Identifying Regional Factors Associated with Crime in South Korea: Synthesis of Social Disorganization and Routine Activities Theories

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Abstract

As criminological theories play a significant role in providing insights to explain the crime phenomenon, some theories such as social disorganization and routine activity theories have been tested with various scopes and locations. In this study, factors related to the theories were tested to confirm any significant effect on crime rates at a regional level. By using hierarchical regression analysis, the study attempts to examine the relations among the socio-economic and environmental factors across the regions. The results indicate that the community heterogeneity (i.e., foreign population and single-person household) was a significant factor in regional crime rates, but the environmental factors had possible mediating effects, lowering the significance level. Moreover, the number of commercial places per area affected crime rates representing a higher criminal opportunity level with business areas.

Keywords

Crime Rates, Social Disorganization Theory, Routine Activities Theory, Theory Testing, South Korea

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INTRODUCTION

Crime prevention aims to promote adequate interventions to reduce the motives or opportunities for a crime before they arise. One way to prevent crime is to identify the causes of crime and criminal behavior. Much evidence from criminological research shows that crime incidents are concentrated at hot spots within urban environments (Weisburd et al. 2012a, b), implying that crime events need to be understood under the spatio-temporal context. With the pattern research involving neighborhood-level crime analysis being actively carried out in Western societies, relevant research has also emerged in South Korea. Routine activity theory and social disorganization theory have been extensively used for spatial analysis of crime as they both provide macro perspectives on crime. However, empirical studies of those two theories are often carried out separately. Because of the complexity of social phenomena, it is essential to test those criminological theories in various geographical and contemporary contexts. Considering how pattern research involving neighborhood-level crime analysis is primarily done in Western societies, the current study aims to understand the factors associated with local crime in Korea by using social disorganization theory and routine activity theory in tandem by employing a hierarchical regression model. Because those two theories propose different predictors of crime, integrating both theories can be a more rigorous approach for investigating factors influencing regional crime. It is expected that this integrated theoretical framework will provide more valid empirical evidence, which in return, provides possible explanations for the mixed findings of those theory-testing research conducted in Korea.

THEORETICAL BACKGROUND AND LITERATURE REVIEW

Social Disorganization Theory

Social disorganization theory is one of the main criminological theories that explain the link between criminal activities and neighborhood ecological characteristics. The earlier formulation of social disorganization theory by Shaw and McKay (1942) suggested that structural disadvantages such as poverty, racial heterogeneity, and residential mobility were the leading causes of a neighborhood crime problem. Early

empirical studies showed strong support for the theory—they found that an increase in the poverty rate, residential mobility, and racial heterogeneity of the neighborhoods further increased the level of disorganization in the community, indicating that social disorganization is closely associated with high crime rates in the community. In the 1990s, Sampson (1997) and other social disorganization theorists reintroduced this social disorganization theory. In particular, they focused more on social control aspects by developing the concept of collective efficacy. Collective efficacy is a form of social capital that is a standardized and well-tested measure, and it is defined as "social cohesion among neighbors combined with their willingness to intervene on behalf of the common good" (Sampson, Raudenbush, & Earls, 1997, p. 918).

Although social disorganization theory is mainly derived from Western societies (i.e., the United States), it continues to be carried out in Korea to test this theory. However, more scholarly attention is needed as these theory-testing studies show mixed findings. When it comes to testing social disorganization theory, it generally involves examining how social disorganization variables and collective efficacy-related variables influence crime rates, crime victimization rates, and the fear of crime.

One of the most recent studies testing social disorganization theory in South Korea, Lee and Choi (2019), applied theoretical frameworks of social disorganization and life course theories. As crimes of violence, theft, and robbery often threaten people's lives the most obviously, the study analyzed the effects of social structural variables (e.g., poverty, housing instability, racial heterogeneity, population density) and demographic factors (i.e., age and gender) in explaining these three crime types. This study was community-level research that calculated the average of regional social structural variables to run a panel regression, and their major findings are worth highlighting: 1) theft was more likely to occur when the poverty rate and foreigner ratio were lower, which led to all social structural factors (except residential instability to be meaningful predictor); 2) violent crime showed a statistically significant correlation with the foreigner ratio; 3) the higher the population density and residential mobility, the higher the frequency of robbery—suggesting that the socio-structural factors can have a different impact depending on the nature of the crime.

Similarly, Cheong and Kang (2013) conducted a negative binomial regression analysis on homicide for all administrative divisions of Seoul to validate the effect of social structural characteristics on crime based on ecological crime theory. To measure the level of economic disadvantage in the Seoul administrative divisions, their research model included social structural factors such as the ratio of basic livelihood security recipients, residential mobility, racial heterogeneity, household dissolution index (which was created based on the number of people per household), population density, and commercial land use ratios. Then, they investigated the degree of influence on the number of homicides between 2007 and 2009 in each administrative division in Seoul, as it was their outcome variable. The study findings indicated that the higher the proportion of basic livelihood security recipients in the neighborhood (division), the smaller the number of people per household, and the higher the commercial land use rate, the higher the murder crime rate was. Other variables had no effect.

Research models used in those studies mentioned above involved three central theoretical elements from the classical social disorganization theory (i.e., socioeconomic status, residential mobility, and racial heterogeneity) to identify a onedimensional causal link with a crime. However, unlike those research models constructed from the classical social disorganization theory, Sampson and Groves (1989) brought newer perspectives into measuring social disorganization. The research model used in modern analyses of social disorganization theory allows for testing the theory more directly and effectively by using social control factors as a mediator in predicting how social structural characteristics influence crime.

The concept of social control in social disorganization theory has been conceptualized and operationalized as collective efficacy (Sampson et al., 1999), which was also adopted and tested in Korean research studies. In a study examining the effect of collective efficacy on crime victimization in the Daegu area, social structural factors and collective efficacy of the neighborhoods showed a relatively positive relationship with Daegu's economic power, residential instability, and the ratio of Koreans (versus non-Koreans). However, the study found no significant association between collective efficacy and crime victimization (Yoon, 2012). In Lee and Lee's (2012) study, social structural factors were included in the research model to identify the factors that change in violent crime trajectories, and they examined informal social control factors (e.g., the presence of elderly neighbors, the number of police officers) to measure collective efficacy. They found a negative correlation, suggesting that collective efficacy could explain the crime phenomena. Supplemental to the central elements of social disorganization theory, Choi and Park (2018) included socio-physical environmental factors in the model to analyze crime phenomena, demonstrating how social disorganization theory is utilized in various ways for crime analysis.

Routine Activity Theory (RAT)

The basic elements of crime in the routine activity theory are a motivated offender, a suitable target, and the absence of appropriate guardianship (Felson & Cohen, 1979). It is hypothesized that crime will occur when these three elements converge in time and space. Since the routine activity theory was first formulated by Cohen and Felson (1979), research using this theory has been carried out in various criminological research fields, including victimization (e.g., gender, sexual assault, adolescents-related events), cybercrime, and opportunistic crime perpetration (e.g., burglary, theft). In particular, the relationship among crime, the absence of capable guardianship, and various spatial characteristics have been used in conjunction with those studies focusing on temporal and spatial factors to explain neighborhood crime. For the routine activity and lifecourse theories, recent research studies have tended to subdivide the constituent factors into attractiveness, proximity, exposure, and level of protection (Miethe & Meier, 1990, 1994; Popp, 2012; Reynald & Elffers, 2015; Vakhitova et al., 2016). For instance, Miethe and Meier (1990) came up with the idea of lifestyle-routine activity theory, which emphasized the fact that the selection of a victim within its socio-spatial context is dependant on the "expected utility of one target over another" (p. 245). They identified four key factors as *attractiveness* to a motivated offender (e.g., physical visibility and accessibility), proximity to offenders (e.g., the physical distance between where potential targets reside and potential offenders are found), exposure to risk (e.g., physical visibility and accessibility), and level of protection (e.g., availability of personal, social, and physical dimensions). Traditionally, researchers measured "target attractiveness" through economic indicators such as unemployment, social class, possession of expensive goods (Miethe & Meier, 1990; Sampson & Wooldredge, 1987). "Proximity to offenders" and "exposure to risk" were often measured by considering non-household activities such as the number of evenings per week spent outside the home and the number of hours per week the home was vacant (Messner & Blau, 1987; Miethe & Meier, 1990). Lastly, the concept of "level of protection" and "capable guardianship" were often measured using the number of household members, the density of social networks in the neighborhood, use of safety devices such as door locks or burglar alarms (Miethe & Meier, 1994; Reynald & Elffers, 2015). Furthermore, a large body of scholarship attempts to apply this lifestyle-routine activity theory to explain various cybercrimes such as hacking, phishing, and media fraud. When Rutger and Yar (2016) used a large sample (N = 9,161) to measure the effects of value, visibility, accessibility, and guardianship on the victimization of six cybercrimes, they found that visibility plays the most significant role in explaining cybercrime victimization, while capable guardianship had no significant impact on victimization.

Most of the studies in Korea that draw on routine activity theory look at how adolescents' lifestyle or routine activities are related to delinquency, crime perpetration, and crime victimization (Jo & Lee, 2013; Kim, 2008; Lee, 2017; Lim, Choi, & Yoo, 2015; Park & Jo, 2017). According to studies examining the effects of differences in adolescents' routine activities on deviance, male students attending vocational schools were more likely to commit juvenile delinquency. When examining the impact of routine activities on juvenile delinquency, activities involving computer games, entertainment/nightlife, nighttime loitering, and sports activities had a positive effect. However, shopping, cultural activities, and housework/communication with family members were negatively correlated. When demographic characteristics and all routine activities were controlled, male adolescents, nighttime activities/nightlife, and nighttime loitering significantly impacted juvenile delinquency (Kim, 2008).

Furthermore, studies examining gender differences in the types of juvenile delinquency and crime victimization (Lee, 2017; Lim, Choi, & Yoo, 2015) found that gender is significant. It demonstrated that gender affected the seriousness of delinquency and type of crime—the prevalence of crime victimization was about 1.63 times higher in male students than in female students. Both male and female juveniles had a high explanatory power for the variables of routine activity theory. Reckless behavior and a risky lifestyle had the most significant influence on male students' crime victimization, but the absence of capable guardianship had no effect. The absence of capable guardianship and participation in extra-curricular activities were meaningful in predicting female students' victimization, resulting from high target suitability due to relational thinking and physical vulnerability (Lim, Choi, & Yoo, 2015).

As a study of routine activity theory, Yun (2018) analyzed survey data from 923 adult men and women over 18 to investigate the relationship between deviant lifestyles and crime victimization. Those populations were drawn from 44 areas in Daegu. Independent variables were drunk driving, assault, robbery, and property damage, while the dependent variables of deviant lifestyles mainly included jaywalking, smoking in non-smoking areas, parking violations, and signal violations. As a result of the analysis, the effect of a deviant lifestyle on experiencing crime victimization is mediated through criminal behavior, and the fact that the behavior of taking part in a crime has the most significant effect on having experienced crime victimization. This suggests that there is

an overlap between crime perpetrators and victims. In a study done by Kim and Kwak (2016), an empirical analysis was performed on the relationship between an individual lifestyle and crime victimization using the 2012 crime victimization survey data. The study results showed a positive relationship between returning home late (after 10 pm) and property victimization, mainly due to lack of guardianship. Concerning assault, people returning home under the influence of alcohol and wearing expensive goods increased their attractiveness as victims, increasing their crime victimization. For sex crimes, none of the independent variables in the model turned out to be significant.

Social Disorganization and Routine Activity Theories

Several past research studies attempted to integrate routine activity and social disorganization theories (Miethe & McDowall 1993; Miethe & Meier 1990; Smith et al., 2000; Weisburd et al., 2012a, b; Wilcox et al., 2003). Although Miethe and McDowall (1993) first used a survey of Seattle residents and characteristics of city blocks to explore the feasibility of integrating these two theories, they found that the context of social disorganization did not affect opportunities for crime. However, when their data was reexamined by Rountree et al. (1994) to determine if neighborhood context impacted individual victimization, they found that neighborhood-level density, degree of disorder, and racial heterogeneity significantly predicted property and violent crime. Identifying how neighborhood context moderates the relationship between individual opportunity and victimization allowed the authors to support the potential for integrating both theories.

Wilcox et al. (2003) attempted to expand on Rountree et al.'s (1994) study and proposed interaction effects between neighborhood context and place-based opportunity variables. Smith et al. (2000) then focused on exploring routine activities and social disorganization in a combination based on geographic units and found significant interaction effects between social disorganization and routine activities at the face block level. Another study supported integrated social and routine activity theories using geographic units rather than individuals. For instance, Rice and Smith (2002) used street segment as their main unit of analysis and found that interaction effects between variables from both theories explained more of the variance in predicting the rates of motor vehicle theft.

Most importantly, several empirical studies that used routine activity and social disorganization theories in Korea should be highlighted. Kim (2010) used 2009 crime

victimization survey data to identify situational factors associated with victims of crime by applying life course theory, routine activity theory, and social disorganization theory. At the individual level, he intended to demonstrate the relationship, attractiveness, exposure, protection/capable guardianship between sociodemographic characteristics and personal crime victimization. He then examined the direct association between social disorganization and individual crime victimization at the neighborhood level. Using hierarchical linear modeling (HLM), Kim (2010) further assessed the impact of neighborhood-level factors in predicting individual-level factors. In some cases, however, the independent variables showed conflicting results for each variable in explaining the level of crime victimization.

Kim, Park, and Park (2010) used Korean census and crime victimization survey data to comprehensively understand what factors predict crime victimization. They assessed correlation and statistical interaction effects between factors of structural choice theory and crime victimization. These effects were tested, and the effect of social disorganization variables on crime victimization at the neighborhood level was confirmed. In addition, applying a hierarchical linear model proved that the influence of individual-level variables appeared differently depending on neighborhood-level variables. As a result of the study, individual-level variables that affected property damage were age, income level, cash holdings, and a late homecoming. Social level variables that affected property damage were housing instability, proximity, and official control. Individual-level variables of age and late homecoming and a social-level variable of proximity significantly impacted on violent victimization. All individuallevel variables also interacted with social-level variables.

Park (2011, 2012) measured central elements of social disorganization theory through the level of social disorganization, neighborhood order, neighborhood informal social control while measuring three elements of routine activity theory by attractiveness, exposure to crime victimization, and protection ability. Park (2011, 2012) then analyzed the relationship between each factor and the crime victimization. According to the research results, individual crime victimization was mainly explained by demographic characteristics (gender and age) and crime opportunity factors (attraction, exposure, and protection ability) rather than neighborhood characteristics.

It is also essential to consider neighborhood characteristics to understand household crime victimization, especially because it has been suggested that there is a strong correlation between residential type, socio-economic level, and proximity in urban areas. For instance, Park (2011) found single-family housing areas with low residential mobility, a low socio-economic level, and high proximity had a higher rate of household crime victimization, whereas apartment areas with high residential mobility, a high socio-economic level, and low proximity showed relatively low victimization. The need to reinterpret traditional social disorganization theory in the socio-cultural context of Korea was thus emphasized. However, Park (2012) study found that although neighborhood factors cannot influence household crime victimization directly, there was a relationship with the area's housing type characteristics, such as the apartment occupancy rate. It was found that there is a positive correlation among high socio-economic levels, high housing instability, and apartment occupancy rates, which is expected to result from the change in the analysis target and the difference in the timing of the data analysis.

Lee (2016) pinpointed the methodological limitations of previous research studies, where individual-level and neighborhood-level factors were looked at independently in explaining elderly fraud victimization. A contextual analysis was then conducted to comprehensively test the interaction effect of individual-level variables with neighborhood-level variables. At the individual level, the study findings indicated that leisure time, pocket money, cognitive vulnerability, possession of expensive goods, and crime prevention education significantly affected the victimization. The study also found that higher use of leisure time leads to a lower victimization rate, which contradicts the existing routine activities theory. When the interaction effects with socio-structural variables were observed, the study found that females with lower education levels were more likely to be victimized. However, the level of impact changed when their residence period, social trust, community disorder, financial independence, basic livelihood security recipients' ratio in the community, and welfare budget ratio interacted with community variables. The higher the social trust, the higher the disorder, the higher the financial independence, the higher the level of pocket money, the more expensive things possessed, and the older the age, the more likely it was that an individual would be victimized.

Current Study

The current study aims to employ a multi-level theoretical model of crime concentration by integrating routine activity and social disorganization into a single hierarchical model. This theoretical model can provide a better framework for understanding the relationships between neighborhood context and micro-spatial environmental conditions in South Korea. In Korea, each theory has been applied in various ways to analyze the crime phenomenon, and using public data to develop a broader scale contributes to a better understanding of the crime phenomenon. In this study, while utilizing the elements of these pioneering studies, hierarchical regression analysis is applied to present a comprehensive theoretical model and explain the crime. Applying elements of social disorganization theory – poverty, residential instability, ethnic heterogeneity as well as collective efficacy – and, routine activities theory – likely offender, a suitable target, absence of a capable guardian – the current study intended to understand the widespread phenomenon in the nation . Therefore, three main hypotheses of the current study are 1) social disorganization factors have a relation with the regional crime rate, 2) routine activities factors have a relation with the regional crime rate, and 3) synthesized factors from the integration of the two theories can explain regional crime better than each theory alone.

METHODS AND DATA MEASURES

This study focuses on comprehensively verifying the social disorganization and routine activity theories by utilizing constructing indicators referred in existing studies (Cheong & Kang, 2013; Choi & Park, 2018; Felson & Cohen, 1979; Jo & Lee, 2013; Lim, Choi, & Yoo, 2015; Kim, 2008; Kim & Kwak, 2016; Lee, 2017; Lee & Choi, 2019; Lee, Kim, & Ryu, 2018; Lee & Lee, 2012; Park et al., 2019; Park & Jo, 2017; Sampson & Groves, 1989; Sampson et al., 1999; Yun, 2018). In addition, the level of analysis was set to the unit of a metropolitan city or higher, where all relevant survey and publically open data were available. As dependent variables, the analysis was performed on the index of five items frequently treated when analyzing crime: theft, robbery, homicide, sexual violence, and assault¹. All the data, including crime data, was collected from the most recent public data (2014-2018). The analysis was conducted under the consideration of data limitations.

¹ 2018 data from Statistics Korea

Regional Factors of Social Disorganization Theory

Various social disorganization theories have been used as indicators of ethnic heterogeneity, residential instability, and level of economic disadvantage in local communities (Sampson & Groves, 1989; Sampson et al., 1999). However, when applied in Korea, the utility of the indicator on racial diversity is so low that this variable is often excluded in many cases (Cheong & Kang, 2013; Choi & Park, 2018; Lee & Choi, 2019; Lee & Lee, 2012; Lee, Kim, & Ryu, 2018). The analysis of the current study's population heterogeneity includes a foreigner rate and a socio-economic status such as gender, age, and a single-person household. Previous studies often used gender and age variables for control variables. However, the current study included those variables as independent variables to predict the regional crime rates because the measure has already been used in some prior research as independent variables (Jung, 2014; Sampson & Laub 2005; Schwartz et al., 2009), providing valid evidence that age may be related to criminal behaviors. For the resident instability index, annual data living in the relevant area were collected from the census data, then the ratio by a period of residence was calculated, and the ratio of residents living in the area for less than three years was standardized. As an indicator of the level of economic disadvantage, the ratio of the next-lowest class by region was used.

Regional Factors of Routine Activities Theory

In one study done in Miami-Dade County, Florida, the three elements of the routine activities theory – motivated offender, suitable target, and lack of guardianship – were synthesized and indexed by the factors used in the previous studies (Louderback & Sen Roy, 2018). This current study further reconstructed these indices reflecting on the social context of Korea. First, the indicators of motivated offenders are composed of the age and gender groups that commit the most crimes found in various surveys and studies (Felson & Cohen, 1979; Sampson & Laub 2005; Schwartz et al., 2009). In the United States, most of the young people aged 15-24 make up the most significant proportion of criminals (Sampson & Laub 2005; Schwartz et al., 2009), but in Korea, some studies showedthat middle-aged people aged 40 to 50 have the highest crime rate (Jung, 2014). Accordingly, the motivated offender indicators were established by standardizing the proportion of age groups. The unemployment rates were unable to be collected based on regions. Second, the number of commercial facilities per area is calculated and standardized for the suitable target index. In addition, the number of subway stations per area was indexed. References

were made to studies using these items based on the theoretical background that many commercial facilities and subway stations have many visitors and passers-by, which increases the chance of a potential criminal committing a crime (Merton, 1938; Louderback & Sen Roy, 2018). Lastly, the number of parks and playgrounds, which are public places where CCTVs are generally installed, were summed up and standardized to be used as an index for capable guardianship. Also, security measures such as security zone², facilities³, and policies⁴ in the area were counted.

Analysis Method

Analytic techniques of the current study include basic descriptive statistics, correlations among the variables, and hierarchical regression model analysis. Since the final analysis is to understand crime within the theoretical framework, socio-economic status factors related to social disorganization theory were analyzed (Model1), and environmental factors related to routine activities theory were included for the final analysis (Model2).

Before analyzing the hierarchical regression analysis, basic descriptive statistics for the variables were examined. The crime rate was calculated based on Statistics Korea; five major crimes (i.e., theft, robbery, homicide, sexual violence, and assault) were summarized and calculated per 100,000 populations. The mean crime rate among the areas was 886.61, and the standard deviation was 517.425. However, the distribution of crime rates across the regions was left-skewed because most of the crime rates were lower than the mean of crime rates. Thus, by logging the crime rate, the distribution of crime rates was adjusted close to a normal distribution (M=6.69, S.D.=0.412), which was used as a dependent variable.

The independent variables were grouped into two based on the relation to the theories. Firstly, the variables related to social disorganizations and socio-economic status in regions were analyzed. The population per square kilometer was calculated to understand the density of the population of the areas. The mean population per area was 10,111.77, and the standard deviation was 7,006.291. The mean female population rate was 0.50, which meant 50% of the population was female among the regions. The range of rates across the regions was from 0.43 to 0.53. Age distribution was categorized into teens and under, the 20s-30s, 40s-50s, and 60s and over. The smallest rate population

² Sum number of public CCTV, safety emergency bells, and women's safety house, 2018

³ Number of police stations, 2018

⁴ Number of CPTED(Crime Prevention Through Environmental Design) policies per area

was teens and under (M=.16, S.D.=.032), followed by 60s and over (M=.22, S.D.=.052), 20s-30s (M=.29, S.D.=.035) and 40s-50s (M=.32, S.D.=.035). The residential mobility could be presented with residential instability (i.e., living less than three years) and residential stability (i.e., living over ten years). Assuming a strong relationship between residential stability and instability, both variables were calculated to confirm the assumption before the final analysis. The mean population rate living in the same household less than three years was about 0.38, whereas more than ten years was about 0.30. Moreover, the single-person household mean rate was 0.30 (S.D.=0.055), and the mean rate of the foreign population was 0.03 (S.D.=0.025). Lastly, the low-income population rate was 0.07, and the standard deviation was 0.027.

The second group of variables was related to routine activities theory. The commercial places such as restaurants, convenience stores, and cafes were collected based on the official business data per square kilometer. The mean of commercial places was 0.86, and the standard deviation was 1.25. The number of subway stations per kilometer was from 0 to 2.41, mean number of subway stations was 0.4. Also, the number of public parks was counted and calculated per square kilometer, resulting in the mean being 1.85 and the standard deviation being 1.25. The mean number of playgrounds per square kilometer was 6.3; the minimum mean was 0.08, while the maximum number of playgrounds was 18.89. The numbers of businesses, subway stations, and public facilities differed depending on the region. Moreover, the rate of security zone index varied across the regions from 0 to 86.92 per square kilometer (M=0.77, S.D.=1.49). Lastly, the mean number of security-related policies was 0.74, the maximum number of policies was 4.

Va	riables		Mean	S.D.	Min.	Max.	
Crime ra	te (raw da	ta)	886.61	517.425	429.21	3434.98	
Crime r	d)	6.69	.412	6.06	8.14		
Socio-Economic Status related to Social Disorganization Theory	Popula	ation per km ²	10,111.77	7,006.291	111.10	4,306.04	
]	Female	.50	.015	.43	.53	
		Teens and under	.16	.032	.10	.24	
	Age	20s-30s	.29	.035	.16	.40	
		40s-50s	.32	.019	.28	.37	
		60s and over	.22	.052	.12	.41	

Table 1. Descriptive on crime rates and influencing factors by region (N=74)

Va	riables		Mean	S.D.	Min.	Max.
	Living	Under 3yrs	.38	.060	.20	.52
	years	Over 10yrs	.30	.070	.15	.56
	Single-p	erson household	.30	.055	.19	.46
	F	oreigner	.03	.025	.01	.12
	Low income			.027	.02	.16
	Co	mmercial	0.86	1.66	0.00	11.90
	S	Subway	0.40	0.42	0.00	2.41
Environmental	Publ	ic restroom	3.05	5.10	0.00	34.30
Characteristics		Park	1.85	1.25	0.00	5.83
related to Routine	Pla	ayground	6.3	4.52	0.08	18.89
Activities Theory	Sec	urity zone	17.12	19.67	.00	86.92
	Secu	rity facility	.77	1.49	.00	11.87
	Seci	rity policy	.74	.89	.00	4.0

The following analysis was to understand relations among the variables of the current study. Since the logged crime rate was the dependent variable of the study, correlation analysis between logged crime rate and the other variables was conducted. The significant results were with rate of female population(+), age teens and under(-), age 20s-30s(+), age 40s-50s(-), single-person household(+), foreign population(+), commercial places(+), public park(-), playground(-), and security facilities(+). Among the age variables, the age 'teens and under' group and the '20s-30s' group were considered to represent the age group since there was no significant relationship between them. Moreover, the relationship between residential instability and stability indicated strong negative relationships. Thus, the analysis only included residential instability.

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2			.146	.195	*****-	.187	-291*	249*	.028	.062	.544*	373**	.161	.378**	.143	116	-317**	-325**	.152	529**	077
1	1	.947**	208	254*	480**	262*	-307**	225	.085	.018	.581**	.412**	.145	371**	191.	-176	-303**	-319**	.175	.433**	.005
	1	2	3	4	5	9	7	~	6	10	11	12	13	14	15	16	17	18	19	20	21

Table 2. Correlation analysis between regional crime rate and influencing factor variables⁵

⁵ Variables: 1. Logged crime rate, 2. Crime rate (raw), 3. Population per km2, 4. Female, 5. Age teens and under, 6. Age 20s-30s, 7. Age 40s-50s, 8. Age 60s and over, 9. Living less than 3 years, 10. Living more than 10 years, 11. Single-person household, 12. Foreign population, 13. Low income population, 14. Commercial places, 15. Subway station, 16. Public restroom, 17. Public park, 18. Playground, 19. Security zone, 20. Security facilities, 21. Security policy

RESULTS

For a comprehensive understanding of local crime rates, a hierarchical regression model was applied with first social disorganization factors (Model1) and later inclusion of routine activities factors (Model2).

The first model included socio-economic status variables related to social disorganization theory only. Based on the results, the model was significant at level of .000 and the adjusted R square was .437, which can be interpreted as having 43.7% explanatory power. Unlike the correlation analysis, most of the variables lost their significance which can be explained when the collective effect of variables applied, variables such as age distribution was not a significant factor to the local crime rate. However, the rate of the female population (β =0.294, p<.001), single-person household (β =0.465, p<.001), and rate of foreign population (β =0.399, p<.001) were significant factors that positively influenced local crime rate. This result indicates that metropolitan areas with a higher female, single-person households, and foreign populations present higher crime rates than other areas.

However, the results changed when the environmental characteristics related to routine activities theory were included in the first model (Model2). The second model was also significant at a level of .000, the R square change from Model 1 was .197, and the adjusted R square was 0.610. The Model2 analysis presents the lower significance levels of variables in Model1(i.e., female, single-person household, and foreigner), which environmental factors such as security level can affect those factors on crime rates. Also, Model2 indicates a higher significant level with the number of commercial places (β =0.410, p<.001) which the other routine activities factors did not present significance.

The result concludes that residential stability and poverty were not the factors that can explain local crime rates, but other characteristics such as gender ratio, singleperson household rate, and foreign population were significant factors. Moreover, these factors' effects were interfered by environmental factors related to routine activities theory, while the number of commercial places per square kilometer was a significant factor in local crime rates.

V	ariables			Model1		Model2			
			В	SE.B	β	В	SE.B	β	
		(Constant)	1.506	1.511		2.328*	1.386		
Socio-Economic	Populat	ion per km ²	0.001	0.000	-0.063	0.001	0.000	- 0.545*	
	Fe	emale	7.826	2.940	0.294**	6.154	2.748	0.231*	
	Age	Teens and under	-0.055	2.610	-0.004	0.134	2.331	0.010	
Status related to Social	6	20s-30s	-1.053	1.982	-0.091	0.423	1.711	0.036	
Disorganization Theory	Living	under 3yrs	0.680	1.042	0.099	0.044	0.902	0.006	
	Single-per	son household	3.461	1.297	0.465**	2.764	1.176	0.371*	
	Foi	reigner	6.533	1.888	0.399**	4.352	1.800	0.266*	
	Low	income	1.602	2.126	0.107	1.167	1.889	0.078	
	Com	mercial				0.101	0.029	0.410*	
	Su	ıbway				0.261	0.177	0.264	
	Public	restroom				0.002	0.008	0.028	
Environmental Characteristics]	Park				0.063	0.045	0.191	
related to Routine Activities Theory	Play	ground				0.007	0.012	0.073	
	Secu	rity zone				0.003	0.002	0.155	
	Securi	ty facility				-0.030	0.035	-0.108	
	Secur	ity policy				0.002	0.038	0.005	
		R^2		.499		.696			
	Adjı	isted R^2		.437		.610			
Summary of Models	R^2	change		.499		.197			
		F		8.088		8.134			
		р		.000		.000			

Table 3. Hierarchical Regression Model Analysis of Factors Influencing Crime Rate(N=74)

*p<.05, **p<.001

DISCUSSION AND CONCLUSION

The current study attempted to test predicting factors' effect on regional crime rates by applying a theoretical framework of social disorganization and routine activities theories. Based on the hierarchical regression analysis results, the study confirmed some predicting factors on regional crime rates.

Socio-economic status factors related to social disorganization theory and environmental factors related to routine activities theory were synthesized in the final analysis model. Among the factors related to social disorganization theory, residential mobility and disadvantage ratio were not significant factors affecting the local crime rate. However, community heterogeneity, which includes rates of foreign population and single-person households, was significantly impacting the local crime rate. The social disorganization factors became less significant when the environmental variables related to routine activities theory were included in the analysis model. This result was noteworthy because the routine activities factors could act as mediators on local crime rates; the local crime rates were not only determined by community heterogeneity but also the environmental situation. Moreover, the number of commercial places per square kilometer was the only factor that affected the local crime rate among routine activity variables. Being related to crime opportunity, suitable targets can be exposed more to motivated offenders in the areas with more commercial places providing more opportunity for people to gather .

Although the current study results did not show consistent findings from those previous studies that supported the integrated theories, these results still provide new evidence to reconsider theory implication. For example, ethnic heterogeneity reinterpreted as the area's diversity (e.g., foreign population, single-person household rates) showed significant relations with the regional crime rate. Moreover, unlike previous studies, the current study did not present significance on poverty and residential stability, the variables of the original theoretical model. These results may suggest that researchers might need to interpret the original independent variables into more specific variables.

Even though the current study found limited support on synthesized model analysis, it should be noted that environmental factors can affect regional crime rates. The study also found that commercial places were associated with crime rates. More security measures should be implemented when commercial places are established in the area. This research validated regional factors affecting local crime rates within criminological theories. Still, some limitations exist in data construction and analysis. Even the study's data was collected based on the rule using the most recent data that was publicly available, these were obtained from different public sources and time frame. Therefore, there may be some inconsistencies across the data. Also, because the current study relied on externally available, some factors (i.e., local unemployment rate, community-level crime rates) were excluded in the study.

In addition, more relevant data and advanced analysis could have improved the interpretation of the findings. Because the data in the current study was at the regional level, more advanced data analysis techniques such as geographical crime analysis (GIS) or geographically weighted regression (GWR) can overcome the possible omission of geographical relations among the areas in regular regression analysis. For instance, GIS uses the local community as the unit of analysis, which allows including geographic proximity as one of the variables in the analysis model (Reid, Tita, & Valasik, 2011).

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