Sensory Effect of Daylight on Contemplative Perception of Space

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Abstract

The needs for reaching a contemplative spirituality during prayer have never been easy to meet. Infinite number of designs of mosque and church has been developed, but seemingly the result is still dissatisfied. We experimented the role of daylight to meet that needs and used 24 university students to evaluate the responses. The ANOVA statistic results show that the samples perceive the spatial effect from the maximum and a lesser amount of skylight above the mihrab or altar significantly differently from that of the lesser wall openings. This study proves the positive effect of daylight in creating a contemplative perception of space.

Keywords: Contemplation; prayer; daylight; spatial perception

1. Introduction

People think or use their brain to support simple daily practical activities or complex future problems they encounter in life. In performing these activities, people use and consider the information or memories in the brain they have collected from the previous experience, the world around they sensed, and what they read and learned. Therefore, human ability to absorb, retain and recall that information becomes crucial for survival. Unfortunately, this does not always happen smoothly. In carrying out daily activities, people often do a single task without complex cognitive processes like walking; sitting; sleeping or bathing, and mostly, they would do it smoothly. However, when they have to perform a serial task or even multi-task involving concentrating, thinking, remembering, writing, saying a word or

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speaking, they would need to make some efforts to fulfil the task, and there is a chance for them to fail. In fact, during the interaction with the immediate environment people will select the information and perform the relevant task based on how it passes through the attentional filter as this will help them to analyze, recognize, interpret and store it in the memory (Gleitman, 1995). Thus, there is a chance that the messages get lost, as it does not pass through that filter. Such process of attention occurs when our sensory modalities work normally and are able to select one most appealing stimulus while filtering out the rest. In carrying out this process, how fast we select it or not depending on how many features are involved in the stimulus as target or distractors. Since there are infinite situations, which apply various stimuli that we may encounter while we do a single or serial activities, there may be a possibility for them to face a problem in filtering out the messages.

Performing a prayer or Salah as part of daily obligatory activities for Muslim may illustrate how complex the task they should perform. They not only have to follow the proper way to pray as guided by the Quran, but they also need to think, remember, understand the words or Surah. They also have to say it silently with full concentration and expect that God is presence to listen what they say. The same case happens to the people from other religion do the prayer to their God. When people from any religion perform a prayer, they mostly orient themselves to a direction or object in the room or space, and this is even stricter for Muslim than other religion. Regardless the minor difference of prayer procedure of Muslim that may exist in order that prayer is valid, they must face the Qibla when performing a prayer, where the prayer will be performed. In a mosque, although the qibla is indicated by the location of Imam or khatib where the sermon (khutbah) is given, there is a chance for the worshipers to miss their attention to the khatib. The chance for them to do that may be higher if there are lots of stimuli other than the sermon they are listening. Since, we are not recommended to talk during this time, the only possibility from which the stimuli we may perceive is from the spatial element. In fact, there are lots of Mosque or Church that apply elaborated interior decorations. In such condition, instead of directing their attention to the khatib or Priest who is giving the sermon, the worshipers may have a higher chance to pay attention to the interior details, because although they can listen the sermon, the process of attentional selection through the other sensors like their eyes is working actively. This occurrence could lead the worshipers to miss listening the sermon they may regularly need to listen for life improvement.

As this preceding activity is important to pass before one performs the congregational prayer that is to condition our mind and heart so that we could expect to be able to do the prayer better or with full contemplation, we might need to rethink how a religious space should be designed. Paolo Portogesi, as quoted by Rasdi (1998), also stressed “the importance of prayers and meditative seclusion in the interior spaces of the mosque and gardens which secure silence, privacy and allude to images of the Muslim paradise”. This idea is relevant because, people need concentration during the prayer, and this act seems not to be easily done if they are not well conditioned in the space. However, there are no rules or strict guidance in terms of how building design style of prayer should be well developed. Rasdi (1998) stated, “mosque is considered no different than either a church or a temple in relation to the design principles of a sacred edifice where the mosque is looked upon as a place of silent meditation and seclusion from the outer world”. Therefore, considering the principle of ijithad, designers seem to interpret freely and innovate based on such stereotypical understanding of religious settings.

Aside from the fact that daylight are abundant, at least in Asian countries, it is considered effective to create a psychological effect of space, “a visually stimulating and productive environment for building occupants” (Husin and Harith, 2012), which allows us to do various activities either outdoor or indoor during the daytime. Therefore, if we can control over daylight, we could provide better religious space we need.
2. Literature review

2.1. Symbolic role of light in sacred buildings

The use of daylight in religious or sacred buildings has been practiced for thousand of years, in line with the process of men to recognize and worship any religion, very long before the artificial light was found. Monolithic buildings like, viharas and stupas for Buddhists, temples of Hindus, up to early religious architecture of Christian churches and Islamic mosques are the first sacred buildings, which relied on sunlight as the only source of energy to support worshipping activities and no wonder that its existence was connected with God. Supporting this notion Antonakaki, T. (2007) describes that Egyptians considered the sun to relate to their God, Ra, who creates the world. Christians believe that light was promoted in the beginning of creation.

The symbolic role of light has long related to “the sacred, religious, and cosmologic belief and even to gender” (Antonakaki, 2007). The way of manipulating light in sacred spaces to allow the worshipers interpret and relate it to God is varied. For instance, the transitional quality of brightness set up from the dimly lit entrance to the main hall, which is most brightly lit, symbolize the less sanctified to the highest level of holiness of the space, according to Humphrey and Vitebsky (1997) as Antonakaki (2007) quoted. In the case of Islamic religious buildings, a similar approach to this is also applied to Ottoman architecture where the daylight were collected and distributed through the openings around the dome and brighten up the worshipers gathered below and partly lit to the mihrab. In this situation, the adjacent space around the main hall, through which people enter the mosque, has a lower level of illumination so that they could feel the transition of light from the rather dark area in the entrance hall to the brightest area under the dome. Concerning this, Antonakaki (1997) points out, “Light of Allah pours down from the dome at the gathered worshipers”. Symbolic role of light in sacred space might work differently across culture and religion as it relates to how people interpret the relation of light with God and the religious ritual.

2.2. Perceptual experience of light in sacred buildings

Beside the fact that light help us see our immediate environment and to some degrees enable us to do a simple task up to complex activities including a prayer, light also can importantly create an effect of space. The quality of space light can create is determined by its attributes, the characteristic of the space itself and by people’s perception. Since there are so many factors involved in the creation of spatial effect by light, it can be understood that various ways are continually explored to find the best way in using light for a better environment.

A different way of perception towards space is one of the reasons why people keep looking for ways of designing it with light to facilitate a prayer. In fact, beyond the introduction of daylight as a method to create an association with God, it should also be considered as a tool for helping people perceive and feel the presence of God. Such process may support the symbolic role of light in creating the religious experience. This assumes that when people perform a prayer, they need to have a religious experience to retain their belief in God, according to Hughes et al. (1933) (Ludovici, A.M., 1934). To fulfill this they not only could do through their understanding of the light’s symbolic role of religious experience but perceive and emotionally feel its presence. However, Zangwill (2004) seems to be doubt about this and raises a question whether or not we could perceive God, or in other words he questions, ”are there perceptual experiences of God, which justify those who have them in believing in God?” Although it is not easy to answer to this question, more over if it should be related to the use of light in sacred space, this author suggests, we may look at its opportunity through various aspect of perceptual experiences.
including “moral, aesthetic, mathematical, counterfactual, micro-physical and theological content”. Zangwill also emphasizes that to assure that perceptual experiences and have relational evidences to God, it should have a theological content or the perceiver should believe in God. Probably, the problem of judging that the content is a theological one or not needs to have indicators or criteria, which could be verified and understood by most people who believe in God. In other words, Zangwill also said in order that people can claim to have got religious experiences, they should be able to feel it. Such condition might lead to a difficult question if the cause of experience might be God, then how could God carry out this? Besides, since the perceptual experiences involve all the sensory modalities, people’s possible claim of perceiving God may seem to lack evidence because perception can only work if the object perceived has a spatial-temporal quality, which might not possibly apply to God. In fact, although people of any religion can believe in the existence of God, there are no ways we can see, hear, touch, smell or taste God, except if we have “sixth religious sense or secret internal sensory capacity” said Kenny (1992) as Zangwill (2004) quotes.

2.3. Emotional experience of light in sacred building

Our religious experience through the perception of space in sacred building may not avoid the involvement of emotions as also supported by Zangwill (2004). This author believes that people’s love or fear to God should be based on their belief in the existence of God, otherwise the experience they might claim had no relation with religion at all. Thagard, P. (2005) supports this statement by saying, “religion is emotional”, and every religion has a different emphasis in how positive emotions like, love and comfort and negative emotions like, fear and shame, are balanced. To complement this, McCauley and Lawson (2002) as Thagard quotes, said performing a religious ritual cheers us up. In this respect, people experience emotion different from what they normally have. In religious situations, Emons R.A (2005) categorizes it as sacred emotion, however, people may feel it in nonreligious environment. He further said such emotions “are those that are more likely to be elicited through spiritual or religious activities or practices (e.g. worship, prayer, mediation) than by nonreligious activities”. Thus in order that worshipers could get positive emotion during a prayer, we might need to improve the environment, whose quality and character have relevant effect to achieve the goal of prayer.

2.4. Towards a contemplative experience

Prayers or salah (salat) as one of the main activities for Muslims are performed to communicate with and remember God, and these can be done in any place as long as it is free from physical impurity “This reflects one of the favours Allah has bestowed upon us, making this religion easy and practical” said Bahammam (2012). During this practice, a person has a chance to praise, ask forgiveness and give thanks to Allah by remembering or recalling words to express those intentions. Essentially, any other worshipers may perform a similar activity to this; regardless the differences of praying procedure that exist. To make sure that such regular activity could lead to a contemplative fashion. Contemplative experience defines “a state which can be experienced either consciously or subconsciously” (Shah, 2009). In religious case, it relates to a meditation or prayer. This does not mean to relate to meditative prayer, or just concentrate while saying divine words or messages by heart. In fact, in Christianity, contemplative prayer relates to centering prayer, “an Eastern Religion mind emptying meditation technique” (Caddock, 1997). It can also tell as “contemplative spirituality” where people need to have alternative consciousness in experiencing the presence of the world, other people, self and God. From these understandings, we can infer that contemplation means to bring one’s mind to a psychological situation to meet a spiritual (asking for blessings or forgiveness and expressing gratitude) goal through religious activities like, prayer. It may
relate to a spiritual consciousness and ability to feel or state of being aware of the external world or a religious experience.

People create religious settings to accommodate worshiping activities and use light including daylight to make it practically possible and at best satisfy symbolic aspiration of religious. In this study, we try to investigate further the role of daylight in creating sacred space, which has perceptual, as well as symbolic effect on the people. In exploring this, a research question is proposed. How can daylight be controlled to create a space, which has contemplative effect to the perceiver?

3. Method of study

We used an experiment using digital pictures of an interior applying four different form of day lighting as the stimuli, which was developed by using 3D Max computer graphic software. We proposed a simple room of size 5x9 m² with a ceiling height: 6m and 3m at the front and backside, and width of the opening: 40cm, to represent a place of prayer as Muslim called musalla as the simulated interior space. Rasdi (1998) classifies this as “a type of mosque that is used only for prayer”. The reason of using such room for this study is to consider that such a space is basic for anyone to perform a prayer and look neutral for respondents so that they would respond to the stimuli more objectively. Besides, since a very simple quality of the room is more recommended for a prayer according to Rochym (1983), and we focus the role of daylight only on an interior space set up digitally at 10763.9 Lm/m² so that other variables of the space are not considered.

Fig.1 The stimuli 1, daylight enter from the maximum opening along the front corner of the ceiling; the stimuli 2, daylight enter from three openings along the front corner of the ceiling; the stimuli3, daylight enter from the maximum opening along the front corner of the walls; the stimuli4, daylight enter from three openings of the front corner of the walls.
Based on this model of space, four different forms and dimensions of opening on the corner of ceiling and wall, from where the daylight at noon came in, were created. Two kinds of opening were made along the front corner of the ceiling, and the other two made along the front corner of the walls so that four different effects of day lighting on the space were created.

Twenty-four university students were involved in this within subject design experiment. They were asked to respond to each of four digital pictures (See Figure 1) presented repeatedly by filling in the checklist. It contains twenty items of paired adjective words representing the indicators by which a contemplative perception may be experienced when looking at an interior space such as, simple/ complex; formal/ informal; unique/ ordinary; elegant/ not elegant; peaceful/ disturbed; familiar/ foreign and so on.

We used ANOVA statistical analysis to compare the perceptual responses of the samples toward the stimuli to see whether there is any significant difference of response each group has given to the four stimuli.

4. Results and discussion

After testing the homogeneity of variances of the samples using Levene statistic, we got the result that the significant score is 0.962, or larger than .05, meaning that the variances of the samples is homogeneous. Therefore, we run an ANOVA test, and since its score is also significant, .000 or smaller than .05, meaning that there are differences among the samples’ response data. From a post hoc test, it shows that the samples perceive the stimuli 1 significantly differently from the stimuli 4 as indicated by its significant score, 0.003. As well, the samples perceive that stimuli significantly differently from the stimuli 2, marked by its significant score, 0.001. Thus, only towards the stimuli 1 and 2 the respondent’s perception is different significantly from that of the stimuli 4, whereas the rest of comparisons does not show any difference. The respondent’s perception towards stimuli 1 was not significantly different from that of the stimuli 2 and 3 (Sig. score: .982 and .242 respectively), and the respondent perception of stimuli 2 was not significantly different from that of stimuli 3 (Sig. score: .116).

These results show that the samples’ perception toward the spatial effect is significantly differently only if, the comparison is done between that resulted from the opening along the ceiling corner or partly opened on it, and that resulted from the serial openings on the wall corner. In other words, this fact, may give us a clue that the spatial quality made from the daylight entering through the gaps along the ceiling corner creates a different sensory effect from that made from the daylight entering through the partial gaps along the wall corner. We can say that the spatial quality resulted from two alternative gaps on the ceiling corner seems not to be effective to expect different impact to the perceiver, and comparison of this with the space quality resulted from the maximum gap along the wall corner is also not effective in giving a significant sensory effect to the samples. This fact may infer that the spatial effect resulting from the repetitive gaps along the wall corner as represented by the stimuli 4, may be the most effective way to create a sensory effect to support needs for contemplative experience. Such spatial effect reminds us to the lighting effects seen on the Catholic Church at Ronchamp, France, called Notre Dame du Haut designed by Le Corbusier and finished in 1954. Another inference can also be considered as well that the samples may have experienced the sensory effect of light resulting from the gaps along the ceiling corner (the stimuli 1 and 2) as this create a significant different perception compared to one shown in the stimuli 4. In many Ottoman mosques, the use of daylight is concentrated around the dome to light up the worshipers. People believe that the light of Allah comes down from the dome. It is also true to refer to the statement of Humphrey and Vitebsky (1997), “spiritual-light, stars, lamps and rays are entwined together with verses from the Koran and located at doors, window and prayer alcoves” as quoted by Antonakaki, T. (2007).
5. Conclusion

Dominated use of daylight in religious space especially that penetrates through narrow gaps around the interior space to which people need to direct their attention is potential to create perceived contemplation. We found that to elicit such perception depends on how the daylight distribute through the interior space. The different form of opening both on the corner of ceiling and the wall create the effect of space, and this can result in a significant different perception to support contemplation. This situation occurs at least in the space where there is no other attractive design element applied. Therefore, people may only pay attention on the luminous part of the space that is where the mihrab or altar is located, or where the sermon is given in the case of Mosque or Church.

This research shows how a specific manipulation of daylight by creating particular openings can influence contemplation-oriented perception; therefore this finding may serve as a reference for the design process or insight for future environment-behavior research. However, this study has limitation on the simulation of daylighting, as this only refers to a certain point in time, the middle of the day. As time changes, in line with the setting sun, the daylight penetration would also change and we still do not know how it comes out. We can expect to see an animated space as a result of the dynamic effect of light, which could be positive or negative in relation to the need for contemplative effect through it. Therefore, in the future such we may consider a different level of daylight penetration and luminance to find out its effect on the interior space and the respondents’ perception.

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