

RESOURCE INFORMATION ABOUT THE EVIDENCE-BASED IMPORTANCE OF URBAN GREENSPACE FOR INDIVIDUAL AND CIVIC WELL-BEING

The topics below relate to ways in which urban greenspace has been shown to improve individual and civic well-being.

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[Activity, encouragement of](#)

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Violence (see [Safety](#))

Mental fatigue (see [Cognitive functioning](#))

[Work settings](#)

Activity, encouragement of

Coley, R.L., Kuo, F.E., & Sullivan, W.C. (1997). "Where does community grow? The social context created by nature in urban public housing." *Environment & Behavior*, 29(4), 468-494.

In a study of relatively green spaces within inner-city public housing developments, "results consistently indicated that landscaping encourages greater use of outdoor areas by residents. Spaces with trees attracted larger groups of people, as well as more mixed groups of youth and adults, than did spaces devoid of nature. In addition, more dense groupings of trees and trees that are located close to public housing buildings attracted larger groups of people." The article reflects on relationships discussed in other articles by the authors, such as the development of neighborhood social ties, sense of personal efficacy, and crime and safety.

[Read this article](#)

Kuo, F.E., Sullivan, W.C., Coley, R.L., & Brunson, L. (1998). Fertile ground for community: Inner-city neighborhood common spaces. *American Journal of Community Psychology*, 26(6), 823-851.

In a study of residents of an inner-city housing development, it was found that neighborhood social ties—a measure of sense of community—were stronger among residents who lived close to greener open spaces: "[T]he more vegetation in a common space, the stronger the neighborhood ties near that space—compared to residents living adjacent to nearly barren spaces, individuals living near to greener common spaces had more social activities and more visitors, knew more of their neighbors, reported that their neighbors were more concerned with helping and supporting one another, and had stronger feelings of belonging." The article includes an extensive discussion of the importance of neighborhood social ties, particularly for lower-income individuals.

[Read this article](#)

Sullivan, W.C., Kuo, F.E., & DePooter, S.F. (2004). The fruit of urban nature: Vital neighborhood spaces. *Environment & Behavior*, 36(5), 678-700.

Within a low-rise urban housing development, residents' use of space for individual activity and social interaction was measured, comparing relatively green areas with relatively barren areas. Significantly greater use and interaction was measured in the greener areas. This was particularly true for women, and not true for teens. "Trees and grass help create vital neighborhood spaces in inner-city settings," the authors conclude. This article includes a thorough summary of many other articles relating to the impacts of green space on urban individuals.

[Read this article](#)

Taylor, A.F., Wiley, A., Kuo, F.E., & Sullivan, W.C. (1998). Growing up in the inner city: Green spaces as places to grow. *Environment & Behavior*, (30)1, 3-27.

Observing children within 64 low-rise courtyards in an inner-city housing project, researchers found: “There was more play, and more creative play, in spaces that had more trees.” And “Children had more access to adults in greener spaces than they did in more barren spaces....Children had *double* the access to adult attention when higher levels of vegetation were present.”

[Read this article](#)

ADD/ADHD

Faber Taylor, A. & Kuo, F.E. (2009). Children with attention deficits concentrate better after walk in the park. *Journal of Attention Disorders*, 12, 402-409.

Children diagnosed with Attention Deficit/Hyperactivity Disorder went on twenty-minute individual guided walks in a city park, a well-kept urban neighborhood, and a well-kept urban downtown. The walks took place at one-week intervals. They concentrated better after the walk in the park than after the downtown walk or the neighborhood walk. “Twenty minutes in a park setting was sufficient to elevate attention performance relative to the same amount of time in other settings. These findings indicate that environments can enhance attention not only in the general population but also in ADHD populations. ‘Doses of nature’ might serve as a safe, inexpensive, widely accessible new tool in the tool kit for managing ADHD symptoms.”

[Read this article](#)

Faber Taylor, A., Kuo, F.E., & Sullivan, W.C. (2001). Coping with ADD: The surprising connection to green play settings. *Environment & Behavior*, 33(1), 54-77.

In a study of children with Attention Deficit Disorder, reports from the children’s parents showed that the children’s symptoms were more manageable after activities in green outdoor settings than after activities in other settings (indoors and in built outdoor settings). Moreover: “Although the greenness of a child’s residential setting was unrelated to the severity of their ADD symptoms, the greenness of their play setting was related to symptom severity.... Children who played in windowless indoor settings had significantly more severe symptoms than children who played in grassy outdoor spaces with or without trees did.”

[Read this article](#)

Kuo, F.E., & Faber Taylor, A. (2004). A potential natural treatment for Attention-Deficit/Hyperactivity Disorder: Evidence from a national study. *American Journal of Public Health*, 94(9), 1580-1586.

Parents rated the aftereffects of 49 common after-school and weekend activities on children’s ADHD symptoms. Green outdoor activities reduced symptoms significantly more than did activities conducted in other settings; findings were

consistent across age, gender, and income groups, community types, geographic regions, and diagnoses.

[Read this article](#)

Asthma

Kimes, D., Ullah, A., Levine, E., Nelson, R., Timmins, S., Weiss, S., Bollinger, M., Blaisdell, C. Relationships between pediatric asthma and socioeconomic/urban variables in Baltimore, Maryland. *Health and Place*. 2004; 10:141–152.

Using satellite data, the researchers found (among other things) that urban areas with the highest asthma hospitalization rates have the lowest vegetation cover.

[Read an abstract of this article](#) [\$ for full text]

Attention restoration theory

Kuo, F.E. (2001). Coping with poverty: Impacts of environment and attention in the inner city. *Environment & Behavior*, 33(1), 5-34.

When residents of housing with low levels of nearby vegetation (some grass and trees) were compared to residents of similar housing with no nearby vegetation (just concrete and asphalt), “[I] individuals who had some nearby vegetation were significantly more effective in managing their major life issues than were their counterparts living in barren environments.” Because the more effective residents were also more successful at tests that measure the ability to pay attention, the difference is ascribed to Attention Restoration Theory.

The author states: “Research and theory on coping has focused almost exclusively on social support as an external resource for coping; this work suggests that the physical context matters as well and points to a possible new focus for intervention efforts.... This study suggests that, in poor inner-city neighborhoods, planting a few trees may help provide individuals and families the psychological resources needed to ‘take arms against a sea of troubles.’”

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[Read this article](#)

Faber Taylor, A., Kuo, F.E., & Sullivan, W.C. (2002). Views of nature and self-discipline: Evidence from inner-city children. *Journal of Environmental Psychology, Special Issue: Environment and Children*, 22, 49-63.

For girls, the more that a view from the apartments where they lived contained natural elements as opposed to man-made ones, the higher their self-discipline related to concentration, impulse inhibition, and delay of gratification was found to be. Attention Restoration Theory is offered as an explanatory mechanism for this connection.

No connection between view and self-discipline was found for boys in the study. The researchers suggest this might result from the fact that boys usually play farther from home than girls. "Consistent with this, findings from a previous study indicated that boys' attentional functioning was not related to the level of nature immediately around their home, but was related to the level of nature in their usual play space." (See "[Coping with ADD](#)").

The researchers also suggest: "These findings raise the possibility that incorporating trees and grass in schoolyards could play an important role in the classroom. Perhaps after spending breaks in green schoolyards, children return to their classrooms better prepared to pay attention, to suppress disruptive impulses, and to wait patiently for future breaks."

[Read this article](#)

Faber Taylor, A. & Kuo, F.E. (2006). Is contact with nature important for healthy child development? State of the evidence. In Spencer, C. & Blades, M. (Eds.), *Children and Their Environments: Learning, Using and Designing Spaces*. Cambridge University Press, Cambridge, U.K.

After describing the methodological limitations of most studies regarding the relationship between nature and child development, the authors nonetheless conclude: "[G]iven the pattern of findings pointing in the same direction and

persisting across different sub-populations of children and in different settings...current evidence suggests that the general hypothesis may be correct: contact with nature is supportive of healthy child development in several domains—cognitive, social, and emotional. Until proven otherwise, we may continue to assume that, just as they need good nutrition and adequate sleep, children may very well need contact with nature.”

[Read this article](#)

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[Read an abstract of this article](#) [\$ for full text]

Wells, N.M. (2000). At home with nature—Effects of “greenness” on children's cognitive functioning. *Environment and Behavior*, 32, 775-795:

17 children of low-income families that moved into new housing were assessed for the quality of their cognitive functioning; their capacity to focus or direct their attention. The researcher concluded: “Children whose homes improved the most in terms of greenness following relocation also tended to have the highest levels of cognitive functioning following the move.”

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Cognitive functioning

Wells, N.M. (2000). At home with nature - Effects of “greenness” on children's cognitive functioning. *Environment and Behavior*, 32, 775-795:
http://www.sfrc.ufl.edu/urbanforestry/Resources/PDF%20downloads/Wells_2000.pdf

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Cimprich, Bernadine and Ronis, D.L. “An Environmental Intervention to Restore Attention in Women with Newly Diagnosed Breast Cancer.” *Cancer Nursing*. 26 (4): 284-292 Aug 2003. ABSTRACT
http://journals.lww.com/cancernursingonline/Abstract/2003/08000/An_Environmental_Intervention_to_Restore_Attention.5.aspx (\$)

This dissertation studied recovering breast-cancer patients engaged in gardening activity programs. Compared to another recovering group who were not given such an opportunity, the patients who undertook nature activities three times a week for ninety days had far less tendency to complain of mental fatigue, depression, marital problems, or a general inability to cope. They scored significantly higher on tests of cognitive acuity than their counterparts. They were far more likely to go back to work full-time and tackle new projects, such as losing weight or learning a foreign language.

Concentration (see also Self-discipline)

Ottosson, J., Grahn, P.A. (2005). Comparison of leisure time spent in a garden with leisure time spent indoors on measures of restoration in residents in geriatric care. *Landscape Research*, 30, 23-55. ABSTRACT:
<http://www.ingentaconnect.com/content/routledg/clar/2005/00000030/00000001/art0002> (\$)

In this study involving “very elderly nursing-home patients,” the researchers state: “The results indicate that powers of concentration increase for very elderly people after a visit to a garden outside the geriatric home in which they live, compared to that after resting indoors in their favorite room. The results did not show any effects on blood pressure or heart rate. It is suggested that having a one-hour rest outdoors in a garden setting plays a role in elderly people's powers of concentration, and could thereby affect their performance of activities of daily living.”

Hartig, T., Mang, M. and Evans, G. W. (1991) Restorative effects of natural environment experiences. *Environment and Behavior*, 23, 3–26. Abstract:
<http://eab.sagepub.com/cgi/content/abstract/23/1/3> (\$)

The researchers compared the effects, among college students, of a walk in a natural setting, a walk in an urban setting, and relaxing in a comfortable chair, finding that mental fatigue was most successfully relieved by a walk in a park.

Coping skills

[Kuo, F.E. \(2001\). Coping with poverty: Impacts of environment and attention in the inner city. *Environment & Behavior*, 33\(1\), 5-34.](#)

When residents of housing with low levels of nearby vegetation (some grass and trees) were compared to residents of similar housing with no nearby vegetation (just concrete and asphalt), “[I] individuals who had some nearby vegetation were significantly more effective in managing their major life issues than were their counterparts living in barren environments.” Because the more effective residents were also more successful at tests that measure the ability to pay attention, the difference is ascribed to Attention Restoration Theory. The author states: “Research and theory on coping has focused almost exclusively on social support as an external resource for coping; this work suggests that the physical context matters as well and points to a possible new focus for intervention efforts.... This study suggests that, in poor inner-city neighborhoods, planting a few trees may help provide individuals and families the psychological resources needed to ‘take arms against a sea of troubles.’”

R. Kaplan, S. Kaplan, and R. L. Ryan (1998) *With people in mind: Design and management of everyday nature*. Washington, DC: Island Press.

A study reported in this book shows that workers with a view of natural elements, such as trees and flowers, experienced less job pressure, were more satisfied with their jobs and reported fewer ailments and headaches than those who either had no outside view or could only see built elements from their windows. Moreover, simply the knowledge that the view was available was important to the employees, even if they did not take advantage of it.

Leather, P., Pyrgas, M., Beale, D. and Lawrence, C. (1998) *Windows in the workplace. *Environment and Behavior*, 30, 739–763.*

<http://eab.sagepub.com/cgi/content/abstract/30/6/739>

In a non-urban factory, 100 workers were studied to determine the attitudinal effects of direct sunlight, views of nature, and higher levels of illumination. The researchers report: “A view of natural elements (i.e., trees, vegetation, plants, and foliage) was found to buffer the negative impact of job stress on intention to quit and to have a similar, albeit marginal, effect on general well-being.”

Cimprich, Bernadine and Ronis, D.L. “An Environmental Intervention to Restore Attention in Women with Newly Diagnosed Breast Cancer.” *Cancer Nursing*. 26 (4): 284-292 Aug 2003. ABSTRACT

http://journals.lww.com/cancernursingonline/Abstract/2003/08000/An_Environmental_Intervention_to_Restore_Attention.5.aspx (\$)

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such an opportunity, the patients who undertook nature activities three times a week for ninety days had far less tendency to complain of mental fatigue, depression, marital problems, or a general inability to cope. They scored significantly higher on tests of cognitive acuity than their counterparts. They were far more likely to go back to work full-time and tackle new projects, such as losing weight or learning a foreign language.

Defensible space theory

[Kuo, F.E. \(2003\). The role of arboriculture in a healthy social ecology: Invited review article for a Special Section. *Journal of Arboriculture* 29\(3\), 148-155.](#)

In this summary of research findings, the author suggests that defensible space theory helps explain why trees and grass cover have been shown to be “systematically linked to...stronger ties among neighbors, greater sense of safety and adjustment, more supervision of children in outdoor spaces, healthier patterns of children’s play, greater use of neighborhood common spaces, fewer incivilities, fewer property crimes, and fewer violent crimes.”

Economic value

Harnik, P., Welle, B. (2009) Measuring the economic benefit of a city park system. Philadelphia : The Trust for Public Land.

http://www.tpl.org/tier3_cd.cfm?content_item_id=22879&folder_id=3208

(Complete form to download)

Acknowledging, “Determining the economic value of a city park system is a science still in its infancy,” the authors describe and apply ways of measuring economic benefits from such park systems with regard to hedonic/property values, tourism, direct use, health, community cohesion, and management of stormwater runoff and air pollution.

Been, V. and Voicu, I. The Effect of Community Gardens on Neighboring Property Values: Working Paper 06–01 Furman Center for Real Estate & Urban Policy New York University School of Law and Wagner School of Public Service March 16, 2006 **THIS IS BEN’S: GET A URL??**

Reviewing community gardens in New York City, the authors conclude: “[C]ommunity gardens have significant positive effects on surrounding property values in all neighborhoods, and that those effects are substantial in the poorest of host neighborhoods (raising neighboring property values by as much as 9.5 percentage points within five years of the garden’s opening).”

Elderly

Ottosson, J., Grahn, P.A. (2005). Comparison of leisure time spent in a garden with leisure time spent indoors on measures of restoration in residents in geriatric care. *Landscape Research*, 30, 23-55. ABSTRACT:

<http://www.ingentaconnect.com/content/routledg/clar/2005/00000030/00000001/art00002> (\$)

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Takano, T., Nakamura K., Watanabe M. (2002). Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable green spaces. *Journal of Epidemiology and Community Health*, 56, 913-918. Ulrich, R.S., Simons, R.F., Miles, M.A. (2003). <http://jech.bmj.com/content/56/12/913.full> (requires free registration)

In Tokyo, longevity of populations of elderly citizens (86, 81, 76, and 71 years old) was compared with the presence of walkable green spaces. The researchers concluded: “Living in areas with walkable green spaces positively influenced the longevity of urban senior citizens independent of their age, sex, marital status, baseline functional status, and socioeconomic status.”

Health, Mental

Sugiyama, T., Leslie, E., Giles-Corti, B., Owen, N. (2008). Associations of neighbourhood greenness with physical and mental health: do walking, social coherence and local social interaction explain the relationships? *Journal of Epidemiology and Community Health*, 62, e9. ABSTRACT: <http://jech.bmj.com/content/62/5/e9.abstract> (\$)

Adults in Adelaide, Australia were surveyed regarding their physical and mental health, the amount of greenspace in their neighborhoods, and their levels of physical activity. The researchers state: “Perceived neighbourhood greenness was more strongly associated with mental health than it was with physical health. Recreational walking seemed to explain the link between greenness and physical health, whereas the relationship between greenness and mental health was only partly accounted for by recreational walking and social coherence.”

Pretty, J., Peacock, J., Sellens, M., Griffin, M. Mental and physical health outcomes of green exercise. *International Journal of Environmental Health Research* October 2005; 15(5): 319 – 337: <https://www.essex.ac.uk/bs/staff/pretty/IJEHR%20Green%20exercise%20%28Pretty%20et%20al%202005%29.pdf>

While exercising on a treadmill, the study subjects were exposed to a sequence of 30 scenes projected on a wall; the scenes were “rural pleasant, rural unpleasant, urban pleasant and urban unpleasant.” Both rural and urban pleasant scenes produced a significantly greater positive effect on self-esteem than the

exercise-only control. “This shows the synergistic effect of green exercise in both rural and urban environments. By contrast, both rural and urban unpleasant scenes reduced the positive effects of exercise on self-esteem.”

Maas J, Verheij RA, de Vries S, Spreeuwenberg P, Schellevis FG, Groenewegen PP **Morbidity is related to a green living environment.** *J Epidemiol Community Health.* 2009 Dec;63(12):967-73. Epub 2009 Oct 15 ABSTRACT
<http://jech.bmj.com/content/early/2009/10/15/jech.2008.079038.abstract> (\$)

Morbidity data were derived from electronic medical records of 195 general practitioners in 96 Dutch practices, serving a population of 345,143 people, and the percentage of green space within a 1 km and 3 km radius around the postal code coordinates was derived from an existing database and was calculated for each household. The researchers state: “The annual prevalence rate of 15 of the 24 disease clusters was lower in living environments with more green space in a 1 km radius. The relation was strongest for anxiety disorder and depression. The relation was stronger for children and people with a lower socioeconomic status.... The study stresses the importance of green space close to home for children and lower socioeconomic groups.”

Maas, J, van Dillen, S., Verheij, R., Groenewegen, P. (2008) Social contacts as a possible mechanism behind the relation between green space and health. *Health Place.* Jun;15(2):586-95. ABSTRACT:
[http://www.ncbi.nlm.nih.gov/pubmed/19022699?ordinalpos=1&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_SingleItemSuppl.Pubmed_Discovery_RA&linkpos=3&log\\$=relatedarticles&logdbfrom=pubmed](http://www.ncbi.nlm.nih.gov/pubmed/19022699?ordinalpos=1&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_SingleItemSuppl.Pubmed_Discovery_RA&linkpos=3&log$=relatedarticles&logdbfrom=pubmed) (\$)

This study involving 10,089 residents of the Netherlands explored whether social contacts are an underlying mechanism behind the relationship between green space and health. The researchers report: “After adjustment for socio-economic and demographic characteristics, less green space in people's living environment coincided with feelings of loneliness and with perceived shortage of social support.”



Maller, C., Townsend, M., Pryor, A., Brown, P., and St. Leger, L. (2005) Healthy nature healthy people: ‘contact with nature’ as an upstream health promotion intervention for populations *Health Promotion International*, Vol. 21 No. 1 :
<http://heapro.oxfordjournals.org/cgi/reprint/21/1/45>

A survey of the anecdotal, theoretical, and experimental evidence that nature promotes health, in support of the authors’ contention that “In the context of the growing worldwide mental illness burden of disease, contact with nature may offer an affordable, accessible and equitable choice in tackling the imminent epidemic, within both preventative and restorative public health strategies.”

Mind. Ecotherapy: the green agenda for mental health. London: Mind; 2007.
http://www.mind.org.uk/assets/0000/2138/ecotherapy_report.pdf

This report includes a study that compared a walk in nature with a walk in a shopping mall (pages 18-25). Compared to those who participated in the mall walk, participants in the nature walk reported stronger increases in self-esteem,

greater reduction in feelings of depression, and greater improvements in many aspects of mood.

Sandra A. Sherman^a, James W. Varni^b,  , Roger S. Ulrich^c and Vanessa L. Malcarne^d Post-occupancy evaluation of healing gardens in a pediatric cancer center *Landscape and Urban Planning* Volume 73, Issues 2-3, 15 October 2005, Pages 167-183 http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V91-4F60NDR-2&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&_docanchor=&_view=c&_searchStrId=1165023090&_rerunOrigin=scholar.google&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=4ff079f32c97d5f393c2ccac958e84c3

ABSTRACT (\$)

In this study of 1400 users of hospital gardens, “preliminary data suggest that emotional distress and pain are lower for all groups when in the gardens than when inside the hospital.”

Health, Physical

[Faber Taylor, A., Kuo, F.E., & Sullivan, W.C. \(2001\). Coping with ADD: The surprising connection to green play settings. *Environment & Behavior*, 33\(1\), 54-77.](#)

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Hu, Z., Liebens, J., Ranga, K.R. (2008). Linking stroke mortality with air pollution, income, and greenness in northwest Florida: An ecological geographical study. *International Journal of Health Geographics*, 7, Article number 20. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2396612/>

This study across a broad geographic area shows that “exposure to more green space could reduce the risk of stroke mortality.” The authors state: “The empirical result in this study supports the “salutary” effects of the exposure to natural environments on human health as well as the significance of residential environments to counteract “sedentary” lifestyles and that greening of urban areas could make a contribution to increase physical activity.”

Kimes, D., Ullah, A., Levine, E., Nelson, R., Timmins, S., Weiss, S., Bollinger, ME., Blaisdell, C. Relationships between pediatric asthma and socioeconomic/urban variables in Baltimore, Maryland. *Health Place*. 2004;10:141–152.. http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VH5-49FB9GP-1&_user=10&_coverDate=06%2F30%2F2004&_rdoc=1&_fmt=high&_orig=search&_sort=d&_docanchor=&_view=c&_searchStrId=1190840278&_rerunOrigin=schola

[r.google& acct=C000050221& version=1& urlVersion=0& userid=10&md5=2b275f6a25745e983064989eeb9d09ae](http://r.google&acct=C000050221&version=1&urlVersion=0&userid=10&md5=2b275f6a25745e983064989eeb9d09ae)

Using satellite data, the researchers found that urban areas with the highest asthma hospitalization rates have the lowest vegetation cover.

Mitchell, R., & Popham, F. (2008). Effect of exposure to natural environment on health inequalities: An observational population study. *Lancet*, 9650, 1655-1660. <http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2808%2961689-X/fulltext> (requires brief free registration)

In this study of the entire below-retirement-age population of England, the researchers found that the presence of green spaces counteracts some of the health inequalities of lower-income people: “The inequality in all-cause and circulatory disease mortality related to income deprivation is lower in populations who live in the greenest areas than in those who have less exposure to green space. We also noted an independent association between residence in the most green areas and decreased rates for all-cause and circulatory mortality.”

Mitchell, R., & Popham, F. (2007). Greenspace, urbanity and health: Relationships in England. *Journal of Epidemiology and Community Health*, 61, 681-683. <http://jech.bmj.com/content/61/8/681.full>

This study, conducted in England, compared the quantity of greenspace in a number of areas with general health data for those areas. The researchers state: “In general, a greater proportion of greenspace was associated with better health.... The association varied according to the combination of area income deprivation and urbanity. It held in all urban areas and rural low-income areas, but there was no significant association between greenspace and health in higher income suburban and higher income rural areas.”

Pretty, J., Peacock, J., Sellens, M., Griffin, M. Mental and physical health outcomes of green exercise. *International Journal of Environmental Health Research* October 2005; 15(5): 319 – 337: <https://www.essex.ac.uk/bs/staff/pretty/IJEHR%20Green%20exercise%20%28Pretty%20et%20al%202005%29.pdf>

Subjects were exposed to a sequence of 30 scenes projected on a wall whilst exercising on a treadmill; the scenes were “rural pleasant, rural unpleasant, urban pleasant and urban unpleasant.” Both rural and urban pleasant scenes produced a significantly greater positive effect on self-esteem than the exercise-only control. “This shows the synergistic effect of green exercise in both rural and urban environments. By contrast, both rural and urban unpleasant scenes reduced the positive effects of exercise on self-esteem.”

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Morbidity data were derived from electronic medical records of 195 general practitioners in 96 Dutch practices, serving a population of 345,143 people, and

the percentage of green space within a 1 km and 3 km radius around the postal code coordinates was derived from an existing database and was calculated for each household. The researchers state: “The annual prevalence rate of 15 of the 24 disease clusters was lower in living environments with more green space in a 1 km radius. The relation was strongest for anxiety disorder and depression. The relation was stronger for children and people with a lower socioeconomic status.... The study stresses the importance of green space close to home for children and lower socioeconomic groups.”

Maller, C., Townsend, M., Pryor, A., Brown, P., and St. Leger, L. (2005) Healthy nature healthy people: ‘contact with nature’ as an upstream health promotion intervention for populations Health Promotion International, Vol. 21 No. 1 : <http://heapro.oxfordjournals.org/cgi/reprint/21/1/45>

A survey of the anecdotal, theoretical, and experimental evidence that nature promotes health, in support of the authors’ contention that “In the context of the growing worldwide mental illness burden of disease, contact with nature may offer an affordable, accessible and equitable choice in tackling the imminent epidemic, within both preventative and restorative public health strategies.”

Maas, J., Verheij, R.A., Groenewegen, P.P., de Vries, S., Spreeuwenberg, P. (2006). Green space, urbanity, and health: How strong is the relation? *Journal of Epidemiology and Community Health*, 60, 587-592. <http://jech.bmj.com/content/60/7/587.full> AND <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2566234/>

In this very large Dutch study, correlations were sought among self-reported health status and proximity to greenspace. The authors report: “The percentage of green space in people’s living environment showed a positive association with the perceived general health of residents. People with a greener environment within a 1 km or 3 km radius around their homes have better self perceived health than people living in a less green environment.... The overall relation is somewhat stronger for lower socioeconomic groups. Elderly, youth, and secondary educated people in large cities seem to benefit more from presence of green areas in their living environment than other groups in large cities.”



Frumkin, H. (2001) Beyond toxicity human health and the natural environment. *American Journal of Preventative Medicine*, 20, 234–240. <http://download.journals.elsevierhealth.com/pdfs/journals/0749-3797/PIIS0749379700003172.pdf>

A review of evidence (mostly non-urban) in support of the author’s conviction that natural elements might be included more in public health and patient care: “On the clinical level, this may have implications for patient care. Perhaps we will advise patients to take a few days in the country, to spend time gardening, or to adopt a pet, if clinical evidence offers support for such measures. Perhaps we will build hospitals in scenic locations, or plant gardens in rehabilitation centers. Perhaps the employers and managed care organizations that pay for health care will come to fund such interventions, especially if they prove to rival pharmaceuticals in cost and efficacy.”

Cimprich, Bernadine and Ronis, D.L. "An Environmental Intervention to Restore Attention in Women with Newly Diagnosed Breast Cancer." *Cancer Nursing*. 26 (4): 284-292 Aug 2003. ABSTRACT

http://journals.lww.com/cancernursingonline/Abstract/2003/08000/An_Environmental_Intervention_to_Restore_Attention.5.aspx (\$)

This dissertation studied recovering breast-cancer patients engaged in gardening activity programs. Compared to another recovering group who were not given such an opportunity, the patients who undertook nature activities three times a week for ninety days had far less tendency to complain of mental fatigue, depression, marital problems, or a general inability to cope. They scored significantly higher on tests of cognitive acuity than their counterparts. They were far more likely to go back to work full-time and tackle new projects, such as losing weight or learning a foreign language.

Sandra A. Sherman^a, James W. Varni^b,  , Roger S. Ulrich^c and Vanessa L. Malcarne^d Post-occupancy evaluation of healing gardens in a pediatric cancer center *Landscape and Urban Planning* Volume 73, Issues 2-3, 15 October 2005, Pages 167-183 [http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V91-](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V91-4F60NDR-)

[2&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&_docanchor=&_view=c&_searchStrId=1165023090&_rerunOrigin=scholar.google&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=4ff079f32c97d5f393c2ccac958e84c3](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V91-4F60NDR-2&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&_docanchor=&_view=c&_searchStrId=1165023090&_rerunOrigin=scholar.google&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=4ff079f32c97d5f393c2ccac958e84c3)

ABSTRACT (\$)

In this study of 1400 users of hospital gardens, "preliminary data suggest that emotional distress and pain are lower for all groups when in the gardens than when inside the hospital."

Longevity

Mitchell, R., & Popham, F. (2008). Effect of exposure to natural environment on health inequalities: An observational population study. *Lancet*, 366, 1655-1660. <http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2808%2961689-X/fulltext> (requires brief free registration)

In this study of the entire below-retirement-age population of England, the researchers found that the presence of green spaces counteracts some of the health inequalities of lower-income people: "The inequality in all-cause and circulatory disease mortality related to income deprivation is lower in populations who live in the greenest areas than in those who have less exposure to green space. We also noted an independent association between residence in the most green areas and decreased rates for all-cause and circulatory mortality."

Takano, T., Nakamura K., Watanabe M. (2002). Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable green spaces. *Journal of Epidemiology and Community Health*, 56, 913-918. Ulrich, R.S., Simons, R.F., Miles, M.A. (2003). <http://jech.bmj.com/content/56/12/913.full> (requires free registration)

In Tokyo, longevity of populations of elderly citizens (86, 81, 76, and 71 years old) was compared with the presence of walkable green spaces. The researchers concluded: “Living in areas with walkable green spaces positively influenced the longevity of urban senior citizens independent of their age, sex, marital status, baseline functional status, and socioeconomic status.”

Neighborhood Cohesion

[Coley, R.L., Kuo, F.E., & Sullivan, W.C. \(1997\). Where does community grow? The social context created by nature in urban public housing. *Environment & Behavior*, 29\(4\), 468-494.](#)

In a study of relatively green spaces within inner-city public housing developments, “results consistently indicated that landscaping encourages greater use of outdoor areas by residents. Spaces with trees attracted larger groups of people, as well as more mixed groups of youth and adults, than did spaces devoid of nature. In addition, more dense groupings of trees and trees that are located close to public housing buildings attracted larger groups of people.” The article reflects on relationships discussed in other articles by the authors, such as the development of neighborhood social ties, sense of personal efficacy, and crime and safety.

[Kuo, F.E., Sullivan, W.C., Coley, R.L., & Brunson, L. \(1998\). Fertile ground for community: Inner-city neighborhood common spaces. *American Journal of Community Psychology*, 26\(6\), 823-851.](#)

In a study of residents of an inner-city housing development, it was found that neighborhood social ties—a measure of sense of community—were stronger among residents who lived close to greener open spaces: “[T]he more vegetation in a common space, the stronger the neighborhood ties near that space—compared to residents living adjacent to nearly barren spaces, individuals living near to greener common spaces had more social activities and more visitors, knew more of their neighbors, reported that their neighbors were more concerned with helping and supporting one another, and had stronger feelings of belonging.” The article includes an extensive discussion of the importance of neighborhood social ties, particularly for lower-income individuals.

[Sullivan, W.C., Kuo, F.E., & DePooter, S.F. \(2004\). The fruit of urban nature: Vital neighborhood spaces. *Environment & Behavior*, 36\(5\), 678-700.](#)

Within a low-rise urban housing development, residents’ use of space for individual activity and social interaction was measured, comparing relatively green areas with relatively barren areas. Significantly greater use and interaction was measured in the greener areas. This was particularly true for women, and not true for teens. “Trees and grass help create vital neighborhood spaces in inner-city settings,” the authors conclude. This article includes a thorough summary of many other articles relating to the impacts of green space on urban individuals.

Overview

[Kuo, F.E. \(2003\). The role of arboriculture in a healthy social ecology: Invited review article for a Special Section. *Journal of Arboriculture* 29\(3\), 148-155.](#)

In this summary of research findings, the author suggests that defensible space theory helps explain why trees and grass cover have been shown to be “systematically linked to...stronger ties among neighbors, greater sense of safety and adjustment, more supervision of children in outdoor spaces, healthier patterns of children’s play, greater use of neighborhood common spaces, fewer incivilities, fewer property crimes, and fewer violent crimes.”

[Faber Taylor, A. & Kuo, F.E. \(2006\). Is contact with nature important for healthy child development? State of the evidence. In Spencer, C. & Blades, M. \(Eds.\), *Children and Their Environments: Learning, Using and Designing Spaces*. Cambridge University Press, Cambridge, U.K.](#)

After describing the methodological limitations of most studies regarding the relationship between nature and child development, the authors nonetheless conclude: “[G]iven the pattern of findings pointing in the same direction and persisting across different sub-populations of children and in different settings...current evidence suggests that the general hypothesis may be correct: contact with nature is supportive of healthy child development in several domains—cognitive, social, and emotional. Until proven otherwise, we may continue to assume that, just as they need good nutrition and adequate sleep, children may very well need contact with nature.”

Kuo, F.E. (2004). Horticulture, well-being, and mental health: From intuitions to evidence. In Relf, D. (Ed.), “Proceedings of the XXVI International Horticulture Congress: Expanding roles for horticulture in improving human well-being and life quality.” *Acta Horticulturae*, 639, 27-36. ABSTRACT:

http://www.actahort.org/books/639/639_2.htm (\$)

A summary of the evidence for horticultural contributions to human mental health and well-being, with a particular focus on its implications for children, the poor, and other vulnerable populations, showing outcomes that include lower rates of violent and property crime, lower incidence of aggression, greater ability to cope with poverty, better life functioning, greater life satisfaction, reduced attention deficit symptoms, and greater strength of community.

[Sullivan, W.C., Kuo, F.E., & DePooter, S.F. \(2004\). The fruit of urban nature: Vital neighborhood spaces. *Environment & Behavior*, 36\(5\), 678-700.](#)

Within a low-rise urban housing development, residents’ use of space for individual activity and social interaction was measured, comparing relatively green areas with relatively barren areas. Significantly greater use and interaction was measured in the greener areas. This was particularly true for women, and not true for teens. “Trees and grass help create vital neighborhood spaces in inner-city settings,” the authors conclude. This article includes a thorough summary of many other articles relating to the impacts of green space on urban individuals.

Maller, C., Townsend, M., Pryor, A., Brown, P., and St. Leger, L. (2005) Healthy nature healthy people: 'contact with nature' as an upstream health promotion intervention for populations Health Promotion International, Vol. 21 No. 1 : <http://heapro.oxfordjournals.org/cgi/reprint/21/1/45>

A survey of the anecdotal, theoretical, and experimental evidence that nature promotes health, in support of the authors' contention that "In the context of the growing worldwide mental illness burden of disease, contact with nature may offer an affordable, accessible and equitable choice in tackling the imminent epidemic, within both preventative and restorative public health strategies."

Frumkin, H. (2001) Beyond toxicity human health and the natural environment. *American Journal of Preventative Medicine*, 20, 234–240. <http://download.journals.elsevierhealth.com/pdfs/journals/0749-3797/PIIS0749379700003172.pdf>

A review of evidence (mostly non-urban) in support of the author's conviction that natural elements might be included more in public health and patient care: "On the clinical level, this may have implications for patient care. Perhaps we will advise patients to take a few days in the country, to spend time gardening, or to adopt a pet, if clinical evidence offers support for such measures. Perhaps we will build hospitals in scenic locations, or plant gardens in rehabilitation centers. Perhaps the employers and managed care organizations that pay for health care will come to fund such interventions, especially if they prove to rival pharmaceuticals in cost and efficacy."

Participation in horticulture activities

[Miles, I., Sullivan, W.C., & Kuo, F.E. \(2000\). Psychological Benefits of Volunteering for Restoration Projects. *Ecological Restoration*, 18\(4\), 218-227.](#)

Using written surveys completed by 100 individuals participating in prairie restoration outside of Chicago, the researchers ranked six general sources of satisfaction from that participation. In descending order, they were: involvement in meaningful action; fascination with nature; participation with others; a chance to be away; physical fitness; and personal growth.

Safety

[Kuo, F.E., & Sullivan, W.C. \(2001\). Environment and crime in the inner city: Does vegetation reduce crime? *Environment & Behavior*, 33\(3\), 343-367.](#)

Whereas dense vegetation such as thick shrubbery and groves of trees may increase crime or fear of crime, the authors suggest that "in some settings, visibility-preserving forms of vegetation may actually deter crime. Specifically, we propose that in poor inner-city neighborhoods, vegetation can inhibit crime through the following two mechanisms: by increasing surveillance and by mitigating some of the psychological precursors to violence." Surveillance is increased because more people use green spaces (and, relatedly, potential criminals may be deterred by the expectation of greater surveillance in such

spaces, even when it is not actually taking place). The propensity to violence is reduced because vegetation can reduce “attentional fatigue,” which has been shown to be related to irritability, impulsiveness, and outbursts of anger. In a comparison of 98 buildings within a housing project, with different levels of nearby vegetation, the authors found: “Compared to buildings with low levels of vegetation, those with medium levels had 42% fewer total crimes, 40% fewer property crimes, and 44% fewer violent crimes. The comparison between low and high levels of vegetation was even more striking: Buildings with high levels of vegetation had 52% fewer total crimes, 48% fewer property crimes, and 56% fewer violent crimes than buildings with low levels of vegetation.” This paper also reports “a variety of evidence suggesting that vegetation may be linked to lower levels of crime in residential neighborhoods, particularly poor inner-city neighborhoods,” showing that “residential vegetation has been linked with a greater sense of safety, fewer incivilities, and less aggressive and violent behavior.”

[Kuo, F.E., & Sullivan, W.C. \(2001\). Aggression and violence in the inner city: Effects of environment via mental fatigue. *Environment & Behavior, Special Issue 33\(4\)*, 543-571.](#)

A study of residents of an urban housing development shows that aggression is less when there is vegetation nearby than it is in more barren settings: “Nearby nature was systematically related to lower scores on multiple indices of aggression against partners and one index of aggression against children.” The research suggests that this effect relates to the attention restoration effect of nature, which combats chronic mental fatigue and fatigue-related aggression: “At this juncture, attention restoration theory provides the best explanation for the link between nature and aggression.”

[Kuo, F.E., Bacaicoa, M., & Sullivan, W.C. \(1998\). Transforming inner-city neighborhoods: Trees, sense of safety, and preference. *Environment & Behavior, 30\(1\)*, 28-59.](#)

One hundred residents of urban public housing were shown a variety of computer simulations of landscaping around their buildings and asked which landscaping they preferred and which made them feel safer. They reacted very positively to the ideas of having more trees and better grass maintenance; the highest recommended density of trees was preferred.

Both high levels of grass maintenance and high density of trees were highly correlated with the residents’ anticipated sense of safety. These findings are contradictory to many other findings; the authors speculate: “Perhaps in the context of barren inner-city no man’s lands, the presence of trees and well-maintained grass sends a positive signal, indicating to residents and possible offenders that this is a “nice” place, a civilized, cared-for place with civilized standards of behavior.”

The authors also note, “This study suggests that landscape design principles developed in the context of largely middle- or upper-income European American neighborhoods are not universal.”

Self-Discipline

Faber Taylor, A., Kuo, F.E., & Sullivan, W.C. (2002). Views of nature and self-discipline: Evidence from inner-city children. *Journal of Environmental Psychology, Special Issue: Environment and Children*, 22, 49-63.

For girls, the more that a view from the apartments where they lived contained natural elements as opposed to man-made ones, the higher their self-discipline related to concentration, impulse inhibition, and delay of gratification was found to be. Attention Restoration Theory is offered as an explanatory mechanism for this connection.

No connection between view and self-discipline was found for boys in the study. The researchers suggest this might result from the fact that boys usually play farther from home than girls. "Consistent with this, findings from a previous study indicated that boys' attentional functioning was not related to the level of nature immediately around their home, but was related to the level of nature in their usual play space." (See "Coping with ADD").

The researchers also suggest: "These findings raise the possibility that incorporating trees and grass in schoolyards could play an important role in the classroom. Perhaps after spending breaks in green schoolyards, children return to their classrooms better prepared to pay attention, to suppress disruptive impulses, and to wait patiently for future breaks."

[Read this article](#)

Self-esteem

Pretty, J., Peacock, J., Sellens, M., Griffin, M. Mental and physical health outcomes of green exercise. *International Journal of Environmental Health Research* October 2005; 15(5): 319 – 337:

<https://www.essex.ac.uk/bs/staff/pretty/IJEHR%20Green%20exercise%20%28Pretty%20et%20al%202005%29.pdf>

Subjects were exposed to a sequence of 30 scenes projected on a wall whilst exercising on a treadmill; the scenes were "rural pleasant, rural unpleasant, urban pleasant and urban unpleasant." Both rural and urban pleasant scenes produced a significantly greater positive effect on self-esteem than the exercise-only control. "This shows the synergistic effect of green exercise in both rural and urban environments. By contrast, both rural and urban unpleasant scenes reduced the positive effects of exercise on self-esteem."

Mind. Ecotherapy: the green agenda for mental health. London: Mind; 2007.

http://www.mind.org.uk/assets/0000/2138/ecotherapy_report.pdf

This report includes a study that compared a walk in nature with a walk in a shopping mall (pages 18-25). Compared to those who participated in the mall walk, participants in the nature walk reported stronger increases in self-esteem,

greater reduction in feelings of depression, and greater improvements in many aspects of mood.

Social ecology

[Kuo, F.E. \(2003\). The role of arboriculture in a healthy social ecology: Invited review article for a Special Section. *Journal of Arboriculture* 29\(3\), 148-155.](#)

In this summary of research findings, the author suggests that defensible space theory helps explain why trees and grass cover have been shown to be “systematically linked to...stronger ties among neighbors, greater sense of safety and adjustment, more supervision of children in outdoor spaces, healthier patterns of children’s play, greater use of neighborhood common spaces, fewer incivilities, fewer property crimes, and fewer violent crimes.”

[Coley, R.L., Kuo, F.E., & Sullivan, W.C. \(1997\). Where does community grow? The social context created by nature in urban public housing. *Environment & Behavior*, 29\(4\), 468-494.](#)

In a study of relatively green spaces within inner-city public housing developments, “results consistently indicated that landscaping encourages greater use of outdoor areas by residents. Spaces with trees attracted larger groups of people, as well as more mixed groups of youth and adults, than did spaces devoid of nature. In addition, more dense groupings of trees and trees that are located close to public housing buildings attracted larger groups of people.” The article reflects on relationships discussed in other articles by the authors, such as the development of neighborhood social ties, sense of personal efficacy, and crime and safety.

Social support

Maas, .J, van Dillen, S., Verheij, R., Groenewegen, P. (2008) Social contacts as a possible mechanism behind the relation between green space and health. *Health Place*. Jun;15(2):586-95. ABSTRACT:
[http://www.ncbi.nlm.nih.gov/pubmed/19022699?ordinalpos=1&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_SingleItemSuppl.Pubmed_Discovery_RA&linkpos=3&log\\$=relatedarticles&logdbfrom=pubmed](http://www.ncbi.nlm.nih.gov/pubmed/19022699?ordinalpos=1&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_SingleItemSuppl.Pubmed_Discovery_RA&linkpos=3&log$=relatedarticles&logdbfrom=pubmed) (\$)

This study involving 10,089 residents of the Netherlands explored whether social contacts are an underlying mechanism behind the relationship between green space and health. The researchers report: “After adjustment for socio-economic and demographic characteristics, less green space in people's living environment coincided with feelings of loneliness and with perceived shortage of social support.”

Stroke

Hu, Z., Liebens, J., Ranga, K.R. (2008). Linking stroke mortality with air pollution, income, and greenness in northwest Florida: An ecological geographical study.

International Journal of Health Geographics, 7, Article number 20.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2396612/>

This study across a broad geographic area shows that “exposure to more green space could reduce the risk of stroke mortality.” The authors state: “The empirical result in this study supports the “salutary” effects of the exposure to natural environments on human health as well as the significance of residential environments to counteract “sedentary” lifestyles and that greening of urban areas could make a contribution to increase physical activity.”

Theories

[Kuo, F.E. \(2003\). The role of arboriculture in a healthy social ecology: Invited review article for a Special Section. *Journal of Arboriculture* 29\(3\), 148-155.](#)

In this summary of research findings, the author suggests that defensible space theory helps explain why trees and grass cover have been shown to be “systematically linked to...stronger ties among neighbors, greater sense of safety and adjustment, more supervision of children in outdoor spaces, healthier patterns of children’s play, greater use of neighborhood common spaces, fewer incivilities, fewer property crimes, and fewer violent crimes.”

Work Settings

R. Kaplan, S. Kaplan, and R. L. Ryan (1998) *With people in mind: Design and management of everyday nature*. Washington, DC: Island Press.

A study reported in this book shows that workers with a view of natural elements, such as trees and flowers, experienced less job pressure, were more satisfied with their jobs and reported fewer ailments and headaches than those who either had no outside view or could only see built elements from their windows. Moreover, simply the knowledge that the view was available was important to the employees, even if they did not take advantage of it.

Leather, P., Pyrgas, M., Beale, D. and Lawrence, C. (1998) Windows in the workplace. *Environment and Behavior*, 30, 739–763.

<http://eab.sagepub.com/cgi/content/abstract/30/6/739>

In a non-urban factory, 100 workers were studied to determine the attitudinal effects of direct sunlight, views of nature, and higher levels of illumination. The researchers report: “A view of natural elements (i.e., trees, vegetation, plants, and foliage) was found to buffer the negative impact of job stress on intention to quit and to have a similar, albeit marginal, effect on general well-being.”

de Vries, S., Verheij, R.A., Groenewegen, P.P., Spreeuwenberg, P. (2003). Natural environments—healthy environments? An exploratory analysis of the relationship between greenspace and health. *Environment and Planning, A35*, 1717-1731.
<http://www.environment-and-planning.com/epa/fulltext/a35/a35111.pdf>

Gotta go back to this one. “Living in a green environment was positively related to all three available health indicators” (recently-reported symptoms, overall self-assessment, and score on a general health questionnaire). “people living in a greener environment appear to be significantly more healthy than others. The amount of water in people's living environment and the presence of a garden is positively associated with number of symptoms only.” “assuming a causal relation between greenspace and health, 10% more greenspace in the living environment leads to a decrease in the number of symptoms that is comparable with a decrease in age by 5 years.” Does not confirm a consistent link between greenspace and health indicators across urban settings “further studies may help to assess whether greenspace in the living environment is not only *related* to perceived health, but actually *makes* people healthier.”

Kaplan, R. (2001). The nature of the view from home—psychological benefits. *Environment and Behavior, 33*, 507-542.

(http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6WJ8-462T8K3-6&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&_docanchor=&_view=c&_searchStrId=1162122242&_rerunOrigin=google&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=e1d0d9c72d736bb2404d61e3ab93a27f)

Lewis, C. A. (1992) Effects of plants and gardening in creating interpersonal and community well-being. In Relf, D. (ed.) *Role of Horticulture in Human Well-being and Social Development: A National Symposium*. Timber Press, Arlington, Virginia, pp. 55–65.

Lewis, C. A. (1996) *Green Nature/Human Nature: The Meaning of Plants in our Lives*. University of Illinois Press, Urbana, Chicago.
http://books.google.com/books?hl=en&lr=&id=yMAymj0G3QQC&oi=fnd&pg=PR11&dq=Lewis,+C.+A.+nature&ots=0DZJjoxdmy&sig=da3RNesKPsC_YG8Px3yhhN9VDMI#v=onepage&q=&f=false

Community gardens for example provide opportunities for socializing with and learning from fellow gardeners and residents that may normally be unavailable. This aids community cohesion by dissolving prejudices about race, and economic or educational status.

Relf, D. Human issues in horticulture. *Horticulture Technology* April/June 1992 2(2)

A thorough exploration of theories and research relating to the positive place of plants in individual and social life.

“The Intrinsic Value of Parks”: <http://www.canberra.edu.au/centres/developing-cities/autumn-seminar/docs/Senior-Paper.pdf>

Patel IC. Socio-economic impact of community gardening in an urban setting. In: Relf D, ed. The role of horticulture in human well-being and social development: a national symposium, 19–21 April 1990, Arlington, Virginia. Portland, OR: Timber Press, 1992:84–7.

Rohde, C. L. E. and Kendle, A. D. (1997) Nature for people. In Kendle, A. D. and Forbes, S. (eds) Urban Nature Conservation—Landscape Management in the Urban Countryside. E. and F. N. Spon, London, pp. 319–335. Wong examined the benefits of contact with nature for migrants (Wong, 1997; cited in Rohde and Kendle, 1997). Benefits included: increased sense of identity and ownership of the country they live in; sense of integration rather than isolation; a reunion with nature (i.e. particularly important for first generation immigrants who have rural backgrounds); the reawakening of a sense of possibility; restoration and a relief from daily struggles; empowerment, skill development and the enabling of opportunity to participate in caring for the environment.

Children Cognition

Health Self-esteem

Property values

“Parks and Health Policy Brief”:

http://www.tpl.org/tier3_cd.cfm?content_item_id=22362&folder_id=3208

“Health Benefits of Parks White Paper”:

http://tpl.convio.net/site/Survey?ACTION_REQUIRED=URI ACTION_USER_REQUIREMENTS&SURVEY_ID=1640

Property values, Health, Community

Health Elderly Children

Health Mental Health Children Poverty

Health Mental health Social support

RACHEL Kaplan WEBSITE: <http://www.snre.umich.edu/profile/rkaplan>

BOOK:

R. Kaplan, J. E. Ivancich, and R. De Young (2007) *Nearby nature in the city: Enhancing and preserving livability*. <http://hdl.handle.net/2027.42/48784> **NOT RESEARCH, BUT A KIND OF “MANUAL”**

J. Kim and R. Kaplan (2004) Physical and psychological factors in sense of community: New urbanist Kentlands and nearby Orchard Village. *Environment and Behavior*, 36(3), 313-340 <http://eab.sagepub.com/cgi/content/abstract/36/3/313> **(ABSTRACT, \$)**

Field of “Conservation Psychology”:

<http://www.conservationpsychology.org/resources/articles/>

Guidebooks: <http://www.evergreen.ca/en/resources/communities/index.sn>

SACRED SPACES

http://www.tkffdn.org/what/sacred_space_locations.php On a trip to London in 1995, we visited an urban park tucked in the midst of a busy London neighborhood. This serene and protected park was used by many as a place of refuge during World War II. Wooden benches line the walking path in this small park, and on the back of many of the benches are reflections of those who experienced a sense of community and a sense of peace in this special place during the worst days of that war.

It was our belief that if a natural green space in an urban setting could provide such a spiritual place at such a difficult time, perhaps places built and created by communities in our urban spaces in our time could also provide a place to find refuge, to slow down, to find oneself, to reconnect with one's spirituality and to provide peace. From this idea and with this hope TKF was formed. The speed, violence, and alienation that characterize our current period in human history create an important need for open spaces, sacred places. It is our hope that the spaces we have helped to support bring some spiritual peace and connection to people's lives.

HEALING GARDENS

Health Pain Mental health

Health Mental health Coping

Mental health Self-esteem

GOOD ONE! "What Makes A Garden a Healing Garden?" Ulrika A. Stigsdotter and Patrick Grahn *Journal of Therapeutic Horticulture* ??? 2002 60-69

<http://projectnet.flec.kvl.dk/upload/paperi.pdf>

THIS could be "best practices" The authors explore the research associated with three schools of thought regarding the "healing" effects of gardens (i.e., gardens' positive effect on overall wellbeing): the "Healing Garden School," the "Horticultural Therapy School," and the "Cognitive School." They suggest ways to incorporate the three schools appropriately into gardens. *Relatedly*, see Ulrika A. Stigsdotter and Patrick Grahn (2003) **Experiencing a Garden: A Healing Garden for People Suffering from Burnout Diseases** *Journal of Therapeutic Horticulture* XIV:39-49

http://www.nepal.sl.life.ku.dk/upload/terapihaven_experiencing_a_garden.pdf,

in which the authors describe the multidisciplinary process utilized to design a healing garden for a particular purpose.

DON't forget the Cooper-Marcus book.

HUMAN HEALTH AND WELL-BEING: THE PSYCHOLOGICAL, PHYSIOLOGICAL, AND SOCIOLOGICAL EFFECTS OF PLANTS ON

PEOPLE

Author: C.A. Lewis http://www.actahort.org/members/showpdf?booknrarnr=391_2

Keywords: Landscape preference, People-plant relationships, Horticultural therapy, Community gardening, Psychological effects of plants, Physiological effects of plants, Social effects of plants, Horticulture and human health

Abstract:

Evolutionary origins are suggested for the affinity of people with plants. Plants enter the human psyche through observation and/or participation. Given a choice, people prefer settings with vegetation over those lacking vegetation. Research indicates such settings reduce stress, promote peace, tranquility, enhanced self-esteem, and sense of mastery of the environment.

Horticultural therapy is cited for its history of using plants as a treatment modality. Settings of vegetation reduce blood pressure and heart rate, speed recovery from surgery and other forms of stress, and enhance sense of well-being. They ameliorate the institutional effects of geriatric centers.

Community gardening and tree planting lead urban residents to social and physical actions for improving neighborhoods. Gardening also positively affects self-image and social relationships of prison inmates.

THIS IS REALLY A MANUAL-RELATED/CASE-STUDY-RELATED THING

Lynne M. Westphal Urban Greening and Social Benefits: A Study of Empowerment Outcomes *Journal of Arboriculture* 29(3): May 2003

<http://www.treelink.org/joa/2003/may/03westphal.pdf> [Suggestions for deriving empowerment from projects (based on Chicago experiences)]

[Sullivan, W.C., Kuo, F.E., & Prabhu, M. \(1997\). Communicating with citizens: The power of photosimulation and simple editing. *Environmental Impact Assessment Review*, 17\(3\), 295-310.](#)

Could this be best practices? Mind. Ecotherapy: the green agenda for mental health. London: Mind; 2007.

http://www.mind.org.uk/assets/0000/2138/ecotherapy_report.pdf

Best Practices!!!: <http://www.actahort.org/books/639/index.htm>

The Walk for Health Trail: http://www.ccint.org/html/projects/proj_phi_1.html

THEORIES

TABLE ON P.6 HERE GIVES AN IDEA FOR ORGANIZING:

<http://heapro.oxfordjournals.org/cgi/reprint/21/1/45.pdf>

THEORIES

Defensible space (see pdf Kuo2003Arboriculture) [Brunson, L.B., Kuo, F.E., & Sullivan, W.C. \(2001\). Resident appropriation of defensible space in public housing: Implications for safety and community. *Environment & Behavior* 33\(5\), 626-652.](#)

Attention Restoration [soft fascination] , which holds that “natural settings and stimuli such as landscapes and animals seem to effortlessly engage our attention, allowing us to attend without paying attention. For this and a number of other reasons, nature provides a respite from deliberately directing one’s attention. As a consequence...time spent in nature allows us to recover from mental fatigue and leaves us with enhanced effectiveness and a sense of rejuvenation.” FROM [Kuo, F.E. \(2001\). Coping with poverty: Impacts of environment and attention in the inner city. *Environment & Behavior*, 33\(1\), 5-34.](#)

S. Kaplan (1995) “The Restorative Benefits of Nature” *Journal of Environmental Psychology* 15 169-182:
http://www.uns.ethz.ch/edu/teach/masters/ebcdm/readings/Kaplan_S.pdf

An extended discussion of Attention Restoration Theory in the context of seeking to integrate the role of ARS in understanding restorative properties of nature with Ulrich’s stress reduction theory.

Physical Disorder **see article in folder—“Systematic Social Observation”**

The physical state of a neighborhood affects the mental health, physical health, and overall well-being of the residents living in the community. Haney (2007) found an association between physical disorder and early sexual activity, low educational attainment, increased school drop out rates, violence, anti-social behaviors, and mistrust in the community.

Haney, T. J. (2007). “Broken windows and self-esteem: subjective understandings of neighborhood poverty and disorder.” *Social Science Research*. 36, 968-994.
http://www.allacademic.com/meta/p_mla_apa_research_citation/0/9/4/6/6/pages94664/p94664-1.php

Physical state of the neighborhood also affects the self-esteem of residents, but more importantly, the residents’ perceptions of the physical state of the neighborhood had an even greater affect on their self-esteem (Haney 2007). Self-esteem is developed by social comparison and self-attribution (Rohe and Basolo 1997). When there is perceived disinvestment in the community because of the deteriorating physical state and space, the community takes less pride in the neighborhood and the individual self-esteem of the residents decreases. The negative perception of the neighborhood leads to reduced

community involvement, more isolation, and in turn diminished self-esteem. A sense of powerlessness is also created when neighbor relationships are not formed.

Haney, T. J. (2007). "Broken windows" and self-esteem: subjective understandings of neighborhood poverty and disorder." *Social Science Research*. 36, 968-994. **See above**

Rohe, M. & Basolo, V. (1997) "Long term effects of homeownership on the self-perceptions and social interaction of low-income persons". cited in Haney, T. J. (2007). "Broken windows" and self-esteem: subjective understandings of neighborhood poverty and disorder. *Social Science Research*. 36, 968-994. **Cited**

Ulrich: aesthetic and affective responses to natural environments and stress recovery

Ulrich, Roger S. "Natural versus Urban Scenes: Some Psychophysiological Effects." *Environment & Behavior*, 13(5): 523-556, Sept 1981.

Eighteen students, ages 20-27, viewed 60 color slides of each of three types: nature with water; nature dominated by vegetation; and urban environments without water or vegetation. The effects of the slides on were measured. The two categories of nature views had more positive influences on psychophysiological states (alpha amplitude, heart rate and emotional states) than the urban scenes.

6. Ulrich, Roger, S. "View through a Window May Influence Recovery from Surgery." *Science*. 224 (April 1984): 420-1.

Medical records on recovery of patients after gall bladder surgery in a suburban Pennsylvania hospital between 1972 and 1981 were examined to determine whether assignment to a room with window view of a natural setting might have restorative influences. Twenty-three surgical patients assigned to rooms with windows looking out on a nature scene of trees had shorter postoperative hospital stays, received fewer negative evaluative comments in nursing notes, and took fewer potent analgesics than 23 matched patients in similar rooms with windows facing a brick building wall.

E.O. Wilson – biophilia

R. S. Ulrich, 'Biophilia, Biophobia and Natural Landscapes', *The Biophilia Hypothesis*, Shearwater Books/Island Press, Washington DC, 1993, pp73-137

Ecotherapy - The term 'ecotherapy' was first coined

by Clinebell.³ He posits a form of 'ecological spirituality' whereby our holistic relationship with nature encompasses both nature's ability to nurture us, through our contact with natural places and spaces, and our ability to reciprocate this healing connection through our ability to nurture nature. In this sense, ecotherapy has always shared a close relationship to ecopsychology⁴ – placing humans within a reciprocal healing (and disconnected and destructive)

relationship with nature. From

http://www.ecotherapy.org.uk/files/ecotherapy/home/Therapy_today_article_on_ecotherapy.pdf

Mc Ewen, B. (2000). "Allostasis and allostatic load: implications for Neuropsychopharmacology". cited in Ross, C.E. & Mirowsky, J. (2001). Neighborhood disadvantage, disorder, and health. *Journal of Health and Social Behavior*. 42(3). 258-276.

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<http://www.ncbi.nlm.nih.gov/pubmed/11668773>

Kuo and Sullivan (2001) found that green areas reduce fear levels, incivilities, and aggressive and violent behaviors. This occurs because green space, that does not obstruct views, suggests care for the neighborhood, that an intruder would be noticed, and that more people are outside and watching the street. If fear levels are reduced by green space, the negative health affects of threatening environments and stressors are eliminated by green space as well.

Kaplan (1992) found that nature actually helps restore attention and reduce the mental fatigue we all face. Attention Restoration theory states that a natural setting and stimuli effortlessly engage attention by allowing us to attend to nature without paying attention (cite). This helps our minds recover from the mental fatigue we experience everyday.

Kaplan, R. (1992). The psychological benefits of nearby nature. In Relf, D. (ed.) *The Role of Horticulture in Human Well-Being and Social Development: A National Symposium*. Timber Press, Arlington, Virginia, pp. 125-133.

Nature also "restores harmony to the functions of the brain as a whole" (Furnass 1979 in Maller et al. 2005) and reduces excess circulation and nervous system activity (Yogendra 1958 in Maller et al. 2005).

In addition, Ulrich (1981) found that slides of vegetation caused participants to be more wakefully relaxed and less anxious than when viewing urban scenes without any nature.

Ulrich, R.S. (1981). Natural versus urban scenes: some psychophysiological effects. *Environment and Behavior*. 13, 523-556. SUMMARY:

<http://www.forestresearch.gov.uk/forestry/HCOU-4U4JNS> \$:

<http://eab.sagepub.com/cgi/reprint/13/5/523>