Review of: "Study of Environment-Behaviour in Three Types of Urban Contexts in Tehran: A Comparative Analysis of the Chizar, Narmak, and Khazane Neighbourhoods Using Survey and Space Syntax Methods"

Romina Fucà[1]

1 Management, University of Verona, Italy

Potential competing interests: No potential competing interests to declare.

This paper delves into environment-behavior (E-B) studies by examining the spatial and social dynamics of Tehran's neighborhoods, aiming to reveal how spatial configurations influence resident behavior and social interactions. Through a structured methodology, the authors integrate survey data with space syntax analysis—a recognized tool for configurational urban analysis developed by Hillier et al. (1993) and later refined by researchers like Butts (2003) and Liben-Nowell et al. (2005). By developing correlation tables and matrices, the study maps out the influence of spatial attributes on social affordances, behaviors, and safety perceptions.

The application of space syntax here utilizes visual features like vertices, edges, pathways, and nodes to analyze spatial configurations, highlighting anchor points within the environment that support interaction potential and safety concerns. This dual focus transforms physical elements from neutral backdrops into meaningful relational spaces influenced by repeated engagement and resident feedback. Enhancing this computational approach with qualitative data from observations and interviews provides a multidimensional view of each neighborhood.

The study compares three distinct Tehran neighborhoods: Chizar, with its historical, organic layout; Narmak, with a structured, orthogonal grid; and Khazane, with a hierarchical dead-end layout. Each neighborhood offers unique spatial typologies that affect accessibility, integration, and potential for social interactions. This cross-sectional view enables a comparative analysis of diverse layouts and their impact on social affordances, walkability, safety perceptions, and community dynamics.

Survey data, space syntax metrics, and visibility analyses are presented using correlation tables and visual figures, offering insight into the relationship between spatial configurations and behaviors within each context (see Tables 4, 5, and Figure 3). Key findings suggest that spatial integration and connectivity significantly shape social affordances and perceptions of safety. For instance, Narmak's integration supports frequent social interactions due to its open squares, while Khazane's dead-end structure limits connectivity, creating isolated areas and impacting perceived safety.

The study further explores the division between adult and children's spaces, finding that active social areas for adults may not support children's activities. To better capture residents' nuanced perceptions—particularly regarding comfort and safety—the study could expand its methodology by incorporating structured interview questions focused on spatial

dimensions, openness, and sight lines. Such questions could explore residents' comfort, spaciousness, and security perceptions based on visibility, helping to capture aspects of spatial experience not fully conveyed through quantitative data.

Enhanced Methodology Using Human Scale and Sight Lines: The paper's visibility analysis could be improved by directly correlating spatial metrics (e.g., sight lines and dimensions) with resident responses. This approach, inspired by Sharma's (2015) study on human-scale proportions in Indian public squares, could enhance understanding of how physical features shape perceptions of comfort and connectivity. Open sight lines and human-scale proportions improve inclusivity and reduce perceptions of isolation. By incorporating these findings, the study could examine sight lines as a factor in perceived connectivity, particularly relevant for dead-end structures in Khazane. Clear sight lines in such areas might mitigate isolation and enhance accessibility, and responses to spatial comfort and visibility could further refine the space syntax model to reflect residents' spatial preferences.

Suggested Resident Feedback Framework: Including a structured interview for the study's 96 residents (32 per neighborhood) could reveal spatial dimensions they find conducive to socialization. Responses from each neighborhood could be categorized by context type (organic, orthogonal with squares, or hierarchical passages), allowing planners to understand how preferences vary across urban layouts and resident demographics. Questions might address perceptions of openness, ease of navigation, and safety, offering insights that could guide adjustments in future spatial simulations. For example, if residents highlight specific comfortable dimensions, these metrics could be prioritized, while areas perceived as lacking visibility might be adjusted to test configurations better suited to resident preferences.

Framework for Spatial Ratios and Planning Implications Across Tehran's Neighborhoods:

Neighborhood	Spatial Metrics	Sample Size	Perceptions	Behavioral Response	Planning Implication
Chizar (Organic)	Sight lines, Openness	32	Comfortable with confined spaces	Short interactions; lower perceived safety	Enhance sight lines and create open pathways to improve visibility and cohesion.
Narmak (Orthogonal)	Square Dimensions, Connectivity	32	Spacious, high visibility	Frequent gatherings; strong safety sense	Emphasize open, human-scale areas with consistent sight lines to squares.
Khazane (Hierarchical)	Connectivity, Dead-ends	32	Mixed; isolated in dead-ends	Lower interaction, perceived exclusion	Improve connectivity, reduce dead-ends, and enhance sight lines for safety.

To better illustrate the relationship between spatial configurations and resident perceptions, the following visual additions could enhance clarity and provide valuable context:

1. **Composite Spatial-Perception Maps**:
    - **Suggested Figure:** A map set overlays spatial configuration metrics (e.g., integration and connectivity) with resident feedback on perceptions (e.g., safety, social interaction potential, openness).
    - **Purpose:** This visual helps bridge objective space syntax metrics with subjective perceptions, highlighting areas where spatial features align (or diverge) with resident experiences.

2. **Sight Line and Visibility Analysis Diagrams**:
    - **Suggested Figure:** Diagrams showing sight lines in key areas across each neighborhood (e.g., squares in Narmak, confined paths in Khazane).
    - **Purpose:** These diagrams illustrate how sight lines impact feelings of openness, isolation, and safety, directly linking visual accessibility with resident comfort levels.
3. **Correlation Heatmaps for Spatial-Perceptual Attributes**:
    - **Suggested Table or Figure:** A heatmap correlating specific spatial metrics (e.g., connectivity, node count) with survey-based perceptions like social interaction frequency, comfort, and safety ratings.
    - **Purpose:** This provides an at-a-glance view of which spatial characteristics most strongly correlate with positive or negative resident perceptions.
4. **Behavioral Response Pathways Visualization**:
    - **Suggested Figure:** Flowcharts or pathways diagrams showing behavioral responses within each neighborhood's layout (e.g., common walking routes in Narmak versus isolated paths in Khazane).
    - **Purpose:** This illustrates the direct impact of spatial configuration on movement patterns, social clustering, or isolated areas, reinforcing spatial-behavioral connections.
5. **Resident Feedback Summary Table by Neighborhood**:
    - **Suggested Table:** A table summarizing key feedback themes from residents in each neighborhood, organized by metrics (e.g., perceived openness, safety) and their corresponding spatial dimensions.
    - **Purpose:** A consolidated table enables easy comparison across neighborhoods, clarifying how residents experience and respond to different spatial layouts.

These visuals could enhance the reader's understanding of the spatial-behavioral linkages and make the findings more actionable for urban planners aiming to apply these insights.

Including specific examples of resident feedback would add depth to the analysis by linking spatial metrics with individual experiences and perspectives. Here are some types of resident feedback that could strengthen the analysis:

1. **Perceived Safety in Visibility-Restricted Areas**:
    - *Example Feedback:* "I feel uneasy walking down the alleyways with dead ends in Khazane because I can't see what's around the corner."
    - *Purpose:* This feedback reinforces the need for open sight lines, illustrating how restricted visibility impacts perceptions of safety, especially in confined or dead-end spaces.
2. **Social Interaction in Open Squares versus Narrow Pathways**:

- *Example Feedback:* "In Narmak's squares, I often meet neighbors and stop to chat, but in Chizar's narrow alleys, I usually pass by quickly without stopping."
- *Purpose:* This highlights how spatial openness can foster incidental social interactions, contrasting with the faster-paced, interaction-limited movement in narrow pathways.

3. **Walkability and Comfort in Varied Neighborhood Layouts**:
   - *Example Feedback:* "The grid layout in Narmak makes it easy to get around and find my way, but the winding paths in Chizar are confusing and cramped."
   - *Purpose:* Such feedback directly connects resident comfort with layout clarity, emphasizing how grids enhance walkability and spatial orientation.
4. **Usage of Public Spaces with Clear Sight Lines**:
   - *Example Feedback:* "I feel comfortable spending time with my kids in Narmak's open spaces because I can see them across the square."
   - *Purpose:* This feedback could support findings that open, visible spaces encourage family and social activities, linking spatial visibility with perceived safety and social comfort.
5. **Perception of Isolation in Hierarchical Passageways**:
   - *Example Feedback:* "In Khazane's dead-end sections, I often feel isolated, and I avoid them at night."
   - *Purpose:* This reinforces the notion that specific spatial configurations—like dead ends—can lead to perceived isolation, impacting how residents use or avoid spaces based on their layout.

Integrating these specific examples would illustrate how spatial design decisions translate into lived experiences, grounding the analysis in tangible resident perspectives. These insights make the findings relatable, showing urban planners how spatial configurations directly affect community members' day-to-day experiences and perceptions.

Such an approach helps urban planners design layouts that enhance social cohesion, particularly in high-density areas where pedestrian-friendly pathways and informal gathering spaces support vibrant community interactions. This shift in perspective—recognizing that not all urban spaces need immediate economic returns—reflects a commitment to sustainable urban life through socially oriented, inclusive planning.

References:

1. Small, M.L., and Adler, L. *The Role of Space in the Formation of Social Ties Annual Review of Sociology*, Volume 45, 2019, 111-132. https://doi.org/10.1146/annurev-soc-073018-022707
2. Sharma, V. *Perception of Urban Public Squares in India*. Dissertation for the Faculty of Architecture, Manipal University, Manipal, November 2015, pp. 1-70.
3. Guo, G., Yang, Y., Cheng, Z., Wu, Q., Li, C., Lo, T., and Chen, F.*Spatial social interaction: An explanatory framework of urban space vitality and its preliminary verification. Cities*, Volume 121, 2022, 103487, ISSN 0264-2751.

https://doi.org/10.1016/j.cities.2021.103487

4. Jabareen, Y., and Eizenberg, E. *Theorizing urban social spaces and their interrelations: New perspectives on urban sociology, politics, and planning. Planning Theory*, 20(3), 2021, 211-230. https://doi.org/10.1177/1473095220976942
5. Lutzoni, L. *In-formalised urban space design: Rethinking the relationship between formal and informal. City Territ Archit*, 3, 20, 2016, pp. 1-14.https://doi.org/10.1186/s40410-016-0046-9