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Visual Privacy Factors Influencing Usage of Spaces for Urban Housing

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Abstract
Contemporary terrace housing in Malaysia reflects colonial and Western influences, often misaligning with the spatial needs of modern Malay Muslim families. This study examines how visual privacy impacts space usage and housing satisfaction in urban terrace homes. Misaligned semi-outdoor spaces to occupant's values may lead to underused core areas. A survey of 435 respondents, 10 case studies, statistical analyses, and space syntax methods reveal that visual privacy significantly influences satisfaction. The findings highlight the need for culturally sensitive design innovations, particularly at the home's perimeter, to enhance usability and satisfaction for modern Malay families in Malaysia.

Keywords: Privacy; Visual Privacy; Terrace Housing; Muslim Malay Family.

1.0 Introduction

1.1 Background & Issues
A house is more than just a structural shelter; it is a fundamental institution that shapes cultural and family dynamics (Rapoport, 1969). In the Malay community, privacy—particularly visual privacy—has long been a significant consideration in housing design. Traditional values emphasize the need to maintain privacy within the home, influencing architectural layouts and spatial organization. Various studies highlight the importance of visual privacy in housing, particularly in Malay society, where cultural norms shape expectations for domestic spaces (Asiah, 2008; Hisham, 2003; Spahic, 2010; Zulkeplee, Buys, & Aird, 2014). Given its significance, housing design should align with cultural principles to ensure an optimal level of visual privacy for families.

Privacy, modesty, and social interactions are deeply ingrained in Malay customs and traditions. However, modernization and urbanization have altered traditional housing patterns, impacting established social norms. While local customs (*'urf'*) and behavioral practices have long influenced Malay housing (Zulkeplee et al., 2014), contemporary housing trends sometimes overlook the cultural importance of privacy. In their study on the interplay between privacy and hospitality, Zulkeplee et al. (2014) identified modesty as a key moderating factor in housing design. Traditional Malay culture has historically prioritized communal ties and neighborhood intimacy over individual privacy (Zaiton & Ahmad Hariza, 2008; Farah, 2010). This emphasis is reflected in the spatial arrangement of traditional Malay houses, where openness facilitates social interactions while maintaining a balance with household privacy. Just as attire provides

modesty for individuals, the home serves as a protective space for its occupants (Spahic, 2010). While some scholars argue that traditional Malay houses are too 'extroverted' compared to the more enclosed layouts found in other cultures, others contend that the vernacular design successfully integrates communal connectivity with private domestic spaces (Tahir et al., 2010; Zaiton, 2015).

Existing literature indicates a gap in understanding the evolving housing needs and perceptions of urban Malay communities (Asiah, 2008). As lifestyles and social structures shift, it is essential to explore how contemporary Malays perceive and prioritize visual privacy. Housing design plays a critical role in providing adequate privacy, and a lack of consideration for these needs may lead to behavioral adaptations that affect the well-being of residents. Privacy remains a defining characteristic of Malay homes, influencing the form, layout, and functionality of residential spaces (Asiah, 2008; Besim, 1986; Hisham, 2003; Zulkeplee et al., 2014). Past studies have emphasized that addressing occupants' needs is crucial for ensuring housing satisfaction (AmirHosein, Berardi, Nur Dalilah, & Ali, 2014; Lau, Gou, & Li, 2010; Shach-Pinsly et al., 2011). AmirHosein et al. (2014) highlighted concerns that neglecting these needs could lead to significant dissatisfaction with the housing environment. When there is a mismatch between the occupants' expectations and their living conditions, housing stress can arise, resulting in behavioral adjustments and, in some cases, the abandonment of essential cultural and religious values.

1.2 Research Aim & Objectives
This research aims to examine the impact of visual privacy on the use of core spaces in urban terrace housing design for Malay Muslim families in Malaysia. The study has two main objectives: (1) to analyze current trends in space usage among Malay families in terrace houses, and (2) to investigate how visual privacy factors influence the use of spaces and household activities.

1.3 Research Scope & Limitation
This study focuses on terrace housing, one of the most popular housing typologies among Malay Muslim families. It is limited to urban housing in Malaysia and does not include comparisons with other countries. Bandar Baru Bangi and Bandar Seri Putra were selected as study areas as they represent Malay-majority communities in Malaysia. While the study acknowledges that various factors influence space usage in urban housing, it specifically examines the impact of visual privacy, given its significance to Malay families. Additionally, the study's scope is constrained by time limitations.

2.0 Literature Review

2.1 Concept & Function of Visual Privacy of the Home for the Muslim Family
Visual privacy refers to the ability to control visual permeability in a space (Besim, 1986; Hisham, 2003; Reis & Lay, 2004; Shach-Pinsly et al., 2011). Reis and Lay (2004) describe it as regulating visual connections through viewing angles and distances. Shach-Pinsly et al. (2011) view it as an optimization process balancing visual exposure and openness, aligning with Altman's (1977) privacy regulation theory.

In Malaysia, visual privacy is crucial for Malay Muslim families, particularly in terrace housing, where inadequate designs often lead to modifications for privacy protection. Traditional Malay houses were designed to balance private and public spaces, preserving family dignity and modesty (Asiah, 2008; Hisham, 2003; Shabani et al., 2010). Besim (1986) noted that excessive visual exposure disrupts family life and social harmony.
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2.2 Visual Exposure and Visual Access as Factors Affecting Visual Privacy of a Home
Visual exposure refers to the degree of privacy penetration from external spaces (Shach-Pinsly et al., 2011), while visual access allows controlled connectivity to the surroundings (Besim, 1986). Inadequate privacy can negatively impact well-being, yet moderate visual access, such as natural light and outdoor views, enhances mental health and neighborhood security (Lau et al., 2010; Mohammad & Hanan, 2010; Luo et al., 2024). Strategies such as Building Information Modeling (BIM) help optimize privacy while maintaining beneficial visual access (Sadeghi & Jahantab, 2024).

2.3 Terrace Housing in Malaysia
Housing satisfaction in Malaysia is influenced by affordability, space, location, and privacy (Salfarina et al., 2010; Tan, 2009). Privacy concerns in terrace housing, particularly among Malay families, result in behavioral adaptations and home modifications (Farah, 2010; Tahir et al., 2009; Zaiton & Ahmad Hariza, 2008). Close proximities to neighborhood facilities further compromise privacy (Masran, 2019), prompting families to invest in costly modifications to align with cultural preferences (Khoiry et al., 2012).

The lack of privacy in terrace housing affects daily life and overall satisfaction (Azhani Abd. Manaf et al., 2022). Privacy violations arise from house orientations and their proximity to streets or commercial areas. Families often install fences, tinted windows, and curtains to minimize exposure, though these modifications may not always be aesthetically or financially viable (Zaiton & Ahmad Hariza, 2008). Additionally, the cost of modifications raises concerns about affordability and long-term housing suitability (Khoiry et al., 2012).

Figure 1: (a) Example of a typical terrace house floorplan (Source: MPKj, 2017),
(b) Example of the typical front façade of a two-story terrace house in Malaysia
(Source: https://malaysiahomereno.blogspot.com/2015/02/2-storey-terrace-house-renovation-6.html

2.4 Exterior Elements of the Terrace House

Exterior design significantly influences privacy levels in terrace housing. Traditional Malay houses achieved privacy through spatial arrangements and external elements (Lim, 2001). In terrace housing, boundary modifications such as higher fences, tinted glass, and landscaping help mitigate visual intrusion (Erdayu et al., 2012a; Mohd Jusan, 2007; Rahim & Hashim, 2020).

Zaiton (2015) highlighted that the absence of external walls and physical barriers between terrace houses increases the likelihood of overlooking neighboring homes. Elements such as unit proximity, window placement, and landscaping contribute to overall privacy satisfaction (Ismail & Said, 2021). Implementing thoughtful spatial configurations and external modifications can offer a balance between openness and seclusion, improving privacy while maintaining community engagement.

3.0 Methodology

This study employs a sequential mixed-methods approach to examine the impact of terrace housing design on visual privacy satisfaction among Malay Muslim families. The first phase involved a questionnaire survey of 451 respondents from intermediate terrace houses in Bandar Seri Putra and Bandar Baru Bangi, Selangor. These locations were chosen for their diverse housing developments. The survey, pre-tested for reliability, provided quantifiable insights into privacy perceptions. Random sampling minimized bias, and ethical approval ensured respondent confidentiality and voluntary participation.

The second phase included in-depth interviews and space syntax analysis as qualitative supplements. Ten participants and their homes (A1–A5, B1–B5) were selected based on survey responses to provide rich case studies. Interviews, conducted in natural settings, allowed for open discussion, reducing response bias. Observational methods, such as photo documentation and sketching, captured housing conditions ethically. Space syntax analysis, using isovist diagrams, assessed visual exposure and privacy levels for objective spatial analysis. The integration of quantitative and qualitative methods, along with ethical safeguards, ensures credible and well-substantiated findings on visual privacy in terrace housing.

4.0 Findings

4.1 Perception of Occupants - Areas and Activities Affected by Visual Privacy Factors

The measure of central tendency reveals significant differences in mean values between satisfaction levels for various activities, highlighting variations in how different activities and areas are impacted by inadequate visual privacy (Table 1). The study identifies that outdoor activities, particularly those conducted in highly exposed areas, are the most affected. When visual privacy is compromised, respondents tend to regulate their behavior or modify their homes to achieve a more acceptable level of privacy. The findings in Table 1 indicate that indoor activities are generally less affected by visual intrusion, whereas outdoor activities—such as hanging clothes, washing the car, standing at the entrance, and gardening—face higher levels of exposure. This suggests that areas with minimal visual shielding create discomfort for residents, leading them to adjust their behaviors or adopt privacy-enhancing measures.

Table 1. One-way ANOVA on Activities Affected by Lack of MVP

Activities Affected by Lack of MVP	*N*	*Mean*	*One-Way ANOVA*	
			F-value	Sig.
11b. Hanging clothes to dry	435	2.6993	4.817*	.029
11d. Standing in the doorway of the main entrance	441	2.4694	4.148*	.042
11a. Gardening	441	2.3471	4.955*	.027
11c. Washing car	439	2.5510	2.607	.107
11e. Attending to guests	439	2.1617	.225	.636
11f. Reading or doing work in the living room	441	2.1111	2.176	.141
11j. Doing laundry	439	2.0523	1.663	.198
11i. Cooking	440	2.0159	.003	.957
11g. Sitting at the dining table	440	2.0228	.382	.537
11h. Washing dishes	440	2.0227	.762	.383
11l. Watching television or spending time with family	441	2.0159	.003	.957
11k. Getting ready for bed	439	1.8526	.251	.617

*ρ ≤ 0.05

As presented in Table 2, the most vulnerable areas to visual intrusion are the porch or parking space, entrance area, and balcony. This aligns with the findings from Table 1, which show that activities carried out in these locations—such as hanging clothes to dry, standing in the main entrance doorway, and gardening—experience the greatest disruption due to inadequate visual privacy. Insights from in-depth interviews reveal that female participants expect a high level of privacy while performing these tasks. This can be gauged from the verbatim from one of the in-depth interviews (participant B2). Some homeowners even regulate their daily routines to avoid unwanted visibility and interactions with neighbours, especially those of the opposite sex (see verbatim on page 191). While this adaptation safeguards personal privacy, it also points to a shift in social behavior where maintaining visual privacy takes precedence over fostering neighbourly interactions. This growing trend underscores the significant impact that visual privacy concerns have on daily life, influencing both spatial usage and social engagement within residential environments.

Table 2. One-way ANOVA analysis on Areas Affected by Lack of MVP

Areas Affected by Lack of MVP	N	Mean	One-Way ANOVA	
			F-value	Sig.
12c. Porch/parking	441	2.4439	19.668	.000**
12d. Entrance	441	2.2511	13.863	.000**
12k. Balcony	437	2.1023	15.257	.000**
12h. Wet kitchen	440	1.9021	14.962	.000**
12g. Dry kitchen	418	1.8612	14.812	.000**
12e. Living	438	2.0636	12.119	.001**
12f. Dining	440	1.9205	6.450	.011*
12j. Staircase	440	1.7886	6.711	.010*
12i. Bathrooms	439	1.8114	4.679	.031*
12a. Master bedroom	440	1.7846	1.730	.189
12b. Other bedrooms	391	1.7188	1.564	.212

*ρ ≤ 0.05, ** ρ ≤ 0.001

The findings from Table 3 supported by the following verbatims below indicate that the majority of respondents (65.6%) rarely use their balconies, particularly those facing the street or neighboring houses. Similarly, 54% of respondents seldom spend time outside on the porch or in the street in front of their homes. These results suggest that high visual exposure from surrounding neighbors significantly influences how residents utilize both indoor and outdoor spaces, often leading to reduced use of exposed areas to maintain privacy. Insights gathered from in-depth interviews highlight issues with the visual privacy of the house and the importance of privacy regulation mechanisms employed by occupants to increase satisfaction of privacy of indoor and outdoor spaces of the house.

"I am satisfied with the ability of the design to block views from the outside. However, in terms of the interior design, I was not satisfied with the privacy levels in the house. As you can see, the existing front door opened directly straight to the kitchen. This here (indicating the room of the interview) was previously the kitchen. I was unhappy with that."
 (Participant A2)

"I am not happy with the ability of the house to protect privacy. We are not happy with the windows. The windows in the master bedroom are so high and big. We were not sure of how to cover them, you know? The same issue with the gate, it is so basic and open. The door is not an issue. It is mainly about the windows."
(Participant B4)

"Yes, I do like the open planning concept. It is easier to manage and furnish. However, regarding the protection of *awrat*, people can easily see you due to the open concept and it can be quite inappropriate at times. It is because there is no divider or partitions."
(Participant B5)

"I wait for my next-door neighbor to leave before stepping outside. If I hear his car engine or see him on the porch, I hold off on going out or hanging my laundry until he's gone. Sometimes, seeing a neighbor means exchanging pleasantries, so when I'm not in the mood, I prefer to wait until they leave." (Participant B2)

Table 3. Physical elements and areas frequency of use by respondents

Usage of physical elements and spaces	Rarely %	Often %	Total	
			N	%
How often do you use the balcony in your house facing the street or neighbours' houses?	65.6	34.3	441	100.0
How often do you spend time outside on your porch?	54.0	46.0	441	100.0
How often do you use/open the windows in the house facing the street or the neighbors?	53.3	46.7	441	100.0
How often do you open doors that face the street or neighbours?	47.4	52.6	441	100.0
How often do you open internal doors that are facing common areas of the house?	44.6	55.4	440	100.0
How often do you pull open curtains for windows that are facing the street or the neighbours?	38.1	61.9	441	100.0

4.2 Visual Privacy Factors Influence the Use of Spaces and Household Activities.
Isovist analyses were conducted on the external areas of houses belonging to participants from the in-depth interviews. The isovist field, indicated as areas shaded in grey in the diagram, indicates the area visually penetrable from a person with 1.6m height at 360 degrees angle, standing at the chosen point. The area indicates privacy analysis. The isovist fields were generated from a point in the porch area, directly in front of the entrance door, to assess the extent of visual penetration when standing at the main entrance of a terrace housing unit. The analysis considered the worst-case scenario under the following assumptions:

- The main door of the house is open.
- The main doors of neighboring houses are open.
- All internal doors inside the house are open.

Code: B2
(Type B)
Area: Bandar Seri Putra
Year Built: 2007
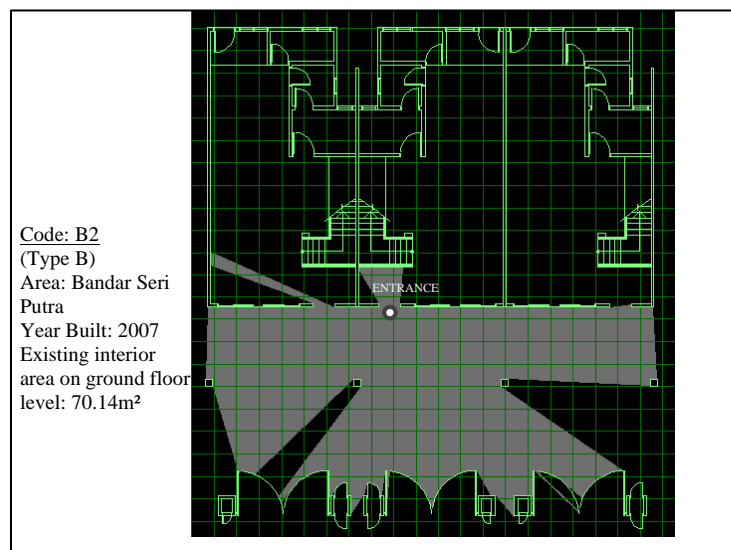Existing interior area on ground floor level: 70.14m²

Figure 1. Isovist field on the external area of case study house B2

Figures 1 to 2 illustrate examples of isovist fields in terrace housing environments. The findings reveal that in 7 out of 10 cases, the visual field extended beyond the house's boundaries, intruding into neighbouring properties. This was primarily due to the height and

materiality of the side boundary walls or fencing. In the 10 houses analyzed, the side walls separating porch or parking areas were often below eye level, allowing direct visual penetration between houses, or constructed from fencing materials that provided minimal privacy.

Additionally, the positioning of the main entrance was a critical factor influencing the extent of visual intrusion into both the internal spaces of the house and neighbouring properties. The isovist analysis further showed that in terrace houses, constructed between 2000 and 2015, 4 out of 5 cases exhibited isovist fields that not only extended into adjacent house boundaries but also penetrated private living areas within neighbouring homes. These findings highlight significant concerns regarding privacy in modern terrace housing designs.
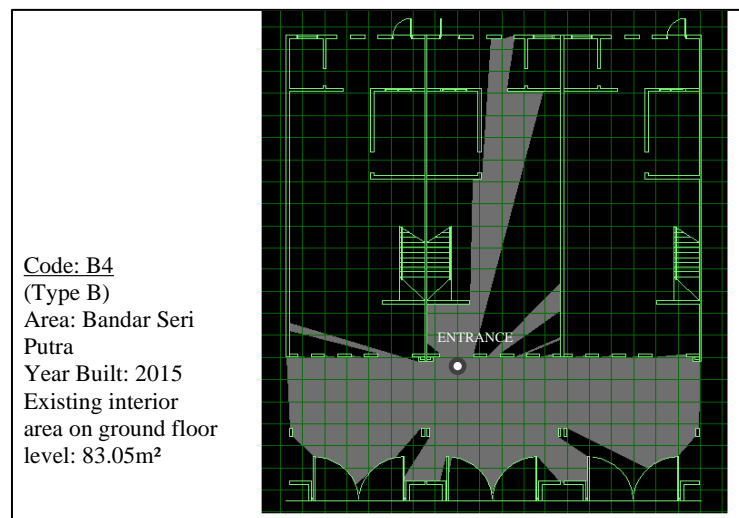

Code: B4
(Type B)
Area: Bandar Seri Putra
Year Built: 2015
Existing interior area on ground floor level: 83.05m²

Figure 2. Isovist field on the external area of case study house B4

5.0 Discussion

Urban terrace housing remains a practical and economical choice in Malaysia's high-density areas, yet space constraints—especially in intermediate units—demand efficient use of key spaces. This study reveals a mismatch between the standardized design of these homes and the cultural and religious needs of Malay Muslim families. Although long, narrow layouts are intended to enhance ventilation and lighting through semi-outdoor areas, many occupants avoid using porches and balconies due to visual privacy concerns, leading to underutilized spaces.

Survey findings show a strong link between privacy and space usage. Most respondents keep windows and doors closed, particularly those facing the street or neighboring homes. While residents express a desire to use outdoor spaces more freely, they rely on behavioral adaptations and house modifications to safeguard privacy. Space syntax analysis confirms that isovist fields from semi-public areas often intrude into neighboring homes, creating discomfort and discouraging openness. Interviews further highlight daily routines shaped by the need to maintain modesty and avoid unwanted visual exposure.

These insights underscore the importance of incorporating cultural and religious considerations into housing design. As urban densification and demographic shifts reshape Malaysian cities, terrace housing must evolve to remain relevant and livable. Features such as layered thresholds, privacy screens, and semi-permeable facades could help reconcile the need for openness with the demand for privacy, allowing residents to reclaim underused spaces while respecting cultural values.

The findings suggest that building codes and planning guidelines should better address visual privacy as a core design parameter. Existing regulations often prioritize spatial efficiency and ventilation without considering residents' lived realities. Incorporating privacy metrics—such as strategic window placement, buffer zones, and adaptable facades—could foster housing models that are both efficient and culturally attuned. As urban housing trends shift, future designs must balance density with dignity, supporting diverse lifestyles within compact urban environments.

6.0 Conclusion & Recommendations

This study provides original insights into how visual privacy concerns shape the spatial use of terrace housing among Muslim Malay families in Malaysia—an area that remains underexplored in both local and international housing research. Unlike previous studies that focus broadly on space efficiency or socio-cultural housing preferences, this research specifically integrates spatial analysis (space syntax) with qualitative behavioral insights to highlight how visibility dynamics directly affect the usability of core residential spaces. It contributes to the academic literature by foregrounding visual privacy as a measurable and impactful variable in housing design, expanding current discourse on culturally responsive architecture.

The findings confirm that standard terrace house designs often conflict with religious and cultural expectations related to modesty and visual seclusion. This misalignment leads to the underutilization of important transitional spaces such as porches and balconies,

prompting homeowners to adopt behavioral adaptations or make physical alterations to maintain privacy. These responses—ranging from selective use of space to facade modifications—highlight a disconnect between design intentions and lived realities.

To address this, the study recommends incorporating visual privacy strategies as a core consideration in both future housing design and urban planning. Specific interventions may include reoriented layouts, staggered setbacks, adaptive facades, and the integration of design elements such as lattice screens, louvered panels, and strategic landscaping. Such features can enable residents to comfortably inhabit semi-outdoor spaces without compromising cultural or religious values.

By identifying privacy-related spatial behaviors and proposing design-informed responses, this study bridges the gap between academic theory and architectural practice. It calls for building codes, housing policies, and architectural education to evolve in tandem with the socio-cultural contexts they serve, ensuring that urban housing in Malaysia and similar contexts supports not only physical well-being but also cultural and spiritual identity.

Acknowledgments

Paper Contribution to Related Field of Study

The findings highlight the need for designers, authorities, and the housing industry to rethink urban house designs, particularly core spaces, to prevent inefficiency and underutilization. This study emphasizes the importance of modern façades and perimeter designs that balance privacy with cultural sensitivity while optimizing natural ventilation and lighting for sustainable, functional housing.

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