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MARIANA HERNANDEZ FRANCO

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BY THE COMMITTEE CONSISTING OF

Dr. Yeji Yi, Chair

Dr. Tiziana Proietti

Dr. Francesco Cianfarani

Dedication

To Jesus, may this beautiful coincidence last forever. Thank you for always believing in me and for making our family a warm haven. I love you with all my heart.

A Jesús, que esta bonita coincidencia nos dure toda la vida. Gracias por siempre creer en mí y por hacer que nuestra familia sea un lugar lleno de amor. Te amo con todo mi corazón.

And to my mom and dad, whose effort, love, and support have given me everything I ever dreamed of and more. You are the most wonderful parents anyone could wish for, and I am deeply grateful to have you. I love you.

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Abstract

This study investigates the relationship between the habitability of affordable housing and the perceived well-being of low-income households in Oklahoma. While extensive research has explored the impact of housing on people's health, there is a significant gap in understanding how comprehensive design aspects of affordable habitability influence residents' satisfaction and quality of life. Employing a multi-scale approach, this research analyzes habitability features at both a micro-level – unit features (e.g., typology, affordability, and tenure) and interior design parameters (e.g., spatial adequacy, design/functionality, and indoor environmental quality) – and macro-level – neighborhood characteristics (e.g., amenities and accessibility). This research also compares single-family and middle-housing options to provide affordable, satisfying, and equitable living solutions suited to each typology.

Data was gathered through physical and online surveys from 215 residents with experience living in affordable housing in Oklahoma, including middle-housing residents ($n = 50$) and single-family home residents ($n = 165$). A mixed-methods approach was used, combining quantitative correlation analysis and qualitative thematic analysis. Correlation analysis revealed significant relationships between residents' well-being and various habitability features, including unit features (single-family housing $r = .562$, $***p < 0.001$, middle housing $r = .698$, $***p < 0.001$), interior design parameters (single-family housing $r = .764$, $***p < 0.001$, middle housing $r = .859$, $***p < 0.001$) and neighborhood characteristics (single-family housing $r = .599$, $***p < 0.001$, middle housing $r = .495$, $***p < 0.001$). Comparison analysis revealed that unit features and interior design parameters exhibited stronger correlations with well-being among middle-housing residents than among single-family housing residents. Meanwhile, neighborhood characteristics were more relevant to the well-being of single-family home residents than those in middle housing.

Additionally, thematic analysis identified key themes that enriched and contextualized the quantitative findings. This investigation offers user-oriented design strategies for designers to enhance habitability and improve the well-being of residents in affordable housing. The design recommendations emphasize residents' satisfaction, equity perception, and quality of life while also considering aspects such as privacy, place attachment, safety, social interaction, and sense of community.

Keywords: Affordable Housing, Habitability, Well-being, Interior Design, Low-Income, Middle Housing, Single-Family Homes, Quality of Life, Equity, Satisfaction, Oklahoma.

Terms and Definitions

Accessibility: The ease with which residents can move around the neighborhood and access various destinations, including public transportation, local services, and community resources. It involves walkability and proximity to essential amenities.

Affordability: The extent to which housing is financially accessible to potential occupants.

Affordable Housing: Dwelling units that are economically viable for low-income households, allowing them to cover basic needs without financial strain.

Amenities: The services, facilities, and attractions available within or near a neighborhood, including parks, schools, shopping centers, community centers, and recreational facilities.

Area Median Income (AMI): Midpoint of a region's income distribution, meaning that half of the households in the area earn more than this figure, while the other half earn less. It is calculated annually by the U.S. Department of Housing and Urban Development (HUD). It serves as a benchmark for determining eligibility for affordable housing programs and other economic assistance initiatives.

Design/Functionality: Considerations such as furniture layout, workflow, and design elements that enhance usability.

Detached Single Family House: A standalone residential structure not connected to any other dwelling unit. It is designed for occupancy by a single family or household.

Duplex: Multifamily home that consists of two separate living units within a single building with its own entrance, arranged side by side or stacked on top of each other, sharing a common wall or floor.

Equity: The fairness and justice in access to housing opportunities, resources, and benefits, ensuring that all individuals have equal chances to secure safe, affordable, and quality housing.

Habitability: Settings that must be considered for providing adequate living environments, including physical conditions such as unit features, interior design parameters, and neighborhood characteristics, as well as their psychological implications, including privacy, safety, comfort, and place attachment.

Indoor Environmental Quality: Conditions inside a building that affect its occupants' health, comfort, and well-being. Key factors include air quality, lighting, temperature, noise levels, and moisture control.

Interior Design Parameters: Guidelines that define the functional, the conditions, and the aesthetic aspects of housing's interior spaces.

Low-income Households: Families or individuals with annual earnings below 80% of the Area Median Income (AMI). This typically translates to an annual income of approximately \$50,000 or less in Oklahoma.

Macro-habitability: Encompasses habitability at the neighborhood or community level, including factors such as neighborhood amenities and accessibility to services and resources.

Micro-habitability: Refers to habitability at the individual dwelling level, focusing on unit features, and interior design parameters.

Middle Housing: Medium-density housing types between single-family homes and large multifamily complexes, such as duplexes, triplexes, and townhouses. These options provide more affordable and accessible living choices, supporting walkable neighborhoods and diverse housing needs.

Neighborhood Characteristics: Attributes and features that define the quality and livability of a neighborhood.

Place Attachment: The emotional connection and sense of personal belonging that individuals develop with their home, often resulting from personalization and experiences within that space.

Privacy: The degree to which individuals can control access to their personal space and maintain confidentiality within their home environment.

Quality of Life: The overall enjoyment and fulfillment of living in a particular housing situation.

Residential Satisfaction: The degree to which residents are content with their housing situation, including factors such as affordability, condition of the home, and neighborhood quality.

Safety: The perception and reality of being protected from harm within one's home and neighborhood.

Self-rated Health: An individual's subjective assessment of their own health status, influenced by housing conditions.

Sense of Community: The feeling of belonging and connection among residents within a neighborhood, often fostered by shared spaces, community events, and social cohesion.

Sixplex: Multifamily residential building with six separate dwelling units, each with direct access.

Social Interaction: The opportunities and frequency of engaging with others in the community.

Spatial Adequacy: The extent to which the interior space meets the needs of its occupants, ensuring that there is sufficient room for living, working, and moving comfortably within the space.

Tenure: The legal right of occupancy, which can be either tenancy or ownership.

Typology: The classification of housing based on its physical structure and layout.

Unit Features: Characteristics and attributes of a housing unit that define its nature, design, and accessibility.

Well-being: The comprehensive state of physical, emotional, and social well-being influenced by one's housing situation.

I INTRODUCTION

1.1 Background

1.1.1 Context

Housing is a fundamental human right and a crucial aspect of urban development (Tars, 2024). However, in the United States and globally, the deficiency of affordable housing options predominantly affects low-income families, impacting their quality of life and prolonging cycles of economic disparity and marginalization, as people with limited financial resources are often confined to unsafe environments for personal growth (Swope & Hernández, 2019).

According to the National Association of Home Builders (NAHB), approximately 25% of the tenant population has meager incomes in the United States (NLIHC, 2024). A National Housing Conference study shows that low-income households spending over half their income on housing costs had less to spend on food and healthcare compared to those spending 30% or less (Maqbool et al., 2015).

1.1.2 Local Housing Challenges

In Oklahoma, the housing context mirrors these national trends with some unique challenges. As of December 10th, 2024, the Oklahoma Housing Finance Agency faced a significant affordable housing crisis with a budget deficit, forcing the agency to keep its waitlist for Section 8 Housing Choice vouchers, a U.S. Department of Housing and Urban Development (HUD) program that supports affordable “safe and private housing” (USAGov, 2024) closed to new applicants since October 2023 (Keyes, 2024). The severity of this measure becomes evident when considering that, according to 2022 National Low Income Housing Coalition data, 39% of low-income households in Oklahoma were spending more than 30% of their income on housing costs,

6% were allocating over half of their income to this expense (NLIHC, 2022) and the housing market is experiencing a 4% increase in home prices year-over-year, with a median price of \$241,000 (Redfin, 2024). As a result, housing costs further widen the affordability gap for low-income residents. The need for affordable housing has become even more critical, precisely when access to these initiatives has become more limited.

Despite attempts to implement public programs and policies in the state, such as the Section 8 Housing Choice Vouchers Program, Low-Income Housing Tax Credit, and USDA Rural Development Multifamily Housing (U.S. Department of Housing and Urban Development (HUD), 2025), there is still a 7.3 million affordable dwelling scarcity for renters with low incomes, as just 34 housing possibilities exist for every 100 households (NLIHC, 2024a). Only roughly 1 in 4 qualified families receive federal rental assistance (Bailey, 2022). Thus, "millions of families struggle to afford housing and meet other basic needs like food, clothing, and transportation" (Bailey, 2022, p.2).

The severe lack of affordable housing options "limits where low-income individuals can live, often forcing them into substandard dwellings in overcrowded areas with higher poverty rates and fewer health resources" (Braveman et al., 2011, p.4), reflecting and exacerbating broader structural inequalities in society. Moreover, these factors directly influence habitability, a concept that integrates the physical-spatial and psychosocial aspects of housing.

1.1.3 Habitability and Well-being: Satisfaction, Quality of Life, and Equity Perceptions

Habitability refers to the relationship between residents and their living environment, emphasizing the creation of safe, comfortable spaces that enhance resident well-being (Meng et al., 2006; Riva et al., 2022). It encompasses the overall quality of living conditions, including the

physical design of spaces, thermal comfort, air quality, and lighting conditions of a dwelling and its surroundings (González et al., 2024; Guevara Fierro et al., 2023). Resident satisfaction, equity perceptions, and quality of life are primary dimensions of well-being, especially within the context of housing, as they reflect how the dwelling setting meets residents' needs, their sense of fairness and justice, and their overall holistic sense of wellness, respectively. High resident satisfaction correlates with greater stability and community involvement (Jia et al., 2023). Equitable perceptions foster trust and reduce stress (Jia et al., 2023). Good quality of life indicates that housing provides shelter, security, and access to essential services (Palimaru et al., 2023).

Poor habitability, often associated with substandard interior quality, is linked to spatial challenges and physical hazards (Taylor, 2018), resulting in lower residential satisfaction among affected households compared to those in adequate living conditions (Hu et al., 2022). Previous studies revealed that living conditions, including factors such as safety, amenities, and social connections, correlate strongly with lower reported levels of quality of life (Fernández-Carro et al., 2015).

Furthermore, for many low-income and minority households, the experience of living in substandard housing or facing housing instability directly influences their understanding of equity, generating significant stress, depression symptoms, and poorer self-reported health (Swope & Hernández, 2019; T.-C. Yang et al., 2016).

Recognizing that people spend a substantial portion of their time indoors (US EPA, 2021) and roughly 60% at home (Taylor, 2018), dwelling-related difficulties or poor habitability significantly impact individuals' well-being. These conditions can lead to psychological discomfort and a sense of powerlessness (Maqbool et al., 2015) as the physical environment is

necessary for fostering a sense of home, quality of life, equity and contributing to overall security (Rolfe et al., 2020).

1.1.4 Exploring Solutions: Middle Housing

In response to the challenges, the concept of middle housing has gained attention as a potential solution. Middle housing refers to a range of multi-unit housing types that maintain a scale similar to single-family homes, such as duplexes, townhouses, triplexes, fourplexes, mansion apartments, and cottage courts. These housing options often feature shared outdoor spaces and are designed to meet the increasing demand for walkable urban living (Parolek, 2020).

The affordability of middle housing stems from its design and efficient use of space. By incorporating multiple units on a single lot, this housing type optimizes land use, spreads costs across several households, resulting in lower purchase or rental prices, and implements solutions to maximize space efficiency without compromising comfort and functionality. Additionally, it makes use of existing infrastructure and services more effectively, increasing accessibility for a broader range of residents and fostering community interaction (NAHB, 2023). In contrast, while offering privacy and often larger living spaces, traditional single-family homes tend to be less affordable and less efficient in land use. They typically require more resources per capita for infrastructure and services, contributing to urban sprawl and increased housing costs (Dehan, 2024; Falkson, 2024).

Despite its potential benefits, middle housing faces several barriers, such as restrictive zoning regulations and community opposition. In Oklahoma's two largest cities, Oklahoma City and Tulsa, 96% and 81% of residential land, respectively, is zoned exclusively for single-family homes (OK Policy, 2024), limiting the implementation of dwelling diversity. This restrictive

zoning not only hinders the development of middle housing but also perpetuates a system where access to housing becomes more complicated and focused on individuals with higher purchasing power, exacerbating the affordability crisis and social inequality (Brown, 2023; Opticos Design, 2019).

1.2 Problem Statement

The affordable housing deficit in Oklahoma, characterized by high housing costs, limited options, and restrictive zoning, significantly affects low-income households, altering their well-being and prolonging cycles of economic disparity. This shortage forces them to live in inadequate dwellings with poor habitability, which includes challenging space constraints and limited access to fundamental resources, disturbing their well-being, including equity perceptions, satisfaction, quality of life, privacy, place attachment, safety, self-rated health, social interaction, and sense of community.

Studies on well-being in low-income populations have encompassed various aspects, including residential satisfaction. While well-being is an umbrella term that includes multiple dimensions, residential satisfaction represents a crucial component, especially in the context of housing analysis. Research in this field has generally focused on a macro perspective (Riazi & Emami, 2018), emphasizing urban developmental and policy aspects, such as neighborhood satisfaction (Ciorici & Dantzler, 2019), access to facilities (Addo, 2016), social participation, home ownership (Karimzadeh et al., 2015), length of residence, and previous housing experience (Rent & Rent, 1978).

Within the broader framework of well-being, there is an under-researched area that focuses on the micro level, particularly on the interior characteristics of this housing category, especially

in the United States. The few studies that address indoor spaces typically focus only on the three-dimensional measures of residential satisfaction: environmental quality (Kim et al., 2009), the type of structure (Rent & Rent, 1978), and area size (Ibem et al., 2019), and they are typically conducted in Eastern countries.

Although these investigations reveal a physical and psychological relationship between housing habitability and well-being, a significant gap exists in understanding how both the micro-level, considering unit features and interior design parameters, and the macro-level, including neighborhood characteristics, residents' perceptions of privacy, place attachment, safety, self-rated health, social interaction, sense of community and, particularly, equity and quality of life are affected. This gap is evident when comparing traditional detached single-family housing with middle housing options, such as duplexes, triplexes, and small apartment buildings. While single-family homes represent the traditional housing model, middle housing offers an alternative that can potentially increase density and improve affordability in urban areas, providing more adaptable solutions for diverse needs (Parolek, 2020).

Moreover, the role of interior design in enhancing habitability and, consequently, well-being has been largely overlooked in affordable housing, especially when considering these diverse housing typologies and their impact on low-income residents.

1.3 Research Purpose

This study analyzes how affordable housing habitability influences well-being perceptions among Oklahoma low-income households. By employing a multi-scale approach, the research combines a micro-level habitability analysis of unit features (typology, affordability, and tenure) and interior design parameters (spatial adequacy, design/functionality, and indoor environmental

quality) with a macro-level examination of neighborhood characteristics (amenities and accessibility). The research also compares traditional detached single-family homes to middle housing options to assess the potential of diverse housing typologies in providing more satisfying and equitable living solutions.

To achieve these objectives, the study gathered perceptions through both physical and online surveys from three suburban developments in Oklahoma: two middle housing projects and one single-family home complex. Notably, the same instrument was used for a broader statewide survey, which targeted residents of single-family homes and middle housing across the state. This comprehensive analysis employed a mixed-methods approach, combining quantitative and qualitative methodologies. The quantitative component involved a correlation study, while the qualitative aspect utilized thematic analysis to enrich and contextualize the quantitative findings.

Based on the results, the research identified key user-oriented interior design strategies that can enhance habitability and improve resident well-being in affordable housing contexts. While the analysis encompasses multiple dimensions, particular emphasis was placed on residential satisfaction, equity perceptions, and quality of life. However, other important aspects were considered, such as privacy, place attachment, safety, self-rated health, social interaction, and a sense of community.

By addressing both individual unit and community-wide aspects, this investigation will contribute to socially responsible practices in interior design, architecture, and urban planning, aiding in creating fairer and health-promoting communities.

1.4 Research Questions

This study seeks to answer the following research questions:

- How do the dwelling unit features, interior design parameters, and neighborhood characteristics in affordable housing, specifically within single-family and middle housing, correlate with residents' perceived well-being among low-income households?
- How is habitability related to satisfaction, quality of life, and equity perceptions?
- What user-oriented interior design strategies enhance habitability and resident well-being in Oklahoma's affordable housing contexts?

1.5 Significance of the Study

This research addresses a critical gap in affordable housing studies in Oklahoma by focusing on a new multi-scale perspective that integrates micro and macro-level factors. By examining unit features and interior design parameters at the micro level, alongside neighborhood characteristics at the macro level, the study provides a comprehensive understanding of how these interconnected habitability elements influence residents' perceived well-being. The dimensions of resident satisfaction, quality of life, and sense of equity are identified as principal factors contributing to the broader goal of "reducing poverty, increasing economic mobility" (NLIHC, 2024b).

The study's focus on middle housing options and their comparison with traditional single-family homes offers valuable insights for developing more effective and equitable affordable housing solutions that cater to the diverse needs of low-income residents.

Moreover, by bridging the gap between interior design practices and social equity considerations, this investigation has the potential to inform evidence-based design decisions through user-oriented strategies for improving interior quality that can significantly enhance the living conditions and overall well-being of low-income residents in Oklahoma. This approach not only addresses immediate housing needs but also contributes to long-term community development and social sustainability across the state.

1.6 Thesis Outline

The research is structured into five chapters, each contributing to a comprehensive topic analysis.

1.6.1 Chapter 1: Introduction

The first chapter establishes the foundation of the study by contextualizing the affordable housing problem in Oklahoma and its impact on residents' perceived well-being. It defines the research purpose, objectives, and questions, providing a roadmap for the investigation. Additionally, it emphasizes the significance of the study in informing design practices aimed at improving housing habitability and well-being. The delimitations of the study are also outlined, specifying key criteria such as the definitions of affordable housing and low-income households.

1.6.2 Chapter 2: Literature Review

This chapter provides a comprehensive review of existing literature on affordable housing, habitability, and their relationship to residents' perceived well-being. It delves into the challenges specific to affordable housing in Oklahoma and examines how physical and psychological aspects

of habitability influence factors such as residential satisfaction, quality of life, and perceptions of equity. The analysis includes a comparison of single-family and middle-housing typologies, highlighting their respective strengths and limitations in terms of affordability, habitability, and well-being. A conceptual framework is introduced to guide the research by identifying key variables and their interconnections. Finally, a gap in the literature is identified, particularly regarding how specific unit features, interior design parameters, and neighborhood characteristics affect residents' perceived well-being.

1.6.3 Chapter 3: Methodology

This chapter outlines the research design and methods employed to address the study's objectives. A mixed-methods approach is adopted, combining quantitative methods (correlation analysis) with qualitative methods (thematic analysis) to provide a holistic understanding of the research questions. The sample selection process is detailed, including eligibility criteria and recruitment procedures to ensure robust data collection. Additionally, data collection instruments such as physical and online surveys are described alongside the variables measured in the study. The chapter concludes by detailing the data analysis techniques used to explore relationships between variables and answer the research questions.

1.6.4 Chapter 4: Results

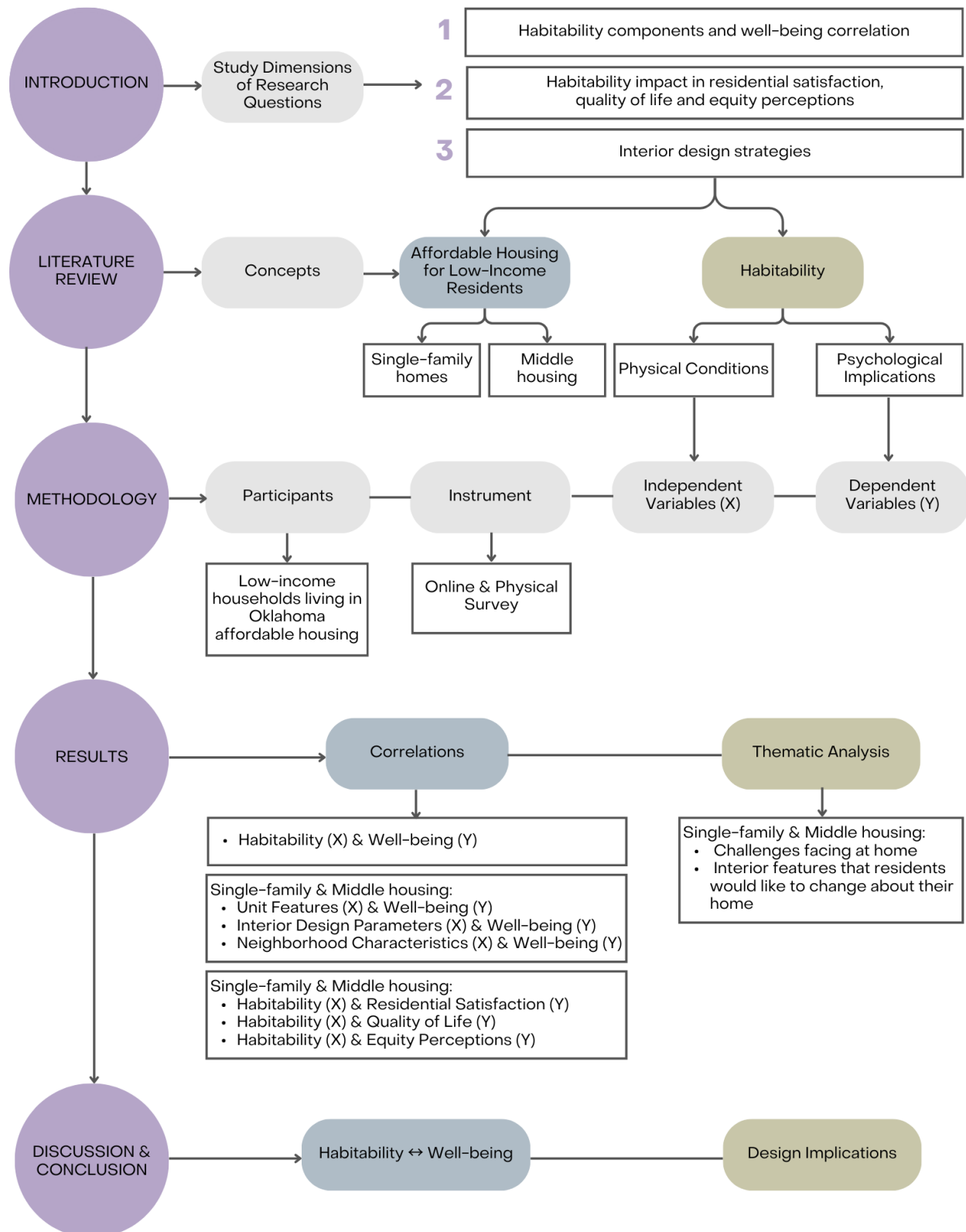
The fourth chapter presents a detailed account of both quantitative and qualitative findings. The results of the correlation analysis are illustrated, revealing relationships between habitability, well-being, residential satisfaction, quality of life, and equity perceptions. Comparisons between single-family and middle-housing typologies are also provided to highlight outcome differences.

To complement these findings, thematic analysis results are presented, offering deeper insights into residents' experiences, challenges faced in their housing environments, and desired improvements.

1.6.5 Chapter 5: Discussion and Conclusion

The final chapter discusses the broader implications of the study's findings within the context of existing literature and the conceptual framework introduced earlier. It highlights key contributions to understanding how affordable housing habitability impacts low-income residents' well-being in Oklahoma. The study's limitations are acknowledged to provide transparency and guide future research directions. The chapter concludes by emphasizing the importance of addressing habitability issues in affordable housing to enhance well-being and resident satisfaction, improve quality of life, promote social equity, and inform better design practices.

Figure 1. Thesis Outline.



1.7 Delimitations

The study explores the association between affordable housing habitability factors and low-income residents' well-being in Oklahoma, focusing on its psychological implications.

Affordable housing is defined according to the U.S. Department of Housing and Urban Development (HUD) as a dwelling that a household can afford while spending no more than 30% of their total income on it (HUD, 2024).

The research specifically examines low-income households, defined by two criteria: those earning below 150% of the poverty line, adjusted for family size (FTA, 2024), and those earning up to 80% of the Area Median Income (AMI), as outlined by HUD (PD&R, 2024), excluding extremely low, very low, middle, and high-income categories (NLIHC, 2022). For context, the Oklahoma AMI between 2019 and 2023 was \$63,603. Households earning up to \$50,882 annually are therefore classified as low-income in this study (*U.S. Census Bureau QuickFacts*, 2023).

The term habitability refers to the set of physical and psychological conditions necessary to provide adequate living (Guevara Fierro et al., 2023). It encompasses tangible aspects, such as unit features, interior design parameters, and neighborhood characteristics, and intangible factors like satisfaction, quality of life, sense of equity, privacy, place attachment, safety, self-rated health, social interaction, and sense of community. These elements collectively shape how individuals perceive their housing and its impact on their overall well-being.

Based on the Person-Environment Fit Model, which postulates that well-being is determined by the alignment between individual characteristics and environmental conditions (Rauthmann, 2021), this study frames habitability as a critical framework for understanding housing-related well-being. In this context, well-being is considered an umbrella term encompassing multiple dimensions identified in the literature, with residential satisfaction, quality

of life, and equity perceptions emerging as key subcategories. However, these are not the only aspects analyzed in this study.

Residential satisfaction refers to the subjective perception of the degree of contentment individuals experience with their dwelling. It arises from the interaction between individual or household needs and aspirations and the actual conditions of their home and neighborhood (Biswas et al., 2021). Quality of life is approached as a multidimensional concept encompassing physical, emotional, and social aspects of well-being (Diener et al., 2018). Equity perceptions reflect residents' sense of fairness in accessing housing resources compared to others in similar socioeconomic circumstances (Swope & Hernández, 2019).

The research acknowledges that well-being is a complex concept influenced by various factors such as education, healthcare access, employment opportunities, social relationships, among others, based on the recognition of housing as a critical social determinant of physical and mental health, and well-being, though not its sole determinant (Briggs et al., 2022; Maqbool et al., 2015; Simpson et al., 2024). However, this study focuses explicitly on housing-related factors, to provide a detailed analysis of the relationship between the housing environment and residents' lived experiences, recognizing the inherent limitation of isolating housing from other structural determinants that contribute to well-being.

The study explores single-family dwellings, which consist of individual residential structures occupied by one family each, featuring private living spaces and shared communal facilities. It also examines middle housing developments, characterized by residential units that balance density and affordability while incorporating shared amenities and outdoor spaces within planned community settings (Parolek, 2020). To gain insights, the investigation gathered perceptions from residents of three specific affordable housing projects in Oklahoma, comprising

a single-family dwelling complex and two middle housing developments, while also incorporating feedback from a broader audience of residents living in affordable single-family homes and middle housing developments across the state. This dual approach provides an in-depth understanding of residents' experiences within particular housing projects while capturing broader trends and perceptions in Oklahoma's affordable housing landscape.

This exploration does not engage with market-driven theories or political or urban methodologies or models. All terms used in this study are defined in a dedicated list to ensure consistency.

1.8 Conclusions

A dwelling is more than just a shelter; it profoundly shapes residents' health, well-being, and social perceptions. The quality of living spaces directly influences people's satisfaction and their sense of equity, highlighting the critical link between housing and quality of life. This connection extends beyond individual units to encompass the broader concept of habitability, which integrates both micro-level factors like interior design and macro-level elements such as neighborhood characteristics.

By considering these physical-spatial and psychosocial aspects together, we can develop environments that truly enhance quality of life. Understanding these relationships is crucial for creating functional, affordable housing solutions that not only provide shelter but also foster well-being and contribute to a more egalitarian society.

II LITERATURE REVIEW

2.1 Literature Review Structure and Focus Summary

The literature review primarily involved articles published from a diverse range of academic journals and housing-related institutions, and it was structured by themes that shape the habitability conditions of affordable housing for low-income residents and its psychological implications, focusing on residential satisfaction, quality of life, and equity perception. In each section, the relations among the different concepts are established. Additionally, a comparative table showing the sources consulted, and their correspondence with their variables is presented to facilitate the synthesis of the information and to provide a theoretical framework for the study development.

2.2 Affordable Housing for Low-Income Residents

2.2.1 Definitions and Implications

Several authors define the concept of affordable housing as dwelling units that are economically viable for low-income households that have earnings below 80% of the Area Median Income (AMI) (Robinson et al., 2023). However, it is crucial to note that affordability goes beyond just the cost of rent or mortgage. True affordability should allow households to allocate resources to cover basic needs such as food and healthcare without financial strain (Uwayezu & de Vries, 2020).

Due to the increase in the cost of housing that has outpaced wage growth, much of the world's population has experienced housing instability (Uwayezu & de Vries, 2020). Specifically, the low-income sector has faced significant challenges in accessing quality housing and living in dwellings with substandard settings, overcrowding, and, in extreme cases, homelessness

(Hernández, 2016; Marquez et al., 2022). These conditions are directly related to adverse health effects, both physical and mental (Chung et al., 2020), such as respiratory conditions like asthma, risk of injuries, increased stress, anxiety, and depression (Krieger & Higgins, 2002; Kuzior et al., 2022), triggering a decrease in the quality of life of residents (Robinson et al., 2023; Telfar Barnard et al., 2020) and contribute to broader health inequities in society as this creates a cycle that can be difficult for low-income families to break without intervention (Kottke et al., 2017; Swope & Hernández, 2019). Research has shown that physical housing conditions, such as structural integrity and safety, ventilation, adequate lighting, sustainability, and access to amenities, play an essential role in determining the health outcomes and well-being of inhabitants (Kamata & Kawakubo, 2024; Swope & Hernández, 2019).

Consequently, intervening in affordable housing should require a growing recognition of a holistic approach, considering not just the cost but also the quality, location of housing and access to opportunities (*Housing Creates Health*, n.d.; Swope & Hernández, 2019), as it could lead to substantial health benefits for the community (Chung et al., 2020) and lessen healthcare burdens in low-income populations (Telfar Barnard et al., 2020).

2.2.2 *Oklahoma Affordable Housing Context*

Oklahoma faces significant challenges in providing affordable housing, particularly for low-income residents. According to the National Low Income Housing Coalition (NLIHC), 45% of the low-income population in the state are cost-burdened, meaning that 39% of these households spend more than 30% of their earnings on housing costs, while 6% are severely cost-burdened, allocating over 50% of their income to housing expenses (NLIHC, 2022). These statistics highlight

the pressing need for targeted housing solutions to alleviate the financial strain on vulnerable populations.

The Oklahoma Housing Finance Agency (OHFA) plays a crucial role in addressing the state's housing challenges through initiatives like the Affordable Housing Tax Credit Program (LIHTC) that allows developers to use funds to acquire, rehabilitate, or construct new affordable housing, thereby increasing the availability of quality living spaces for low-income residents. (*Affordable Housing Tax Credits*, 2025). However, despite these efforts, many individuals and families still struggle to secure stable housing, even with financial support available.

Oklahoma's housing issues are not just about quantity but also quality. The state ranks 19th out of 50 for substandard housing, highlighting the urgent need for improvements in the condition of available dwellings (Metriarch, 2024).

2.3 Habitability: Physical Conditions and Psychological Implications

Habitability is a crucial concept when referring to affordable housing, as it encompasses the essential conditions that must be considered for providing tenants with safe, healthy, and livable environments (Hussein et al., 2024). The fundamental aspects of habitability include physical safety, adequate space, arrangement of interior spaces, indoor air quality features, such as proper ventilation and lighting, absence of overcrowding, and proper maintenance of installations and facilities (Vima-Grau et al., 2021).

However, the true essence of habitability extends beyond mere shelter, encompassing both physical and human factors (González et al., 2024; Meng et al., 2006; Rolfe et al., 2020). Physical factors include natural and man-made considerations, while human factors comprise socio-cultural and psychological elements (Meng et al., 2006). This holistic approach aligns with the broader

spectrum of elements contributing to occupants' quality of life. For instance, housing is linked to environmental justice and serves as a social determinant of health, significantly influencing overall well-being (Adamkiewicz et al., 2011; Rolfe et al., 2020).

The interior quality of a home and neighborhood characteristics play a pivotal role in shaping the daily experiences of its residents (Gocer et al., 2023; Guevara Fierro et al., 2023). These qualities are not merely about meeting minimum standards but about creating an environment that promotes health, well-being, and comfort. Factors such as design, functionality, the materials used, the quality of construction, the maintenance of spaces, and access to commodities contribute to occupants' physical and mental health (Krieger & Higgins, 2002).

The psychological aspects of habitability refer to dwellers' inner responses to design and space arrangement. Positive responses, such as feeling safe, secure, and relaxed, contribute to a better living atmosphere, enhancing personal development and family relationships (Meng et al., 2006). Improved habitability can reduce stress, improve relationships in the home, and enhance residents' overall well-being (González et al., 2024; Krieger & Higgins, 2002).

Habitability also involves socio-cultural aspects, reflecting the nature of relationships within the community. A sense of belonging enhances people's capacity to build a habitable environment (Meng et al., 2006).

Therefore, to achieve optimal habitability within the context of affordable housing, dwellings must address the occupants' needs in terms of space adequacy and flexibility (Simões & Leder, 2022), building safety (Adeliana et al., 2023), environmental factors (Attia, 2020), health standards (Adeliana et al., 2023) and community interaction (Chung et al., 2020) while aligning with residents' income levels (Uwayezu & de Vries, 2020).

2.3.1 *Housing Typology*

Historically, the post-World War II era marked a significant shift in housing preferences in the United States, leading to a suburbs boom where single-family homes became synonymous with prosperity and the American Dream (Manville & Osman, 2017). This typology continues to be perceived as the ideal form of housing due to the sense of privacy and autonomy it offers (Guglielminetti et al., 2023). Oklahoma's housing landscape reflects this trend, with a higher percentage of detached single-family dwellings compared to national averages (Cianfarani et al., 2024).

Nonetheless, their affordability has become an urban concern as their prices have risen disproportionately, pushing people with insufficient economic means to weigh this imbalance to live in high-density housing that may lack quality and essential services (Marquez et al., 2022).

High-density housing is often correlated with higher levels of stress among residents due to its tendency to overcrowding, which can lead to physical and psychological distress such as respiratory infections, family violence, poor academic performance in children, and mental health issues (America's Health Rankings, 2023; Corral-Verdugo et al., 2011). According to America's Health Rankings, 3% of occupied housing units in Oklahoma have more than one person per room. This statistic places the state in a moderate position nationally, with the lowest-ranking state reporting 1.3% and the highest at 9.4%, providing insight into the state's housing density and potential overcrowding issues (America's Health Rankings, 2023). However, high-density housing can foster a sense of community and social interaction (Marquez et al., 2022), linked with better health outcomes (Turcu et al., 2021), crucial components of habitability.

Given the complex nature of housing needs, it is crucial to analyze the availability of different affordable housing typologies to improve residential satisfaction (Addo, 2016) and

quality of life for low-income people, as unaffordable housing is associated with worse health outcomes, with people living in such conditions reporting significantly lower self-rated health (Pollack et al., 2010; Robinson et al., 2023).

In response to the challenges of the housing affordability crisis, Daniel Parolek's book *"Missing Middle Housing: Thinking Big and Building Small to Respond to Today's Housing Crisis"* proposes middle housing as a compelling solution to address the gap between low and high-density dwellings with intermediate-scale units, offering diverse housing options, that are compatible in scale with single-family homes, that cater to a wide range of demographics and income levels, and meet the growing demand for walkable urban living while providing more affordable options than traditional single-family homes (Parolek, 2020).

Middle housing types, such as duplexes, triplexes, fourplexes, cottage courts, courtyard buildings, townhouses, multiplexes, and live-work flex houses, provide several advantages, including affordability, achieved through efficient land use; increased density, reaching 16 to 35 dwelling units per acre, significantly higher than traditional single-family neighborhoods, without compromising scale; walkability, as it is typically located in areas with pedestrian infrastructure and access to services, amenities, and public transportation, reducing or eliminating the need for cars and parking; and diversity, by accommodating different household sizes, life stages, and income levels within the same neighborhood, while fostering a sense of community (Parolek, 2020).

In Oklahoma, where 96% of residential land in Oklahoma City and 81% in Tulsa is zoned exclusively for single-family homes (OK Policy, 2024), middle housing presents a significant opportunity to create more inclusive, sustainable, and livable environments that cater to a wide

range of needs and preferences while addressing the critical aspects of habitability: excellent interior quality, access to neighborhood-level resources, and affordable possibilities.

2.3.2 *Housing Interior Quality*

The physical characteristics of housing significantly influence resident satisfaction and health outcomes (Adeliana et al., 2023; Hu et al., 2022; Ibem et al., 2019). On a micro or indoor scale, factors such as density or capacity concerning the number of inhabitants (Park & Seo, 2020), space size and distribution of main activity areas (Ibem & Alagbe, 2015), indoor environmental quality features, like lighting and ventilation (Chundeli & Berger, 2023; Sánchez-Guevara Sánchez et al., 2017), and access to outdoor space (Ibem et al., 2019) can enhance or deteriorate the overall living experience.

In Oklahoma, affordable housing for low-income households faces significant challenges, especially regarding interior conditions and space utilization.

The state's housing stock has a median age of 40 years, which aligns with national trends (Cianfarani et al., 2024) but presents ongoing maintenance and quality issues, contributing to various habitability concerns, such as long-term health effects. “13.5% of occupied housing units in Oklahoma have at least one of the following problems: lack of complete kitchen facilities, lack of plumbing facilities, overcrowding, or severely cost-burdened occupants” (Severe Housing Problems in Oklahoma, 2017).

Another critical issue affecting the interior housing quality in Oklahoma is the mismatch between household sizes and available housing units. The median household size is approximately 2.5 people, with 29% of households being one person, only 23.4% of the housing stock is two-bedroom units, and 65.9% consists of units with three or more bedrooms (Cianfarani et al., 2024).

Thus, smaller households may be in oversized units, increasing utility costs and maintenance burdens. On the contrary, larger low-income families might face overcrowding in smaller units due to the limited availability of appropriately sized affordable housing. This issue is exacerbated in social housing projects, where the units typically suffer from problems such as insufficient space, poor ventilation and lighting, lack of privacy, and the use of low-quality materials. As a result, residents often make modifications and additions to their homes in an attempt to improve their habitability. Common modifications include expanding kitchens and bedrooms, enclosing balconies, and adding rooms. However, these changes may lead to reduced natural ventilation and lighting, increased indoor humidity, and thermal discomfort, illustrating a cycle where deficiencies in the design and planning lead to compromise the quality of their living space (“A New Vision for Social Housing in America,” 2024; Krieger & Higgins, 2002).

Compounding these issues is the lack of proactive code enforcement in Oklahoma’s major cities. Municipal authorities do not regularly inspect rental properties or rigorously enforce housing codes, allowing some landlords to ignore requests for repairs and let properties deteriorate (Hines, 2024). This regulatory gap leaves many low-income tenants living in substandard conditions with little recourse for improvement.

The challenges of interior design in affordable housing demand innovative solutions that go beyond mere aesthetics. Effective strategies must address the core issues of space limitation, functionality, and quality of life.

Reimagining interior spaces in this dwelling typology requires a balance between efficiency, comfort, and inclusiveness. By focusing on flexible, multifunctional designs, the living environments can adapt to residents' changing needs, maximize limited square footage, and enhance the overall living experience (Purcell, 2024).

Key strategies include innovative storage solutions, such as built-in cabinets and multi-functional furniture, significantly reducing clutter and improving organization (Gajwani & Pande Rana, 2024). Thoughtful lighting design, combining natural light with layered artificial lighting, transforms small spaces, making them feel larger and more inviting (Ginthner, 2022). The strategic use of light colors for walls and large surfaces amplifies this effect, creating an illusion of openness and spaciousness (Al-Zamil, 2017).

Furthermore, integrating sustainable materials, energy-efficient technologies, and smart home features reduces long-term costs for residents, promotes environmental responsibility, and enhances accessibility (Ashaye, 2024).

By incorporating universal design elements such as no-step entries, wide doorways, extra floor space, and user-friendly fixtures like lever door handles and rocker light switches, these living spaces become more adaptable and inclusive, ensuring the environment is accessible and usable by everyone, regardless of age or ability, promoting independence and improving quality of life for all residents (Stern & Rekhi, 2024).

2.3.3 *Neighborhood Characteristics*

From a macro standpoint, in a neighborhood context, access to public features and social infrastructure extends the impact of housing beyond the individual dwelling, contributing to emotional connections and overall happiness (Nzimande & Morris-Kolawole, 2024). Studies have shown that residents rated their housing to be adequate primarily based on neighborhood environmental conditions and amenities (Ibem & Alagbe, 2015). However, poor habitability is frequently related to low-income neighborhoods, where residents may lack access to essential community amenities and services (Robinson et al., 2023).

The concept of habitability extends beyond physical structures to include socioeconomic and psychological implications. Factors such as social networks and resources will likely contribute to residents' perceptions of their living environments (Ciorici & Dantzler, 2019; Ibem et al., 2019) and affect, positively or negatively, their sense of belonging and place attachment (Elizondo, 2023). Furthermore, the emotional associations that individuals develop with their living spaces based on past experiences also shape their perception of habitability (Widyaevan, 2023). These psychological aspects cannot be overlooked, as authors have indicated that while residents may express satisfaction with their housing's physical quality, they often experience emotional distress, such as feelings of loneliness and anxiety, particularly in low-income households with limited financial resources and with overcrowded living conditions (Debnath et al., 2019; Park & Seo, 2020).

2.3.4 Residential Satisfaction, Quality of Life, and Equity Perceptions

Habitability, residential satisfaction, quality of life, and equity perceptions are intricately interconnected concepts as they affect how individuals observe their living environments.

Research indicates that the multidimensional nature of residential satisfaction encompasses various factors that contribute to an individual's contentment with their living space in different housing types, like privacy, environmental conditions, social infrastructure, interior quality, and affordability (Chung et al., 2020; Ibem & Alagbe, 2015). The interconnection between housing quality and residential satisfaction is particularly evident in social housing contexts (González et al., 2024). The Regeneración Urbana, Calidad de Vida y Salud (RUCAS) study has demonstrated that improvements in habitability, specifically through dwelling renovations, significantly enhance residents' perceptions of their living conditions. This finding is especially crucial for low-income

inhabitants, who are often exposed to more significant health risks and experience higher levels of dissatisfaction due to substandard living environments (Marquez et al., 2022).

The impact of habitability on quality of life is particularly profound in low-income housing (Hu et al., 2022). Poor housing affordability can lead to chronic stress related to debt, ultimately leading to adverse well-being effects, particularly in mental health, decreasing the quality of life of the residents (Chung et al., 2020). Community resources in low-income communities strengthen social ties by building a sense of companionship, identity, and place attachment, which can reduce mental burdens and improve quality of life (Adeliana et al., 2023). Residents in more affordable, better-maintained housing have higher satisfaction and participation in the community (Ibem et al., 2019; Riazi & Emami, 2018).

When people have access to decent housing in safe neighborhoods with adequate amenities, they are more likely to experience a sense of security, community belonging, and social cohesion. This positive residential environment fosters a perception of fairness and equal opportunity, as individuals feel their basic needs are being met and they have a foundation for personal growth and success. Conversely, those living in substandard housing or facing housing instability are more likely to experience stress, health issues, and limited economic mobility, leading to a perception of systemic inequity. The stark disparities in housing quality and accessibility, often patterned along racial and socioeconomic lines, further reinforce perceptions of societal inequality. As such, addressing housing disparities and improving residential satisfaction can be a powerful tool for promoting a more equitable society, as it directly impacts individuals' lived experiences and their understanding of fairness and opportunity within their communities.

Table 1. *Literature Review Summary – Case Studies*

Author Year	Study Design	Study Population	Independent Variables	Dependent Variables	Results
(Addo, 2016)	Survey. Interviews. Focus group. Discussions.	290 low-income household heads.	Number of rooms, household size, community support, proximity to recreational areas, shared facilities.	Residential satisfaction.	Resident satisfaction is directly linked to dwelling and neighborhood characteristics, as well as social cohesion.
(Aigbavboa & Thwala, 2014)	Survey.	Low-income housing residents in Gauteng Province, South Africa.	Building Quality Features.	Residents' satisfaction with housing.	Improving building quality features can enhance the residential satisfaction.
(Ajayi et al., 2020)	Survey.	Low-income residents and construction professionals.	Living and environmental conditions, access to basic amenities in the neighborhood.	Access to housing.	Poor living conditions are the most significant factor affecting access to affordable housing.
(Chen et al., 2019)	Survey.	4291 workers and inhabitants.	Satisfaction with neighborhood natural and community spaces.	Self-rated health.	Satisfaction with neighborhood open and community spaces is associated with better self-rated health.
(Chung et al., 2020)	Survey.	1,978 adults in Hong Kong.	Housing affordability.	Residents' physical and mental health.	Lower housing affordability is associated with poorer physical and mental health.

(Ciorici & Dantzler, 2019)	Survey.	300 residents of the North Camden neighborhood in Camden, New Jersey	Quality of social networks. Extent of social networks. Neighborhood safety.	Neighborhood satisfaction.	To promote resident satisfaction, physical design elements and social factors should be considered in affordable housing development.
(Debnath et al., 2019)	Interviews.	30 households in slum rehabilitation dwellings.	Dwellings architectonic features: open and community spaces, natural lighting and ventilation, kitchen areas, environment aesthetic, noise, thermal comfort.	Resident discomfort.	The dwellings' poor design and lack of social spaces contribute significantly to discomfort and financial stress.
(Geprägs et al., 2022)	Survey.	2,515 participants aged 16 and older in Germany.	Sociodemographic factors.	Life satisfaction.	Higher life satisfaction was associated with fewer mental health problems.
(Ghasemi et al., 2019)	Cross-sectional study.	432 residents of informal settlements in Iran.	Poverty level, perception of household socioeconomic status.	Quality of life.	A positive perception of socioeconomic status was associated with a better quality of life.

(González et al., 2024)	Survey.	Homemakers in two social housing complexes in Chile.	Dwelling intervention status (non-intervened, under intervention, intervened).	Housing satisfaction.	Implementing renovation programs could improve existing substandard housing, thereby fulfilling the human right to adequate housing for urban poor populations.
(Gurran et al., 2022)	Analysis of online rental advertisements. Interviews.	Low-cost rental listings in Sydney, Australia Local government planners and building inspectors in Sydney.	Planning deregulation policies. Housing market conditions.	Affordability.	Informal housing affordability emerges without formal planning and regulation, highlighting the failure of financialized housing markets to accommodate lower-income renters.
(Hu et al., 2022)	Panel dataset by using the Chinese government database.	Low-income urban households in China.	Housing difficulties: family members living in the same room, beds in the living room, temporary beds. Socioeconomic characteristics: household income, housing debt.	Residential and life satisfaction, health, and well-being.	Housing difficulties are negatively associated with life satisfaction and residents' physical and mental health.

(Ibem & Alagbe, 2015)	Household survey.	Residents of 9 public housing estates in urban areas of Ogun State, Nigeria.	Housing unit attributes. Housing services and infrastructure. Neighborhood facilities.	Perception of housing adequacy.	Housing providers must pay closer attention to the key dimensions that residents identify as essential to improve housing adequacy and satisfaction.
(Kang, 2019)	Analysis of spatial data.	30,012 condominiums in 2,465 areas of census tracts in Seoul, South Korea.	Proximity of housing to commercial, office, and industrial areas.	Housing affordability.	Greater accessibility to commercial and residential space increases prices. Access to industrial uses decreases prices.
(Marquez et al., 2022)	Phone interviews.	Tenant residents with a documented housing concern.	IEQ features: heating, ventilation, air conditioning, mold, pests.	Housing concerns.	The number of concerns is directly related to household income. The lower the income, the greater the concerns.
(Nziman de & Morris-Kolawole, 2024)	Survey.	213 residents of high-rise and low-rise residential buildings.	Dwelling typology: high-rise, low-rise.	Residential satisfaction. Place attachment.	Residents of low-rise buildings reported greater satisfaction with the social environment and a stronger sense of place attachment compared to those in high-rise buildings.

(Ren et al., 2022)	Survey.	17,217 Chinese residents aged 17-70 years old.	Subjective socioeconomic status. Social equity. Social trust.	Life satisfaction.	Improving subjective socioeconomic status, social equity perceptions, and social trust can enhance life satisfaction.
(Rolfe et al., 2020)	Interviews.	Low-income tenants in social and private housing in Scotland.	Satisfaction with housing layout, property quality, financial capacity, and neighborhood quality.	Self-rated health and well-being.	A positive tenant experience and high-quality housing are directly related to improvements in health and well-being.
(Roma et al., 2023)	Survey.	19 participants (16 primary crewmembers and 3 backups).	Habitat areas (Sleep/Bedroom, Hygiene/Bathroom, Work/Office/Workshop, Food Preparation/Kitchen/Galley).	Group Activities, Mood, Psychological Stress, Sleep, Social Interactions.	The questionnaire was a reliable, valid, and sensitive measure of the behavioral health and performance impacts of habitat size and layout.
(Santana & Maués, 2022)	Survey.	658 social housing residents in Brazil.	Environmental protection features: indoor and outdoor energy efficiency savings, neighborhood recreation equipment, and water management.	Perception of quality of life in housing.	Environmental protection was not perceived as relevant to their quality of life.

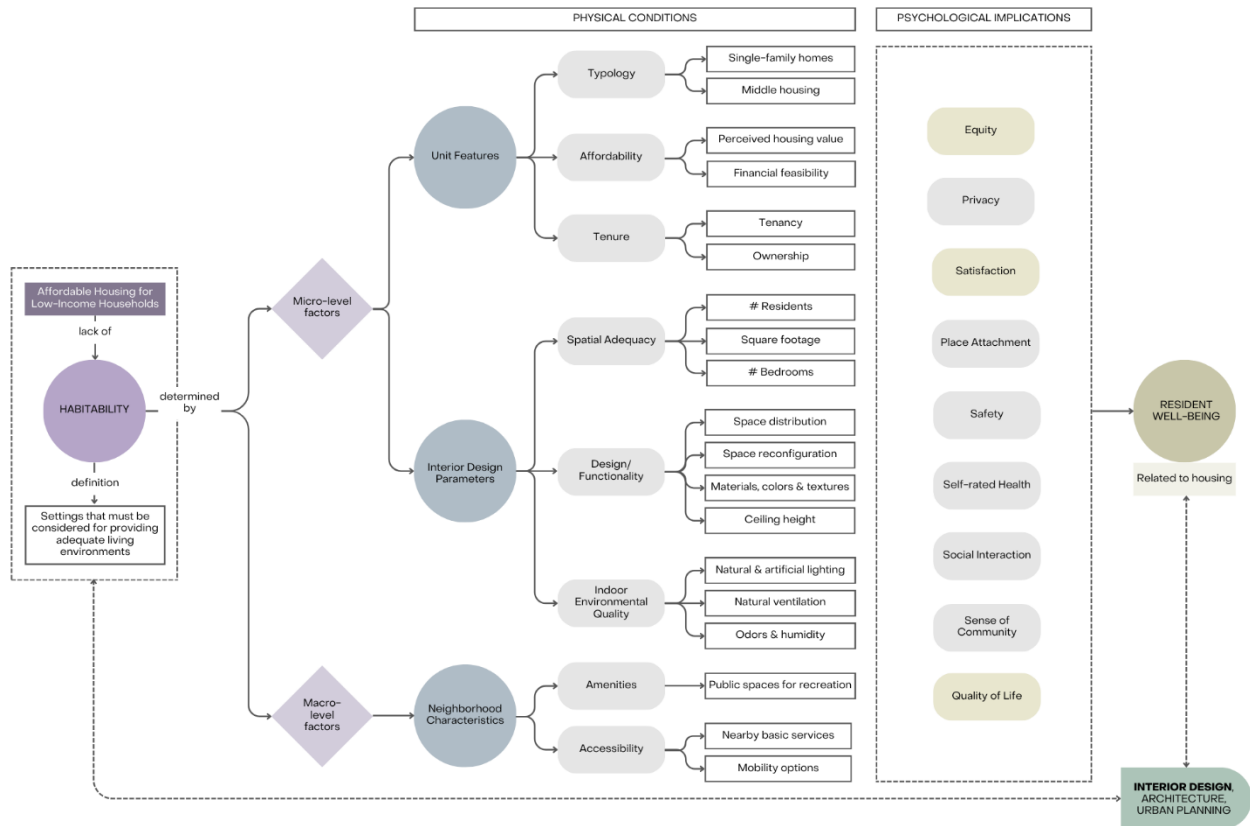
(Uwayezu & de Vries, 2020)	In-person surveys. Interviews.	Households near affordable housing developments and built environment professionals.	Housing costs, households' incomes, access to bank loans, and strategies to promote cost reduction.	Housing affordability.	The cost of new affordable housing is often beyond the means of low-income individuals.
(Wang et al., 2023)	Survey.	1,926 participants from the Chinese General Social Survey.	Socioeconomic status.	Subjective well-being.	There was a mediating effect of class identity and social activity participation on the relationship between socioeconomic status and subjective well-being.
(Widya et al., 2023)	Online reviews.	468 inhabitants' reviews of apartments in Bandung, Indonesia	Perceived discomfort in the home.	Perceived quality of housing.	Five main categories of nuisance were identified in residences: management, functionality, security, safety, and economic disruption.
(Widyaevan, 2023)	Report of an art installation about public housing.	Public housing residents in Jakarta.	Dwellings' design: insufficient dimensions that do not adapt to the needs of the residents.	Residential satisfaction: perceptions and sense of restlessness. Social interaction.	Inadequate housing design leads to a sense of uneasiness among residents. The lack of communal spaces affects the sense of belonging.

(Yang et al., 2023)	Survey.	8,922 survey respondents in China.	Social equity perception.	Mental health.	A higher perception of social equity was associated with better mental health. Happiness, satisfaction, and social trust partially mediated this relationship.
(Zhang et al., 2015)	Cross-sectional study.	4,479 adults in China.	Income, age, employment status, and educational level.	Health-related quality of life.	Low income was significantly associated with worse quality of life ratings.
Zhang et al. (2020)	Analysis of spatial data.	Affordable housing projects and potential residents in China.	Land subsidy levels. Construction standards.	Distribution of affordable housing projects.	Provides insights into how location and spatial factors impact the benefits and distribution of affordable housing projects.
(Pollack et al., 2010)	Telephone-based survey.	10,004 residents of Philadelphia.	Housing costs.	Self-rated health.	Individuals residing in housing they cannot afford are more likely to report poor self-rated health.
(Kuzior et al., 2022)	Time series and panel data.	Data about affordable housing in 27 EU countries during 2011-2019.	Overcrowding.	Health impacts.	There is a correlation between overcrowding and increased mortality rates from severe diseases.

2.4 Conceptual Framework

A literature review was conducted on the habitability of affordable housing intended for the low-income sector, analyzing key concepts and their interrelationships with its psychological implications, with a primary focus on residential satisfaction, quality of life, and equity perceptions. Figure 2 shows a conceptual framework identified for the current research.

Figure 2. *Conceptual Framework.*



The conceptual framework suggests that the most significant challenge facing low-income housing is its frequent inadequacy of habitability, which is directly associated with well-being, a crucial factor in evaluating people's resident satisfaction. This habitability encompasses three main

elements: unit features, interior design parameters, and the characteristics of the surrounding neighborhood. Perceived well-being significantly influences how individuals evaluate the equity of their environment. Greater well-being was associated with a positive perception of the environment.

Based on this outline, this research hypothesizes that interior design can play a crucial role in enhancing the habitability of low-income housing, aiming not only to improve residents' well-being but also to act as a catalyst for promoting a positive change in the perception of quality of life and social equity.

Table 2. *Conceptual Framework – Habitability Focus.*

Category	Subcategory	Approach
Unit Features	Typology	Focuses on the type and classification of dwelling units, such as single-family homes or various forms of middle housing (duplexes, triplexes, townhouses).
	Affordability	Measures the financial accessibility of housing, considering the ratio between housing costs and household income.
	Tenure	Addresses whether occupants are owners or renters.
Interior Design Parameters	Spatial Adequacy	Assesses whether the available space is sufficient for the number of occupants, considering the total floor area and the number of bedrooms.
	Design/Functionality	Evaluates the layout, flexibility, and aesthetic qualities of the interior space,

Neighborhood Characteristics		including how well it facilitates social interaction and adapts to changing needs.
	Indoor Environmental Quality	Focuses on factors such as air quality, ventilation, and lighting that affect occupant health, comfort, and satisfaction.
	Amenities	Highlights the proximity and availability of essential services and facilities, including grocery stores, healthcare facilities, schools, and parks.
	Accessibility	Emphasizes the ease of reaching desired destinations, considering factors such as walkability, public transportation options, and the overall connectivity of the neighborhood.

These categories allow for a comprehensive assessment of habitability, considering not only the internal characteristics of the dwelling but also its broader context.

2.5 Gap in Literature

Despite extensive research on the impact of housing on people's health, a significant gap remains in understanding how the habitability, primarily the interior design parameters, of affordable housing for low-income households influences well-being, impacts their quality of life, and affects their perceptions of satisfaction and equity. Studies in Latin American and Eurasian countries have predominantly focused on macro or urban aspects of housing, such as location and access to services, while overlooking interior elements and their psychological impact.

This research seeks to fill that gap by examining in detail how housing characteristics, from typology, affordability, ownership, spatial adequacy, design/functionality, indoor environmental quality, and neighborhood environment, affect not only residential satisfaction but also the broader perceptions of well-being and social position of low-income residents.

While numerous articles have used Pearson correlation to examine the relationships between housing factors, health, and social outcomes, they often overlook nuanced experiences that cannot be captured by quantitative measures alone. This study addresses this limitation by employing a mixed-methods approach, combining Pearson correlation with thematic analysis. The quantitative analysis provides clear evidence of direct associations between variables, while the thematic analysis explores contextual experiences that are essential for a comprehensive understanding of housing and well-being.

2.6 Conclusions

Affordable housing often comes with poor living conditions that can negatively impact the health and quality of life of low-income residents. Therefore, analyzing the habitability of dwellings is crucial and requires an encompassing, comprehensive approach that includes, but is not limited to, the physical structure, interior environment, and socioeconomic factors. This literature review suggests that better-maintained and more affordable housing increases satisfaction and community involvement. Housing typologies and quality, including interior and neighborhood characteristics, have a significant influence on resident satisfaction, health outcomes, and emotional connections.

The reviewed studies have primarily employed surveys and questionnaires, encompassing a wide range of populations. A significant number of these articles evaluated multiple projects,

typically of typologies that encourage social interaction, aiming to comprehensively measure the perception of residential satisfaction. However, a research gap has been identified: few studies have explored differences between specific groups, such as single-family homes versus medium-size housing. Therefore, this study will utilize the above characteristics as a basis for data collection, building upon existing knowledge and enhancing the overall quality and reliability of the results. Furthermore, special emphasis will be placed on comparative analysis between different housing typologies to gain a more nuanced understanding of residents' well-being.

III METHODOLOGY

3.1 Study Design

This study employed a mixed research design, combining quantitative and qualitative methods (Creswell & Creswell, 2017). The quantitative phase examined the relationship between habitability, well-being, and related factors, including satisfaction, quality of life, and equity. The quantitative analysis also compared the relationship between single-family homes and middle housing to provide insights into the growing need for diverse, affordable housing options in Oklahoma. Single-family homes represent the traditional housing model, while middle housing, such as duplexes, triplexes, and townhouses, among others, offers an alternative that can potentially increase density and affordability in urban areas. The research then incorporated a qualitative analysis to complement these quantitative findings, capturing residents' suggestions for home improvements.

3.1.1 Sample and Participants

The study sample consisted of 215 residents in Oklahoma, focusing on low-income households who have experience living in affordable housing, including both renters and homeowners. Eligibility criteria for participants included (1) being at least 18 years old, (2) having an annual household income below the low-income threshold for Oklahoma, approximately \$50,000 (*U.S. Census Bureau QuickFacts*, 2023), and (3) having lived in their current residence for at least one year to ensure familiarity with living conditions to ensure familiarity with their neighborhood, including local community dynamics and social interactions.

The sample was geographically diverse, with participants mapped across various urban and suburban areas of Oklahoma to verify the spatial distribution of the sample and ensure a broad

coverage of different regions (see Figure 3). Of the total sample, 165 participants resided in single-family homes, while 50 lived in middle housing types (see Table 3).

Figure 3. *Participants Spatial Distribution.*

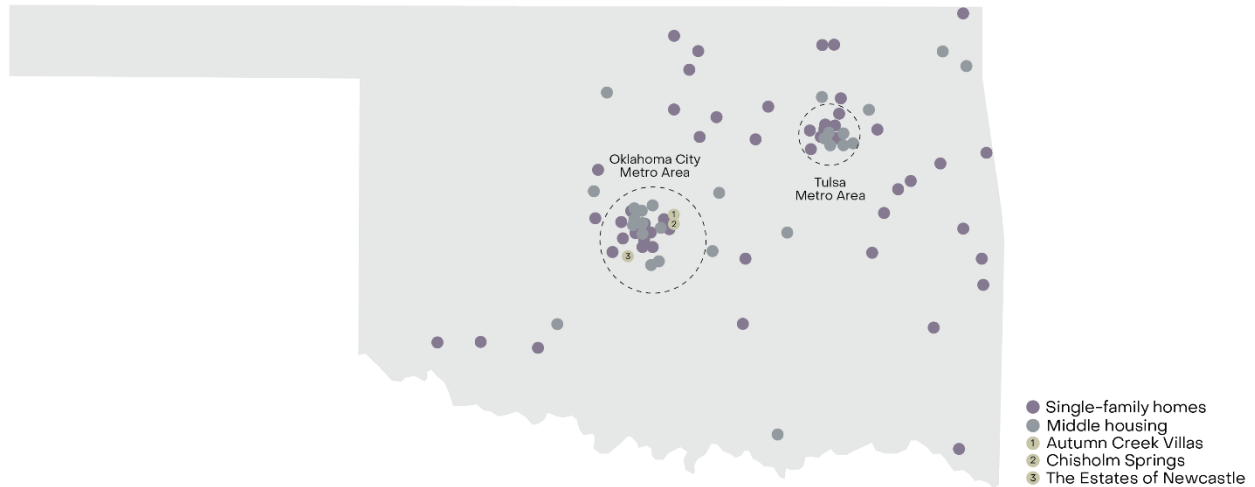


Table 3. *Participants Demographic Data, n = 215.*

Demographic Data	Categories	N	%
Age	0-19	7	3.26%
	20-29	37	17.21%
	30-39	32	14.88%
	40-49	30	13.95%
	50-59	42	19.53%
	60-69	34	15.81%
	70-79	28	13.02%
	80+	5	2.33%
Gender	Female	124	57.57%
	Male	90	41.86%
	Other	1	0.47%

	Prefer not to say	0	0%
Residence Time	1 year	10	4.65%
	1-5 years	99	46.05%
	5-10 years	50	23.26%
	10-20 years	31	14.42%
	20-50 years	21	9.77%
	>50 years	4	1.86%
Household Size	1 person	59	27.44%
	2 people	81	37.67%
	3 people	34	15.81%
	4 people	22	10.23%
	5 people	8	3.72%
	6 people	4	1.86%
	7 people	4	1.86%
	8 people	1	0.47%
Tenure	Tenancy	98	45.58%
	Ownership	113	52.56%
	Other	4	1.86%
Housing Typology	Single-family home	165	76.74%
	Middle housing	50	23.26%
Square Footage	Average	1,309 sqft	-
	Average single-family home	1,403 sqft	-
	Average middle housing	987 sqft	-

The initial sample size was determined to detect at least a moderate correlation coefficient of $r = 0.3$ with an 80% statistical power and alpha $\alpha = 0.05$, which required a minimum sample of 84 participants (Bujang & Baharum, 2016). However, 215 participants were recruited within the study's constraints and resources, significantly exceeding the minimum required sample.

A power analysis (two-tailed, $\alpha = 0.05$) confirmed the study's robust statistical power. For the strongest observed correlation ($r = 0.859$), the analysis showed 1.000 power. Even for the weakest statistically significant correlation ($r = 0.495$), the power remained at 1.000, indicating that the sample size was more than adequate to detect moderate to strong correlations and enhance reliability.

3.2 Data Collection

3.2.1 Procedure

After obtaining approval from the University of Oklahoma Institutional Review Board (IRB), participants were recruited voluntarily using convenient sampling (Golzar et al., 2022) from January 15 to February 7, 2025.

The study employed two primary data collection strategies: an online survey and a target project survey.

Online Survey

To reach a diverse pool of participants across Oklahoma who met the eligibility criteria, an invitation to participate in the online survey (see Appendix II) was distributed through Centiment, a research platform specializing in targeted participant recruitment, chosen for its quality control measures, including initial soft launches to evaluate response rates and completion times, security features to prevent automated or fraudulent responses and its growing reputation and use in academic research demonstrating its reliability and effectiveness (Choudhury & Asan, 2022; Donovan et al., 2024).

The survey was hosted on Qualtrics, providing participants with a user-friendly interface and the flexibility to complete the survey at their convenience.

Targeted Project Surveys

Three specific affordable housing projects (see Table 4) were selected from the Midwest Housing Equity Group's catalog, representing a mix of single-family and middle-housing options.

Table 4. *Affordable Housing Projects.*

Project	Participants	Housing Typology	Total Units	Unit Square Footage	Monthly Rent Range
Chisholm Springs	10	Single-family homes	70	3 bedrooms: 1422 sqft 4 bedrooms: 1550 sqft	\$1075 - \$1200
Autumn Creek Villas	3	Middle housing: duplex complex	30	2 bedrooms: 1,289 sqft	\$820 - \$930
The Estates of New Castle	9	Middle housing: sixplex complex	48	1 bedroom: 701 sqft 2 bedrooms: 840 sqft	\$924 - \$1,106

For each of the three selected projects, the management of the respective housing complexes assisted in identifying and selecting eligible residents to ensure that they met the study criteria and facilitated access to a representative sample within each project. Participation invitations were extended to the eligible residents, ensuring an equitable representation across the different housing types.

In-person site visits were conducted for two selected projects (see Table 4). During these visits, surveys were conducted directly among the residents identified by management, allowing for face-to-face interaction and immediate data collection. The third project utilized the online survey hosted in Qualtrics by recommendation of the project's management (See Table 4), ensuring their inclusion in the study while accommodating any logistical constraints that prevented in-person data collection.

Informed consent was obtained from all participants to guarantee their voluntary participation in the research and to provide details on the study's purpose, procedures, and data management practices. Participants were informed of their right to withdraw from the study at any time.

All data collected, whether online or in-person, was anonymized to protect participants' privacy. The anonymized data was securely stored in compliance with data protection regulations and institutional guidelines.

3.2.2 Instruments

A structured survey was designed to measure the physical features of habitability and residents' psychological implications of well-being, including satisfaction, quality of life, and equity perceptions. The survey used a 5-point Likert scale of agreement (5-strongly agree, 4-somewhat agree, 3-neither agree nor disagree, 2-somewhat disagree, and 1-strongly disagree) and open-ended questions. Both online and physical versions of the survey were used, utilizing an identical instrument (see Appendix II) to ensure consistency across all data collection methods. The questionnaire was divided into four sections. The first collected demographic information, such as age, gender, length of residence, number of household members, and dwelling

size. The second section focused on perceived habitability, covering unit features, interior design, neighborhood characteristics, and their psychological effects. The third section included open-ended questions to gather detailed insights into residents' experiences and perspectives on their living conditions. Participants were asked to identify the main challenges they face at home and how these affect their daily lives. They were also invited to suggest changes they would make to their homes if possible, along with their reasons for these choices. This approach aimed to gather nuanced feedback that could inform improvements and better address residents' needs.

3.2.3 Variables

Table 5 describes the variables measured in this study.

Table 5. *Independent Variables.*

Variables			Definition
Habitability Settings that must be considered for providing adequate living environments, including physical conditions such as unit features, interior design parameters, and	Unit Features	Typology	The classification of housing based on its physical structure and layout.
		Affordability	The extent to which housing is financially accessible to potential occupants.
		Tenure	The legal status of occupancy, which can be either tenants or homeowners.
	Interior Design Parameters	Spatial Adequacy	The extent to which the interior space meets the needs of its occupants, ensuring that there is sufficient room for living,

neighborhood characteristics, and their psychological implications like privacy, safety, comfort, place attachment, etc.		working, and moving comfortably within the space.
	Design/Functionality	Considerations such as furniture layout, workflow, and design elements that enhance usability.
	Indoor Environmental Quality	Conditions inside a building affect its occupants' health, comfort, and well-being.
	Amenities	The services, facilities, and attractions available within or near a neighborhood, including parks, schools, shopping centers, community centers, and recreational facilities.
	Neighborhood Characteristics	The ease with which residents can move around the neighborhood and access various destinations, including public transportation, local services, and community resources. It involves walkability and proximity to essential amenities.
Well-being		The fairness and justice in access to housing opportunities, resources, and benefits, ensuring that all individuals have equal chances to secure safe, affordable, and quality housing.
	Equity	
The comprehensive state of physical, emotional, and social well-being influenced by one's housing situation.	Place Attachment	The emotional connection and sense of personal belonging that individuals develop with their

	home, often resulting from personalization and experiences within that space.
Privacy	The degree to which individuals can control access to their personal space and maintain confidentiality within their home environment.
Quality of Life	The overall enjoyment and fulfillment of living in a particular housing situation.
Safety	The perception and reality of being protected from harm within one's home and neighborhood.
Satisfaction	The degree to which residents are content with their housing situation, including factors such as affordability, condition of the home, and neighborhood quality.
Self-rated Health	An individual's subjective assessment of their health status, influenced by housing conditions.
Sense of Community	The feeling of belonging and connection among residents within a neighborhood, often fostered by shared spaces, community events, and social cohesion.

Social Interaction	The opportunities and frequency of engaging with others in the community.
--------------------	---

3.3 Data Analysis

3.3.1 Quantitative Analysis

For quantitative data, Pearson correlation analyses were conducted using IBM SPSS Statistics software to examine the relationships between:

- Habitability and Well-Being
- Individual Habitability Factors (e.g., Unit Features, Interior Design Parameters, and Neighborhood Characteristics) and Well-Being
- Housing Habitability and Satisfaction
- Housing Habitability and Quality of Life
- Housing Habitability and Equity Perceptions

Pearson correlation was chosen for its ability to measure the strength and direction of linear relationships between continuous variables, as it allows for the quantification of associations between housing habitability factors and various well-being indicators.

JASP software was utilized as the foundation for data visualization; however, all graphs were manually created to ensure a visually cohesive presentation that effectively communicates the findings.

Additionally, this study presented the correlation results between single-family homes and middle housing. This comparison provides valuable insights into how different housing types influence residents' well-being, particularly in terms of residential satisfaction, quality of life, and equity perceptions. By examining the strengths and weaknesses of various housing types, this

study aims to identify cost-effective solutions that address the ongoing housing affordability crisis, thereby fostering equitable and satisfactory living conditions for low-income households.

3.3.2 *Qualitative Analysis*

For the qualitative component of the study, thematic analysis was conducted using ATLAS.ti 25 software, including its AI-powered coding features to assist in identifying initial patterns and themes. The AI-generated results were refined and interpreted, comparing them to the original responses, which enhanced the rigor and reliability of the qualitative findings.

The analysis focused on identifying recurring themes related to home challenges and improvements suggested by residents, providing deeper insights into their perceptions and needs.

IV RESULTS

4.1 Correlation between Habitability and Well-being

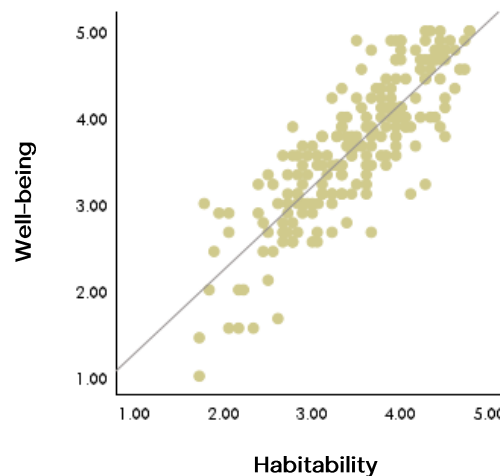
The analysis of the sample ($n = 215$) revealed a strong, positive correlation between habitability and well-being ($r(213) = .842$, $***p < .001$). The statistically significant correlation suggests an association between the habitability of affordable housing and residents' well-being (see Table 6 and Figure 4).

Table 6. *Pearson's Correlation Between Habitability and Well-being in Oklahoma's Affordable Housing.*

Variables	1	2
1. Habitability (X)	-	.842***
2. Well-being (Y)	.842***	-

Note. $n = 215$. * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 4. *Scatter Plot Illustrating the Relationship Between Habitability and Well-being in Oklahoma's Affordable Housing.*



4.2 Correlation between Unit Features, Interior Design Parameters, and Neighborhood Characteristics and Well-being

4.2.1 *Single-Family*

Unit Features and Well-being

A moderate, positive correlation was found between unit features and well-being, $r(163) = .562$, $***p < .001$. The statistically significant relationship indicates an association between unit features and residents' well-being in single-family homes (see Table 7 and Figure 5).

Interior Design Parameters and Well-being

A strong positive correlation was found between interior design parameters and well-being, $r(163) = .764$, $***p < .001$. The statistically significant relationship indicates that higher interior design parameter scores are associated with higher levels of well-being in single-family homes (see Table 7 and Figure 5).

Neighborhood Characteristics and Well-being

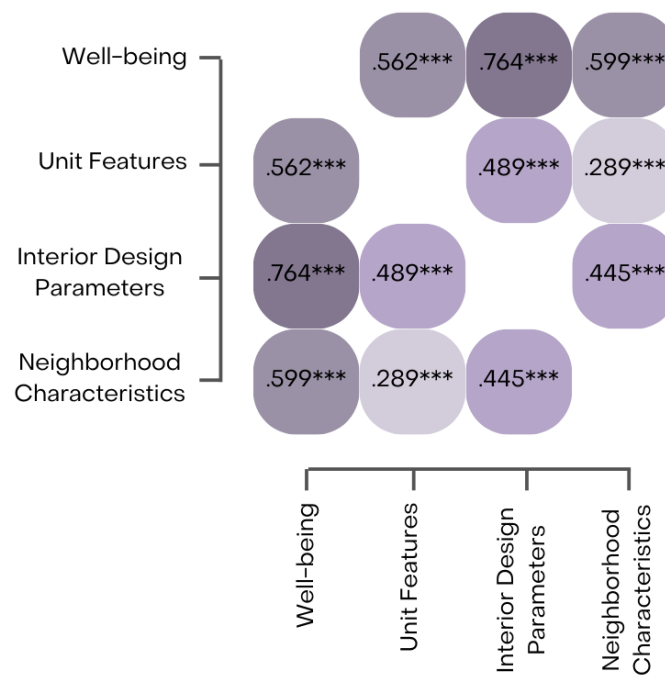
The results of the correlation analysis revealed a statistically significant positive relationship between well-being and neighborhood characteristics, $r(162) = .599$, $***p < .001$. The strong correlation suggests that individuals' well-being tends to increase as the quality of neighborhood characteristics of affordable single-family homes improves (see Table 7 and Figure 5).

Table 7. *Pearson's Correlation Between Unit Features, Interior Design Parameters, Neighborhood Characteristics, and Well-being in Single-Family Homes.*

Variables	1	2	3	4
1. Well-being (Y)	-			
2. Unit Features (X)	.562***	-		
3. Interior Design Parameters (X)	.764***	.489***	-	
4. Neighborhood Characteristics (X)	.599***	.289***	.445***	-

Note. n = 165. * p < .05, ** p < .01, *** p < .001

Figure 5. *Pearson's Correlation Heat Map Between Unit Features, Interior Design Parameters, Neighborhood Characteristics, and Well-being in Single-Family Homes.*



4.2.2 Middle Housing

Unit Features and Well-being

The results revealed a strong positive correlation between unit features and well-being, $r = .698$, $***p < .001$, indicating a statistically significant association. This implies that there is a relationship between unit features and residents' well-being within middle housing (see Table 8 and Figure 6).

Interior Design Parameters and Well-being

The results revealed a strong positive correlation between interior design parameters and well-being, $r = .859$, $***p < .001$, which was statistically significant, indicating that as the quality of interior design parameters increases, there is a corresponding substantial increase in well-being among the participants (see Table 8 and Figure 6).

Neighborhood Characteristics and Well-being

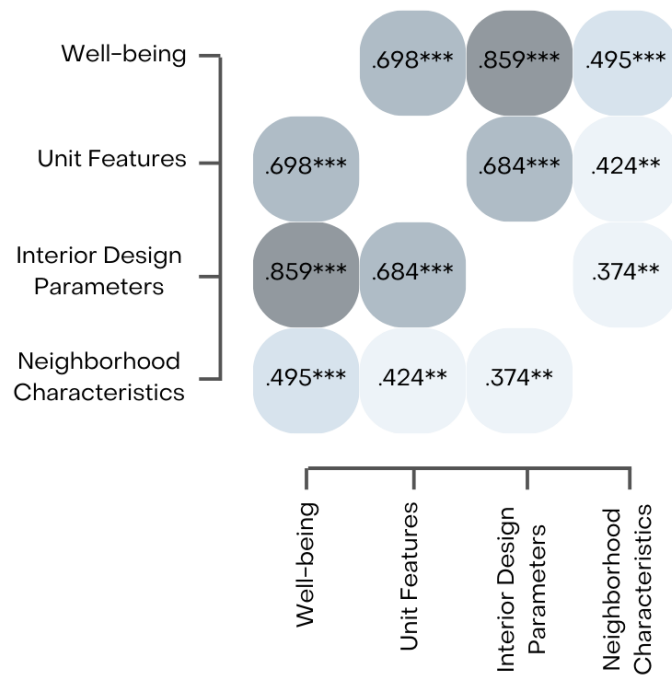
The results revealed a moderate positive correlation between the neighborhood characteristics and well-being, $r = .495$, $***p < .001$, which was statistically significant, showing that as the quality or desirability of neighborhood characteristics increases, there is a corresponding moderate increase in well-being among the participants (see Table 8 and Figure 6).

Table 8. *Pearson's Correlation Between Unit Features, Interior Design Parameters, Neighborhood Characteristics, and Well-Being in Middle Housing.*

Variables	1	2	3	4
1. Well-being (Y)	-			
2. Unit Features (X)	.698***	-		
3. Interior Design Parameters (X)	.859***	.684***	-	
4. Neighborhood Characteristics (X)	.495***	.424**	.374**	-

Note. n = 50. * p < .05, ** p < .01, *** p < .001

Figure 6. *Pearson's Correlation Heat Map Between Unit Features, Interior Design Parameters, Neighborhood Characteristics, and Well-Being in Middle Housing.*



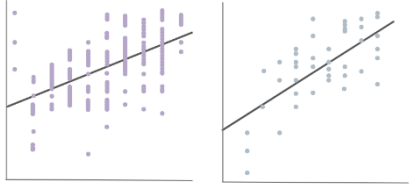
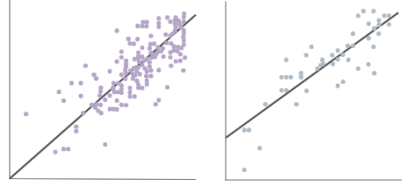
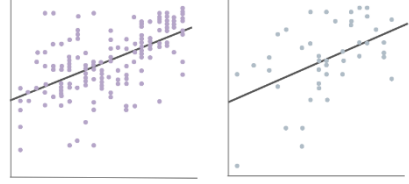
4.2.3 Comparison

As shown in Table 9, the correlations between unit features, interior design parameters, neighborhood characteristics, and well-being for single-family and middle-housing are statistically significant ($***p < .001$).

For single-family housing, interior design parameters show the strongest correlation with well-being, followed by neighborhood characteristics and unit features.

In middle housing, interior design parameters also have the strongest correlation with well-being. However, unit features show a stronger correlation than neighborhood characteristics.

Table 9. Comparison Between the Correlation Results of Single-Family and Middle Housing.

Correlations	Single-family	Middle housing	Comparison
Unit Features and Well-being	$r(163) = .562^{***}$	$r(48) = .698^{***}$	Single-family < Middle housing 
Interior Design Parameters and Well-being	$r(163) = .764^{***}$	$r(48) = .859^{***}$	Single-family < Middle housing 
Neighborhood Characteristics and Well-being	$r(162) = .599^{***}$	$r(47) = .495^{***}$	Single-family > Middle housing 

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

4.3 Correlation between Habitability and Satisfaction, Quality of Life and Equity

Perceptions

The analysis exposed a strong positive correlation between habitability and satisfaction, $r(213) = .682$, $***p < .001$, which was statistically significant, revealing that as the perceived habitability of a home increases, there is a corresponding substantial increase in satisfaction (see Table 10 and Figure 7).

There is a moderate positive correlation between habitability and quality of life, $r(210) = .580$, $***p < .001$, $n = 212$, indicating that as the perceived habitability of a living space increases, residents' quality of life also tends to improve (see Table 10 and Figure 7).

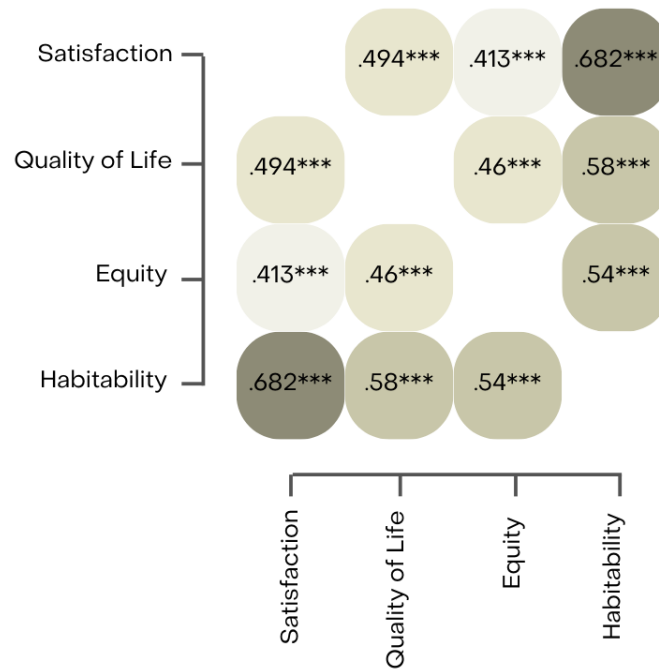
The results revealed a moderate positive correlation between habitability and equity perceptions, $r(213) = .540$, $***p < .001$, which was statistically, indicating that as habitability scores increase, there is a corresponding increase in participants' belief that they have equal opportunities to access quality housing compared to others in the area (see Table 10 and Figure 7).

Table 10. *Pearson's Correlation Between Habitability, Satisfaction, Quality of Life, and Equity Perceptions in Oklahoma's Affordable Housing.*

Variables	1	2	3	4
1. Satisfaction (Y)	-			
2. Quality of Life (Y)	.494***	-		
3. Equity Perceptions (Y)	.413***	.460***	-	
4. Habitability (X)	.682***	.580***	.540***	-

Note. $n = 215$. * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 7. *Pearson's Heatmap Between Habitability, Satisfaction, Quality of Life, and Equity Perceptions in Oklahoma's Affordable Housing.*



4.3.1 Single-Family

Habitability and Satisfaction

There is a significant positive correlation between habitability and satisfaction, $r(163) = .660$, $***p < .001$, $N = 165$, indicating that as the perceived habitability of a home increases, residents' satisfaction also tends to increase (see Table 11 and Figure 8).

Habitability and Quality of Life

The analysis shows a moderate positive correlation between habitability and quality of life, $r(161) = .544$, $***p < .001$, which was statistically significant, implying that as habitability scores increase, there is a corresponding increase in reported quality of life scores among single-family residents (see Table 11 and Figure 8).

Habitability and Equity Perceptions

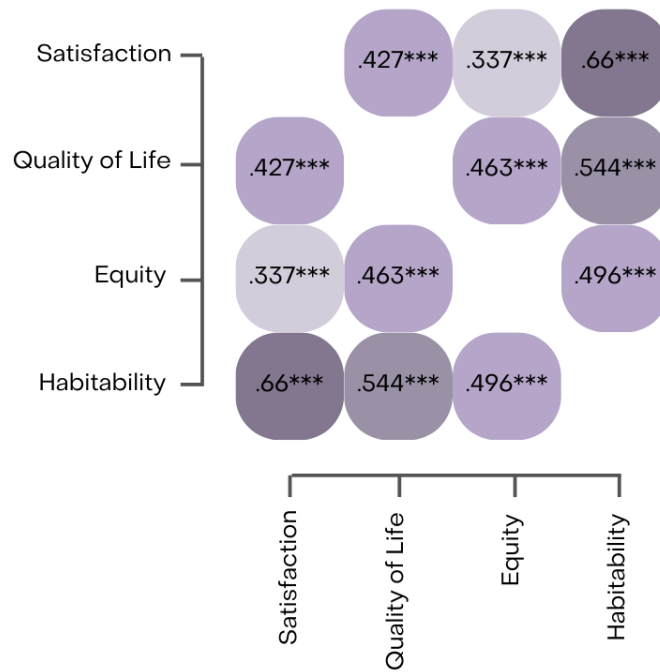
The results revealed a moderate positive correlation between habitability and equity, $r(163) = .496$, $***p < .001$, which was statistically significant, showing that as habitability scores increase, there is a corresponding increase in single-family participants' belief that they have equal opportunities to access quality housing compared to others in the area (see Table 11 and Figure 8).

Table 11. *Pearson's Correlation Between Habitability, Satisfaction, Quality of Life, and Equity Perceptions in Single-Family Homes.*

Variables	1	2	3	4
1. Satisfaction (Y)	-			
2. Quality of Life (Y)	.427***	-		
3. Equity Perceptions (Y)	.337***	.463***	-	
4. Habitability (X)	.660***	.544***	.496***	-

Note. n = 165. * p < .05, ** p < .01, *** p < .001

Figure 8. *Pearson's Heatmap Between Habitability, Satisfaction, Quality of Life, and Equity Perceptions in Single-Family Homes.*



4.3.2 Middle Housing

Habitability and Satisfaction

The exploration revealed a strong positive correlation between habitability and satisfaction, $r(48) = .763$, $***p < .001$, $n = 50$, showing that as the perceived habitability of a home increases, residents' satisfaction also tends to increase significantly (see Table 12 and Figure 9).

Habitability and Quality of Life

The results revealed a strong positive correlation between habitability and quality of life, $r(47) = .705$, $***p < .001$, indicating a statistically significant and suggesting that as habitability scores increase, there is a corresponding increase in reported quality of life scores among the middle housing residents (see Table 12 and Figure 9).

Habitability and Equity Perceptions

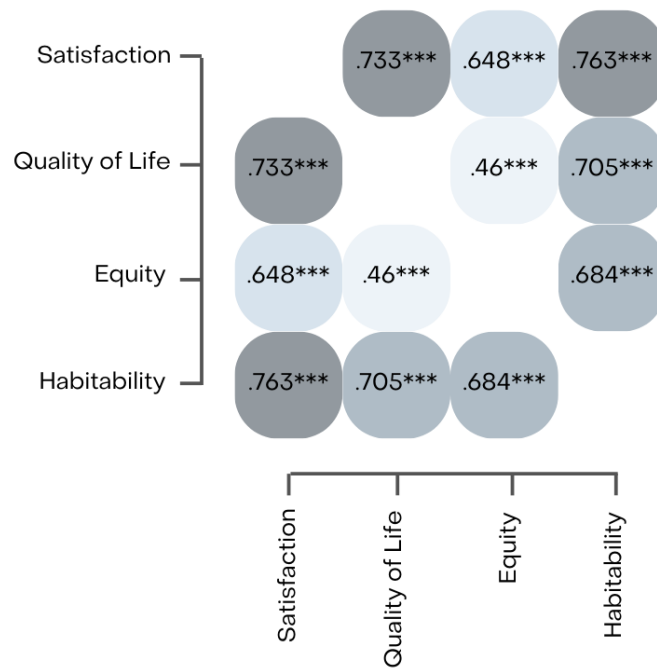
The results revealed a strong positive correlation between habitability and equity, $r(48) = .684$, $***p < .001$, which was statistically significant, indicating that as habitability scores increase, there is a corresponding increase in middle housing residents' belief that they have equal opportunities to access quality housing compared to others in the area (see Table 12 and Figure 9).

Table 12. *Pearson's Correlation Between Habitability, Satisfaction, Quality of Life, and Equity Perceptions in Middle Housing.*

Variables	1	2	3	4
1. Satisfaction (Y)	-			
2. Quality of Life (Y)	.733***	-		
3. Equity Perceptions (Y)	.648***	.460***	-	
4. Habitability (X)	.763***	.705***	.684***	-

Note. n = 50. * p < .05, ** p < .01, *** p < .001

Figure 9. *Pearson's Heatmap Between Habitability, Satisfaction, Quality of Life, and Equity Perceptions in Single-Family Homes.*



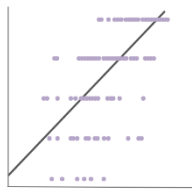
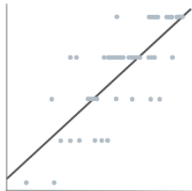
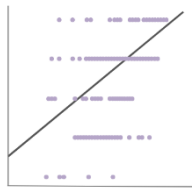
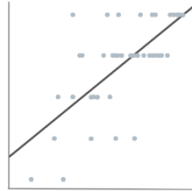
4.3.3 Comparison

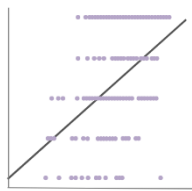
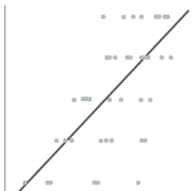
The relationship between habitability and satisfaction is stronger in middle housing, suggesting that the impact of habitability on residents' satisfaction with their living spaces may be more pronounced in middle housing configurations (see Table 13).

Middle housing exhibits a stronger correlation compared to single-family homes, demonstrating that the relationship between habitability and quality of life is more pronounced in middle housing settings (see Table 13).

The data shows that both housing types have statistically significant positive correlations. However, the middle housing correlation is stronger than the single-family homes correlation, indicating a stronger relationship between habitability and perceived equity in middle housing (see Table 13).

Table 13. *Comparison Between the Correlation Results of Single-Family and Middle Housing.*

Correlation	Single-family	Middle housing	Comparison	
			Single-family < Middle housing	
Habitability and Satisfaction	$r(163) = .660$ *** $p < .001$	$r(48) = .763$ *** $p < .001$		
			Single-family < Middle housing	
Habitability and Quality of Life	$r(161) = .544$ *** $p < .001$	$r(47) = .705$ *** $p < .001$		

			Single-family < Middle housing	
Habitability and Equity	$r(163) = .496$ $***p < .001$	$r(48) = .684$ $***p < .001$		

4.4 Thematic Analysis - Homeowners' Challenges and Desired Improvements

Qualitative data analysis revealed several key themes regarding homeowners' challenges and desired improvements in single-family and middle housing (see Tables 14 and 15). The exploration and design implications of these themes were identified in the floor plans of two of the target projects, one representing single-family housing and the other representing middle housing (see Figures 10 and 11).

Table 14. *Single-Family Housing Thematic Analysis.*

Themes	Exploration	Design Implications
Financial Constraints	Participants reported significant financial difficulties, particularly in affording essential bills and insurance, that hindered their ability to make necessary home repairs or upgrades.	• Incorporate energy-efficient features to reduce utility costs. • Design for easy maintenance to minimize long-term expenses. • Consider modular or adaptable designs that allow for phased improvements.

Structural and Maintenance Issues	Homeowners described various structural problems, including: • Narrow hallways • Unstable areas • Leaks • Rodent infestations • Inadequate space Many participants expressed concerns about the need for major structural upgrades, such as rewiring and plumbing improvements.	• Design wider hallways and doorways for improved accessibility. • Use durable, quality materials to reduce maintenance needs. • Implement proper waterproofing and drainage systems to prevent leaks. • Incorporate pest-resistant design features and materials. • Optimize space utilization through efficient layout design. • Plan for easy access to electrical and plumbing systems for future upgrades.
Utility and Comfort Challenges	Respondents highlighted issues related to home comfort and utility efficiency: • High heating costs • Poor insulation • Inadequate water quality and pressure • Outdated appliances	• Incorporate high-quality insulation and energy-efficient windows. • Design for passive heating and cooling strategies. • Implement water-saving fixtures and filtration systems • Plan for easy replacement and upgrading of appliances • Consider renewable energy solutions like solar panels

Safety and Accessibility Concerns	Several individuals, particularly those with physical limitations or health issues, mentioned safety and accessibility challenges. They suggested improvements such as: Installation of grab bars Enhanced security features More accessible and senior-friendly amenities	• Incorporate universal design principles for aging-in-place. • Design for easy installation of grab bars and other accessibility features. • Implement enhanced lighting and clear sightlines for improved security. • Include features like non-slip flooring and lever-style door handles. • Design zero-step entries and first-floor master bedrooms.
Environmental Factors	Participants reported challenges related to their living environment, including: • Noisy neighbors • Messy housemates • Lack of natural light	• Use sound-insulating materials and construction techniques. • Design for privacy and personal space within shared living areas. • Maximize natural light through strategic window placement and light wells. • Incorporate flexible spaces that can adapt to changing needs.
Desired Improvements	Homeowners expressed a desire for various upgrades and changes: • Repairs of existing structures • Layout modifications	• Design for easy future modifications and expansions.

-
- Installation of new appliances
 - Improved insulation
 - Expanded living spaces
 - Better fencing (with concerns about associated costs)
 - Create flexible, multi-purpose spaces to maximize functionality.
 - Plan for energy-efficient appliance upgrades.
 - Incorporate high-performance insulation systems.
 - Design outdoor spaces that balance privacy and community interaction.
 - Use cost-effective fencing alternatives like landscaping or partial barriers.
-

Figure 10. Single-Family Housing Thematic Analysis – Floor Plan.

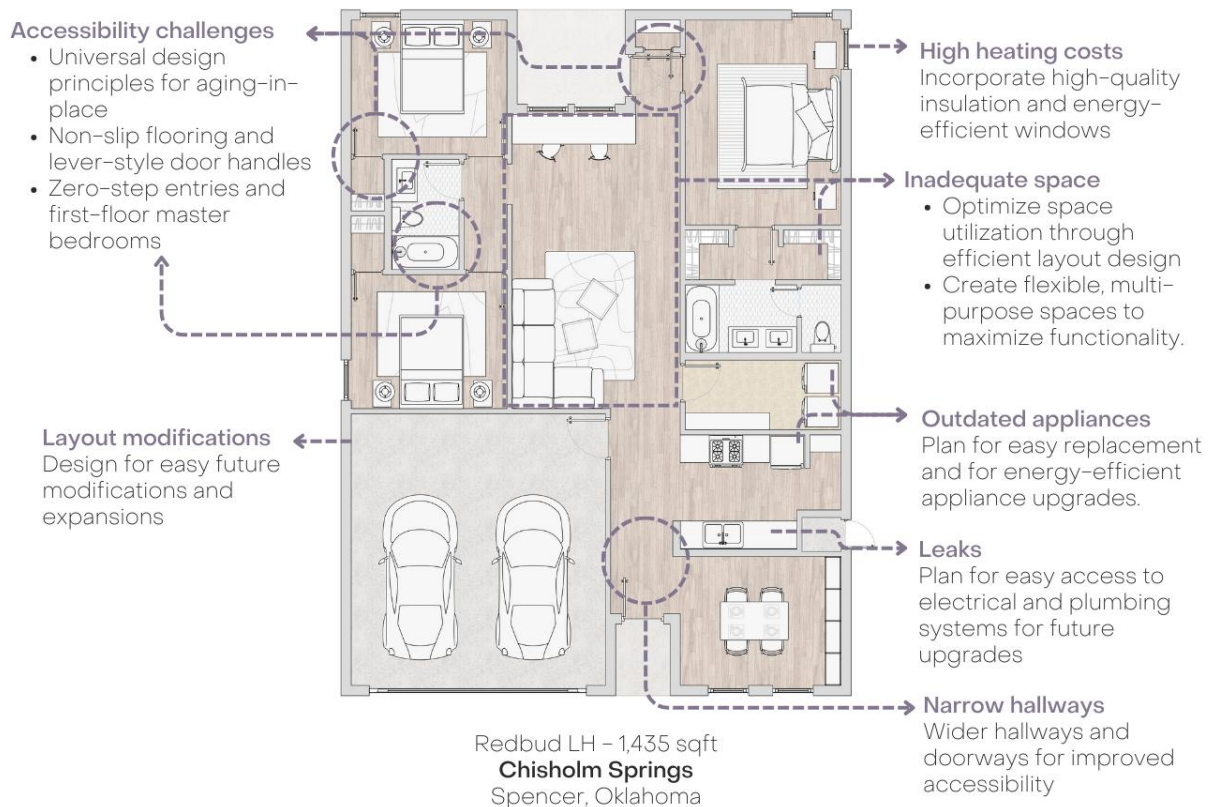
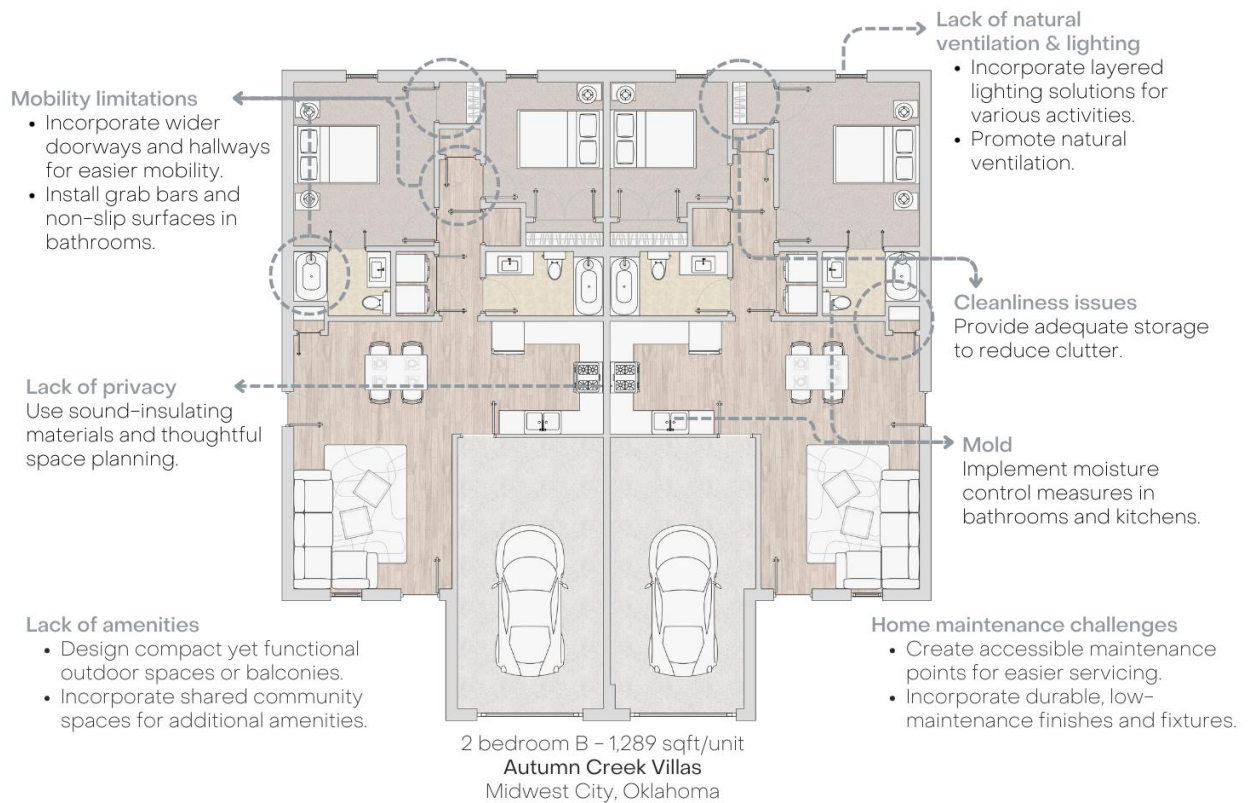


Table 15. *Middle Housing Thematic Analysis.*

Themes	Exploration	Design Implications
Financial Constraints	Many respondents reported struggling with money-related issues in their current living situations. Financial instability was a common concern, affecting participants' ability to maintain their homes and meet basic needs.	• Design flexible spaces that can adapt to changing financial situations. • Include energy-efficient features to lower utility bills. • Provide options for shared amenities to reduce individual costs. • Consider modular designs that allow for gradual expansion as finances improve.
Structural and Maintenance Issues	Participants frequently mentioned challenges related to home maintenance. A significant issue that emerged was the presence of mold in their living spaces. Additionally, many respondents expressed a desire for better maintenance services from their housing providers.	• Design for easy maintenance and cleaning. • Implement moisture control measures in bathrooms and kitchens. • Create accessible maintenance points for easier servicing. • Incorporate durable, low-maintenance finishes and fixtures.
Utility and Comfort Challenges	Space constraints were a common concern among participants. Many respondents reported a	• Design compact yet functional outdoor spaces or balconies. • Incorporate shared community spaces for additional amenities.

	lack of amenities, such as access to a backyard or assigned parking.	• Provide secure, designated parking areas. • Use space-saving appliances and fixtures.
Safety and Accessibility Concerns	Neighborhood safety was a recurring theme in participants' responses. Some participants noted mobility limitations in their current living situations, suggesting a need for more accessible housing options.	• Include security features such as proper lighting and secure entry systems. • Design clear sightlines and defensible spaces. • Incorporate wider doorways and hallways for easier mobility. • Install grab bars and non-slip surfaces in bathrooms.
Environmental Factors	Some respondents highlighted issues with cleanliness in their living environments.	• Design proper waste management systems. • Incorporate air filtration systems for improved indoor air quality. • Provide adequate storage to reduce clutter. • Design spaces that promote natural ventilation.
Desired Improvements	Desires for improvements included: • More windows • Additional rooms • Better lighting • Increased privacy	• Design flexible room layouts to accommodate changing needs. • Incorporate layered lighting solutions for various activities. • Use sound-insulating materials and thoughtful space planning for privacy. • Consider adaptable partitions for creating additional rooms when needed.

Figure 11. Middle Housing Thematic Analysis – Floor Plan



V DISCUSSION AND CONCLUSION

5.1 Key Findings

5.1.1 *Habitability and Well-being*

The strong correlation between habitability and housing-related well-being ($r = 0.842$, $p < 0.001$) underscores housing's role as a critical social determinant of health, aligning with Swope & Hernández's (2019) framework linking housing quality to holistic wellness. This finding expands on González et al. (2024), who emphasized habitability's physical-psychological interplay by demonstrating that interior design emerged as the strongest predictor of well-being in both housing types ($r = 0.764$ for single-family; $r = 0.859$ for middle housing). This challenges the traditional focus on macro-level urban solutions (Riazi & Emami, 2018), and highlights the urgency of integrating micro-level design interventions into affordable housing strategies.

5.1.2 *Habitability and Satisfaction*

The study revealed a stronger correlation between habitability and satisfaction in middle housing ($r = 0.763$) compared to single-family homes ($r = 0.660$), supporting Parolek's (2020) argument that shared amenities and community-centric designs foster social cohesion. This aligns with Ibem et al.'s (2019) findings on communal spaces enhancing satisfaction but contrasts with assumptions that single-family homes inherently provide superior living experiences (Guglielminetti et al., 2023). Qualitative themes, such as residents' desire for "multifunctional spaces" and "better storage solutions," contextualize these results, emphasizing the need for user-centered design to address spatial limitations in both typologies.

5.1.3 *Habitability and Quality of Life*

Echoing findings within the literature review (Fernández-Carro et al., 2015; Jia et al., 2023), a significant correlation was observed between habitability and quality of life, confirming that improved living conditions are generally associated with an elevated sense of overall quality of life. More specifically, middle housing options often demonstrated a stronger between the variables than single-family homes, suggesting that the interior design parameters and neighborhood characteristics inherent in middle housing, such as community-oriented layouts, walkable neighborhoods, and access to shared amenities (Parolek, 2020), may exert a particularly positive influence on residents' sense of fulfillment and enjoyment of life within their housing environment.

5.1.4 *Habitability and Equity Perceptions*

The moderate habitability-equity correlation ($r = 0.540$) echoes Swope & Hernández's (2019) framework, where substandard housing conditions exacerbates systemic inequality. Middle housing's stronger association ($r = 0.684$ vs. 0.496 in single-family) suggests that diversified housing typologies may mitigate perceptions of exclusion. Qualitative themes like “space constraints” and “lack of maintenance support” reveal how poor interior conditions amplify residents' sense of marginalization. These findings argue that equity perceptions are embedded in both zoning and interior retrofits.

5.1.5 *Single-family vs. Middle Housing*

Middle housing habitability consistently outperformed single-family homes across all metrics: well-being, satisfaction, quality of life and equity perceptions. This challenges the traditional assumption that single-family homes represent the "ideal" housing typology (Guglielminetti et al., 2023) and highlights the potential of middle housing as a more inclusive and sustainable alternative. Oklahoma's zoning reforms could prioritize middle housing to address the affordability crisis, aligning with Parolek's (2020) argument that these housing types are key to creating vibrant, equitable, and resilient communities. By embracing this shift, there is an opportunity to redefine architectural and interior design strategies to balance affordability, habitability, and long-term sustainability.

When further analyzing habitability factors, comparison analysis showed that residents' well-being had stronger correlations with unit features (single-family housing $r=.562$, $p < 0.001$, middle housing $r=.698$, $p < 0.001$) and interior design parameters (single-family housing $r=.764$, $p < 0.001$, middle housing $r=.859$, $p < 0.001$) among middle housing residents than single-family housing residents. Meanwhile, neighborhood characteristics (single-family housing $r = 0.599$, $p < 0.001$, middle housing $r = 0.495$, $p < 0.001$) were more relevant to the well-being of single-family home residents than those in middle housing.

5.1.6 Design Implications

Based on the correlations between micro and macro habitability factors (unit features, interior design parameters, and neighborhood characteristics) and their relationship with well-being, the following design implications are proposed to enhance living conditions in affordable single-family and middle housing contexts. The implications are structured hierarchically, reflecting the strength of each factor's association with resident well-being.

Interior Design Parameters (Strong Correlation)

This section shows the strongest correlation with well-being for both single-family ($r = .764$) and middle housing ($r = .859$). The high correlation suggests that these factors have the most significant impact on residents' well-being and suggest the following design strategies:

Table 16. *Design Implications for Interior Design Parameters.*

	Design Implications
Spatial Adequacy	• Ensure appropriate total floor area for the number of occupants. • Provide an adequate number of bedrooms for residents.
Design/Functionality	• Design common areas to enhance social interaction and openness. • Create flexible layouts for easy reconfiguration of space. • Use materials, colors, and textures that evoke a relaxing atmosphere. • Implement ceiling heights that contribute to spaciousness. • Incorporate design elements that ensure privacy. • Optimize overall layout to meet occupants' needs.

Indoor Environmental Quality	• Install appropriately sized windows for each room.
	• Maximize natural lighting through window placement and design.
	• Implement artificial lighting that allows comfortable visual tasks.
	• Ensure proper ventilation to maintain air quality and comfort.

Unit Features (Moderate to Strong Correlation)

This section shows a moderate correlation for single-family housing ($r = .562$) and a strong correlation for middle housing ($r = .698$), suggesting that the following design implications factors are essential to enhance resident well-being, especially for middle housing residents:

Table 17. *Design Implications for Unit Features.*

	Design Implications
Affordability	• Ensure fair pricing relative to home offerings.
	• Design homes that allow residents to cover expenses without sacrificing necessities.

Neighborhood Characteristics (Moderate to Weak Correlation)

The impact of neighborhood factors varies between housing types. For single-family housing, there is a moderate correlation ($r = .599$) with well-being, while for middle housing, the correlation is weak ($r = .495$). This difference suggests that neighborhood characteristics have a

more noticeable impact on residents of single-family homes. Based on these findings, the following design strategies are prioritized:

Table 18. *Design Implications for Neighborhood Characteristics in Single-Family Homes.*

	Design Implications
Amenities	• Maintain well-kept, safe, and inclusive streets and public spaces. • Provide access to parks and recreational spaces within walking distance. • Locate homes near well-maintained community services.
Accessibility	• Locate homes near basic services within walking distance. • Ensure diverse mobility options in the neighborhood.

Table 19. *Design Implications for Neighborhood Characteristics in Middle Housing.*

	Design Implications
Amenities	• Ensure maintenance and safety of nearby streets and public spaces. • Consider access to parks and recreational spaces. • Plan for accessibility to community services.
Accessibility	• Ensure maintenance and safety of nearby streets and public spaces. • Consider access to parks and recreational spaces. • Plan for accessibility to community services.

5.2 Data Validation Methods

5.2.1 Cross-validation

To ensure robustness, results from three targeted housing projects ($N = 22$) were cross-validated against the broader online survey data ($N = 193$). Patterns remained consistent across both datasets, confirming that interior design parameters showed the strongest correlation with well-being (single-family: $r = 0.764$; middle housing: $r = 0.859$) and that middle housing exhibited stronger habitability-equity correlations ($r = 0.684$ vs. $r = 0.496$ in single-family homes). This triangulation reinforced the reliability of findings across distinct geographic and typological contexts.

5.2.2 Reliability Test: Cronbach's Alpha

Cronbach's alpha for the survey instrument was calculated to assess the internal consistency of variables related to habitability and different constructs: well-being, satisfaction, quality of life, and equity perceptions (see Table 20).

Table 20. Comparison Of Cronbach's Alpha Values Between Variables.

Variables	α
Habitability and Well-being	0.910
Habitability and Satisfaction	0.761
Habitability and Quality of Life	0.692
Habitability and Equity Perceptions	0.628

5.3 Limitations and Future Research

While the study provides valuable insights into the relationship between affordable housing habitability and well-being in Oklahoma, certain limitations must be acknowledged.

5.3.1 Generalizability

Although the sample included urban and suburban representation, it did not fully encompass the experiences of residents in rural areas or those within the broader spectrum of low-income populations, limiting the ability to generalize the findings to more diverse contexts. Future research should include more representative samples that capture residents' geographic and socioeconomic diversity to better understand how housing characteristics affect well-being in different contexts. Despite these limitations, the inclusion of both homeowners and renters across various housing projects strengthens the findings' applicability to similar regions in the United States facing affordability and zoning challenges.

5.3.2 Recruitment

There was an imbalance in participant representation, with a 3:1 ratio between residents of single-family homes ($n = 165$) and those living in middle housing ($n = 50$) that may have skewed comparative analyses. These limitations were influenced by the reduced availability of middle housing in Oklahoma and the logistical challenges associated with collecting data.

5.3.3 Demographic Aspects

The study did not explore how demographic factors such as age, family size, or marital status affect perceptions of habitability and well-being. Future research should analyze these

differences to better understand how individual characteristics interact with housing conditions. For example, families with children might prioritize neighborhood safety, while older adults might place greater value on accessibility.

5.3.4 *Comparative Geographic Analysis*

The analysis focused exclusively on Oklahoma's context, which may limit its applicability to other states or regions with different socioeconomic and urban characteristics. Future research could conduct comparative studies across different geographic regions to identify contextual factors influencing the relationship between habitability and well-being to help develop housing solutions tailored to the specific needs of diverse communities.

5.3.5 *Contradictory Results*

The findings revealed a stronger correlation between neighborhood characteristics and well-being in single-family homes ($r = .599$) compared to middle housing ($r = .495$). This result is unexpected, given that middle housing is designed to promote walkable and accessible communities. Several potential explanations could account for this discrepancy. Middle housing is often located in less desirable areas due to zoning restrictions, whereas affordable single-family homes may be situated in established neighborhoods with better amenities. Additionally, middle housing designs often include intentional community spaces, such as shared courtyards or common areas, which may reduce reliance on external neighborhood resources. Personal preferences may also play a role; residents of middle housing might prioritize affordability over neighborhood quality, while single-family home residents may place greater value on external environmental

features. Future research should combine qualitative and geospatial analyses to explore this contradiction further and examine how location impacts perceptions of well-being.

5.3.6 *Objective Measures*

The study relied primarily on subjective measures of habitability and well-being, which may limit precision in assessing certain physical aspects. Future research could incorporate objective measures, such as environmental monitoring (indoor air quality, noise levels, lighting conditions) and evaluations of physical health outcomes. This would allow a more holistic understanding of how housing environments impact well-being.

5.4 Conclusion

This study advances understanding of how micro-habitability factors, particularly interior design, mediate well-being in affordable housing, challenging traditional focus only on macro-level solutions. Middle housing's stronger performance in satisfaction, quality of life, and equity perceptions metrics positions it as a critical tool for addressing Oklahoma's affordability crisis. By prioritizing user-centered design strategies and advocating for zoning reforms, stakeholders can create dwellings that transcend basic shelter to become a catalyst for health, dignity, and social justice.

This research bridges the gap between interior design practice and social equity frameworks, offering evidence-based strategies to transform affordable housing habitability from a structural challenge into a vehicle for holistic well-being.

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Appendix I. Survey Conceptual and Operational Definition

5.5 Study Aim

This study aims to examine the impact of affordable housing habitability on the well-being and other aspects, such as satisfaction, quality of life, and equity perceptions, among low-income households in Oklahoma. By using a multi-scale approach, the research analyzes unit features, interior design parameters, and neighborhood characteristics, comparing traditional single-family homes to middle housing options to contribute to socially responsible interior design practices and the creation of fairer, greener, and health-promoting communities.

5.6 Research Questions

5.6.1 Research Question 1 (RQ1)

How do the dwelling unit features, interior design parameters, and neighborhood characteristics in affordable housing, specifically within single-family and middle housing, correlate with residents' perceived well-being among low-income households?

5.6.2 Research Question 2 (RQ2)

How is habitability related to satisfaction, quality of life, and equity perceptions?

5.6.3 Research Question 3 (RQ3)

What user-oriented interior design strategies enhance habitability and resident well-being in Oklahoma's affordable housing contexts?

Table 21. *Relationship Between Independent Variables, Survey Questions, and Research Questions.*

Constructs (Conceptual definition)	Measures (Operational definition)	Survey Question	Research Question
Habitability	Unit Features	Typology	P1: Q6 RQ1, RQ2
		Affordability	P2: Q1, Q2 RQ1, RQ2
		Tenure	P1: Q7 RQ1, RQ2
	Interior Design Parameters	Spatial Adequacy	P1: Q4, Q5 RQ1, RQ2
		Design/Functionality	P2: Q6, Q7, Q8, Q9 RQ1, RQ2
		Indoor Environmental Quality	P2: Q14, Q15, Q16, Q17 RQ1, RQ2
	Neighborhood Characteristics	Amenities	P2: Q19, Q20 RQ1, RQ2
		Accessibility	P2: Q23, Q24, Q25 RQ1, RQ2

Table 22. *Relationship Between Dependent Variables, Survey Questions, and Research Questions.*

Constructs (Conceptual definition)	Measures (Operational definition)	Survey Question	Research Question
Well-being	Equity	P2: Q3	RQ1, RQ2
	Privacy	P2: Q10	RQ1, RQ2
	Residential Satisfaction	P2: Q11	RQ1, RQ2
	Place Attachment	P2: Q12	RQ1, RQ2
	Safety	P2: Q13	RQ1, RQ2
	Self-rated Health	P2: Q18	RQ1, RQ2
	Social Interaction	P2: Q21	RQ1, RQ2
	Sense of Community	P2: Q22	RQ1, RQ2
	Quality of Life	P2: Q26	RQ1, RQ2

Table 23. *Relationship Between Independent Variables, Survey Questions, and Research Questions.*

Constructs (Conceptual definition)	Measures (Operational definition)	Survey Question	Research Question
Interior Design Strategies	Challenges facing at home	P3: Q1	RQ3
	Interior features that residents would like to change about their home	P3: Q2	RQ3

Appendix II. Physical and Online Survey

Hello! You are invited to participate in research about Micro-habitability in Oklahoma's Affordable Middle Housing: Impact on Residential Satisfaction, Quality of Life, and Equity Perceptions for Low-Income Households.

5.7 Study Objectives

This study aims to analyze the relationship between **affordable housing habitability** and resident satisfaction and how they impact quality of life, socioeconomic and equity perception.

When it comes to habitability, analysis will focus on aspects such as **dwelling type, affordability, occupancy, layout, indoor environmental features** such as natural lighting and ventilation, and **neighborhood amenities, and accessibility**.

Considering the results found, the study will propose **user-oriented and sustainable design strategies** to **improve the quality of the interior environment** of this housing category, increase resident satisfaction and quality of life, contribute to **socially responsible interior design practices**, and help create fairer, greener, and health-promoting communities.

5.8 Consent to Participate in Research

If you agree to participate, you will complete a **10-to-12-minute online survey** which includes **26 scale questions**, where you will indicate your level of agreement or disagreement with certain statements and **2 open-ended questions**, where you can respond freely in your own words.

- There are no benefits for participating in this research.
- Your participation is voluntary, and your responses will be anonymous and confidential.

- We will not share your data or use it in future research.
- Even if you choose to participate now, you may stop participating at any time and for any reason.

5.9 Possible Risks

You may experience these **risks** by participating in this research:

- **Collection of demographic data that could lead to deductive re-identification:** You will be asked to provide demographic information that describes you. Different combinations of personal information may make it possible for your identity to be guessed by someone who was given, or gained access, to our research records. To minimize the risk of deductive re-identification, we will not combine identifying variables, nor analyze and report results for small groups of people with specific demographic characteristics.
- **Data collected online or by a device and transmitted electronically:** You will be asked to complete an online survey as part of this research. The organization hosting the data collection platform has its own privacy and security policies for keeping your information confidential. There is a risk that the external organization, which is not part of the research team, may gain access to, or retain your data or your IP address which could be used to re-identify you. No assurance can be made as to their use of the data you provide for purposes other than this research.

5.10 Contact Information

If you have questions about this research, please contact:

- Principal Investigator: Mariana Hernandez Franco (mariana.hernandez.franco-1@ou.edu).

- Faculty Advisor: Ye Ji Yi (yeji.yi@ou.edu).

You can also contact the University of Oklahoma – Norman Campus Institutional Review Board at 405-325-8110 or irb@ou.edu with questions, concerns or complaints about your rights as a research participant, or if you don't want to talk to the researcher.

Please print this document for your records. By providing information to the researcher(s), I am agreeing to participate in this research.

Are you 18 years of age or older?

- ☐ Yes
- ☐ No (If no – cannot participate)

Have you lived in your current housing unit for a minimum of one year?

- ☐ Yes
- ☐ No (If no – cannot participate)

IRB #: 17993

IRB Approval Date: 12/02/2024

Part 1: Demographic Information

Please indicate:

1. Age _____
2. Gender
 - ☐ Female
 - ☐ Male
 - ☐ Other (please specify): _____
 - ☐ Prefer not to say
3. Length of time living in your home _____
4. Number of people living in your home _____
5. Square footage of your home _____
6. What is your housing type?
 - ☐ Single family home
 - ☐ Multifamily home - Duplex
 - ☐ Multifamily home – Sixplex
 - ☐ Other (please specify): _____
7. Which of the following best describes your current living situation?
 - ☐ I own my home
 - ☐ I rent my home
 - ☐ Other (please specify): _____

Part 2: Housing Habitability

Please indicate your level of agreement with the following statements.

Affordability

1. I believe the cost of my home, whether it is the monthly rent, mortgage payment, or the value in general, is fair for what it offers.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

2. I can cover my housing expenses without sacrificing necessities like food or healthcare.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

Equity

3. I believe I have equal opportunities to access quality housing compared to other people in the area.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree

- Somewhat agree
- Strongly agree

Occupancy

4. The total floor area is appropriate for the number of people living in my home.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

5. The number of bedrooms is adequate for the number of residents.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

Design/Layout

6. The distribution of common areas, like living room, dining room, kitchen, etc., enhances the sense of openness and facilitates social interaction with the other residents or neighbors in my home.

- Strongly disagree
- Somewhat disagree

- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

7. The layout of my home allows for easy reconfiguration of spaces to accommodate changing needs, for example, home office, exercise area, etc.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

8. The materials, colors and textures of the walls, floors and ceilings create a pleasant and relaxing atmosphere.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

9. The ceiling height contributes to a sense of spaciousness and comfort.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

Privacy

10. I feel that my home provides adequate privacy for my activities and routines.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

Satisfaction

11. I am satisfied with how the layout and design of my home meet my needs.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

Place Attachment

12. My home reflects my personal identity.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

Safety

13. I feel safe in my home.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

Indoor Environmental Quality

14. The size of the windows in my home is appropriate for each room.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

15. The windows provide sufficient natural lighting for my daily activities without needing to turn on artificial lights during daytime hours.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

16. The artificial lighting in my house allows me to perform visual tasks, like reading, cooking, writing, etc., comfortably without experiencing glare or eye strain in at least one of the living areas.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

17. I can breathe comfortably in my home most of the time without noticing unpleasant odors or excessive humidity.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

Self-rated Health

18. My housing conditions contribute positively to my health.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

Neighborhood Amenities

19. Parks, playgrounds, and other public spaces for recreation and socialization are within walking distance from my home.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

20. Community services, like cultural centers, libraries, etc., are in good condition and easy to get to from my house.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

Social Interaction

21. I frequently engage in social interactions with my neighbors.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

Sense of Community

22. I feel a strong sense of community in my neighborhood.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

Neighborhood Accessibility

23. Basic services, like stores, pharmacies, etc., are within walking distance from my home.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

24. My neighborhood offers diverse mobility options, such as public transportation, bike lanes, and pedestrian paths, connecting key areas.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

25. The streets, sidewalks, and public spaces within walking distance of my home are well-maintained, safe, and inclusive for all users, including those with mobility challenges.

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

Quality of Life

26. Please rate your overall quality of life.

- ☐ Extremely dissatisfied
- ☐ Somewhat dissatisfied
- ☐ Neither satisfied nor dissatisfied
- ☐ Somewhat satisfied
- ☐ Extremely satisfied

Part 3: Perceptions

Please respond freely in your own words:

27. What are the main problems or challenges you face in your home? How do these affect your daily life?

28. If you could change anything in your home, what would it be and why?
