The Effects of Crime Incident Characteristics and Neighborhood Structure on

Police Response Time

by

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A Thesis Presented in Partial Fulfillment
of the Requirements for the Degree
Master of Science

Approved June 2012 by the
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ARIZONA STATE UNIVERSITY

August 2012

ABSTRACT

Effectiveness and efficiency of the police have been contentious topics

from the public perspective. Police departments have developed policies to help

better their patrol officers' effectiveness on the streets in both quality and

timeliness. Although there have been few recent studies about the response time

of officers to calls for service, this is a subject that should not go overlooked. As

an important aspect to the patrol officer's repertoire, response time can have

effects on the community and its perception on the police. This study uses a

multi-level modeling approach to examine the effects of incident and

neighborhood factors on police response time within a medium size Southwest

city. Police departments use a scale to determine the priority of a call for service,

commonly referred to as the PRI. This index scale was found to have the most

effect on the response times, while a few cyclical patterns were obtained of level

1 variables. Neighborhood characteristics showed significant effects, measuring

structural disadvantage, however, caution should be used in generalizing these

findings to other public jurisdictions.

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INTRODUCTION

Only a small number of studies have examined police response time for calls for service. This study focuses primarily on incident characteristics, not neighborhood structural factors. This is an area that has been overlooked for years but potentially holds a key to understanding any agency's efficiency of their mission statements. Patrol officers are the first responders to any crime that has been reported or witnessed by the officer. This makes their timeliness to those calls for service top priority in terms of patrol protocol. There may be numerous departmental factors that can affect response time outcomes: number of officers on duty, number of patrol units on duty, as well as one or two-officer patrol units. Social and physical factors may also play important roles in the outcomes of police response time. External physical factors such as city and neighborhood design, the structure of the roads (pot holes, construction, etc.), location of the call for service and current location of responding officer can all have an effect on the police response time. There is also the presence of external social factors that can affect police response time (amount of traffic, volume of calls for service during that shift, minority concentration, and structural disadvantage).

The public service role of the police is to protect and serve the citizens of their community. Effectiveness and efficiency of the police are transparent through the cooperation of officers and the community. While we know how incident characteristics – priority of a call for service – affect response time, we still know little about how neighborhood structure affects it. The focus of this thesis is to understand police effectiveness using the priority of a call for service

and taking it further to use the neighborhood structure of those calls for service. Police effectiveness is operationalized by response time to calls for service. We may then be able to draw upon the data to develop any relationship between neighborhood structure and police response time. In doing so, we might be able to further understand how neighborhood structure affects police response time.

BACKGROUND LITERATURE

Police Response

The landmark study on police response time, Response Time Analysis: Executive Summary, was conducted in Kansas City, MO in 1977. This experiment was the first of its kind, and has remained a seminal piece, as there has not been a very strong focus on analyzing police response time. Prior to the Response Time Analysis, the understanding of police response time was "first, that visible police presence prevents crime by deterring potential offenders; second, that the public's fear of crime is diminished by such police presence" (Kelling, 1974; 1978). This assumption implied that the amount of police patrolling the streets would directly affect the amount of crime in the community. A side effect of both the increase in preventative patrol and decrease in criminal activity would create shorter response times. What Kelling found was that decreasing or increasing routine preventative patrol in the experiment had no impact on clearance rates (crimes solved) (Kelling, 1978), no effect on crime, citizen fear of crime, community attitudes toward the police on delivery of police service, police response time or traffic accidents (Kelling, 1974). While these experiments proved to be paramount in understanding a multitude of ways that

police patrols can be enhanced, it found that proactive levels of patrol had little to no effect on crime, compared to reactive patrol.

The notion of noncommitted time was suggested through the analysis and conclusions of Kelling's work. He defined noncommitted time as, "time available for answering calls for service" (Kelling, 1974; 1978). During this time, officers could be classified into three different categories: "stationary, mobile, and contacting personnel in the field" (Kelling, 1974; 1978). Each of these categories was then differentiated between police-related and nonpolice-related activities. What he found was that police often used their noncommitted time to engage equally in both police and non-police related activities. This means that much of their time was dedicated to order maintenance and non-crime related issues.

What this experiment meant for routine preventative patrol was not that it is ineffective nor that an increase of patrol officers on duty will show a decrease in criminal activity. Rather, departments should look into more constructive and instrumental activities for officers to spend their noncommitted time while on patrol. If officers could use their noncommitted time more efficiently, then there is potential to increase effectiveness of preventive patrols in dealing with criminal activity. This ties together with police response times, as certain noncommitted time will directly result in varying response times to calls for service. If officers are engaging in more behaviors that are "mobile" and involve "contacting personnel in the field," response time may be able to be decreased. Kelling found that officers are engaging in crime-related and noncrime-related behavior during their noncommitted time, roughly at even amounts. Police patrol officers

assigned to their beats tended to spend more of their noncommitted time on non-police related mobile and stationary activities (e.g., eating, resting), personal phone calls, driving to relieve boredom, pleasure riding) than did their proactive and control counterparts. Encouraging officers to spend less time engaging in nonpolice-related behaviors and more time engaging in police-related behaviors may affect response time in a positive way. While there are most certainly internal factors within the department that can affect response time, there are many external, neighborhood factors that may also affect response time.

Disorder then, is a condition resulting from a behavior that, depending on location, time, and local traditions, is offensive in its violation of local expectations for normalcy and peace in a community (Kelling, 1987). Whether malevolent or innocent in intent, disorderly behavior powerfully shapes the quality of urban life and citizens' views both of their own safety and the ability of the government to ensure it (Kelling, 1987). Kelling's definition of disorder will have an influential role in relation to the outcome of this study. While it is each community that defines what disorder is to them, the variation in definitions should have some effect on the response times for officers for calls for service. Many crimes go unreported as individuals in certain neighborhoods may deem specific behavior acceptable, while it is deemed disorderly in other neighborhoods or they may have less trust in the police department's ability to resolve those problems. This can result in an influx of specific calls for service in a neighborhood, which will then affect an officer's attitude toward that call (See Klinger, 1997).

While serious crime is a common problem in many neighborhoods, often residents are troubled by less serious problems, such as chronic and demoralizing public disorder (Kelling, 1987). This has presented itself as a major issue for police agencies, as the majority of departments have not routinely collected data about chronic disorder nor citizens' response to it. Without such data collection and allocation of time and resources, departments may not place sufficient emphasis on tactics that combat these quality of life problems. This can leave neighborhoods with a sense of alienation from the police and an absence of trust and legitimacy as residents are left to their own devices. In turn, this can then result in serious crimes with delayed report times; some never get reported due to the police-citizen mistrust. This problem is only exacerbated by the fact that patrol units in vehicles are increasingly isolated from the very communities they are entrusted to serve.

While these neighborhoods have seen an increase in public disorder, public political awareness has been growing and spreading, to help provide their neighborhoods with security and structure (Kelling, 1987). This has resulted in more neighborhood-police collaboration and stronger citizen-police relations. When the neighborhoods demand police action of a certain type, under the community policing model, departments will begin to shift policy and priorities to conform to those demands. As departments develop policies and tactics in collaboration with the broader community, preventive expectations and goals will progress accordingly.

In early work, policing scholars theorized both macro-level and micro-level theories that required actions and behaviors by both individual officers and departments alike. George Kelling was one of the most profound policing scholars who used that focus on policing to understand the profession, the people who work in it, and the people who are affected by it. As the decades passed, so did the role of the police. Kelling studied not only the changing role of police, but he also studied the changing social conditions as a determinant of how the role of the police will develop. He theorized that there was a developing trend in the role of the police. He asserted that rapid response to calls for service and an emerging omnipresence of patrol units throughout the neighborhoods would dramatically and effectively reduce crime (Kelling, 1978). This was not to replace the importance and necessity of civilian-police interaction at a close and personal level, as Wilson had emphatically stressed (Wilson, 1953). The new trend was to place a large emphasis on the constant movement of officers within their vehicles, rather than directly engaging with citizens while on their beats. This idea stemmed from the belief that the role of the police was to apprehend criminal rather than maintain order and the safety of communities and citizens. Police were now classified as "in-service" while driving in their vehicles and, conversely, classified as "out-of-service" while outside of their vehicles and directly engaging with both citizens and offenders (Larson, 1972). What Kelling wanted to emphasize was that the developing role of preventive patrol was not a wrong direction. This was also not to be a replacement for old fashioned citizen-police personal contact, where information is exchanged, trust established, and

problems are identified. This is where criticism was strongest, the failure of preventive patrol as an effective tool to reduce crime.

Citizen approval of police did not reside with, or was contingent upon, police response times, rather, their approval rating resided with citizen expectations of response times (Kelling, 1978). It was the combined effects of the dispatcher, officer and type of incident that would determine both the expectations and actual response times of officers. Response time became a political tool used by both agencies and critics, as an indicator of police effectiveness (Kelling, 1978)

Preventive patrol involves officers assigned to vehicles (patrol units), driving through pre-assigned beats to observe any disorder or deviation from normalcy. While on preventive patrol, units are available to respond to various calls for service as per requested. Kaplan found that response times may be affected by one-officer versus two-officer patrol units in multiple ways (Kaplan, 1979). While his study did not focus on the role of backup and the necessity for such a situation, it illustrates costs and benefits to both one-officer and two-officer patrol units. "Response delays" are less frequent with more one-officer units than with less two-officer units (Kaplan, 1978). What this means is that, while two-officer units conducted calls at a faster rate, there are fewer total units in the field which results in a longer delay from call to call. One-officer units conduct calls at a longer rate, however, because there are roughly twice as many total units, the response delay to future calls and calls in queue are more likely to be available to an open unit. While the actual response time to calls for service is not directly

affected by number or officers per patrol vehicle, it is indirectly affected through "response delay" from available units to take various calls for service in queue.

Only a small number of studies have examined police response times for calls for service, and this research focuses primarily on incident characteristics, not neighborhood structural factors. This is an area that has been overlooked for years but potentially holds a key to understanding any agency's efficiency of their mission statements. Patrol officers are the first responders to any crime that has been reported or witnessed by the officer. This makes their timeliness to those calls for service top priority in terms of patrol protocol. Not only can research help create a more efficient response time within an agency, it can potentially streamline their calls for service to reduce both misuse of manpower and the cost of systems based for calls for service. The majority of previous literature on police response time comes from public surveys about the police and their satisfaction with response times. For example, a past study found that the majority of people do believe that police response is acceptable with a 76 percent satisfaction rate among victims (Percy, 1980). Several studies took a different approach and strictly focused on the police response system and its function as an algorithm (See Larson, 1967; Bertram & Vargo, 1976). In a 1989 study, the San Francisco Police Department (SFPD) implemented an optimization-based decision support system for deploying patrol officers. This system would forecast hourly needs, schedule officers to maximize coverage, and allow fine tuning to meet human needs (Taylor & Huxley, 1989). The fine-tuning mode would help captains evaluate schedule changes and suggest alternatives. The system would

also evaluate policy options for strategic deployment. The integer search procedure generated solutions that made 25 percent more patrol units available in times of need, equivalent to adding 200 officers to the force or a savings of $11 million per year. As a result, response times improved 20 percent, while revenues from traffic citations increased by $3 million per year (Taylor & Huxley, 1989). A necessary piece to understanding response time and what factors affect it comes from an ecological standpoint. One study discussed the implications of the theory for understanding how police behavior varies across physical space and how crime patterns develop and are sustained in local communities (Klinger, 1997). This means that neighborhoods were seen differently by the police, depending on the racial and class compositions. Crime patterns within these varying neighborhoods were different, depending on the neighborhoods at hand. This caused the police to adapt their behavior to accommodate for each specific neighborhood, altering across physical space.

The 1960s proved to be a decade fixated with social scientific review on the police and police strategies. Primary research has delved into immediate implications of police-citizen relationships and encounters, citizens' actions and approval, as well as the police organizations themselves (Black and Reiss, 1970; Lundman, 1974; Smith, 1987; Brown, 1981; Wilson, 1968). A few studies have considered the possibility that police action might vary across urban neighborhoods (Slovak, 1987; Smith 1986; Klinger, 1997). Research by Klinger provided the research community with a new theory about officer behavior and discretion within varying neighborhoods and characteristics. His theoretical

framework sought to specify how the ecological and organizational structures of policing frame work group negotiations, while providing a framework for understanding spatial variation in dimensions of police action that does not explicitly address the amount of time officers devote to incidents, and the degree to which officers observe the due process rights of citizens (Klinger, 1997). He also touched on the notion that some literature noted that police officers' ideas about normal crime and victim deservedness may vary with sub district variation in deviance (Rubinstein, 1973; Waegel, 1981). While this work did not examine how ecological variables impacted response time specifically, it is still important to understand police efficiency from a broad perspective.

What Klinger theorized may have an effect on police response times within certain districts. Officers' attitudes toward varying neighborhoods within their beats are reflected by their ideas of what normal crime is like and the extent of victim deservedness per individual. If such an effect is to be found, this research can be informative in addressing possible improvements for officer oversight of varying neighborhoods with known crime rates and victim deservedness. While this is not the only factor in understanding officer response times, this approach may provide a strong foundation for improvements to current response numbers.

Police might not be efficient in responding to calls for service in these structurally disadvantaged neighborhoods due to deliberate delays in response time, as they may see these neighborhoods and the individuals who reside within them as deserving of the activities that occur. The police might be delayed in

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response time due to external factors out of their reach, numerous calls for service result in a larger queue which would result in longer response times. These neighborhoods tend to be more dense, which would assume shorter travel distances for officers, suggesting shorter response times. While travel distance may be shorter, neighborhoods that are more dense might see a higher total aggregate calls for service, which will result in much longer queue times. Structurally disadvantaged neighborhoods tend to have individuals reluctant to contact police, and if contact is made, may still be reluctant to give any information to help the police efficiently carry out their support. Reluctant individuals within neighborhoods with longer queue times may result in much longer response times for police.

Department Perception

Both the role and direction of police departments and the police as a whole, have evolved through the years of United States history. Beginning from the 1840's, this era of police strategy falls under the Political Era, due to the close ties of police with politics and politicians of the time. The 1930's provided a time to distance many governmental departments from politics all together. This, the Reform Era, lasted until the 1970's where a reaction to the politics of the prior era was developed to increase efficacy of the police. Present day policing falls under the Community Era, sparked in reaction from the Reform Era (Kelling & Moore, 1988). This focus on community problem solving began in the 1970's and is currently the strategy and direction in which police are going. The police are focused on maintaining order, peacekeeping, meeting community needs, crime

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control and resolving disputes (Kelling & Moore, 1988). Response time has

evolved to be a large indicator of police effectiveness, as seen by citizens.

Throughout the three reforms, the organizational design of the police has evolved

from decentralized departments during the Political era, to centralized

bureaucratic organizations during the Reform era, back to decentralized,

generalist departments of today's Community era. Contributing to the creation of

these flaws, the function of the police carries the departments into roles where

they cannot produce the desired outcomes demanded by the external relationships

of the police (Bittner, 1967).

The Community era has resulted in various outcomes by which the police

conduct performance. Citizens, scholars, media and the departments themselves

uphold the police to maintain order, carry out peacekeeping, meet community

needs, perform crime control methods, and resolve disputes at various levels of

society (Kelling & Moore, 1988). However, the performance of the police is

measured by different standards. "The good pinch" is how citizens and

departments alike measure the performance of the police (Bittner, 1967). The role

of the police has been of a professional "crime fighter," weighing the

effectiveness of the "good pinch" and crime fighting techniques.   Within this role

as a professional crime fighter, many issues are associated that effect both the

police and the citizens they serve. There is a stark over-emphasis on the crime-

fighting persona of a police officer, which has been structured over the years.

Beginning with the reform era, the police departments wanted to change their

ideals and infrastructure to ensure corruption could be eradicated (Kelling &

Moore, 1988). They focused the majority of their attention and efforts to become more of a crime-fighting profession. In doing so, the police departments neglected many important issues that are necessary of the role of the police. As a crime-fighter, the police are restricted to reactionary policing. In order to fight crime, they must first wait for crime to occur, react to the crime, and "fight" it. This style of policing has some major issues because it simply does not address the root of the problem. This style will only react to past events, it will not prevent future crime, nor will it ever address the roots of any problems; be they social, ecological or physical.

In order to cope with these various roles, the policeman develops a perceptual shorthand to identify certain kinds of people (Skolnick, 1966). These people are identified as "symbolic assailants, that is, as persons who use gesture, language, and attire that the policeman has come to recognize as a prelude to violence" (Skolnick, 1966). A policeman's job, especially that of a patrolman, requires split second choices and quick reaction times. In order to minimize reaction time and build routine upon visuals, the policeman must use these perceptual shorthands to effectively and efficiently carry out his/her job. In doing so, the policeman is able to create comparisons to minimize reaction time. This makes them suspicious of all activity. "It is the nature of the policeman's situation that his conception of order emphasizes regularity and predictability" (Skolnick, 1966). With this, the policeman establishes the standard deviation of "normal," and in turn, is able to minimize his/her reaction time for preconceived

choices. The use of perceptual shorthands leads into the ability to use and manage discretionary skills.

Popular television shows, movies and novels depict the police officer as a young and clever individual. They create the image that an officer's job is constantly exciting, full of adrenaline and always presenting different challenges. This image has been portrayed for numerous decades and aids in the over-emphasis on the crime-fighting role of law enforcement. A subculture has evolved from the lasting image of what a police officer ought to be (Skolnick, 1966: Strecher, 1971). The police subculture is one that is marginally disassociated with its surroundings. The "us vs. them" mentality is both accepted and strengthened on both sides (Strecher, 1971: Van Maanen, 1978: Manning, 1992). Strecher explains the police subculture as a product of the very nature of the job description. He likens the police officer to that of a soldier, school-teacher and an industrial worker due to the constant presence of danger, the need to apply authority, and a challenge for efficiency. The role of the police is to both protect and monitor the actions of the community, thus police are figures of authority and are authorized to use coercive force when necessary. This role of an authoritative figure, by nature, isolates the police from the rest of the community. This isolation is strengthened by the authorization to use coercive action, because any type of force will immediately divide those who are empowered with it and those whom it is used upon. The police are further isolated from the community because danger creates a form of solidarity within the police community, to which

only other members of the force can relate. This strengthens the "us vs. them" component from within the police community.

The challenge for efficiency becomes problematic, as it diminishes the quality of the police's job in the eyes of the community. This is what is meant by the "impossible mandate" (Manning, 1992). Striving for efficiency, the police have assumed the role of the professional "crime-fighter," the "peace-keeper," and the role of "keeper of order." In doing so, they have taken on expectations of an "impossible mandate," as Manning argues. Within the policing community, a subculture has evolved to attempt to fulfill that impossible mandate. There are certain rules that govern this subculture, rules that place greater emphasis on this exclusionary mentality. These rules explain what a good police officer is, the different rankings and who is favorably looked upon. Similarly, the public's assessment of a "good" officer is one who solves crimes, and catches the serious offenders. The other two roles assumed by the police, peace-keeping and order-maintenance, are simply expected, but not used as performance measures. Even though the quality of a good police officer is one who solves crimes and catches criminals, the public's view of a police officer is sometimes one who is above the law. There are many stigmas in popular culture associated with the police and their authorization of use of force, which only strengthen the police subculture and the "us vs. them" mindset.

Neighborhood Characteristics

A primary focus of this thesis is on neighborhood structural disadvantage. This aims to understand the local conditions in which individuals live, how they

cope with such conditions and how those structural characteristics can affect both

municipal services as well as residents within the community. These social

conditions and processes effect the growth of individuals within the community,

and lay a foundation for negative ecological influences and physical dangers

found in these environments (Delbert, 1996). All neighborhoods can be seen

through an ecological-developmental perspective, (Bronfenbrenner, 1989), which

assumes that neighborhoods are transactional settings that influence individual

behavior and developments both directly and indirectly. Shaw and McKay (1942)

laid this classical foundation for social ecology of neighborhoods, explaining that

there is a direct relationship between conditions existing in local communities and

differential rates of delinquents and criminals. This has been taken one step

further by Delbert (1989), who explains that differences in neighborhood

organization and culture are linked to individual-level outcomes. What this

means is that the effectiveness of all municipal services – and police specifically -

can vary by community-level characteristics as well as individual-level

characteristics. The effectiveness of services can be seen as a derivative of the

neighborhood variables that are determined by those social institutions and

individuals who reside within those very communities. This concept may fall

under the notion of "ecological contamination," as previously theorized

(Werthman and Piliavin, 1967). The police divide up the territories they patrol

into readily understandable and racially shaped categories. The result is a process

of what they called ecological contamination, whereby all persons encountered in

"bad" neighborhoods are viewed as possessing the moral liability of the

neighborhood itself. This process has various implications that may affect the way the police carry out routine calls for service in certain neighborhoods. This may also have implications for the way in which the individuals in these neighborhoods assume characteristic roles and personas.

Disadvantaged neighborhoods

Neighborhood disadvantage has been commonly measured as the concentration of poverty (See Blau & Blau, 1982; Hipp, 2007; Kane, 2005; Quane & Rankin, 1998; Sampson & Raudenbush, 2004; Sampson et al., 2002). This has also been extended to include rates of unemployment (See Hipp, 2007), residential instability (See Hipp, 2010; Quane & Rankin, 1998), cultural heterogeneity (See Blau & Blau, 1982; Hipp, 2007; Hipp, 2010; Kane, 2005; Rankin & Quane, 2002; Sampson & Raudenbush, 1999; Sampson & Raudenbush, 2004), economic inequalities (See Blau & Blau, 1982; Morenoff et al., 2001), family composition (See Cohen & Felson, 1979; Felson & Cohen, 1980; Hipp, 2007; Rankin & Quane, 2002; Sampson et al., 1998; Sampson et al., 1999), the impact of urban renewal (See Delbert, 1996; Shaw and McKay, 1942; Wilson, 1987; Sampson & Raudenbush, 1999), and collective efficacy (See Sampson & Raudenbush, 1999). For purposes of this study, family income, cultural heterogeneity, neighborhood household tenure, poverty rate and population density have all been included as ecological indicators of neighborhood disadvantage.   The use of a multidimensional approach to neighborhood disadvantage is necessary to determine differences among neighborhoods whose status may vary in social disorganization. Not all ghetto-poverty neighborhoods

are characterized by high mobility, broken families, chronic unemployment or cultural heterogeneity; and these conditions of disadvantage may interact with poverty to produce certain variable outcomes (Delbert, 1996).

Neighborhood Disorder

Disorder can be classified into two categories, physical disorder and social disorder. Physical disorder can be compromised of, but is not limited to, presence of graffiti, broken bottles and/or litter scattered throughout a neighborhood, deteriorated buildings, abandoned vehicles and unkempt properties (See Wilson & Kelling, 1982; Skogan, 1980; Skogan, 1986; Hipp, 2010; Sampson & Raudenbush, 1997; Sampson & Raudenbush, 1999). Physical disorder can be anything that is physically in existence that can be altered to a different state. Social disorder will then consist of different types of disorder that contain no physical presence but affect the neighborhood and its residents in a negative way. Social disorder can consist of, but is not limited to, constant presence of loitering, barking dog complaints, fireworks disturbance, loud noise disturbance, gang presence, drug activity presence, consumption of alcohol in public, and presence of transients (Wilson & Kelling, 1982; Sampson & Raudenbush, 1997). Physical disorder concerns property and the structural integrity of the physical image of a neighborhood, while social disorder concerns individuals and their behaviors that can directly or indirectly affect others within the neighborhood.

Disorder is heavily concentrated in disadvantaged communities; it tends to be high in the same generally poor places, whether it is assessed by outside observers or by the people who live in the community (Skogan, 1990; Skogan

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2012; Hipp, 2010). Disorder is closely associated with many forms of common crime; because disorder undermines the social processes that help constrain neighborhood crime; or because disorder actually attracts and generates other forms of crime (Skogan, 1990; Skogan 2012). Disorder plays a role in undermining the stability of urban neighborhoods, undercutting natural processes of informal social control, discouraging investment, and stimulating fear of crime (Skogan, 2012).

"Unwelcome police-citizen interactions are more likely to take place in distressed neighborhoods where aggressive policing efforts are disproportionately employed…most of their encounters with police were the result of officer-initiated contacts, and characterized officers' demeanor as combative" (Brunson, 2010).

Disorder and ecological contamination are then meshed together as police view the individuals in high disorder neighborhoods as reflections of the structure of the neighborhood. This causes the police to perceive the high amount of disorder as a result of each individual's actions as an aggregate of the whole neighborhood. The police may then be aggressive toward individuals to complement their perception of the neighborhood. This may then be a causal link to the mistrust the community has with the police and instill fear where trust has diminished.

Research Questions

While previous research has examined incident-level predictors of response time and neighborhood characteristics, limited research has incorporated all of these elements to develop a greater understanding of how neighborhood conditions affect police efficiency. In this study, I hope to answer several

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research questions to understand police efficiency, namely response time, within the realm of both the department and the communities in which they serve. Studying police efficiency by examining only crime-incident level predictors of response time allows only one perspective – that of the police agencies. Incorporating information about neighborhoods and their structural characteristics allows for a broader perspective for understanding how neighborhood disadvantage impacts police response time. My research questions are as follows:

1. How does the call priority, as measured by the priority response index (PRI), effect police response time to calls for service?

2. Once the call priority code has been disaggregated, how do characteristics of the crime incident (e.g. violent/nonviolent, disorder/nondisorder, time occurred, etc.) effect police response time to calls for service?

3. Holding crime incident characteristics constant, how does neighborhood-level structural disadvantage effect police response time to calls for service?

RESEARCH DESIGN

Data Collection

I gathered, coded, and analyzed data for this thesis from Southwest Sky Department's internal database records. Data collection and development of my research questions occurred in Fall 2011/Spring 2012 when I served as an intern for the CPD's Crime Analysis Division and took part in entering large numbers of crime incident reports to the official police database. The data were generated from calls for service received by communicators and then dispatched to patrol

officers and their superiors. This information is logged into the incident report

system by both members of dispatch and patrol officers who are on site. After the

information is sent into the city records for verification, the information is then

relayed to members of the Crime Analysis Division where it is subsequently

entered into a new system that is used for analysis and comparison of all calls for

service. These records are streamlined for department purposes to obtain

information on calls for service quality and improvement. The data set used for

this thesis is from the crime analysis system, after city approval of officer and

dispatch description, where all coding is done to department standards for their

needs. The data includes all calls to the Southwest Sky Police Department (N=

17,164) for the 2011 calendar year relating to felony crimes, misdemeanor

offenses, and public disorder. Table 1 below includes the call categories,

frequencies, and mean response times for each category.

The second data set draws from the social ecology of the city being

evaluated. The data sets were obtained from the US Census Bureau website that

is publicly available for download and analysis. This information consists of

surveys conducted by the US Census Bureau to be completed by each household

throughout the country. The information is then analyzed and provided in

aggregate by the US Census Bureau and available in subsection data sets for

various demographic categories. The use of this information allows for

implementation and speculation on neighborhood level variables to tap into the

social ecology of the area. I specifically collected census tract-level measures of

structural disadvantage and racial composition for the entirety of the Southwest

city. I specifically used the 2010 Census data for population and race. This data was available through the Census collection that is determined every 10 years. I used ACS data, American Community Survey, for the neighborhood variables. This data were then merged with incident-level call data that were geocoded to specific locations.

Dependent Variable

This study focuses on the calls for service within the Southwest Sky Police Department and aims to better understand police efficiency in a neighborhood context. I am measuring police efficiency as response time to each incident. This response time is measured from "hello-to-hello," meaning from the time dispatch answers the 911 call to the time an officer is physically present with the reporting party. I elected to focus on the response time of officers for all crime-related calls for service from January 1st 2011 – December 31st 2011 within the Southwest Sky city. This allows for an examination of response rates for different types of calls with different priority rankings. No sampling strategy was necessary, as I included all major crime-related call types in my analysis.

Incidents within this study are all a result of a call for service from someone within the city. Numerous incidents were omitted due to an officer initiated incident (i.e. the officer witnessed an incident and called it in himself/herself), as well as any incidents resulting in a citizen flagging down an officer to initiate a response.

The 12 months of data are made up of 140,366 different calls for service within the metropolitan city.   Roughly 12.2% (n =17,164) of these calls for

service are used in the analysis of response time. I omitted approximately 87.9%
of the calls for service, as they are not crime related. These omitted call types
include false alarms, traffic-related incidents, 911 hang-ups, and other non-
incident service calls. Further omission of calls for service occurred for times
over 3 hours, as the initial responding officer has already been on scene but
requested special assistance (K9, SAU, Air assistance, CSI) which takes a longer
amount of time and is logged as the ending response time for that incident. The
types of offenses are further recoded to denote violent and non-violent offenses,
the timing of the incident (in progress, just occurred, or report), whether or not it
was a disorder incident, and the volume of call activity on that day.

Within the crime-related offenses, the calls for service are categorized into
a streamlined priority response index (PRI), to indicate seriousness of offense and
response time approximation.

Table 1

DESCRIPTIVE STATISTICS OF RESPONSE TIME

AND NEIGHBORHOOD CHARACTERISTICS

	N	Minimum	Maximum	Mean	Std. Deviation
Felony crime (yes/no)	17164	0	1	.27	.445
Misdemeanor crime (yes/no)	17164	0	1	.54	.498
Disorder incident (yes/no)	17164	0	1	.18	.386
Violent crime (yes/no)	17164	0	1	.37	.484
Is this the incident in progress, just occurred, or a report of a past event?	17164	0	2	.66	.560
Did this call come from an apartment building?	17164	0	1	.22	.413
At about what time of day did the call occur?	17164	0	2	1.10	.756
Did the call occur on a weekend day?	17164	0	1	.47	.499
What season did the call occur in?	17164	1	4	2.49	1.112
Did the call occur in a crime hot spot?	17164	0	1	.33	.471
Volume of call activity	17164	1	13	3.40	1.826
Minority concentration	16640	-2.237	2.207		
Structural disadvantage	16640	-3.541	1.983		
Response time	17164	.03	179.40	24.368	30.667
Valid N (listwise)	16640				

Categorical Variables

The first set of analyses focuses on the call priority code relating to the type of incident that has generated a request for service. There are eight tiers within the "PRI" (response priority index) that group the various 153 types of incidents further, into a streamlined priority index (PRI). A PRI of "3" requires

immediate police service while a PRI of "0" requires police service within an hour, depending on factors of incoming calls for service and location of officer. For the most part, a PRI of "2" requires police service within 10 minutes, while a PRI of "1" requires police service within 15 minutes. These numbers are all based off time when dispatch relays the incident to the officers after being determined by the dispatchers through a conversation with the caller. As more calls for service are requested, the PRI is streamlined to place new "3's" before any "2's" or "1's," even if they are past the 10 or 15 minute marks. This is done to ensure all calls for service that require immediate police service are tended to in the shortest possible time frame.

Independent and Control Variables

There are ten categorical variables used in this study to understand how crime incident characteristics may have an effect on officer response time. The second of the eleven variables is the felony crime characteristic. This is a dichotomous variable that indicates whether a call for service is for a felony crime. A call for service that is considered a felony crime will result in a "1," while a call for service that is not considered a felony crime will result in a "0."

The third categorical variable is the disorder incident. This is a dichotomous variable that indicates whether the call for service is for a disorder incident. A call for service that is considered a disorder incident will result in a "1," while a call for service that is not considered a disorder incident will result in a "0."

The fourth categorical variable is the misdemeanor crime. This is a dichotomous variable that indicates whether the call for service is for a misdemeanor crime. A call for service that is considered a misdemeanor crime will result in a "1," while a call for service that is not considered a misdemeanor crime will result in a "0."

The fifth categorical variable used is the timing of the incident. This variable has three categories that indicate whether the call for service requested is for an incident that is: "in progress," "just occurred," or a "report of a past event." Calls for service within a police department consist of a variety of incident types. Southwest Sky Police Department has 153 types of police incidents in the system that vary from a simple 911 hang up to homicide, etc. This variable identifies the timeline of the incident.

The sixth categorical variable is the call from an apartment. This is a dichotomous variable that indicates whether the call for service is requested at an apartment building. A call for service that is requested at an apartment building will result in a "1," while a call for service that is not requested at an apartment building will result in a "0."

The seventh categorical variable is the call hour variable that categorizes the incident as to when the call occurred. This variable consists of three categories: Morning, Afternoon/Evening, and Night. This is based on when it is received by the dispatcher, before the call is relayed to the patrol officers. It is useful to see if there were any discrepancies, not only by the officers, but also by the dispatchers in terms of response time and time of day. Since the response time

is affected by individuals who call in, dispatchers, and officers, it is appropriate to control for the call hour. This is because there are generally more calls for service during the day than there are at night, as more people tend to sleep during the night and are not observant of or involved in, incidents until the day time.

The eighth categorical variable used in this study is the day of the week variable. This is a dichotomous variable that indicates whether the call for service was requested on a weekday or a weekend. This is used for streamlining purposes to observe patterns in response time that may be affected by individuals who call in, what type of incident it is, and by the officers and dispatchers. For example, certain types of incidents are called in more frequently on certain days of the week. Thefts and burglaries tend to be called in on a Monday or Tuesday as they are not discovered until after the weekend (such as cases of home burglaries where individuals are out of town at the time of the crime).

The ninth categorical variable in this study is the month variable. This variable consists of four categories that groups the months into seasons: Summer, Fall, Winter, Spring. Like that of the weekday variable, the month is controlled for to determine patterns in both incidents and response time by officers over time. The response time of officers is approximately the same throughout each month. As seasons affect almost everything in a social context, it is important to observe and control for the season in which the call for service was requested, as it will most likely have an effect on the response time of the officer.

The tenth categorical variable is dichotomous and indicates whether the call for service was requested within a "hot spot" area or not. The department

divides the city into sections that are more easily serviced and identifiable by the department, into varying beats. These "beats" are groupings of neighborhoods that contain similar characteristics with their close surroundings, thus allowing the department to familiarize itself with the social ecology and physical location. The city consists of 17 beats that descend from north west to south east, roughly (See Appendix H). Beats are made up of different populations and zoning sections.

Linear Variables

The only linear variable is the volume of calls per day. This variable indicates the volume of calls occurring during the same time of hour and day as the requested call for service. This is used to determine whether a large volume of calls will inundate officers with calls for service and affect response time.

Neighborhood Characteristics

The calls for service have been married to the census tracts available for public use for Southwest Sky. Specific data about the neighborhood characteristics of Southwest Sky were then obtained and merged with the newly merged calls for service data. This data set was obtained to categorize areas based on levels of neighborhood disadvantage and racial composition. In this study, I operationalize neighborhoods as census tracts. I have done so to increase the neighborhood-level degrees of freedom, providing more statistical power. The categories are as follows:

The first neighborhood characteristic obtained is minority concentration. Race information was obtained from the US Census Bureau to measure the percent of Hispanics and Asians within each census tract. The tracts were then

merged into the various predetermined police beats to obtain the percentage of

Hispanics and Asians living within each tract. These categories were then paired

to the total population of each beat to find the percent of Hispanics and percent of

Asians in each tract. Factor analysis was done to create the minority

concentration variable. Through this process, the total population of Hispanics

living within a census tract was divided by the total population of all individuals

living within that census tract, to develop the percent of Hispanics residing within

that tract. The same was done with the Asian population and develop the percent

of Asians residing within the tract.

The second neighborhood variable obtained is structural disadvantage.

This consists of the percent of individuals living in poverty, the percent of

individuals who rent as their tenure, and the total population for each census tract.

This variable reflects the amount of individuals whose residential tenure is by

rent, separating from those who have a mortgage to own or currently own. Factor

analysis was done to create the structural disadvantage variable. Three categories

were used to create the variable, percent poverty, percent renter, and the total

population of each census tract. To find the percent poverty, the total population

of households living in poverty was divided by the total population of each

respectable census tract. The same was done for the percent of individuals who

rent for household tenure. Neighborhoods that contain an abundance of renting

residential tenure tend to have more residential mobility and less cohesiveness.

This variable reflects the proportion of individuals who live under the poverty

line. Neighborhoods that contain an abundance of individuals living under the

poverty line tend to have lower-valued housing markets and attract low-wage renters. This also allows for the recognition of racial percentages within each beat. The population density will indicate whether more densely populated areas are inundated with calls for service that may affect response time.

ANALYSIS PLAN

The focus of this study was to establish a link between police response times and the varying links that may affect them. Data were obtained through the police database of the evaluated city, and was transposed through ACS and Census tract data. The police department characteristics were also paired with the data to determine the effectiveness of the impact of policies and procedures.

This study found that the time-lapse of the incident, as well as when the incident was called in, both had a strong effect on the response time of officers. The time-lapse refers to when an indecent occurred and the amount of time passed before it was called into dispatch. Whether the incident was violent also had a very strong effect on police response time. The study also found that whether an incident was reported to the police on a weekday or weekend had a strong effect on response time. The type of incident (felony, misdemeanor, disorder), had a strong effect on police response time, indicating the use of discretion as a tool for incident response. Both the volume of calls for each shift on each particular day, as well as whether the call for service was within a "hot spot" in the city, had significant effect on the police response time. This study found that, holding the police department's priority response index and all other external factors constant, structural disadvantage had a small but significant effect on police response time.

This is an important finding as it leaves room for many theories as to why

structural disadvantage of a neighborhood will have a significant effect on police

response time. From a departmental view, these neighborhoods may be looked at

as dangerous and backup may be required on certain calls for service, resulting in

an increase in response time. Perhaps there are more calls for service within these

densely populated neighborhoods, resulting in longer queue times and creating

longer police response times. From an internal view, there might be more crime

and disorder within these structurally disadvantaged neighborhoods which would

see an increase in calls for service and cause longer police response times. These

neighborhoods tend to have more apartments, which can result in longer response

times if the apartments are gated or have a physical layout more complicated than

that of a residential home.

There are a few problems with the data that have given the results some

biasing and weakness. Functional form misspecification tests were performed on

the data to make sure there were no specification problems. The outcome did, in

fact, prove that the data are free of functional form misspecification and there are

no missing variables. While there was originally over-specification, as previously

explained, the new models have condensed and selected variables to account for

this. What was found to be wrong with the data is the amount of

heteroskedasticity within the variables. This is not due to model misspecification,

thus suggesting it must be from a bounded independent variable. Since the lower

limit of response time is 0, the minimum residual and error variance is artificially

limited for high priority calls for service. The RESET test was conducted to test

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for Functional Form Misspecification. The test failed to reject the null hypothesis, resulting in a lack of functional form misspecification. This may occur if AGE was used in the model to determine percent juvenile/adult, however these data were unavailable at the time so they were not implemented into the model.

The results found a strong correlation between PRI and the various types of calls for service, as expected. These variables are covering similar analysis, but they are equally important in understanding patterns in response time as reactionary to the calls for service. The results of the rest of the variables show that the error within the models run is equally distributed. This sample size is rather large, which helps to overcome the unequally distributed error in two of the variables.

Multicollinearity may pose a potential issue. The variables for violent calls for service and the variables for felony calls for service may be very closely related. This may pose as a potential issue for future research, as the two variables are not indicative of each other. However, they may possess an indirect relationship. This is something that might be taken into account.

Data are not available for the exact number of officers on patrol for each call for service incident, that information is not logged by any officer to analyst. Southwest Sky Police Department does conduct research to obtain the amount of officers on duty per day, averaging the amount of officers on patrol each hour throughout the year. Table 3 shows the department's average amount of officers out on patrol duty for each allotted hour throughout a day, averaged for the entire

year. While this information is important in understanding response times, because only the average number of officers for the entire year is available, it is assumed to be held constant for the previous models as the figures in Table 3 are the same throughout. The department has 17 beats, so they make every attempt to have a minimum of 17 patrol units out at any given time. Due to scheduling, personnel and the human variability, it is not always possible to have a minimum of 17 units.

The public service role of the police is to protect and serve the citizens of their community. Effectiveness and efficiency of the police are transparent through the cooperation of officers and the community. While we know how incident characteristics – priority of a call for service – affect response time, we still know little about how neighborhood structure affects it. The focus of this thesis is to understand police effectiveness using the priority of a call for service and taking it further to use the neighborhood structure of those calls for service. Police effectiveness is operationalized by response time to calls for service. We may then be able to draw upon the data to develop any relationship between neighborhood structure and police response time. In doing so, we might be able to further understand how neighborhood structure affects police response time.

RESULTS

TABLE 2

DEPARTMENT LEVEL AND TRACT LEVEL HLM OF POLICE REPONSE TIMES

	Model 1			Model2			Model 3		
	Coefficient	SE	P>|z	Coefficient	SE	P>|z	Coefficient	SE	P>|z
PRI	-10.41	.24	0.00						
Felony				-1.42	0.56	0.01	-1.37	0.57	0.02
Disorder				7.22	0.75	0.00	7.16	0.76	0.00
Misdemeanor				2.1	0.84	0.00	2.03	0.86	0.00
Violent				-6.55	0.61	0.00	-6.67	0.62	0.00
In Progress, Just Occurred, Report				-12.03	0.51	0.00	-12.04	0.51	0.00
Apartment				-0.99	0.54	0.07	-1.08	0.55	0.05
Time of Day				-0.94	0.33	0.01	-0.87	0.33	0.01
Weekend				-2.85	0.46	0.00	-2.86	0.46	0.00
Season				-0.20	0.20	0.31	-0.15	0.20	0.45
Hot Spot				3.80	0.48	0.00	3.32	0.49	0.00
Volume of Call Activity				1.01	0.13	0.00	1.02	0.13	0.00
Minority Concentration							0.33	0.23	0.16
Structural Disadvantage							0.59	0.23	0.01

||Note --- N = 17164. All regression models are at the 95% confidence interval.

While the initial models were run with all categories of level one data,

data were recoded due to the large variability within the variables, causing over

specification in the outcomes. In doing so, Table 2 allows for more modified

specification within the variables to develop a clearer understanding of the

correlation and significance in the findings. Table 2 presents the results of the

bivariate and multivariate proportional models designed to estimate the response

time of officers in calls for service. Model 1 serves as a baseline model and

includes the streamlined PRI controls. As the outcome displays, PRI has a

negative coefficient, as expected. This illustrates the effectiveness of the PRI

system as priority goes up, response time decreases.

Model 1 is only establishing the police department's priority response index as a procedural mechanism for determining what priority order calls for service as placed into. This shows a very strong relationship between response time and the PRI rating, with a very high coefficient. The higher the PRI rating, the higher priority the call for service is. This results in a decreased response time but a coefficient of -10.41.

Table 3 displays the descriptive statistics for whether a call for service was in progress, just occurred, or a report of a past event. This is most closely related to the PRI, as the department's response index is determined by time of incident among other variables.

Police are inundated with priority 1 calls which are lower on the PRI, resulting in longer response times due to both an influx of calls for service in queue as well as priority 1 calls constantly being raised in the queue due to low priority. Priority "0" calls for service are, on average, responded to more quickly than priority "1" because patrol officers are not tending to these calls. These are calls for service logged into the system from a desk officer who is stationed inside the precinct. They are still classified as a call for service to streamline and categorize all incident reports, but are responded to by different officers.

Model 2 then categorized the various calls for service into different groupings. The PRI of these calls are determined by the type of incident, the seriousness of the crime and the timeframe in which the incident has occurred. This model shows that whether the crime is in progress, has just occurred, or is a

report of a past incident, has a very strong relationship. The high coefficient

shows that crimes in progress have a much faster response time than those calls

that lack the immediate danger or a current incident (i.e. a reported crime of a past

incident). Each one of the department level categorical variable was significant,

however, the season that call for service occurred in had little significance.

TABLE 3

DESCRIPTIVE STATISTICS INCIDENT OCCURENCE

	N	Minimum	Maximum	Mean	Std. Deviation
Report of a past event	6663	.03	179.10	32.9893	36.19568
Just occurred	9745	.03	179.40	19.9095	25.57479
In progress	756	.07	159.57	5.8625	11.08246

Model 2 has added departmental controls to incorporate more department-

level categories. As previously explained, the model has been compressed to

specific categories within each variable, to account for over specification.   This

regression found that weekends tended to have faster response times. This could

be a result of more calls for service being requested during the weekday, more

officers on duty during the weekend, or because different types of calls for service

might be requested more often during the weekday/weekend. This usually occurs

for a few reasons. For example, if individuals were out of town and their

home/vehicle was burglarized and they did not notice until the following

weekday. People are more comfortable with reporting an incident on a weekday,

as the weekends are more often leisure days that should not be interrupted by

talking with police and filling out an entire incident report. This is not surprising

as the calls for service are a continuous variable that are a human construction in

social realms. This is to mean that crimes are committed and discovered daily,

regardless of the day of the month or day of the week. These variables do show a

hint of patterns in which types of crimes are called for service around similar days

of the week or weekend.

Whether a call for service was requested in a hot spot showed significant

levels on the impact of police response time. The models show that a call for

service within a hot spot area would increase the response time by a coefficient of

3.32. This can be due to a larger amount of calls for service each day, resulting in

longer queue times for newly appointed calls for service, than that of other areas.

This can also be an effect of the previously discussed perceptions of both the

police and residents. A model with level 2 variables will be able to determine the

significance of neighborhood characteristics and a possibility of perception

effects.

The time of day a call for service was requested showed a small but

significant effect to police response time. Model 2 shows the outcome of

significance. This is probably due to the fact that the majority of society is awake

during the day and asleep during the night, resulting in the majority of calls for

service being requested during the day. Crimes that have been committed during

the night may go undiscovered until the following morning. There are more

human interactions during the day, resulting in a higher probability that calls for

service will be requested at a higher rate during those hours of greater interaction.

Seasonal differences found no significant levels for police response times. The Pacific Southwest has generally less extreme weather throughout the year than that of the Midwest and East, which may result in less of a social change among seasons. This might be the reason why there was no significance found in police response time for seasonal differences.

Whether the call for service was for a violent offense showed a large significant value. Generally, calls for service that were for violent offenses showed a decrease in response time by a coefficient of 6.67. This is expected as violent offenses tend to result in harm toward individuals or harmful situations that can lead to serious injury or death. These incidents are taken very seriously and are placed on the top of the PRI, resulting in faster response times.

TABLE 4
DESCRIPTIVE STATISTICS VIOLENT VS NONVIOLENT

Violent crime	N	Minimum	Maximum	Mean	Std. Deviation
No	10747	.03	179.10	29.8602	33.31481
Yes	6417	.03	179.40	15.1707	22.84398

Table 4 illustrates the mean response times for violent and nonviolent calls for service. As for the rape offense, the vast majority of these calls for service are long after the initial offense took place. Far too often, the individual who has been a victim of crime does not want to disclose this traumatizing information for fear of embarrassment only to report the incident after talking with friends and family. Usually this is conducted at a local hospital where a rape kit evaluation

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has been conducted, thus a longer response time average as the priority is lower on the PRI even though the offense is extremely heinous.

A call for service for a felony crime reduced the response time of officers by a coefficient of 1.37, indicating that felony crimes are considered higher priority. This could be due to felony crimes consisting of various violent offenses where it has already been determined that violent offenses have response times that are half those of calls for service that are not violent. Whether the call for service was a disorder incident showed a significant value resulting in a coefficient increase of 7.16. While disorder incidents generally do not involve any immediate harm toward individuals, they make up a large portion of community concern.

Whether a call for service was requested at an apartment building had a small but somewhat significant effect on response time. A decrease in response time that was seen for calls requested at an apartment building saw a change in the coefficient of 1.08. This could be due to the density of the apartments, requiring officers to travel less distances. More calls for service may occur in these residential areas, as more individuals live there, which would allow the officers to become familiar with the area and result in shorter response time. Some apartments are gated communities, which would result in an increase in response time, however, the regressions show a decrease for requests to apartment buildings.

The variable with the greatest effect on response time was whether the incident is in progress, just occurred, or is a report of a past event. With a

coefficient of -12.04, this shows that calls for service for incidents that just occurred has response times around 12 minutes faster than calls for service for incidents that are reports of past events. This also indicates that incidents in progress have response times 12 minutes faster than calls for service of incidents that just occurred (See figure 1).

The volume of call activity on each particular day and hour had small but significant effects on police response time. With a coefficient increase of 1.02, calls for service that occurred during times of high call volume activity would generally see an increase in response time, holding all other variables constant.

Model 3 has the added level 2 variables of neighborhood characteristics in the regression, to account for any significance in response times. Minority concentration showed very little effects with little to no significance. Structural disadvantage, however, showed a small effect with a small significance factor. This is very important to note as previous studies have not considered structural disadvantage when evaluating police response time. This effect can be from a multitude of factors as previously explained by the literature and past studies conducted within neighborhood disadvantage. It is important to further examine these findings and better understand the relationship between structural disadvantage and police response times in terms of individual officer relationships, departmental relationships and neighborhood relationships. Note that the regression found 90% of the total variance in the model is not explained.

Model 3 added in the neighborhood characteristics to determine if anything outside of the department level characteristics were affecting the

response times. Minority concentration showed to have little significance, which structural disadvantage showed strong significant levels. While both coefficients are relatively small, the significance of these variables is important. This shows that there is something in the structurally disadvantaged neighborhoods that results in a slower response time, than other neighborhoods that do not contain as much structural disadvantage.

Three models were run through HLM regression to determine the effects, if any, that the created variables had on police response time. These variables were used to create two factors, minority concentration and structural disadvantage. These factors have to do with the area of the neighborhoods in question. Three variables were loaded in to minority concentration: percent Hispanic, percent Asian, and percent Black. Three variables were loaded in structural disadvantage: percent in poverty, percent renting, and total population. Eigen values for the two factors were greater than one and all factor loadings were above .7, while only one variable was not, percent in poverty.
The extraction method for these regressions was principle component analysis. The orthological rotation method used was verimax rotation with Kaiser Normalization (See Appendixes F and G)

DISCUSSION

Study Limitations

One major factor that cannot be taken into account through the models is the physical layout of the city being analyzed. While the city of Southwest Sky was built on a grid foundation and layout, most cities do no share these

convenient qualities. The major streets of Southwest Sky all run North/South and East/West at one-mile junctures, allowing for quick transportation and positioning. Other cities have numerous streets that curve, bend, turn, ox bow, and end abruptly. This causes for a small but essential generalizability problem in the study. It is not enough to discredit the findings or the implications, but it is something to be considered. As for the residential streets, there are many fingered layouts that aesthetically look good in the eyes of a developer, but are detrimental to municipal services. Fingered streets are residential areas where one street is only accessible off one other street, and they figure in that nature into dead ends. This results in much less traffic throughout the neighborhood, but in certain cases it will take an officer (or paramedic, etc.) much longer to drive through the neighborhood and onto the fingered street of choice. This can cause for possible delays in response times for various calls for service and should be included in future studies.

There was approximately 10% variance explained in Model 3 for this study, leaving about 90% variance as unexplained. Within the 10% explained, 9% of the variance explained was due to departmental procedures and guidelines. This leaves approximately 1% of the variance explained to neighborhood structure. This is not to down play the importance of understanding the neighborhood structure and its effect on police effectiveness, but it ensures that the police department of Southwest Sky has policies in place that effectively combat crime and crime prevention. With that said, there is something about the

neighborhoods that is causing the 1% variance explained and future research should delve deeper into this finding.

Future Theoretical Research

Attitudes toward the legitimacy of the police have varied throughout the historical legacy of its establishment. Throughout the history of the United States, the role of the police has changed in both direction and function. These changes have been sparked by issues dealing with historical context, as well as internal police departmental reformations. Within each profession, lies a subculture, unique in its own way. This subculture, both naturally and socially created and supported, is the main source for police effectiveness. Knowing and understanding the existence of this unique subculture, the police profession attracts a certain kind of person. This person tends to be upright, virtuous, and civic-minded (Skolnick & Fyfe, 1993). Those whose lives encompass this profession will then develop utilities (use of discretion) to maximize efficiency and strengthen the subculture. This use of discretion may play a large role in police effectiveness and efficiency, more specifically with response time. Further studies should take into account the amount of discretion being used by a department and pair that with the response times to various calls for service. This could have further implications as to why certain calls for service has varying response times, holding PRI constant. Judgment calls could be made, knowing the underworld parameters and the relationship between the police and civilians that could essentially have a large effect on police response times.

Future research should take into account the various social factors that will undoubtedly affect response time for officers. There are other indicators of neighborhood disadvantage that were not looked at in this study. Receipt of public assistance, unemployment, female headed-families, density of children, foreign born, (Sampson et al., 1997) physical disorder, other social disorders such as loitering, drinking alcohol in public, gang indicators, presence of drugs, and prostitutes (Sampson and Raudenbush, 1999; Blau & Blau, 1982) could be used to improve the analysis of neighborhood characteristics.

While only 10% of the overall variance is explained through this study, the findings are still significant to understand implications for future research and policy. That being said, this study has illustrated small trends of calls for service during certain hours of the day, days of the week, months of the year, and in this case, locations in the city. This can be transposed into other cities that share similar demographics. The city of Southwest Sky has a population of just over 250,000 people and a police force of over 320 sworn officers. That is approximately 1.28 officers per 1000 residents. Cities with similar police : resident ratios may or may not have similar calls for service demographics and response times.

This analysis found that 90% of the over variance was not explained by these variables, leaving a large amount of room for speculation and implications. Be it the physical make-up of the city, the underworld societal parameters, or the nature of the topic at hand, the relationship between the police and those whom they have authority over will constantly affect effectiveness. Numerous studies

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have been conducted, analyzed and explained that cause a need to account for a myriad of parameters for municipal services. These findings show certain areas that have an influx of calls for service compared to other parts of the city. This might mean that those areas need to be more closely monitored to understand why it is that more calls for service are being requested there. The total population of each area can be one reason, but that causes implications of its own. This raises concern for more municipal services, new policies that take into account the differences in population totals and perhaps stricter laws on offenses that occur more often. This is all speculation and much more thought and research must be done in order to recommend policy changes, but with 90% of the variance not explained, there is a very large amount of space to move around.

Conclusion

The findings of this thesis indicate a larger reasoning behind the effects of police response time. With small but significant findings for the structural disadvantage, it is important to determine exactly what it is about structurally disadvantaged neighborhoods that have an effect on police response. Whether the effect is from the officers and the department, or it has to do with the structural makeup of the disadvantaged neighborhoods, or even with the individuals who reside within these neighborhoods, an important finding was established. Perhaps policy has to be altered for structurally disadvantaged neighborhoods for municipal services to affect them similarly to structurally sound neighborhoods. Perhaps it is embedded in the subculture of the policing profession, something that needs to be addressed and changed to better serve the community as a whole.

Whatever the cause, future research should further investigate the resulted findings in this thesis and establish a better understanding of why structurally disadvantaged neighborhoods affect police response time.

Structurally disadvantaged neighborhoods, or neighborhoods that display projections of structural disadvantage, tend to disrupt the social organization process and cohesion within the neighborhood (Shaw and McKay, 1942; Park and Burgess, 1924). These types of neighborhoods often have lower rent values and attract lower-socioeconomic groups and diverse racial and ethnic backgrounds (Delbert, 1996; Blau & Blau, 1982; Morenoff et al., 2001). While these neighborhoods tend to have a closer proximity to jobs, more affordable housing and public transportation, they can be indicative of higher rates of poverty and residential instability (See Hipp, 2010; Quane & Rankin, 1998; Blau & Blau, 1982; Hipp, 2007; Kane, 2005; Quane & Rankin, 1998; Sampson & Raudenbush, 2004; Sampson et al., 2002). The racial/ethnic heterogeneity generates diversity in cultural values and norms, which sometimes creates a social divide among resident groups. Among other things, this divide is created by variation in languages and values, which results in a loss of communication among local residents. When communication is dysfunctional, a consensus cannot be met to uphold standards and norms within the community. This can result in a separation or disconnect in cultures and values, all within a single neighborhood. In doing so, the disadvantaged neighborhood may reach a tipping point that results in social disorganization. Differential disorganization results in high population turnover (See Hipp, 2010; Quane & Rankin, 1998), which creates

difficulty in establishing shared standards and norms within that community

(Rankin & Quane, 2002). The net result is no effective institutional presence or

support for conventional behavior and a diminished capacity for informal social

control (Delbert, 1996). Because there is little or no institutional integration at the

neighborhood level, there are few intermediate structures that link primary and

secondary institutions to one another (e.g., family, schools, friends, and work). In

short, persons living in these neighborhoods are isolated from mainstream

institutions (Wilson, 1987). They are far less able to access conventional means

to achieve conventional societal goals, to support family socialization of

mainstream values and norms, and to exert effective informal social control over

the behavior of residents (Delbert, 1996).

The same causal processes that lead disadvantaged neighborhoods to

weakened social controls and norms, also result in moral diversity (Shaw and

McKay, 1942). Moral diversity, or normlessness, gives rise to delinquent and

illegitimate enterprises. Delinquent value systems may be transmitted

generationally. For example, one study found that offenders do not consistently

assume the role of instigator or joiner over time, but instead switch from one role

to the other depending on their relative position in the group in which they are

participating at the time (Warr, 1996). It also found that offenders typically

commit offenses with only a small number of co-offenders, but have substantially

larger networks of accomplices (Warr, 1996). Illegitimate organizations feed off

the lack of neighborhood social organization and structure, which results in

neighborhoods that are disassociated with social services whether it be from lack

of trust, negative experiences, or word of mouth. This disassociation from social services – including municipal police –   can translate into a lack of police effectiveness throughout the neighborhood.

A difference in police response times may be the outcome of the existence of structure barriers that differ from one neighborhood to another. While the ecology of neighborhoods explains the strains certain communities experience, the variations in police effectiveness may very well be a direct result of the ecological status within (Hunter, 1985; Bursik & Grasmick, 1993). If this is true, a change in policy might be needed to compliment the variations in neighborhoods to establish more effective municipal services throughout.

Third parties, when in groups or as individuals, can act as escalators of conflict due to a modern social expectation of "honor." This sense of honor is constructed throughout society and holds no material value, but can be worth almost everything in underclass areas (Anderson, 2000). Any type of interaction between two individuals is precluded to be between the two said parties. Third parties are those affiliated with either previously said parties or individuals who are in immediate proximity of the interaction of the two individuals. The partisanship that third parties hold for certain groups and individuals is tied to their own honor status as well as the honor status of those groups and other individuals. As a neighborhood, the code of the streets may play an important role in the way in which individuals behave. The presence of third parties may mean that police assistance would result in a loss of honor, and a sign of weakness

in the individual. In an event that an incident does occur, the code of the streets

may hinder the efficiency of the police through neighborhood resolution.

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APPENDIX A

MODEL 1 REGRESSION

COEFFICIENTS

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	40.960	.447		91.548	0.000
PRI	-10.410	.244	-.310	-42.746	0.000

a. Dependent Variable: Response time

MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.310[a]	.096	.096	29.15569

a. Predictors: (Constant), PRI

APPENDIX B

MODEL 2 REGRESSION

COEFFICIENTS

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	32.165	.840		38.287	.000
Felony crime (yes/no)	-1.422	.558	-.021	-2.550	.011
Disorder incident (yes/no)	7.217	.748	.091	9.643	.000
Violent crime (yes/no)	-6.548	.612	-.103	-10.705	.000
in progress, just occurred, or a report of a past event?	-12.030	.510	-.220	-23.590	.000
Did this call come from an apartment building?	-.995	.544	-.013	-1.828	.068
At about what time of day did the call occur?	-.943	.325	-.023	-2.900	.004
Did the call occur on a weekend day?	-2.846	.457	-.046	-6.225	.000
What season did the call occur in?	-.204	.201	-.007	-1.017	.309
Did the call occur in a crime hot spot?	3.796	.476	.058	7.976	.000
Volume of call activity on that particular day and hour	1.014	.125	.060	8.089	.000

a. Dependent Variable: Response time

MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.306[a]	.094	.093	29.20529

a. Predictors: (Constant), Volume of call activity, season, hot spot?, Violent crime?, apartment building?, weekend day?, Felony crime?, time of day?, in progress, just occurred, or a report of a past event?, Disorder incident?

APPENDIX C

MODEL 3 HLM

COEFFICIENTS

| Model | Unstandardized Coefficients | | Standardized Coefficients | | |
	B	Std. Error	Beta	t	Sig.
(Constant)	32.089	.855		37.523	.000
Felony crime (yes/no)	-1.366	.565	-.020	-2.419	.016
Disorder incident (yes/no)	7.155	.758	.090	9.445	.000
Violent crime (yes/no)	-6.671	.618	-.106	-10.786	.000
In progress, just occurred, or a report of a past event?	-12.037	.514	-.221	-23.400	.000
Did this call come from an apartment building?	-1.075	.551	-.015	-1.952	.051
At about what time of day did the call occur?	-.871	.329	-.022	-2.646	.008
Did the call occur on a weekend day?	-2.860	.462	-.047	-6.185	.000
What season did the call occur in?	-.152	.203	-.006	-.750	.454
Did the call occur in a crime hot spot?	3.316	.492	.051	6.736	.000
Volume of call activity on that particular day and hour	1.017	.127	.061	8.007	.000
Minority concentration	.323	.230	.011	1.404	.160
Structural disadvantage	.588	.230	.019	2.560	.010

a. Dependent Variable: Response time

MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.308[a]	.095	.094	29.08869

a. Predictors: (Constant), Structural disadvantage, Minority concentration, season?, weekend day?, Violent crime?. Volume of call activity, apartment building?, Felony crime?, hot spot?, time of day?, In progress, just occurred, or a report of a past event?, Disorder incident?

APPENDIX D

FACTOR ANALYSIS INCLUDING ALL SEVEN LEVEL-2 VARIABLES

TOT VARIANCE EXPLAINED

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.647	52.095	52.095	3.647	52.095	52.095	2.686	38.374	38.374
2	1.542	22.029	74.125	1.542	22.029	74.125	2.503	35.750	74.125
3	.656	9.365	83.489						
4	.529	7.552	91.042						
5	.290	4.147	95.188						
6	.254	3.630	98.818						
7	.083	1.182	100.000						

Extraction Method: Principal Component Analysis.

ROTATED COMPONENT MATRIX

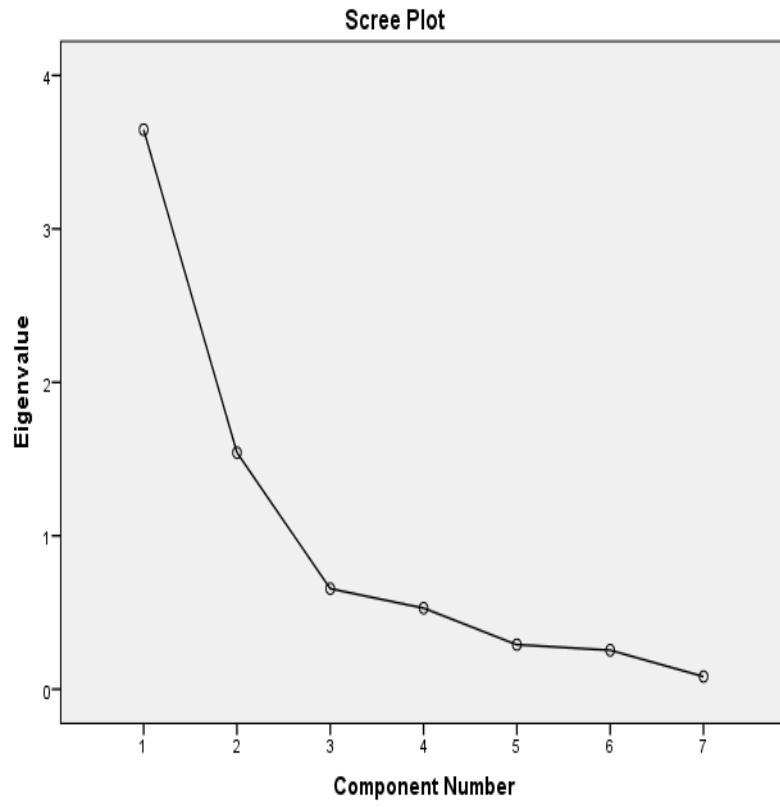|	Component	
	1	2
Percent Hispanic	.864	.387
Percent Asian	-.835	.279
Percent White	-.751	-.198
Percent Poverty	.717	.578
Percent Black	.063	.826
Percent Renter	.401	.800
Total Population	.015	.761

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

APPENDIX E

SCREE PLOT OF FACTOR ANALYSIS

Scree Plot

APPENDIX F

FACTOR ANALYSIS INCLUDING ONLY THREE MINORITY
CONCENTRATION VARIABLES

TOTAL VARIANCE EXPLAINED

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.948	64.929	64.929	1.948	64.929	64.929
2	.599	19.975	84.904			
3	.453	15.096	100.000			

Extraction Method: Principal Component Analysis.

COMPONENT MATRIX

| | Component |
	1
Percent Hispanic	-.838
Percent Asian	.812
Percent Black	.806

Extraction Method: Principal
Component Analysis.

APPENDIX G

FACTOR ANALYSIS INCLUDING ONLY FOUR STRUCTURAL
DISADVANTAGE VARIABLES

TOTAL VARIANCE EXPLAINED

| | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.624	65.612	65.612	2.624	65.612	65.612
2	.639	15.974	81.586			
3	.737	18.414	100.000			

Extraction Method: Principal Component Analysis.

COMPONENT MATRIX

	Component
	1
Percent Renter	.902
Percent Poverty	.816
Total Population	.705

Extraction Method: Principal
Component Analysis.
.

APPENDIX H

ACTUAL LOGGED IN PATROL UNITS - AVERAGE PER DAY OF WEEK/HOUR OF DAY

LOGGED PATROL UNITS
Jan 1, 2011 - Dec 31, 2011

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Avg
0000-0100	30.06	24.92	24.99	23.44	24.34	28.05	27.81	26.23
0100-0200	21.59	17.97	18.64	17.92	18.70	21.07	19.96	19.41
0200-0300	20.74	17.45	17.85	17.29	17.82	20.22	18.89	18.61
0300-0400	20.23	17.26	17.46	17.00	17.48	19.74	18.29	18.21
0400-0500	19.85	17.00	17.13	16.71	17.01	19.36	17.97	17.86
0500-0600	19.98	16.99	16.93	16.16	16.52	19.11	17.86	17.65
0600-0700	26.65	22.16	20.57	18.42	19.59	23.10	24.13	22.09
0700-0800	19.56	20.56	20.90	18.69	20.11	18.43	19.16	19.63
0800-0900	17.80	19.39	19.90	17.54	19.13	17.56	17.76	18.44
0900-1000	17.17	19.12	19.67	17.23	18.87	17.36	17.34	18.11
1000-1100	17.00	18.95	19.67	16.96	18.87	17.25	17.18	17.98
1100-1200	16.86	19.03	19.56	16.93	18.78	17.16	16.89	17.89
1200-1300	16.72	18.79	19.27	16.93	18.61	17.15	16.69	17.74
1300-1400	16.69	18.98	19.22	17.09	18.73	17.16	16.68	17.79
1400-1500	18.91	20.04	19.73	17.54	19.70	19.49	19.21	19.23
1500-1600	28.02	28.67	27.98	26.79	29.00	29.01	29.66	28.45
1600-1700	18.68	18.65	19.25	19.41	21.03	21.84	20.90	19.97
1700-1800	17.48	17.35	17.83	18.29	19.68	20.49	20.01	18.73
1800-1900	17.23	17.09	17.40	17.99	19.41	19.97	19.89	18.43
1900-2000	17.13	16.98	17.26	17.93	19.20	19.81	20.21	18.36
2000-2100	17.78	17.72	17.57	18.55	20.04	20.62	21.38	19.09
2100-2200	27.08	26.44	24.45	23.93	27.54	28.29	31.32	27.01
2200-2300	32.22	32.29	31.25	32.38	36.70	36.22	38.18	34.18
2300-2400	31.97	31.93	31.21	32.28	36.61	36.13	38.18	34.04
Avg	21.14	20.66	20.65	19.73	21.39	21.86	21.90	21.05

Total Units: 88.40
Boxed: Less than 17