marans (2004)	
Residential yards		×		Australia	Daniels and Kirkpatrick (2006)
	×		×		Syme et al. (2004)

Table 2 (Continued)

Type of site	Type of human need			Location (country)	Researchers
	Contact with nature (64%) ^a	Aesthetic preference (50%) ^a	Recreation/play (37%) ^a		
		×		Canada	Henderson et al. (1998)
		×			Zmyslony and Gagnon (1998)
		×		United States	Helfand et al. (2006)
		×	×		Larsen and Harlan (2006)
Rooftop gardens	×	×	×	Singapore	Yuen and Hien (2005)
School play yards	×			United States	Herrington and Studtmann (1998)
Stream corridors	×	×	×	Japan	Asakawa et al. (2004)
		×			Yamashita (2002)
	×	×		United Kingdom	Fordham et al. (1991)
	×		×	United States	Brody et al. (2005)
		×			Schauman and Salisbury (1998)
Streetscapes		×		Japan	Todorova et al. (2004)
	×			United States	Antupit et al. (1996)
	×				Mok et al. (2006)
	×	×			Sullivan and Lovell (2006)
Town		×		United States	Palmer (1997)
	×				Stewart et al. (2004)
Views of natural landscapes	×	×		Switzerland	Lange and Schaeffer (2001)
Views of urban high rises		×		Computer Modeling	Zacharias (1999)
Woodlands or forests–urban	×	×	×	Belgium	Roovers et al. (2002)
	×			Finland	Tyrväinen (1997)
	×		×		Tyrväinen and Väänänen (1998)
		×	×	Japan	Oku and Fukamachi (2006)
	×		×	Norway	Fjørtoft and Sageie (2000)
			×	Sweden	Hörnsten and Fredman (2000)
	×			United Kingdom	Coles and Bussey (2000)
	×	×			Simson (2000)

^a Percentage of studies manifesting this need.

was found to be the most important community feature contributing to inhabitants' appreciation of their neighborhood (Crow et al., 2006). Similarly, the negative effects of retail land use on neighborhood preference and satisfaction were reduced by the presence of greater levels of tree or shrub cover (Sullivan and Lovell, 2006; Ellis et al., 2006). In addition, walking for health purposes was encouraged by neighborhoods landscaped with appropriate amounts of water features and trees (Naderi and Raman, 2005).

Finally, through the use of real estate economic models, indirect evidence of the benefits of nature was reported. Specifically, people's desire to live near or have a view of nature was revealed through greater housing and hotel room prices (Jim and Chen, 2006b; Lange and Schaeffer, 2001; Luttik, 2000; Morancho, 2003; Tyrväinen, 1997).

3.1.2. Aesthetic preference

The second category in the Nature needs grouping, aesthetic preference, involves a range of topics related to the bases for preference, including such issues as scenic beauty, degree of cleanliness, and pleasant sounds. Of the studies addressing Nature needs in the database, over half (54%) addressed some aspect of this category. These 44 studies provide strong support

that urban landscapes dominated by natural features show strong preference.

Among the many contexts for studies investigating such preferences were botanical gardens and parks (Jim and Chen, 2006a; Oguz, 2000; Özgüner and Kendle, 2006), greenways (Gobster, 1995), streetscapes (Sullivan and Lovell, 2006; Todorova et al., 2004), and neighborhoods (Berg, 2004; Crow et al., 2006; Dökmeci and Berköz, 2000; Ellis et al., 2006; Kaplan and Austin, 2004; Vogt and Marans, 2004). In addition, such preference is a key factor in the acceptance by local residents of revitalized brownfields (Damigos and Kaliampakos, 2003) and stream corridors (Asakawa et al., 2004; Schauman and Salisbury, 1998), and employees' acceptance of an ecological rehabilitation landscape within corporate campus grounds (Hands and Brown, 2002).

3.1.3. Recreation and play

The third of the Nature needs categories is recreation and play. Of the studies incorporating Nature needs, 40% included this category. These studies include a wide range of activities—walking, jogging, cycling, hiking, and playing sports and games. As these studies show, the opportunities for recreation can be satisfied in many nature-based contexts. Important settings for recreation

and play include not only parks (Chiesura, 2004; Oguz, 2000; Gobster, 2001; Jim and Chen, 2006a), greenways (Gobster, 1995; Lindsey, 1999; Shafer et al., 2000; Yabes et al., 1997), and woodlands (Fjørtoft and Sageie, 2000; Hörnsten and Fredman, 2000; Roovers et al., 2002), but also renovated brownfields (De Sousa, 2003), derelict lands (Damigos and Kaliampakos, 2003), rooftop gardens (Yuen and Hien, 2005), and revitalized stream corridors (Asakawa et al., 2004). The need for recreation, therefore, can be addressed by both traditional and nontraditional nature-based settings. As would be expected, the studies show the pervasive need for such opportunities across the age spectrum, diverse socio-economic groups, and nationalities.

3.2. Human-interaction needs

The second group consists of needs that focus on human interactions promoted by the environments. Table 3 lists the studies that include any of the three categories subsumed by this group. On the whole, the Human-interaction needs manifested themselves much less frequently than the Nature-based needs, with 56% of the studies in the database included in Table 3. Furthermore, the studies were more likely to fall into a single category of Human-interaction needs (66% of these studies) than in multiple categories.

3.2.1. Social interaction and privacy

Of the three categories, social interaction and privacy needs appeared most often in the studies—58% of the studies that concerned Human-interaction needs. These studies expressed great optimism that improved social interactions can be promoted through properly designed urban spaces. These improvements include interactions among adolescents (Owens, 1997), different racial and ethnic groups (Gobster, 1998), and urban (Oguz, 2000; Shafer et al., 2000) and neighborhood residents as a whole (Saleh, 1999; Owens, 1993). Natural landscapes can sometimes play a key role in promoting social interaction. These include landscapes found within hospital grounds, urban parks, and greenway trails (Barnhart et al., 1998; Gobster, 1998; Oguz, 2000). In addition, by providing the public with a refuge from urban activity, privacy needs can be met in urban woodlands (Coles and Bussey, 2000), parks (Oguz, 2000), and rooftop gardens (Yuen and Hien, 2005).

3.2.2. Citizen participation in the design process

Almost half of the studies (46%) in the Human-interaction group incorporated ways that citizens can participate in the design process. These studies speak to the importance of promoting citizen participation to achieve a superior design and to foster community support for urban landscapes. Furthermore, they provide evidence that municipal planners, designers, and researchers are recognizing this need. Interestingly, this recognition is taking place not only in countries with more democratic governments, such as Brazil (Frischenbruder and Pellegrino, 2006), Canada (Quayle, 1995), Germany (Kühn, 2003), Great Britain (Fordham et al., 1991), Italy (Toccolini et al., 2006), Japan (Yokohari et al., 2006), Singapore (Tan, 2006), Switzerland (Buchecker et al., 2003), The Netherlands (Chiesura, 2004),

and the United States (Al-Kodmany, 1999; Sancar, 1993), but also within less democratic countries such as Jordan (Abu-Ghazze, 1996) and Saudi Arabia (Al-Hathloul and Mughal, 1999; Saleh, 1999). Public input is seen as leading to a design that takes into account relevant human needs as well as the local culture, religion and history of a particular region.

3.2.3. Sense of community identity

The last of the Human-interaction needs, sense of community identity, was included in 38% of the studies included in Table 3. There is widespread recognition expressed in several of these papers that such identity is being lost worldwide among citizens in residential neighborhoods of major urban areas. The causes of this loss are being attributed to many factors, some of which involve outdoor design characteristics of these neighborhoods. For example, Middle Eastern researchers cite improper designs that concentrate on community economics rather than residents' needs (Abu-Ghazze, 1996), and indiscriminant applications of zoning regulations (Al-Hathloul and Mughal, 1999) and use of foreign Western residential neighborhood designs (Saleh, 1999). In the United States, some researchers are concentrating on the loss of symbols and place identity of the residential environment (Hull et al., 1994; Lucy and Phillips, 1997). These researchers believe that enhancing the place identity of the physical environment can increase the sense of community attachment. Another study (Stewart et al., 2004) revealed that the presence of public or semi-public outdoor gathering places promotes community identity.

3.3. Combinations of needs categories

Since these studies were all published in *LUP*, it is hardly surprising that the environmental context is a salient characteristic. Very few (8%) of the studies included none of the nature themes and about one half of the others included two or all three themes. Almost half the studies (48%) included at least one of the Nature-based needs as well as one or more of Human-interaction needs. Table 4 provides a summary of the combinations of categories reflected by the 90 studies in the database.

Taken together, an important contribution of these studies lies in their many examples of the importance of seeing these human needs addressed in combination. Most significantly, urban settings with prominent natural features that address the nature contact need can meet other requirements in a manner unique to these more natural environments. Tables 2 and 3 include many studies that show ways that contact with nature can at the same time meet the other two categories of Nature needs (aesthetic preference or recreational purposes), as well as the Human-interaction needs. For example, urban woodlands are seen as beneficially affecting those who live near them by providing opportunities for contact with nature, recreation, and privacy, as well as offering increased sense of community attachment (Simson, 2000). In addition, greenways are becoming more common in urban areas worldwide. Their use for recreation and social interaction (Shafer et al., 2000; Tan, 2006; Yabes et al., 1997) as well as aesthetic qualities (Gobster, 1995) and potential for enhancing sense of community identity (Shafer et al., 2000;

Table 3
Studies that include Human-interaction-based needs

Type of site	Type of human need			Location (country)	Researchers
	Social interaction/privacy (32%) ^a	Citizen participation (26%) ^a	Sense of community Identity (21%) ^a		
Derelict lands		×	×	Canada	De Sousa (2003)
Green open spaces—residential neighborhoods	×		×	United States	Austin (2004)
Green open spaces—urban		×		Canada	Balram and Dragičević (2005)
Greenbelts		×		Germany and The Netherlands	Kühn (2003)
Greenways		×		Brazil	Frischenbruder and Pellegrino (2006)
	×	×	×	Canada	Quayle (1995)
		×	×		Taylor et al. (1995)
		×	×	Italy	Toccolini et al. (2006)
		×	×	Japan	Yokohari et al. (2006)
	×	×	×	Singapore	Tan (2006)
		×		United States	Lindsey (1999)
	×		×		Shafer et al. (2000)
	×				Yabes et al. (1997)
Hospital grounds	×			Canada	Barnhart et al. (1998)
	×			United States	Sherman et al. (2005)
Municipal public spaces	×			United States	Owens (1997)
Parks	×	×		The Netherlands	Chiesura (2004)
	×			Turkey	Oguz (2000)
	×			United Kingdom	Özgüner and Kendle (2006)
	×			United States	Gobster (1998)
		×	×		Gobster (2001)
	×				Solecki and Welch (1995)
Residential neighborhoods	×			Japan	Ge and Hokao (2006)
		×	×	Jordan	Abu-Ghazze (1996)
	×	×	×	Saudi Arabia	Al-Hathloul and Mughal (1999)
	×	×	×		Saleh (1999)
	×		×	Sweden	Berg (2004)
	×			Taiwan	Huang (2006)
	×			Turkey	Dökmeci and Berköz (2000)
	×				Türkoğlu (1997)
	×			United Kingdom	Pacione (2003)
		×		United States	Al-Kodmany (1999)
	×				Crow et al. (2006)
			×		Hull et al. (1994)
			×		Lucy and Phillips (1997)
	×	×	×		Luymes (1997)
	×				Owens (1993)
	×				Vogt and Marans (2004)
Residential yards			×	United States	Larsen and Harlan (2006)
Rooftop gardens	×			Singapore	Yuen and Hien (2005)
School play yards	×			United States	Herrington and Studtmann (1998)
Stream corridors		×		Japan	Asakawa et al. (2004)
		×		United Kingdom	Fordham et al. (1991)
		×		United States	Schauman and Salisbury (1998)
Streetscapes		×		United States	Antupit et al. (1996)
Town		×		Switzerland	Buchecker et al. (2003)
		×		United States	Sancar (1993)
	×		×		Stewart et al. (2004)
Woodlands or forests	×	×		United Kingdom	Coles and Bussey (2000)
			×		Simson (2000)

^a Percentage of studies manifesting this need.

Table 4
Number of studies summarized in terms of needs categories

Human-interaction categories	No nature	Nature categories							Total
		Nature contact, 1	Aesthetic preference, 2	Recreation play, 3	1 and 2	1 and 3	2 and 3	1, 2 and 3	
No H-I		6	12	1	9	6	1	5	40
Social/privacy: A	1	3	1	4	3	1	1	4	18
Participation: B	4	2	1		1	2		1	11
Community: C		2			1		1		4
A and B		1				1			2
A and C	1	2	1			1			5
B and C		3				2	1		6
A, B and C	1		1		1	1			4
Total	7	19	16	5	15	14	4	10	90

Taylor et al., 1995), make them appear as an ideal remedy for numerous urban ills.

The pattern among the 90 studies shows that the human-interaction categories frequently operate in combination with needs in the nature group (Table 4). In particular, social interaction and privacy were infrequent as the sole focus of the study; rather they generally (90% of the studies that included the category) were studied jointly with at least one of the nature categories. Over two-thirds of these studies had nature contact as one of the nature categories. In other words, settings that provide for contact with nature may provide useful venues for social interaction and privacy opportunities. Clearly the sample of studies comprising our database may not be representative of all relevant research and hidden alternative causes may exist. Nor can these categorizations unveil underlying explanations for these associations. Nonetheless the analysis serves as a basis for future explorations.

4. Implications and applications

The 90 empirical studies published in the 16-year span in *LUP* that constitute our database offer some important insights and mandates. These have implications for urban planners, landscape architects, architects, and other professional designers as well as citizen groups, members of homeowner associations, and others concerned about the relationship between the urban environment and human well-being. Appendix A provides a sense of some of the findings and conclusions by quotes from a sample of the studies. Here we offer some major conclusions that are derived from these studies.

4.1. A consistent and persistent message

The international scope of the articles we examined shows substantial consistency with respect to the role played by the outdoor environment. Perhaps the most prominent findings emerging from this review are the strong confirmation of the importance of the nearby natural environment to human well-being and the remarkable similarities that exist worldwide concerning these six human needs in the urban landscape. Spaces that address people's needs for contact with nature can be small

or large, on a rooftop or along a linear path. They need to be available in residential settings, and also at workplaces, schools, retirement homes, and health facilities. Although the needs are addressed in different ways in separate regions of the world, the nature of the needs themselves is very similar across diverse cultures and political systems. Wherever they may be, urban residents express a desire for contact with nature and each other, attractive environments, places for recreation and play, privacy, a more active role in the design of their community, and a sense of community identity.

4.2. Theme and variation

While the importance of nearby nature is a constant, people of different ages, gender, and socio-economic status can differ greatly in how they use and perceive both built and more natural urban landscapes. Many of these differences are shared across diverse cultures. For example, younger people throughout the world are attracted to more active pursuits (e.g., sports, interactive play with landscape features), while adults and the elderly are more likely to enjoy nature opportunities that afford contemplation (Chiesura, 2004; Crow et al., 2006; Oguz, 2000; Oku and Fukamachi, 2006; Sherman et al., 2005). Residents of higher socio-economic status also use or value urban nature areas to a greater degree than those of lower means (Balram and Dragičević, 2005; Crow et al., 2006; Damigos and Kaliampakos, 2003; Dökmeci and Berköz, 2000; Lindsey, 1999; Roovers et al., 2002; Shafer et al., 2000; Vogt and Marans, 2004) and live in neighborhoods richer in vegetation (Martin et al., 2004). The socio-economic differences, however, may be a reflection of how richer people use their resources rather than an expression of differential preferences, benefits, or desires.

4.3. Participation as a vital tool

Conflicts can arise while trying to satisfy some of these needs in the design of urban landscapes. For example, contact with nature can clash with recreational needs when the preservation of ecological reserves are involved (Gobster, 2001). Likewise, aesthetic preference can conflict with human recreational desires

(Asakawa et al., 2004) or ecological issues (Hands and Brown, 2002; Schauman and Salisbury, 1998).

Given the diverse and potentially conflicting needs and preferences, a balance must be sought to attain wide public support. As some of these studies demonstrate, people's desire to participate in decisions that affect them is expressed in many nature-based situations. Given the importance that such settings play, involving local groups early in the planning process is particularly valuable. Conflicts can be anticipated and addressed in the design solutions of sites and facilities. Participation can also lead to outcomes that respect the local culture, religion, or history of the community. Although one can argue that the six needs investigated in this review are universally desired, the ways to address them are not universal and require sensitivity to local circumstances.

4.4. *Before it is too late*

As Tables 2 and 3 show, a wide variety of spaces can meet the same needs and a particular setting can meet multiple needs. For example, nature settings often enhance social interactions which, in turn, can help foster a sense of community. Nature elements are also particularly effective in creating privacy in an outdoor space. Thus, loss of nearby natural settings can lead to ramifying negative consequences. In addition, some researchers, particularly in the Middle East (Abu-Ghazzeh, 1996; Al-Hathloul and Mughal, 1999; Saleh, 1999), place much of the blame for the breakdown of traditional community social networks on the nontraditional Western-style residential layouts currently being introduced. The studies reviewed here offer substantial evidence that the design of urban landscapes strongly influences the behavior and well-being of users. Valuable lessons can be learned from planning successes, and mistakes.

4.5. *A need for continued research*

LUP is not the only journal that has included studies addressing the themes we have discussed. In fact, the articles in our database can serve as useful resources for accessing the larger literature. As such, conclusions based on these 90 studies may offer a limited perspective of what has been done and what future needs might be. Furthermore, the presentation here has not focused on the specific findings of the 90 studies, but rather the emphasis is on the questions to which they contribute understanding. At the same time, however, by selecting empirical articles that have received close peer scrutiny this review highlights an important set of publications. Moreover, the focus on *LUP* is appropriate given its far-reaching international and interdisciplinary audiences and its high impact factor, 2.03. (The Journal Citation Report, published by Thomson Institute for Scientific Information [ISI], shows *LUP*'s 2006 Journal Impact Factor, as the highest for journals addressing urban environmental issues.)

While having widespread applicability, the themes discussed here also call for needed research. There remains much to be learned about the relationships among the six human

needs examined here and other issues not discussed in this paper.

With the rapid urbanization of the countryside around the world, it is important to examine issues of scale in terms of human benefits. There is a tension between protecting large-scale tracts of land and providing small areas that afford frequent nature opportunities. How do communities approach this tension?

Complementary to evidence of increased crime when opportunities for nature are undermined, would be the further substantiation of increased sense of community identity and civility in places that address people's needs for nearby nature.

It would be valuable to study examples of different participatory approaches as means of respecting local patterns. How much of the increase in social disorder might be attributed to changes in the physical environment as compared to cultural, political, or economic factors resulting from rapid social change and modern urbanization? Research on the individual and community benefits derived from programs that encourage such participation with respect to nature-based activities could lead to wider adoption of such programs. Such environments, in turn, not only meet Nature-based needs, but also provide opportunities for fulfilling Human-interaction needs.

Although we have organized this collection of human needs into six categories within two general groupings, it is important to be reminded that these needs often interact with each other. Within a given urban setting, addressing one need can affect the fulfillment of other purposes. These needs may also interact with political, cultural, historical, religious, economic, circulation, or security issues not investigated in this paper, as well as important ecological requirements of the local natural environment.

The studies published in *LUP* in the last 16 years make a substantial contribution in providing a wealth of information about meeting people's needs in urban landscapes. Settings that properly provide for these needs will result in healthier, more effective, and more socially involved urban inhabitants. We look forward to the insights to be gained in the decades ahead.

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Appendix A

Sample of findings and conclusions that address the combination of contact with Nature- and Human-interaction-based needs.

Type of site	Researchers	Method	Findings/conclusions	
			Nature contact	Human interaction
Green open spaces–residential neighborhood	Austin (2004)	Interview	“Eleven of the 15 residents expressed pleasure with respect to the ‘openness’ of their neighborhood. A second benefit, expressed by eight residents, pertained to viewing natural settings or appreciating the easy access they have to nature from their home” (pp. 248–249)	“The open space conservation subdivision seems to provide the preservation of natural resources in the form of open space, while at the same time offering opportunities for residents to take a more active role in managing these resources” (p. 252)
Greenways	Shafer et al. (2000)	Survey	“Respondents indicated that trails have contributed most to community quality of life through health and fitness, the provision of natural areas, accessible recreation, land use patterns, pride in the community, and community identity.” (p. 173)	
	Tan (2006)	Case study	“Singapore looks forward to completing its network of greenways to connect people to places wherein to experience life’s essential moments of rest, recreation and wellbeing” (p. 65)	“Greenways, with their multifunctional capacity, have great potential in the areas of recreation, nature conservation, education and community bonding” (p. 65)
	Taylor et al. (1995)	Case study	“This ‘ecosystem approach’ as defined includes ‘the whole system, not just parts of it; focuses on the interrelationships among resources and land use; understands that humans are part of nature, not separate from it;’” (p. 57)	“A review of the case study findings suggests that planners of future greenways need to gather public support by informing and involving local citizenry;” (p. 63)
	Yokohari et al. (2006)	Case study	“Their rich vegetation was intended to shield them from automobiles and also from their urban surroundings to evoke the nature that existed before the New Town was built” (p. 217)	“We would like to suggest that public involvement offers a solution for planning, designing and maintaining greenways” (p. 220)
Hospital grounds	Barnhart et al. (1998)	Survey	“Fifty-one percent of the patient scores indicate a preference for natural settings, 31% for mixed built-natural settings and 18% for built settings (p. 153)	“Both staff and patients predominantly selected natural and open settings as their first choice for passive behaviours such as: ‘sitting watching others,’ ‘sitting viewing scenery,’ ‘sitting with others watching outdoor sports’
Park	Chiesura (2004)	Survey	“‘To listen and observe nature’ constitutes another important motive to visit the park (54.4%)” (p. 133) “While sporting and meeting other people apply more to the youngest age-categories, the other motives and activities – relax, stay with children and contemplating nature – seem preferred by adult and elderly visitors” (p. 134)	
	Gobster (2001)	Workshops and focus groups	“The chief purpose of nature. would be to provide people with an aesthetic experience” (p. 40)	“By working to integrate the different visions of nature expressed by the parks’ stakeholders and protecting the icons that they value most highly, park planners and landscape architects can build the cultural support needed to sustain natural processes and functions” (p. 50)
	Oguz (2000)	Interview	“Attractive features of the parks such as pleasant landscape and visual elements, nearness to water, peaceful atmosphere were listed as the primary reasons of satisfaction by all users” (p. 170) The main objectives of park use were “to spend time in the open air, to rest and contemplate by water and green areas, to meet and chat with friends and to get rid of the pressures of urban life” (p. 170)	
	Özgüner and Kendle (2006)	Survey	“Endcliffe Park is regarded as a place in which the majority of respondents better experience the ‘sense of naturalness’ (55%) and ‘freedom’ (63.4%) and ‘socialise’ (68.1%) better than the Botanical Garden” (p. 148)	
Residential neighborhood	Abu-Ghazzeh (1996)	Interview and observations	“The role of natural environmental quality has been a neglected aspect of open-space design in Abu-Nuseir. . . Most users of neighborhood communal spaces value natural vegetation and rate trees as one of the most desirable elements in outdoor areas” (p. 213)	“Concentrating on economy, the designer ignored those factors that make a neighborhood space suitable and livable and that allow for the growth of individuals and their community in a context of holistic development” (p. 209)

Appendix A (Continued)

Type of site	Researchers	Method	Findings/conclusions	
			Nature contact	Human interaction
	Crow et al. (2006)	Survey	“Residents in both communities perceived having ‘nature right outside my door’ and residents in both communities found this perceived proximity to nature as contributing to their sense of well being, satisfaction, and comfort” (p. 297)	“Berwyn residents ranked social atmosphere for the community and locomotion (wayfinding) highest among the seven community attribute categories” (p. 282)
	Dökmeci and Berköz (2000)	Survey	“The older people do care more for green areas and view than the other groups; probably, they have more time to enjoy the natural beauty of Istanbul” (p. 52)	“The most important reasons for the middle-age group is proximity to relatives, then followed by job location, a clean and quiet environment, social environment and amenities” (p. 51)
	Hull et al. (1994)	Interview	“The frequency with which trees (17%) and parks and gardens (13%) were mentioned illustrates a powerful bond between people and nature” (p. 117)	“Residents’ explanation for why these icons were special fell into six major categories . . . connections to residents’ pasts; symbolize the social groups to which residents belonged or with which they identified; gave the community its distinctive character; satisfied important functional needs; evoked emotions or feelings; and served as reminders of personal accomplishments and concerns” (p. 109)
	Lucy and Phillips (1997)	Case study	“Four factors explain exurbanization. They include: the latent antiurban and rural location preferences of U.S. households” (p. 261)	“The role of planning and design includes creating and adapting physical characteristics which help turn territories into places and communities or enhance the place status that has previously been achieved. If suburban territories are regarded as places toward which people feel community attachments, then suburban decline is less likely to lead to severe deterioration” (p. 274)
	Vogt and Marans (2004)	Survey and focus groups	“For those who recently purchased homes in open space neighborhoods, its natural and openness features overshadowed considerations of neighborhood location, schools, and proximity to job, while for the general population survey the findings were roughly reversed. (p. 267)	“We wanted a rural feeling to our neighborhood, where there is space between homes. We wanted to be set back from major roads and nearby highway access” (p. 267)
Rooftop gardens	Yuen and Hien (2005)	Interview	“She joined other respondents who were mothers with young children to suggest that roof gardens should be provided with more plants that would become the ‘honeypot’ of insects (such as butterfly and caterpillar) where their children could observe nature at close range and develop an interest in nature that may otherwise be lost in the congestion of urban life. They were keen to see more nature and less concrete in the garden” (p. 272)	“Many, especially those living near the roof gardens, appreciated the roof gardens as a space where they can bring their children to play, entertain visiting friends, hold block parties or just be alone” (p. 272)
School play yards	Herrington and Studtmann (1998)	Observation	“Contact with natural elements in outdoor play environments is a vanishing experience of childhood. The play yards associated with these settings could become one of the primary places where young children could gain experiences with nature” (p. 204)	“Connections between how a child develops socially, physically, emotionally, and cognitively, and the particulars of their outdoor environment are paramount for identifying processes and methods that will produce quality outdoor environments for children” (p. 204)
Stream corridors	Asakawa et al. (2004)	Survey	“The main factors accounting for residents’ perceptions toward the stream corridors were recreational use, participation, nature and scenery, sanitary management, and water safety” (p. 180)	
Woodland or forests-urban	Coles and Bussey (2000)	Survey, interview, and focus groups	“The emotional feelings of those visiting urban woodlands included . . . happy, relaxed, and close to nature; a secondary group included explore and uplifted; . . .” (p. 183)	“The most valuable urban woodlands present a refuge away from urban life and probably human (urban) activity.” (p. 185)

Appendix A (Continued)

Type of site	Researchers	Method	Findings/conclusions	
			Nature contact	Human interaction
	Simson (2000)	Case study	“Initial investigations would suggest that the urban woodland/open space structure of Telford is, by and large, very successful and much loved by the local people (Wrekin Council, 1993; Simson, 1998b)” (p. 194)	“The author believes there are advantages in such diversity: the variety of species gives rise to “local distinctiveness”, an important aspect of the design of large areas of new development; different species can help to establish “place” in the minds of new residents and children;” (p. 194)

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