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Social Disorganization and Feeling Safe: Insights from Diverse Scottish Neighbourhoods

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ABSTRACT

Neighbourhood safety remains a critical urban challenge, with social disorganization theory positing that structural factors like poverty and residential instability weaken community cohesion and amplify crime perceptions. While Scotland has seen declining crime rates, persistent violence in deprived areas, and emerging disorder in affluent communities necessitate safety measures across socioeconomic situations. This study examines how social disorganization influences perceptions of safety across affluent and deprived neighbourhoods in Edinburgh and Glasgow, Scotland. Using a cross-sectional survey of 610 residents, we employed multiple regression and ANOVA models to analyse six key indicators of social disorder (noise, vandalism, verbal abuse, burglary, unsupervised children, and physical assault) against self-reported feelings of safety. Data were transformed using the Item Response Theory and Rasch Model to enable parametric analysis, with cross-validation confirming model robustness ($R^2 > 0.92$). Results revealed that verbal abuse ($\beta = -0.565$) and physical assault ($\beta = -0.499$) were the strongest predictors of reduced safety, with deprived areas exhibiting heightened vulnerability. Counterintuitively, affluent neighbourhoods reported higher perceived disorder for vandalism and unsupervised children, suggesting socioeconomic differences in reporting behaviours or tolerance thresholds. City-specific variations emerged: vandalism significantly impacted safety in Glasgow's deprived areas but not Edinburgh's, highlighting the need for locally tailored interventions. The findings reinforce social disorganization theory while demonstrating its nuanced application across socioeconomic contexts. Urban safety research by incorporating minor incivilities often overlooked in crime statistics, offering evidence for holistic approaches to neighbourhood security.

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1. Introduction

Safety and security are basic needs for individuals and society, yet these concerns remain highly dynamic, as they are shaped by personal circumstances and environmental conditions. Neighborhood safety is a fundamental determinant of community well-being, influencing residents' physical health, psychological security, and social engagement (Zuberi, 2018). When individuals perceive their surroundings to be safe, they are more likely to participate in outdoor activities, foster social connections, and contribute to communal cohesion. Conversely, feelings of insecurity can lead to social withdrawal, restricted mobility, and heightened anxiety, ultimately diminishing the quality of life (Porter et al., 2012). Beyond its immediate psychological effects, neighborhood safety is intrinsically linked to exposure to crime and violence, which can perpetuate cycles of fear and victimization. Unsafe environments are often characterized by elevated crime rates, including vandalism, assault, robbery, and other forms of interpersonal violence, all of which erode residents' sense of security (Markowitz, 2001).

Neighborhood safety has become a pervasive societal challenge in both developing and developed nations. Scotland continues to face significant challenges in violent crime (Scottish Government 2023a). The United Nations has identified Scotland as having one of the highest levels of violence in the developed world, a finding corroborated by the World Health Organization, which reported that Scotland had the highest murder rate among the 21 European nations (Krug, 2002). Historically, Glasgow earned the grim distinction of being

labelled the "murder capital of Europe" due to its disproportionately high homicide rates (Fraser and Gillon, 2023). Much of this violence has been attributed to youth conflicts in economically deprived urban areas, where territorial disputes among gangs frequently escalate to violent altercations involving bladed weapons (Goodall, 2019). Additionally, high rates of alcohol and drug consumption have exacerbated violent incidents, further undermining neighborhood safety (Scottish Government 2023b).

The study of neighborhood safety has long been a focal point across multiple disciplines, including criminology, sociology, urban planning, and public health. One of the most enduring theoretical frameworks in this field is social disorganization theory, which posits that structural and social factors, such as poverty, ethnic heterogeneity, and residential instability, weaken community cohesion and reduce collective efficacy, thereby increasing crime rates (Kubrin and Mioduszewski, 2019). Early research by Sampson (1987) demonstrated that neighborhoods characterized by high mobility, family disruption, and ethnic diversity often experience diminished social bonds, leading to greater exposure to crime. However, social disorganization extends beyond macro-level factors, such as economic deprivation; it also manifests in micro-level incivilities, such as noise, vandalism, and public disorder, that shape residents' perceptions of safety. Rountree and Land (1996) found that ambient risk indicators, including burglary rates and visible neighborhood incivilities, significantly increased perceived crime risk. Similarly, Ross and Jang (2000) observed that individuals residing in disordered environmentsmarked by graffiti, drug use, and public disturbances reported elevated levels of fear and mistrust. These findings underscore the psychological dimension of safety, wherein subjective perceptions often diverge from objective crime statistics (Morenoff and Sampson, 1997).

Social disorganization highlights how structural neighborhood factors undermine cohesion and informal control, leading to higher crime and reduced perceptions of safety (Zahnow and Wickes, 2017). Research shows that residents in disorganized neighborhoods experience greater exposure to crime and heightened fear, particularly among vulnerable groups, such as older adults and at-risk youth (Gonyea et al., 2018; Tapia et al., 2024). Although collective efficacy is often proposed as a mitigating factor, its impact may be limited in areas with severe structural disadvantages (Kubrin et al., 2022). Emerging perspectives suggest shifting focus towards institutional actors and property owners, as traditional community-based interventions prove less effective in highly disorganized settings (Linning et al., 2022). Despite these insights, key gaps remain in the literature. Few studies have examined how social disorganization and safety perceptions vary across cultural or urbanizing contexts, nor have the intersectional dynamics in shaping safety experiences been sufficiently explored.

While social disorganization theory has been widely applied in criminological research, many studies have disproportionately focused on economically deprived areas, potentially overlooking how disorganization operates in affluent contexts. Research by Lymperopoulou and Bannister (2022) in Birmingham and Glasgow (2001–2015) reinforces the well-documented association between poverty and crime, particularly in urban centers. However, concentrating solely on deprived neighborhood risks neglects critical variations in how social disorganization influences safety perceptions across different socioeconomic strata. Despite their material advantages, affluent communities may still experience disorders such as antisocial behavior among youth or property-related crimes that affect residents' sense of security (Lee et al., 2023). Thus, a comparative approach examining deprived and affluent areas is essential for a more nuanced understanding of neighborhood safety dynamics.

This study seeks to advance the existing literature by investigating how social disorganization influences feelings of safety in two contrasting Scottish cities, Edinburgh and Glasgow. Specifically, it examines whether the relationship between social disorganization and perceived safety differs between socioeconomically deprived and affluent neighborhoods. This research addresses the following questions: 1) How does social disorganization influence individuals' perceptions of feeling safe within communities? 2) Is there a significant difference in the relationship between social disorganization and feelings of safety among socioeconomically deprived and affluent groups in Edinburgh and Glasgow? By analyzing diverse neighborhood contexts, this study aims to elucidate the varying mechanisms through which social disorganization affects safety perceptions. The findings will contribute to policy discussions on crime prevention, urban planning, and community interventions, offering evidence-based insights into how different environments shape residents lived experiences of security, ranging from security authorities (local police) to community-based initiatives organized by local governments, and emphasizing the importance of neighborhood-specific security measures.

2. Method

2.1. Research location and data acquisition

This study employed a cross-sectional survey design to examine perceptions of neighborhood safety across different socioeconomic contexts in Scotland. Data were collected from 610 participants residing in four strategically selected neighborhoods–two affluent and two deprived areas–each in Edinburgh and Glasgow (Figure 1). Deprived areas in Scotland are characterized by low educational attainment, poor economic conditions, and a lack of employment opportunities, while affluent areas exhibit the opposite (Macintyre et al., 2008; Scottish Government, 2020). This sampling approach enabled meaningful comparisons between socioeconomic groups while maintaining a geographical balance. The dataset was obtained from the UK Data Service (Atkinson, 2004), which provides access to high-quality, representative, community-level data suitable for rigorous analysis. This survey was based on a randomly generated household sample drawn from postcode addresses within each defined neighborhood. The dependent variable, feeling safe, was conceptualized as the residents' subjective assessment of their security within their neighborhood environment. Following established theoretical frameworks (Hutta, 2009; Nurbayani, Dede, and Malihah, 2022), this construct was operationalized using a 5-point Likert scale (De Pedro et al., 2016), with response options ranging from 1 ("Very safe") to 5 ("Very unsafe") (Bilen et al., 2013). This measurement approach captures the nuanced nature of safety perceptions while maintaining methodological consistency with prior research in this field (Mariano et al., 2022; Meyer, 2014).

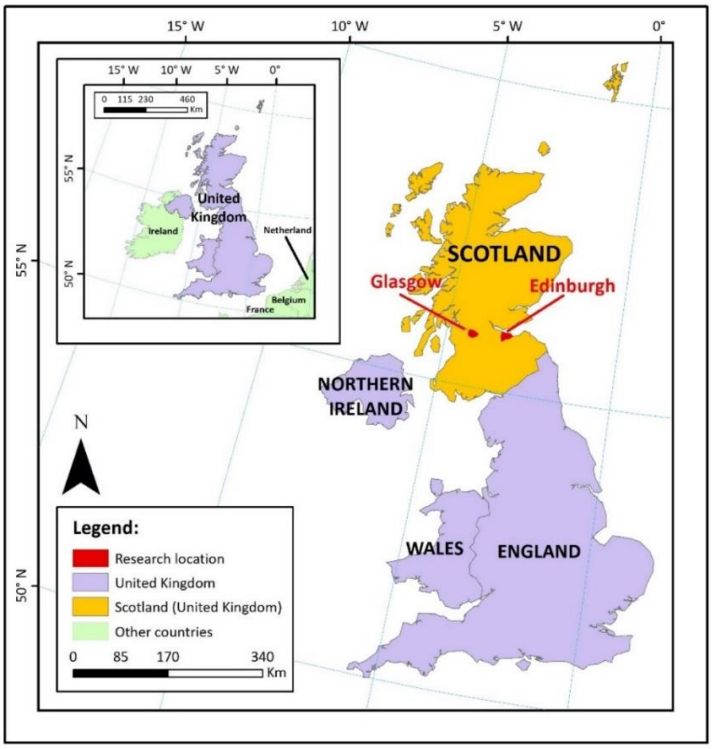

Figure 1. Research focuses on Edinburgh and Glasgow.
Source: Analysis results.

Table 1. Standard score in IRT and RM.

Percentile	z	t	Percentile	z	t
0.010	-3.179	18.200	0.403	-0.189	48.100
0.023	-2.752	22.500	0.623	0.238	52.400
0.051	-2.325	26.800	0.836	0.665	56.700
0.084	-1.897	31.000	0.969	1.092	60.900
0.131	-1.470	35.300	0.995	1.519	65.200
0.174	-1.043	39.600	1.000	1.946	69.500
0.259	-0.616	43.800	—	—	—

Source: analysis results.
Note: z = z-score, t = t-statistic value.

Six independent variables were included to assess the different dimensions of neighborhood conditions that might influence safety perceptions. These were organized into three thematic categories: public disorder

(encompassing noise, vandalism, and verbal abuse), crime and delinquency (including burglary and physical assault), and child welfare concerns (specifically unsupervised children). These variables reflect social structures and informal controls that usually maintain safety in neighborhoods (Butcher et al., 2015; Kotlaja et al., 2020; Rogers and Pridemore, 2018; Snowden et al., 2017). Each independent variable was measured using a 3-point ordinal scale (Atkinson, 2004; Nurbayani et al., 2023), with response options of 1 ("A big problem"), 2 ("A slight problem"), and 3 ("Not a problem").

Table 2. Model comparison and the likelihood ratio test.

Model	Log-likelihood	Deviance	AIC	N	χ^2	df	p
PCM	-3678	7357	7393	610	173	6	< 0.001
RSM	-3765	7530	7554				

Source: analysis results.

Note: PCM = Partial Credit Model (PCM); RSM = Rating Scale Model; AIC = Akaike Information Criterion; N = number of samples; χ^2 = chi-square value; df = degree of freedom; p = probability value.

2.2 Data analysis

The analytical approach addressed the methodological challenge of working with ordinal response data that represent latent psychological constructs. To enable more sophisticated statistical analysis, ordinal responses were converted to interval-level data using Item Response Theory (IRT) and the Rasch Model (RM) (Gomes, 2014; Kean, 2018). This transformation was particularly appropriate given the polytomous nature of both the independent (3-point scale) and dependent (5-point scale) variables, which require specialized treatment to maintain measurement precision. The transformation process employed several key steps to ensure the data quality and analytical appropriateness. First, the responses were standardized using z-scores to facilitate comparisons across different measurement scales (Table 1). The data were then converted into interval-level metrics (Dede et al., 2018; Onori, 2021), enabling the application of parametric statistical techniques. Model fit was rigorously assessed, with infit and outfit mean-square values between 0.75-1.30 indicating acceptable model fit (Yudiana et al., 2019). The Partial Credit Model (PCM) was selected as the preferred transformation approach over the Rating Scale Model (RSM) because of its superior performance in handling the specific characteristics of our dataset, particularly its low error values (Table 2).

The analysis employed a multistage approach to comprehensively examine the relationships between neighborhood conditions and safety perceptions. Descriptive statistics provided an initial overview of response distributions across the four neighborhood categories (affluent and deprived areas in both Edinburgh and Glasgow), establishing baseline patterns in the data. For inferential analysis, multiple regression was used to examine the relationships between the six independent variables and the dependent variable for perceived safety. This approach allowed for the assessment of each factor's relative contribution, while controlling for other variables. Pearson correlation analysis complemented this by examining bivariate associations between variables, with the assumption of a normal distribution supported by the data transformation process (Krzywinski and Altman, 2015; Sari and Mahmudi, 2024). To test for significant differences between socioeconomic groups, ANOVA was conducted at a 95% confidence level (Danapriatna et al., 2023), providing robust comparisons between affluent and deprived neighborhoods. The analytical framework incorporates several validation procedures to ensure the reliability of the findings. Cross-validation techniques were implemented to detect potential overfitting, with particular attention paid to the coefficient of determination (R^2) and error values (Yulia and Suhandy, 2014). The reliability and validity of the transformed data were systematically confirmed through examination of the IRT and RM fit statistics (Tables 3 and 4), ensuring measurement quality.

Table 3. Transformation model fit.

Person reliability	MADaQ3	p	Information
0.521	0.281	< 0.001	Data fit to the RM

Source: analysis results.

Note: MADaQ3 = Mean of absolute values of the centered Q3 statistic with p-value obtained by Holm's adjustment.

Table 4. Item statistics of the scale model.

Variable	Measure	SE Measure	Infit	Outfit
X1 (noise)	-1.174	0.070	0.996	0.965
X2 (vandalism)	-0.160	0.064	0.788	0.786
X3 (verbal abuse)	-2.039	0.085	1.081	0.909
X4 (burglary)	0.058	0.063	0.768	0.784
X5 (unsupervised children)	-0.892	0.067	1.042	1.006
X6 (physical assault)	-2.398	0.094	1.028	0.825
Y (feeling safe)	1.127	0.054	1.511	1.793

Source: analysis results.
Note: SE = Standard error; Infit = Information-weighted mean square statistic; Outfit = Outlier-sensitive means square statistic.

3. Results and Discussion

3.1. Respondent characteristics and regional distribution

A substantially larger number of respondents originate from affluent regions, with Glasgow and Edinburgh contributing significantly to the overall sample composition (Figure 2a). This demographic pattern indicated a pronounced trend whereby individuals from wealthier areas demonstrated higher participation rates in research activities, reflecting the broader civic engagement and research accessibility observed across urban Scotland. However, the data revealed notable disparities in respondent distribution within economically disadvantaged areas, with Glasgow demonstrating considerably higher representation than Edinburgh among deprived communities. This differential participation rate between the two cities within economically disadvantaged areas suggests potential variations in community engagement patterns, accessibility to research participation, or underlying socioeconomic factors that influence willingness to participate in academic studies.

The independent variables demonstrated clear socioeconomic gradients across the study area. The mean values of the independent variables X1 (noise), X2 (vandalism), X3 (verbal abuse), X5 (unsupervised children), and X6 (physical assault) consistently registered higher values in affluent areas compared to their deprived counterparts (Figure 2b). This counterintuitive finding warrants careful interpretation, as it may reflect differences in reporting behaviors, awareness levels, or tolerance thresholds between socioeconomic groups, rather than actual prevalence rates. Notably, a consistent pattern was observed for variable X4 (burglary), which demonstrated consistently elevated values in Edinburgh across all studied areas, regardless of their affluence or deprivation status, when compared to Glasgow. This geographic distinction suggests that burglary-related concerns may be influenced by city-specific factors, such as urban planning, housing density, policing strategies, or historical crime patterns that transcend socioeconomic boundaries.

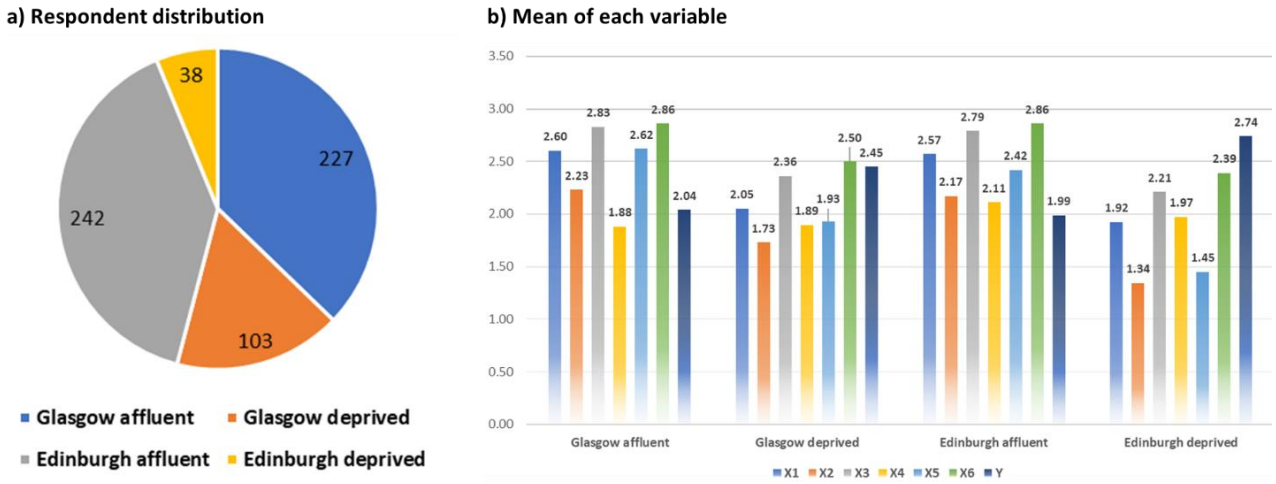

Figure 2. a) Respondent distribution in each area; b) Mean for each variable, where the independent variable using scale of 1-3 and the dependent variable had as scale of 1-5.
Source: Analysis results.

The social situation in deprived areas presents a concerning picture, characterised by consistently low mean values across all independent variables. This pattern suggests that while deprived areas may experience lower

reported levels of individual antisocial behaviors, the overall social environment may still contribute to reduced feelings of safety through other mechanisms. The dependent variable Y (feeling safe) demonstrated markedly higher values in deprived areas, particularly pronounced in Edinburgh, where safety concerns reached their highest levels with greater variability compared to Glasgow (1.99-2.74 versus 2.04-2.45). These findings indicate that deprived areas in Glasgow and Edinburgh present greater safety challenges than their affluent neighborhoods, with a higher safety scale indicating reduced feelings of security.

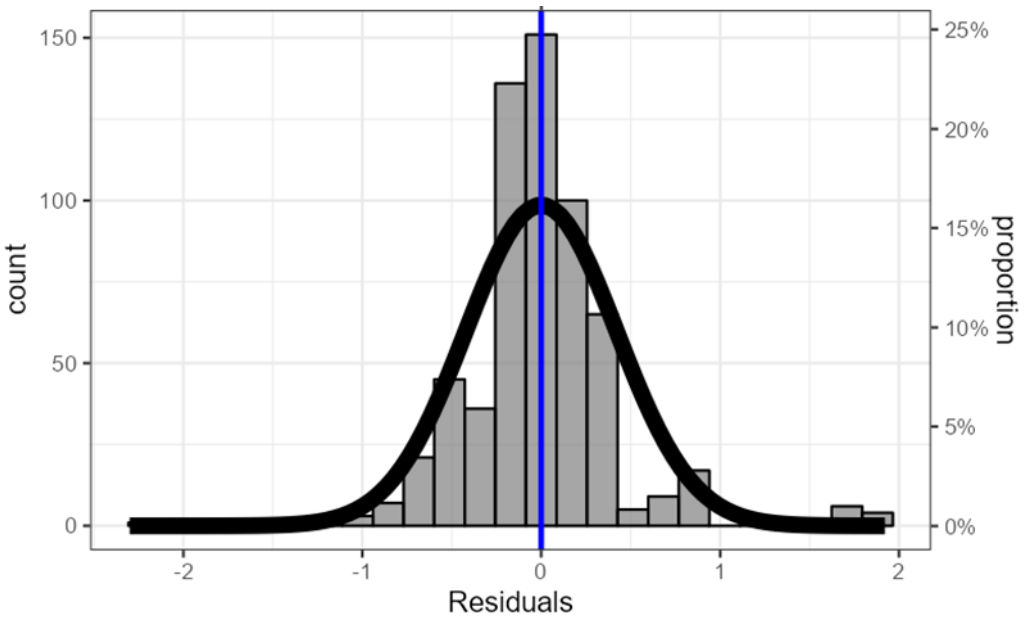

Figure 3. Residual normal curve distribution in all areas of the transformation.
Source: Analysis results.

3.2. Model validation

Multiple regression and ANOVA models are methodologically sound, as these approaches fulfil the critical assumption, especially normality, following appropriate transformation procedures (Figure 3). This transformation process enables comprehensive statistical analyses because of the normal distribution characteristics evident in the residual regression test results (Sumintono and Widhiarso, 2014). This methodological approach significantly enhanced the analytical power and interpretability of the findings. The methodological rigor of the study was tested using cross-validation to verify the feasibility of the regression model for explaining real-world phenomena (Dede, 2023; Yusep, 2009). Cross-validation procedures confirmed the appropriateness of the regression model by testing across three distinct scenarios: the full population (N=610), a balanced 50:50 split (N training=305 versus N testing=305), and a 70:30 division (N training=427 versus N testing=183). The consistent results across all validation scenarios, characterized by small error values, high r-square values exceeding 0.90, and significance levels below 0.01 (Table 5), demonstrate that the analytical approach meets the stringent requirements for inferential statistical analysis using parametric methods (Susiati et al., 2022).

Table 5. Cross validation for multiple regression model.

Model dataset	R	R^2	Adjusted R^2	AIC	RMSE	df1	df2	p
Main model	0.966	0.933	0.932	693	0.422	6	603	< 0.001
50% training and 50% testing	0.965	0.932	0.931	363	0.427	6	298	< 0.001
	0.966	0.934	0.934	335	0.415	6	298	< 0.001
70% training and 30% testing	0.964	0.929	0.928	505	0.429	6	420	< 0.001
	0.968	0.938	0.938	183	0.392	6	176	< 0.001

Source: Analysis results.
Note: R = correlation value; AIC = Akaike information criterion; RMSE = root mean square error; df = degrees of freedom.

3.3. Social Disorganization and Feeling Safe in Scottish Neighbourhoods

Comprehensive analysis across all study areas revealed remarkable model performance, with all independent variables demonstrating simultaneous interactions with the dependent variable, achieving an impressive R^2 value of 0.933 (Table 6). This substantial coefficient of determination indicates that the model successfully explains 93% of the variance in the dependent variable phenomenon through reference to the independent variables, representing the predictive power that rarely occurs in social science research. The simultaneous interaction between variables receives additional statistical support through the ANOVA results, which confirms the significant influence between the means of different variables. The consistently small p-values, substantially below the conventional significance level of 0.05, provide compelling evidence for the significant differences between the groups represented by each variable in the study (Table 7). These statistical findings collectively suggest meaningful differences among the groups represented by each variable throughout the research framework.

Table 6. Overall model in all areas.

R	R^2	Adjusted R^2	AIC	RMSE	F	df1	df2	p	N
0.966	0.933	0.932	693	0.422	1391	6	603	< 0.001	610

Source: Analysis results.
Note: F = F-statistic value.

Table 7. ANOVA in all areas.

Variable	Sum of Squares	df	Mean Square	F	p
X1 (noise)	300	1	299.812	1668	< 0.001
X2 (vandalism)	258	1	258.398	1438	< 0.001
X3 (verbal abuse)	230	1	230.371	1282	< 0.001
X4 (burglary)	267	1	266.959	1485	< 0.001
X5 (unsupervised children)	271	1	270.999	1508	< 0.001
X6 (physical assault)	189	1	188.512	1049	< 0.001
Residual	108	603	0.18	—	—

Source: Analysis results.

The model coefficients demonstrated significant values for both the constants and independent variable coefficients (Table 8). The negative notation characterizing each coefficient revealed an inverse relationship between the predictor variables and phenomenon Y, indicating that increases in antisocial behaviors and social disorder correlate with decreased feelings of safety. This inverse relationship aligns with theoretical expectations and provides empirical support for the core propositions of social disorganization theory. The fit of the regression model to the observed phenomenon was visually confirmed using the diagnostic plots presented in Figure 4. The F-statistic test provided additional confirmation of the significance of the overall regression model. With critical values from the F-distribution tables for the given degrees of freedom (df1 = 6, df2 = 603), the calculated F-statistic value of 1391 substantially exceeds both the one-tailed test critical value of 2.10 and the two-tailed test critical value of 2.80 at the 95% confidence level (Table 7). The F-statistic indicated highly significant results and provided robust evidence for the validity of the model. The regression model for all areas can be expressed by Equation 1.

Table 8. Model coefficients in all areas.

Predictor	β	SE	95% CI		Stand. Estimate	t	p
			Lower	Upper			
Constant	0.422	0.018	0.387	0.456	—	23.900	< 0.001
X1 (noise)	-0.848	0.021	-0.888	-0.807	-0.444	-40.800	< 0.001
X2 (vandalism)	-0.870	0.023	-0.915	-0.825	-0.412	-37.900	< 0.001
X3 (verbal abuse)	-0.863	0.024	-0.911	-0.816	-0.400	-35.800	< 0.001
X4 (burglary)	-0.860	0.022	-0.904	-0.816	-0.445	-38.500	< 0.001
X5 (unsupervised children)	-0.837	0.022	-0.879	-0.794	-0.440	-38.800	< 0.001
X6 (physical assault)	-0.828	0.026	-0.878	-0.778	-0.358	-32.400	< 0.001

Source: Analysis results.
Note: CI, confidence interval (95%); SE, standard error.

Table 9. Pearson's correlation matrix between variables in all areas.

Variable	Parameter	X1	X2	X3	X4	X5	X6	Y
	R	1	—	—	—	—	—	—
X1	df	608	—	—	—	—	—	—
	p-value	0.00	—	—	—	—	—	—
	R	-0.111	1	—	—	—	—	—
X2	df	608	608	—	—	—	—	—
	p-value	0.006	0.00	—	—	—	—	—
	R	0.03	0.048	1	—	—	—	—
X3	df	608	608	608	—	—	—	—
	p-value	0.453	0.237	0.00	—	—	—	—
	R	-0.179	-0.164	-0.09	1	—	—	—
X4	df	608	608	608	608	—	—	—
	p-value	< 0.001	< 0.001	0.027	0.00	—	—	—
	R	0.109	-0.026	0.155	-0.322	1	—	—
X5	df	608	608	608	608	608	—	—
	p-value	0.007	0.525	< 0.001	< 0.001	0.00	—	—
	R	0.018	0.031	0.288	-0.032	0.046	1	—
X6	df	608	608	608	608	608	608	—
	p-value	0.659	0.45	< 0.001	0.428	0.256	0.00	—
	R	-0.385	-0.309	-0.565	-0.109	-0.413	-0.499	1
Y	df	608	608	608	608	608	608	608
	p-value	< 0.001	< 0.001	< 0.001	0.007	< 0.001	< 0.001	0.00

Source: Analysis results.

The correlation analysis presented in Table 9 reveals significant relationships between independent variables and their impact on the dependent variable, with r-values ranging from 0.109 to 0.565, all characterized by negative correlations. These findings provide additional evidence that all X variables function as negative predictors of Y, reinforcing the inverse relationship between indicators of social disorder and feelings of safety. The negative correlations demonstrate that every unit increase in any X variable was associated with a 0.743 unit decrease in the response variable Y, highlighting the substantial impact of social disorder on community safety perceptions. Two variables emerged as significant predictors of safety perception. The variable X3 (verbal abuse) demonstrated the strongest negative correlation with the dependent variable (R = -0.565), indicating a robust relationship between experiences or observations of verbal abuse and diminished feelings of safety within communities. This finding suggests that verbal aggression, while perhaps considered less serious than physical violence, plays a crucial role in shaping residents' perceptions of neighborhood security. Variable X6 (physical assault) exhibited a strong negative correlation with the dependent variable Y (R = -0.499), confirming a significant relationship between physical violence and safety perceptions. The strength of this correlation underscores the profound impact that violent crime, or fear thereof, exerts on community members' sense of security and well-being.

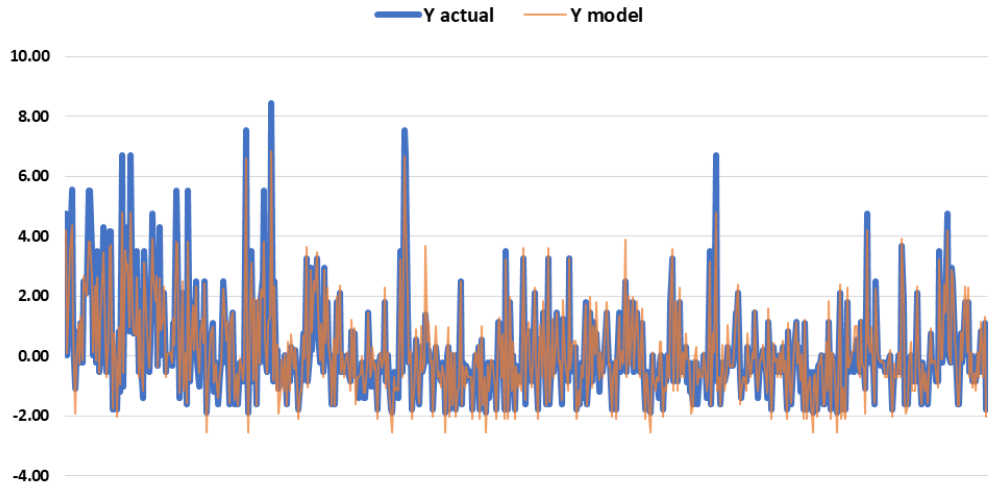

Figure 4. Comparison of regression model results with phenomena in all areas.
Source: Analysis results.

Table 10. Overall model in Edinburgh.

Area	R	R^2	Adjusted R^2	RMSE	F	df1	df2	P	N
Edinburgh affluent	0.973	0.946	0.945	0.263	691	6	235	< 0.001	241
Edinburgh poor	0.982	0.965	0.958	0.455	141	6	31	< 0.001	38

Source: Analysis results.

Table 11. ANOVA in Edinburgh.

Area	Parameter	Sum of Squares	df	Mean Square	F	p
Edinburgh affluent	Regression	286.12	6	47.687	691.474	< 0.001
	Residual	16.206	235	0.069	—	—
	Total	302.326	241	—	—	—
Edinburgh poor	Regression	175.449	6	29.241	141.127	< 0.001
	Residual	6.423	31	0.207	—	—
	Total	181.872	37	—	—	—

Source: Analysis results.

3.4. Case in Edinburgh

Edinburgh-specific analysis revealed distinctive patterns that differed from those of the overall model while maintaining strong predictive power. All independent variables in Edinburgh demonstrated simultaneous interactions with the dependent variable, achieving an R^2 value of 0.946 (Table 10), which exceeded the overall performance of the model. This enhanced explanatory power suggests that the relationship between social disorder and safety perceptions may be more clearly defined or pronounced within Edinburgh's specific urban context. The ANOVA results for Edinburgh confirm significant effects across all variables (Table 11), with the calculated F-statistics substantially exceeding their respective critical values at the 95% confidence level. Specifically, Edinburgh's affluent areas demonstrated a calculated F-statistic of 691, which was considerably greater than the critical values of 2.10 (one-tailed) and 2.80 (two-tailed). Edinburgh's deprived areas showed a calculated F-statistic of 141, which exceeded the critical values of 2.42 (one-tailed) and 3.24 (two-tailed). These statistical results confirm the significance of the model across both socioeconomic contexts in Edinburgh. The model coefficients for Edinburgh also demonstrated negative significant values, with the regression model fitting the observed phenomena, as illustrated in Figure 5. Edinburgh-specific regression models can be expressed using Equations 2 and 3.

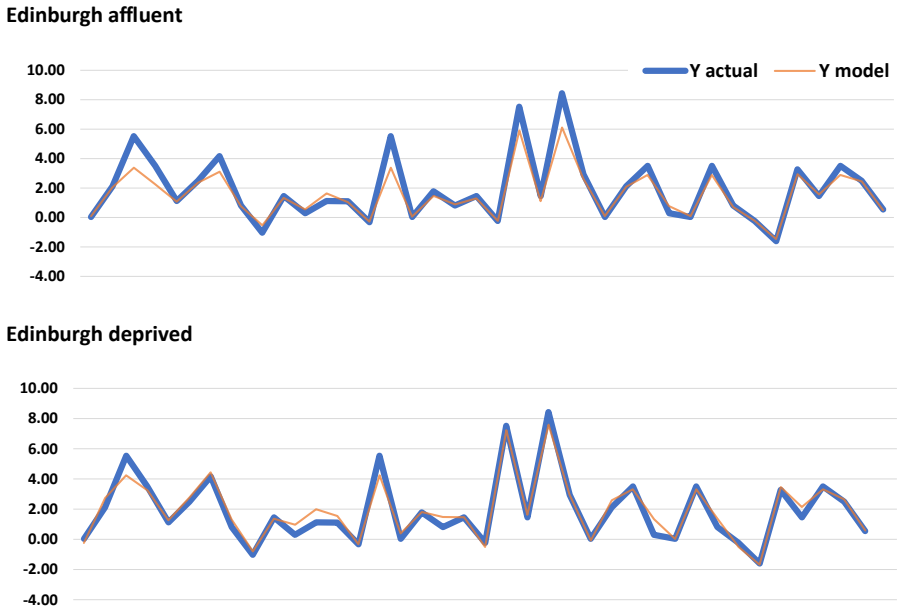

Figure 5. Comparison of regression model results with the phenomenon in Edinburgh.
Source: Analysis results.

Pearson correlation tests revealed that variable Y (feeling safe) demonstrated significant negative correlations with all independent variables (X1-X6) across both affluent and deprived areas in Edinburgh, with higher Y values corresponding to lower values in other variables (Table 12). Variable X3 (verbal abuse)

exhibited the strongest negative correlation with Y (-0.479 for Edinburgh affluent and -0.629 for Edinburgh deprived), indicating that elevated levels of verbal abuse correspond to substantially reduced feelings of safety, which is particularly pronounced in deprived areas. An interesting finding emerged regarding the prevalence of certain antisocial behaviors in affluent versus deprived areas within Edinburgh. Vandalism and unsupervised children appeared more prevalent in affluent areas than in deprived ones, challenging conventional assumptions about the geographic distribution of social disorders. However, the negative correlation between feeling safe and these variables demonstrated greater strength in affluent areas, suggesting an apparent association between these factors and reduced safety perceptions in economically advantaged regions.

Table 12. Pearson's correlation matrix between variables in Edinburgh.

Area	Variable	Y	X1	X2	X3	X4	X5	X6
Edinburgh affluent (N = 242)	Y (feeling safe)	1	—	—	—	—	—	—
	X1 (noise)	-0.317**	1	—	—	—	—	—
	X2 (vandalism)	-0.244**	-0.095	1	—	—	—	—
	X3 (verbal abuse)	-0.479**	-0.048	-0.083	1	—	—	—
	X4 (burglary)	-0.148*	-0.262**	-0.147*	-0.104	1	—	—
	X5 (unsupervised children)	-0.421**	-0.013	-0.153**	0.151*	-0.200**	1	—
	X6 (physical assault)	-0.327**	-0.027	-0.066	0.210**	-0.081	-0.019	1
Edinburgh poor (N = 38)	Y (feeling safe)	1		—	—	—	—	—
	X1 (noise)	-0.409**	1	—	—	—	—	—
	X2 (vandalism)	-0.022	-0.160	1	—	—	—	—
	X3 (verbal abuse)	-0.629**	0.057	-0.136	1	—	—	—
	X4 (burglary)	-0.504**	-0.120	-0.167	0.213	1	—	—
	X5 (unsupervised children)	-0.209	0.142	-0.019	-0.064	-0.159	1	—
	X6 (physical assault)	-0.530**	-0.111	-0.124	0.326*	0.306*	-0.114	1

Source: Analysis results.
Note: *p-value < 0.05; **p-value < 0.01.

3.5. Case in Glasgow

Glasgow presented similar patterns as Edinburgh and exhibited distinctive characteristics. All independent variables in Glasgow demonstrated simultaneous interactions with the dependent variable, with an R^2 value of 0.920 (Table 13). Although slightly lower than Edinburgh's performance, this coefficient represents 92% of the variance in the safety perceptions. The ANOVA results confirmed significant effects across all variables (Table 14), with Glasgow's affluent areas showing a calculated F-statistic of 419, substantially exceeding the critical values of 2.10 (one-tailed) and 2.80 (two-tailed). Glasgow's deprived areas demonstrated a calculated F-statistic of 264, surpassing the critical values of 2.19 (one-tailed) and 2.92 (two-tailed). These results confirmed the statistical significance across all areas within Glasgow. The model coefficients exhibit significant values for both constants and independent variable coefficients, with negative notations indicating inverse relationships between the predictors and phenomenon Y. The coefficient patterns suggest that increases in each factor contribute to decreased feelings of safety, which is consistent with theoretical expectations. The regression models for Glasgow are expressed by Equations 4 and 5, respectively.

Table 13. Overall model in Glasgow.

Area	R	R^2	Adjusted R^2	RMSE	F	df1	df2	P	N
Glasgow affluent	0.959	0.920	0.917	0.349	419	6	220	< 0.001	227
Glasgow poor	0.943	0.939	0.549	0.943	264	6	96	< 0.001	103

The correlation patterns between variable Y and other variables in Glasgow mirror those observed in Edinburgh, with significant negative correlations between variable Y and all independent variables (X1–X6) (Table 15). Consistent with Edinburgh's findings, variable X3 (verbal abuse) exhibits strong negative correlations with variable Y (-0.433 for Glasgow affluent and -0.69 for Glasgow deprived). Variable X6 (physical assault) also demonstrated significant negative correlations with variable Y, reinforcing the finding that higher levels of physical violence corresponded to substantially reduced feelings of safety. Similar to Edinburgh, Glasgow's affluent areas showed a higher prevalence of vandalism and unsupervised children

compared to deprived areas (Figure 6), suggesting that this represented a broader urban phenomenon rather than city-specific characteristics.

Table 14. ANOVA in Glasgow.

Area	Parameter	Sum of Squares	df	Mean Square	F	p
Glasgow affluent	Regression	305.918	6	50.986	419.311	< 0.001
	Residual	26.751	220	0.122	—	—
	Total	332.669	226	—	—	—
Glasgow poor	Regression	477.058	6	79.51	264.179	< 0.001
	Residual	28.893	96	0.301	—	—
	Total	505.951	102	—	—	—

Source: Analysis results.

Table 15. Pearson's correlation matrix between variables in Glasgow.

Area	Variable	Y	X1	X2	X3	X4	X5	X6
Glasgow affluent (N = 227)	Y	1	—	—	—	—	—	—
	X1	-0.280**	1	—	—	—	—	—
	X2	-0.297**	-0.262	1	—	—	—	—
	X3	-0.433**	-0.077	0.038	1	—	—	—
	X4	-0.218**	-0.173	-0.081	-0.043	1	—	—
	X5	-0.337**	0.122*	-0.144*	-0.006	-0.295*	1	—
	X6	-0.450**	-0.064	-0.015	0.166*	0.01	0.066	1
Glasgow poor (N = 103)	Y	1	—	—	—	—	—	—
	X1	-0.465**	1	—	—	—	—	—
	X2	-0.267**	-0.106	1	—	—	—	—
	X3	-0.69**	0.129	0.115	1	—	—	—
	X4	-0.235**	0.088	-0.097	-0.03	1	—	—
	X5	-0.289**	0.044	-0.061	0.148	-0.281**	1	—
	X6	-0.598**	0.09	0.097	0.413**	0.016	-0.089	1

Source: Analysis results.
Note: *p-value < 0.05; **p-value < 0.01.

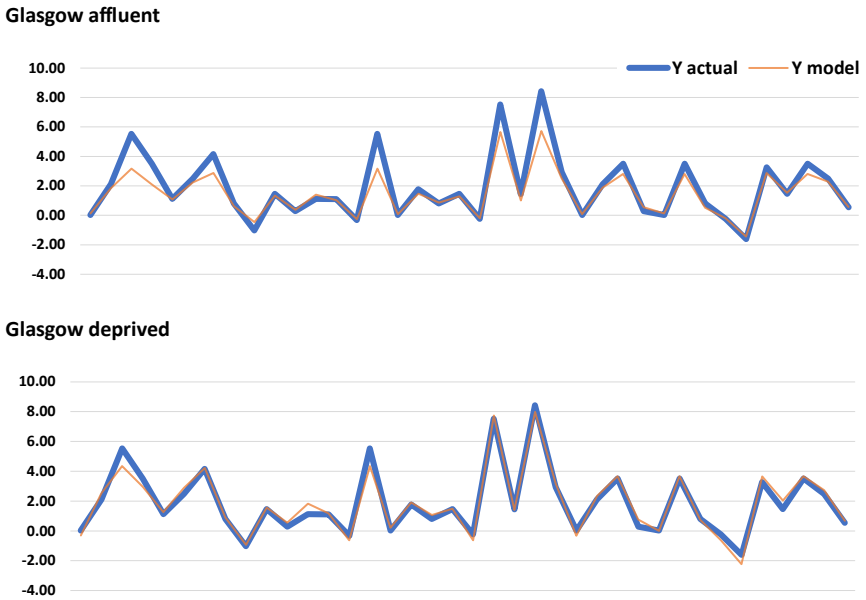

Figure 6. Comparison of regression model results with the phenomenon in Glasgow.
Source: Analysis results.

$$Y_{all} = 0.422 - 0.848\ (X_1) - 0.870\ (X_2) - 0.863\ (X_3) - 0.860\ (X_4) - 0.837\ (X_5) - 0.828\ (X_6) \quad (1)$$

$$Y_{EA} = 0.298 - 0.743\ (X_1) - 0.799\ (X_2) - 0.708\ (X_3) - 0.824\ (X_4) - 0.769\ (X_5) - 0.625\ (X_6) \quad (2)$$

$$Y_{EP} = 0.257 - 1.117\ (X_1) - 1.005(X_2) - 1.031\ (X_3) - 1.047\ (X_4) - 1.002\ (X_5) - 0.97\ (X_6) \quad (3)$$

$$Y_{GA} = 0.322 - 0.750\ (X_1) - 0.812\ (X_2) - 0.754\ (X_3) - 0.822\ (X_4) - 0.792\ (X_5) - 0.735\ (X_6) \quad (4)$$

$$Y_{GP} = 0.433 - 0.950\ (X_1) - 0.849\ (X_2) - 1.072\ (X_3) - 0.776\ (X_4) - 0.854\ (X_5) - 0.983\ (X_6) \quad (5)$$

Y_{all} = Dependent variable in the general model, Y_{EA} = Dependent variable in Edinburgh affluent, Y_{EP} = Dependent variable in Edinburgh poor, Y_{GA} = Dependent variable in Glasgow affluent, Y_{GP} = Dependent variable in Glasgow poor, X = independent variables.

3.6. Comparison in Scottish Neighbourhoods

ANOVA across both cities indicated significant differences among group means when examining variable interactions, with all p-values notably small, implying significant variations in noise, vandalism, verbal abuse, burglary, unsupervised children, and physical assault experiences. Verbal abuse and physical assault emerged as the most significant factors, which is consistent with the strong correlation coefficients observed throughout the analysis. The F-statistic tests confirm the significance of all regression models, with this value consistently exceeding the F-distribution tables, indicating highly significant results across all geographic and socioeconomic contexts. These findings showed significant relationships between social disorganization and feelings of safety, aligning with prior studies that have emphasized these associations throughout the criminological literature.

Verbal abuse and physical assault emerged as primary concerns across both cities, findings that align with reports from the Scottish Government regarding community safety priorities. The perception of violence appears significantly shaped by community context, where variables such as poverty, housing disparities, and cultural norms exert considerable influence, contributing to perceived safety within specific communities (Scottish Government, 2023a). The remarkably high F-statistics highlight substantial differences in safety perceptions between affluent and deprived areas. Correlations between feeling safe and other variables appeared consistently stronger in deprived neighborhoods than in affluent ones, suggesting that safety concerns may be more acute and noticeable in economically disadvantaged communities. This pattern likely reflects differences in access to resources, security services, and better-maintained physical environments that characterize affluent areas.

Several noteworthy findings challenge conventional assumptions about urban safety and social disorders. The correlation between vandalism and unsupervised children's feelings of safety proves statistically non-significant in Edinburgh's deprived areas, while it remains significant in Glasgow's deprived areas. This geographic variation suggests fundamental differences in the factors influencing safety perceptions between the two cities, indicating that policy approaches and community interventions may require city-specific tailoring rather than uniform regional strategies. In deprived areas, there may be differences in perception or tolerance towards vandalism (Holland, 1972) and unsupervised children (Liu, 2023). Within this context, acts of vandalism or the presence of unsupervised children may not be perceived as significant threats to feeling safe (Brunton-Smith et al., 2013). This finding contradicts the established literature suggesting that in deprived neighborhoods, issues such as antisocial behavior and the need for visible policing are predominant, with teenagers often viewed as sources of community problems (Camina, 2004).

Most social disorganization research has traditionally examined serious crime types while omitting minor forms of criminal activity. This gap represents a significant limitation, as minor crimes and antisocial behaviors may negatively influence neighborhood perceptions in ways that serious crime statistics fail to capture. Research conducted by Reid (2020) demonstrated that criminal action causes signs of disorder, anxiety, perceived risk, fear of harm, and feelings of insecurity, highlighting the importance of examining the full spectrum of antisocial behaviors. Another study by Putrik (2019) explored the relationships between crime, fear of crime, feelings of safety, and health outcomes. Their research documented various criminal activities including theft, vehicle-related crimes, pickpocketing, burglaries, and violent crimes. However, their findings revealed weak correlations between crime and community perceptions regarding feeling safe, suggesting that recorded crime statistics may inadequately capture factors that genuinely influence residents' safety perceptions. These findings support the current research's focus on more specific crime types, such as burglary and physical assault, and their relationship with feeling safe.

Public disorders, including vandalism, noise, and verbal abuse, represent another factor that negatively influences neighborhood perceptions. Research by Velasquez (2021) highlighted how neighborhood disorders, including street litter and vandalized buildings, may compromise the degree to which people feel safe walking alone in their neighborhoods, suggesting that vandalism, as a form of public neighborhood disorder, can

significantly impact people's safety perceptions. Mason et al. (2013) identified vandalism as a crucial factor influencing neighborhood perceptions. Their research explored perceptions of vandalism and other antisocial behaviors to understand their impact on neighborhood walking frequency, categorizing vandalism as antisocial behavior, and recognizing that serious neighborhood issues could discourage residents from local area mobility, thereby contributing to reduced feelings of safety. However, these studies had limitations regarding participant demographics, involving children, young people, and adults separately, rather than representing all age groups, while the impact of public disorder affects the entire population. Additionally, limited research has specifically considered noise and verbal abuse within social disorganization analysis frameworks.

Children left without adequate adult supervision can engage in risky behaviors or cause disturbances, as highlighted by Zuberi (2018). This research emphasizes the crucial role of various forms of unsupervised younger children, such as drug-related behavior, gun-related violence, and problematic social relationships, in influencing perceptions of neighborhood safety. Younger participants demonstrated a higher likelihood of feeling safe when there was little perceived danger in their environment. In more dangerous neighborhoods, youth reported feeling safe when violence levels were low, protective social ties existed, and they could successfully avoid perceived dangers. This research specifically focused on younger children, a demographic often associated with social disorganization, particularly among those who feel unsettled in environments characterized by inadequate child supervision (Nurbayani et al., 2022b).

Edinburgh and Glasgow's cases strongly support social disorganization theory, while revealing geographic and socioeconomic variations in how disorder affects safety perceptions. Regression models demonstrated high predictive power ($R^2 > 0.92$), confirming that social disorder variables were reliable indicators of safety concerns. These findings have significant policy implications, particularly for targeted intervention in urban criminology. Deprived neighborhoods exhibit pronounced social disorganization, marked by crime, poverty, and weak cohesion, fostering institutional distrust (Courson and Nettle, 2021). Affluent areas, although less visibly affected, face isolation and inequality (Solari, 2012). Policymakers should prioritize inclusive development and spatial analysis (Kubrin and Wo, 2015; Setiawan et al., 2019) to align interventions with localized needs.

Significant disparities arise in the perceptions of social disorganization and safety between neighborhoods. Deprived areas, typified by economic disadvantages, ethnic diversity, and residential mobility, demonstrate heightened social disorganization and crime, creating diminished perceptions of safety in England and the United States (Bromley and Stacey, 2012; Goodson and Bouffard, 2020; Trepka et al., 2022). Conversely, affluent areas in the Netherlands benefit from greater stability, robust social networks, and effective informal controls, which collectively enhance safety (Steenbeek and Hipp, 2011). Vulnerable residents in deprived areas, particularly children and older adults, report significantly lower feelings of safety, although strong social cohesion may mitigate these effects (Allik and Kearns, 2017). Crucially, a self-reinforcing cycle operates: disorder undermines social control, exacerbating disorganization and safety concerns in deprived contexts, while affluence perpetuates stability. These disparities underscore the need for context-specific interventions that target both structural inequalities and community dynamics.

4. Conclusion

This study provides critical insights into the complex relationship between social disorganization and perceptions of safety across affluent and deprived areas in Glasgow and Edinburgh. The findings revealed significant socioeconomic disparities in both reporting behaviors and safety perceptions, with residents in deprived areas consistently reporting lower feelings of safety despite counterintuitive trends in antisocial behavior prevalence. The regression models ($R^2 > 0.92$ across all analyses) confirmed that verbal abuse (X3) and physical assault (X6) were the strongest predictors of reduced safety, reinforcing the need for targeted interventions addressing interpersonal violence. Notably, this research highlights city-specific variations in safety determinants. While vandalism and unsupervised children significantly impact affluent areas, their influence diminishes in Edinburgh's deprived neighborhoods, a finding that challenges conventional assumptions about disorder and deprivation. This suggests that policy interventions must be context specific, accounting for localized tolerances to antisocial behavior and differing community expectations. The study also underscores methodological advancements, demonstrating that cross-validated regression models effectively capture real-world phenomena with high predictive power validated across multiple sampling scenarios.

These findings align with social disorganization theory, emphasizing how structural inequalities exacerbate safety concerns. However, this study expands this framework by incorporating "minor" crimes (e.g., noise, verbal abuse), which are often overlooked yet critically shaped public perceptions. For policymakers, the

results advocate for 1) community-based anti-harassment initiatives to reduce verbal aggression; 2) enhanced visible policing in deprived areas to address physical violence; and 3) tailored urban strategies that recognize Glasgow's heightened sensitivity to vandalism compared to Edinburgh. Future research should explore longitudinal data to assess causal relationships and incorporate qualitative methods to understand the cultural influences on safety perceptions.

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