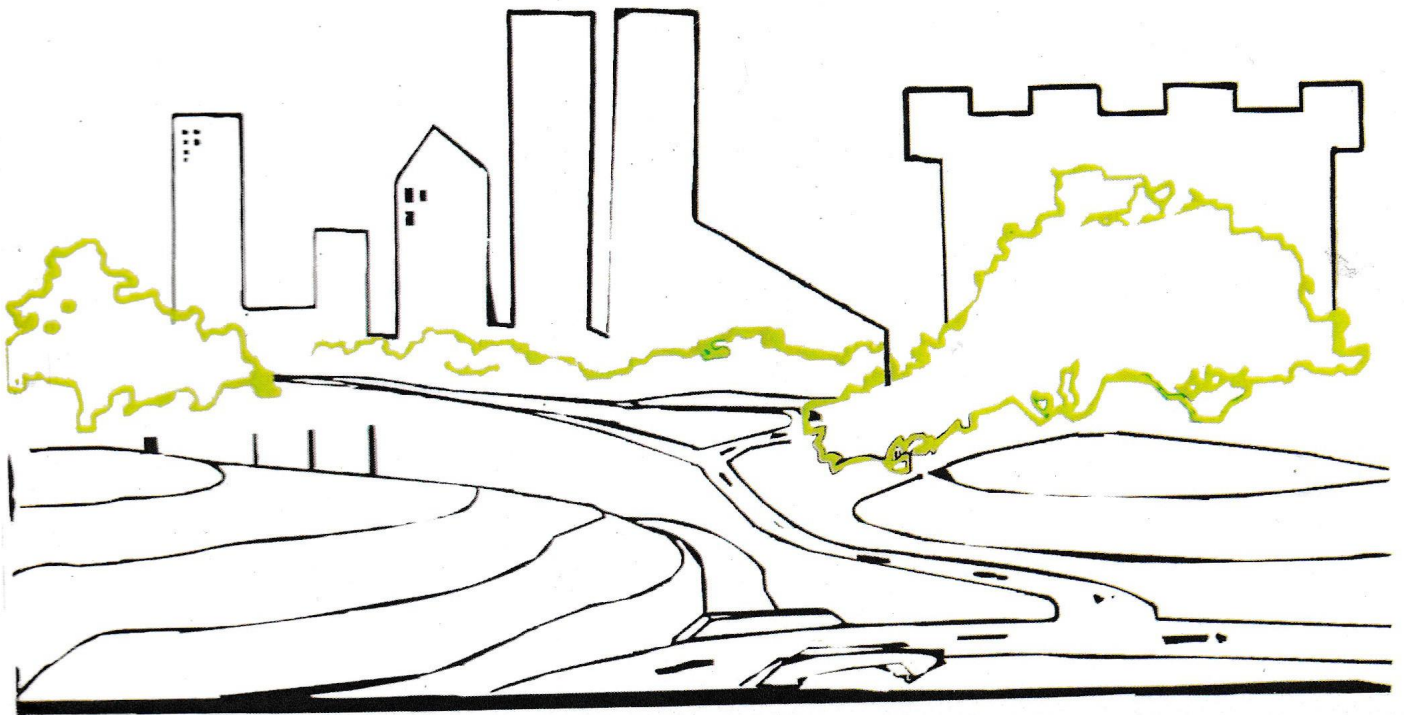


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## CRIME RISK INTERPRETATIONS IN NIGERIAN BUILT ENVIRONMENT: THE CASE OF MINNA, NIGER STATE

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### Abstract

*Using a multistage sampling of respondents, this study uses ordinary least square logistic regression models to estimate violent crime victimization risks in the different residential neighbourhoods of Minna, Nigeria. It focuses on the effects of the neighborhood built environment in the form of nonresidential landuses and neighbourhood-level social and economic characteristics. As shown in the outcomes, residents with higher level of education had lower risk of violent crime victimization, as did high income individuals. Results showed that individuals' risks of violent crime victimization were significantly on the increase if respondents lived in the high density than do residents of the low density residential neighbourhood. Findings indicated that the neighbourhood-level presence of commercial and recreational landuses significantly increases residents' risk of violent crime victimization in the study area. The study concludes that violent crime victimization risks varied significantly across neighborhoods and that socio-economic, structural and landuse variables accounted for this. Implications for future research and crime prevention policy are discussed.*

**Keywords:** Violent crime; Victimization; Built environment; Risks Minna town; Nigeria.

### Introduction

Analysis of spatial distribution of crime risks have extensively been in the forefront of crime analysis histories. Shaw and McKay (1942) were the first major contributions to this perspective. Grounded in the concentric zone model of urban growth; first articulated by Park and Burgess (1915), Shaw and McKay (1942) postulate that variations in crime rates across space result from the process of urban growth and its resulting effects on community social organization factors. Following Shaw and McKay's postulation, studies have addressed this nexus of factors in micro, macro and multilevel studies (Zhang, Messner, & Liu 2007; Reynald 2011; Lemieux & Felson, 2012; Pratt & Turanovic 2015). Macro-level studies emphasize the interrelationships among characteristics of aggregate units (such as neighborhoods, urban centres, cities, countries) while micro-level analyses focus on differences in the social behaviour across types of individuals. Multilevel studies center exclusively on both the macro and individual level of analysis.

Social disorganization theory, routine activities and life-style theories have been proposed to account for crime trends at micro, macro and multi levels analysis (Baumer 2007; Sampson, Eck & Dunham, 2010; Clarke & Felson, 2011; Bunch, Clay-Warner & McMahon-Howard, 2014). Social disorganization perspective believe that areas with unstable residential populations, high density, lower-income households, and ethnically heterogeneous populations have higher rates of criminal victimization than do other types of geographical areas. Lifestyle and routine activity theories both view victimization through the lens of the convergence of a motivated offender, a victim, and the absence of capable guardianship. These theories differ, however, in how they view the behaviours that put people at risk for crime victimization. Where lifestyle theory conceives of risk in certain behaviours elevate one's chances of being victimized, routine activity theory simply describes the victimization event itself. In other words, routine activity assumes that if the three key elements converge; victimization occurs; however, if one of the elements is absent, victimization is avoided.

A thought-provoking slip from previous investigations is an examination of the effects of the built environment features despite that this appears particularly important to shaping crime victimization risk. Researches that have addressed the role of the physical environment in understanding victimization risk are those studies that have examined the effects of physical incivilities (Wilson and Kelling 1982; Taylor and Covington 1993; Taylor 2001; Abegunde, et. al 2007; Abdullah, et. al 2013). Taylor and Covington (1993) described clearly the role of physical incivilities (such as broken windows and graffiti) within macro models of risk. They proposed that community structure affects the ability of residents to informally control their streets and to repel crime. Fear of crime models incorporating incivilities elaborate this core proposition by pointing to specific physical and social signals which inform residents about safety and informal control on the street. Residents infer weakened informal controls from more extensive incivilities. Physical incivilities are particularly visible environmental cues signaling criminal opportunity or risk to an individual within that context (Wilcox et. al 2003).

Besides incivilities, other aspects of the built environment seem important in assessing crime risk victimization. Merry (1981) clearly addressed this issue having observed that places appear dangerous not simply because of the incidence of crime but also because of their design, their familiarity, and residents' anticipation that someone will intervene to help them, and the behaviour and reputations of their habitual users. Later studies have supported Merry's findings, suggesting that features of the built environment such as poor design, poor lighting, bushes and overgrown bushes landscaping all allowing for refuge while disallowing prospect and escape increase crime risk (Brantingham and Brantingham 1994; Fisher and Nasar 1995; Stamps 2005a, 2005b). Built environment and crime risk linkages most relevant to the present study's focus have also been found. Taub *et al.*'s (1981) in their study, for instance, revealed that landuses affected crime risk victimization. More specifically, residents living in close proximity to parks or playgrounds or other open spaces experienced heightened victimization risk. Furthermore, the presence of parks and playgrounds increases individual perceptions of danger in a study by Wilcox et al (2003).

The above studies, however, were not carried out in Nigeria. In fact, no study to date that we are aware of has examined the possible effects of landuse on violent risk victimization in the Nigeria context. In this study, we extend previous researches to the sub-Saharan Africa by examining how commercial, recreational landuses as well as street layout, the neighbourhood composition, the routine activities, and resident's lifestyle influence the risks of violent crime victimization. More specifically, using a sample of individual households in Minna, Nigeria, the study estimated ordinary least square logistic regression models of how risks of crime victimization are influenced by the personal characteristics of residents and that of their immediate environment. Through this analysis, we aimed to delineate the extent to which neighbourhood-level aspects of contextual factors serve as an exploratory tool in shaping individual residents' crime victimization risk in Minna, Nigeria. The study concludes with a discussion of the implications of the results for further research and crime control policy in Nigeria.

### **The study area**

The study adopted a case study method. Minna, Nigeria was chosen as the study area. The city is situated within latitudes  $9^{\circ} 33'$  and  $9^{\circ} 51'$  north and longitude  $6^{\circ} 33'$  and  $7^{\circ} 5'$  east of the Greenwich Meridian. It is located in northern Nigeria, precisely in the north-central geo-political zone of the country. The spatial coverage of Minna covers areas from River Chanchaga to the south-east, Upper River Basin to the north and Maitumbi to the east. Minna can be classified into 26 neighbourhoods including a Military Barrack area (See Figure 1). Studies have shown that these residential neighbourhoods could be divided into the high, medium and low density areas (Baba, Morenikeji and Odafen, 2001; Sanusi, 2006). Each of these zones is observed to be internally homogeneous in terms of physical layout, population, economic status and environmental amenities available among others. The high density residential areas are usually located in the central area of pre-colonial neighbourhoods. It is usually with a density of over 300 persons per hectare (Coker et al 2007). The areas are largely unplanned, lacking good access roads. Medium density residential area are usually planned and laid out after establishment of British rule. They

were developed to satisfy the need of the middle grade income households in the formal sector. Medium density residential district is usually with a population density of 100 – 300 persons per hectare (Coker et al. 2007; Efe and Eyefia 2014). Low density residential areas are high quality districts usually well laid out. They are not common in the old growing pre-colonial towns except those, which were once provisional headquarters like Minna. Low-density residential districts are less than 100 persons per hectare (Coker et.al 2007; Efe and Eyefia 2014).

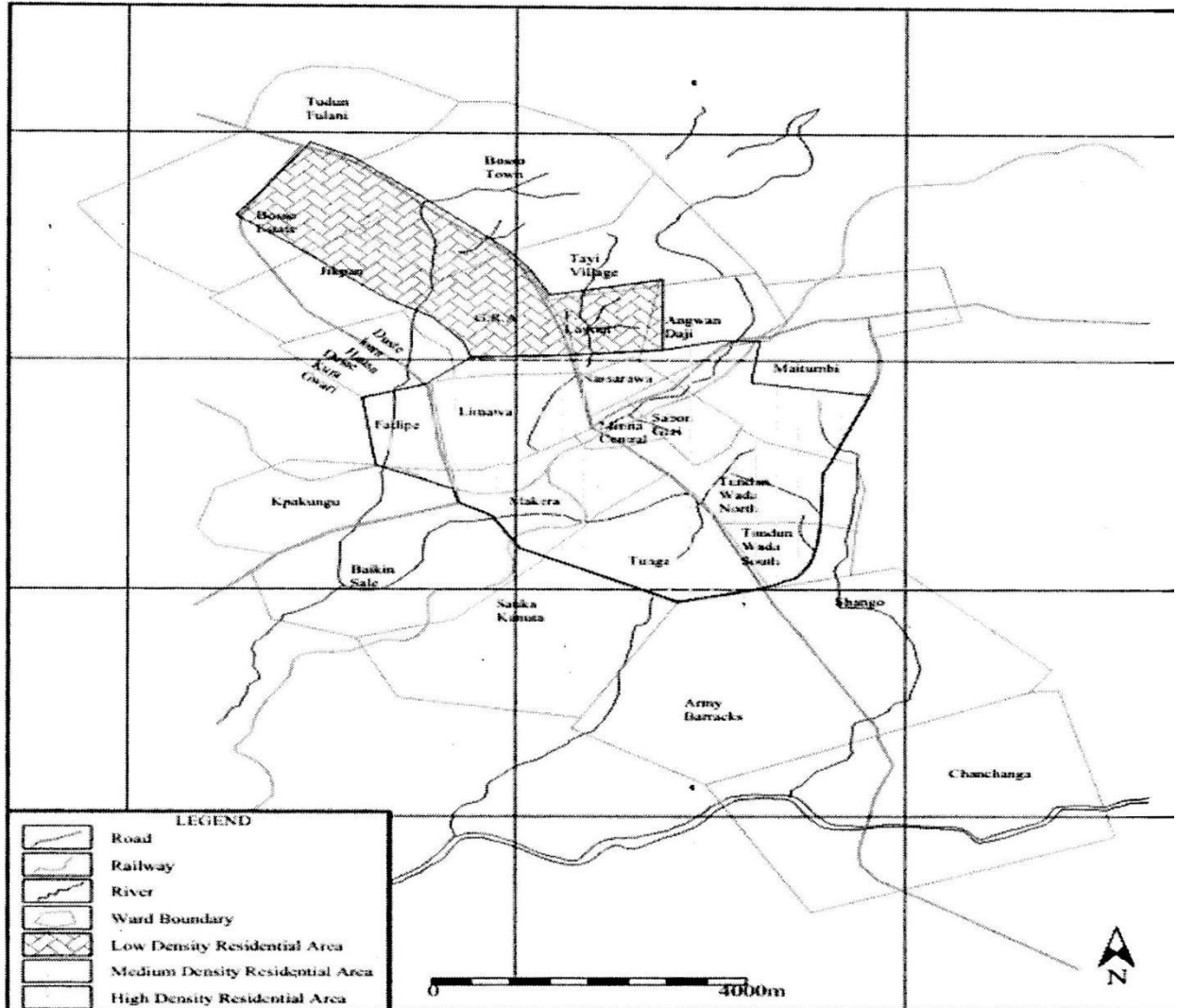


Figure 1: Spatial structure of Minna, Nigeria

These sub-divisions had been observed by previous studies to be the characteristics of some Nigerian towns and cities. Towns and cities in Nigeria where these zones are identifiable include among others Ilorin (Akorede 1974); Ibadan (Onokerhoraye 1977; Adigun 2012); Lagos (Agbola 1997; Oduwaye 2013); Ogbomosho (Afon 2005) and Ile-Ife (Badiora 2012).

### Methodology

Data were obtained through the stratification of Minna into the high, medium and low density areas (See Figure 1). Investigation revealed that there were 98, 181 and 52 streets in the high, medium and low densities respectively in Minna. One out of every five streets (20%) in each residential area was selected using systematic sampling. A total of 66 streets were selected. There were 1026, 1357 and 375 buildings on the selected streets in the high, medium and low density areas respectively. Every tenth building (10%) was selected using systematic sampling after the

first building was chosen randomly. Questionnaire was administered on a household representative person on each floor of the selected buildings. A total of 304 copies of questionnaire were administered while 241 were retrieved (approximately 79% response rate). Information elicited included residents' socio-economic characteristics, land/building use and experience of violent crime in the twelve (12) months prior to the survey. Data collected were subjected to descriptive statistics and regression analysis. Unless otherwise stated, tables and figures in this chapter are the outcomes of the author's field survey in the second quarter of 2015.

The dependent variables are whether or not respondents experienced violent crime in the selected street during the 12 months prior to the survey. Violent crime as used in this study includes being physically attacked or threatened, or having something stolen by force (for instance; bag/purse-snatching & pick pocketing). Our attention is restricted to violent crimes that occurred within the street of the respondent's because criminal opportunity theories are not applicable to crimes among intimates (see Miethe, Stafford & Long 1987) and our measures of context factors are only relevant to crimes at or near the home-based. The independent variables include measures of social structures, economic conditions in the neighborhood and key concepts underlying theories of victimization, land use and the built environment (that is, guardianship).

### **Results and Discussion of Findings**

As shown in Table 1, nearly 33% of the residents in Minna, Nigeria were victims of violent crime victimization while 34% of the residents in the high, 19% in the medium and 16% in the low density area experienced violent crime victimization in the last 12 months prior to the survey. This is relatively high. Besides, the results suggest that crime victimization risk reduces with an increase distance from the high to low density areas. It is evident from the above that individuals who live in the high density areas have greater risks of violent crime victimization than do residents in other areas. Differences in crime victimization risk between the residential densities were statistically significant. The result of the analysis of variance ( $F=32.01$  and  $p=.000$ ) confirmed this.

Guardianship represents the ability of persons or objects to prevent the occurrence of crime. This is usually measured by the number of housemates or crime prevention activities (Miethe and Mcoowall 1993). Guardianship could be social or physical. However, the later is measured in this study. Physical guardianship is indicated by the number of safety precautions taken by the resident (i.e. lock doors & windows, leave lights on, use extra locks or special locks, own a burglar alarm, security camera, own a dog, have neighbors watch home, own a weapon among others). It is used in this study to measure the lifestyle of respondents. To minimize the violent crime victimization effect, each element in our composite measure of physical guardianship is based on ex post facto information of protective actions/behaviours that took place in the study area twelve months before the survey. Findings showed that highest numbers of physical guardianship behaviours was found in the low density area. Comparing guardianship behavioural pattern with crime victimization pattern, it is evident that both are inversely related. That is, individuals/residents who engage in less guardianship behaviour have greater risks of violent crime victimization. This assertion is further analysed in the regression model analysis presented later in this article.

Table 1: Descriptive Statistics of Variables on Spatial Pattern of Residential Neighborhoods

	High Density	Medium Density	Low Density	Minna
<b>Income</b>				
Below Poverty Line	23(25.3)	06(5.1)	01(3.2)	30(12.5)
Low Income	49(53.9)	54(45.7)	05(16.1)	108(44.8)
Middle Income	19(20.9)	35(29.7)	06(19.4)	60(24.9)
High Income	--(0.0)	23(19.5)	19(61.3)	42(17.4)
<b>Total</b>	<b>91(100.0)</b>	<b>118(100.0)</b>	<b>31(100.0)</b>	<b>241(100.0)</b>
<b>Occupation</b>				
Civil Servant	3(3.3)	32(27.1)	8(25.8)	43(17.9)
Trading	31(34.1)	22(18.6)	13(41.9)	66(27.5)
Farming	42(46.2)	37(31.4)	2(6.5)	81(33.8)
Artisans	15(16.5)	20(16.9)	2(6.5)	37(15.4)
Professional Practice	3(3.3)	7(5.9)	6(19.4)	13(5.4)
<b>Total</b>	<b>91(100.0)</b>	<b>118(100.0)</b>	<b>31(100.0)</b>	<b>241(100.0)</b>
<b>Level of Education</b>				
None	23(25.3)	11(9.3)	00(0.0)	34(14.2)
Primary	24(26.4)	26(22.0)	6(19.4)	56(23.3)
Secondary	43(47.3)	38(32.2)	15(48.4)	96(40.0)
NCE/OND	1(1.1)	25(21.2)	6(19.4)	32(13.3)
HND/B.SC	00(0.0)	15(12.7)	4(12.9)	19(7.9)
Post Graduate	00(0.0)	3(2.5)	00(0.0)	3(1.2)
<b>Total</b>	<b>91(100.0)</b>	<b>118(100.0)</b>	<b>31(100.0)</b>	<b>241(100.0)</b>
<b>Use of Buildings</b>				
Residential	46(50.5)	72(61.0)	25(80.6)	143(59.3)
Commercial	33(36.3)	34(28.8)	2(6.5)	69(28.8)
Educational	7(7.7)	7(5.9)	1(3.2)	15(6.2)
Recreational	5(5.5)	5(4.2)	3(9.7)	13(5.4)
<b>Total</b>	<b>91(100.0)</b>	<b>118(100.0)</b>	<b>31(100.0)</b>	<b>241(100.0)</b>
Main roads Network	12.0	7.0	3.0	22.0
Safety precautions	2.92	3.55	3.96	3.24
Violent crime victim	.342	.191	.163	.331

Note: Income was grouped using the Nigerian civil service income grade level as follows. Below poverty line/the national minimum wage (<N18000); low income group (grade level 01 to 06 or N18000-N60000), middle income group (grade level 07 to 12 or N61000-N150000) and high income group (grade level 13 to 17 or above N150000). 1USD = N383.00k; Main road network (No. of Intercepts); Violent Crime Victim coding (Yes or No), Safety Precaution coding (No. of Precautions)

From the summary presented in Table 1, the mean monthly income of respondents Minna, Nigeria was ₦65,400. The average monthly income of respondents in the high, medium and low densities was respectively, ₦38,100, ₦71,300 and ₦88,500. It is evident through Table 1, that 12.5% of the residents in Minna were living below poverty line. It was also evident that 16.5%, 25.3% and 5.1% of the respondents in the high, medium and low density area were living below poverty line respectively. Low income earners accounted for 44.8% of the residents in Minna. Findings showed that 53.9%, 45.7% and 16.1% of the residents in high, medium and low density areas respectively were in the low income group. While, 61.3% of the residents in the low density area were in the high income group, no respondents earning above ₦150,000 monthly lived in the high density residential. From the above, it is conclusive that the average monthly income varied inversely with residential densities. That is, as distance increases from low to high densities, average monthly income was on the decrease. Differences in the income of residents were significant. The result of the analysis of variance ( $F=67.207$  and  $p=.000$ ) confirmed this.

As presented in Table 1, farming reported the most important occupation by accounting for 46.2% and 31.4% of all the occupation types in the high and medium densities. Trading was the most

predominant occupation in the low density area (41.9%). Residents who were artisans were on the decrease as distance increases from the high density to low density areas while the proportion of residents who were civil servant or professionals was on the increase from the high density towards the low density residential area. Differences in occupation within Minna were statistically significant. The chi-square test ( $\chi^2=53.813$ ;  $p=0.000$ ) confirmed this assertion.

The highest level of education status in the high density area was secondary school (47.3%). The educational status ranked first in both the medium and low densities accounting for 32.2% and 48.4% respectively. Findings further showed that 26.4%, 22.0% and 19.4% of the residents in the high, medium and low densities respectively had primary education. Residents with OND/NCE accounted for 1.1% in the high density; 21.1% in the medium and 19.4% in low density. Findings showed that respondents with no formal education were concentrated in the high density areas while those with higher education were concentrated in the low density. It was thus, deducible that the educational status of respondents was on the increase as distance increases from the high density towards the low density area. Differences in educational status within the city were statistically significant. The chi-square ( $\chi^2 = 49.687$  and  $p=0.000$ ) confirmed this assertion.

Examination of physical, built environment features were based on land/building use. Findings showed that the most important land/building use in the high density was residential (50.5%). Residential also ranked first in the medium (61.0%) and low densities (80.6%). Furthermore, findings showed that 36.3%, 28.8% and 6.5% of the buildings in the high, medium and low densities respectively were for commercial purposes. Findings revealed that recreational activities accounted for 5.5% of all the land/buildings in the high density; 4.2% in the medium density and 9.7% in the low density areas.

The belief of this study is that lifestyle, economic and physical, built environment characteristics identified and examined above have effects on violent crime victimization risks in Minna, Nigeria. Therefore, having described the variables, a multivariate regression model was developed to explore the relationship between violent crime victimization and contextual variables capturing economic and land/building use characteristics of Minna, Nigeria. This study extracted variables that are in closest proxies within the general framework of social control-disorganization theory, life-style and routine activities theory. The independent variables extracted from the previous analysis include the proportion of highly educated workers; the proportion of commercial use; the number of main roads; number of safety precautions used; the proportion of residents living in the low density area, and the presence or absence of recreational activities/landuse.

A variable label QTY\_GB was extracted into the model to represent the number of resident who engage in physical guardianship behaviour. This was chosen as a proxy and indirectly a measure of residents' behaviour in the context of life-style theory. Lifestyle theory conceives of risk in probabilistic terms. It is conceived that certain behaviours elevate one's odds of being victimized or not (Pratt & Turanovic 2015). However, guardianship behaviour can effectively improve safety and thus help curtail risk of violent crime victimization (Badiora, Popoola & Fadoyin 2014). It is believed that higher level of guardianship should reduce risk of violent crime victimization. Variable labeled "PRO\_HEW" represent the proportion of the better educated residents who have a HND/B.Sc. or higher degrees. This was chosen as a proxy and indirectly a measure of social control of neighborhoods in the context of social disorganization theory. High level of education is often considered a key contextual characteristic of neighborhoods where crimes are less likely to occur due to the collective efficacy against crimes fostered among educated citizens. Further, people in areas with high percent of better-paid jobs usually can afford more security measures such as extra/special locks, security alarm, security dogs, and security guards. These measures can effectively improve guardianship in the areas and thus help curtail crimes.

It is believed that building or landuse features of an area seem to influence the concentration of crimes. Researches in criminology have long taken certain landuse characteristic into consideration when accounting for urban crime patterns (See Ackerman & Murray, 2004; Browning *et al.*, 2010;

Cahill & Mulligan, 2007; Lockwood, 2007; Stucky & Ottensmann, 2009). In this regards, three variables were extracted in earlier information. These include the proportion of commercial use (*PRO\_COM*), the proportion of recreational landuse/buildings (*PRO\_REC*) and the quantities of main roads (these are used in this study as denser road networks) in each residential density (*QTY\_MR*). These are included in the model to measure indirectly the availability of targets and offenders, as well as the weakening of local residents' sense of territory and formal controls. These variables are postulated to influence, and more specifically, increase the risk of individual victimization in an area. As commercial areas usually suffer more crimes than other areas (Lockwood, 2007), the proportion of commercial area in a neighborhood should be positively associated with the crime rates. The proportion of recreational landuse/buildings and the corresponding characteristics in the distribution of population and other economic activities within and near these recreational areas are expected to have an effect on the violent crime risk. Similarly, since the distribution of crimes is often believed to be related to the transportation network (Zahm, 2007), it is reasonable to consider that main road (which is usually denser road network) may generate more crime risks because more nodes, paths, and edges means more opportunities for criminal activities and meanwhile weakening the territory sense of the residents (Brantingham & Brantingham, 1993; Chainey & Ratcliffe, 2005).

Concentrated disadvantage or affluence can influence a neighborhood's collective social control, thus affecting the local crime risk. The economic segregation between both poor and affluent families in Minna has led to the emergence of concentrated affluence and disadvantage, reflected increasingly by the striking contrast in housing conditions. We attempted to obtain a variable to reflect this important dimension of residential neighbourhood structure in Minna, Nigeria. A variable labeled *PRO\_RLD* was derived to denote the proportion of respondents in the low density residential area. It was used as a proxy of a concentrated advantage or affluence. Generally, low density areas in Nigerian cities are typically well designed. They tend to correlate to where white-collar workers and/or high-class households reside, which is a special and prevalent phenomenon in Nigerian cities. So this variable, as a proxy of concentrated affluence, is postulated to be negatively associated with the violent crime victimization rates.

It should be noted at this juncture that Table 1 contains the descriptive statistics for the explanatory variables in the multivariate regression model. It is clear that these variables indeed vary quite significantly across Minna's residential areas. The results of the Ordinary Least Square (OLS) regression analysis are shown in Table 2, including both un-standardized and standardized parameter estimates and collinearity statistics. From both the methodological and practical standpoints, the OLS regression model as presented in Table 2 offers a meaningful explanation for the variation of crime rates in Minna, Nigeria. Overall, the model explains about 70% of the variance of violent crime victimization risks, and all the coefficients are significant. Interestingly, all are also in expected direction. By and large, the results support the notion that violent crime victimization risks are a function of the characteristics of people as well as the environment and characteristics of the area where people reside or work. The variance inflation factors (VIFs) of all the independent variables are less than 2. This indicates that collinearity among the variables is low. Nonetheless, this model does provide helpful insights in explaining violent crime victimization in Minna, Nigeria.

The results of the analysis of guardianship behaviour attributes (*QTY\_GB*) revealed that risks of violent crime victimization are higher among persons who take fewer safety behaviour or precautions. This was evident as significant negative correlation was modeled between guardianship behaviours and violent crime risk. In other words, findings indicate that for every additional safety behaviour or precaution in which an individual engaged, the probability that he or she would be victimized reduces. This finding is consistent with predictions based on a criminal opportunity perspective (Lemieux & Felson 2012). Other life-style factors that appear important in previous literature include involvement in dangerous public activities, leaving the home unoccupied, carrying valuables or money in public (Pratt & Turanovic 2015).



Table 2: OLS Regression Estimates for Models of Crime Victimization Risks in Minna, Nigeria

Independent variables	Un-standardized coefficients	Standardized coefficients	t	Sig.	VIF
Constant	7.234	---	5.403	.010	---
PRO_HEW (%)	- 8.433	-.191	- 2.129	.000	1.284
PRO_COM (%)	21.461	.201	3.221	.000	1.421
QTY_MR (counts)	2.461	.281	3.124	.000	1.654
PRO_RLD (%)	-.028	-.121	- 1.675	.020	1.528
PRO_REC (%)	-.035	-.122	1.681	.000	1.087
QTY_GB (counts)	-.041	-.135	- 1.212	.001	1.241

Model:  $R^2 = 0.711$ ; Adj.  $R^2 = 0.681$ ;  $F = 24.55$ ; Sig. = 0.002

Note: VIF: Variance inflation factors; PRO\_HEW: Proportion of highly educated workers; PRO\_COM: Proportion of commercial use; QTY\_MR: Number of main roads; PRO\_RLD: Proportion of respondents in the low density residential area; PRO\_REC: Proportion of recreational land use/buildings; QTY\_GB: Number of Residents engaging in Physical Guardianship Behaviour.

The parameters for the proportion of recreational landuses, commercial buildings and the quantity of main road are significantly positive, supporting the three variables as measures of increased potential targets in line with the routine activities theory. Commercial and recreational areas are usually open and easily accessible to the public, and tend to draw many more people, especially, visitors or shoppers, into the area. This convergence of people in time and space could increase the number of suitable targets and potential offenders. Since most of the people in commercial and recreational areas are simply transient, crime control, and prevention become more difficult. There are many potential blind spots without effective and capable guardians. Furthermore, many banks, supermarkets, secondary schools, bars or taverns and alcohol outlets, fast-food restaurants and other businesses exist in commercial and recreational areas. The availability of money with people and/or businesses could mean more suitable targets for crimes as bag-snatching and pick pocketing. Actually, the guardianship in many of the recreational and commercial areas is enhanced during daytime through increasing number of security cameras, guards and patrolling policemen. However, with the usual vast concentration and mobility of people, potential targets and offenders, may very well outweigh the effect of improved guardianship in many of these areas. In other words, compared with the tremendous level of pedestrian and traffic flows, security guardianship always appears inadequate and ineffective in commercial and recreational areas. Even after dark, many of the commercial areas tend to be poorly attended and guarded, making them less safe for those people using the area as a passageway.

The positive correlation between violent crime rates and quantity of main road (denser road networks) can be similarly interpreted largely from the perspective of the routine activities theory. Although main road network may mean increased natural surveillance and guardianship, this can also mean that more vehicle traffic and pedestrian traffic are on the street in an area, thus increasing the number of potential offenders and targets, and consequently the opportunities for crimes. Availability of main road can also imply that the area is more accessible and there are more street corners and intersections where crimes, such as purse-snatching and assaults, are more likely to be committed by motivated offenders. It is believed that the existence of numerous main roads and streets could offer offenders more escaping routes, and makes effective policing and crime control more difficult to achieve.

The significantly negative correlation between the proportion of residents with higher education level and crime rates can be explained primarily within the framework of social disorganization theory. Various studies have revealed that well-educated persons have significantly lower levels of mistrust and are more sensitive and responsive to crimes (Ross & Jang, 2000; Badiora, 2012). Low level of education, on the contrary, is considered a key contextual characteristic of neighborhoods where crimes victimization are more likely to occur. Similar situations have also been found in

contemporary Nigerian cities (See Adigun, 2012; Badiora, 2012; 2016). In Nigerian urban centres, areas where a lot of highly educated individual resides tend to be well designed, planned, and have a favorable physical and social environment. Various modern facilities and infrastructures are usually provided. Social cohesion and informal social control, such as local organizations, voluntary associations and neighborhood watch, as well as public control in the form of an effective police presence are easier to foster and function in these neighbourhoods than their less educated counterparts, thus exerting the expected negative effects on violent crime victimization rates. Hence, an increase in the concentration of highly educated people exhibits a considerable impact on the decrease in the risk of violent crimes victimization in Minna, Nigeria.

As far as the proportion of residents in the low density area is concerned, it shows a significant negative relationship with violent crime victimization in the regression model. This indicates that the low density area in Minna, Nigeria tends to suffer lower risks of violent crime victimization. This further confirmed the lowest violent crime figures generated in the descriptive analysis (See Table 1). These findings have many implications. First (and the most obvious) is found within the guardianship behaviour of the residents in this area. Most of the streets and buildings in the low density areas of Minna, are well secured with gates, lock doors, security lights, special/extra locks, burglar alarm, security camera, security dog, and neighborhood watch, own a weapon among others. Hence, it is not easy for the offenders to enter the communities anytime and find suitable targets. Second, although a significant proof to this is beyond the model of this study, we can presume that the old/transition/high density areas are likely to experience more violent crimes mainly due to more opportunities to commit crimes. It has been established that residents of areas with fewer indications of informal social control and physical guardianship had greater risks of violent (See for instance Wilcox, et al 2003; Zhang, et al 2007; Pratt & Turanovic 2015). In summary, it seems that violent crime risks are reduced in the low density areas as compared with the high density areas, owing to the enhanced social organization and social control in these areas.

### **Conclusion and Recommendations**

This research presents an exploratory analysis of violent crime victimization risk in Minna, Nigeria as well as its relationships with contextual socio-economic and built environment characteristics of the town's neighborhoods. The results suggest that there are several individual predictors of crime victimization risk in the study area. First, findings indicate that individuals' risks of violent crime were significantly increased if they lived in high density areas than do residents of the low density areas. Residents with higher education level had lower risk of crime victimization, as did high income individuals. Similarly, those who engage more in guardianship behaviour/safety precautions are likely to have lower risk of violent crime victimization in their local communities. Although these individual-level predictors of violent crime risk are new in the Nigeria context, many of such findings have been revealed previously elsewhere. Therefore, our consideration then moved to under researched nonresidential landuse factors that affect violent crime victimization risk.

Findings indicate that violent crime victimization risks indeed, varied significantly across neighborhoods and both socio-economic and landuse variables accounted for this. Consistent with few previous works, neighbourhood structural characteristics (proportion of the population living in the low density area) had significant negative effects on violent crime victimization risks. We also found in the regression models that landuses involving commercial, recreational and access street layout had significant positive effects on violent crime victimization risk. All these suggest that social, economic, structural and landuse variables are important in explaining the variation in violent crime victimization risks in Nigerian built environment. Our findings suggest that commercial landuse, recreational landuse and access street layout might mediate the effects of crime victimization risks. Building on the early defensible space literature (Jacobs & Lees 2013; Jacobs 1968; Newman 1996), numerous studies have been conducted in an attempt to verify a relationship between landuse and crime. There is evidence that crime can result from proximity to nonresidential landuses such as bars and alcohol outlets (Roncek and Maier 1991; Badiora 2012),

fast-food restaurants (Brantingham and Brantingham 1982) and other big business (Kurtz, Koons, and Taylor 1998; Pratt & Cullen 2005; Reynald, 2011).

The results of this study have several implications both for future research and for practical crime prevention applications. These analyses add to a growing body of literature globally on crime victimization risk; particularly in the Nigerian context. For the purpose of crime prevention policy, neighborhood-level presence of commercial and recreational landuses/activities should be minimized. Similarly, access roads into and within the residential neighbourhoods should be curtailed. Nonetheless, where these landuses are greatly required at neighbourhood planning level, adequate guardianship should be provided. Guardianship represents the capacity of communities or persons to prevent the occurrence of crime. At community level, such capacity may include neighbourhood watch, security patrol, and access control, crime prevention enlightenment among others. A number of guardianship may be carried out at individuals' level as well. Such include lock doors, leave lights on, use extra locks, have a burglar alarm, security camera, own a dog, and have security men watch home, own a weapon and the like. Residents, as a form of social guardianship, should also avoid living alone, walking or waiting alone; particularly in the dark. Younger residents could stay, live and walk with other adults to avoid crime victimization risks.

Future research addressing crime should continue to examine factors in crime victimization risks. Policy makers and police organization would be well directed to also do so. Due to the absence of some detailed socio-economic data, several variables employed in this analysis may not provide the most ideal measures. Nonetheless, this study has defined variables that are closest proxies within the general framework of social disorganization, routine activities and lifestyle theory and produced important insights to violent crime risk. Analytical results indicate that factors within these leading theoretical approaches are indeed important in understanding the risk of violent crime victimization in Minna, Nigeria. We also found that violent crime risk did vary across neighborhoods, and the social structural and landuse factors measured in this study assisted us in explaining why crime risk varied. However, the regression models used in this study did not account for combined-level variance. For instance, will significant effect of nonresidential landuses on crime risk be affected when individual-level variables are adjusted? Future researches should examine this and many more factors to ascertain more comprehensively, violent crime risks interpretation in Nigeria. This analysis can also be extended to understanding variation in property crime.

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