

UNPACKING THE PERCEPTIONS OF HIGH-DENSITY LIVING AND ZONING LAWS: A CASE OF PHILADELPHIA AREA, USA

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America's residential housing model of suburban sprawl has its own environmental impact compared to high-density residential models that are believed to operate more efficiently in other places. There is hesitation in America regarding enacting changes towards a more sustainable model. An understanding of the barriers inhibiting the implementation of high-density residential model is fundamental to changes in the current system. This study evaluated American perceptions of current living models; high-density models and understanding of zoning laws. A mixed-method approach was adopted involving 207 questionnaires with 14 follow-up interviews from participants in the Philadelphia area. Findings suggest young adults' preference for high-density living with concerns for housing affordability and inequality crisis in America. The sampled population lacked awareness of residential high-density models and what it physically embodies including its impact on the surrounding population. Findings suggest lack of understanding of the zoning laws that have perpetuated America's sprawling living model. These results are significant for planners; developers; and proponents of high-density models regarding planning housing models that sets up America into a more sustainable future.

Keywords: high-density living; zoning laws; suburban sprawl; Philadelphia

INTRODUCTION

The United States of America (USA) has an abundant landmass of about 9,147,420 square kilometres (The World Bank, 2022). Land of that size drew the first immigrants to America, and those original ideals have transformed into residential living models that is considered not beneficial to the environment, promotes unhealthy lifestyles and expensive (Litman, 2015). The abundant space gave rise to a unique zoning model of residential planning that differs from European models (Hirt, 2013). As a result of the social, environmental, and economic movements, American residential housing reform is gaining greater support (Holleran, 2020). New generation of homeowners are taking centre stage regarding such transformation, but there are some disconnect between current and future homeowners which has led to housing model stagnation. This stagnation is suggested to have led to the abundance of detached single-family homes that are responsible for the inordinate amount of suburban sprawl in the USA. These homes are built on private plots of land, usually

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1-5 acres, with no other structures connected to them (Brody, 2013). The popularity of this living model has resulted in a land use phenomenon called ‘suburban sprawl’, which is an unplanned or unrestricted spreading of residences onto undeveloped land on the periphery of an urban centre (Designing Buildings, 2022). The idea of residential density can be difficult to define and compare across different living models (Angel *et al.*, 2021), however, the most suitable and functional measure is the neighbourhood density measure, which divides total residential dwelling units by the residential neighbourhood area (Forsyth, 2003). The aim of this study is to gain insight on American current living models, the perceptions of higher density living, and an understanding of zoning laws to reorient resources and make meaningful change within the residential housing with emphasis on the Philadelphia Area, USA.

LITERATURE REVIEW

The support for single-family homes has been galvanised by zoning laws and perceptions of homeownership that have resulted in a cultural norm of unsustainable living (Wegmann, 2019). Extant studies focus primarily on the data regarding the effects of suburban living, benefits of high-density models and youth urbanisation rates, but not on understanding the perceptions of the different models or changes in legislation that could potentially result in a more sustainable living system (Gately *et al.*, 2015; Hummel, 2020; Moos, 2016). The path to the dominance of the single-family home has been paved by over a century of zoning laws resulting in one of the most socially inequitable and environmentally unfriendly living standards (Gately *et al.*, 2015; Maya, 2008), a different approach from the European models. The social hierarchy furthermore makes the single-family home as the ‘American dream’, making it the preferred building practice across the country (Hirt, 2013).

Zoning Laws - The first American zoning ordinance came via New York City in 1916 (Hirt, 2016). The planners attempted to combat the rising pollution and safety crisis plaguing the city due to increased manufacturing (Hirt, 2016). This led to the separation of the working and living areas of the city and New York instituted an urban plan putting residential areas at the top of its zoning pyramid; businesses in the middle; and industry at the base (Hirt, 2016). This distribution was not dissimilar to other progressive zoning practices at the time, but the distinctiveness was the restrictions placed between the districts. A protection was placed firmly on residential districts where business and industry operations were prohibited from encroaching into residential territory, making about half of New York’s inhabited districts solely residential. The plan was opposite to that of German zoning practices at the time, where residential and business entities could intermix, and the heaviest restrictions were placed on industry (Hirt, 2016). Over time, these residential zoned neighbourhoods were dominated by wealthy residents, and many of the early zoning codes were racially and ethnically motivated leading to segregation of minorities into multi-family developments (Hirt, 2013; Manville *et al.*, 2020). The detached single-family zoning, better known as R1, has become the staple of American land use with many cities and towns dedicating majority of their land to this designation (Manville *et al.*, 2020). For instance, 70% of Los Angeles land is zoned R1, 80% in Seattle, and 90% in San Jose (Manville *et al.*, 2020). This has ensured that the single-family home has the largest market share in the US as it accounts for 63% of the living options in the country (Hirt, 2013). R1 zoning/single-family zoning has dominated the country and a change in this zoning practice will not only have to be legislative, but it will require a major cultural shift in the population to more sustainable options that have proven effective around the globe.

Suburban Sprawl - The effects of suburban sprawl have been well documented, but a review of the major implications is imperative for this study (social, economic and environmental impacts) (Litman, 2015; Gately *et al.*, 2015; Hirt, 2016; Slaper and Hall, 2011).

Environmental: Americans rely heavily on automobiles, and it is one of the largest polluters in the world (Gately *et al.*, 2015). The zoning practices that have resulted in the separation of living and working areas has exacerbated American dependence on the automobile and, in turn, its harmful effects on the environment (Nechyba and Walsh, 2004). In 2017, 91% of American households had access to a personal vehicle (Commuting in America, 2021). As America zoned its residences further away from city centres and businesses, it resulted in lack of public transportation capable of fulfilling the unique situation suburban sprawl presented. Suburbs tend to radiate outward from population centres, making it difficult and expensive to establish public transportation links to all neighbourhoods. The lack of public transportation to low density areas has resulted in almost 80% of Americans commuting in single occupancy vehicles (Commuting in America, 2021). This large number of commuters has resulted in America becoming one of the worlds' transportation CO2 emitters (Gately *et al.*, 2015). Lowering the greenhouse gas (GHG) emissions has been a key factor of America's 2030 GHG reduction plan presented by the White House. Reaching these goals require adaptations to current transportation methods (reduce personal vehicle use) and higher density living is an option capable of alleviating the reliance on personal automobile. In fact, Lewyn (2012) estimates that if residential density is doubled, household vehicle use will fall by 5-12%. Increasing density also promotes a more physical lifestyle and increases overall public health (Forsyth *et al.*, 2007).

Social: The housing segregation in the US is deeply rooted in the original zoning laws that were implemented over 100 years ago (Hirt, 2016). Those laws preserved the barriers blocking residents with lower socioeconomic status, specifically minorities, from gaining access to suburban lifestyle thereby maintaining the inequality seen around the country (Hirt, 2012; Hirt, 2016; Maya, 2008). The practice of suburban sprawl has played a critical role in the racial and financial inequality throughout the country and the spatial distribution of sprawling suburbs tends to impact the social ties and sense of community found within neighbourhoods (Boessen *et al.*, 2014; Butts *et al.*, 2012).

Economic: Living costs inside cities has led many residents to seek affordable homes on the outskirts of population centres in the sprawling suburbs. The demand for these areas has created a fragmented suburban housing market that has resulted in increased house prices (Helbich, 2015). Case and Mayer (1996) suggest that homes in 'high end' suburbs, closer to population centres, are affected to a greater extent in times of economic volatility. The unique suburban housing market that took off with the COVID-19 pandemic, pushed people toward more spacious living and remote work opportunities (The Economist, 2022). The surge in pricing has created a housing affordability crisis in low-density neighbourhoods around the nation (Wilermuth, 2021). Increased demand may be steering developers into constructing more single-family neighbourhoods, further entrenching America in low-density living.

Housing Affordability: High-density developments and their relation to housing affordability is one of the most contentious issues surrounding dense building practices. Many believe that the increase in housing supply will increase all housing

prices in the area. ‘Supply skeptics’ (Been *et al.*, 2019) have continued to combat higher density building practices and have reinforced the land use laws that restrict them. Been *et al.*, (2019) argue that these claims are unfounded and can be mitigated with careful investment and government assistance. As new housing of different varieties and sizes are built, it lessens the demand in other markets and disperses savings across markets (Been *et al.*, 2019). Furthermore, this argument asserts that in times of economic stability, building new housing filters old housing into more affordable markets, offering low-income solutions for residents who cannot afford new construction (Weicher *et al.*, 2018).

METHOD

This study adopted the more pragmatist views with the premise that there is not a singular reality and that reality changes constantly based on human experiences. In a methodological sense, pragmatism believes that individuals can experience reality differently (Kelly and Cordeiro, 2020). This study focuses on the ‘practical understandings’ of real-world issues and then places emphasis on the relationship between knowledge and action (Kelly and Cordeiro, 2020). An inductive approach was used to gather the perceptions of Americans as per their living models, awareness of zoning laws and higher density living models and the data was collected using mixed method (207 online questionnaire survey using Microsoft Forms and 14 follow-up semi-structured interviews via MS Teams and Zoom) techniques for a more robust output (Johannesson and Perjons, 2021). The purposive sampling strategy bolstered by snowball sampling (Johannesson and Perjons, 2021) was used for participants in the Philadelphia area, USA. The Philadelphia area has a strong distribution of dense city living, surrounded by sprawling suburbs on its outskirts. This is the traditional model of an American city and allowed for respondents from both high- and low-density living models to participate in the study. This sampling strategy may not allow for results to be generalised across an entire population, but it provides a strong basis for future representative studies. The survey questionnaire with 25 questions was analysed using both descriptive and inferential methods. The result from the questionnaire were categorised and coded using nominal and ordinal techniques to assign numerical values to categorical and ranked data sets (Johannesson and Perjons, 2021). Since the data collected was non-parametric, (data is non-normal and the variance of groups are not equal) Kruskal Wallis and Mann Whitney U Tests were most suitable (Riffenburgh, 2006). Mann Whitney U Tests was conducted between each grouping to identify which were statistically different from each other (McClenaghan, 2022). Statistical significance for these tests was set at $\alpha < 0.05$. The 14 interviews (lasting approximately 25 minutes) provided the opportunity to reinforce any emerging relationships inferred because of analysis. The interviews were recorded and transcribed and then coded into categories based on the demographic information that was provided by each respondent using content analysis technique (Johannesson and Perjons, 2021).

FINDINGS AND DISCUSSION

The two-hundred and seven (207) participants (Table 1) all reside in and around the city of Philadelphia. This area has a large population to draw from and a mixture of high-density city living and suburban neighbourhoods. Perceptions of Current Living Arrangements: Figure 1 shows the preferences for the living arrangements for the different age distribution indicating the age brackets that reside more in single-family

homes. Four of the five age groups had most respondents living in single-family homes.

Table 1: Demographic Statistics

Age	N = 207	%
18-24	10	5%
25-34	96	46%
35-49	31	15%
50-64	55	27%
65+	15	7%
Gender		
Female	142	69%
Male	64	31%
Prefer not to respond	1	< 1%
Education		
High School Diploma or GED	20	10%
Bachelor's Degree	108	52%
Master's Degree	65	31%
PhD	14	7%
Living Arrangement		
Apartment	45	22%
Multi-Family Home (Row Home, Terraced, Duplex, etc.)	31	15%
Single Family Home	131	63%
Previously Lived in a Single-Family Home		
No	40	19%
Yes	166	80%
Travelled Outside of the United States		
No	7	3%
Yes	200	97%

The age group 25-34 showed a more homogeneous living arrangement with 41% and 45% living in apartments and single-family homes while 15% live in multi-family homes. This age group also had the most respondents living in higher-density environments. Age brackets from 35 to over 65 mostly reside in single-family homes which is about the age for most adults with home ownership. However, 70% of 18-24-year-olds living in single-family homes suggest that these are young people still living with their parents.

Furthermore, the living arrangement was evaluated against each other using the Mann Whitney U Test to determine what groups showed differences from each other. The participants who live in apartments showed significant differences from those who live in single-family homes and multi-family homes. The social hierarchy that has resulted has perpetuated the idea of the single-family home as the ‘American dream’ and made it the preferred building practice across the country (Hirt, 2013). However, young people do seem to have a desire to reside in higher density living situations based on youth urbanisation rates throughout the years, a phenomenon Moos (2015) calls ‘youthification’. There was no significant difference between those living in apartments and multi-family homes because the institution of zoning laws ushered minorities into multi-family developments (Hirt, 2013). The participants aged 25-34 showed significant differences from all other age groups as they are more open to the

higher density living arrangements. The other age group categories produced distributions that leaned towards the detached single-family homes that are responsible for the inordinate amount of suburban sprawl seen in the United States (Manville *et al.*, 2020; Wegmann, 2020).

Figure 1: Living arrangement distribution by age

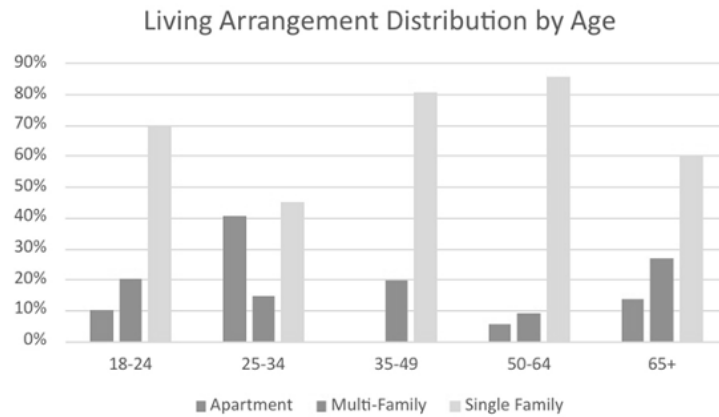


Table 2: Mann Whitney U Test Comparisons of Living Arrangements

Mann Whitney U Test Comparisons of LA		
Groups	P-Value	Sig @ 0.05
Single Family X Apartment	8.38E-07	Yes
Single Family X Multi-Family	0.1329	No
Apartment X Multi-Family	0.0277	Yes

Participants who lived in apartments or multi-family homes indicated their high level of connectivity to public transportation, variety and social/basic amenities (Enger, 2012) in walking distance that promote daily physical activity (Chaudhury *et al.*, 2012):

“I live within a 10-block radius of over six grocery stores. I have walking access to restaurants and shopping as well as access to parks and green space.”

However, participants who live in single-family homes indicated they enjoyed the quietness and privacy of their homes, but disliked the lack of amenities:

“I dislike the lack of public transport. We are also on the lower end on the amenities side, specifically restaurants.”

The participant’s perception of the detached single-family home and its impact on the environment (8 of 14 respondents) suggested that they believed the model was not environmentally sustainable and healthy (Gately *et al.*, 2014). However, the homeowners of single-family dwellings were more neutral signifying the model could be beneficial to the environment if modifications were made.

“If you are using efficient lights, insulate the home well, and use solar panels then yes, it can be sustainable.”

Overall findings suggest strong preference for the more spacious living model with 73% of the participants in favour of it but they would have to rely on vehicle to access amenities. This finding is in contrasts with results from Klineberg (2017) where there was an even split between participants preferences in their living model. This contrast

could be explained by the fact that 63% of the surveyed sample in this study currently reside in a detached single-family home. The number of young respondents currently living in a high-density area and their preference for the high-density model reinforces findings by Moos (2016) and Opit *et al.*, (2020) which propose that younger generations are showing a greater preference for high-density living models as opposed to older generations.

Perceptions of High-Density Models: The participants' perceptions of high-density living arrangements varied broadly with 46% understanding high-density living model, while 44% consider high-rise apartment blocks as high-density model. 9% of the respondents considered the sustainable high-density development as high-density living while 1% considered the suburban sprawl as high-density models. The participants were asked if they preferred living in a high-density environment closer to amenities or a more spacious but disconnected living model and the age group 25-34 had the highest number of respondents with 36% opting for the higher density living model because it can provide housing at affordable prices, appropriate sizes and with equal opportunity (Hummel, 2020). These results based on living arrangements suggest that 49% of those living in an apartment, 39% who live in multi-family homes and 17% of those who live in a single-family living arrangement said that they preferred the higher density living model. Regarding the potential development of new high-density neighbourhood near where the participants currently reside, 68% of those currently living in single-family homes objected to such plans, 18% indicated they would welcome such initiatives while 19% were unsure if they would like to live next to such neighbourhoods. 56% of respondents who live in an apartment and 39% of multi-family home dwellers indicated they would be comfortable with the creation of a high-density development in their neighbourhood. The respondent's thoughts of high-density living and if they would accept it in their current neighbourhood suggest that those living in apartments or multi-family arrangements were more likely to offer support towards high density living.

"I like that you are closer to other people. Living closer to people is like built in friends and there is more community participation."

Responses from participants who lived in single-family homes varied more than those living in a denser environment. Some respondents were pro high-density living, but the majority said that they could not see high-density developments in their neighbourhood and thought that would not match the ethos of the neighbourhood. Corradino (2021) found that there is a shortage of 7 million low-income rental units and a further 3.8-million-unit shortage for single-family homes.

"It would absolutely not be welcome in my current neighbourhood. Because people come to a neighbourhood like mine to specifically not be in a high-density situation."

The participants suggested barriers they thought existed in implementing a high-density model, e.g., the perception of crime and traffic that is tied to high-density communities (Orth, 2022), aesthetics, racism, the need for space later in life and general misunderstanding of high-density living. Overall, the findings suggest that participants instinctively equate high-density living with large cities and cramped apartment buildings.

Understanding of Zoning Laws: The participants familiarity with zoning laws indicates that 85% of respondents were not familiar with zoning laws (specifically R1), while 15% of those surveyed said they were familiar with them. Responses from 78% of the participants agreed that zoning laws dictated what houses could be built

while 19% remained 'Neutral,' and 4% of respondents said they 'Disagreed'. Participants indicated minimal understanding or familiarity with the zoning laws or their implications and have no personal experience with zoning laws.

"I definitely think they need a lot of work. They need to understand the needs of the people who live in the areas. I don't think people know much about zoning laws. I don't know much about them but I know they are not fair. They marginalise populations like poor people, seniors and minorities."

In line with America's dark history of legislation concerning minorities, many early zoning codes were racially and ethnically motivated (Hirt, 2013; Manville *et al.*, 2020). Some respondents indicated that they thought that zoning laws would be difficult to change due to this general misunderstanding:

"In terms of changing the way our neighbourhoods are, zoning is a huge barrier to them. Because so few people know how they work there's probably not a lot of public pressure to change them."

Whilst the participants lacked strong factual understanding of zoning laws, they did demonstrate some familiarity with how the laws worked and the extent to which they impact American living models and Wegmann, (2019) suggest that Zoning laws are barriers to the adaptation of new housing models.

CONCLUSION

Understanding the perceptions of housing model in America is essential to building a plan that address American needs and mitigate fears of high density living. The study shows the need for change and has identified key barriers that are inhibiting efforts to achieving a more sustainable housing model in America. The steps required to change a social system is to reform the inhibiting perceptions that are restraining it in its old ways. Education and awareness of what a high-density residential model genuinely embody is essential to changing American perceptions and alleviating the dominance of the old, unsustainable construction design whilst looking outward to other parts of the world like Europe that have adopted the high-density living models successfully. The inevitability of that disruption cannot be reduced to the justification for avoiding change but should be accepted as a prerequisite to the constructive path of finding a new, and more sustainable balance. This study indicates a need for a sustainable residential model shift in America and serves as a building block in the growing evidence supporting the potential for a more advanced and effective housing model in the United States.

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