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WHY DO WE FEEL BETTER WITH WOOD?

WOOD SHOWS PSYCHOLOGICAL AND PHYSIOLOGICAL BENEFITS, ACCORDING TO RESEARCH

Wood has been used as a building material for millennia, but its benefits to people who live, work, and gather in the built environment are only beginning to be understood. Researchers are discovering that wood can contribute to the health and wellbeing of building occupants. While many people would agree that wood is visually pleasing, its aesthetic properties affect humans on a deeper level.

Can the use of natural elements in building design enhance moods and reduce stress? Can they improve focus, creating environments that enhance productivity and learning? In this white paper, we'll examine the benefits of an emerging design approach, and the science behind it.

WHITE PAPER



BIOPHILIC DESIGN

Being outdoors makes people feel good. Fresh air, sunlight, plants, and trees, all contribute to an overall sense of wellbeing.

Most people in North America spend approximately 90 percent of their time indoors, either at home, at work, or in other spaces like retail stores, restaurants, schools or other public buildings. The remaining 10 percent of time is divided between vehicular travel and spending time outdoors.

It should come as no surprise that the built environment, and the materials used to construct it, have a major impact on us. Because we spend so much time indoors, the spaces we inhabit can affect the way we act and feel, and even our health and wellbeing.

Interior design may prove to be just as important as diet, sleep habits or exercise routine. This is the premise behind biophilic design – the idea that incorporating natural elements into buildings, such as exposed wood, natural light, or plants, can actually improve overall health.

EXPOSED WOOD CAN REDUCE STRESS

One of the biggest causes of health problems is stress. Stress can manifest in many ways, causing any number of health problems, and it can also affect the way people function. When people feel stressed, they may feel more anxious, and have difficulty focusing or interacting socially.¹

There are many factors that can contribute to stress, including the indoor environments where people spend their time. In reviewing existing research from the U.S., Canada, Austria and other countries on the physiological and psychological impact of natural elements – views of nature, natural light, plants, and exposed wood – environmental psychologist Dr. Sally Augustin and researcher Dr. David Fell found that humans automatically relax when they are surrounded by elements from the natural world.²

¹ <https://www.nimh.nih.gov/health/publications/stress/index.shtml>

² Wood as a Restorative Material in Healthcare Environments, February 2015

<https://www.woodworks.org/wp-content/uploads/Wood-Restorative-Material-Healthcare-Environments.pdf>

“When we experience things in a built environment that are similar to hospitable natural spaces that sheltered humans for thousands of years, we feel relaxed and de-stressed in a profound way,” Dr. Augustin said. “We are not as stressed in difficult situations and our lives are improved.”³

A study conducted in 2010 by the University of British Columbia and Dr. Fell tested the stress-reducing effects of wood and plants in the context of an office environment,⁴ through measurement of the two branches of the autonomic nervous system which are responsible for physiological stress responses in humans.⁵

One hundred and nineteen university undergraduate students were assigned to one of four rooms: 1) wood and plants, 2) wood and no plants, 3) no wood and plants, and 4) no wood and no plants. The experiment consisted of a 10-minute baseline period, a 12-20 minute stressful task, and a 10-minute recovery period. Subjects exposed to wood had lower sympathetic nervous system (also known as fight or flight) responses in all periods of the study. No treatment effects were found with respect to parasympathetic activation, or the recovery from stress.

According to the study, “The practical implication of this effect is that wood may be able to be applied indoors to provide stress reduction as a part of the evidence-based and biophilic designs of hospitals, offices, schools, and other built environments.”

WOOD CAN INCREASE PRODUCTIVITY

Wood interior design has been used to achieve diverse design styles, from contemporary and informal to elegant and stately. The trend of biophilic design in offices and other workplaces has been growing for years.

Until recently, the link between wood interiors and productivity has been anecdotal. Research is beginning to show that wood can make a difference.

³ Mother Nature Knows Best: How Natural Elements in the Home Make You Healthier; Wood, Naturally
<https://www.reviewjournal.com/sponsor-old/mother-nature-knows-best-how-natural-elements-in-the-home-make-you-healthier/>

⁴ Wood in the human environment : restorative properties of wood in the built indoor environment;
<https://open.library.ubc.ca/cIRcle/collections/ubctheses/24/items/1.0071305>

⁵ <https://www.apa.org/helpcenter/stress/effects-nervous>

Forest and Wood Products Australia commissioned a study (“Workplaces: Wellness+ Wood = Productivity”) that linked nature, biophilic design, and wood with improved physical and mental wellbeing. The study surveyed 1,000 Australian workers and found a correlation between the presence of wood and employees’ overall satisfaction at work, lower absenteeism, higher levels of concentration, and improved productivity.

For example, people in workplaces with less than 20 percent natural wood surfaces were up to 30 percent less satisfied with both their working life and physical workplace compared to those with a high proportion of wood.⁶

NATURAL ELEMENTS HELP PEOPLE HEAL

Healthcare facilities—hospitals, clinics, and nursing homes—serve important functions in our built environment. An emerging field of evidence-based design seeks to use data to design interior spaces that positively impact their occupants. Architects who specialize in healthcare design have been exploring the impact of exposure to nature and natural elements on patient recovery and the wellbeing of staff and visitors for years.

A large and growing body of evidence attests to the fact that physical environment impacts patient stress, patient and staff safety, staff effectiveness, and quality of care provided in hospitals, and other healthcare settings.⁷

A study by Roger Ulrich compared patient outcomes in those with views of a brick wall versus those who saw nature and trees. While patients had the same type of surgery and were matched for other demographics, patients with windows that looked out on trees and landscape had improved patient outcomes – from shorter hospital stays to enhanced mood and less reported pain (Ulrich, 1984).⁸

⁶ <https://makeitwood.org/documents/doc-1624-pollinate-health-report--february-2018.pdf>, page 8

⁷ <https://www.healthdesign.org/certification-outreach/edac/about>

⁸ <https://www.nrs.fs.fed.us/pubs/gtr/gtr-nrs-p-39papers/04-heerwagen-p-39.pdf>, page 42, Ulrich studies

Case Study

Duke University Health Facilities⁹

Nestled in the woodlands of Duke Forest in Durham, North Carolina is a holistic medicine facility that puts biophilic strategies and nature at the center of its design.

Program spaces for traditional and alternative medicine are united through a rich use of natural materials, such as wood and stone. Its radial configuration affords generous views of interior and exterior gardens and the surrounding forest, while bathing the interior in natural light.

“Whereas traditional clinical settings often evoke negative feelings of sterility and coolness, we created a warm, welcoming environment by interweaving the natural and the man-made. Our design strategy – ‘human-centered healthcare design’ – reduces stress through environmental design,” according to the project’s architects, DudalPaine Architects, a firm that has embraced the use of wood in healthcare facilities.

A similar design strategy was employed for the Duke University Student Wellness Center. DudalPaine’s design weaves together student health, nutrition, counseling, and psychological services under one roof. Wood is featured throughout, including a soaring glulam timber post-and-beam atrium along with salvaged-timber benches. A contemplative garden reinforces connections to nature and connects to a network of campus pathways.

⁹ <https://www.thinkwood.com/news/timber-tonic-how-wood-and-natural-materials-can-transform-health-care-facility-design>

**Wood has positive effects
on our health, productivity,
and well-being.**



WOOD AND NATURE SUPPORT LEARNING

Schools, like healthcare facilities, play an important role in our society. The restorative benefits of nature on mentally-fatigued adults and children is being established through an increasing number of studies, including field experiments and longitudinal analysis.¹⁰ In one experiment, 94 high schools students randomly assigned to classrooms with views of greenery performed better on concentration tests than those assigned to purely “built” views or windowless classrooms.¹¹ In multiple studies, contact with nature has been linked to greater self-discipline in children.¹²

Research on the effects of wood as an interior element of classroom design is a relatively new area of study. In Japan, government officials have found that the use of wood in schools has a positive impact on students. The Japanese Wood Academic Society conducted a three-year study of 700 schools and reported reduced incidence of influenza outbreaks in schools featuring wood interiors vs. “non-wood” schools.¹³

A one-year Austrian study observed 36 high school students, aged 13-15, who attended either fully wooden furnished classrooms or standard classrooms with plastic equipment and plasterboard walls. By the end of the year, students who were taught in wood-based environments daily had significantly lower stress levels, blood pressure and heart rates, as well as increased productivity compared to the opposite group of teenagers who didn’t have contact with wooden items. (Kelz, C. & Moser, M. 2011).¹⁴

¹⁰ Do Experiences With Nature Promote Learning? Converging Evidence of a Cause-and-Effect Relationship, *Frontiers in Psychology*, February 2019, page 2, <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.00305/full#B37>

¹¹ Impact of views to school landscapes on recovery from stress and mental fatigue. *Landsc. Urban Plan*, 2016, abstract,

<https://www.sciencedirect.com/science/article/pii/S0169204615002571>

¹² Do Experiences With Nature Promote Learning? Converging Evidence of a Cause-and-Effect Relationship, *Frontiers in Psychology*, February 2019, page 2, <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.00305/full#B37>

¹³ <https://www.bdcnetwork.com/back-nature-can-wood-construction-create-healthier-more-productive-learning-environments>

¹⁴ <https://makeitwood.org/documents/doc-1253-wood--housing--health--humanity-report-2015-04-00-final.pdf>, page 6

WOOD ENHANCES THE SHOPPING EXPERIENCE

Research on the wellbeing effects of wood in commercial and institutional environments may point to the same benefits for customers and employees in retail spaces. A growing number of retail brands, including fast-food giant McDonalds,¹⁵ are seeing the impact of biophilic design on their bottom line.

A report on the economics of biophilic design found that participants said they were more inclined to make a purchase if in an environment characterized by views of nature, intermittent greenery, big trees, and vegetation. In the same study, participants were willing to pay up to 20 percent more for practical expenditures (such as a sandwich for lunch) and up to 25 percent more for general merchandise (such as a new jacket or a watch).¹⁶

A recent study conducted by the University of Laval suggests that exposed structural wood can have a positive impact on customers. A survey of 100 randomly selected customers compared shopping experiences in a wooden building compared with a steel building in three types of stores: a supermarket, a home renovation center, and a furniture store. In all three cases, a higher number of customers expressed greater satisfaction with the aesthetics of the wooden building than with the steel building. Customers were more inclined to describe the wooden building as ecological, healthful and warm.¹⁷

WOODEN SUPERMARKET	WOODEN HOME RENO CENTER	WOODEN FURNITURE STORE
95% noticed the wooden structure	67% noticed the wooden structure	75% noticed the wooden structure
80% think the wood structure has a positive influence on their shopping experience	68% think the wood structure has a positive influence on their shopping experience	71% think the wood structure has a positive influence on their shopping experience
79% think the store strongly differentiates itself from other stores of the same type		21% of visits exceeded 30 minutes
17% of visits exceeded 30 minutes		

¹⁵ <https://www.thinkwood.com/our-projects/mcdonalds-global-flagship-in-chicago>

¹⁶ The Economics of Biophilia, Terrapin Bright Green, 2012, pages 20-21

<https://www.terrapinbrightgreen.com/report/economics-of-biophilia>

¹⁷ https://cecobois.com/wp-content/uploads/2020/04/CECO-11987_Journal_Automne_2018_

FINAL_LR.pdf, page 7

Case Study

Union Way Shopping Center¹⁸

Portland-based design firm LEVER Architecture is leading wood design trends with projects like Union Way, a 10,000 square-foot retail renovation project that serves as much a civic function—a pedestrian connection between city blocks—as a retail experience. Reminiscent of European passageways and Middle Eastern bazaars, LEVER put its own unique stamp on the timber-clad arcade that packs nine different retailers/restaurants into a covered galleria including Danner, the iconic Oregon boot brand, California-based retailer All Good and local clothier Bridge & Burn crafts apparel.

The walls are built with sustainably harvested Pacific Albus siding, farm-grown three hours outside of Portland. Twelve skylights reinforce a visual connection that blurs the boundaries between interior and exterior. Historic heavy timber beams were salvaged and incorporated into the structural design. Union Way represents architecture as placemaking, elevating the retail experience to evoke inspiration and a connection to nature.

While it is early days for biophilic design and more research is needed, initial findings and anecdotal reports show promising results when it comes to boosting a brand's value. And undoubtedly, wood can play an important role, making the retail experience more inviting, calming, and connected to nature.



RETAIL THERAPY | Shoppers at Portland's Union Way—a 10,000 square-foot retail renovation project connecting 9 unique stores—are enveloped by Pacific Albus siding and abundant natural light. (Photo courtesy LEVER Architecture | Photographer: Jeremy Bittermann)

¹⁸ <https://www.thinkwood.com/news/biophilic-brands-can-wood-and-nature-boost-the-bottom-line-2>



courtesy of Ross Barney Architects

CONCLUSION

Architects and builders across the ages used wood to build practical structures for everyday living. Yet studies are increasingly showing that wood may have more to offer than just versatility and aesthetics. People feel an instinctive connection and attraction to natural materials, and many building designers cite the warm and natural attributes of wood as a reason for its use.¹⁹

More and more, research is confirming common sense and what folk wisdom has taught us: being exposed to nature—and natural, organic materials—can have positive effects on our sense of wellbeing. This has led to an increase in the use of wood and other natural materials as a key element of biophilic and evidence-based design.²⁰

For more information on building and designing with wood, visit thinkwood.com.

¹⁹ The Economics of Biophilia, Terrapin Bright Green, <https://www.terrapinbrightgreen.com/reports/the-economics-of-biophilia/>

²⁰ The Economics of Biophilia, Terrapin Bright Green, <https://www.terrapinbrightgreen.com/reports/the-economics-of-biophilia/>