

Perceived Transit-Induced Gentrification, Walkability, and Crime: An Examination of the Purple Line Light Rail Transit in Prince George's County, Maryland

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Abstract

This study investigates perceived transit-induced gentrification in anticipation of the Maryland Purple Line light rail transit among residents of Prince George's County, Maryland, and its associations with walkability and crime. In spring 2021, Wave I of the Gauging Effects of Neighborhood Trends and Sickness Study collected data from 465 residents (61% Black/African American, 28% White) through an online questionnaire. Exploratory factor analysis and multiple linear regression revealed that greater accessibility ($\beta = 0.160, p < 0.01$) and a pedestrian-friendly environment ($\beta = 0.212, p < 0.01$) were significantly associated with higher neighborhood gentrification perceptions. In contrast, concerns about house break-ins ($\beta = 0.134, p < 0.01$), purchasing a gun ($\beta = 0.101, p < 0.05$), and walking barriers ($\beta = 0.380, p < 0.01$) were linked to heightened perceptions of neighborhood disruption. These findings underscore the need for transit-oriented development strategies that not only enhance walkability but also address residents' safety concerns and risk of displacement, ensuring more equitable and inclusive urban planning outcomes.

Keywords: light rail transit, transit-induced gentrification, walkability, crime

As urban populations grow, cities are increasingly adopting transit-oriented development (TOD) to address challenges related to mobility, sustainability, and economic growth. Transit-oriented developments, such as light rail transit (LRT), focus on creating high-density, mixed-use areas around transit hubs and are designed to reduce traffic congestion and improve access to public services (Nieuwenhuijsen, 2020; Wu & Roberts, 2023). In addition to these transportation and economic goals, TOD has become increasingly relevant to public health, as it encourages more active forms of commuting like walking and cycling, which are key to preventing chronic disease and promoting mental well-being (Tehrani et al., 2019). However, while TOD offers many potential benefits, it can also lead to a phenomenon known as transit-induced gentrification (TIG), where rising property values and new amenities attract wealthier residents, often displacing lower-income and minority communities (Dawkins & Moeckel, 2016; Kim, 2021; Tribby et al., 2016).

Understanding how TOD affects both health and community stability requires examining the connections between walkability, crime, and gentrification as interrelated social determinants of health. Enhanced walkability, a central goal of TOD, is often viewed as a public health and quality of life improvement (Frank et al., 2022). However, the infrastructure and accessibility improvements that make neighborhoods more walkable can also increase property values and accelerate gentrification (Bereitschaft, 2017). At the same time, changes in perceptions of crime, whether linked to the influx of new residents or shifts in neighborhood conditions, can shape how communities experience these transitions (Papachristos et al., 2011).

This study focuses on Prince George's County, Maryland, where the planned Purple Line LRT project has raised concerns about neighborhood change and displacement. Drawing on Wave 1 of the broader multi-wave Gauging Effects of Neighborhood Trends and Sickness study (GENTS), we examine how the anticipated opening of the Purple Line and associated changes in walkability and crime are shaping residents' perceptions of TIG (Roberts et al., 2020). These early perceptions offer critical insight into the health equity implications of large-scale transit investment, revealing who stands to benefit from enhanced accessibility and walkability, and who may face increased risks of displacement or social disruption. Understanding these dynamics is critical for policymakers seeking to balance the benefits of TOD with strategies to mitigate displacement and preserve community stability.

Transit-Induced Gentrification

Gentrification refers to the socioeconomic and physical transformation of neighborhoods, typically involving an influx of higher-income residents and businesses into areas historically occupied by lower-income populations. This process often leads to rising property values, demographic shifts, and the displacement of vulnerable residents. Among the key drivers of gentrification are economic trends, housing policies, urban revitalization projects, and public

investments, particularly infrastructure development. Light rail transit (LRT) systems, specifically, have been identified as significant catalysts for neighborhood change, improving accessibility and attracting wealthier residents and developers, a phenomenon known as transit-induced gentrification (Chapple & Loukaitou-Sideris, 2019; Dawkins & Moeckel, 2016; Delmelle, 2021).

Evidence from a longitudinal study across seven U.S. regions (1970–2010) demonstrates gentrification near new LRT stations, marked by increased White populations by 2000, while Black populations remained stable (Chava & Renne, 2022). Studies further indicate that the installation of light rail stations significantly increased household income and housing values within a mile of the stations, signaling gentrification (Bardaka et al., 2018, 2019). Similarly, Jackson and Buckman (2020) found that residents near the Evans Light Rail Station in Denver perceived neighborhood changes and gentrification, including shifts in character and diminished place attachment.

While much of the existing research focuses on changes following LRT implementation, the impact of LRT often begins well before systems become operational, as the anticipation of improved transit access drives speculative investment. Knaap et al. (2001) found that land values in Washington County, Oregon, increased during the planning phase of an LRT project, encouraging higher-density, transit-oriented development. Golub et al. (2012) observed similar pre-operation property value increases around the Phoenix LRT system. Recent studies show that even before the completion of the Purple Line LRT in Maryland, gentrification trends were evident, with rising housing prices, increased rents for larger multifamily units, and significant impacts on local businesses (Peng & Knaap, 2023; Peng et al., 2023; Finio, 2023). Recognizing that gentrification often precedes LRT operation underscores the need for proactive policies to balance development goals with the protection of vulnerable populations, ensuring equitable outcomes in transit-oriented growth.

Walkability and TIG

Walkability is a cornerstone of transit-oriented development (TOD) and a well-established determinant of public health, associated with increased physical activity, reduced chronic disease risk, and improved mental well-being (Baobeid et al., 2021). In the context of transit-induced gentrification (TIG), however, walkability improvements can play a dual role, serving as both a health-promoting feature and a signal of impending neighborhood change (Tehrani et al., 2019).

The health benefits of walkable environments are clear (Henson et al., 2016; Tehrani et al., 2024). Routine physical activity such as walking for transportation has been linked to lower risks of obesity, cardiovascular disease, and Type 2 diabetes (Brownson et al., 2000; Nieuwenhuijsen, 2020; Reyes et al., 2014). Enhanced physical exercise can also promote mental health by alleviating depression and improving emotions and a sense of recognition (Dunn et

al., 2001; Ohmatsu et al., 2014). TOD aims to support such outcomes by improving pedestrian access between transit stops, homes, and destinations, while also addressing environmental goals like reducing emissions (MacDonald et al., 2010; Owen et al., 2007; Saelens et al., 2003; Mei et al., 2024).

Yet, walkability enhancements may also contribute to rising property values and shifting neighborhood demographics, especially in communities near light rail transit (LRT) investments (Tehrani et al., 2019). According to research, residents have expressed a generally positive view of the enhanced connectivity and walkability related to LRT, but are frequently concerned about the availability of parking and pedestrian safety due to new commercial construction and traffic congestion (Brown & Werner, 2011; Jackson & Buckman, 2020; Nilsson et al., 2020). For example, the majority of surveyed Charlotte, North Carolina, residents (65%) viewed the neighborhood outcomes of LRT as beneficial due to reduced pollution and traffic and increased walkability. Conversely, a smaller group (18%) cited negative impacts such as increased traffic and insufficient parking. Still, residents living within one mile of new stations in low-income areas, especially long-term and Hispanic residents, showed a high likelihood of remaining, indicating a strong acceptance of LRT (Nilsson et al., 2020). These findings highlight the complex and sometimes contradictory perceptions of walkability in transit corridors, particularly in communities vulnerable to gentrification. Despite mounting concerns around displacement and gentrification, little is known about how communities surrounding LRT stations perceive transportation-induced walkability.

Crime and TIG

Just as walkability improvements can be perceived as both beneficial and exclusionary, perceptions of safety and crime also influence how residents experience neighborhood change. These perceptions are closely tied to residents' sense of belonging, collective efficacy, and mental well-being, all of which may be disrupted during gentrification (Pinkster et al., 2014; Skogan, 1986).

In the context of TOD, such as LRTs, research has debated whether such investments "breed" criminal activity by creating new targets of opportunity or if they move crime from the inner city to the suburbs (Billings et al., 2011). Yet, little empirical research is available on whether investment and development of an LRT affects perceived TIG among current residents and changes in neighborhood crime, and the available data have produced inconsistent results over the past few decades. For example, a time-series analysis of crime rates between 1970 and 1984 in 14 gentrified neighborhoods in Boston, MA; New York, NY; San Francisco, CA; Seattle, WA; and Washington, DC, revealed a reduction in personal crime rates, but no effect on property crime rates (McDonald, 1986). Yet, quantitative analyses of Baltimore from 1970 to 1980 discovered a positive link between gentrification and assault, homicide, and robbery (Taylor & Covington, 1988). In the 1990s, a similar study in Los Angeles

discovered a strong association between gentrification and robbery and assault, but not rape or homicide (Lee, 2010). Another study found a negative correlation between gentrification and assault and robbery in 1990s Portland, OR (O'Sullivan, 2005). Moreover, assessments of gentrification and violent crime in Chicago from 1991 to 2005 revealed that as gentrification increased, robberies and gang-related homicides decreased, specifically among Whites and Hispanics. In contrast, while Black gentrifying communities experienced a decline in homicides, robberies in these areas saw an increase (Papachristos et al., 2011). Regardless of the form or type of crime, the direct association between fear or perception of neighborhood crime and changes in the community's structure has confirmed the impact of gentrification (Skogan, 1986; Taylor & Covington, 1993).

Gentrification has frequently been hailed as a strong force of urban transformation since gentrified districts have received gains in amenities and services, and a decrease in crime rate as a result of the influx of middle-class inhabitants. Although these shifts appear favorable, gentrification has repeatedly been cited as a probable causative reason for the observed increase in urban violence (Barton, 2016). According to researchers, gentrification displaces long-term residents, breaks social ties, and potentially contributes to increases in crime and disorder, including vandalism (Papachristos et al., 2011; Taylor & Covington, 1988). Opponents of gentrification assert that the flow of increasingly affluent White households into low-income communities of color may exacerbate racial and class conflicts and tensions. While many have focused on racial tensions, conflicts have also been observed between gentrifiers and resentful citizens of the same race (Anderson, 2013). Such hostility is typically associated with growing concerns about potential residential displacement (Balzarini & Shlay, 2016). These concerns can discourage incumbent locals from forming ties with new, often wealthier residents, thereby reducing informal social control and collective efficacy (Armstrong et al., 2015). The lack of collective efficacy in a neighborhood characterized by concentrated poverty, racial and ethnic heterogeneity, and high residential turnover is a mediating factor between structural disorganization and neighborhood violent crime rates (Kreager et al., 2011). Disruption in local governance and the lack of informal surveillance due to incumbent residents' reluctance to intervene in neighborhood issues may encourage gentrifiers in these areas to rely on formal control such as increased police surveillance, advanced security systems, and/or guards typical of new condominium communities that substantially reduced area crime levels (Anderson, 2013; Kreager et al., 2011; Taylor & Covington, 1988).

Methods

Study Setting

The Maryland Purple Line, a 16.2-mile light rail transit (LRT) system with 21 stops currently under construction, will connect key suburbs of Washington, D.C., including areas like Bethesda in Montgomery County and New Carrollton in Prince George's County. Planned for

completion in 2027, the Purple Line is expected to transform the region by enhancing transportation access and promoting economic growth. This paper focuses on Prince George's County, a predominantly Black and Hispanic community with 11 of the Purple Line's stops, where concerns about potential gentrification and displacement related to the project are already emerging.

Prince George's County is home to nearly 900,000 residents, with over 80% identifying as Black or Hispanic (U.S. Census Bureau, 2020). The area also has a significant immigrant population, with nearly one-quarter of residents being foreign-born (Data USA, 2022). While the median household income is around \$98,000, the county faces economic challenges, and many neighborhoods are particularly vulnerable to the pressures of gentrification (Data USA, 2022). The county's diverse demographics and reliance on public transportation, including DC Metro train lines, make it a significant site for examining the social impacts of transit development.

Study Design

The GENTS Study, a multi-wave research project, initiated and completed Wave I from March 2021 to December 2021 using a rolling recruitment and enrolment strategy to establish a baseline sample (Roberts et al., 2020). Three distinct questionnaire deployment pathways were employed to recruit the eligible study participants who were adults (18 years and older) and Prince George's County residents. The first deployment utilized snowball sampling in partnership with community organizations and involved referrals from existing participants and the use of community email databases. The second pathway involved on-site sampling at community events like farmers' markets, where researchers provided iPads to allow participants to start the questionnaire immediately. The third involved email blast sampling through Alesco Data Group, which allowed targeted outreach to households in the study area. Data were collected using the Qualtrics platform. Participants completed a comprehensive questionnaire focused on neighborhood change, gentrification, walkability, and crime using validated instruments.

Measures

Perceived Transit-Induced Gentrification (TIG) was measured using the Neighborhood Change and Gentrification Scale (NCGS), a 10-item instrument developed and validated by DeVlyder et al. (2019) to assess resident experiences of neighborhood change. The scale consists of two previously validated subscales including Neighborhood Gentrification Perception (4 items,

Cronbach's $\alpha = 0.64$), reflecting more positive changes such as improved amenities and infrastructure, and Neighborhood Disruption Perception (6 items, Cronbach's $\alpha = 0.83$), reflecting more negative experiences like feeling unwelcome or pushed out. Items were rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), and subscale scores were calculated as the mean of item responses. Sample items include "I have experienced improved access to neighborhood amenities and city services," "I have observed a lot of renovation activity in the neighborhood," "I have feared being 'pushed out' of my neighborhood," and "I worry about feeling 'unwelcome' in my neighborhood," capturing both the physical transformation and psychosocial impact of neighborhood change.

Walkability in the study area was assessed using 14 items adapted from the Neighborhood Environment Walkability Survey (Cerin et al., 2006). Items covered infrastructure (e.g., sidewalks, intersections), aesthetics (e.g., tree-lined streets), accessibility (e.g., proximity to shops and transit), and barriers (e.g., hills, traffic). Participants responded on a 5-point scale from 1 = Strongly Disagree to 5 = Strongly Agree. Exploratory factor analysis using principal component analysis produced three subscales, including Pedestrian-Friendly Environment (5 items, Cronbach's $\alpha = 0.702$), Accessibility (5 items, $\alpha = 0.710$), and Walking Barriers (4 items, $\alpha = 0.700$). These three components accounted for 32.36%, 14.20%, and 8.19% of the variance, respectively (KMO = 0.832; Bartlett's Test $p < 0.001$). Items were grouped based on factor loadings that distinguished between environmental features, practical access to destinations, and walking impediments. Subscale scores were computed by averaging the corresponding items. Higher values indicate greater agreement, except for barriers, where higher values represent more obstacles (Table 1).

Perceived Crime was measured using six items adapted from Roberts et al. (2015). Four items assessed how frequently participants worried about specific types of neighborhood crime in the past month, being physically attacked, robbed, harassed, or experiencing a home break-in. Each item was rated on a 4-point frequency scale (1 = Everyday to 4 = Not once in the past month) and reverse-coded so that higher scores indicated greater concern. Two additional binary items asked whether participants had (a) been a victim of crime in their neighborhood in the past three years, and (b) purchased a gun for protection from neighborhood crime. All six items were analyzed individually rather than combined into a composite score to preserve the distinct meaning of each crime-related concern and response.

Table 1. Walkability Factor Analysis

Given Name	Walkability	Component			Communalities
		1	2	3	
Pedestrian-Friendly Environment					
	Trees along the sidewalk	0.776			0.604
	Well-maintained sidewalks	0.738			0.580
	Sidewalk availability	0.709			0.528
	Interesting things to look at along the way	0.494			0.380
	Connected walkways	0.473			0.380
Accessibility					
	Places within walking distance		0.822		0.727
	Stores within walking distance		0.819		0.753
	Transit stops within walking distance		0.628		0.426
	Shopping at the local store		0.479		0.44
	The presence of crosswalks and pedestrian signals		0.450		0.419
Barriers					
	Hilly neighborhood			0.867	0.763
	Canyons/hillsides in the neighborhood			0.857	0.747
	Traffic			0.630	0.549
	Presence of 4-way intersections			0.381	0.367
Eigenvalues		4.53	1.99	1.15	
% of Total Variance		32.36	14.20	8.19	
Extraction Method: Principal Component Analysis.					
Rotation converged in 5 iterations.					
(sig. of Bartlett's Sphere Test < 0.001, KMO value= 0.832)					

Data Analysis Approach

Descriptive statistics were used to summarize the sociodemographic characteristics of the sample, including gender, race, education, income, relationship status, and homeownership. To contextualize housing vulnerability in relation to transit-induced gentrification (TIG), we used chi-square tests to examine associations between these demographic variables and housing tenure (renter vs. homeowner).

Pearson correlation analyses were then conducted to examine bivariate associations between the two TIG perception subscales, walkability factors, perceived crime items, and sociodemographic variables. These results were

used to guide the inclusion of variables in the multivariable models.

Next, a series of hierarchical OLS regression models were conducted to assess the influence of walkability and crime on each of the two dependent variables, neighborhood gentrification perception and neighborhood disruption perception. Model 1 included only sociodemographic variables to account for potential confounders. Model 2 added the three walkability subscales. Model 3 introduced crime-related variables, and Model 4 combined all factors to evaluate their collective impact. Model fit and explanatory power were evaluated using adjusted R-squared values and F-statistics. Variance Inflation Factor (VIF) tests showed that all predictors had

scores below the threshold of 3, indicating no multicollinearity issues (James et al., 2023).

Results

Descriptive Analysis

Wave I data resulted in a sample of 465 adult residents of Prince George’s County (Table 2). There were slightly more female (61%) respondents, and the average age of the sample was 39 years. The study population consisted of predominantly Black/African American (61%) and White (28%) respondents who differed significantly with regard to homeownership (54% of Black respondents were homeowners, compared with 76% of White respondents).

Most respondents (67%) reported annual household incomes below the county’s median of \$98,000, and 51% had attained some form of higher education (Data USA, 2022). Nearly all participants (92%) had lived in the same residence for over three years. Compared to countywide data, the sample aligns reasonably on race and income but underrepresents Hispanic and foreign-born populations. Chi-square analyses revealed significant differences in housing tenure by gender, race, education, income, and relationship status, patterns that help contextualize disparities in exposure to TIG, particularly among renters who were disproportionately women, people of color, and lower-income individuals.

Table 2. Study Sample (N=465)

Parameter	Total (%)	Home Renters (%)	Homeowners (%)	Chi-Square
Gender				
Male	37.0	27.9	72.1	$\chi^2 = 13.861^{**}$ df = 2
Female	60.6	44.7	55.3	
Other	2.4	57.1	42.9	
Race/Ethnicity				
White American	28.0	23.8	76.2	$\chi^2 = 24.365^{**}$ df = 5
Asian American	2.3	9.1	90.9	
American Indian	0.9	25.0	75.0	
African American	60.8	45.9	54.1	
Native Hawaiian	0.9	25.0	75.0	
Hispanic/Latino	7.1	48.5	51.5	
Highest Education				
Some High School	6.0	46.4	53.6	$\chi^2 = 45.104^{**}$ df = 5
High School Diploma	24.1	58.0	42.0	
Some College	19.1	47.2	52.8	
Associates Degree	11.0	35.3	64.7	
Bachelor’s Degree	18.5	30.2	69.8	
Graduate Degree	21.3	16.2	83.8	
Annual Household Income				
<20,000	12.4	66.0	34.0	$\chi^2 = 86.741^{**}$ df = 7
\$20,000 - \$39,999	18.6	58.5	41.5	
\$40,000 - \$59,999	17.8	53.8	46.2	
\$60,000 - \$79,999	7.6	23.1	76.9	
\$80,000 - \$99,999	11.3	33.3	66.7	
\$100,000 - \$124,999	12.3	17.3	82.7	
\$125,000 - \$149,999	8.5	8.6	91.4	
> \$150,000	11.5	6.1	93.9	
Relationship Status				
Never Married	44.5	46.4	53.6	$\chi^2 = 71.900^{**}$ df = 5
Married	30.5	12.0	88.0	
Separated	3.7	70.6	29.4	

Divorced	5.2	37.5	62.5	
Living With Partner	12.9	63.3	36.7	
Widowed	3.2	53.3	46.7	
Home Tenancy				
<1 year	1.5	57.1	42.9	$\chi^2 = 99.420^{**}$ df = 5
1-2 years	7.1	63.6	36.4	
3-5 years	42.2	50.0	50.0	
6-10 years	18.3	41.2	58.8	
10-20 years	17.0	22.8	77.2	
>21 years	14.0	6.2	93.8	

Correlation Analysis

Table 3 presents the result of a Pearson correlation that was conducted to examine the relationship between the participants' sociodemographic characteristics, gentrification, walkability, and crime variables. A noteworthy finding is the negative correlation between neighborhood gentrification perception and certain demographic groups, including females ($r = -0.134$, $p < 0.01$), non-White populations such as Black or African American, Hispanic, and Asian individuals ($r = -0.127$, $p < 0.01$), and unpartnered people including those who are separated, widowed, divorced, or unmarried, showing that these groups are less likely to perceive gentrification positively and may hold more critical views of gentrification. In contrast, higher education ($r = 0.181$, $p < 0.01$) and income ($r = 0.114$, $p < 0.05$) show a positive correlation with neighborhood gentrification, indicating that those with higher socioeconomic status may view gentrification more favorably, potentially appreciating its perceived benefits.

Findings also demonstrate that more accessibility ($r = 0.344$, $p < 0.01$) and pedestrian-friendly environments ($r = 0.355$, $p < 0.01$) were linked to a higher level of perceived gentrification. Meanwhile, both neighborhood gentrification ($r = 0.321$, $p < 0.01$) and neighborhood disruption perceptions ($r = 0.537$, $p < 0.01$) are strongly

associated with greater walking barriers. This finding shows that individuals who view gentrification as either beneficial or disruptive also report more barriers to walking, such as increased traffic or challenging intersections, underscoring the complexity of gentrification's perception.

In addition, results revealed a significant positive relationship between the perception of neighborhood disruption and various crime indicators such as physical attacks, robberies, harassment and threats, house break-ins, being a crime victim, and gun purchases. This connection implies that as perceptions of these specific types of crime increase, so do negative views of gentrification, which suggests that residents may associate the rising incidence of these crimes with the disruptive aspects of neighborhood changes. Also, there was a significant positive association between being subjected to harassment ($r = 0.091$, $p < 0.05$), crime ($r = 0.120$, $p < 0.01$), and purchasing a gun for personal protection ($r = 0.127$, $p < 0.01$), and perception of neighborhood gentrification. Based on this finding, even residents who view gentrification positively may perceive an increase in localized crime and harassment, prompting them to take measures such as purchasing guns for their safety. This counterintuitive result highlights the complexity of perceptions surrounding gentrification, where positive views coexist with serious concerns about immediate personal safety and security.

Table 3. Correlation Between Gentrification, Demographic Characteristics, Walkability, and Crime

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Neighborhood Gentrification																	
2 Neighborhood Disruption	.380**																
3 Gender (Female)	-.134**	-.112*															
4 Race (Non-White)	-.127**	-.092*	.293**														
5 Relationship Status (Unpartnered)	-.182**	-.106*	.226**	.363**													
6 Homeownership (Renter)	-.097*	-0.029	.152**	.190**	.207**												
7 Education	.181**	.160**	-.182**	-.336**	-.321**	-.295**											
8 Income	.114*	0.001	-.150**	-.262**	-.290**	-.415**	.352**										
9 Residency Length	0.027	-0.055	-0.081	-.183**	-0.012	-.360**	0.083	.147**									
10 Accessibility	.334**	.199**	-0.076	-0.051	-0.064	0.017	.117*	0.017	-.119*								
11 Pedestrian-friendly environment	.355**	.130**	-.118*	-.104*	-.139**	-.092*	.196**	0.062	0.001	.524**							
12 Walking Barriers	.321**	.537**	-.150**	-.125**	-.140**	-0.030	.149**	0.011	-.142**	.276**	.196**						
13 Physical Attacked	.108*	.453**	-0.055	-0.058	-.109*	0.009	0.020	0.001	-0.071	0.036	-0.040	.300**					
14 Robbed/Mugged	0.071	.397**	-0.032	-0.052	-.110*	-0.006	0.038	0.001	-0.078	0.049	-0.063	.277**	.760**				
15 Harass/Threat	.091*	.418**	-0.037	-0.025	-.093*	-0.039	0.079	-0.061	-0.089	0.090	-0.030	.319**	.687**	.745**			
16 House Break-In	0.085	.398**	0.018	-0.059	-0.089	-0.045	0.007	0.005	-0.066	0.030	-0.027	.248**	.638**	.662**	.621**		
17 Crime Victim	.120**	.302**	-.153**	-.210**	-.181**	-.094*	.155**	0.005	-0.066	0.063	0.046	.291**	.349**	.248**	.318**	.226**	
18 Gun Purchase	.127**	.282**	-.154**	-0.053	-.113*	-.147**	.128**	0.022	-0.026	-0.033	-0.027	.171**	.312**	.267**	.275**	.228**	.433**

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Regression Analysis

Using OLS regression models, arranged hierarchically in blocks, we examined the impact of walkability and crime on neighborhood gentrification and disruption perceptions after controlling for demographic factors. Some sociodemographic variables were initially considered but not included in the final regression analysis due to their insignificant correlations with both outcome variables.

Table 4 presents the regression results examining the associations between walkability, crime, and neighborhood gentrification perception across four models. In Model 1, which includes only demographic characteristics, being unpartnered ($\beta = -0.112, p < 0.05$) is negatively associated with neighborhood gentrification perception, while higher education shows a positive association ($\beta = 0.113, p < 0.05$). In Model 2, walkability variables are added, and all show significant positive associations with neighborhood gentrification perception. Model 3, which includes crime variables, shows no significant associations with perceived neighborhood gentrification. Model 4, the full model including demographics, walkability, and crime factors, reveals that accessibility ($\beta = 0.160, p < 0.01$), pedestrian-friendly environment ($\beta = 0.212, p < 0.01$), and walking barriers ($\beta = 0.202, p < 0.01$) remain significant predictors of gentrification perception, reinforcing the importance of walkability features. The full model explains 23.4% of the variance.

Table 5 displays the regression results exploring the relationships between walkability, crime, and perceptions of neighborhood disruption. In Model 1, among demographic characteristics, education is significantly associated with neighborhood disruption perceptions ($\beta = 0.128, p < 0.05$), suggesting that individuals with higher education levels may be more likely to perceive neighborhood disruption. In Model 2, which explains a significant 28.7% of the variance ($R^2 = 0.287, F = 57.162, p < 0.01$), only walking barriers show a strong positive association with neighborhood disruption perception ($\beta = 0.510, p < 0.01$). In Model 3, several indicators of crime-related fears and experiences are positively associated with perceptions of neighborhood disruption. Specifically, worry about being physically attacked, fear of being harassed or threatened, concern over home break-ins, having been a victim of crime in the neighborhood, and purchasing a gun for protection, all show significant positive relationships with perceptions of neighborhood disruption. In Model 4, the full model including demographic, walkability, and crime variables, walking barriers ($\beta = 0.380, p < 0.01$), worry about physical attacks ($\beta = 0.188, p < 0.01$), concern over home break-ins ($B = 0.140, SE = 0.053, \beta = 0.134, p < 0.01$), and gun purchases for protection ($\beta = 0.101, p < 0.05$) remain significant predictors of neighborhood disruption. This comprehensive model explains 42.0% of the variance in neighborhood disruption perceptions ($R^2 = 0.420, F = 25.160, p < 0.01$), demonstrating that both walkability and crime-related factors play substantial roles in shaping how individuals perceive neighborhood disruption.

Table 4. Association of Walkability, Crime, and Neighborhood Gentrification Perception

	Model 1 (Demographic Characteristics)			Model 2 (Walkability)			Model 3 (Crime)			Model 4 (Full)		
	B	Std. Error	Beta	B	Std. Error	Beta	B	Std. Error	Beta	B	Std. Error	Beta
Gender (Female)	-0.127	0.079	-0.078	-0.050	0.072	-0.030	-0.108	0.079	-0.066	-0.035	0.072	-0.021
Race (Non-White)	-0.031	0.092	-0.018	-0.012	0.084	-0.007	-0.027	0.093	-0.015	-0.027	0.084	-0.015
Relationship Status (Unpartnered)	-0.180	0.082	-0.112*	-0.119	0.075	-0.074	-0.158	0.082	-0.099	-0.111	0.075	-0.069
Homeownership (Renter)	-0.028	0.083	-0.017	-0.037	0.076	-0.023	-0.016	0.084	-0.009	-0.021	0.077	-0.013
Education	0.055	0.025	0.113*	0.017	0.023	0.036	0.052	0.025	0.107*	0.015	0.023	0.030
Income	0.006	0.016	0.018	0.014	0.015	0.047	0.009	0.016	0.029	0.016	0.015	0.051
Accessibility				0.131	0.042	0.155**				0.135	0.042	0.160**
Pedestrian-friendly environment				0.228	0.055	0.205**				0.236	0.055	0.212**
Walking Barriers				0.162	0.033	0.216**				0.152	0.035	0.202**
Physical Attacked							0.049	0.038	0.064	0.017	0.036	0.022
Crime Victim							0.025	0.056	0.024	-0.032	0.051	-0.031
Gun Purchase							0.121	0.107	0.059	0.187	0.098	0.091
R2	0.057			0.226			0.069			0.234		
F Change	4.646**			33.11**			1.973			11.495**		

** Significant at the 0.01 level (2-tailed).
 * Significant at the 0.05 level (2-tailed).

Table 5. Association of Walkability, Crime, and Neighborhood Disruption Perception

	Model 1 (Demographic Characteristics)			Model 2 (Walkability)			Model 3 (Crime)			Model 4 (Full)		
	B	Std. Error	Beta	B	Std. Error	Beta	B	Std. Error	Beta	B	Std. Error	Beta
Gender (Female)	-0.156	0.100	-0.075	-0.040	0.086	-0.019	-0.113	0.088	-0.054	-0.029	0.080	-0.014
Race (Non-White)	-0.026	0.117	-0.011	0.014	0.100	0.006	0.013	0.103	0.006	0.022	0.093	0.010
Relationship Status (Unpartnered)	-0.090	0.104	-0.044	-0.015	0.089	-0.007	0.032	0.091	0.016	0.062	0.082	0.030
Education	0.079	0.031	0.128*	0.048	0.027	0.077	0.072	0.027	0.117**	0.047	0.025	0.076
Accessibility				0.061	0.050	0.057				0.065	0.046	0.061
Pedestrian-friendly environment				-0.025	0.066	-0.018				0.037	0.061	0.026
Walking Barriers				0.487	0.040	0.510**				0.363	0.039	0.380**
Physical Attacked							0.212	0.065	0.218**	0.183	0.059	0.188**
Robbed/Mugged							-0.006	0.076	-0.005	-0.010	0.069	-0.009
Harass/Threat							0.110	0.063	0.113*	0.045	0.057	0.046
House Break-In							0.160	0.059	0.153**	0.140	0.053	0.134**
Crime Victim							0.128	0.063	0.100*	0.036	0.057	0.028
Gun Purchase							0.227	0.120	0.087	0.264	0.108	0.101*
R2	0.035			0.287			0.281			0.420		
F Change	4.125**			57.162**			25.900**			25.160**		

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Discussion

This study examined how the perception of TIG in Prince George's County, Maryland, is associated with residents' views on walkability, neighborhood crime, and sociodemographic factors in the context of the Purple Line light rail development. Using survey data collected in 2021, we found that walkability and crime-related concerns were significantly related to perceived neighborhood change, and that these relationships varied based on individual characteristics such as education level and relationship status.

Although not the primary focus of this analysis, differences in housing tenure across sociodemographic groups help contextualize vulnerability to neighborhood change. In our sample, women and racial and ethnic minority residents, particularly African American and Hispanic/Latino respondents, were more likely to rent than White or male residents. These descriptive differences reflect broader structural inequities in income, financing access, and exposure to discrimination, which may inform how residents interpret and respond to changes in their neighborhoods (Charles & Hurst, 2002; Roscigno et al., 2009). Such contextual disparities may also contribute to elevated concern about displacement and neighborhood disruption among historically marginalized groups.

Consistent with this, higher levels of education and income were positively correlated with neighborhood gentrification perception. This finding is consistent with previous research showing that individuals with higher socioeconomic status may be more inclined to interpret neighborhood changes, such as new infrastructure and improved walkability, as signs of investment rather than displacement risk. Homeownership patterns in our sample also reflected this socioeconomic stratification, with higher-income and more educated individuals being more likely to own homes, showing greater residential stability and lower vulnerability to transit-induced displacement. In contrast, renters, often lower-income individuals with less access to financial capital, may face greater challenges in remaining in place as demand for housing rises with new transit development (Dawkins & Moeckel, 2016; Delmelle, 2021; Desmond et al., 2015). This disparity points to a broader issue in urban planning that, while transit-oriented development aims to enhance connectivity and economic opportunities, it often does so at the expense of housing affordability for lower-income residents.

In the stepwise regression approach, walkability emerged as a significant factor influencing perceptions of neighborhood gentrification. A more pedestrian-friendly environment and improved accessibility were associated with more favorable views of neighborhood change, consistent with literature linking walkability improvements to positive evaluations of neighborhood quality and revitalization (Knell et al., 2018; Lachapelle et al., 2016). However, for some residents, especially renters and those from lower-income backgrounds, enhanced walkability may signal the onset of gentrification, raising concerns about potential displacement as neighborhoods become

more attractive to higher-income newcomers (Delmelle, 2021). In addition, the presence of walking barriers, such as inadequate sidewalks or a lack of safe pedestrian crossings, may further heighten these concerns by highlighting disparities in infrastructure improvements. For residents facing such barriers, limited accessibility may exacerbate feelings of exclusion from revitalization efforts, underscoring the need for transit-oriented development (TOD) projects, such as the Purple Line, to balance walkability enhancements with protections for existing residents and investments in underserved areas to avoid exacerbating housing insecurity (Bereitschaft, 2017).

Crime perceptions were closely linked to the perception of neighborhood disruption. While previous research has shown mixed results, with some studies finding that gentrification increases crime and others reporting reductions in crime, this study found that greater concern about crime was associated with more negative perceptions of neighborhood change (Lee, 2010; Papachristos et al., 2011; Barton, 2016; MacDonald et al., 2010). Safety concerns, such as robbery, harassment, and home break-ins, were associated with stronger perceptions of disruption. These results suggest that fears of crime may amplify residents' unease about neighborhood change, even in the absence of actual increases in crime. In gentrifying contexts, increased surveillance, changing social norms, and the erosion of informal safety networks may contribute to these perceptions (Bloch, 2022; Pileri, 2021). This points to the multifaceted nature of TIG, where perceived threats to both physical and social environments inform how residents evaluate neighborhood change.

The findings have several implications for urban planners, transit agencies, and policymakers. As cities invest in new transit infrastructure, it is essential that TOD strategies incorporate safeguards to prevent displacement and support community stability. Policy responses might include rent stabilization, inclusionary zoning, affordable homeownership programs, and pedestrian improvements tailored to the needs of existing residents. Efforts to foster inclusive community engagement, especially during early planning and implementation phases, can help ensure that transit investments reflect the priorities of those most affected. In particular, attention should be given to how infrastructure is perceived across different demographic groups and how these perceptions shape trust in the development process. By prioritizing equity alongside mobility, TOD can promote both access and belonging.

This study's findings contribute significantly to the fields of gentrification and active living and fill gaps in the literature on the association of walkability and crime with TIG. A unique strength of this study is its focus on resident perceptions during the construction phase of TOD, a period when changes are felt but outcomes are not yet fully visible. This early-stage analysis provides valuable baseline data, enabling future research to track how TIG perceptions evolve as the transit system becomes operational. However, several limitations must be acknowledged. The cross-sectional design restricts causal inference, and findings reflect associations at one point in time. The reliance on

self-reported perceptions may introduce bias or misreporting. Additionally, the study is limited to one geographic region, which may constrain generalizability. Future research should employ longitudinal designs across multiple sites to assess how perceptions and outcomes shift over time and space.

Conclusion

This study highlights how perceptions of transit-induced gentrification (TIG) are shaped by walkability, crime concerns, and sociodemographic factors in the context of the Purple Line development. While improved accessibility is often seen as neighborhood enhancement, it may also signal displacement risk, especially for renters and lower-income residents. Crime concerns further amplify negative perceptions of change. These findings emphasize the importance of transit-oriented development strategies that address both physical improvements and the lived experiences of residents. Inclusive planning and equitable investment are essential to ensure that the benefits of new transit projects do not come at the expense of community stability.

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