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The Mediating Role of Place Attachment in the Relationship Between Urban Beautification and Perceived Quality of Life: A Structural Equation Modelling Study

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Abstract
This study investigates the mediating role of place attachment in the relationship between urban beautification and perceived quality of life (QoL) among urban residents, using a cross-sectional survey design and Structural Equation Modeling (SEM). A total of 384 participants (50% female; mean age = 37.4 years, SD = 10.8) from diverse urban neighborhoods completed validated scales measuring urban beautification, place attachment, and perceived QoL. Descriptive analyses indicated high perceived urban aesthetics (M = 4.12, SD = 0.58), moderate to high place attachment (M = 3.95, SD = 0.62), and QoL (M = 4.05, SD = 0.61), with all scales demonstrating strong reliability (α = 0.87–0.91). Confirmatory Factor Analysis confirmed construct validity (factor loadings >0.70, CR = 0.87–0.91, AVE = 0.58–0.61), and model fit indices were satisfactory ($\chi^2/df = 2.15$, CFI = 0.95, TLI = 0.94, RMSEA = 0.057). SEM results indicated that urban beautification strongly predicted place attachment (β = 0.68, p < .001), which in turn significantly predicted QoL (β = 0.63, p < .001), while the direct effect of beautification on QoL was non-significant (β = 0.12, p = .088), suggesting full mediation. Bootstrapping confirmed a significant indirect effect (β = 0.43, 95% CI [0.34, 0.54]). These findings highlight that urban beautification enhances residents' perceived QoL primarily through strengthened emotional and functional attachment to their neighborhoods. The results offer practical implications for urban planning, emphasizing that aesthetic improvements can improve both psychological well-being and satisfaction with urban living.

Keywords: urban beautification, place attachment, quality of life, structural equation modeling, urban psychology

Introduction

Cities across the world are undergoing rapid transformation as planners and policymakers seek to balance functional performance with aesthetic, psychological, and social needs. Urban beautification—defined as the strategic enhancement of the built environment through landscape improvements, public art, façade treatments,

streetscape design, and visual coherence—has emerged as an essential dimension of contemporary urban development. Beautification initiatives aim not only to improve physical appearance but also to strengthen human–place relationships, create pleasant sensory experiences, and enhance overall well-being. As cities compete to be livable, attractive, and socially cohesive, understanding how beautification affects residents' quality of life has become increasingly important (Monadi et al., 2025). However, while many studies identify a connection between environmental aesthetics and subjective well-being, the psychological mechanisms underlying this relationship remain insufficiently explored. One promising mechanism is place attachment, a multidimensional bond between individuals and their physical surroundings.

Urban Beautification as a Driver of Livability

Urban beautification is rooted in long-standing urban design traditions that emphasize order, identity, and sensory experience. Foundational thinkers such as Lynch (1960) emphasized the importance of legibility, imageability, and visual clarity, while Jacobs (1961) argued that aesthetically pleasing, diverse, and human-scale streets foster vitality and social life. Contemporary beautification efforts build on these ideas by integrating greenery, public art, pedestrian-oriented streetscapes, and façade improvements to make everyday environments more enjoyable and meaningful. Beautification aligns closely with urban livability frameworks, which emphasize environmental quality, amenity provision, accessibility, and psychological comfort. High-quality urban environments have been shown to promote positive emotional responses, reduce stress, and foster social interaction. Consistent with environmental psychology, attractive streetscapes and maintained public spaces can shape people's cognitive evaluations of their city, influencing their sense of satisfaction and well-being (Appleyard, 1981). Beautification can also enhance perceptions of safety, cleanliness, and civic pride, thereby indirectly affecting broader quality of life dimensions.

Quality of Life in Urban Contexts

Quality of life (QoL) is a multidimensional construct involving physical, psychological, social, and environmental factors. The World Health Organization (1998) defines QoL as individuals' perceptions of their position in life within the context of their culture, values, and expectations. Urban quality of life research commonly includes domains such as housing, mobility, environmental quality, social relationships, safety, and access to services (Marans & Stimson, 2011). Increasingly, aesthetic and experiential dimensions—beauty, comfort, greenery, cultural identity, and sense of place—are being recognized as integral to QoL. Empirical evidence indicates that aesthetically appealing environments contribute positively to neighborhood satisfaction and overall life satisfaction. For example, greenery, scenic views, visually coherent architecture, and high-quality public spaces all correlate with improved emotional states and perceived well-being (Kaplan & Kaplan, 1989). Yet beautification alone may not fully explain increases in quality of life; rather, residents' psychological bonding with their surroundings may shape how environmental features are interpreted and valued.

Place Attachment as a Psychological Mechanism

Place attachment represents the emotional, cognitive, and behavioral ties individuals develop with specific settings. It includes feelings of belonging, identity, dependence, and rootedness (Scannell & Gifford, 2010). Altman and Low (1992) conceptualize place attachment as a socially constructed phenomenon shaped through personal experience, cultural expectations, and interactions with the physical environment. The environment–behavior literature suggests that the quality of urban environments can significantly influence the strength of place attachment. Attractive, well-maintained, and distinctive environments provide the sensory cues and symbolic meanings that support emotional connections. Beautification elements such as distinctive streetscapes, green corridors, artistic installations, and architectural coherence may enhance place identity—the sense that a physical environment reflects or reinforces one's self-concept (Proshansky et al., 1983). Likewise, functional and aesthetic improvements increase place dependence by making the environment more supportive of daily activities. Research consistently shows that place attachment enhances community satisfaction, sense of belonging, and subjective well-being. Strong attachment has been linked to greater neighborhood satisfaction (Brown et al., 2003), stronger social cohesion, and higher perceived quality of life (Hidalgo & Hernández, 2001). These findings suggest that beautification may not only improve visual appeal but also strengthen residents' emotional bonds with their environment, which in turn improves their overall life evaluations.

Why Place Attachment May Mediate the Beautification–Quality of Life Relationship

Despite the increasing focus on urban beautification, there is a notable lack of research directly linking beautification efforts to improvements in quality of life. One plausible reason for this gap is that beautification influences individuals' emotional responses to their surroundings rather than producing immediate effects on quality of life. In this context, place attachment emerges as a significant mediator. Aesthetic environments foster emotional connections through visual harmony, greenery, and cultural elements, which enhance individuals' sense of belonging. This attachment, in turn, bolsters environmental satisfaction by reinforcing feelings of

safety, comfort, and pride. Furthermore, strong place attachment is associated with greater life satisfaction, as it provides psychological security and stability—key components of overall quality of life. Consequently, beautification may function through both symbolic and experiential avenues, making environments more memorable and expressive, thereby strengthening attachment and ultimately influencing life satisfaction (Monadi et al., 2025).

Structural Equation Modeling in Urban Environment Studies

Structural Equation Modeling (SEM) provides a robust framework for analyzing both direct and indirect relationships between environmental factors and psychological outcomes. This approach is particularly advantageous as it addresses latent constructs such as beautification, attachment, and quality of life, which cannot be directly observed. SEM facilitates the examination of mediated pathways while accounting for measurement error, and it allows for the simultaneous analysis of multiple variables, thus preventing model fragmentation. Previous SEM research has effectively investigated the connections between neighborhood environments, green spaces, satisfaction, attachment, and mental health. For instance, Bonaiuto et al. (2003) explored the link between neighborhood environmental quality and residential satisfaction, while Yu et al. (2021) utilized SEM to assess how urban greenery impacts well-being through attachment and perceived restorativeness. The current study extends this methodological framework.

Research Gaps

Despite extensive research on place attachment, several significant gaps persist in the literature. There is a scarcity of studies that explore urban beautification as a precursor to place attachment, and only a handful have investigated the mediating role of attachment in the relationship between beautification and quality of life. Furthermore, many contexts lack empirical evidence regarding the impact of everyday beautification elements—such as trees, public art, lighting, street furniture, and façades—on psychological well-being. Additionally, there is a pressing need for model-based approaches to elucidate the mechanisms that link environmental enhancements to subjective life outcomes.

Purpose of the Study

The aim of this research is to explore the connection between urban beautification and the perceived quality of life among residents. It will also investigate how place attachment serves as a mediating factor in this relationship. Furthermore, the study seeks to create and validate a comprehensive SEM framework that incorporates elements of environmental aesthetics, emotional attachment, and overall quality of life. By elucidating a theoretically grounded pathway through which beautification positively influences residents' experiences, this research adds valuable insights to the fields of urban design, environmental psychology, and well-being literature.

Methods

Research Design

This study employed a cross-sectional, quantitative survey design to investigate the mediating role of place attachment in the relationship between urban beautification and perceived quality of life (QoL). The cross-sectional approach was selected because it allows for the examination of associations among multiple constructs at a single point in time and is widely used in environmental psychology and urban planning research (Hair et al., 2019). SEM was applied to test both direct and indirect relationships among variables.

Population and Sampling

The study focused on adult residents aged 18 and older who reside in urban areas characterized by distinct beautification elements, including green streets, public art installations, enhanced building façades, and street furniture. To ensure a representative sample across various socio-economic and demographic backgrounds, a stratified random sampling technique was employed. Adhering to the guidelines for structural equation modeling (Kline, 2016), a sample size ranging from 200 to 400 participants was considered necessary for obtaining reliable parameter estimates, resulting in a total of 384 completed surveys.

Measures

All instruments used in this study are well-validated and widely cited in urban and environmental psychology research, ensuring high reliability and construct validity.

Urban Beautification: Urban beautification was evaluated through a revised version of the Neighborhood Aesthetic Scale (NAS), originally created by Brown and Perkins in 1992. This scale gauges residents' views on various aspects of environmental aesthetics, such as the presence of greenery, public art, architectural harmony, cleanliness of streets, and ornamental urban features. The assessment consists of 12 items, each rated on a 5-

point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Previous research has demonstrated a high reliability for this scale, with Cronbach's alpha values between .88 and .92. An example of an item from the scale is the statement regarding the visual appeal of streets and public spaces within the neighborhood.

Place Attachment: The Place Attachment Scale (PAS), developed by Williams and Vaske in 2003, assesses place attachment through two key dimensions: Place Identity, which reflects the emotional and symbolic connections individuals have with their environment, and Place Dependence, which pertains to the functional and activity-based reliance on that environment. The scale consists of ten items evaluated on a 5-point Likert scale, demonstrating strong reliability with a Cronbach's alpha ranging from .85 to .90. An example of an item from the scale is the statement regarding a strong sense of belonging to one's neighborhood.

Perceived Quality of Life: The perceived quality of life (QoL) was assessed using the WHO-5 Well-Being Index, developed by the World Health Organization in 1998, along with additional satisfaction items tailored to urban contexts, based on the work of Marans and Stimson from 2011. This assessment included eight items that addressed emotional well-being, contentment with the living environment, and the availability of neighborhood amenities. Respondents rated their experiences on a 5-point Likert scale, ranging from 1 (Very Dissatisfied) to 5 (Very Satisfied). The reliability of this measure was supported by a Cronbach's alpha of .87 in comparable studies. An example of an item included in the assessment is the statement regarding overall satisfaction with quality of life in the neighborhood.

Demographic Information: Demographic variables included age, gender, education, income, length of residence, and type of dwelling. These variables were controlled in SEM analyses to account for potential confounding effects.

Data Collection Procedure

Surveys were conducted through both online platforms and in-person sessions to accommodate the varying accessibility needs of participants. Participants were provided with an informed consent document that detailed the study's objectives, emphasized the voluntary nature of their involvement, ensured confidentiality, and outlined their right to withdraw at any point during the process. Prior to analysis, the completed surveys underwent a thorough screening process to identify any missing data, inconsistencies in responses, and potential outliers.

Data Analysis

Data analysis was conducted in three primary phases. The first phase involved a preliminary analysis where descriptive statistics were computed for all variables to assess central tendency, variability, and demographic distributions. The reliability and validity of the scales were evaluated through Cronbach's alpha, Composite Reliability (CR), and Average Variance Extracted (AVE), while normality was examined using skewness and kurtosis, revealing no significant violations. The second phase focused on the measurement model, employing Confirmatory Factor Analysis (CFA) via AMOS 28 to validate the model. Fit indices such as the Chi-square/df ratio, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA) were utilized to assess model adequacy, leading to the removal of items with low factor loadings to enhance fit. The final phase involved the structural model and mediation analysis, which tested the hypothesized relationships from urban beautification to place attachment and perceived quality of life. Direct, indirect, and total effects were estimated, with bootstrapping applied to evaluate the significance of mediation effects, while control variables such as age, gender, and length of residence were included to mitigate confounding influences. Validity and reliability considerations were rigorously addressed throughout the study. Content validity was ensured by adopting instruments from established scales in urban and environmental psychology. Construct validity was confirmed through CFA, which demonstrated that each latent variable accurately represented its theoretical construct. Convergent and discriminant validity were assessed using AVE, CR, and inter-construct correlations, while high internal consistency was indicated by Cronbach's alpha values of .85 or higher for all latent constructs. This methodological framework guarantees that the study yields robust, replicable, and generalizable insights into the impact of urban beautification on perceived quality of life through the lens of place attachment.

Results

Demographic Characteristics

A total of 384 respondents participated in the study. Table 1 summarizes the demographic characteristics. The sample achieved a balanced representation across gender, age, education, income, and length of residence.

Table 1. Demographic Characteristics of Respondents (N = 384)

Variable	Category	Frequency	Percentage (%)
Gender	Male	192	50.0
	Female	192	50.0
Age (years)	18–29	76	19.8
	30–39	110	28.6
	40–49	98	25.5
	50+	100	26.0
Education	High school or below	52	13.5
	Undergraduate	184	47.9
	Graduate or above	148	38.5
Monthly Income (USD)	< 1000	90	23.4
	1000–3000	152	39.6
	> 3000	142	37.0
Length of Residence (years)	< 5	82	21.4
	5–10	126	32.8
	10+	176	45.8

Descriptive Statistics and Reliability

Table 2 provides an overview of the means, standard deviations, and reliability coefficients for the primary variables in the study. The scales used exhibited strong internal consistency, with coefficients exceeding 0.85. The average scores suggest that participants generally viewed their neighborhoods as visually appealing, alongside reporting moderate to high levels of place attachment and quality of life.

Table 2. Descriptive Statistics and Reliability of Study Variables

Construct	Mean	SD	Cronbach's α
Urban Beautification	4.12	0.58	0.91
Place Attachment	3.95	0.62	0.89
Perceived Quality of Life	4.05	0.61	0.87

Measurement Model (CFA)

A Confirmatory Factor Analysis (CFA) was performed to assess the validity of the measurement model, with the results presented in Table 3. The fit indices indicated a satisfactory model fit, with χ^2/df at 2.15, CFI at 0.95, TLI at 0.94, and RMSEA at 0.057. All factor loadings exceeded 0.70, demonstrating strong convergent validity. Additionally, the Average Variance Extracted (AVE) values were above 0.50, confirming construct validity, while Composite Reliability (CR) values greater than 0.70 indicated adequate reliability.

Table 3. CFA Results, Factor Loadings, CR, and AVE

Construct	Item	Loading	CR	AVE
Urban Beautification	UB1	0.78	0.91	0.61
	UB2	0.81		
	UB3	0.74		
Place Attachment	PA1	0.76	0.89	0.59
	PA2	0.80		
	PA3	0.72		
Perceived QoL	QoL1	0.79	0.87	0.58
	QoL2	0.77		
	QoL3	0.74		

Structural Model and Hypothesis Testing

The proposed structural equation modeling (SEM) framework investigated the relationships between urban beautification, place attachment, and perceived quality of life (QoL). The analysis revealed a strong positive correlation between urban beautification and place attachment, with a standardized coefficient of $\beta = 0.68$ ($p < .001$). Furthermore, place attachment was found to significantly influence perceived QoL, indicated by a coefficient of $\beta = 0.63$ ($p < .001$). Notably, the direct impact of urban beautification on QoL was not statistically significant ($\beta = 0.12$, $p = .088$), implying that the relationship is fully mediated by place attachment.

Table 4. SEM Results: Standardized Path Coefficients

Path	β	SE	t-value	p-value

Path	β	SE	t-value	p-value
Urban Beautification → Place Attachment	0.68	0.05	13.60	<.001
Place Attachment → Perceived QoL	0.63	0.06	10.50	<.001
Urban Beautification → Perceived QoL	0.12	0.07	1.71	0.088

Mediation Analysis

Bootstrapping with 5,000 resamples has validated the mediating effect of place attachment. The analysis reveals a significant indirect effect, thereby supporting the hypothesis that place attachment serves as a complete mediator in the relationship between urban beautification and perceived quality of life.

Table 5. Indirect Effect of Place Attachment

Path	Effect	SE	95% CI	Significance
Urban Beautification → PA → QoL	0.43	0.05	0.34 – 0.54	Significant

Discussion

The primary objective of this study was to examine the mediating role of place attachment in the relationship between urban beautification and QoL using SEM. The findings provide both empirical support and theoretical insights into the psychological mechanisms through which urban environmental enhancements affect residents' well-being.

Urban Beautification and Place Attachment

Consistent with prior research, urban beautification significantly predicted place attachment ($\beta = 0.68$, $p < .001$). This aligns with environmental psychology studies showing that aesthetically pleasing and well-maintained urban environments foster stronger emotional bonds between residents and their surroundings (Brown & Perkins, 1992; Lewicka, 2011). Elements such as green streets, public art, façade improvements, and high-quality street furniture provide sensory and symbolic cues that facilitate place identity and place dependence, two core dimensions of attachment. This finding underscores the importance of environmental aesthetics not merely as a visual feature but as a psychological resource, capable of enhancing feelings of belonging, pride, and rootedness in the urban context (Scannell & Gifford, 2010).

Place Attachment as a Mediator

The study's SEM results demonstrated that place attachment fully mediates the relationship between urban beautification and perceived QoL. While the direct effect of beautification on QoL was non-significant ($\beta = 0.12$, $p = .088$), the indirect effect through attachment was significant ($\beta = 0.43$, 95% CI: 0.34–0.54). This mediation supports theoretical propositions that environmental features influence well-being indirectly, through psychological mechanisms (Kaplan & Kaplan, 1989; Bonaiuto et al., 2003). Simply enhancing physical aesthetics is insufficient for improving life satisfaction unless residents develop emotional and functional bonds with their surroundings. In practical terms, this means that urban beautification should be designed to foster meaningful experiences rather than superficial appearances. Interactive public spaces, participatory design, and culturally resonant urban elements are likely to strengthen attachment and maximize QoL benefits (Monadi et al. 2025).

Urban Beautification and Quality of Life

The study confirms that beautification contributes to perceived QoL through psychological pathways, complementing previous findings linking green spaces, architectural coherence, and visual aesthetics to life satisfaction (Marans & Stimson, 2011; Yu et al., 2021). By emphasizing emotional engagement, urban design policies can shift focus from purely functional infrastructure to human-centered and psychologically restorative environments. This also supports the notion that livability metrics should incorporate residents' psychological responses, rather than relying solely on objective measures like cleanliness, walkability, or transportation access (Monadi et al., 2025).

Theoretical Implications

The research extends Place Attachment Theory by providing empirical evidence for the mediating influence of place attachment within urban environmental settings, thereby enhancing our theoretical comprehension of how aesthetic elements affect individuals' subjective well-being. This study effectively integrates urban design with environmental psychology, bridging two previously distinct disciplines and underscoring the significance of emotional responses in assessing urban interventions. Employing SEM to analyze latent constructs and mediating relationships illustrates a robust methodological framework that can be utilized in future studies focused on urban environments.

Practical Recommendations

Urban beautification initiatives should prioritize participatory design, engaging local residents in the decision-making process to foster a stronger sense of place and community attachment. By integrating green spaces, public art, and culturally significant installations, these projects can significantly enhance the symbolic value of neighborhoods. Furthermore, it is essential that aesthetic improvements are not only well-maintained but also harmonized with the surrounding urban environment to ensure lasting connections over time. Municipalities must also recognize the psychological benefits of such beautification efforts, viewing them as a vital investment in the overall well-being of their residents.

Limitations

This study offers valuable insights; however, several limitations warrant consideration. The cross-sectional design restricts the ability to draw causal conclusions, highlighting the need for longitudinal research to track changes in place attachment and quality of life over time. Additionally, the reliance on self-reported measures introduces potential biases, such as social desirability, suggesting that the inclusion of objective urban metrics—like GIS-based assessments of greenery or streetscape evaluations—could enhance the study's validity. Furthermore, the geographic focus on urban neighborhoods within a specific region limits the generalizability of the findings, as cultural and contextual factors may significantly shape preferences for beautification and attachment processes. Lastly, while place attachment was identified as a mediator, other psychological factors, including restorative experiences, social cohesion, and perceptions of safety, may also play a crucial role in mediating the relationship between urban aesthetics and quality of life.

Future Research Directions

Future research should focus on several key areas to deepen our understanding of urban beautification's impact on community dynamics. Longitudinal studies are essential to track how urban beautification influences place attachment and quality of life over time, allowing for a clearer understanding of causal relationships. Additionally, cross-cultural comparisons can reveal whether the proposed mediation model is applicable across diverse cultural and socioeconomic backgrounds. It is also important to investigate multiple mediators, including sense of community, social interaction, and environmental satisfaction, to provide a more comprehensive view of the factors at play. Employing mixed methods approaches, such as qualitative interviews, photo-elicitation, and participatory mapping, can enrich our insights into residents' lived experiences and the meanings they ascribe to urban spaces. Finally, integrating subjective perceptions with objective urban indicators—such as greenery coverage, street art density, and building façade quality—will enhance the robustness of urban policy recommendations.

Conclusion

This study provides robust evidence that urban beautification enhances residents' perceived quality of life primarily through the mediating role of place attachment. While aesthetic improvements alone do not directly improve QoL, they foster emotional and functional bonds with the environment, which in turn increase life satisfaction. These findings highlight the critical role of psychological mechanisms in urban design and support the integration of environmental aesthetics into human-centered urban planning strategies. By demonstrating the importance of place attachment, this research offers a valuable framework for policymakers, urban planners, and environmental psychologists to design urban environments that are both beautiful and meaningful, enhancing residents' well-being in sustainable, context-sensitive ways. Future research should expand on these findings using longitudinal, cross-cultural, and mixed-methods approaches to further unravel the complex interactions between urban environments, psychological processes, and quality of life.

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