Plan On It

A Dutchess County Planning Federation eNewsletter

DUTCHESS COUNTY PLANNING FEDERATION

January-March 2022

Shaping Our World from the Inside Out

Considering the Instincts of the Subconscious Mind in the Built Environment

By: Devin Rigolino, Senior GIS Project Coordinator, and Shelby Frangk, Planner

Last year, several of our staff attended a webinar hosted by the Congress for the New Urbanism (CNU) where presenters described how new insights from the fields of neuroscience, psychology, and mathematics reveal how the human mind is inherently drawn to certain features, shapes, colors, and spaces in the buildings we design and in the communities we live. This webinar stood out in a lot of ways. For starters, the content was grounded in biology, ancient history, and art – subjects we don't often find ourselves exploring in our everyday work as planners. It also challenged us to think about something that we are often encouraged to steer away from – our own subjective opinions of what composes aesthetically pleasing architecture and community spaces.

We've all heard the saying "beauty is in the eye of the beholder," and it's true that an individual's culture, values, experiences, and unique genetics can shape what they find to be beautiful. It's for this very reason that two people can view the same painting and have completely different interpretations. But what if beauty isn't always as subjective as we might think? Could there be some aspects of design and architecture that are universally appreciated? [1] It might surprise you to learn that certain qualities we perceive to be beautiful have been shaped by our evolution as a species. They are rooted in patterns established in human prehistory that were then made material as people gradually created the built environment.[2] By exploring the connections between human evolution, ancient architecture, science, and the inner workings of the human mind, we can see how our subconscious instincts influence the choices we make every day as designers and planners, and how those choices can foster or deter healthy communities.

Patterns Rooted in Evolution

Many early examples of prehistoric architecture were constructed in geometric patterns and symmetrical designs.[3] These early stone circles, earthen mounds, and megaliths are thought to have been built in relation to the cycle of the sun and moon, as humans began to consider the significance of the heavens on their lives. Later, sometime between 100 B.C. and 10 A.D., the ancient Roman architect, Marcus Vitruvius Pollio wrote what is believed to be the first architecture textbook called *De Architectura (On Architecture)*.[4] This text served as a guide for building projects, putting on record core principles that many of those early examples of architecture already embraced, including the importance of symmetry and proportion.

The Golden Ratio

In *De Architectura*, Vitruvius wrote that the ratios observed in mankind should be modeled in the buildings that humans construct. Scientists later discovered that the same ratios Vitruvius saw in the human body exist in every part of nature, from "swimming fish to swirling planets." This "golden ratio" has been called the building block of all life and the hidden code in architecture.[4][5]

The golden ratio, a critical mathematical relationship, can be seen all throughout nature as well as reproduced in some of mankind's most iconic buildings. Photo source: Fern | Taj Mahal

As time marched on and humans continued to build, different cultures all around the world established unique architectural styles. Among these varying designs, some common elements of architectural beauty can be found: symmetrical windows, columns, centrally located doors, and access to natural light.[2] Many of these patterns can be found in people and nature – from the symmetry observed in the human body and face to the repetitive spirals found in mollusk shells. Fundamentally, evolution is as responsible for the designs of our earliest buildings as the human hands that built them, guided by instinctive perceptions rooted in the subconscious mind.

Evidence of symmetry, central entrances, and use of columns have been found in various ancient cultures all around the world. Can you spot the similarities?
Photo sources: 1–Egypt Temple of Hatshepsut 2–China Mukden Palace 3–Greece Temple of Hephaestus 4–Mexico Temple of the Warriors 5–India Konark Sun Temple

Jumping forward to today, we generally spend the majority of our time indoors but an innate connection with nature still exists within all of us. As humans began constructing relatively closed-off homes, workplaces, and vehicles, a divergence from nature occurred, leaving behind many of the fears and unpredictability that came from exposure to the elements, vegetation, and wildlife.[6] Yet still, nature is our original context, and even though most of us now have the luxury of no longer worrying about apex predators lurking in our living rooms or poisonous plants being mixed into our Panera salads, our evolved, biological fear responses remain. These instincts influence how we perceive the built environment.

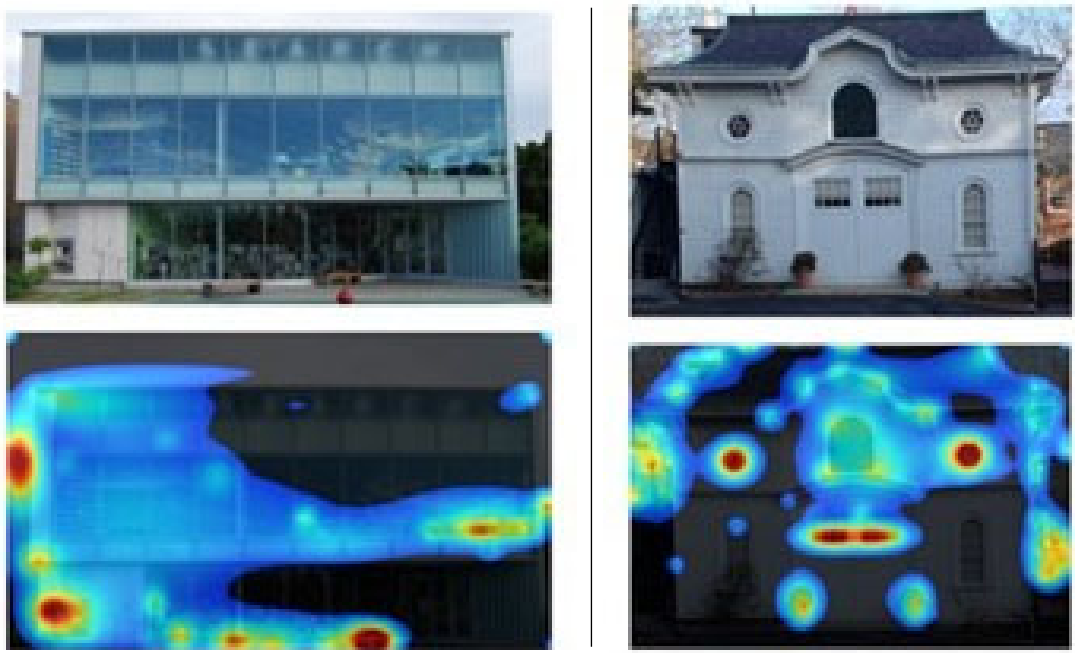
The Objectivity in Subjectivity

At the center of our environment-influenced evolution lies the biological instincts of our subconscious brains and nervous systems, which control how we respond and react to the world around us. Our bodies handle external stimuli first through an initial subconscious reaction, followed by a conscious response. The secondary, conscious response to a visual stimulus can take up to 5 seconds to take hold.[7] Within the first several seconds, though, it's the subconscious that is in control. This is where things get interesting: our nervous systems are wired to seek out safety as the number one priority, but once safety is secured, they then seek out pleasurable experiences, including those we find to be beautiful.[7]

Modern neuroscience is trying to de-romanticize conversations around beauty to demonstrate their objective value, including with respect to our overall health and well-being. Most people understand the concept of beauty to be a subjective experience, but there also exists an innate understanding of beauty that is universally programmed within our DNA. We are born looking for and intuitively interpreting certain visual experiences as comforting and pleasurable, such as quiet scenes from nature, awe-inspiring landscapes, and human faces of all types. One step deeper, in the fields of architecture and planning, humans are drawn to windows and doors that display symmetry and predictability, and prefer to avoid blank spaces. Searching for these pattern types is instinctual no matter the individual or culture.[2]

Lessons from Eye-Tracking Research

Referenced in the webinar was a research study conducted by Justin Hollander, Professor of Urban and Environmental Planning and Policy at Tufts University, in collaboration with architect Ann Sussman. The study involved eye-tracking software used to understand what the human mind sees at a subconscious level, further underlining how there is objectivity in subjectivity. When tracking eye movements of individuals looking at pictures of buildings, it is universally observed that modern glass buildings appear "faceless" and are almost invisible to the human brain. People instead focus on the sky or ground at the edges of the structures as a way of avoiding cognitive stress.[2] Alternatively, when shown images of more traditional architecture, participants fixated on centrally located entrances with flanking windows.



A comparison of where the human eye focuses when viewing two distinctly different architectural styles. Eye-tracking software was used to render a heat map overlay, where the darker red colors indicate "hot spots" that received the most focus from viewers. Source: The Built Environment Impacts Our Health and Happiness More Than We Know, Arch Daily

The study also highlighted our innate inclination towards repetition and consistency when shown an image of a house-lined street. Because of these predictable and visible points along the road, participants could anticipate what's to come, demonstrating that the space is inviting and safe. However, when given images of parking garages with no discernable outlets, participants' eyes scanned for windows or doors, and upon seeing none, gave up and instead fixated on the sky.

Our Wall-Hugging Instinct

It's well known that humans are wall-hugging species who may prefer well-defined corridors and paths to promote walking. This stems from our ancestral need to be wary of open areas where dangers could approach from multiple directions. This phenomenon is known as "thigmotaxis," and you can keep an eye out for this characteristic behavior the next time you enter a restaurant and notice how people gravitate towards the tables along the walls before sitting in the middle of the room.[8]

Two different scenes that show how the human eye focuses and moves across an area. Well-placed buildings that frame a road can help encourage pedestrian activity by giving the eye a sequential pattern to focus on, while wide, frameless streetscapes can result in pedestrians not knowing where to focus or walk. Source: https://geneticsofdesign.com/page/5/

Subliminal Stress in the Built Environment

Subconsciously, the brain deals with information by searching for patterns by which to organize inputs. In identifying patterns, the brain can immediately recognize something as either dealing with our survival/safety (things that are exciting or threatening) or dealing with pleasure (things that are comforting or beautiful).[7] When a pattern of each type is presented in the same environment, the brain will prioritize its attention towards the survival pattern over the pleasure pattern by an estimated 5-7 times[2]. This is because evolution has finely-tuned our bodies to think about ways to protect us first and to experience joy and beauty second. The subconscious brain is making these kinds of decisions on our behalf all day, every day, while our conscious attention focuses elsewhere.

But here's the rub — when buildings and community spaces are designed in contrast to our subconscious preferences, we can unintentionally create an environment that may instinctively elicit a low and often unnoticed stress response.[2] We may not always be able to articulate why we prefer being in some spaces versus others, but our subconscious mind is reacting differently to different spaces.

Fight or Flight - Health and the Subconscious Mind

Deep within the autonomic nervous system, which controls essential involuntary functions of our internal organs and glands, are the sympathetic and parasympathetic systems, otherwise known as our "fight or flight" responses. They prepare our bodies for stress-induced activities and bring the body back into a balanced state when the stress event is over.[9]

Remember the earlier discussion about how our brains look for patterns to sort through all of the information coming in? When the body is subjected to a survival pattern, the sympathetic response is triggered, spurring feelings of stress and anxiety.[9] It's no secret that stress and anxiety do not contribute to generally positive states of health and well-being. As we navigate a global pandemic, the ongoing war in Ukraine, and a whole host of other societal challenges, these

stressors combine to have a lasting and detrimental effect on our collective physical and mental health. The consequences of unchecked stress on the human body are clear: higher incidences of anxiety, chronic illness, unhappiness, and depression. Interestingly, stress can either be exacerbated or alleviated, in part, by our built environment.

So, at this point, you may be wondering why your friendly county planning department might be stressing you out with all this talk about stress. Enter the intersection of modern neuroscience and the field of planning.

Planning for the Subconscious Mind

We've learned that all people gravitate to the patterns, trends, and forms that subconsciously speak to them which are, in part, predetermined by science – thanks biology. So, while beauty and pleasure can be subjective, they also have scientifically objective roots. We can use this science to make long-lasting, sustainable, unique, and welcoming communities that enhance our health and well-being. Let's explore how we can better connect this research with our built environment.

For starters, we can begin to recognize ways in which the subconscious mind can be integrated into the design of our communities. Some big-picture ideas to consider include:

- **People-Centric Focus**: Streets and community spaces that are primarily vehicle-focused may deter the movement of people on foot or bicycles because the brain can't locate predictable points to focus on, called "fixations," which promote feelings of safe walking.[7] Communities can determine where it makes the most sense to plan and design for people-centric spaces and streetscapes, and memorialize them in comprehensive plans.

- **Architectural Design**: We already know that our subconscious is drawn to symmetrical windows, columns, and centrally located doors. These features not only make a building inviting and welcoming, but they also make it intuitively understandable for our human brains. Since we can immediately recognize where the door is and how we can enter, there may be less need for signage to identify the building and less directional signage to get us to the door. Less signage means less visual clutter, another stressor for many of us, in the built environment.

- **Connections**: Biology tells us that people naturally prefer to walk and bicycle around communities that feel safe and inviting, characteristics that extend from the architectural and design choices made by community planners. A well-maintained network of sidewalks and bike paths helps provide people with options to navigate through their community while potentially improving their health.

- **Greening Our Spaces**: Greening our community spaces can mean adding intentional landscaping to our built environment, creating new public parks and squares, and finding ways to enhance the natural environment. In both indoor and outdoor settings, not only do plants boost air quality but they also soften the cognitive stress of an environment. More specifically, tree-lined sidewalks and pathways subconsciously communicate predictability and safety to users.

- **Public Art**: One way to mitigate stress and create visual interest is through public art. Well-placed murals or sculptures, for example, give our eyes something enjoyable to focus on, further reducing cognitive stress caused by the built environment.

- **Timelessness**: In many cases, buildings with traditional forms and neighborhoods with traditional design will stand the test of time not only because they are consistent with what our subconscious instincts crave, but also because they adhere to tried and true planning principles. In the end, designing communities for the subconscious can be a way of potentially "futureproofing" projects and safeguarding community longevity.

On a more detailed level, we can utilize this research to help control subconscious environmental stressors within local projects. This includes ensuring that the project's overall design and site elements will not create undue stress on the community at-large. For example, keeping in mind some of the basic takeaways from the eye-tracking research can inform architectural design. Other site elements such as landscaping, lighting, and signage, can be carefully designed and

arranged to consider our subconscious instincts. Many of these principles serve as the foundation to Dutchess County's Greenway Guides, which were designed to assist in "smart growth" planning within local communities. For additional information on these guides, please visit https://www.dutchessny.gov/Departments/Planning/Greenway-Guides.htm.

Looking locally, we can find examples of planning and design that are grounded in patterns that have evolved alongside us, showing how we can create buildings and communities that are timeless while still reflecting the unique character that make our communities special. Some of our communities already recognize the value of traditional patterns of development and architectural form. This is evident in pattern books, form-based or hybrid codes, and design guidelines. The Village of Tivoli Pattern Book is one example that sets design and architectural standards for neighborhoods and buildings within the village. You'll notice these espouse many of the traditional forms and subconscious instincts discussed earlier in this article. How can your community embed these principles into its built environment?

Just the Beginning

What happens when we build, plan, and design communities that actively take our subconscious minds into account? We should see people become a little less stressed, healthier, more socially connected, and more invested in the places they call home. As we write this article, new research about planning and designing for the subconscious mind is actively being developed. The foundation of this research is clear, but how we apply it in our role as planners and community decisionmakers is not. Your community is tasked with working within the constraints of a built environment, retrofitting spaces where appropriate, and hopefully creating new, innovative places that take into account our biological instincts toward certain trends and patterns. We know that balance, as with most things in life, will be the way forward. The goal is not to create communities that all look the same and with all the same priorities. It's been said that the 21st Century, unlike the others that came before it, is marked by the phrase, "I think, therefore I feel." We encourage you to consider this phrase when planning your communities – how do you want people to feel in your community? Whatever the answer is, no matter how complex or nuanced, plan for that.

Thanks for coming along this journey with us – we know it's been a long, windy road. As you continue to plan for your communities, we hope you are encouraged to keep this article and planning for the subconscious in mind (pun intended).

[1] https://earthsky.org/human-world/semir-zeki-beauty-is-in-the-brain-of-the-beholder/
[2] https://dirt.asla.org/2021/06/07/new-research-the-built-environment-impacts-our-health-and-happiness-more-than-we-know/
[3] https://www.thoughtco.com/architecture-timeline-historic-periods-styles-175996
[4] https://www.thoughtco.com/symmetry-and-proportion-in-design-177569
[5] https://www.britannica.com/science/golden-ratio
[6] https://www.britannica.com/science/biophilia-hypothesis
[7] CNU webinar: Healthy Urban Environments – New Insights from Neuroscience, Psychology, and Mathematics.
[8] https://now.tufts.edu/articles/urban-planning-if-people-mattered
[9] https://www.efchealth.com/sympathetic-vs-parasympathetic-matter/

More Information

Neuroscience: A Playbook for Placemakers

Beauty, Neuroscience & Architecture

Dutchess County Greenway Connections and Guides

Click here to view past issues of *Plan On It*.

This newsletter was developed by the Dutchess County Department of Planning and Development, in conjunction with the Dutchess County Planning Federation.