

# Effects of Natural Light and Courtyard Together on A Family's Behavior and Well-Being In A Residence

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**Abstract**—This study examines the effects of natural sunlight and courtyards on the behaviour and development of families in the home environment. Natural light is one of the simplest architectural elements that has a direct impact on the mental well-being, productivity and inter personal relations. Courtyards are integral design feature that increases connectivity, provide privacy and contribute to environmental sustainability. The research is based on case studies, user surveys and architectural designs, forming relationships between these factors and family dynamics, emotional health, and general growth. The results of these studies guide architects and planners in designing houses that facilitate family cohesion, individual well-being and sustainable life-homes that are not a residence but a prosperous community.

**Keywords**— *Courtyards, natural light, family dynamics, indoor-outdoor connections, family behavior, residential design, family well-being, and emotional development.*

## I. INTRODUCTION

Families' development and well-being are directly impacted by architecture due to the surrounding environmental conditions. Beyond just being aesthetically pleasing, natural light and courtyards become essential design features in a home that will undoubtedly influence the behavior, emotional health, and development of families. These elements can assist in designing areas that are not only practical but, more significantly, nurturing—that is, fostering harmony in daily life.

One of the essential components of sustainable and people-centered design, natural light is crucial for improving mental and physical health. It improves the quality of sleep, sharpens the mind, and gives family members more vitality by regulating circadian cycles. Additionally, it has been noted that exposure to natural light increases the creation of vitamin D, which is crucial for overall health, especially for young people and the elderly. This lowers stress, increases comfort and security, and is emotionally equivalent to establishing a happy and upbeat environment in a house. Courtyards are vibrant areas that have a significant impact on family relationships and development.

They serve as a focal point for social interaction, which strengthens ties among the families. The presence of greenery and open areas in courtyards helps people feel less stressed, anxious, and confined, which significantly enhances their mental health. Children can play and explore in secure, engaging spaces like courtyards, which encourage movement and creativity.

These areas eliminate the need for artificial lighting and cooling while also improving interior air quality on a passive climate control level. Courtyards and natural light combine to create a harmonious space that reflects a family's social, emotional, and physical health. They provide intimacy with nature, create spaces for bonding, and encourage good habits. This essay will examine the significant ways in which these architectural features can impact a family's overall development and happiness while highlighting their importance in creating houses that support and uplift families.

## II. OVERVIEW OF LITERATURE REVIEW

### A. Enlightening well-being in the home:

This paper addresses how natural light and courtyards in residential design extensively influence the behavior and well-being of a family. Natural light, being the heart of biophilic design, improves mood, keeps circadian rhythms intact, and therefore enhances productivity, thus creating spaces through which favorable interaction among people in the family is encouraged. Courtyards are places that are multifunctional hubs serving ventilation, cooling, as well as networking opportunities among residents and connecting them to nature. These features, therefore, improve the looks of a house but also ensure a healthier and more harmonious living environment.

### B. Interior Courtyard and its Impact on the Well-being of Residents:

This paper investigates the role indoor courtyards play in the general well-being of residents, encompassing general, physical, emotional, and social domains. The paper defines a courtyard as a natural interior hub that provides ventilation and daylight, translating to the aspect of a healthy indoor environment. They function as little green pockets which bring about fresher and cleaner air quality. They promote natural interactions among the members of the family by creating communal activities and instances of sharing, thus promoting a sense of unity and belonging.

### C. Healthy Dwelling: The Perspective of Biophilic Design:

This paper, captures cases where houses with biophilic design, for instance, have green walls, interior gardens, and open layouts, showed improved air quality and better comfort that may ultimately be the instances that improve relationships in family settings. Its conclusion will point out that "biophilic design is no longer aesthetically credible but necessary for the creation of sustainable life-enhancing residential spaces that

ultimately prioritize well-being of individuals and communities."

#### D. Natural Light in Interior Spaces:

The research emphasizes the transformative properties of natural light inside spaces with regard to functionality and ambiance and can improve health, productivity, and emotional well-being. Natural light is stated as one of the fundamental design elements that enhance spatial aestheticism while regulating circadian rhythms, reducing stress levels, and providing a positive mood. Natural light also reduces reliance on artificial lighting and therefore optimizes energy efficiency and sustainability in buildings.

#### E. The Role of Shading, Natural Ventilation, and Daylighting in Comfort:

This paper discusses the interconnected role of shading, natural ventilation, and daylighting in enhancing indoor comfort with energy efficiency. Devices for shading devices are the use of overhangs, louvers, and even vegetation, which can reduce heat gain to a significant extent and also optimize daylight, reduce glare, and keep the indoor temperature at its best. Natural ventilation improves airflow with better air quality and also helps in passive cooling. An alternative is daylighting, which provides spatial aesthetics, improves the occupant's well-being, and minimizes artificial lighting usage.

### III. PARAMETERS OF STUDY

- Combined effects of natural light and courtyards on behavior
- Family dynamic with positive thoughts and well emotional and mental being
- Design of natural lighting and courtyards

#### A. Combined Effects of Natural Light and Courtyards on behavior

- Natural light and courtyards, together have a huge influence on the human behavior and well-being in the residential spaces. Natural light regulates the circadian rhythm of a person; it improves sleep, mood, and energy levels. Brightly lit natural space welcomes and uplifts the mind and promotes productivity and reduces stress. Such environments stimulate healthy family social interaction patterns [1, 2].
- Courtyards, on the other hand, are multifunctional spaces for relaxation, socialization, and playing. Family interactions improve because it encourages one to stay physically active; at the same time, the stress that would arise in the human mind due to the greenery and open design often present is improved [2]. To children, courtyards offer a safe place that stimulates creativity and encourages physical activity.
- The combination of natural light with courtyards enhances their benefits. Courtyards are conduits for natural light, and they can penetrate the inside of the house to a great depth, minimizing the need for artificial

lighting. Natural light complements the aesthetic and functional value of courtyards, making them more pleasing to sit in or reconnect with others. Researches state that this combination establishes a sense of security, decreases feelings of confinement, and develops emotional well-being and cohesion of families [3].

- Together, courtyards and natural light transform homes into healing spaces, promoting healthy behaviors, emotional well-being, and green practices. This is a synergistic relationship that forms a very valuable design framework for homes focused on wellness and family relationships.

#### B. Connection of natural light and human well being

- The more energetic a family, and the more optimistic towards life, they tend to carry out more vitality in their daily interactions that pave the way for better psychological and physical wellbeing. A feeling of being more alive, family members carry out lively activities such as outdoor games, exercising and socialization, which lead to better well-being [4]. This increase of energy actually makes the family dynamic more playful and interesting, spontaneous acts more often, and quality time spent together.
- This positive atmosphere gives rise to a sense of vitality, which intensifies the bonds of family members and makes the environment more enjoyable.
- The family also benefits from positive thoughts and energies by greatly improving communication. Positive thinking actually encourages improved problem-solving capabilities, reduces the number of conflicts, and develops more effective communication. Family members have a voice, and their opinions are valued and cared for; they feel emotionally close and connected to one another. It enables the family environment to increase the possibilities of mutual laughter and enjoyment, enhancing a happy and harmonious family life [5]. The experience of the family then leads to positive interaction and a better outcome of the family process.

#### C. Design of natural lighting and courtyards

- The design of natural lighting and courtyards within residential architecture strongly influences both the aesthetic quality and health of the living occupants. The size and shape of windows, combined with material specifications, directly influence the potential for natural light and its quality. Larger openings or strategically positioned skylights can improve daylight entry and create a brighter and more welcoming space. Materials like glass and light-colored finishes tend to maximize the admission of light, whereas greater wall sizes or darker surfaces tend to limit light entrance. According to research, aside from the aesthetic aspect, these design elements also improve the person's mood and even mental well-being by establishing a connection with the outdoors and raising spatial comfort [6, 7].

- More importantly, courtyards play a critical role in this dynamic by providing spaces for ventilation and outdoor interaction, further promoting a sense of well-being. Well-designed courtyards, when incorporated with effective natural lighting, reduce stress levels, increase social interaction, and enhance the quality of life for residents, as reported in studies [7]. It further indicates that both light distribution and spatial organization in residential design can support physical and psychological well-being.

#### IV. FINDINGS FROM PRIMARY STUDY

This survey encompasses understanding how natural lighting and courtyards in residential spaces influence the development, well-being, and behavior of families. As part of these elements, the research aims to identify what contribution is made by them toward creating healthier, more comfortable, and harmonious living environments. It aims to unveil the insights on how nicely architectural design can impact a family's daily life in health, emotional balance, and social contacts. Your feedback will provide significant information to determine whether these design elements are effective and will shape future architectural practices.

Summary of findings:

##### A. Combined Effects of Natural Light and Courtyards on behavior

The survey results provide valuable insights regarding the preference and perception of the respondents with an age range of 18-24 years. A significant majority, which is 68.8%, prefer spending time with their families in a courtyard within the house, while 25% prefer naturally lit rooms, and a smaller portion opts for rooms with minimal lighting, which amounts to 6.2%. It would appear that the presence of foliage and light in courtyards has a really positive effect, with 81.3% believing them to have the highest of increases in mood and 12.5% scoring small positive increases. Meanwhile, 93.8% in bright spaces say they become more energetic while in dark spaces they become less energetic; such a test goes to prove how lighting has an impact on stimulation of their energy levels. 68.8 % report improvement on focus and concentration by having natural light in work or study areas, 25 % notice some improvement, and no one reports that it's distracting or prefers less natural light. Most importantly, 100 % agrees that having a courtyard and well-lit spaces improves both the moods and behavior of the respondents and those of their family members as well. In this regard, the findings suggest the significance of natural lighting, foliage cover, and well-designed environment in terms of wellbeing as well as sociability within the household.



Fig. 1. Survey response on age group of the respondents

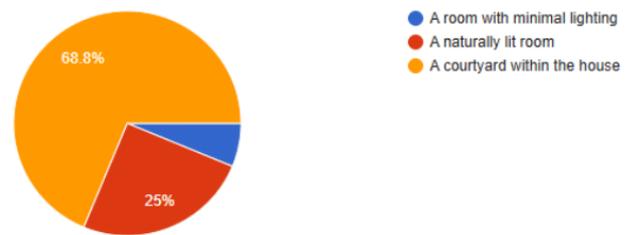


Fig. 2. Survey response on which space the respondents would prefer to spend more time with their family?

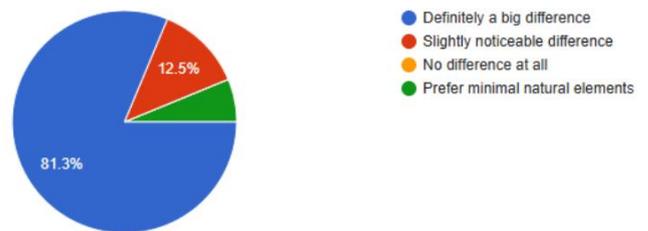


Fig. 3. Survey response on how a courtyard with a lot of greenery and sunlight versus one with minimal natural element would affect their mood?

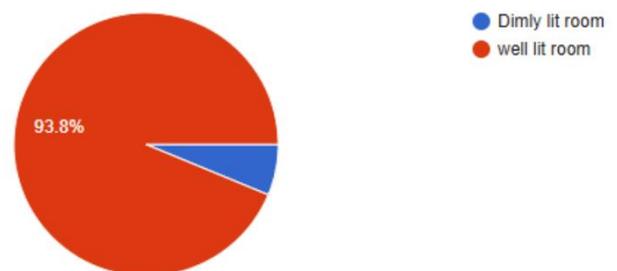


Fig. 4. Survey response on which room the respondents would choose – A dimly lit room or A well lit room?

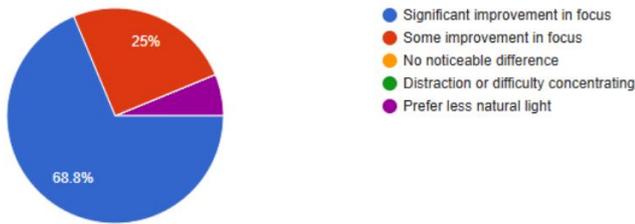


Fig. 5. Survey response on the ability to focus or concentrate in the presence of natural light

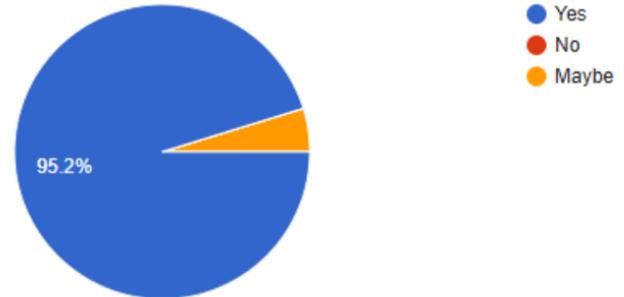


Fig. 9. Survey response on they would prefer to add a courtyard in their house design



Fig. 6. Survey response on whether a well light room and a courtyard improves the mood and behavior of the respondent and their family members

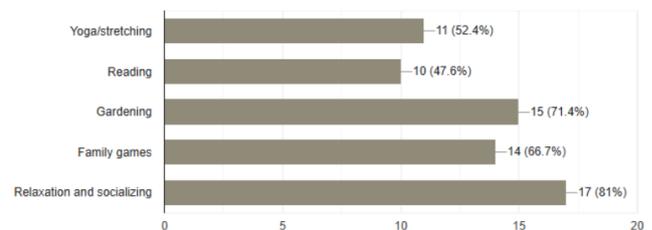


Fig. 10. Survey response on which of the activity they would choose for a courtyard space

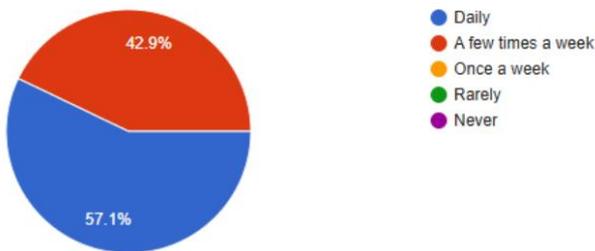


Fig. 7. Survey response on how often the respondent and their family would use the courtyard for activities

The survey results indicate a strong preference for well-lit courtyards or gardens, with 75% of respondents finding their families more relaxed and happier in such settings. Additionally, all respondents (100%) would recommend incorporating natural light and courtyard spaces in home designs to other families. This suggests a significant appreciation for natural light and open spaces in residential environments. image (3,8,5)

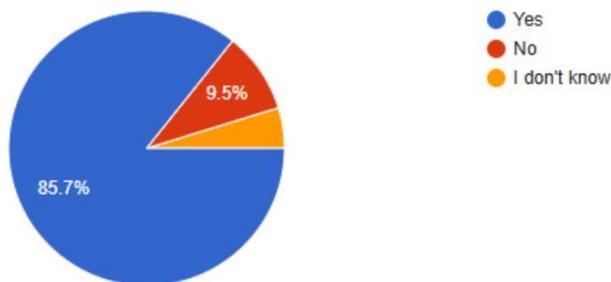


Fig. 8. Survey response on whether the respondents think the courtyard and natural light would enhance intimacy in the family

The survey shows that for an overwhelming 81% majority, they would say their family is more relaxed and happy in a well-lit courtyard or garden setting. In fact, 95.2% of participants went so far as to say they would recommend the addition of natural light and courtyard spaces in home designs. image(9)

The survey explores the use and perceived benefits of courtyard spaces in homes. A majority of respondents (57.1%) daily use the courtyard for activities, while 42.9% use it few times a week. Additionally, an overwhelming 95.2% believe that having access to a courtyard or outdoor space improves family interactions. image(7,8)

The image shows survey results from a Google Form regarding courtyard design and its impact on family privacy and suitable activities for courtyard spaces. A significant majority (85.7%) believe that courtyard design can enhance privacy and intimacy. The most popular activities for courtyards are relaxation and socializing (81%), followed by gardening (71.4%) and family games (66.7%). Yoga/stretching and reading are also considered suitable by over 47% of respondents. image(8,10)

*B. Family dynamic with positive thoughts and well emotional and mental being*

The survey focuses on the impact of a positive family environment on communication and the influence of an individual's mood on other family members. A significant majority believe that a positive family environment encourages more communication, with 91.3% agreeing. Additionally, 65.2% feel that one person's bad day can affect the entire family. The survey also explores how a supportive family dynamic contributes to personal growth.

The responses highlight the significance of having a mentally and emotionally supportive family environment. Participants emphasize that such an environment fosters personal growth, confidence, and resilience, contributing positively to daily life. The presence of features like courtyards and natural light in homes is seen as beneficial, enhancing family well-being and improving mood by allowing for relaxation and quality time together. Overall, there is a consensus that these elements positively impact family dynamics and individual mental health.

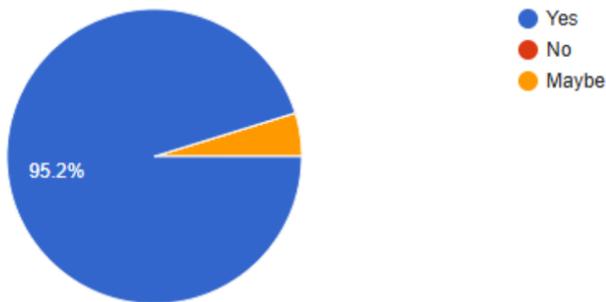


Fig. 11. Survey response on whether having a positive environment in a family makes the respondent want to communicate and spend more time with them

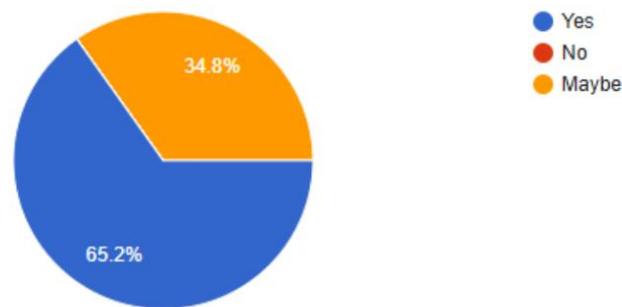


Fig. 12. Survey response on whether one person having a bad day affects the mood of other family members

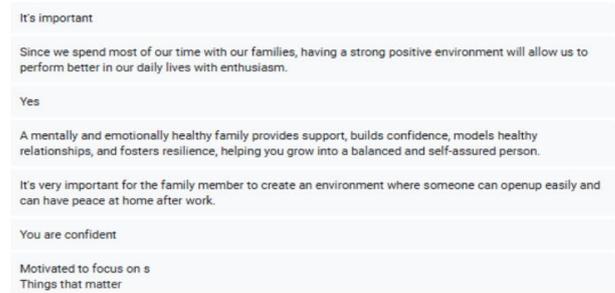


Fig. 13. Survey response on whether having a well mental and emotional family helps you grow as a person

**V. CONCLUSION**

Natural light, combined with courtyards, can create effective design strategies to enhance human behavior and well-being as well as family dynamics. Natural light controls the circadian rhythm, improves moods, refreshes and re-energizes occupants, and all these potentially lead to increases in productivity as well as reduction in perceived stress. Courtyards, multifunctional spaces that stimulate creativity and physical activity and connect people to each other while being places of refuge for rest and bonding, are synergistic relationships with individual benefits, providing a larger healing environment in homes.

Considering wisely designed daylight and openings, being able to maximally permeate daylight further optimizes its potential. Penetration of daylight is ensured through windows, skylights, and reflective surfaces strategically located within the building. Courtyards function as light and air conduits, help in progressing indoor spaces into outdoor spaces, while at the same time facilitating emotional well-being and cohesiveness in the family.

Essentially, this approach can turn houses into habitat environments geared towards wellness and that foster health, happiness, and happy relationships. This enables architects to design homes that meet not only the physical and functional requirements but also cultivate thriving, interconnected, and emotionally rich life among families.

**VI. ACKNOWLEDGMENT**

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