

Human Spaces 2.0: Biophilic Design in Hospitality



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Opening Message from Bill Browning

We all love a hotel room with a view, especially if we can see water. In fact, these hotel rooms tend to be priced significantly more than the same room without a view. This is an obvious example of biophilia – human connection to nature – but there are also other ways that hospitality design can connect with nature and create a better guest experience.

This paper explores the biophilic design strategies used by hotels around the world to enhance guest experiences. It includes an investigation of pricing differentials for rooms with a view to nature and a discussion of the biophilic qualities of different properties and different space types.

Many brands are rediscovering that lobbies can function as more than just transitory space, that they can become spaces that encourage dwell time and increase revenue. This paper also includes the results of an observational study of hotel lobbies with and without biophilic design features. In short, guests like to spend more time in spaces with connections to nature.

Biophilic design is becoming an important topic in hospitality design. We should embrace this design trend; it is good for reducing stress, improving well-being and hopefully, the success of a hotel.

Bill Browning, *Founding Partner of Terrapin Bright Green and one of the green building industry's foremost thinkers and strategists.*



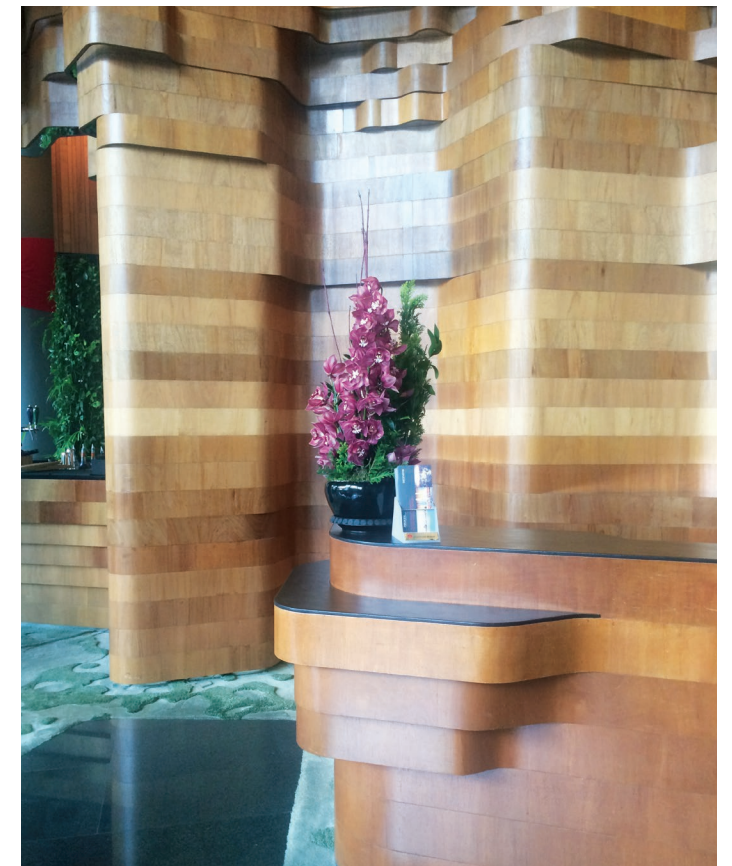
Visual Connection with Nature: The garden view from the restaurant at the Mandarin Oriental in Kuala Lumpur offers respite from the hotel's urban setting.



Material Connection with Nature: The natural furnishings and finishes in the 1Hotel Central Park lobby create a pleasing visual and tactile experience for guests.



Visual Connection with Nature: Malihom Private Estate in Penang is nestled atop a hill and surrounded by lush greenery.



Biomorphic Forms & Patterns: The curvilinear forms of layered wood evoke patterns of natural weathering in the Singapore's Parkroyal on Pickering lobby.



Today's society is more urban, digital and fast-paced than ever before. The downside of this is the overall loss of our connection to nature and the outdoors. As designers, we have a role and an opportunity to positively affect the fundamental ways people interact with space. We can accomplish this by creating hotels that incorporate elements of the natural environment into the overall experience.

Biophilia is the idea that humans possess an innate tendency to seek connections with nature and other forms of life. It stems from the Greek meaning “*love of life.*”

Biophilic design can be very powerful in the hospitality industry. A cost-effective way to enhance the guest experience, it can bolster feelings of community while improving well-being and health. These principles enable us to not only create a more engaging design experience, but also trigger a deeper affinity to certain brands. The potential is amazing!

For our hospitality clients, we are finding that they want a differentiator in the marketplace and we have been using biophilic principles as a layer to our design foundation.

Over the past year I've had the pleasure of collaborating with Bill Browning and his talented team, along with Interface, exploring biophilic principles and the ROI for the guest experience. Come explore our findings.

Lorraine Francis, AIA, LEED AP BD+C is the Regional Director of Hospitality Interiors at Gensler.



Executive Summary

According to the Global Wellness Institute, “wellness tourism expenditures are projected to grow to \$678.5 billion in 2017, rising from 14% to 16% of the total global tourism market.” These numbers, which include non-spa wellness tourism, suggest a significant opportunity for hotels and resorts to leverage wellness initiatives to gain a competitive advantage.

The value of biophilic design has been well documented by studies showing the physiological and psychological benefits of reconnecting humans with nature. So far, much of this research has focused on the workplace and the value of strategic biophilic interventions in office buildings. However, the implementation and benefits of biophilic design have been much less documented in the hospitality industry.

Cornell University has studied “The Impact of LEED Certification on Hotel Performance”, and found that hotels that achieved LEED certification outperformed their non-certified competitors for at least two years after certification. This differentiation was significant enough that certified hotels had an average daily rate (ADR) that was, on average, \$20 higher than their non-certified competitors (Walsman, Verma & Muthulingam, 2014).

In addition, a 2001 study looked at two hotels in Zurich, Switzerland, to estimate the value of a hotel room with a view. One hotel faced either a river or a narrow street, and the other was on a hill outside the city with either a view of a forest or a panoramic view of meadows leading down the city and lake with the Alps in the distance. Using only two hotels, the study showed that both hotels not only charged more for the view, but that many guests showed preference for the river view or lake view and requested those rooms (Lange & Schaeffer, 2001).

To build on these findings, Terrapin, Interface and Gensler collaborated on a series of preliminary studies to help bring clarity to the biophilic design trends in hospitality. The goal is to formulate an approach for further testing and assessing the impact and value of biophilic design elements as well as the unique links to a hotel's total revenue per available room (TRevPAR) and subsequently RevPAR.

We observed pricing trends for rooms both with and without a view at hotels around the world using Hotels.com, an online booking website. We found that, overall, rooms with a view to nature, particularly to water, are consistently priced higher than rooms without one. For resort hotels **there was an 18% difference in the Average Daily Rate (ADR) between a full view to water and other views.**

Executive Summary

The hospitality industry's focus has been shifting from the guest room experience to the common, shared or public spaces, whereby the hotel lobby becomes the neighborhood living room. First interactive and engaging “boutique” hotels, and now “lifestyle” hotels, have emerged to provide a creative, innovative and socially connective guest experience. This industry trend is explained by HVS analyst Zeina R. Fawaz in the 2015 article “Lifestyle Hotels: The Emergence of a New Creative Class.” With this trend in mind, we began to ask how biophilic design may be serving as a tool in creating or enhancing the specialized guest experience. We took a look at the types of biophilic experiences hotels are offering. In addition to hotel lobbies, we also looked at hotel restaurants, bars, guest rooms, spas and other amenities to understand which biophilic qualities contributed to the identity of a space and how those qualities might uniquely impact the guest experience and behavior.

Using the “14 Patterns of Biophilic Design” (Browning, Ryan, & Clancy, 2015) as a contextual framework, guest rooms and amenities at 15 hotels around the world were surveyed on site. A more refined online survey was also distributed to our global network of designers and marketing and sustainability professionals to expand the sample set to a combined total of 39 hotels. This report looks at the results of these two surveys and the design trends found among different hotel and resort amenities and what it might mean for the industry as it continues to evolve with guest health and well-being as a primary differentiator both for the guest experience and the brand's bottom line. The primary takeaway is that a Visual Connection with Nature, Prospect Conditions and a Material Connection with Nature were on average the most frequently or consistently utilized design patterns in all hospitality amenities and hotel rooms.

An additional analysis of a handful of hotels in a shared market in New York City suggests that biophilic experiences can change the use patterns of public hotel spaces. These hotels are also more likely to market themselves – by way of their website – as having a deliberate connection with nature, and how such a connection makes their guest experience unique. This relationship – between design intent and marketing message – reveals yet another opportunity to explore correlations between a hotel's intuitive or learned awareness of the value of biophilic design and its potential value in brand recognition, enhanced guest experience, or contribution to ancillary revenue streams. These early correlations are intriguing and warrant further research.

Research Methods and Results

Research Methods and Results

We conducted a series of experiments to understand biophilic design trends in hospitality and to assess the impact of biophilic design elements. To evaluate whether a price premium exists for biophilic elements, we looked at room price differences for rooms with biophilic and non biophilic views. The initial findings show what so many frequent travelers consider fairly obvious: that it is common for hotels to charge a premium for a room with a view to nature. We then surveyed hotels around the world to understand how biophilic design is being implemented in hotel amenities.

To understand if biophilic elements have an impact on how guests use lobbies, we observed guest behavior over a period of time. Finally, we reviewed hotel websites and compared their language to the language used by guest reviews to understand what hotel brands identified as their differentiator(s), and what influenced guest perceptions the most. The results from these discrete studies all support our hypothesis that biophilic design can enhance guest experience and may have the potential to positively impact TRevPAR.

Sample Profile

- **Guest room pricing based on views to nature:** Analysis of 100 hotels around the world
- **Onsite survey of biophilic elements:** Onsite survey of 15 properties on four continents
- **Global snapshot survey of biophilic hotel amenities:**
 - Survey responses covered hotels ranging from small boutique hotels with less than 30 keys to large hotel brands with over 600 keys.
 - Combined survey responses totaled 39 hotels and resorts from 18 countries – Austria, Bhutan, Cambodia, Canada, China, Ecuador, England, Germany, India, Italy, Malaysia, Mexico, Netherlands, Singapore, Sweden, Tanzania, Thailand, and the United States.
 - Largest proportion of surveyed hotels (38%) were in the USA.
- **User trends in biophilic vs. conventional hotel lobbies:** Observed user trends at three different times during the day in the three biophilic and three conventional lobbies in Midtown Manhattan
- **Website description vs. reported guest experience:** Compared language used to describe these same six hotels on their respective websites to the ten most recent TripAdvisor reviews. We then identified parallels and gaps between guest remarks and the hotel's advertised identity or guest experience

Research Methods and Results

Hotels.com Analysis

Hypothesis

Does biophilia, our innate need to connect with nature, impact the price of a hotel room? Or in other words, do hotels consider rooms with a view to be more valuable? To find out, we undertook an exercise using online pricing of hotel rooms to validate the hypothesis that rooms with a view to nature, in particular to water, are consistently priced higher than rooms without.

Methodology

We selected an online hotel reservation website, Hotels.com, to observe room reservation pricing for rooms with a view and rooms without. Our hypothesis was that rooms with a view to nature would be priced higher than rooms without a view, and that rooms with a view to water would be priced highest.

We chose Hotels.com because it is one of the largest online hotel booking websites. The Hotels.com search results and hotel pages more clearly delineated room differentiation when compared to other online booking websites.

We divided the study into two segments: Resort and Urban. Resort hotels were defined as popular vacation locations associated with a particular natural feature: beach, lake, or other natural feature. Urban hotels were all located in major cities. We kept the Resort and Urban hotels separate because the Urban hotels also have a “*city view*” that the Resort hotels generally did not. We assumed the “*city view*” in a resort hotel would be less desirable than the natural feature.

For each hotel, the default room was the least expensive type of room available. All comparisons were done with the same type of room (i.e. double room, deluxe double, junior suite). When a size difference in rooms was present, it was noted. All stays were two nights, Friday to Sunday. We assumed that weekends would be the most popular travel times and would reflect the most popular prices available. This puts the focus on weekend vacation travel and not travel for work.

High season was chosen based on popular travel times. High season and low season varied with location, which was reflected in the dates selected. Travel guide websites confirmed the peak and low seasons for each location. No holiday weekends were chosen in order to avoid any pricing differences caused by holiday travel. Locations were selected based on team knowledge of popular areas and travel experience and a broader search expanding from those hotels/locations.

Only hotels that had rooms with labeled differences in view were included in this study. This excluded many hotels in the locations we searched that were oriented such that all rooms had a scenic view, or that did not differentiate between room views on Hotels.com.

Research Methods and Results

We chose to use the star rating given by Hotels.com. We felt that this rating, given by the website, would be the most uniform rating system for the entire sample. Some hotels had a separate star rating noted in the hotel description, but many did not. Only hotels with three or more stars were included in this study.

The hotels were also assigned a region: Americas; Europe, Middle East and Africa (EMEA); or Asia Pacific.

Analysis

Using the collected room rates, we calculated the price difference between the full ocean/water view and garden view, and between the full ocean/water view and “*other*” view for the Resort data set. We then calculated the relative percent difference between these prices for each hotel. Because we did not have a complete data set for room prices for each hotel, we did not have a standard room value, and the relative percent (%) difference takes into account the variability in the data set.

We created pivot tables using the entire data collection sheet to determine relative percent difference between view types for the whole sample. We sorted the data by hotel star rating and included a filter by Region. A second pivot table was then created to review trends in the percent differences between view types. We again sorted the data by star rating and included a filter by Region.

Observations

The results indicated that hotel rooms with a view were priced higher than hotel rooms without a view. The hotel room view descriptions in the Resort sample were more similar than those of the hotels in the Urban sample. For the most part, rooms with a view of the beach were priced higher than rooms with a partial view, or a view of a different amenity, such as a garden or pool. The percent difference was greater for resort hotels than urban hotels.

Research Methods and Results

Resort

The Resort hotel sample featured 50 hotels from around the world and slightly favored the Americas region. Overall, water views commanded a higher price than any other kind of view, averaging \$436.49/night during peak season. On average, the price difference between rooms with a full view to water and rooms with a garden view (\$388.67/night) was 18.00% higher, and between rooms within the "other" view category (\$340.53/night) was 18.28%.

The "other" view category included a variety of alternative view types, such as courtyard, city, town, jungle, mountain, and pool. The variability of view types made it hard to aggregate and compare across the whole sample. Additionally, many resorts did not advertise rooms with differing views, and it was impossible to know if all rooms had a view or if none did.

Urban

The Urban sample also contained 50 hotels and drew more evenly from across the globe. Overall, the comparison to rooms with a city view revealed that rooms with a view to water (e.g. ocean, lake, river) had an 11.17% premium, those to a famous landmark had an 11.80% premium, and those with views to a park/garden commanded a premium of only 1.25%.

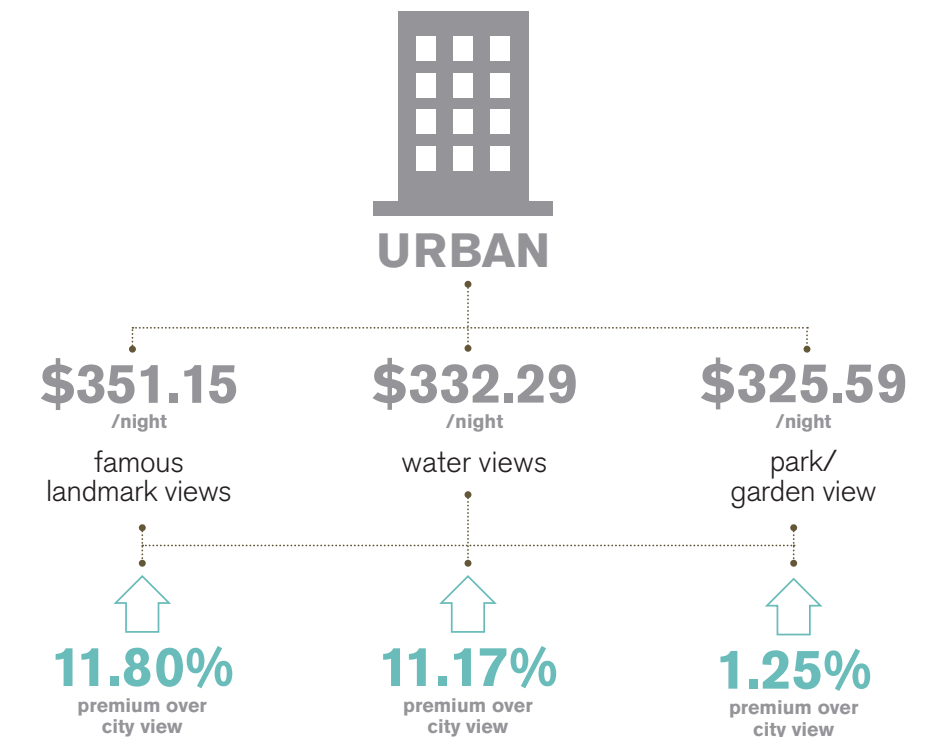
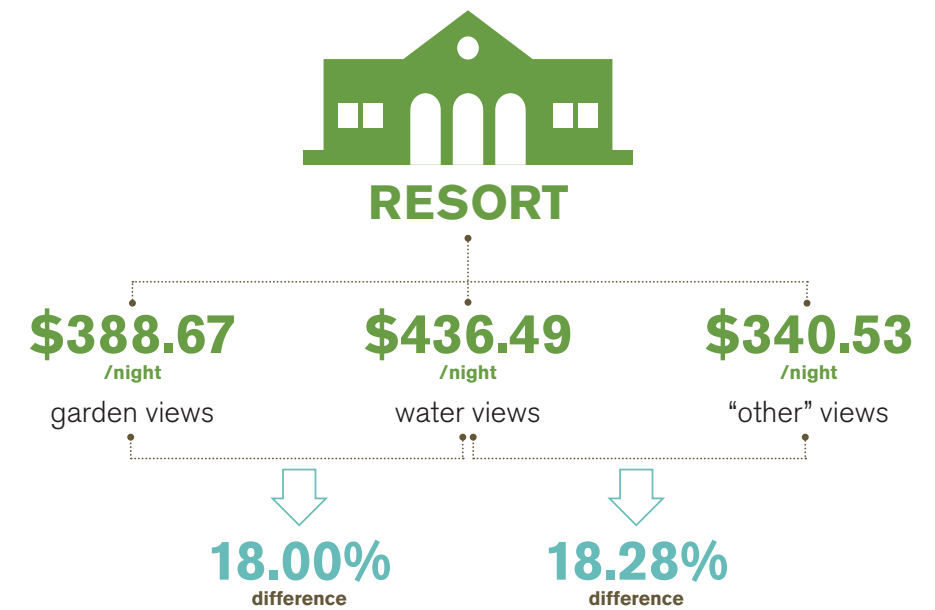
The analysis showed that urban hotels had a higher average pricing for rooms with views to a famous landmark (\$351.15/night). On average, rooms with a view to a park/garden or water were fairly similar at \$325.59 and \$332.29/night, respectively. The average cost per night of a room with a city view was notably lower at \$296.86/night.

Similar to the Resort hotels, the variability in views could be significant. The very small price difference between city view and park view may have been caused by the variability in how the hotels defined *park* and *garden*. For example, hotels in New York City overlooking Central Park have a different experience than a hotel in Marrakesh overlooking the property's garden. The definition of *park*, and its pricing, can change drastically from one location to another.

There is also a value associated with famous landmarks in urban settings that visitors value. Times Square in New York City, the Eiffel Tower in Paris, and Big Ben in London are valuable views as cultural icons. They can, however, also be associated with views of water. For example, the Statue of Liberty is in New York City's harbor, and Tower Bridge in London crosses the Thames, meaning that views to some famous landmarks also have views to water. No adjustment was made in the data to account for these views, and the prices reflected the description given on Hotels.com.

Another factor that influenced hotel pricing was room height (i.e. floor number). While this was a common point of differentiation for urban hotels, room values associated with height were not included in this study. See the Appendix for limiting factors of the study.

Research Methods and Results



Research Methods and Results

Bill Browning: The Value of Views

From a purely rational basis, a good room should be the same price regardless of the view. However, we know from the Hotels.com study that hoteliers charge up to an 18% premium for rooms with a view to water. With such direct evidence that views to nature are regarded as important and valuable, biophilic views should be a qualifying factor in the siting, orientation, and design of any hotel. When existing conditions do not support a quality view to nature, there is relative justification in specifying design strategies, such as natural analogues (e.g. finishes, textiles, hardware, artwork) to help enhance the biophilic experience of the guest room.

Onsite & Global Snapshot Surveys

Two surveys were conducted, one onsite by the lead investigators and one by members of our global network. In total, 39 hotels were reviewed globally. The survey results represent 20 hotels in the Americas, 10 in Asia, and nine in Europe, Middle East and Africa (EMEA).

Onsite Survey Method

Based on the finding that hotels value views to nature, we began to ask how else biophilic design was being used in not just hotel rooms, but in all hotel amenities. To review biophilic design in hotel amenities, we developed a survey framework based on the “14 Patterns of Biophilic Design: Improving Health and Well-being in the Built Environment” (Browning, Ryan, Clancy, 2014). To start, we conducted 15 onsite surveys of hotels across four continents. These surveys reviewed the use of the 14 patterns in each of the amenities, rating each pattern as “absent,” “partial presence,” or “strong presence.” The survey also included notes on each amenity and the overall experience of the space.

Of the 15 properties in the onsite sample, nine were considered “Urban hotels,” located within a city. The remaining six hotels were “Resort hotels” that were located outside of any urban centers. These resort hotels were generally associated with a natural feature or region, such as a beach, as opposed to a city. The hotels ranged in size from chains with over 600 keys to small boutique hotels with less than 30 keys.

The onsite survey revealed that hotels were using biophilic design across many amenities. The survey also showed that while Visual Connection to Nature, or views to nature, was one of the more widely used patterns, it was far from the only pattern used. Even in spaces with no views to nature, hotels were still creating a biophilic experience.

Research Methods and Results

Global Snapshot Survey Method

To get a larger sample size and variety of hotels, we then developed a more concise global snapshot survey using the same criteria as the in-depth survey. The global snapshot survey was designed to capture data regarding trends in pattern usage in hotel design around the world. It did not collect qualitative descriptions of each amenity as was done for the onsite survey, but rather captured a snapshot of biophilic design in each hotel.

Analyses:

The survey findings were analyzed by amenity and showed significant design trends across the sample. The flexible lobby lounge/bar at citizenM Times Square blurs the boundaries between indoors and outdoors in a spacious volume of complexity and order, mystery, comfort, and delight. The Parkroyal on Pickering in Singapore combines biomorphic forms, natural materials, water, and other design patterns for the ultimate biophilic lobby-bar and pool-bar experiences. The Faena in Miami, Florida, delivers the ocean to the guest rooms with a perfect color pairing of textiles and ceramic tiles. Infinity pools excite and indulge, while hotels from The Nines in downtown Portland, Oregon, to the jungle retreat of Malihom Estate in Penang, Malaysia, and Uma Paro in mountainous Bhutan each provide guests with an impressive balance of prospect and refuge.

As we assessed what biophilic design qualities each amenity was doing well (i.e. exhibits a “strong presence” of), survey results began to beg the question: Are other amenities missing out on optimizing the guest experience?

In a competitive market, hotels and brands are continuously looking for ways to differentiate their guest experience. Brands that embrace nature as a differentiator are likely to establish a visual connection right away, signifying a potential association with the guest experience.

As Figure 1 indicates, however, there are differences in survey respondents' perception of the strength of the nature connection. Perhaps more important is understanding why guests might benefit from a strong presence of any one pattern in particular.

Strength of Biophilic Patterns Across Hotel Amenities

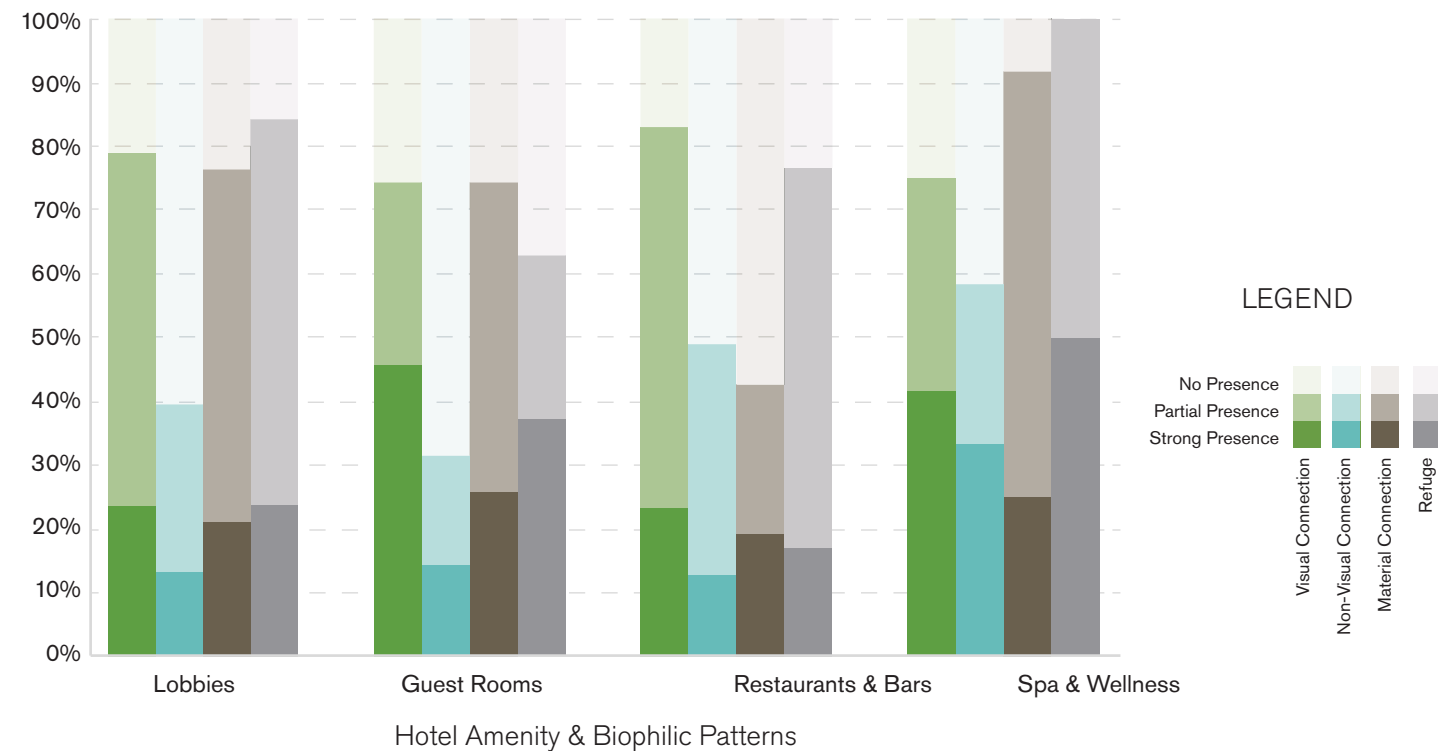


Figure 1. This graph shows the prevalence (in terms of percentage) of four patterns of biophilic design in each of four hotel amenities across all hotels surveyed.

For instance, the use of a visual connection with nature is relatively consistent across hotel amenities. In the surveys, visual connection routinely ranked among the most impactful biophilic design characteristics of each amenity. But the perceived strength of the visual connection is far greater among guest rooms and spas than it is for lobbies and restaurants. It is unclear whether this is a result of leveraging the presence of “free” nature – primarily in the form of quality views to vegetation – or whether hoteliers and designers have made deliberate efforts to enhance the experience of guest rooms and spa facilities with a “strong presence” of that visual connection. A similar question may be asked regarding the prevalence of either Non-Visual Connection with Nature or Refuge in spas compared with lobbies or other amenities.

Research shows that visual connections with nature have resulted in lowered blood pressure and heart rate, improved cognitive performance, and positive attitudes. Given the breadth of research in this particular aspect of biophilia (see Browning, Ryan, Clancy, 2014, p.24), as well as the role of a lobby as a buffer from urban overstimulation, travel, and other stressful circumstances, one might expect the surveys to reflect a higher overall perceived connection with nature within hotel lobbies. One possible explanation is that most conventional urban hotels are too limited in space,

location, or budget to support such a strong visual connection with nature. The other possibility is that the potential positive impact to guest (and employee) health and well-being is not widely shared within the hospitality industry.

The same can be said of the relatively low prevalence of refuge spaces in restaurants and bars, natural materials in guest rooms and spas, or the underutilization of and unique opportunity for multisensory guest experiences in all amenities. Ultimately, the **survey findings suggest that while some hotels and resorts do a great job at capturing the essence of the biophilic guest experience, most are not optimizing their opportunities.**

This translates into action in a number of ways. For any hospitality project, pairing a desired health and wellness outcome with each design decision will be just as important as retaining aesthetics. Leveraging existing or “free” biophilic features is a great place to start. Opportunities for new design projects will differ from operational strategies, but facilities management is usually responsible for upkeep, so collaboration between disciplines will be paramount to moving beyond surface interventions to creating a unique and holistic biophilic guest experience.

Bill Browning: Multisensory Experience

In office buildings, the emphasis of biophilic design tends toward visual interventions. This is not entirely surprising as the majority of the brain's sensory process mechanisms are focused on vision. However, experiences are more intense and more memorable when multiple senses are engaged simultaneously. Hospitality is one of the few places where designers tend to pay attention to the other senses. The hand of the fabrics; the scents of flowers, candles and food; crackling of logs in a fireplace; the splash of water in a fountain; the texture of wood grain and stone in furnishings; and bird song in a lobby or on a patio are ways of creating more memorable spaces.

Some brands have created signature scents that are used in candles and toiletries. For Westin, their signature scent is called White Tea, and guests can purchase bath and fragrance products through the hotels and their website. The Rosewood Inn of the Anasazi in Santa Fe worked with a small local company to produce toiletries using local cedar and Native American medicinal plants.

Research Methods and Results

Lobby User Trends Review

To further understand how guests respond to biophilia in hotels, we looked at user trends in the hotel lobbies of six Midtown Manhattan hotels. Midtown contains many of New York City's most popular tourist destinations, including Times Square, Central Park, and the theater district. This robust tourist hub has a high density of hotels, which provided a good selection of both biophilic and conventional hotels. Biophilic lobbies were selected using the same criteria from the surveys, based on the 14 Patterns of Biophilic Design. Biophilic design patterns that are strongly represented in these spaces are engaging, easy to see, touch, hear and experience, and could be a defining aspect of the space.

The three biophilic hotels selected were similar in size, price range, and location. For each biophilic hotel, a conventional hotel of similar size, price range, and location was selected.

Bill Browning: Lobbies & Guest Rooms – citizenM Times Square, United States

With micro-rooms and a market for millennials on business travel, the citizenM brand has focused on making the lobby a large comfortable gathering space, said Edwin Hendriksen, former Senior VP of Development and Investments, North America, for citizenM hotels. The brand has focused on creating social spaces, as they feel that their target market is less interested in spending time in their rooms and more interested in interaction. The lobby of the Times Square, Manhattan hotel includes a library, full-service bar, self-serve dining area, and a variety of indoor, outdoor, and mezzanine seating areas. Green walls and trees in the rear courtyard are visible throughout the lobby.

This approach supports citizenM's goal of creating a convivial space. Throughout the day, the lobby is popular with both hotel guests and local visitors who come to meet and get a coffee or cocktail at the bar, all of which increase revenue without having to fill additional beds.



The lobby at the citizenM in New York City's Times Square: The built-in wall shelving matrix featuring books, photos, natural artifacts, and plants extends from the street, through the interior lobby, and into the back courtyard, blurring the boundaries between indoors and outdoors.

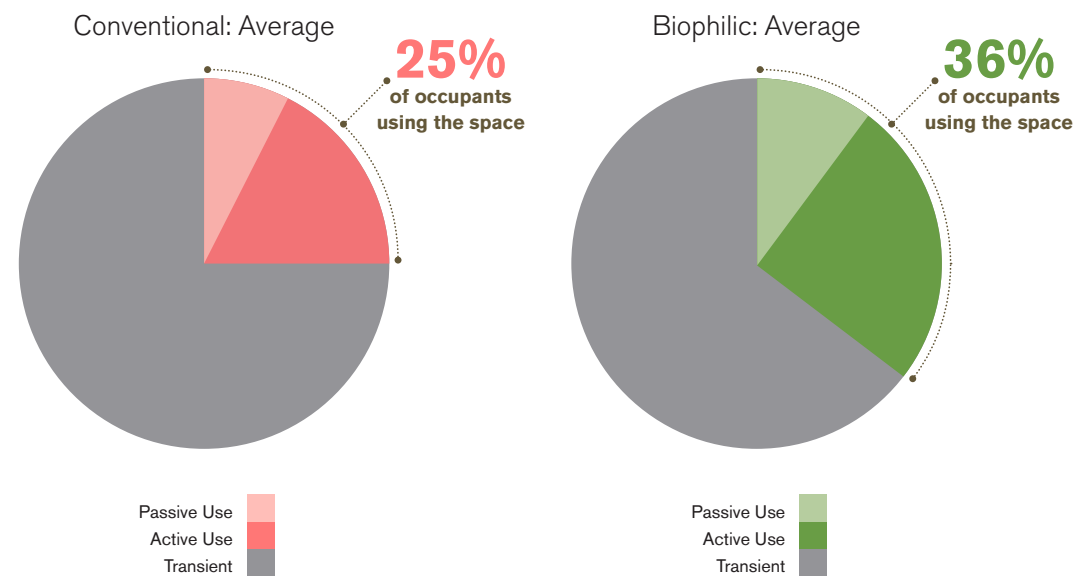
Research Methods and Results

User Trend Analysis

Each of the six hotels' lobbies was visited once in the morning (8:00am-10:30am), once in the afternoon (12:00pm-2:30pm) and once in the evening (5:00pm-8:00pm) during the workweek. Each visit was exactly 45 minutes long. During each visit, all non-employees in the space at the start of the visit and all non-employees who entered the space during the visit were counted. Each occupant was recorded as a passive user, an active user, or transient user. A passive user was defined as engaging in an individual activity, such as using a computer or eating alone. An active user was defined as engaging in a social activity, such as participating in conversation, eating in a group, or having a meeting. Transience was defined by activities passing through the space, including checking in or out and walking through to the exit or elevators. Individuals who entered the space more than once during the 45 minutes were only counted one time. Individuals who switched between active and passive uses during the 45 minutes were counted based on the first use observed. Percentages of use types were compared for different times of day and averaged to reflect overall use patterns.

Observed User Trends

On-site observations showed that guests in the lobbies of the biophilic hotels were slightly more likely to be observed engaging in either an active or passive use of the lobby than guests in the lobbies of the conventional hotels. In biophilic hotel lobbies, 36% of occupants were observed as actively or passively using the space, as compared to 25% of occupants in the conventional hotel lobbies. There was essentially no difference between biophilic and conventional hotels in regards to use type.



Research Methods and Results

Of occupants who were observed using the biophilic hotel lobbies, 71% were engaged in an active use as compared to 70% active use in the conventional hotel lobbies. There was a general trend among both biophilic and conventional hotels of a higher percentage of users engaging in active rather than passive activities in the evening. While mornings had the highest rates of transience in the conventional hotel lobbies, mornings had the lowest rates of transience in the lobbies of the biophilic hotels. This trend was largely due to the popularity of the biophilic hotels' lobbies during the morning hours.

These insights are important as more and more brands are rethinking their lobbies to potentially evolve the guest experience and encourage spending.

Online Marketing and Guest Review Comparison

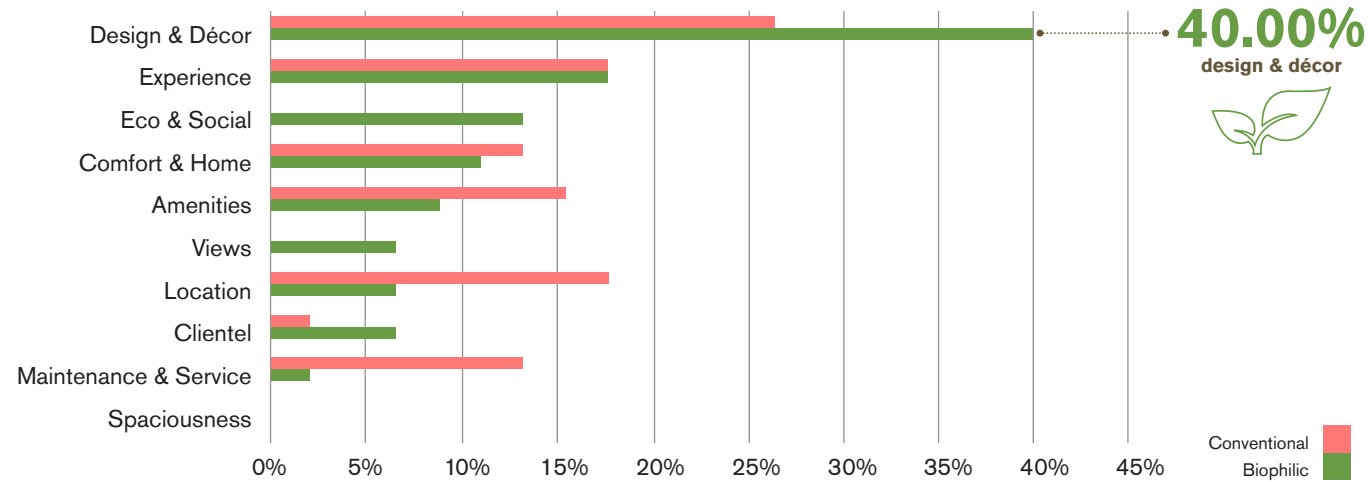
Methodology

An off-site analysis was conducted for each of the six hotels to determine how each hotel represents itself in advertising and how each hotel is portrayed by customers in reviews. We examined the homepage of each hotel and the larger brand or hotel chain associated with it. Fifteen short descriptive phrases were extracted from the text on each hotel's homepage and brand homepage. The ten most recent customer reviews posted on each hotel's TripAdvisor page at the time of the analysis were also examined. Between one and three short descriptive phrases were extracted from each review, depending on the length of the review.

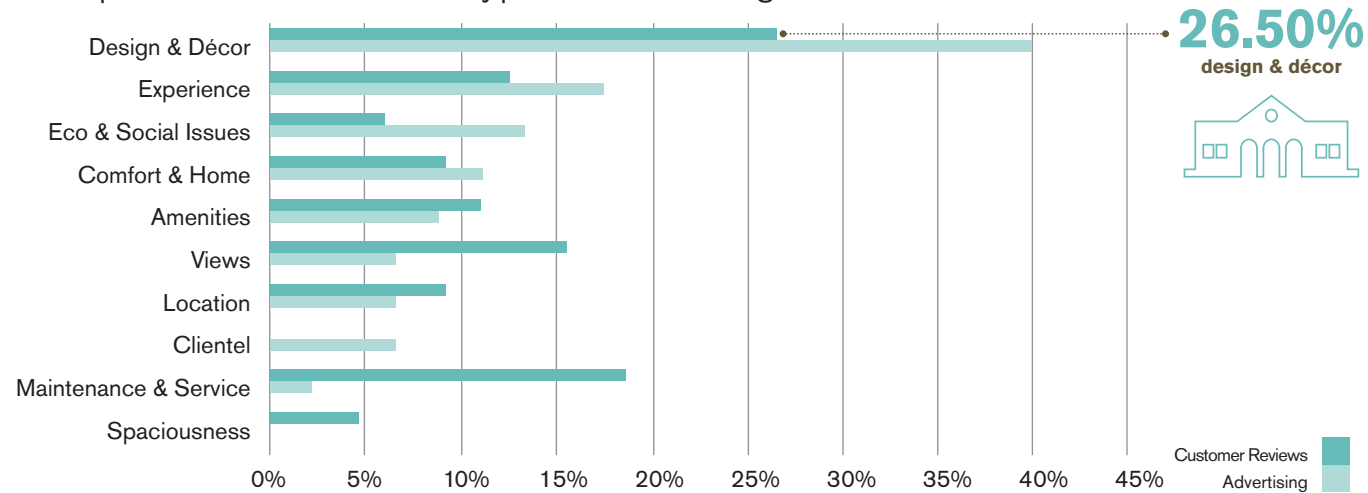
Ten content types were defined based on the content observed in the advertising and reviews: Amenities, Clientele, Design and Décor, Ecological or Social Ideals, Experience, Location, Maintenance and Service, Spaciousness, and Views. In addition, we recorded all references to biophilic design patterns and nature. We calculated the percentage of phrases that refer to each content type, as well as to a biophilic design pattern and nature. Only positive phrases from customer reviews were included in this analysis.

Research Methods and Results

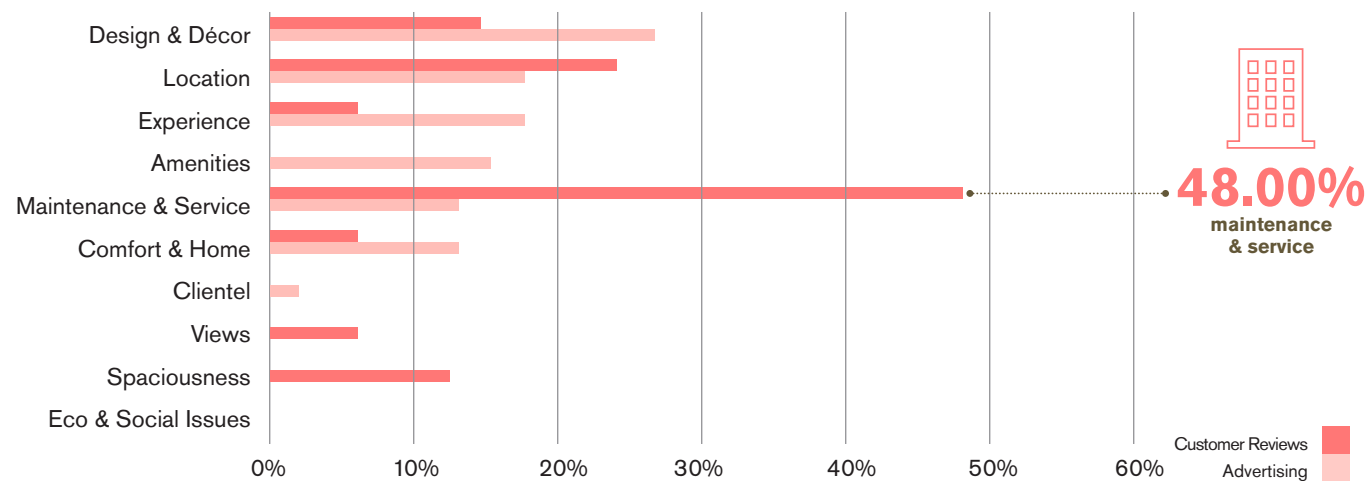
Content Type in Advertising: Biophilic & Conventional Hotels



Biophilic Hotels: Content Type in Advertising & Customer Reviews



Conventional Hotels: Content Type in Advertising & Customer Reviews



Research Methods and Results

Content Comparison

Content type in advertising was similar between the biophilic and conventional hotels overall. The most common content type in selected phrases from both the biophilic and conventional hotels' online advertising was design and décor. The second most common content type was experience, which included phrases such as *"a genuine Manhattan immersion,"* and *"Privacy in the most public place in the world."* While the websites of both hotel types discuss experience the same amount, guest reviews of biophilic hotels mention experience twice as often as reviews of conventional hotels.

The third most commonly mentioned content type differed for the biophilic and conventional hotels. The biophilic hotels talked about ecological and social ideals in phrases such as *"commit to safeguarding [nature],"* *"affordable luxury for the people,"* and *"corporate equality,"* a content type not mentioned at all on the conventional hotel homepages. The conventional hotels, on the other hand, had a heavier focus on location and convenience. This content type, while still mentioned on the biophilic hotels' homepages, was less prevalent. The conventional hotels also had significantly more mentions of maintenance and service on their homepages in phrases such as *"treats the guest as family,"* *"blends Asian hospitality with Western comfort,"* and *"warm Irish hospitality."*

The most common content type in the positive TripAdvisor reviews of biophilic hotels that were examined for this study was design and décor, matching the most common content type in advertising. The second most common content type, however, differed from the advertising focus. Rather than focusing on experience, the customer reviews focused equally on views and on maintenance and service. The experience was still important to reviewers as the third most common content type. Ecological and social ideals were a less prevalent content type but were mentioned a few times in reviews of one of the biophilic hotels.

Maintenance and service were mentioned most in guest reviews of conventional hotels, while in biophilic hotels, nature and design of the space took precedence.

Reviews of conventional hotels were less well-matched with their advertising. While the most common content type in advertising was design and décor, this content type was only the third most common content type in the phrases from positive customer reviews. The most common content type in positive reviews of the conventional hotels was maintenance and service, mentioned in phrases such as *"clean, comfortable and with friendly service,"* *"real enthusiasm and a sense that they really care"* and *"staff seemed like they could not do enough for you!"* The second most common content type was location, which was positively referenced in phrases such as *"Hotel is in an ideal place,"* *"perfect location not too close to the craziness"* and *"so close to everything we needed."*

Research Methods and Results

Biophilic design patterns were also more likely to be referenced in reviews of the biophilic hotels in the study than in the conventional hotels. Prospect was, by far, the most commonly mentioned biophilic design pattern in all the reviews studied. In addition to having more references to biophilic patterns generally, positive reviews of the biophilic hotels also referenced a wider range of biophilic patterns. A customer at *Biophilic Hotel 1* described it as having “smells of wood and nature,” referencing a non-visual connection to nature. A *Biophilic Hotel 2* review described a “mood pad which controls the lights (mood lighting)” as a positive feature of the room, a subtle reference to dynamic and diffuse light. All three biophilic hotels had mentions of a visual connection with nature. A review of *Biophilic Hotel 1* mentioned the “living wall in the dining area,” the rooftop bar at *Biophilic Hotel 2* was described as “perfect to sip on a cocktail and watch the sun”, and a review of *Biophilic Hotel 3* spoke highly of the “spectacular view of the River.” The only biophilic design patterns referred to in reviews of the conventional hotels were Prospect and Refuge.

Using TripAdvisor, the observation of design patterns can vary greatly from person to person. Indeed, a space seen by the same person at different times of day or in different contexts may be interpreted differently. This analysis provides a wider perspective on the use of biophilic design patterns in the hotels in the study than an individual analysis alone could provide. While the sample size was too small to draw any statistically significant conclusions, it suggests a relationship between biophilic design and user trends.



The lobby lounge at The Nines, Portland, OR: The lounge uses furniture and different flooring materials to create different spatial conditions within the larger context of the lobby lounge. Wood floors, natural patterns in the carpet, and the use of natural materials catch the eye and create a unique experience in each seating area.

Analysis of Industry Trends

Analysis of Industry Trends

Industry Trends

According to the Deloitte report, “Winning the race for guest loyalty” (Jennings et al., 2014), one of the most important strategies to generate loyalty in repeat guests is to create a customized experience. Customers have come to expect the basics like cleanliness and comfort, and these qualities are no longer enough to differentiate from competitors. Millennials in particular, who will make up three-quarters of the workforce and frequent business travelers by 2025, are looking for a more memorable experience.

The findings from the online content comparison from the conventional hotels in Manhattan show that guests most often mentioned maintenance and service. This suggests that while guests were pleased with the experience they had, it did not exceed their expectations. While the biophilic hotel reviews also referenced the maintenance of the hotel, they referenced nature and the design of the space more. The emphasis on the design is a differentiating factor between the biophilic hotels and conventional ones, suggesting that guests had an experience that went above and beyond their expectations of a clean room and comfortable bed.

In some cases, biophilic interventions also offer opportunities to create customized guest experiences. If a hotel has a variety of view types, including nature views and less desirable views, ensuring that guests who belong to the hotel's loyalty program check into a room with a view can deepen that guest's loyalty to your hotel. In the online content analysis for citizenM in New York, one guest referenced the adjustable lighting in the room. This adjustable lighting is another opportunity to create a personalized guest experience for loyalty program members by ensuring that their room's lighting is set to their preferred setting upon arrival.

For guests who are not a part of a hotel's loyalty program, creating a customized experience is much more difficult. For these guests, the application of biophilic design can help create a memorable experience that leads to repeat customers. Not only can biophilic design create a unique experience that makes guests want to stay with you again and again, but it can also support the health and well-being of travelers. Travel can lead to stress—whether it's dealing with airport security, a delayed flight, or traveling with kids. Certain biophilic patterns have been shown to decrease stress and improve mood.

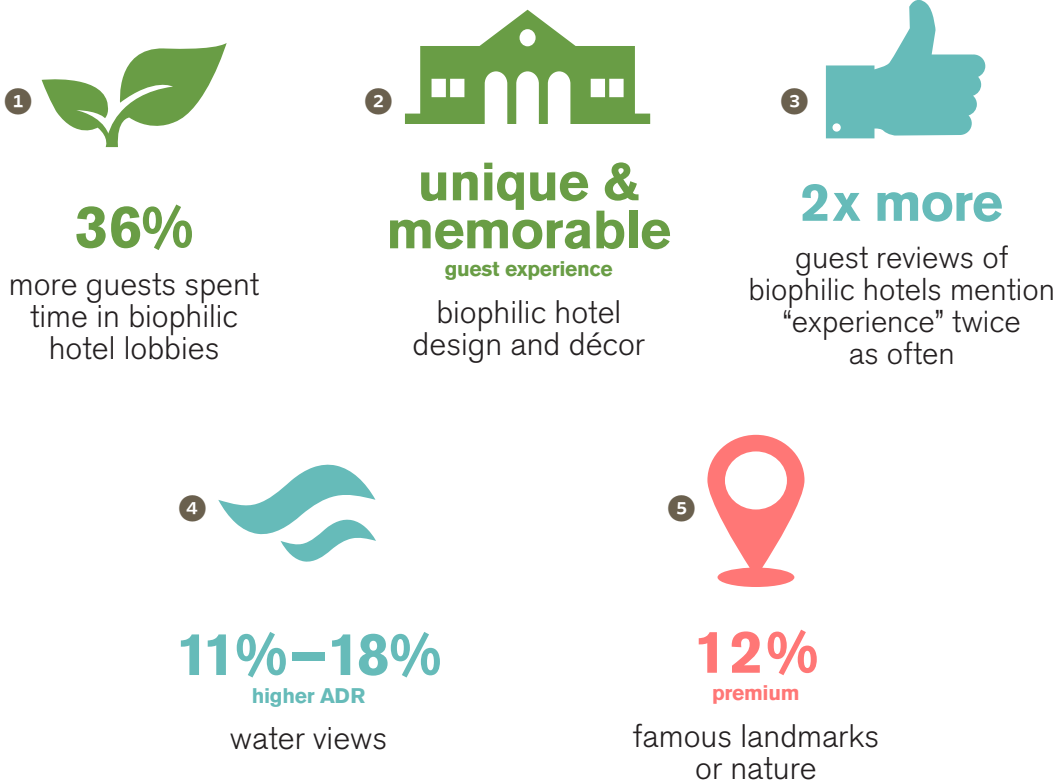
Bill Browning: Branding & Price Points – PARKROYAL on Pickering, Southeast Asia

With more than 2.7 times its footprint in lush planted green areas, extensive water features, and amazing biomorphic forms, the local cab drivers refer to the PARKROYAL on Pickering as the *'jungle hotel.'* According to the architect Richard Hassel of WOHA, as the hotel was about to open, the ownership realized that the experience would be substantially different than the other hotels in the PARKROYAL Hotels & Resorts brand. It was too late to completely rebrand the property, so it was instead renamed a *“PARKROYAL Collection Hotel.”*

Bookings have been better than original projections, and the operators have increased the average rack rate for the hotel.

Key Messages

- 1 36% more guests spent time in biophilic hotel lobbies than in conventional lobbies
- 2 Biophilic hotel design and décor is a strong factor in creating a unique and memorable guest experience
- 3 While the websites of both hotel types discuss “experience” the same amount, guest reviews of biophilic hotels mention “experience” twice as often as reviews of conventional hotels
- 4 Hotel guest rooms with a view to water are priced on average 11%-18% higher than rooms without a view
- 5 Price premiums can be up to 12% for hotel guest rooms with views to famous landmarks or nature compared to rooms without a view



Looking Ahead

The value of conducting a series of smaller studies was to get a broad perspective on how the guest experience might be defined in terms of biophilic design and in the context of hospitality. Given that the guest experience is overwhelmingly a main driver of design choices in the hospitality industry, we would like to better understand the relationship of urban hotels to their local environment to determine what opportunities hotels can potentially use to facilitate an enhanced guest experience and ideally improve the value of the hotel lobby as both a revenue stream and a neighborhood asset.



Appendix

Research Methodology

Global Snapshot Survey Method – *Detailed description*

To get a larger sample size and variety of hotel, we then developed a more concise global snapshot survey using the same criteria based on the 14 patterns of biophilic design as the in-depth survey. The global snapshot survey included the lobby, two responses for restaurants and bars, the spa, and the guest room. For consistency in assessment of biophilic amenities, respondents rated each of the patterns using the same “*absent*,” “*partial presence*,” or “*strong presence*” approach as used in the onsite survey. Respondents were not required to review every amenity in the hotel, only those that they visited. The survey also asked respondents to identify the three patterns that had the strongest presence in each respective amenity and which of the senses were primarily affected. The survey asked additional yes/no questions about references to nature in the furniture, decor, and architecture. For each amenity, respondents were also asked to identify the pattern that had the greatest impact on the space, noting that it could be a pattern that had only “*partial presence*,” but was perceived to be uniquely impactful. The global snapshot survey was designed to capture data regarding trends in pattern usage in hotel design around the world. It did not collect qualitative descriptions of each amenity as was done for the onsite survey, but rather captured a snapshot of biophilic design in each hotel.

The global snapshot survey was accompanied by a reference guide that defined each of the 14 patterns to give all survey respondents the same baseline background knowledge. It was then circulated within our networks to gather responses from around the world. By using the same rating system in both the onsite survey and global snapshot survey, the data from both could be aggregated. Between the two survey efforts, 39 hotels were reviewed globally. The survey results represent 20 hotels in the Americas, 9 in EMEA, and 10 in Asia.

Hotels.com Analysis – *Limitations of study*

The study was limited by the information provided by Hotels.com. The view descriptions are not standardized, which creates variability in how different hotels use the same view type. This variability can affect pricing and guest expectation when booking a room. The hotels' distribution was also affected by the locations populated by Hotels.com. The study also focused on vacationers traveling on the weekends and does not look at weekday hotel prices for work travel.

The average room rates are unweighted averages of all rooms with that view type. However, not every hotel has every view type. The % difference calculations between view types was calculated from a subset of the data which includes only hotels that have both room rates represented. We used the percentage difference formula to compare the room prices against one another.

Hotels.com does not show occupancy rates. Therefore, this study could only assess the price at which rooms were listed, not how frequently people choose a room with a view. While a higher rate is beneficial to the hotel, higher rates do not necessarily reflect how the room impacts the guest experience. Further research is required to determine if the nature view increases F&B sales, increases customer loyalty and return trips, or increases a guest's likelihood to recommend the hotel to others, either by word of mouth or online review.

These preliminary results support our hypothesis that rooms with a view to nature, in particular to water, are consistently priced higher than rooms without.

Appendix

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Case Studies



BIOPHILIC DESIGN IN HOSPITALITY

Biophilic Hotel Lobbies

ROLE OF BIOPHILIA IN LOBBIES

A hotel lobby sets the stage for the guest experience. It's a first impression of the guest experience being offered. Hotels seeking to support a feeling of escape, comfort, or socialization will intuitively or intentionally use biophilic design to engender such experiences. Research in neuroscience and environmental psychology tells us that a biophilic approach to design can effectively reduce stress, among other health benefits, when thoughtfully implemented.

INDUSTRY TRENDS

In a competitive market, hotels and brands are continuously figuring out ways to differentiate their guest experience. Brands that embrace nature as a differentiator are likely to establish a visual connection right away, if not in the approach or entryway, then in the lobby. The question is how to be impactful while addressing common design problems, such as budget and size constraints, and the flow of guest experience across lobby adjacencies.

When we look at these familiar industry challenges with an added lens of biophilic design, solutions emerge that effectively enhance the overall guest experience. Early studies on industry trends reveal that a few biophilic design patterns – patterns such as Visual Connection with Nature, Prospect through the lobby, and Material Connection with Nature – are emerging as the most

frequent and well represented biophilic design patterns in hotel and resort lobbies around the world. How these patterns are articulated tends to differ based on ecosystem and climate, culture, spatial parameters, hotel brand identity, and other factors, but the overarching trend is that direct and indirect references to nature incorporated in the lobby design impact the guest experience, user trends such as dwell time, and potentially even F&B spending.

Working with budget constraints. Views to outdoor greenery are essentially free biophilia, but not all lobbies look out on lush vegetation or natural landscapes. Vegetated walls and other indoor living greenery are sometimes costly, but can be particularly effective from a health and wellbeing standpoint when placed in high density spaces designed to support greater dwell times. Small interventions are sometimes more effective – both from cost (investment and maintenance) and health standpoints – when well designed and strategically located. Hotels with limited available space or a modest renovation budget can create micro-experiences, such as within a lounge area, with plants and small a water feature. The psychological benefits of nature are suggested to increase with higher levels of biodiversity and not with a greater area of vegetated space (Barton & Pretty, 2010). It is important that adequate comfortable seating is within close proximity to optimize the biophilic experience.

Selective application. Materials are a major budget item that provide both broad and targeted opportunities for enhancing the biophilic guest experience. Carpet or other surface materials and finishes can enhance perceptions of textural and material connections with nature, especially in places where guests will most likely touch it (counter tops, seating, hand railing) or see it (floor, ceiling, walls). In most cases, there is no cost impact when incorporated early in the design process, but

when budget constraints limit opportunities for using a uniquely biophilic material or product, limited applications can be just as effective when thoughtfully incorporated. For instance, a broadloom carpet that plays with texture and density may cost more than the baseline design budget allows. Instead of omitting the strategy altogether, select specific areas in the lobby in which to provide occupants a uniquely tactile micro-experience, such as in a small area.

Biophilic navigation. Prospect conditions within and through a lobby can drastically improve the biophilic guest experience. Environmental psychology suggests that we prefer spaces with prospect, similar to the African savanna on which we evolved (Orians & Heerwagen, 1986 and 1992). Prospect can also reduce stress responses, particularly in unfamiliar environments such as a hotel (Petherick, 2000). Smaller lobbies and non-linear adjacencies can make quality prospect a challenging goal. Transparent partitions and peek-a-boo windows can help improve prospect conditions, while biomorphic forms and patterns can support in wayfinding. For new or larger lobbies or new developments, mezzanines, highly visible stairs, and variable elevations can enhance the biophilic navigation of a lobby and its adjacent amenities.

Making the best of what's available. Size constraints are not a barrier to implementing biophilic design. Rules of thumb – to prioritize quality over quantity, and intensity or density over distribution – make the creation of micro-experiences a very effective approach to enhancing the guest experience.

HEALTH IMPACTS

Biophilic design makes a lobby or any space different from the next, essentially adding health and wellness benefits to the overall guest experience. Because the future traveler is more educated and more global, awareness of personal wellbeing is paramount to their travel experience. The work hard, play hard ethic generates a need and expectation to rejuvenate well. Hospitality venues can respond to this growing demand, in part, by offering respite and enabling socialization among their guests and visitors. Research tells us that biophilic design is a means to achieving such experiences. A few minutes or even seconds of exposure to nature each day can help reduce stress and mental fatigue. Views, refuge, and other characteristics of nature incorporated into the building environment may also be able to increase perceptions of safety and comfort, and heighten curiosity and engagement.

BIOPHILIC LOBBIES IN PRACTICE

Visual connection with nature



Image © Catie Ryan/Terrapin Bright Green

Direct and abstract references to nature	Health impacts	
<ul style="list-style-type: none"> Select nature-inspired carpet patterns, colors, and textures. Display animal figurines, flora-fauna motifs, murals, mosaics, and artworks. Blur indoor-outdoor transitions by bleeding representative nature into real, living nature. Leverage regional qualities and characteristics to reinforce a connection with nature, either as direct or abstract references. 	Stress	Lowered blood pressure and heart rate
	Cognitive Performance	Improved mental engagement and attentiveness
	Emotion, Mood & Preference	Positively impacted attitude and overall happiness

New York City, NY, USA. The built-in wall shelving matrix featuring books, photos, natural artifacts, and plants extends from the street, through the interior lobby, and into the back courtyard, blurring the boundaries between indoors and outdoors. Seating options from multiple vantage points—lobby lounge, bar, outdoor courtyard, and mezzanine—provide views to birds, trees, vines, and potted plants, some of which are real and others artificial. Guests spend hours sipping a beverage and enjoying the vibrant space as a place to work, socialize, or chill.

Prospect

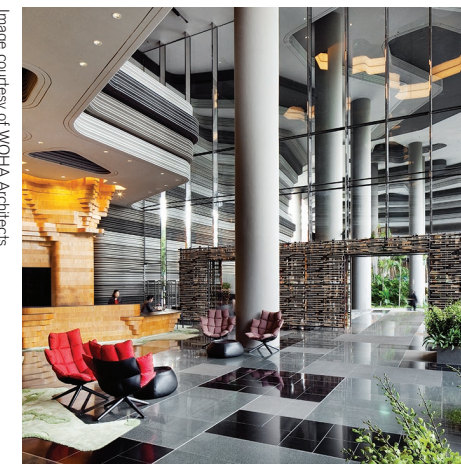


Image courtesy of WOH-A Architects

View depth and content	Health impacts	
Lobbies with strong prospect to focal points and amenities are able to orient, improve comfort, and inform decision-making among guests and employees. They also tend to include one or more of the following elements: <ul style="list-style-type: none"> Rill, fountain, pool, natural water body Comfortable seating area that suggests greater privacy or restoration Bar, restaurant, lounge, other social space Courtyard, landscape, cityscape 	Stress	Reduced stress
	Cognitive Performance	Reduced boredom, irritation, fatigue
	Emotion, Mood & Preference	Improved comfort and perceived safety

Singapore. From the lobby entrance one can see out to the valet and the street, as well as to the reception desk and concierge, multiple casual seating areas and a water feature, past a bar to the elevator lobby and restaurant beyond. The lobby experience minimizes stress and supports an easy decision-making process for the guest.

Material connection with nature

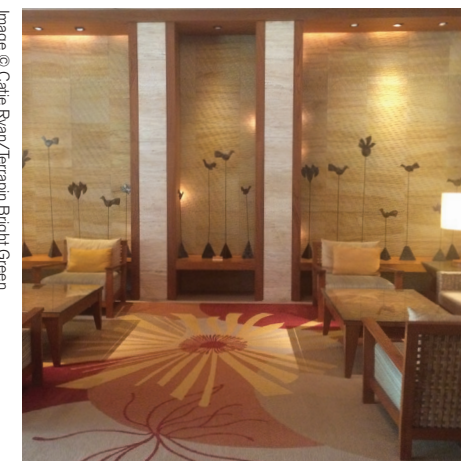


Image © Catie Ryan/Terrapin Bright Green

References to nature	Health impacts	
Common solutions for lobbies include both direct and abstract references to nature and the use of or minimally processed nature-sourced products at the reception and in seating areas: <ul style="list-style-type: none"> Furniture, finish materials (wood, stone, leather) Textiles and textures (wool; woven materials; malleable vs rigid; soft vs hard) Carpet patterns, motifs, colors, tones 	Stress	Unknown
	Cognitive Performance	Decreased diastolic blood pressure; Improved creative performance
	Emotion, Mood & Preference	Improved comfort; Observed view preference

Penang, Malaysia. The whole of the lobby uses a natural color palette with natural materials, including wood furniture and stone flooring. One seating area, out of the main flow of foot traffic, has a carpet with abstract nature references. Ornamental animal figurines line the wall, which is finished with a striated stone and wood panel detail. The characteristics of this seating area are more welcoming than the centrally located.



BIOPHILIC DESIGN IN HOSPITALITY

Biophilic Guest Rooms

ROLE OF BIOPHILIA

Hotels seeking to support a feeling of escape, comfort, or a connection to the local culture and ecosystem will intuitively or intentionally use biophilic design to engender such experiences; this is particularly true of contemporary hotels where the guest room is often designed to support multiple functions beyond sleep, including in-room business, relaxation and restoration, dining, and entertainment. In this type of guest room, outdoor views and quality lighting conditions play an important role in establishing a biophilic experience that is likely to have a meaningful impact on the health and wellbeing of the guest.

Guest rooms in “lifestyle” hotels tend to be smaller, functioning solely as a comfortable place to sleep. With fewer in-room amenities, the hotel's focus is more intently on the shared/ public spaces. In this case, the primary role of biophilia in the guest room is to support restoration while directly or subtly reinforcing a connection to place. Research in neuroscience and environmental psychology tells us that a biophilic approach to design can effectively reduce stress and induce restoration or curiosity, when thoughtfully implemented.

INDUSTRY TRENDS

Early studies tell us that hotels and resorts price guest rooms with a view to water up to 12% more than those without a view to water. Views to parks and landscape are also reportedly

priced higher. Views to outdoor vegetation, oceans, and landscapes are essentially free biophilia, so it is no surprise then to find that a Visual Connection with Nature is the most well represented biophilic design pattern in hotel guest rooms, but not all guest rooms are so fortunately oriented.

Early studies on industry trends reveal that several additional biophilic design patterns are used frequently in guest room design. Material Connection with Nature is a particularly frequent and well-represented biophilic design pattern in hotel and resort guest rooms around the world. Dynamic & Diffuse Light and Refuge are also trending but heavily undervalued patterns in their potential to contribute to the biophilic experience of guest rooms. Some hotel brands are using these biophilic design patterns to help address common design problems, such as creating a uniquely restorative environment with quality daylight and a limited budget.

Working with budget constraints. While passive incorporation of biophilia by way of views to the ocean or landscape is perhaps the most cost effective strategy, not all guest rooms are so fortunately oriented. Some city views can be just as intriguing or captivating, and may garner the same rates. Hotels with limited quality views to nature and a modest renovation budget can use literal or abstract references to nature to help achieve a similar biophilic experience. We have a visual preference for these biomorphic patterns, which have been shown to reduce stress by inducing a shift in focus and concentration (Joyce, 2007). Carpet, textiles (including duvet covers, tapestries and furniture), artwork, lighting, hardware (drawer knobs), wallpaper or wall decal patterns and other accent details provide the best opportunities.

Materials are a major budget item that provide both broad and targeted opportunities for enhancing the biophilic guest experience.

Successful examples of biophilic hotel guest rooms tend to leverage the biophilic properties of just a few fit-out items, which is likely to be more effective than trying to make every material and product exhibit some reference to nature. This approach also allows flexibility for guest room refresh projects.

Creating a restorative environment. Refuge spaces are very effective at supporting restoration. While guest rooms may be perceived as refuge spaces in and of themselves, we must consider both that guest rooms may serve more than one function and that there are different types of refuge experiences. Supporting restoration requires not just separation (such as from a busy common area) but a level of protection overhead and to one's back, in order to engender a heightened feeling of security that allows complete relaxation. Bay windows with integrated seating and similar nook spaces with adequate depth and comfort for extended use can be effective solutions. Guest rooms at the 1 Hotel each incorporate a window seat.

Beds facing the window, rather than parallel to window, provide a subtle refuge experience, whereby the guest can look out from the comfort and protection of the walls above and around them. Canopy beds further elevate the refuge experience, but four-poster beds are rarely a cost-effective solution for moderate sized boutique and larger hotels and resorts. Draped fabric or a soffit overhead can provide a similar refuge experience at a lower investment cost. An architectural solution may include the bed recessed into the wall, or an alcove bedroom area. In each of these solutions, the bed occupies a uniquely protected space within the larger guest room, characterized by a lower ceiling plane and protection to the back, either from a wall or headboard.

Diversifying benefits of smart lighting solutions. Circadian lighting systems are a hot topic in healthy lighting design. While the technology is still a relatively novel and costly investment, the most effective health strategy is to provide ample access to quality sky views.

The right type of light is also important, especially for guests who are traveling from different time zones – access to appropriate daylighting and supplemental electric lighting schemes at the right times of the day supports the need for guests to reset their biological clock. Some hotels have lighting presets for mornings and evenings, making it convenient for guests to configure – so long as the controls are placed at intuitive locations within each room.

Daylight penetration into the bedroom and even the bath has emerged as a major concern giving rise to a significant shift in design solutions. Hotel brands, such as AC Hotels and the Parkroyal on Pickering in Singapore, that opt not to have a wall between bath and bedroom,

using instead the vanity as an open divider, tend to have substantial daylight penetration with the added benefit of lower electricity use. The water closet alone is then enclosed in a smaller room, often with frosted glass, allowing some daylight penetration. This is sometimes a preferred strategy for hotels with smaller guest rooms. The primary benefit of these strategies

is evening and night-time wayfinding, which can help limit the need to turn on disruptive electric lights that can further disrupt sleep patterns.

HEALTH IMPACTS

Today's work hard, play hard ethic generates a need and expectation to rejuvenate well.

Research tells us that refuge conditions support restoration and that quality light at the right times of the day supports healthy sleep cycles. Biophilic design strategies for hotel guest rooms can offer a unique restorative experience – one that supports feelings of safety, comfort, and mind-body recharge without compromising brand quality.

BIOPHILIC GUEST ROOMS IN PRACTICE

Dynamic & difused light



Image courtesy of WOHA Architects

Integrative strategies supporting restoration		Health impacts	
<ul style="list-style-type: none"> Interior window, or low/no wall between bath and bed Glass partitions for water closet and shower Optimize sky views Lighting presets and controls Minimize nighttime exterior electric light intrusion 	Stress	Positively impacted circadian system functioning; Increased visual comfort	
	Cognitive Performance; Emotion, Mood & Preference	Unknown	

Singapore. Daylight pours in with only floor finishes to differentiate between bedroom and bath, while the water closet and shower are enclosed in clear glass, allowing complete daylight penetration and views to vegetation and sky. Two layers of mechanical blinds are provided for varying degrees of daylight penetration and visual privacy. Minimal electric lights are needed to supplement the guest experience.

Material connection with nature & biomorphic forms



Image © Bill Browning/Terrapin Bright Green

Direct and abstract references to nature		Health impacts	
<ul style="list-style-type: none"> Textiles: duvet covers, tapestries, furniture Artwork: paintings, prints, sculpture, installations Light: stands, sconces, pendants, chandeliers Hardware: knobs, handles Materials: floors, sink, carpet, headboard Walls: paint, wallpaper or decal patterns 	Stress	Unknown	
	Cognitive Performance	Decreased diastolic blood pressure; Improved creative performance	
	Emotion, Mood & Preference	Improved comfort	

Phuket, Thailand. Teak floors and paneling are an obvious choice for a Thai resort, but this application is so effective because there are multiple levels of information – solid floors ground the guest to the place, textured track doors encourage a tactile experience, and window screens visually connect the guest to the surrounding environment.

Refuge



Image © Catie Ryan/Terrapin Bright Green

Adaptable strategies supporting restoration		Health impacts	
Moderate refuge: <ul style="list-style-type: none"> Window seat Bed facing a window Canopy bed 	Strong refuge: <ul style="list-style-type: none"> Alcove bedroom area Canopy or alcove bed with partial/optional enclosure 	Stress	Reduced stress
<ul style="list-style-type: none"> Soffit over bed headboard (12-18 inches lower than the ceiling) 		Cognitive Performance	Improved concentration, attention and perception of safety
		Emotion, Mood & Preference	Unknown

Penang, Malaysia. The bed faces french doors looking out to a small balcony and down the mountain valley, providing a restorative experience that would be vastly diminished if the bed were instead perpendicular to the view. The canopy bed provides another optional layer of refuge. Windows with adjustable slats allow daylight in and views out, but protect from passing hotel guests and staff.



BIOPHILIC DESIGN IN HOSPITALITY

Food & Beverage Venues

ROLE OF BIOPHILIA

The role of biophilia in restaurants and bars is to connect guests with nature through an enhanced multisensory experience – the way the space, the cooking, and the food, sounds, feels, smells, tastes, conjures, surprises, and delights.

INDUSTRY TRENDS

According to the USDA 's "Trends in U.S. Local and Regional Food Systems: A Report to Congress" (Low et al., 2015), the number of farmers' markets in the US has grown more than 180% in the last decade and food hubs nearly 290%. But the farm-to-table trend, in and of itself, does not present a biophilic culinary experience.

In a survey of 43 hotel and resort food and beverage venues, results revealed that a Visual Connection with Nature and Material Connection with Nature were present in 83.7% and 76.7% of the venues, respectively. Respondents also indicated that these two biophilic design patterns had a greater impact on the experience of the space than other biophilic qualities observed.

Creating a restorative environment. Spatial conditions of Prospect (74.4%) and Refuge (72.1%) were notably present biophilic qualities of the hotel F&B venues surveyed. The creation of open prospect conditions encourages guests to view the chefs at work in the kitchen – providing guests with a rich array of information that can ultimately inform decision making, such as what to order. However, fewer than 12% of

to the culinary experience – one that is so often focused entirely on what we see and taste – to provide a holistic guest experience that can set one venue apart from the rest.

HEALTH IMPACTS

Studies have shown that olfactory exposure to herbs and tree oils have a positive effect on the healing process (e.g. Li et al., 2012; Kim et al., 2007), and according to Charles Spence (2012) at the University of Oxford, research also suggests audition plays an important role in eating behaviors and flavor perception. So if the intent is to connect the guest to a specific culture or place through cuisine, a venue's smells, background noise and food preparation sounds may each have a profound impact in enhancing the guest experience.

For hospitality ventures looking to further accentuate their health and wellness programming, the auditory experience goes beyond pleasant sounds of expensive coffee grinders, the sizzling of steaks, and culturally relevant music. Consider that exposure to nature sounds can accelerate psychophysiological restoration up to 37% faster than potentially stressful urban sounds (Alvarsson et al., 2010); and that while seeing real nature can have a positive impact on both perceived and real physiological stress reduction (Kahn et al., 2008), the simultaneous auditory experience of nature sounds further impacts perceptions of what is being viewed (Hunter et al., 2010).

As we consider how these various "natural resources" can be leveraged to enhance the culinary experience, we begin to see that the multisensory F&B experience is potentially the richest and most complex of guest experiences, and consequently the greatest opportunity to differentiate a venue from competitors.

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BIOPHILIC FOOD & BEVERAGE IN PRACTICE

Natural analogues

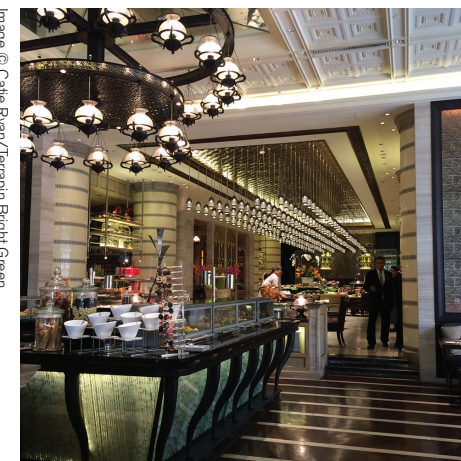


Image © Cate Ryan/Terrapin Bright Green

References to nature	Health impacts
<ul style="list-style-type: none"> Natural materials familiar to the region Repeating and hierarchical patterns Organic forms in decor and furniture 	Stress: Positively impacted perceptual and physiological stress responses
	Cognitive Performance: Decreased diastolic blood pressure; Improved creative performance
<ul style="list-style-type: none"> Complex yet orderly layers of materials, light, and visual information Variety of grab-and-go dishes that support gustatory exploration 	Emotion, Mood & Preference: Improved comfort; Observed view preference

Kuala Lumpur, Malaysia. Each of the hotel's several F&B venues offers a variety of visual and tactile complexity in order to enrich the dining and bar experience. Mosaic buffet restaurant is a maze of tidy grab-and-go dishes that repeatedly pique the guest's curiosity before sitting down in plush a booth or scalloped sofa chairs with a view to the park.

Prospect & Refuge



Image Creative Commons/CC0

View depth and content	Health impacts
<ul style="list-style-type: none"> Protection overhead and to the back Expansive views to nature as well as from where waitstaff may enter, avoiding surprise but supporting information gathering (such as for anticipating the next course) Visual and auditory connection to a stream, fountain, pool, ocean, or other water feature, particularly if it is relevant to the menu Views or physical proximity to gardens, herbs, and other vegetation 	Stress: Reduced stress
	Cognitive Performance: Improved attention, concentration, and perception of safety; Reduced boredom, irritation, fatigue
	Emotion, Mood & Preference: Improved comfort and perceived safety

Sirmione, Italy. The secluded and protective covered dining patio overlooks the garden and water fountain, with cross breezes and stunning views outward, while still having visual access back inside through large windows.

Non-visual connection with nature

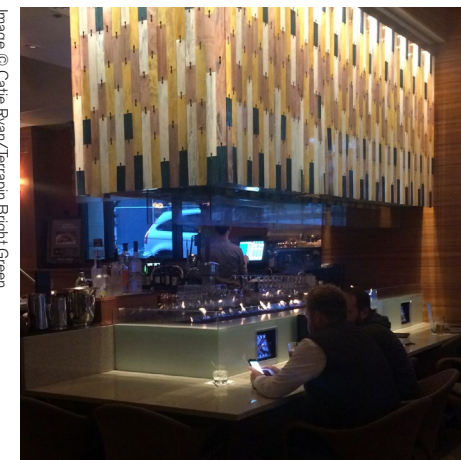


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Multisensory experiences	Health impacts
<ul style="list-style-type: none"> Auditory broadcasting of nature sounds relevant to the culture or place (e.g. the sound of lapping ocean waves while eating oysters) Playful and complex flavors and smells Crackling fires providing visual and (sometimes) auditory stimuli as well as thermal variability Nature-inspired food presentation and composition and serving dishes Variety of tactile connections with nature 	Stress: Reduced systolic blood pressure and stress hormones
	Cognitive Performance: Positively impacted cognitive performance
	Emotion, Mood & Preference: Perceived improvements in mental health and tranquility

Portland, OR, USA. The hypnotizing fire is at eye level and close enough to the bar top to feel the heat, while also enabling visual connection to waitstaff across the bar. Guests have the option to sit at sofas or formal dining areas, but the comfort and prospect provided at the bar makes you want to stay longer, and to order more.



BIOPHILIC DESIGN IN HOSPITALITY

Biophilic Spas & Wellness

ROLE OF BIOPHILIA

People go to spas to escape and restore. The spa guest experience may incorporate décor and a holistic health and beauty menu that stimulate the five senses and highlight local culture. The use of aromatherapy, water, and natural sounds and materials, paired with the intent to cleanse, de-stress, invigorate, and rebalance the body, makes biophilia an inherent concept for spas, but the design strategies are not always optimized.

TRENDS & HEALTH IMPACTS

With wellness tourism on the rise, how do spas distinguish themselves from the competition? We looked at 12 spa and wellness facilities around the world to shed light on which biophilic qualities prevail, and which are potentially underutilized.

Creating a restorative environment. Furniture, finishes, and décor that reference natural materials can have a meaningful impact on the guest experience, as can light and space that mimic qualities experienced in nature. Direct nature references such as stone veins and wood grain have been shown to support restoration through decreased diastolic blood pressure (Tsunetsugu et al., 2007). Of spas surveyed in a recent study, 92% utilized material connections with nature, while only 25% had a “strong presence,” particularly through the use of wood and stone finishes and furniture.

Research also supports that effective refuge conditions can lead to improved concentration, attention and perception of safety (e.g. Grahn & Stigsdotter, 2010). Of the hotels and resorts

surveyed that also had spa and wellness facilities, 100% were identified as having refuge qualities, 50% of which were characterized as having a “strong presence” of refuge. This is not a surprising finding, but it does raise the point that half of all spa facilities are perhaps not as effective as they could be at incorporating perceptions of refuge into the guest experience.

Quality dynamic and diffuse light can positively impact circadian system functioning and increase visual comfort. Spa treatments that submerge guests and employees in highly controlled ambient lighting will want to gradually and periodically reconnect them to the real time of day. This will help avoid causing imbalance to the circadian system (melatonin and serotonin release) than can have negative impacts to sleep patterns and digestion. Spa waiting and recovery spaces with daylight and sky views will help support healthy circadian balance.

Leveraging the fundamentals. A Presence of Water is intuitively a fundamental component of many spa and wellness retreats; 92% of the spas surveyed had a presence of water. Research tells us that water supports a number of psychophysiological health and wellbeing metrics, including reduced stress, increased feelings of tranquility, lower heart rate and blood pressure; improved concentration and memory restoration; and enhanced perception and psychological responsiveness (e.g. Hunter et al., 2010; Pheasant et al., 2010; Biederman & Vessel, 2006). Research also supports that people prefer scenes in which they can see water, and those experiences support positive emotions (e.g. Barton & Pretty, 2010; White et al., 2010).

However, the potential health impact is likely undermet across the industry as 58% of the facilities surveyed were rated as having just a “moderate presence” of water, and only 33% were rated as having a “strong presence,” with water being a definitive characteristic of the guest experience. For spa operators, the

biophilic design response may not be to have more water, but to have more opportunities for guests to experience water – to see it, as well as to hear, touch, and taste it.

Optimizing the multisensory experience. Of the hotel spa and wellness venues surveyed, 58% were identified as having some degree of a non-visual connection with nature, with only 33% rated as having a “strong presence” of non-visual biophilic qualities.

For venues looking to further distinguish themselves from competition, the sensory experience goes beyond pleasant sounds of trickling water and soothing music. Olfactory exposure to herbs and tree oils have a positive effect on the healing process (e.g. Li et al., 2012). Studies have also shown that exposure to nature sounds can accelerate psychophysiological restoration up to 37% faster than potentially stressful urban sounds (Alvarsson et al., 2010); and that while seeing real nature can have a positive impact on both perceived and real physiological stress reduction (Kahn et al., 2010), the simultaneous auditory experience of nature sounds further impacts perceptions of what is being viewed (Hunter et al., 2010).

The strategic pairing of nature-based sensory experiences has the great potential to heal and restore. Spas that effectively support combinations of sounds and smells to define different spaces and desired guest responses are more likely to create a unique and memorable guest experience.

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BIOPHILIC SPAS & WELLNESS IN PRACTICE

Non-Visual connection with nature

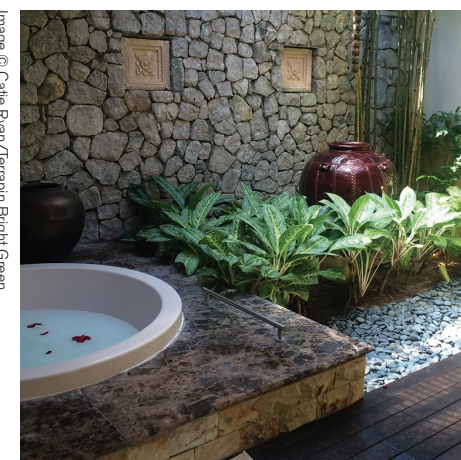


Image © Catie Ryan/Terrapin Bright Green

Multisensory experiences	Health impacts	
<ul style="list-style-type: none"> Trickling of water heard beyond what's visible Seasonal connections to water, daylight, shadow, solar heat 	Stress	Reduced systolic blood pressure and stress hormones
<ul style="list-style-type: none"> Auditory broadcasting of nature sounds relevant to the culture or place 	Cognitive Performance	Positively impacted cognitive performance
<ul style="list-style-type: none"> Crackling fires providing visual and (sometimes) auditory stimuli as well as thermal variability Variety of tactile connections with nature 	Emotion, Mood & Preference	Perceived improvements in mental health and tranquility

Penang, Malaysia. This spa is rich with biophilic experiences, but the uniqueness lies in the subtle infusions of nature – real birdsong, rainwater funneling down the rainchain into a clay vessel, and soft beams of light penetrating through the canopy slats and changing room, into the shower.

Dynamic & diffuse light

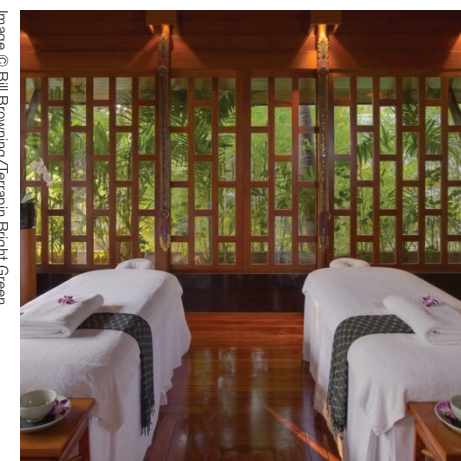


Image © Bill Browning/Terrapin Bright Green

Direct and indirect light and shadow	Health impacts	
People seek a variety of experiences that ultimately require different types of natural or electric light strategies.	Stress	Increased visual comfort; Positively impacted circadian system functioning
<ul style="list-style-type: none"> Reflected water on other surfaces Light from more than one direction 	Cognitive Performance	Unknown
<ul style="list-style-type: none"> Connection to diurnal and seasonal changes in daylight and shadow Perforated screens Varying density in taller vegetation 	Emotion, Mood & Preference	Unknown

Phuket, Thailand. The massage parlor at a resort features teak trellis walls surrounded by vegetation at various heights, allowing for light to filter into the space from multiple directions without overwhelming the occupants. Accent down-lighting and high-gloss finishes reinforce the warm ambiance.

Refuge



Image © Catie Ryan/Terrapin Bright Green

Concealment and views	Health impacts	
A spa may consider itself a refuge space in an of itself, in which case, a hierarchy of refuge characteristics at the spa can further enhance the guest experience.	Stress	Reduced stress
<ul style="list-style-type: none"> Lowered ceiling plane and protection to the back 	Cognitive Performance	Reduced boredom, irritation, fatigue
<ul style="list-style-type: none"> Manual controls, architectural or landscape solutions allowing options for level of visibility Translucent screens, dense vegetation 	Emotion, Mood & Preference	Improved comfort and perceived safety

Singapore. This spa is tucked in among lush vegetation on the hotel's pool deck, almost as its own building, with a substantially lower ceiling, in the heart of downtown Singapore. The frosted windows and shutter screens allow ample daylight penetration while protecting occupants from activity from the adjacent pool, gym, and streets below.

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