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Thanks to the WCR reviewers!

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WESTERN CRIMINOLOGY REVIEW

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Research: A Practitioner's Perspective, from the Streets

Keynote speech as delivered at the
2006 National Institute of Justice Conference
on July 17, 2006

William J. Bratton
Los Angeles Police Department

Good afternoon and thank you. Thank you for the opportunity to address this exceptional gathering of scholars, researchers, and criminal justice professionals. Like all of you, I enjoy and appreciate these conferences in that they give us an opportunity to look at where we have been, where we are, and, most importantly, where we might be going. We are intrigued and inspired about the possibilities the future holds. Unlike most of you, I am first and foremost a practitioner, a cop, and have been one for 36 years. I am also a consumer and strong advocate of research. As the current president of the Police Executive Research Forum, the foremost practitioner/research partnership organization in policing, I am a proponent of more intimate partnerships and collaboration between practitioners and academics. I respect partnerships that helped to shape successful problem solving and community policing philosophies of the 20th century. These partnerships can lead to a better understanding of the complexities of the rapidly expanding paradigm of crime and criminal justice in America in the 21st century.

This is particularly important as we enter that emerging new paradigm of the 21st century where intelligence-led policing and the uncertainties of the under-researched issues of the many facets of terrorism and cyber-crime begin to confront and challenge us. What I would like to do with my time here today is to share with you some of the ways that I believe research has and has not contributed to the practice of policing in this country over the last 40 years. Speaking as a successful practitioner and manager of six police agencies, including three of the largest police agencies in the U.S., I will just state that the views are mine, but they are shared by many of my colleagues.

I think I can be comfortable in saying that for most of the last half of the 20th century, the relationship between police practitioners and researchers has been, at best, one of agreeing to disagree on the causes of crime and the best ways to respond and prevent crime. Unfortunately there are times when we talk past each other and don't connect at all. Since one of the purposes of research is to spawn and encourage debate and dissent, that set of contradictions may be entirely appropriate. I embrace and encourage the need for research, because I am a change agent, who constantly needs timely accurate information to help shape my initiatives and understand my challenges. I want to challenge you all to continue to be inquisitive, forward-thinking, and constructively critical of the status quo. Both practitioners and researchers together must fight fiercely for expansion of NIJ and private sector research initiatives. We all know that funding fuels research as well as the attention of the public, the media, practitioners, and politicians. Right now, the overwhelming majority of federal funding is being redirected from traditional criminal justice arenas to homeland security issues. While I agree that homeland security is important, we need to maintain a balance between counter-terrorism funding and funding in support of our traditional criminal justice responsibilities.

As for the title of my remarks, I also challenge you to aggressively respond to and research the increasingly conflicting theories, efforts, arguments, and almost mean-spiritedness of some criminologists, academics, and sociologists, including some in this room, to diminish, refute, or dismiss outright the contributions and effectiveness of our police officers and practitioners in preventing, controlling, and reducing crime. Some seek to assert, with what to me and my fellow practitioners sometimes appears to be specious data, faulty assumptions or ivy tower perspectives and assertions that the police play little or no role in the prevention of crime. I'm sorry, but *we do play a major role*. Absent clear-cut results, or at least research that is intelligible and useful to the field and to practitioners like me, they and you risk being shut out, cut off, and ultimately reduced to the point of irrelevance.

For most of the period of the 1960s to the 1990s, for a variety of reasons, including the limited criminal justice research available at the time, many of the most influential politicians, researchers, reporters, and even some well-intentioned police leaders sought to limit the role of the police to first responders rather than allowing them to be

first-preventers. We were also told that the causes of crime were economic, social, demographic, and ethnographic. Furthermore, we were told that we could have no impact on these so-called causes. Rather, we were encouraged to focus on response to crime and to measure our success by arrest numbers, clearance rates, and response time. Police leaders at the time either were not intellectually equipped or inclined to refute this research and political direction. Alternatively, they understood, possibly in a self serving manner, that they were being absolved of the traditional and historical role of prevention and were now going to be held accountable only for the less challenging and potentially more successful response to crime that had already occurred. Fortunately, there were some in your ranks and in the new emerging leadership in the ranks of the police, like me, who because of our experience on the front lines, on the streets, and in the neighborhoods of our cities embraced a different approach that understood quite simply that the so-called causes were in most environments strong influences, not causes. We believe strongly that the single most important cause of crime has been human behavior. I have learned from and worked with researchers and practitioners whose focus is on the street, and we have embraced the reality that in order to control human behavior, *the police do matter*.

That focus on outcomes and on controlling behavior, rather than just measuring our response, has shown that after 40 years of uncontrolled increases in crime, fear, and disorder, we finally began to get it right in the 1990s. The police have helped to create a huge and positive impact. We did it by focusing on and prioritizing the right outcomes: less crime and more safety. We began to achieve historic crime reduction and improved quality of life. Our new focus remains primarily on measures of effectiveness, not just activity and response. The lesson learned quite simply is that *cops do count*. We are one of the most essential initiators and catalysts in the criminal justice equation. Crime may go up or down to some degree when influenced by many of the old so-called causes, which I prefer to describe as influences, but the quickest way to impact crime is with a well-led, well-managed, and appropriately-resourced police force that embraces risk taking over risk adversity. A policing structure that includes accountability focused Computerized Statistics (COMPSTAT) management principles, broken windows quality of life initiatives, and problem-oriented community policing that is transparent and accessible to the public, the profession, the media, and the research community will be most effective. It is inclusive not exclusive. I advocate that position, because that is what I have consistently done successfully for almost 30 years in six different police departments.

I am asking that more of you begin to work with us and among us in the real world laboratories of our departments and cities to help us prove or disprove the beliefs and practices that practitioners like myself and most of my colleagues deeply believe in, espouse, and practice. You don't need to look at us and analyze us like a far away galaxy through a telescope. We are right here, and more of you need to work among us, rather than just observing and commenting about us in language that is seen as disparaging or dismissive. You view us through theories that appeal to and are understood fully by a limited few among you, but that are not appreciated, understood, or embraced by those leaders like me, who can take your thoughts and theories and validate or refine them in the petri dish of our departments and cities.

More than ten years ago, I encouraged the creation of and participated in a National Institute of Justice (NIJ) conference similar to this one called Measuring What Matters. The conference was initiated by then NIJ director Jeremy Travis, who had formerly worked for me as my deputy commissioner for legal affairs. I was completing my second year as New York City Police Commissioner at the time. My appointment by Mayor Rudolph Giuliani was based largely on my success in the New York Transit Police two years earlier, as well as our mutual belief in broken windows quality of life enforcement as an essential strategy for reclaiming public spaces. We had undertaken a top-to-bottom reform of the NYPD, including the development of the COMPSTAT process, and we were beginning to see the extraordinary declines in violence and other crimes that have typified New York City ever since. Starting in 1990, there were 17 straight years of decline in reported crime in the subways. Starting in 1991, there were 16 straight years of decline in reported crime in the city. A world-renowned reduction in fear-inducing disorder began and public space quality of life improved. I tried to give the criminologists and attendees at the Measuring What Matters conference a heads up, both in my keynote comments and in my contribution to the seminal report "Measuring What Matters." Indeed some of my remarks to this audience are remarkably redundant of those that I made and wrote ten years ago. Paraphrasing the remarks I told them,

> Something very different is coming your way. If you think police departments can't rouse themselves from their bureaucratic torpor, think again. If you think police are doomed to be perpetually overwhelmed by demographic trends and these so-called so-

> cial causes of crime, think again. If you think adaptability, flexibility, and responsiveness to local conditions are beyond the capacity of police organizations, think again.

Unfortunately, what I mostly encountered was resistance. Many of the attendees at the meeting were pretty sure that I was just a lucky cop riding a statistical wave. "If you take credit when crime goes down, what will you do when crime goes up?" one asked. "Crime goes up somewhere in New York City everyday," I replied. "The difference now is that we know when it goes up we have the flexibility and the focus to drive it back down."

In any event, I must be the luckiest cop alive. Starting in the 70s in Boston and continuing today in the LAPD, one of the smallest police departments per capita, I have always been able, in all six departments, to drive crime down and keep it down by responding quickly to the spikes that will always occur.

It has been an enlightening and invigorating experience. We police managers were supposed to be the conservative ones, stuck in ours ways, and impervious to new ideas. Yet, it was many in the research community who couldn't or wouldn't see what was happening in front of them, possibly because it was so contradictory to their own research and beliefs. We have all come a long way since then. I think much of the criminal justice community now acknowledges that police management was one of the many influences on the remarkable crime declines of the 1990s. And more and more police managers understand that they have to open their organizations to challenging new ideas and research possibilities from the outside. I know I want my new department, the LAPD, to be seen as a national laboratory.

Let me share with you the last paragraph from that 1995 presentation:

> Criminology tends to view the criminals as a kind of irresistible social force. Its prognosis for the future amounts to a cry of, "Look out! Here comes a demographic bulge in the crime-prone age cohort of 15 to 19 year olds, and we are all going to be swamped by it" (remember John Dilulio and the super predators?). I don't think so. The criminals are no irresistible force. In fact, the criminal elements responsible for most street crime are nothing but a bunch of disorganized individuals, many of whom aren't very good at what they do. The police have all the advantages—in training, equipment, organization, and strategy. We can get the criminals on the run, and we can keep them on the run. It's possible. We are doing it in New York.

As the late great Jack Maple once said, "I'm not worried about organized crime; I'm worried about disorganized crime."

And guess what? We are doing it again in Los Angeles with many fewer resources but using many of the same ideas. But we need to do more. We need more ideas and more research into what works. In what has burgeoned over the last five decades into a huge criminal justice research field, it is my belief that not enough effort has been or is being focused on the police, our role, and our impact. So much of what has been done seems intent on disproving that we count.

Expanding on that premise, I want to encourage the research community to be introspective and to think about your audience. Much of the social science research that I encounter appears to be written by academics for academics and does not appear to be grounded in and validated by solid field experience. So, as a result, it is not viewed as credible by many police leaders. Some of it appears to me and to other cops as coming from a decidedly anti-police biased perspective. Now maybe we are cynical and a bit paranoid, after all we are cops, but take a look at some of these arguments and decide for yourself.

Bernard Harcourt recently wrote an editorial for the LA Times, titled "Bratton's Broken Windows" based on his research and aimed at disproving the broken windows approach. His basic premise was that with precious resources, misdemeanor arrests do nothing but waste the time of the officers and the courts. Secondarily, he proposed that this is an either/or situation. Either you focus on guns, gangs, and drugs or you focus on quality of life and public disorder violations. In reality, as police chief, I don't have the luxury to shrink away from my responsibility to the public and pick and choose how to enforce the law. You have to do it all, and the number of police officers is inconsequential in the big picture. If I had one police officer, he or she would be doing both. I have always done both successfully in my six police experiences.

Then there is the economist, Steven Levitt, who in his best-selling book *Freakonomics* spends a great deal of time bashing many of your colleagues' theories before attributing the dramatic crime declines in the 1990s to the unintended benefits of legalized abortion. What neither of these researchers chose to consider in downplaying the role of police in crime reduction is that we did have

something of an experiment with which to gauge the effectiveness of innovative police strategies in the New York City subway system. That is where the philosophy, strategies, and tactics that were later applied to the city of New York as a whole were tested. Unfortunately, these applications have been ignored by most of you but addressed so brilliantly in Malcolm Gladwell's *Tipping Point*.

I understand "research for the sake of research sake" and believe that it has its place. However, in order to be useful to practitioners, researchers need to understand their audiences and the potential impacts of research on the front end. Otherwise, we might just end up having academics writing to impress each other with no long-term lasting effect on what is actually happening in the field. I have also commented that practitioners and researchers often think in different time frames. The police executive has to deliver results in a much more immediate time span and is constantly in need of even more timely and accurate information upon which to make allocation decisions. Researchers oftentimes cannot meet these needs. The sometimes enormous lag between research being conducted and its eventual application is frustrating to those charged with delivering fairly immediate results where lives are quite literally at stake. Knowing what happened two years ago, let alone five or ten, is often of no value and is not included in the decision making processes of practitioners. We often use such information as bell weather guides to measure how we are currently doing. I can remember during my time in New York City that once we had a plan, we did everything everywhere all at once, because with 38,000 cops for the first time in my career, I could do that. Regrettably, according to the experts, this type of approach does not allow for valid experiments or for a perfect research setting. Well I'm sorry, but I am sure that the thousands of people whose lives were saved are grateful that we didn't wait to experiment here and there. This difference in mindset contributes to what I believe is part of the divide between some researchers and some practitioners.

It is of the utmost importance that we exploit opportunities like this conference to foster a more collaborative relationship between researchers and practitioners. That is why I believe it is important to air our differences and to try to come to some common ground. So in the spirit of sharing, let me offer you some of my observations about what is good and productive versus what is misguided and unproductive about research. This is just from my perspective as a practitioner. What my colleagues and I find useful is applied research that is understandable and pertinent to the practitioner, research that is conducted to advance the field and enhance productivity, and research designed to measure effectiveness. When considering the research sources of evidence-based policy and practice, practitioners are concerned with the quality of the research, its synthesis into the overall picture, and the ability for the findings to be disseminated in a "practitioner-friendly" manner so that practitioners can gauge the relevance, importance, and reliability of the research.

What we find of limited value is theoretical research aimed at provocation of a response, grand-standing through controversial hypotheses with little basis in fact, writing that is strictly focused at other academics with no grounding in reality, and the kind of reconstructed logic that is clearly based on presuppositions and bias. Echoing these comments, my friend and equally outspoken colleague Miami Police Chief John Timoney points out that:

> We are not concerned with setting up the perfect experiment to prove our point or satisfy academic curiosity. When we drove crime reduction in New York, we implemented it citywide. We could not ethically let certain communities suffer when we knew what we could do to help them.

We are concerned with saving victims' lives. In LA so far this year through July 16, 2006, due to a combination of strategies, including broken windows, 16 fewer people were killed in this city versus last year at this time. That's 16 families spared the grief of the violence that claims so many lives. That is also 16 fewer young people who would likely be spending the rest of their lives in prison.

My biggest regret in Los Angeles is that, unlike in New York City in 1994, I don't have the cops to do it everywhere all at the same time. But where we have applied the lessons learned from New York with more police, we have been having the same predictable success.

To help you understand the points I am making, it might be helpful to review my background to give you some insight into how I view the world. My first law enforcement job was as an MP in Vietnam. By the time I came back and joined the Boston Police Department in 1970, as a skinny white kid walking a beat in a crime ravaged and predominantly African American community armed with a badge, a six-shot revolver, six spare rounds, handcuffs, a twelve inch club, and no radio, a dramatic change in the so-called policing profession was on the way; 'so-called' because based on any acceptable description of what constitutes a profession, in 1970 we clearly

were not a true profession. More cops were getting educated through the Law Enforcement Assistance Program (LEAP) and on their own, and many were becoming familiarized with the potential benefits of dramatically increasing research and body of knowledge in the practical application of law enforcement operations. But we still had the old guard practitioners to contend with. They tended to be close-minded, cynical, and unwilling to accept new ideas that came initially from outside of their insular environments and experience, and eventually and increasingly from inside.

Coincidentally, this was just about the same time that NIJ came into being. So, in a sense, I grew up in the NIJ era. NIJ grew out of the Omnibus Crime Control and Safe Streets Act of 1968 and dedicated itself to researching crime control issues to meet the challenges of crime and justice, particularly at the state and local levels. As time progressed, the federal government took on more and more of a role in crime control research and dedicated more and more funding to research, other technical assistance, and training programs to assist state and local authorities. During its first years of operation, NIJ focused on law enforcement communications systems, crime prevention, rehabilitation, technology, management, and organization of the criminal justice system. NIJ also began to support graduate research fellowships and assessed curriculum needs in degree programs for criminal justice professionals.

Throughout the 1970s, the federal agencies and NIJ struggled with their new role, and much of the interesting research came out of the Ford Foundation-funded Police Foundation. Still, the initial research on the causes of crime often was of little value to the practitioner in the police environment of the 1970s and 1980s when we were still operating under a reactive model. In fact, many of the academics, sociologists, economists, and politicians did not want the police to focus on the causes. They had already made up their minds about the causes of crime, and we were told it was beyond our purview. In 1973, former NYPD commissioner Patrick V. Murphy took over the Police Foundation and three years later, along with other local police chiefs, created the Police Executive Research Forum (PERF) as a national membership organization that would foster debate, research, and openness to challenging traditional police practices. PERF's first executive director, Gary Hayes, one of Herman Goldstein's former students, decided that problem solving would be the agenda of PERF, and we were off to the races.

In 1978, as a young Boston police lieutenant implementing one of the country's first community policing initiatives, I remember reading Herman Goldstein's *Policing a Free Society*. In 1979, Goldstein published *Improving Policing: A Problem-Oriented Approach to Crime and Delinquency*, and we were thrust forward into the Community Policing Era that would finally take hold in the 1990s. Throughout the 1980s, the crack epidemic raged as NIJ developed and improved soft body armor for the police who were facing heavily armed drug dealers. NIJ also conducted research on difficulties victims faced in the criminal justice system and recommended reforms that led to victim assistance programs nationwide.

Later in the 1980s, James Q. Wilson published *Thinking About Crime*, and the federally funded Executive Sessions on Community Policing began at Harvard's Kennedy School of Government. I was a late-joining participant. It was also during this time that the broken windows philosophy, first espoused in the 1982 Atlantic Monthly article of the same name, by Jim Wilson and George Kelling, was embraced by police leaders, including me. I embraced it, because I had lived it during my neighborhood policing initiatives in some of the highest crime neighborhoods in Boston. Society had told the police to focus on serious crime response, while it figured out what to do about the causes. In the neighborhoods of Boston, the residents wanted to know what I was going to do about the broken windows victimless crimes like graffiti, prostitution, and drug dealing that were destroying their neighborhoods.

It was also around this time that Chips Stewart took over at NIJ in the 1980s and began to sharpen its focus and concentrate its attention on the proximate measures of crime prevention reduction and control; work that was later built upon by Jeremy Travis in the 1990s. With this background, we were positioned to carry out what we learned in the 1980s in a meaningful way in the 1990s. We changed the way we were doing business. We had been focused on a failed reactive philosophy based on the strategies of random patrol, rapid response, and reactive investigations. Based on what we learned in the 1980s, we moved to a community policing model characterized by prevention, problem solving, and partnership. We got it right in the 1990s. We turned the system on its head, and we were successful in driving crime reduction through accountability, through measuring what matters, through partnership with the community, and through problem solving. We developed COMPSTAT with its emphasis on risk taking, accountability, and the use of timely and accurate intelligence to make police smarter.

The results, as reflected by the dramatic crime declines of that period, that continue to this day in cities like Chicago, New York, and Los Angeles were lasting. At the same time, the federal government, through the

Community Oriented Policing Services (COPS) program, took action to increase the number of law enforcement officers, to strengthen penalties, to control guns, to support prevention programs, to widen efforts to combat organized crime through the use of the Racketeer Influenced and Corrupt Organizations (RICO) statute, and, most importantly to this audience, to increase research dollars. In the 1990s, for the first time in our history, we got it right. The police were catalysts in many instances for the significant reductions in crime, fear, and disorder. These successes further reinforced my belief that the philosophy that shaped so much of police policy and practice in the 1970s and 1980s, with its emphasis on police responding to crime rather than focusing on the prevention of crime, was wrong, *dead wrong*. The belief held by many, including possibly many in this room, that crime was caused by economic, social, demographic, or ethnographic factors (or even by the weather) was fundamentally flawed. All of those factors may act as influences, in some instances significant influences on crime, but the real cause of crime is *behavior*. The one thing I have learned and strongly advocate is that the police, properly resourced and directed, can control behavior to such a degree that we can change behavior. My experiences in Boston, in New York, and now in Los Angeles have all borne this out. In sum, *the police do matter*!

I have seen nothing in the way of hard evidence to dissuade me from this simple truth. We are the difference—we are one of the essential catalysts in the reduction and prevention of crime. In a recent article in the National Review, "There Are No Cracks in the Broken Windows," George Kelling and I sought to refute several of the ideological academics who are trying to undermine our efforts and our success. Many of these social scientists are wedded to what I believe is the failed and never proven idea that crime is caused by the structural features of a capitalist-based democratic society such as demographics, economic imbalance, racism, and poverty to name a few. They assume that true crime reduction can come only as the result of economic reform, redistribution of wealth, and elimination of poverty and racism—all worthwhile goals. Indeed, they speak of crime as a sort of disease that criminals are at risk of catching, through no culpability of their own, and for which the police have no responsibility or ability to prevent. I hold that these proponents are very much removed from the reality of the practitioners' experiences and cannot possibly see what we see, up close and personal everyday. On a daily basis, we see that committed cops are making a difference out here in the real world laboratory, far removed from the sometimes sterile and controlled academic environment. What some refuse to see and acknowledge is what I know to be true, and that is: *cops count*!

We got it right in the 1990s—partnership, problem solving, and preventative community policing. We can continue to get it right in the 21st century. We know that the above factors influence crime but do not cause it. The cause of crime is illegal or inappropriate behavior. In a democratic society, we the police are the arm of government authorized to control that behavior in a constitutional, consistent, and compassionate manner. I know as you do that when given the resources, motivation, training, and strategic focus, 'better policing' is a causal variable and catalyst that drives crime reduction.

As we enter the new millennium, there is no denying that the role of the police and criminal justice community must continue to change and expand. It is incumbent on us all, practitioners and researchers alike, to continue in useful and practical ways to advance the field of knowledge, so that we are better able to shape that advancement and expansion into continued, meaningful, and sustainable positive change for the people whose lives and environment we seek to improve. We are in this together and our continued success will rely on our ability to be inquisitive, forward thinking, and constructively critical of the status quo. We need to balance the new challenges of counter-terrorism and cyber crime with our traditional crime-fighting role and need to talk, listen, challenge, debate, and ultimately work together for the betterment of our society and civilization.

About the author:

William J. Bratton is Chief of the Los Angeles Police Department (LAPD) and the only person ever to serve as chief executive of both the LAPD and the New York Police Department. He also was the Chief of the New York City Transit Police, the Boston Police Commissioner, and the New York City Police Commissioner. Chief Bratton also has worked in the private sector, forming the Bratton Group, LLC, and consulting with Kroll Associates. He is president of the Police Executive Research Forum and was a Senior Executive Fellow at the John F. Kennedy School of Government at Harvard University. A frequent lecturer, writer, and commentator, his critically acclaimed autobiography, *Turnaround*, was published by Random House in 1998. He holds numerous honors and awards. He received a B.S. in Law Enforcement from the University of Massachusetts and is a graduate of the FBI National Executive Institute.

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The Distribution of Property Crime and Police Arrest Rates across Los Angeles Neighborhoods

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ERS Group

Abstract. *A cross section of 636 Los Angeles neighborhoods in 1987 is used to examine relationships between neighborhood rates of property crime, levels of policing as measured by neighborhood arrest rates, jobs per square mile, and characteristics of neighborhood residents. Endogeneity between neighborhood crime and arrest rates is explored by estimating a regression model with and without control variables for neighborhood characteristics and fixed area effects. When comparing nearby neighborhoods with similar characteristics, crime is lower where arrest rates are higher, but when comparing neighborhoods across the city without controls, arrest rates are higher in higher crime, lower income minority areas.*

Keywords: property crime; geography of crime; arrest rates; jobs; aggregate crime statistics

Introduction

Economic theories of crime posit that, all else equal, criminals are more likely to engage in criminal activity when and where the expected gains are higher, with the risk of arrest by the police as a key factor affecting the expected gains to criminal activity (Becker, 1968; Phillips and Votey, 1972). There is general agreement in the literature on how the economic model guides expectations about criminal behavior, but there is a wide range of debate about the extent of empirical support for the economic approach due to problems in accurately identifying and measuring these relationships, especially in studies that use aggregate data on crime rates and explanatory characteristics (e.g., at the city-wide, county, or state level). One common problem is difficulty in measuring variables that affect criminal behavior, since the typical candidates are proxy measures that do not distinguish criminal opportunities from criminal motives or are simply omitted entirely. The most difficult statistical issue, however, stems from the simultaneous determination of crime with variables that explain crime rates, such as police arrest rates and criminal opportunities, all of which may change as the public responds to rising crime.

This paper explores these issues using a more localized unit of observation than many previous studies of aggregate crime statistics: 636 neighborhoods (essentially census tracts) that comprise Los Angeles (L.A.) in 1987. The data set contains information to separately identify and control for key factors that should affect property crime, factors often omitted in other studies. In an effort to identify simultaneous influences on property crime from property crime arrest rates, the statistical model is estimated with and without control variables and with and without controls for city areas. As will be discussed, there is a positive relationship between property crime and arrest rates when estimated across neighborhoods of the city when control variables and area effects are excluded from the model, but a negative relationship when estimated with controls for neighborhood characteristics and area effects that restrict measured relationships to variation between similar neighborhoods within city areas.

Economic Model of Property Crime

The economic model of crime is especially relevant for modeling property crime as compared to violent crime due to its clear economic motives. The economic model of property crime posits that property criminals increase or decrease criminal activity in response to changes in their motivations for criminal activity, M_n, the benefits or loot that can be acquired from criminal activity, $B_n(C_n)$, and the risks of arrest and punishment for criminal activity, $a_n(C\text{n})$, which together increase or decrease the net returns (NR_n) to criminal activity in a neighborhood, n:

$$NR_n = f[\, M_n,\ B_n(C_n),\ a_n(C_n)\,] \qquad (1)$$
$$\qquad\qquad +\quad +\quad -$$

In the context of a city with alternative neighborhoods for committing property crime, property criminals can be modeled as assigning an optimal probability for selecting

each neighborhood, c_n^*, in their area of N neighborhoods of criminal activity in order to maximize the net return from their criminal activity[1]:

$$c_n^* = NR_n / (\Sigma_n^N NR_n)$$

$$\text{where } c_n \geq 0 \text{ and } \Sigma_n^N c_n = 1 \text{ and } n = 1, \ldots, N \qquad (2)$$

In other words, criminals are described as routinely visiting each neighborhood n in their area of N neighborhoods at a rate of "c_n^*" percent of the time based on their assessment of the different net returns to property crime in each of the neighborhoods in the area with which they are familiar. Thus, neighborhoods that criminals perceive to have higher net returns are visited proportionally more often than neighborhoods with lower net returns, resulting in more property crimes being committed in these neighborhoods. Each neighborhood's rate of property crime, C_n, is then essentially driven by variation in the factors that affect the net returns to crime between neighborhoods and should therefore attract criminals to a neighborhood.

The theoretical model can be specified with a generalized logarithmic regression equation for statistical estimation[2]:

$$log\,(C_n) = \beta_M\, log(M_n) + \beta_B\, log(B_n) + \beta_a\, log(a_n) + \alpha_{PRA}\, PRA_{Area} + \varepsilon_n$$

$$\text{where } \varepsilon_n \sim N(0, \sigma_n^2) \qquad (3)$$

Subscript n denotes the neighborhood unit of observation and the subscript *Area* on the *PRA* variable denotes areas containing multiple neighborhoods. Since dependent and independent variables in such an equation are logged, the coefficients estimated by the equation represent the percentage change in property crime between neighborhoods that is associated with a one percent change in the factors that affect property crime in different neighborhoods. Notably, a selection probability model of this sort allows for dual equilibrium in which neighborhoods with low property crime can coexist with neighborhoods with higher property crime[3].

In order to apply a model of criminal supply decisions where criminals weigh the net returns to crime between neighborhoods within limited areas of the city to the entire city, fixed intercept terms, PRA_{Area}, are included in the equation that identify areas containing a number of nearby neighborhoods among which criminals are likely to be able to exhibit some mobility. Fixed area effects can account for systematic differences in crime rates between areas due to different populations of criminals and average crime opportunities in these areas[4], as well as provide a crude control for spatial autocorrelation between nearby neighborhoods[5]. The grouping of neighborhoods into fixed effect areas is based on the boundaries of eighteen different Los Angeles Police Department (LAPD) Police Reporting Areas (*PRA*s). Grouping neighborhoods by *PRA* is somewhat arbitrary with respect to areas that criminals may consider within their range of neighborhoods for criminal activity. However, grouping neighborhoods by *PRA* has the advantage of corresponding with the LAPD command-and-control structure that oversees the allocation of police between neighborhoods within these areas. Fixed area effects defined in this way can account for systematic differences in policing strategies for neighborhoods in different *PRA*s, which is one factor that affects criminals' assessment of the net returns to property crime.

The fixed effects technique is typically used in longitudinal data analysis to account for systematic and unobserved differences between individual units of observation that are followed over time. To the author's knowledge, this technique has not been used to analyze purely cross-sectional crime data. However, similar to the strategy in this paper, Dugan, Nagin, and Rosenfeld (2003) use larger area fixed effects than the unit of observation in a longitudinal context (e.g., state fixed effects for multiple observations of cities within states over time) as a means of economizing on the amount of variation used up by a complete set of fixed effects. Dugan et al. (2003) even drop all fixed effect variables for some panels of their data when doing so has a negligible impact on the estimates. Dropping all fixed effects for *PRA*s from the model estimated in this paper, in contrast, substantially alters the estimates of the relationship between property crime rates and property crime arrest rates, indicating that area controls are important.

The statistical model of neighborhood property crime rates is based on the model of criminal supply responses to the key factors that affect the net returns to crime. However, some of these factors, such as arrest rates and criminal opportunities, are likely to respond simultaneously with changes in the neighborhood crime rate. Thus, the estimates from the model can only be interpreted as *net* effects that mix criminal supply responses to changes in explanatory factors with simultaneous responses of these factors to differences in property crime rates between neighborhoods. To explore the direction of the simultaneous influences that may confound the interpretation of estimated relationships, the model is estimated at different levels of aggregation, with and without control variables, and with and without fixed area effects. The expected directions of simultaneous influences on estimated relationships are discussed in detail below.

Measurement of Motives and Opportunities to Commit Property Crime

Aggregate variables used in many studies, such as unemployment rates, commonly fail to separately identify motives versus opportunities for crime commission. Kleck and Chiricos (2002) note that studies that find a positive relationship between crime and the unemployment rate interpret the unemployment rate as a proxy for increased motivations to commit crime, since it may reflect reduced lawful earnings opportunities for criminals. On the other hand, they note that studies that find a negative relationship between crime and unemployment rates interpret the unemployment rate as a proxy for reduced opportunities to commit crime as the unemployed population more carefully guards their property. These ad hoc interpretations of results highlight the problem of failing to separately identify the motives versus opportunities to commit property crime. Kleck and Chiricos (2002) attempt to address this problem using a data set for Florida counties with separate measures for criminal motivations (resident poverty rates) and criminal opportunities (e.g., the number and value of sales at retail establishments). Along similar lines, this paper attempts to distinguish criminal motives from criminal opportunities by using different proxy variables for each.

The average household income of neighborhood residents is used to reflect motivations to commit property crime, M_n, in a particular neighborhood n. The literature commonly associates the high crime found in some city neighborhoods with the characteristics of neighborhood residents including poverty, disintegrated family structure, unemployment, and the compounding of these social ills for residents in these neighborhoods (Comanor and Philips, 1995; Ludwig, Duncan, and Hirschfield, 2001; Ralston, 1999; Wilson, 1987). Research has also indicated that property criminals, especially when using property crime to finance drug use, tend to commit crime near where they live and in neighborhoods with which they are familiar (Wright and Decker, 1994). Thus, lower average household income for residents of a neighborhood may correlate with higher neighborhood crime to the extent that mobility costs for criminals lead local criminals to prefer committing crime nearer to home.

Opportunities to commit property crime in a neighborhood, $B_n(C_n)$, are distinguished from motives to commit property crime in a neighborhood by using a proxy that has some variation distinct from the characteristics of neighborhood residents, in particular, jobs per square mile for people working but not necessarily living in the neighborhood. Business versus residential zoning, the different market forces affecting residential versus business activity, and the fact that workers are not identical to the residents of a neighborhood should enable jobs per square mile to exhibit some independence from the residential characteristics of each neighborhood and thereby provide a measure of crime opportunities that is independent of criminal motives. As noted above, Kleck and Chiricos (2002) have attempted to measure criminal opportunities by economic activity at business establishments, although they did not find significant relationships. Jobs may be a better proxy for criminal opportunities, since workers are more readily observable than levels of economic activity such as total sales[6].

Measures of economic activity in a neighborhood are not, however, expected to be independent of neighborhood property crime rates. In particular, potential victims may respond to rising crime by avoiding activity in more dangerous neighborhoods in preference for safer neighborhoods (i.e., $\partial B_n(C_n)/\partial C_n < 0$). This can lead to a negative correlation between crime and jobs that counters the positive correlation expected from the attraction of crime to jobs. If a net positive relationship is found between crime and jobs, then the simultaneous response of jobs to crime is a smaller effect than the attraction of crime to jobs. On the other hand, if a negative relationship is found then it is not clear that the measure succeeded in reflecting criminal opportunities.

Aggregate variables proxy for criminal opportunities and motivations indirectly and, as a result, are unlikely to completely capture all the relevant factors affecting crime for a particular neighborhood. One way to account for this data limitation is to employ fixed effects to capture unobservable differences in criminal motives and opportunities in each unit of observation. For example, Marvell and Moody (1996) include fixed effects for each unit of observation in a time-series cross section analysis of aggregate city and state data. The data analyzed in this paper are from a single cross section of neighborhoods in L.A. in 1987 that contains no time series observations so that a fixed effect for each neighborhood cannot be used. As an alternative, eighteen fixed area effects are used that identify groups of about 35 nearby neighborhoods and correspond to Police Reporting Areas (*PRA*s) of L.A.

Measurement of the Risk of Arrest

The arrest rate or ratio of the total number of arrests compared to the total number of crimes in a locality, ($a_n = A_n/C_n$), is a commonly used measure for the risk of punishment for committing a crime. The LAPD in 1997 reports data that show that arrest rates correspond with higher

dollar costs of police per square mile and per resident, indicating that it is reasonable to use arrest rates as a measure of police efforts (LAPD, 2005). A higher arrest rate is expected to reduce criminal activity through deterrence or incapacitation of criminals (Levitt, 1998b). Studies in a neighborhood context have found that increased policing reduces or displaces crime from a neighborhood (Kelling and Pate, 1974; Press, 1971). Similarly, analyses based on city and county level data, have found that independent increases in the level of police manpower reduce crime (Kovandzic and Sloan, 2002; Marvell and Moody, 1996; Levitt, 1997). In a neighborhood cross section, the economic model of crime would interpret a negative relationship between the arrest rate and the crime rate as deterrence, displacement, or incapacitation of criminals in a neighborhood. However, measuring an independent effect of the arrest rate on the crime rate is difficult since the arrest rate is not independent of the crime rate. Further complicating interpretation, different strains of the literature predict different responses of the arrest rate to the crime rate.

Negative Simultaneity between Property Crime and the Arrest Rate

One strain of the criminology literature argues that arrest rates (as the ratio of arrests to crimes) should simultaneously *decline* with higher crime rates (Ehrlich, 1973; Glaser and Sacerdote, 1999). This literature has used cross sectional data sets with observations on separate cities or U.S. states between which there is little chance of redistributing police resources, such that the implicit assumption is that police resources are fixed within a unit of observation. When the number of police assigned to patrol a locality is fixed, then the total number of arrests that can be made in the locality will also be limited. In such a situation, the rate of arrest faced by each criminal in the locality will shrink towards zero as criminal activity rises and, at the extreme, overwhelms the fixed number of police patrolling the location, $(\partial a_n(C_n)/\partial C_n < 0$ and $\partial^2 a_n(C_n)/\partial^2 C_n > 0$ when A_n is fixed). Los Angeles' 1965 Watts riot and the 1992 riot in South Central provide good examples of how the risk of arrest can shrink to zero as the police are overwhelmed by a sudden rise in criminal activity. At the intersection of Florence and Normandie where the 1992 riots began, there were about 35 officers facing a growing mob of at least 200 before the officers fled the scene (Cannon, 1999). Fiscal limitations and other policing demands, such as traffic control, may also make it difficult for the police to maintain arrest rates in neighborhoods with particularly high crime rates over the long term. Indeed, the LAPD had no expansion of its police force in the 8 years prior to 1987 (Cannon, 1999)[7]. Despite these constraints on police responsiveness to changes in crime rates, assuming that the police are unable to respond to increases in crime for particular neighborhoods is at odds with the standard police practice of responding to reports of crime as quickly and effectively as possible.

Positive Simultaneity between Property Crime and the Arrest Rate

Another strain of the literature suggests that there can be a *positive* response of arrest rates to crime rates. This literature, also using aggregate data sets but including observations across time, has found that police manpower levels increase with rising crime rates. This has generally been interpreted as a public response to rising crime in which the public chooses to increase police resources, financing, and manpower through the electoral and/or budget cycle to combat rising crime (Kovandzic and Sloan, 2002; Marvell and Moody, 1996; Levitt, 1997)[8].

For a cross section of neighborhoods in a city, a police response that increases neighborhood arrest rates in response to higher crime may occur as a matter of practice well before a new budget cycle. In the late 1980s, the LAPD could be distinguished from precinct based police departments in east coast cities by a more centralized militaristic administrative structure, a centralized research division, and a high degree of autonomy from the city political structure (Cannon, 1999; Alonso, 2005). This centralized administrative structure enabled strategies that could allocate resources between neighborhoods and across the city in response to differences in crime rates. Resources could be allocated to higher crime areas based on longer term information, such as the monthly records from which the data set in this paper is gathered, or more strategically based on assessments of historical trends. For example, in 1988 a contingent of about 1,000 officers was used to sweep through South Central neighborhoods and clear out crime, drugs, and gangs in "Operation Hammer" (Cannon, 1999). A police response to rising crime in a particular neighborhood can also occur instantaneously based on technologies for the reporting of crime (e.g., via 911). Similarly, the advent of Mobile Digital Technology (MDT) in 1983 allowed "e-mail" type communication between patrol cars (Cannon, 1999) and, according to the LAPD, "greatly accelerated response to citizen calls for service via computers installed in black and white patrol vehicles" (LAPD, 2006).

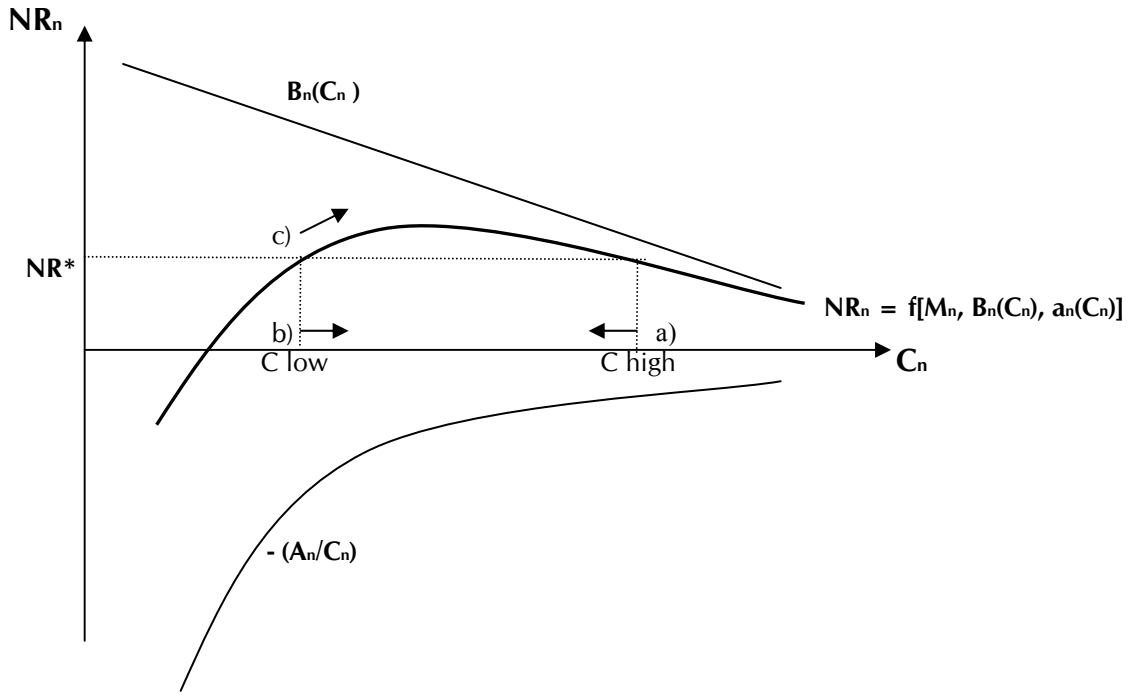
The LAPD collects detailed arrest statistics by date, location, and type of crime, which creates the capacity for arrest rates to be used as an administrative measure of

police effectiveness. The Christopher Commission that reviewed the LAPD's use of force after the Rodney King beating noted that the LAPD made arrests a requirement for promotion and pay advancement (Cannon, 1999). A more general statement of the theory that the arrest rate may represent the public response to crime should also consider other factors that may affect arrest rates, such as the tactics of crime control (e.g., community policing) and the types of force that officers are allowed to use in arresting a suspect (e.g., choke holds or batons). Arrest rates are also likely to be related to neighborhood characteristics. For example, it may be that arrests for additional crimes are easier in higher crime areas, because the typical suspect arrested in one crime may be implicated in other crimes and implicate others leading to additional arrests. Another possibility is that the police are more inclined to make arrests in lower income minority neighborhoods where the typical suspect has less recourse to legal defense. Such a perception certainly existed in the African-American community of L.A. since the late 1960s when groups such as the Black Panthers organized to "police the police" (Alonso, 2005) and was reinforced in the 1980s by police activity, such as the raid on an apartment complex at 39th and Dalton based on a false tip in which dozens of officers were subsequently disciplined for bad conduct (Cannon, 1999).

Separation of Neighborhoods into High and Low Property Crime Areas

Figure 1 describes the net returns to property crime for two nearby neighborhoods with equivalent crime opportunities and police protection, but different levels of criminal activity, (*C* low and *C* high). The expected arrest and punishment curve, $-(A_n/C_n)$, approaches zero as

Figure 1. Net Return to Crime as a Function of the Neighborhood Crime Rate



Legend

Cn Crime rate of the **n**th neighborhood, (x-axis). "C low" marks the crime rate in low crime neighborhood, "C high" marks the crime rate in high crime neighborhood.

NRn = f[Mn, Bn(Cn), an(Cn)] – Net return to crime in the **n**th neighborhood (mapped as a function of the crime rate by bold curve with resulting level of net returns on y-axis).

Bn(Cn) Crime opportunities in the **n**th neighborhood as a function of the crime rate, **Cn**.

an(Cn) = (An/Cn) – Costs associated with risk of arrest and punishment as a function of the number of arrests, **An**, and crime rate, **Cn**.

Mn Motivations to commit crime in the **n**th neighborhood.

NR* Level of equivalent net return to crime in two neighborhoods of the city.

crime rises, which shows the negative simultaneity that occurs as a fixed number of police are overwhelmed by rising crime. Opportunities for committing crime, $B_n(C_n)$, decline more steadily as crime rises, which shows the negative simultaneity that occurs as the best targets are eliminated or flee as crime rises. Together, these variables map the net returns to crime at different crime rates, NR_n (see bold curve in Figure 1).

In this scenario where the two nearby neighborhoods have equivalent fixed police resources, a criminal at the margin in the high crime neighborhood has an incentive to a) reduce crime activity in the high crime neighborhood, b) switch criminal activity to the low crime neighborhood even with equivalent net returns to crime, because c) the lower crime neighborhood will offer a higher net return to crime upon the arrival of the criminal (see Figure 1). This results because the rate of arrest and punishment in the low crime neighborhood drops rapidly with the arrival of criminals from other neighborhoods (note the relatively steep slope of the expected punishment curve at lower crime rates as compared to higher crime rates in Figure 1), while the total stock of crime opportunities declines more steadily as opportunities are targeted by additional criminal activity. As a result, the net return to crime for the marginal criminal in a lower crime neighborhood may actually increase with the arrival of criminals to the neighborhood, because the decline in the arrest rate is greater than the decline in crime opportunities. On the other hand, criminals from lower crime neighborhoods will have no incentive to visit higher crime neighborhoods with equivalent net returns to crime at the margin, because net returns fall with the arrival of additional criminals to higher crime neighborhoods. Indeed, criminals in higher crime neighborhoods have an incentive to keep visiting criminals away, which offers a potential explanation for gang territories (see related arguments in Fiorentini and Peltzman, 1995).

If the assumption of fixed police resources in each neighborhood is relaxed, then the police can shift resources between neighborhoods. If the police move resources from the low to the high crime neighborhood (enabling more total arrests in the high crime neighborhood and flattening the expected arrest and punishment curve), then there are even more incentives for criminals to shift activity to the low crime neighborhood. If the police move resources from the high to the low crime neighborhood (enabling more total arrests in the low crime neighborhood and inclining the expected arrest and punishment curve), then criminals have fewer incentives to shift activity to the low crime neighborhood, but also fewer risks to criminal activity in the high crime neighborhood. On the other hand, when the two neighborhoods are geographically distant, then switching criminal activity between the neighborhoods becomes more costly and less likely. This creates an opportunity for the police to shift resources from the low to the high crime neighborhood without inviting criminals to simply switch activity to the low crime neighborhood. Such a strategy has the potential for reducing crime in the city overall if increases in crime in the low crime neighborhood are small when police resources are extracted. Such a strategy can also generate a positive relationship between arrest rates and crime when measured between greater geographic distances.

Data for Los Angeles Neighborhoods in 1987

Neighborhood crime rate equations are estimated separately for the felony crimes of robbery, burglary, auto theft, felony theft, and for these crimes aggregated together based on annual totals for crime and arrests for 636 neighborhoods that comprise L.A. in 1987[9]. The Federal Bureau of Investigation and many researchers classify robbery as a violent crime rather than a property crime due to the threat of violence, although the motive for obtaining items of value is noted (Federal Bureau of Investigation, 1990). Even burglary involves a chance of violence when home dwellers surprise a burglary in progress. Thus, these crimes may be classified on a scale from less to more serious by the potential for violence they entail. Robbery is included along with property crimes in the equations for aggregate property crime estimated in this paper, since robbery involves the motive of acquiring property that is the basis of the economic decision model in this paper. Another reason to include robbery in the aggregate property crime rate is that arrest efforts for different neighborhoods and areas of L.A. are likely to be especially influenced by more serious crimes, such as robbery.

Neighborhoods are defined by the boundaries of 636 Police Reporting Districts, which are subunits of the Police Reporting Areas (*PRA*s) used to identify fixed area effects. Police Reporting Districts correspond with U.S. census tracts and average 0.75 square miles in size (a handful of census tracts were aggregated together to match the larger Police Reporting Districts). Annual crime and arrest data for each neighborhood in 1987 is obtained by summing the crime and arrest totals from monthly reports for each Police Reporting District in L.A. across the year. These data are compiled by the LAPD and are publicly available in non-electronic form at the L.A. Municipal Library (LAPD, 1987). Crime and arrest data are matched by census tract to demographic information on neighborhood residents from the 1990

U.S. Census, to counts of jobs per neighborhood from the California Department of Employment in 1986, and to indicators of neighborhood features based on historical maps[10].

In order to compare the number of crimes committed in neighborhoods of different size, the rate of crime in each neighborhood, C_n, is defined as the annual number of crimes reported in the neighborhood in 1987 divided by the number of square miles the neighborhood spans. The literature, in contrast, typically defines the crime rate as the total number of reported crimes divided by the resident population for larger geographic areas than neighborhoods within a city, such as entire cities, counties, or states (Levitt, 1997, 1998b; Kleck and Chiricos, 2002). This is insufficient for neighborhoods within a city, because workers, customers, and travelers visiting a neighborhood may be victims of crime in addition to residents of the neighborhood.

The average annual household income of neighborhood residents in 1989 from the 1990 U.S. Census is included in the model to proxy for motivations to commit crime in a neighborhood, M_n. Other variables such as residential density (residents per square mile) and the percent of neighborhood residents that are African-American or Hispanic may also capture motivations to commit crime by reflecting omitted characteristics such as poverty (see Table 1 for a complete list of variables included in the model).

Like the crime rate, the measure of crime opportunities is defined as a rate per square mile. The number of jobs in each neighborhood, tallied by the California Department of Employment in 1986, divided by the square miles of each neighborhood is used to proxy for the stock of crime opportunities in a neighborhood, $B_n(C_n)$. In addition, indicator variables for the presence of a local or regional shopping center or a downtown location are included in the model and may also proxy for crime opportunities in a neighborhood. These variables may identify a greater number of property crime opportunities in a neighborhood by reflecting greater economic activity and their attendant numbers of customers, workers, and merchandise that may be crime targets. Criminals' preferences over the number of jobs per square mile in a neighborhood should correspond in direction to criminals' preferences over the marginal value of property crime opportunities in a neighborhood to the extent that greater economic activity makes more valuable property available for theft in a neighborhood and that criminals first target the most lucrative crime opportunities.

Since employment totals are measured in 1986, while crime is measured in 1987, simultaneity between crime and jobs per square mile may not be pronounced in this data set, since current variations in crime can only affect lagged employment through forward looking behavior on the part of workers and employers in the neighborhood. Similarly, simultaneity between the current crime rate and other measures of economic activity, such as the presence of a shopping mall in a neighborhood, is limited since the construction and leasing decisions for the creation of malls occur at earlier points in time. Jobs per square mile, on the other hand, involves individual decisions about changing jobs with relatively lower sunk costs in many cases, so this variable still has some potential to exhibit simultaneity with variations in the crime rate.

For each type of crime, the risk of arrest faced by criminals active in each neighborhood, a_n, is measured by the annual number of arrests divided by the annual number of crimes reported in each neighborhood. In actuality, criminals may gauge their chances of being caught in loosely defined areas based on personal experience of being stopped by police in the neighborhood, visible street presence of police in the neighborhood, or word-of-mouth about neighborhoods where other criminals have been arrested. Thus, neighborhood arrest rates only proxy for the chances of arrest in a neighborhood as perceived by criminals who are considering criminal activity in a particular neighborhood. Indeed, robbery arrest rates exceed 100 percent in 17 neighborhoods suggesting that criminals either get arrested in neighborhoods other than the neighborhood in which their crime was committed or multiple arrests are made for the same crime.

The clearance rate is another common measure of the risk of arrest and punishment, which defines the rate of arrest using only arrests that can be linked to specific crimes solved. An advantage of such a measure is that it is a more precise measure of the risk of being caught for committing a specific crime. On the other hand, the clearance rate may not be particularly important to a criminal that is a repeat offender who engages in a range of crimes (e.g., multiple robberies, burglaries, drug sales). Then the criminal's primary concern may be to avoid any involvement with the legal system, whether or not ultimately leading to punishment for a specific crime they have committed. In any case, clearance information is not contained in the 1987 data used here.

Eighteen Police Reporting Areas (*PRA*s) spanning L.A. are chosen as fixed effects for grouping nearby neighborhoods, PRA_{Area}. Each fixed effect is an indicator variable that identifies about 35 nearby neighborhoods covering about 26 square miles (areas about 5 miles across). These areas are small enough for criminals and potential victims of crime to reasonably exhibit some

mobility in their choice of neighborhoods for activity. Since fixed effects group neighborhoods by proximity, they may account for unobservable influences on crime rates that are systematic to neighborhoods in a group, and also function as a crude control for spatial autocorrelation. *PRA*s also provide a good basis for grouping neighborhoods because they correspond to an LAPD administrative structure within which police resources may be re-allocated between neighborhoods in response to differences in neighborhood crime rates. Each *PRA* contains one police station, except the downtown central *PRA* that has three stations, one of which is the citywide police headquarters, Parker Center.

More Recent Property Crime and Arrest Data for Police Reporting Areas

This paper also presents property crime and arrest rate statistics from more recent years, 1997-2003, at the aggregate level of each *PRA* (LAPD, 2005). Data for 1987 are aggregated to the *PRA* level to enable comparison with the more recent data.

Findings

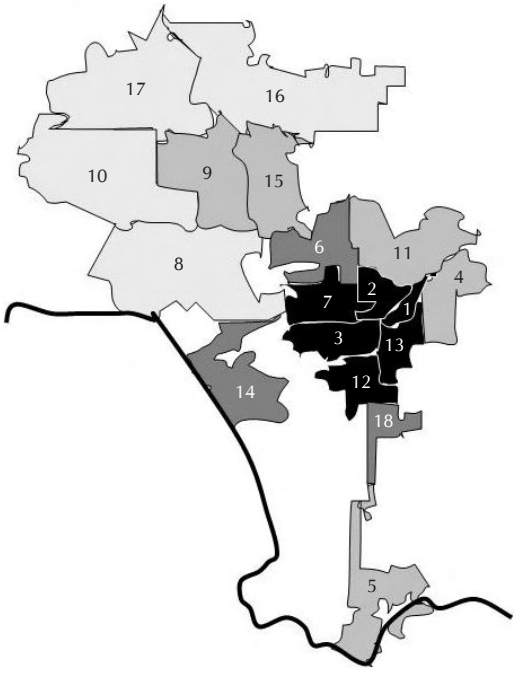
The Relationship between Property Crime and Measures of Criminal Opportunities

Figures 2 and 3 show the overall patterns of aggregated property crimes and household income in L.A. in 1987 by Police Reporting Area (*PRA*). Crime is very high, greater than 1,000 crimes annually per square mile, in downtown and inner city neighborhoods of the Central, Rampart, Southwest, Wilshire, 77th Street, and Newton Street *PRA*s (see Figure 2). The Central *PRA* has 3,474 property crimes per square mile and the Rampart *PRA* has 2,372 property crimes per square mile! In contrast, the rate of crime is under 300 crimes per square mile in the *PRA*s that are the farthest distance from the central city, West L.A., West Valley, Foothill, and Devonshire *PRA*s. Higher crime towards the city center has been a pattern typical of urban areas for the last century (Shaw and McKay, 1942).

Figure 3 shows the distribution of average household income of neighborhood residents in 1987 by *PRA*. Higher property crime and lower average household income generally correspond at this aggregated geographic level, both tending to be higher towards the inner city (compare Figures 2 and 3). For example, the neighborhood at the 80th percentile of the property crime distribution is located in the Newton Street *PRA* and has over four times the rate of property crime per square mile as the neighborhood at the 20th percentile of the property crime distribution which is located in the Foothill *PRA* (1,420.5 property crimes per square mile versus 303.2 property crimes per square mile). The average household

Figure 2. Property Crimes per Square Mile in 1987 by Police Reporting Area

1	Central	3,474
2	Rampart	2,372
3	Southwest	1,546
4	Hollenbreck	589
5	Harbor	353
6	Hollywood	969
7	Wilshire	1,258
8	West L.A.	203
9	Van Nuys	562
10	West Valley	282
11	Northeast	450
12	77th Street	1,133
13	Newton Street	1,413
14	Pacific	736
15	N. Hollywood	530
16	Foothill	168
17	Devonshire	191
18	Southeast	843

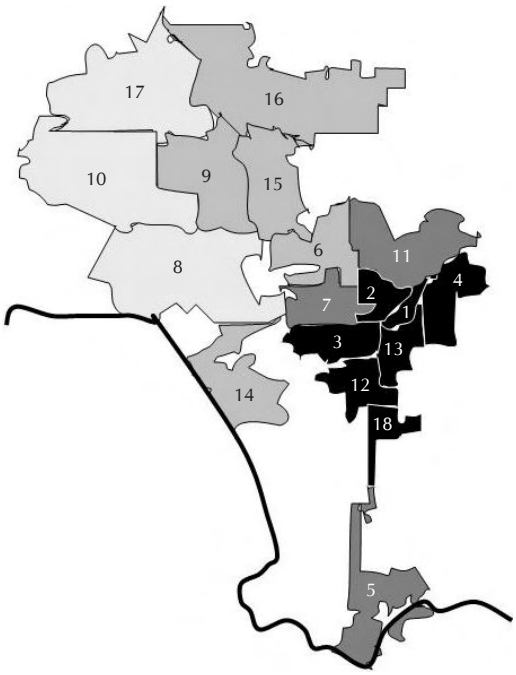


Legend

- Low: 1–300
- Medium: 301–600
- High: 601–1000
- Very high: >1000

Figure 3. Average Household Income in 1987 by Police Reporting Area

1	Central	$25,792
2	Rampart	$23,088
3	Southwest	$24,949
4	Hollenbreck	$28,697
5	Harbor	$37,624
6	Hollywood	$40,874
7	Wilshire	$39,769
8	West L.A.	$94,738
9	Van Nuys	$44,101
10	West Valley	$61,953
11	Northeast	$38,195
12	77th Street	$27,117
13	Newton Street	$22,355
14	Pacific	$49,772
15	N. Hollywood	$45,718
16	Foothill	$44,688
17	Devonshire	$62,066
18	Southeast	$24,228



Legend

- High: over $60,000
- Medium: $40,000 to $50,000
- Low: $30,000 to $40,000
- Very low: Under $30,000

income of residents in the neighborhood at the 80th percentile of the property crime distribution is about half that of residents in the neighborhood at the 20th percentile of the property crime distribution ($24,573 versus $55,335 annually; see Table 1).

Multiple regression models with controls for neighborhood characteristics and fixed effects for each *PRA* show patterns consistent with the aggregate picture. The estimated coefficient of -0.35 on the average household income of neighborhood residents indicates a 0.35 percent higher rate of property crime per square mile for each one percent decrease in average household income in a neighborhood (since dependent and independent variables in the property crime equation are logged; see Table 2, Step 3 and Table 3). Average household income of neighborhood residents is also significantly negatively related to each separate type of felony crime considered here and is largest for robbery (see Table 3). Evaluated at the mean values of L.A. neighborhoods, each one percent decrease in average household income in a neighborhood (a $460 annual decrease in 1989 dollars) is associated with 3.5 more property crimes per square mile, 0.7 more robberies, 0.9 more burglaries, 0.6 more auto thefts, and 1.2 more felony thefts per square mile each year in a neighborhood.

The estimated elasticity of the neighborhood rate of property crime to the average household income of neighborhood residents is not constant across the city. Estimates range from –.23 to –.40 when the neighborhoods in any given *PRA* are dropped from the estimation. This demonstrates the limits of average resident income for consistently reflecting local populations of criminals. However, other measures included in the model also help to identify higher populations of local criminals. Residential density and the percentage of residents who are African-American, which may proxy for poverty rates not included in the model, are associated with significantly higher crime (see Table 2, Step 3 and Table 3).

The Relationship between Property Crime and Measures of Criminal Motives

A correspondence between the crime rate and jobs per square mile is not obvious at an aggregated geographic level by *PRA*. The city center has the greatest concentration of jobs per square mile as well as the highest crime rates per square mile (compare Figures 2 and 4). Outside downtown areas, however, there appears to be a tendency for jobs to be located outside of higher crime areas. For example, jobs per square mile are lowest in the 77th Street *PRA* that includes South Central and has a very high crime rate, while jobs per square mile are fairly high in the West L.A. *PRA* that has a very low crime rate.

Regression models estimated with controls for neighborhood characteristics and fixed effects for each *PRA* show positive relationships between crime rates and jobs per square mile. Since the fixed area effects restrict the estimated relationships to variation between neighborhoods within *PRA*s, the positive estimates at this level are consistent with the hypothesized criminal preference to commit more crimes in nearby neighborhoods where criminal opportunities are greater. A one percent increase in jobs per square mile is, all else equal, significantly positively related to 0.22 percent higher rate of property crime overall, 0.29 percent higher rate of robbery, 0.28 percent higher rate of burglary, 0.21 percent higher rate of auto theft, and 0.21 percent higher rate of felony theft per square mile (see Table 3). Evaluated at the mean values of L.A. neighborhoods, 64.5 more jobs per square mile attract 2.2 more property crimes, 0.3 more robberies, 0.6 more burglaries, 0.5 more auto thefts, and 0.8 more felony thefts per square mile. Other measures of economic activity in a neighborhood are also significantly positively related to property crime rates, such as the presence of a regional shopping center or a downtown location (see Table 2, Step 3).

The presence of a high school in a neighborhood is also related to higher crime. Venkatesh (2005) has found anecdotal evidence that conflict between younger gang members tends to occur around high schools. High schools may provide property criminals of school age with mobility to and familiarity with the neighborhood containing the high school.

Table 1. Descriptive Statistics for Neighorhood Variables in Los Angeles in 1987

(n = 636)

Variable	Mean	Standard error	Value at 20th percentile of property crime distribution	Value at 80th percentile of property crime distribution
Property crime/sq. mi.	998.6	1037.2	303.2	1420.5
Robbery/sq. mi.	114.2	163.5	19.7	295.7
Burglary/sq. mi.	219.1	291.9	50.8	197.1
Auto theft/sq. mi.	254.5	262.8	70.5	411.7
Felony theft/sq. mi.	410.8	429.9	162.3	516.0
Assault/sq. mi.	153.0	200.0	24.6	353.7
Property crime arrest rate	13.2 %	10.9	0.1 %	26.9 %
Robbery arrest rate	38.0 %	88.0	0.1 %	29.4 %
Burglary arrest rate	9.6 %	10.0	0.1 %	11.8 %
Auto theft arrest rate	18.4 %	36.0	0.2 %	46.5 %
Felony theft arrest rate	9.0 %	8.0	0.0 %	15.7 %
Assault arrest rate	62.4 %	106.7	0.8 %	75.4 %
Jobs per square mile	6,446	16,004	488	800
Household income	$46,010	$31,352	$55,335	$24,573
Resident population density	13,332	10,155	9,672	25,679
Percent African-American residents	14.9 %	23.2	3.0 %	37.6 %
Percent Hispanic residents	36.4 %	27.1	51.4 %	63.9 %
Percent age 16-19 residents	5.7 %	4.3	7.3 %	7.2 %
Percent age 20-29 residents	21.6 %	7.5	19.2 %	24.1 %
Ratio female/male residents	1.01	.13	0.97	0.97
Percent high school dropouts aged 16-19	17.5 %	13.0	25.4 %	33.8 %
Downtown	1.4 %	11.8	0	0
Regional shopping center	2.2 %	14.7	0	0
Local shopping center	3.1 %	17.5	0	0
High school	6.0 %	23.7	0	0
College	1.9 %	13.6	0	0
Airport	0.8 %	8.8	0	0
Sports center	0.6 %	7.9	0	0
Railroad yard	0.5 %	6.9	0	0
Freeway exit	28.6 %	45.2	1	0
PRA			Foothill	Newton St.
Square miles	0.75	1.22	0.61	0.17

Since the estimated relationship between property crime and jobs per square mile in the full model in Table 2 is, on net, positive, the simultaneous response of jobs fleeing neighborhoods with higher crime rates appears to be a relatively smaller effect than the attraction of criminal activity to jobs at the local level. Indeed, the estimated elasticity of the neighborhood crime rate to jobs per square mile is fairly robust to dropping the neighborhoods in any

Table 2. Generalized Least Squares Regressions on Property Crimes per Square Mile for L.A. Neighborhoods in 1987

(n = 636)

Estimates for first ten variables represent percent change in property crimes per square mile with respect to a one percent change in variable; estimates for remaining dummy variables are percentage change in property crimes per square mile when characteristic is present.

	Step 1		Step 2		Step 3	
Control variables	β	t	β	t	β	t
Arrest rate	0.41 *	5.21	0.32 *	3.33	-0.13 *	-1.97
Jobs per square mile					0.22 *	10.91
Household Income					-0.35 *	-3.33
Resident population density					0.76 *	16.26
Percent African-American residents					0.05 *	2.20
Percent Hispanic residents					-0.07	-1.30
Percent age 16-19 residents					-0.12 **	-1.86
Percent age 20-29 residents					0.18 **	1.79
Ratio female/male residents					0.10	0.97
Percent high school dropouts					0.01	0.86
Downtown					1.07 *	6.29
Regional shopping center					0.69 *	3.64
Local shopping center					0.07	0.74
High school					0.21 *	3.65
College					-0.17	-1.21
Airport					0.15	0.82
Sports center					0.08	0.76
Railroad yard					-0.31	-1.41
Freeway exit					-0.03	-0.80
1. Central (omitted)						
2. Rampart			-0.58 **	-1.64	-0.33	-0.93
3. Southwest			-1.04 *	-2.87	-0.15	-0.43
4. Hollenbeck			-1.93 *	-5.38	-0.49	-1.33
5. Harbor			-2.39 *	-6.23	-0.52	-1.44
6. Hollywood			-1.00 *	-2.49	-0.23	-0.63
7. Wilshire			-1.02 *	-2.80	-0.25	-0.71
8. West L.A.			-2.05 *	-4.89	-0.56	-1.53
9. Van Nuys			-1.93 *	-5.31	-0.58	-1.61
10. West Valley			-2.54 *	-6.86	-0.58	-1.60
11. Northeast			-1.89 *	-5.19	-0.46	-1.29
12. 77th Street			-1.44 *	-4.10	-0.10	-0.28
13. Newton Street			-1.34 *	-3.75	-0.31	-0.89
14. Pacific			-1.32 *	-3.49	-0.34	-0.94
15. North Hollywood			-1.92 *	-5.41	-0.45	-1.25
16. Foothill			-2.94 *	-7.87	-0.52	-1.41
17. Devonshire			-2.76 *	-6.82	-0.61 **	-1.69
18. Southeast			-1.75 *	-4.86	-0.15	-0.40
Constant	7.39 *	40.30	8.96 *	22.95	1.46	1.04
R Squared	0.0893		0.47		0.9005	

* p < .05; ** p < .10

Table 3. Generalized Least Squares Estimates of Elasticity of Property Crime to Household Income and Jobs per Square Mile for L.A. Neighborhoods in 1987

(n = 636)

Model controls for arrest rate, fixed effect indicators for Police Reporting Areas (PRA) and demographic and neighborhood characteristics listed in Table 1.

		Household income		Jobs per square mile	
Control variables	**R^2**	β	t	β	t
Property crime	.9005	-0.35 *	-3.33	0.22 *	10.91
Robbery	.8712	-0.60 *	-4.15	0.29 *	10.48
Burglary	.8297	-0.41 *	-3.17	0.28 *	11.99
Auto theft	.8857	-0.25 *	-2.29	0.21 *	8.34
Felony theft	.8800	-0.28 *	-2.41	0.21 *	9.73
Assault	.9139	-0.57 *	-5.04	0.13 *	3.98

* p < .05; ** p < .10

given *PRA* from the data (ranging only from 0.20 to 0.23). One factor that may lead to this result is that the measure of jobs per square mile is lagged one year (1986) prior to the crime rate (1987) so that endogenous responses of potential victims are not captured by the estimate. Indeed, lagging related variables is one technique that researchers have used to deal with endogeneity (Marvell and Moody, 1996). Although aggregate patterns outside of downtown areas suggest some tendency for jobs to locate outside of high crime, low income areas, no evidence of this effect is found in the multiple regression estimates.

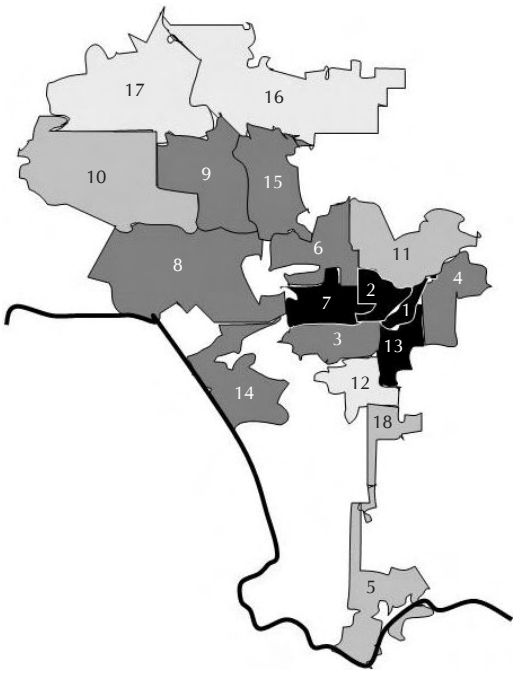
The Relationship between Property Crime and Property Crime Arrest Rates

There is a very wide distribution of arrest rates in L.A. in 1987 (see Figure 5). Property crime arrest rates are less than 10 percent in the 6 *PRA*s at the low end of the distribution that are on the northwest side of the city and near coastal areas. By contrast, arrest rates are more than 17 percent in the 6 *PRA*s at the high end of the distribution found in the center and southeast inner city.

Arrest rates in 1987 tend to be higher where the

Figure 4. Jobs per Square Mile in 1987 by Police Reporting Area

1	Central	66,018
2	Rampart	18,100
3	Southwest	5,728
4	Hollenbreck	5,888
5	Harbor	2,353
6	Hollywood	3,965
7	Wilshire	7,459
8	West L.A.	3,179
9	Van Nuys	5,364
10	West Valley	2,416
11	Northeast	2,414
12	77th Street	1,616
13	Newton Street	11,392
14	Pacific	5,378
15	N. Hollywood	3,062
16	Foothill	891
17	Devonshire	1,908
18	Southeast	2,142

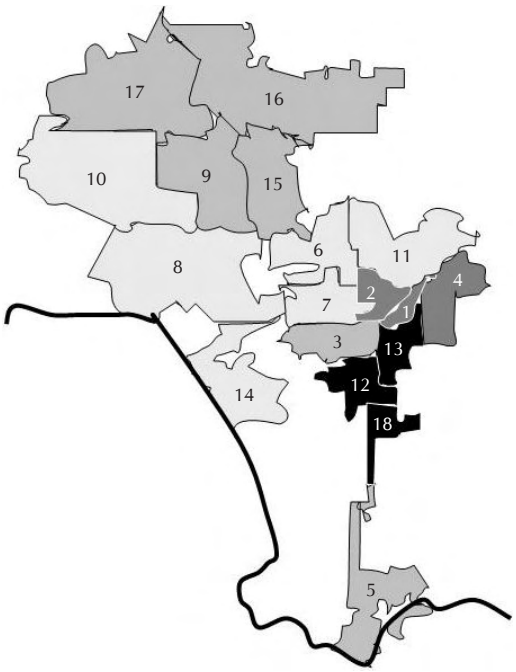


Legend

- Low: Less than 2,000
- Medium: 2,000–3,000
- High: 3,000–6,000
- Very high: More than 6,000

Figure 5. Property Crime Arrest Rates in 1987 by Police Reporting Area

1	Central	18.0 %
2	Rampart	17.5 %
3	Southwest	13.3 %
4	Hollenbreck	17.4 %
5	Harbor	14.0 %
6	Hollywood	9.5 %
7	Wilshire	9.5 %
8	West L.A.	7.0 %
9	Van Nuys	12.1 %
10	West Valley	8.9 %
11	Northeast	9.5 %
12	77th Street	20.8 %
13	Newton Street	22.2 %
14	Pacific	5.1 %
15	N. Hollywood	13.5 %
16	Foothill	14.6 %
17	Devonshire	10.5 %
18	Southeast	29.2 %



Legend

- Low: 0%–10%
- Medium: >10%–15%
- High: >15%–19%
- Very high: >19%

crime rate is higher, and particularly where average resident income is lower. The raw correlation between property crime and arrest rates across the 636 neighborhoods of L.A. in 1987 is 0.11 and significant (see Table 5). The *PRA*s with the highest arrest rates are Southeast (29.2 percent), 77th Street (20.8 percent), and Newton Street (22.2 percent). Arrest rates are also high at around 17 percent in the downtown and Hollenbeck areas just east of downtown. These *PRA*s have average household income below most of the city, under $30,000 annually. However, the Wilshire *PRA* has the 5th highest crime rate in the city at 1,258 crimes per square mile annually as well as a large percentage of minority residents, and yet its property crime arrest rate is only 9.5 percent. Wilshire can be distinguished from other high crime *PRA*s as a relatively affluent area with an average household income of nearly $40,000 annually in 1989 dollars. Thus, arrest rates for property crime are disproportionately high for the lowest income *PRA*s, irrespective of their high minority composition and crime rates. This may well be related to an overall LAPD strategy to combat the epidemics of violent gang activity and crack dealing that particularly distinguished the poorest communities from other high crime areas of L.A. in 1987 (Alonso, 2005). Nonetheless, a strategy that resulted in disproportionately high property crime arrest rates for low income, minority neighborhoods surely contributed to the perception that the LAPD used heavier handed tactics with minorities generally.

Similar to the aggregate picture, multiple regression techniques using neighborhood level data but excluding control variables and fixed area effects show that property crime is significantly higher by 0.41 percent for neighborhoods where arrest rates are one percent higher (see Tables 2 and 4, Step 1). When indicators for each *PRA* are added to the regression model to account for the average level of the crime rate in each *PRA*, the relationship between property crime and arrest rates shrinks to 0.32 percent and is still significant (see Tables 2 and 4, Step 2). Indicators for each *PRA* restrict the estimated relationship to reflect only variation within each *PRA*, which demonstrates that the correlation between higher arrest rates and higher crime rates is stronger for more distant neighborhoods across the city, but still present within *PRA*s.

In contrast, when multiple regression models are estimated with the full set of controls for neighborhood characteristics and fixed area effects for each *PRA*, the elasticity of the property crime rate to property crime arrest rates is -0.13 and significant at the 5 percent level (see Tables 2 and 4, Step 3). When the full model is applied to separate types of property crime, a one percent increase in the rate of arrest in a neighborhood significantly reduces auto theft by 0.11 percent and felony theft by 0.12 (see Table 4, Step 3). The elasticity of crime to the arrest

Table 4. Generalized Least Squares Estimates of Elasticity of Property Crime to Arrest Rate for L.A. Neighborhoods in 1987 adding Control Variables in Stepwise Procedure

(n = 636)

Step 1 controls only for arrest rate. Step 2 controls for arrest rate and indicators of Police Reporting Areas. Step 3 controls for arrest rate, fixed effect indicators for Police Reporting Areas and all demographic and neighborhood characteristics listed in Table 1.

	Step 1			Step 2			Step 3		
Control variables	β	t	R^2	β	t	R^2	β	t	R^2
Property crime	0.41 *	5.21	.089	0.32 *	3.33	.470	-0.13 *	-1.97	.901
Robbery	0.42 *	4.86	.073	0.23 *	3.24	.549	-0.04	-1.25	.871
Burglary	0.28 *	4.94	.069	0.19 *	3.28	.340	-0.03	-1.01	.830
Auto theft	0.17 *	2.56	.026	0.66	0.91	.450	-0.11 *	-2.42	.886
Felony theft	0.21 *	3.39	.031	0.19 *	3.22	.442	-0.12 *	-2.97	.880
Assault	0.40 *	2.07	.029	0.30 **	1.81	.525	-0.27 *	-3.02	.914

* p < .05; ** p < .10

rate for robbery and burglary is also negative, but the estimates are not significant (see Table 4, Step 3). Since the full model controls for neighborhood characteristics and fixed area effects, the estimated coefficients measure effects of arrest rates on crime for nearby neighborhoods with similar jobs per square mile, household income, and other neighborhood characteristics.

Negative estimates in the full model are consistent with the predictions of the economic model of crime, which suggests that higher arrest rates deter, displace, or remove criminal activity from neighborhoods at a local level. Negative estimates are also consistent with previous studies of the relationship between crime and arrest rates, which find arrest rates are simultaneously lower where crime rates are higher as a result of police resources being locally overwhelmed by higher criminal activity (Ehrlich, 1973; Glaser and Sacerdote, 1999). As discussed above, some of the variation in arrest rates should be independent of property crime rates due to the LAPD practice of making disproportionately higher rates of arrest in the lowest income, minority neighborhoods irrespective of their crime rates. Thus, it is reasonable to infer that some of the measured negative relationship between crime and arrest rates reflects deterrence and displacement of criminal activity, rather than just simultaneity.

The contrast between the *negative* relationship between property crime and arrest rates in the regression model with the full set of controls and fixed effects for each *PRA* compared to the *positive* relationship in the regression model without any controls suggests that there is positive simultaneity between property crime and arrest rates. This is consistent with the direction of simultaneity found in the literature on crime and police levels (Kovandzic and Sloan, 2002; Levitt, 1997). It also indicates that when estimates are based on wider geographic distances across *PRA*s, rather than more local distances within *PRA*s, the estimates begin to reflect differences in the level of police efforts rather than responses of criminal activity to arrest rates. This makes sense in the context of neighborhoods within a city where police manpower is under a common police administration that may allocate resources across the entire city but where criminals tend to commit crime locally on their own "turf."

Evaluated at the mean values of crime and arrest rates for L.A. neighborhoods, the arrest of one property criminal translates into 0.98 fewer property crimes per square mile annually in a neighborhood.[11] However, the average values of crime and arrest rates across the city are misleading for many areas of L.A. since arrest rates tend to be much higher in higher crime neighborhoods, especially when they have lower income minority residents. When evaluated at the mean values for crime and arrest rates of the neighborhood at the 80th percentile of the property crime distribution, the arrest of one property criminal is associated with only 0.48 fewer property crimes per square mile annually. In contrast, the arrest of one property criminal in a lower crime neighborhood at the 20th percentile of the property crime distribution is associated with 1.84 fewer property crimes per square mile annually. This is because the much higher arrest rate in the high crime neighborhood at the 80th percentile of the property crime distribution (26.9%) is affected far less by a single additional arrest than the lower arrest rate in the lower crime neighborhood at the 20th percentile of the property crime distribution (7.0%).

The estimated elasticity of the neighborhood crime rate to the neighborhood's arrest rate is not constant across the city. When neighborhoods in any given *PRA* are dropped from the data, estimates based on the remain-

der of the city range from -.08 to -0.15. In addition, estimates remain significant at the 5 percent level only when dropping those *PRA*s that are on the northwest side of the city (*PRA* 8, 10, 15, and 17) or when dropping the 77th Street *PRA*. This suggests that criminals in these *PRA*s are less responsive to changes in arrest rates. Conversely, it implies that criminals are more responsive to arrest rates in downtown and central city areas, with the exception of the 77th Street *PRA*. The 77th Street *PRA* may be a special case, since it is distinguished from other high crime inner city areas by having extremely few jobs per square mile.

Trends in Property Crime and Arrest Rates from 1997 to 2003

Figures 6 and 7 show the pattern of crime and arrest rates in L.A. by *PRA* for 1997, 10 years after the neighborhood level data analyzed in this paper. Crime is considerably lower across the city by 1997 (after peaking in 1992, the year of the L.A. riots and a subsequent gang truce). The rate of property crime per square mile for the average *PRA* is 948 crimes per square mile in 1987 compared to 577 crimes per square mile in 1997. Only three *PRA*s have property crimes per square mile above 1,000 annually in 1997 as compared to six *PRA*s in 1987. Still the distribution of crime across the city is similar, tending to be highest towards the inner city and in historically lower income areas.

The average rate of arrest by *PRA* rose between 1987 and 1997 from 14.0 percent to 15.0 percent. However, the wide range of property crime arrest rates between *PRA*s declined from 1987 to 1997 (see Figure 7). The Southeast *PRA* has the highest average arrest rate in 1987 at 29.2 percent, and the Pacific *PRA* has the lowest at 5.1 percent. By 1997, the 77th Street *PRA* has the highest average arrest rate at 19.5 percent, and the Pacific *PRA* has the lowest at 5.4 percent. Positive correlations between crime and arrest rates at the level of *PRA*s become larger and more significant in more recent years, rising from 0.36 in 1987 to 0.41 in 1997 and to 0.60 in 2003 (see Table 5). This trend appears to be driven by higher arrest rates for more serious property crimes, robbery, burglary, and auto theft; since the correlation between felony theft and felony theft arrest rates is small, insignificant, and changes signs in different years. This suggests that in the more recent decade, the LAPD has a more systematic practice of higher property crime arrest rates for higher property crime neighborhoods that is driven by the most serious property crimes.

Policy Implications

In the full regression model for 1987 with controls

Figure 6. Property Crimes per Square Mile in 1997 by Police Reporting Area

1	Central	1,399
2	Rampart	1,098
3	Southwest	1,063
4	Hollenbreck	429
5	Harbor	289
6	Hollywood	558
7	Wilshire	955
8	West L.A.	138
9	Van Nuys	396
10	West Valley	229
11	Northeast	298
12	77th Street	715
13	Newton Street	858
14	Pacific	546
15	N. Hollywood	404
16	Foothill	135
17	Devonshire	181
18	Southeast	687

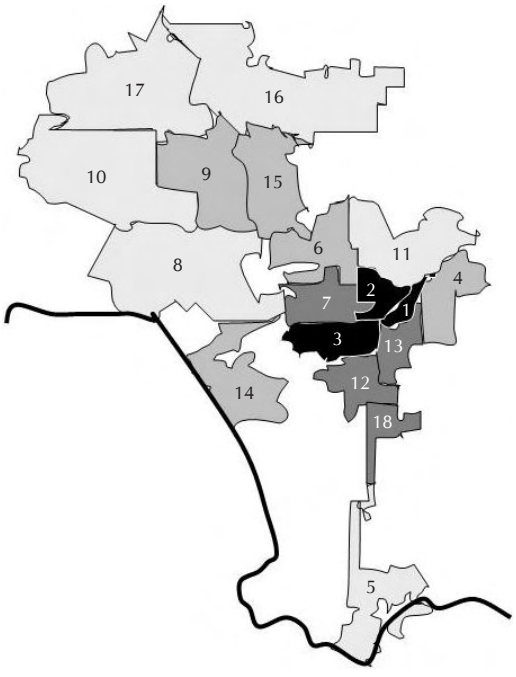
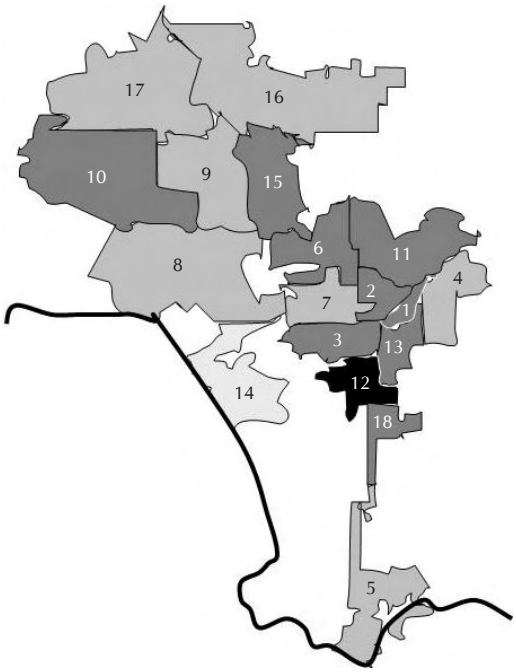


Figure 7. Property Crime Arrest Rates in 1997 by Police Reporting Area

1	Central	17.6 %
2	Rampart	17.7 %
3	Southwest	17.0 %
4	Hollenbreck	13.7 %
5	Harbor	10.4 %
6	Hollywood	15.2 %
7	Wilshire	14.7 %
8	West L.A.	12.0 %
9	Van Nuys	14.6 %
10	West Valley	17.8 %
11	Northeast	15.6 %
12	77th Street	19.5 %
13	Newton Street	18.3 %
14	Pacific	5.4 %
15	N. Hollywood	15.2 %
16	Foothill	14.4 %
17	Devonshire	14.8 %
18	Southeast	16.9 %



Legend

- Low: 0%–10%
- Medium: >10%–15%
- High: >15%–19%
- Very high: >19%

for neighborhood characteristics and fixed area effects, property crime rates are higher in neighborhoods with higher jobs per square mile, lower arrest rates, and lower average household income of neighborhood residents. At an aggregate level by *PRA*, rates of property crime also correlate with lower average household income of neighborhood residents and with more jobs per square mile, although there may be a reverse correlation between crime and jobs outside of downtown areas. In contrast to the full regression model that measures more local relationships, average property crime rates at the level of *PRA* are higher where arrest rates are higher, especially where the average household income of residents is lower.

Since most property criminals are, by definition, active in the higher crime neighborhoods where jobs per square mile are sometimes lower and arrest rates are typically higher, the advantage to criminal activity in the higher property crime neighborhoods, according to property criminals' preferences measured in the full model, is the proximity of these neighborhoods to criminals' likely neighborhoods of residence (e.g., neighborhoods whose residents have lower average household incomes). This parallels spatial mismatch theories of the legitimate labor market in which the lower incomes of minorities who reside in inner city neighborhoods results from a mismatch between their neighborhoods of residence and

Table 5. Raw Correlations between Property Crimes per Square Mile and Arrest Rates, by Type of Crime

Correlations are estimated across data aggregated to level of 18 Police Reporting Area, except for first column which is estimated across 636 neighborhoods.

Control variables	1987 all	1987	1997	1998	1999	2000	2001	2002	2003
Property crime	.11 *	.36	.41 **	.41 **	.22	.42 **	.59 *	.66 *	.60 *
Robbery	-.01	.38	.05	.40	.11	.48 *	.51 *	.41 **	.46 **
Burglary	.05	.37	.35	.22	.21	.49 *	.68 *	.66 *	.62 *
Auto theft	-.04	.19	.39	.40 **	.53 *	.53 *	.59 *	.66 *	.47 *
Felony theft	-.03	.10	.05	.03	-.13	-.02	.13	.19	.24
Sample size	636	18	18	18	18	18	18	18	18

* p<.05; ** p<.10

the suburban neighborhoods with the most lucrative job opportunities (Holzer, 1991; Preston and McLafferty, 1999; Stoll, 1999).

The LAPD appears to take advantage of the limited local mobility of criminals by shifting arrest efforts from lower to higher property crime neighborhoods across the city, especially in more recent years. This strategy is warranted so long as the associated decline in police protection in lower property crime neighborhoods, necessitated by moving limited police resources to higher property crime neighborhoods, does not lead to the commission of more property crimes in lower property crime neighborhoods than are deterred by the addition of police resources in higher property crime neighborhoods. As noted above, using the 1987 estimates from the full model, the arrest of one more property criminal in the high crime neighborhood at the 80th percentile of the property crime distribution reduces crime by only 0.48 property crimes per square mile, while arresting one more property criminal in the low crime neighborhood at the 20th percentile of the property crime distribution decreases crime by 1.84 property crimes per square mile. Based on these citywide estimates, using police resources to arrest one more property criminal in the high crime neighborhood instead of the low crime neighborhood does not appear to reduce property crime for the city as a whole in L.A. in 1987, especially with arrest rates approaching 30 percent in some high crime areas. Indeed, presuming all other characteristics equal between neighborhoods, such a strategy should only have net benefits when arrest rates are higher in lower crime neighborhoods. On the other hand, if criminals in lower crime neighborhoods are less responsive to falling arrest rates (as is likely for the low crime *PRA*s 8, 10, 15 and 17, given results when dropping these *PRA*s from the estimation), then such a strategy could conceivably still lead to a net reduction in crime. It is, however, naïve to assess the practice of shifting police arrest efforts to higher property crime neighborhoods solely based on the effect this may have on property crime, since more important objectives of the police include the control of violent crime. Property crime arrest rates may very well have been disproportionately high in lower income minority neighborhoods as a spillover effect from police efforts to fight violent gang activity and the crack epidemic that hit these neighborhoods particularly hard in the late 1980s.

Conclusion

Estimates at the neighborhood level in a multiple regression model of neighborhood property crime rates that uses a full set of controls for neighborhood characteristics and fixed area effects for *PRA*s show that average household income of neighborhood residents and jobs per square mile separately capture motivations and opportunities for crime commission as expected from the economic model of property crime. A significant negative relationship is measured between property crime and arrest rates in the full model, which may reflect deterrence, displacement, or elimination of property criminals. On the other hand, a significant positive relationship between property crime and arrest rates is obtained when the model is estimated without any controls or fixed area effects for *PRA*s so that estimates are based on variation across the entire span of the city. This suggests that positive simultaneity between property crime and arrest rates may affect estimates that are based on wider geographic distances or when data is aggregated from local units of observation to the citywide level. It also suggests that the LAPD had a practice of higher arrest rates in higher crime neighborhoods in 1987, a practice which appears to be more systematic in more recent years. However, these estimates should be viewed with caution since they are based on a single cross section of data for L.A. in 1987, use aggregate proxy variables, and do not explicitly model spatial autocorrelation between neighborhoods or the complex simultaneous relationships between crime, jobs, and arrest rates.

Endnotes

1. In modeling neighborhood selection probabilities, the following functional form satisfies the properties of probabilities, $c_n \geq 0$ and $\Sigma_n c_n = 1$: $c_n = NR_n / \Sigma_n NR_n$ (Marshak, 1960).

2. Assuming that a population of K property criminals in an area evaluate returns identically and commit crimes at a common rate, C, the expected aggregate number of property crimes supplied to the nth neighborhood in an area of N neighborhoods is: $C_n = C * K * (NR_n / \Sigma_n NR_n)$ for each $n = 1, \ldots N$. Based on a first order approximation of the net returns to crime in which components of net returns are multiplicative, the aggregate supply of property crime to each neighborhood depends on separate arguments for the factors that affect the net returns to crime. A neighborhood's aggregate supply of crime in logarithmic form is: $log\ (C_n) = log(NR_n) + log(C*K/(\Sigma_n NR_n))$. The second term in this equation contains factors that are constant from the decision point of the marginal criminal and so are subsumed into the intercept term for a given area of neighborhoods: $log\ (C_n) = \alpha + log\ (NR_n)$. The efficiency of estimates is also improved by estimat-

ing the residual covariance matrix with the Huber-White estimation procedure and by adjusting standard errors for robustness to sample size.

3. A vector of solution values for each neighborhood will exist, be unique, be stable, and have an interior solution over the range where the net return function has constant sign and decreasing returns to scale or increasing returns to scale that are small (Miyao and Shapiro, 1981). As will be discussed later in the paper and shown in Figure 1, the net return function has two portions with different slopes. Thus, a different equilibrium can be found in each portion (i.e., one with higher crime and one with zero or "low" crime).

4. Random effects are an alternative approach to fixed effects to account for average differences in dependent and predictive variables between different groupings of neighborhoods. Random effects use fewer degrees of freedom than fixed effects and allow more precise estimates. However, random effects can lead to biased estimates if the average differences between groups are not random, but are systematically different for particular groups (i.e., if neighborhoods in downtown *PRA* groupings have substantially higher crime than other neighborhoods, because those neighborhoods systematically differ from other neighborhoods in the city as might be due to the extreme density of residents and commuting jobs). Random effects are not used in this paper because Hausman specification tests indicated that some estimates were systematically different when random effects were used instead of fixed effects. In particular, the estimated effect on the property crime rate due to average household income (used to measure criminal motivations) was negatively biased, which exaggerated its measured effect in a random effects model.

5. The model of neighborhood crime presented here does not explicitly model spatial auto-correlation between crime rates in contiguous neighborhoods, nor does it explicitly include measures of key factors from contiguous neighborhoods. However, each neighborhood level unit of observation is, at root, an arbitrarily defined geographical division of the wider city and might be viewed as an aggregate of potentially smaller units of observation, such as city blocks. Framed in this way, a spillover effect of crime from nearby neighborhoods may be a measurement issue. In general, mis-measurement of dependent or independent variables should increase the unexplained variance in the model, resulting in smaller and less significant but nonetheless unbiased estimates (Greene, 2000).

6. Alternatively, jobs could also provide more positive role models for youth considering crime in a neighborhood and thus have an effect of *reducing* crime in a neighborhood. By their nature, aggregate proxy measures often have conflicting effects. It seems that jobs should primarily function as a measure of potential targets for crime, since residents in a neighborhood are likely to be more influential role models for criminals than workers who are more transient members of the community.

7. Another scenario that can cause negative simultaneity is if criminals are more likely to be arrested in high crime neighborhoods where they live, but visit both high and low crime neighborhoods of the area to commit crimes.

8. Another source of positive simultaneity between crime and arrest rates may come from an upward bias in crime reporting when there is greater police staffing in a locality (Levitt, 1998a). However, this seems unlikely in the highest crime, minority neighborhoods of L.A. where the police were unpopular.

9. Neighborhood crime rate equations are also estimated for assault for 1987 since these data were available.

10. I thank current and former members of the Economics Department of the University of California at Santa Barbara for compiling the crime and arrest data from paper records and matching it with census data and California Department of Employment data. This data set is available from the author by request.

11. The unit change in property crime rate for a unit change of one arrest for a given neighborhood is calculated by simply dividing the estimated elasticity (from Table 2, Step 3) by the arrest rate for that neighborhood: -0.98 property crimes per square mile = -0.13 elasticity estimate / 0.132 arrest rate.

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Self-Restraint: A Study on the Capacity and Desire for Self-Control

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Abstract. *Using self-report survey data on academic dishonesty from a sample of undergraduate college students, this study indirectly tests and extends a recent and novel reconceptualization of self-control offered by Tittle, Ward, and Grasmick (2004). In their reconceptualization, Tittle and his colleagues distinguish the capacity/ability for self-control from a desire/interest to exercise such restraint. We find, as did they, that these are indeed two separate dimensions of self-regulation, each with independent effects on deviant behavior, but each conditioning the effects of the other as well. Moreover, we also find that the cross-product of these two dimensions interacts with opportunity to predict the frequency of academic dishonesty.*

Keywords: academic dishonesty; self-control; self-restraint; capacity for self-control; desire to exercise self-control

Introduction

Beginning in the decade of the 1990s, theoretical criminology has experienced an exciting level of growth and development that easily rivals all previous eras; we are currently in a period of much theoretical ferment in which older theories have been revitalized and new theories have been set forth (Cullen, Wright, and Blevins, 2005). Among the contributions to this theoretical growth are Braithwaite's (1989) theory of reintegrative shaming, Bursik and Grasmick's (1993) systemic model, Gottfredson and Hirschi's (1990) general theory of crime, Messner and Rosenfeld's (1994) institutional anomie theory, Sampson and Laub's (1993) age-graded control theory, Tittle's (1995) control balance theory, Akers' (1998) social structural social learning theory, Agnew's (1992) general strain theory, Cullen's (1994) social support theory, Moffitt's (1993) developmental taxonomy, and Colvin's (2000) integrated theory of chronic criminality.

Recently Charles Tittle, David Ward, and Harold Grasmick (2004) added to this literature with their study "Capacity for Self-Control and Individual's Interest in Exercising Self-Control" in the *Journal of Quantitative Criminology*. In this study, Tittle and his colleagues make a compelling case that Gottfredson and Hirschi's (1990) general theory of crime could be improved "by recognizing that individuals' capacity for self-control is distinct from their interest in restraining themselves" (2004:144). In the current paper, we replicate and extend their study.

As originally conceptualized by Gottfredson and Hirschi (1990:232), low self-control is argued to be "*the* individual-level cause of crime." That is, low self-control is theorized to be the primary explanation for criminal behavior; the effects of all other theoretical constructs employed by criminologists to explain criminal conduct (e.g., weak social bonds, peer influences, strains, psychopathy, poor socialization, etc.) are spurious. While several scholars have issued critiques of the theory (Akers, 1991; Barlow, 1991; Benson and Moore, 1992; Cohen and Vila, 1996; Geis, 2000; Reed and Yeager, 1996; Tittle, 1991), it has also attained considerable empirical support. Low self-control consistently has been found to be a modest correlate of both crime (Evans et al., 1997; Grasmick et al., 1993; Paternoster and Brame, 1998; Pratt and Cullen, 2000) and analogous acts of deviant behavior, including substance use/abuse (Arneklev et al., 1993; Cochran, Wood, and Arneklev, 1994; Gibbs and Geiver, 1995; Keane, Maxim, and Teevan, 1993; Nakhaie, Silverman, and LaGrange, 1999; Piquero and Tibbetts, 1996; Sorenson and Brownfield, 1995; Vazsonyi et al., 2001; Winfree and Burnat, 1998; Wood, Pfefferbaum, and Arneklev, 1993),

academic dishonesty/deviance (Arneklev, Cochran, and Gainey, 1998; Cochran et al., 1998; Gibbs and Geiver, 1995; Gibbs, Geiver, and Martin, 1998), gambling (Arneklev et al., 1993; Jones and Quisenberry, 2004), risky sex (Jones and Quisenberry, 2004; Paternoster and Brame, 1998; Wood et al., 1993), and non-illicit thrill/adventure seeking (Jones and Quisenberry, 2004). These effects have been observed across samples of adults (Avakame, 1998; Evans et al., 1997; Grasmick et al., 1993), college students (Cochran et al.,1998; Gibbs and Giever, 1995; Sellers, 1999), and adolescents (Brownfield and Sorenson, 1999; Junger and Tremblay, 1999), across experimental (Finkel and Campbell, 2001), longitudinal (Polakowski, 1994; Paternoster and Brame, 1998), and cross-sectional designs (Evans et al., 1997; Grasmick et al., 1993; Nagin and Paternoster, 1993), for those with official criminal backgrounds (Longshore, 1998; Longshore and Turner, 1998), and from various countries (Nakhaie et al., 1999; Vazsonyi et al., 2001; Wright et al., 1999).

While consistently found to be a correlate of acts of force or fraud and/or analogous acts, the effects of self-control are, at best, modest with associations (i.e., effect sizes) rarely exceeding .30 (Pratt and Cullen, 2000). As such, a considerable amount of the systematic variation in misbehavior remains unaccounted by self-control and Gottfredson and Hirschi's (1990) general theory of crime is not "as potent as the authors...contend" (Tittle et al., 2004:145).

In fact, several studies have compared the predictive efficacy of self-control against measures from rival criminological theories, particularly social learning theory (Evans et al., 1997; Winfree and Bernat, 1998), strain theory (Burton et al., 1998), and social bonding/control theory (Brownfield and Sorenson, 1993; Evans et al., 1997; Wright et al., 1999). These studies consistently find significant effects of self-control independent of these rival theories; however, these studies also consistently find significant independent effects for these rival theories as well (Pratt and Cullen, 2000).

Finally, as Tittle and his colleagues note (2004:145), the predictive efficacy of self-control on misbehavior may be contingent on a variety of other variables not incorporated into Gottfredson and Hirschi's (1990) original conceptualization; these include gender (Keane et al., 1993; Burton et al., 1998; LaGrange and Silverman, 1999), age (Burton et al., 1999), family, school and peer relations (Nakhaie et al., 1999), neighborhood context (Lynam et al., 2000), and emotions (Giner-Sorolla, 2001). Tittle and his colleagues (2004:145) suggest an additional variable which may also condition the effects of self-control and misbehavior and which was also not fully incorporated into Gottfredson and Hirschi's (1990) original conceptualization, namely individuals' interest in controlling themselves.

Tittle and his colleagues (2004) make a case that self-control (also known as self-restraint or self-regulation) is comprised of both the capacity or ability to exercise self-control, discussed above, and the desire to exercise this ability. They note that while Gottfredson and Hirschi (1990) did not make this distinction, other scholars have; toward these ends, they cite Baumeister, Heatherton, and Tice (1994), Baumeister (1997), Finkel and Campbell (2001), Jackson, MacKenzie, and Hobfoll (2000), and Trope and Fisbach (2000). As such, Tittle et al. (2004:146) suggest that "some people may have a strong capacity for self-control but may not always want to exercise it, while others may have weak self-control ability but have such a keen interest in controlling their deviant impulses that they end up conforming." In addition, they recognize "people who simultaneously lack the capacity for strong self-control and who possess little desire to control themselves [and thus] may be especially prone to criminal behavior, while those with strong capability for self-control and with a great interest in exercising that self-control may be especially unlikely to offend" (Tittle et al., 2004:147-148). With self-report data from a sample of adults from Oklahoma City, OK, they observe that (1) measures of self-control capacity and the desire to exercise self-control form independent/orthogonal factors, (2) scales derived from these factors independently and modestly predict adult criminal/deviant behavior, (3) the capacity for self-control and the desire/interest to exercise self-control have significant interactive effects on adult criminal/deviant behavior, and (4) the effects of the capacity for self-control on adult criminal/deviant behavior (Gottfredson and Hirschi's conceptualization of low self-control) are conditional upon levels of subjects' desire to exercise self-control.

Tittle et al. (2004) have made what could prove to be a very interesting and important contribution to the continuing theoretical growth and development of criminology. The scope of this contribution, however, will remain speculative until the theoretical propositions developed by Title and his colleagues are submitted to additional empirical testing. The purpose of the current study is to test and extend their work. With self-report survey data from a sample of college students, our study very closely approximates both the measurement qualities of Tittle et al. (2004) and their findings. In addition, this study extends Tittle et al. (2004) in two important ways. First, we examine the predictive efficacy of these two dimensions of self-regulation on academic dishonesty, a

different form of fraudulent misbehavior than those studied by Tittle and his colleagues. Secondly, we are also able to examine the conditioning effects of opportunity to cheat on the predictive power of self-regulation.

Methods

The data for this study were derived from a non-random sample of adult (i.e., 18 years of age or older) undergraduate students enrolled in all upper-division sociology classes at the University of Oklahoma during the spring of 1993. While these data are now dated, they were used by Cochran and his colleagues (Cochran et al., 1998; Cochran et al., 1999) in their successful tests of Gottfredson and Hirschi's self-control theory (1990) and Grasmick and Bursik's (1990) deterrence/rational choice model which comprise key elements of the capacity/ability for self-control and interest/desire to exercise self-control. Moreover, the timeliness of these data is not relevant to a test of Tittle et al.'s (2004) thesis.

Despite the limitations associated with our sampling technique, we feel that our sample is sufficiently representative to permit cautious generalizations. All undergraduate students at the University of Oklahoma at the time of this data collection were required to take twelve credit-hours of upper-division electives. Because most upper-division sociology courses, unlike other courses in the College of Arts and Sciences at the University of Oklahoma, did not require any prerequisites, these courses were open to any students needing to fulfill their upper-division elective requirement. This, in addition to the fact that these courses address highly relevant and interesting social issues like marriage and family, crime and justice, and race and gender, made them especially appealing to a large proportion of the student body. As such, this sample was fairly representative of undergraduate students within the College of Arts and Sciences at the University of Oklahoma during this semester. The sample is about 52 percent female, 24 percent minority, and 58 percent junior/senior status.

The research was conducted through the use of a self-administered questionnaire requiring approximately thirty to forty-five minutes to complete. Participation in the study was voluntary, and both the anonymity of the respondents and the confidentiality of their responses were strictly guaranteed. Moreover, signed, informed consent was obtained prior to the administration of the questionnaire, and prior approval for the study was obtained by the University of Oklahoma's Institutional Review Board.

The survey was given to all students attending each upper-division sociology class offered during the spring 1993 academic semester. The total unique enrollment (i.e., no student counted more than once) in all these classes was 732, but only 448 usable surveys were obtained. The rather low response rate (61 percent) was attributed to a combination of absenteeism, incomplete surveys, ineligibility of minor students, and students' decisions not to participate. Nonetheless, this response rate is similar to those reported in other studies using similar techniques with college samples (Gibbs and Giever, 1995; Lanza-Kaduce, 1988).

Finally, these data are cross-sectional in nature. Moreover, other than the capacity/ability for self-control, all variables in these data were not measured in a manner that would allow logical inferences regarding the temporal/casual ordering of phenomena. Hence, we strongly caution the reader against making any conclusions of a causal nature. However, our findings can and should be interpreted in conjunction with and comparison to those produced by Tittle et al. (2004) and other relevant studies.

Dependent Variable

We employ a measure of academic dishonesty as the dependent variable in this study. Academic dishonesty, for the purposes of this study, is defined as using deceit (fraud) in academic work. It is a form of "analogous" non-criminal behavior, an act of fraud undertaken in pursuit of self-interest, and thus is suitable for testing Gottfredson and Hirschi's (1990) general theory of crime. Forms of academic dishonesty include cheating during an exam or on a homework assignment, paying for or being paid for cheating, plagiarism, lying about academic work, etc. All of these items are expressly prohibited under the University of Oklahoma's code of student conduct and some could be prosecuted as felonies or misdemeanors under Oklahoma criminal law.

Our measure is a composite of self-reported frequencies of seventeen forms of academic dishonesty engaged in over the past twelve months. The 17 items comprising this composite measure were operationally consistent with the "unethical academic behavior scale" developed by Calabrese and Cochran (1990). These items were entered into a principal components factor analysis for the purpose of index construction. The 17 items produced six factors with eigenvalues greater than 1.00; however, a scree discontinuity test suggested that a single-factor solution fit the data well (reproducing 22 percent of the variation among these seventeen items). Loadings on this single factor ranged from .22 to .73. The additive index produced from these 17 items has a Cronbach's alpha

reliability coefficient of .73. Eighty-three percent of the student respondents admitted to at least one act of academic dishonesty during the twelve-month period prior to data collection.

Capacity/Ability for Self-Control

Tittle et al. (2004) make a case that individuals' capacity for self-control (also referred to as self-control ability) is conceptually and empirically distinct from their interest to restrain themselves (also referred to as self-control desire). Tittle et al. (2004:147) assert that Gottfredson and Hirschi's (1990) conceptualization of low self-control says "nothing about the trait or characteristics of self-control *per se*" (emphasis in original); instead Gottfredson and Hirschi simply "catalog the various ways in which individuals differ in their *behavioral tendencies* or preferences" (emphasis in original). Tittle et al. (2004:147) further assert that "when Gottfredson and Hirschi (1990) do directly discuss the quality, or trait, they call low self-control, their statements suggest that it consists mainly of the lack of *capability* for controlling behavior." Thus, this conceptualization of low self-control is said to more closely reflect what Tittle et al. (2004:151) refer to as the ability to exercise self-control. To measure self-control ability, Tittle and his colleagues (2004:151) recommend the use of cognitive scales, which measure individuals' "tendencies to behave in certain ways or of expressions of certain preferences." As such, they used the Grasmick et al. (1993) cognitive scale more commonly used in tests of Gottfredson and Hirschi's (1990) general theory of crime. We used a very similar scale as well.

The capacity/ability for self-control was operationalized by asking respondents to indicate how strongly they agreed or disagreed with a series of 31 Likert-type statements (1=strongly agree, 4 = strongly disagree) designed to reflect each of the six components of low self-control: impulsivity, preference for simple tasks, risk-taking, physicality, self-centeredness, and hostility. These items are similar to those developed by Grasmick et al. (1993) and Wood et al. (1993) and were successfully validated by Cochran et al. (1998). Several items were reverse coded and all items were transformed into z-scores prior to scale construction. These 31 items were then entered into a principal components factor analysis. While seven factors revealed eigenvalues greater than 1.00, the scree discontinuity test suggested that a single-factor solution fit these data best; item factor loadings on this first factor ranged in value from .21 to .62. Respondents capacity/ability for self-control was operationalized as an additive scale comprised of these 31 standardized items each weighted prior to summation by its factor loading (alpha reliability = .85). High scores on this scale indicate high levels for the capacity/ability to exercise self-control.

Interest in/Desire to Exercise Self-Control

Tittle and his colleagues (2004:151) note that while the capacity to exercise self-control, once formed, is entirely in the person and lacks any connection to the social environment or to situational contexts, the desire to exercise self-restraint has strong linkages with the social environment and situational contexts. Given the recency of the idea of self-control desire and the resulting absence of direct measures of this concept, Tittle et al. (2004) utilized a number of indicators from other theoretical perspectives which, when combined, produce an indirect approximation of their construct of self-control desire. These include measures of their subjects' (a) self-pride for choosing to exercise restraint from offending, (b) perceptions of the severity of informal sanctions they would anticipate from people whose opinions they value should they engage in various deviant acts, (c) perceptions of the level of praise from people whose opinions they value for exercising self- restraint, (d) perceptions of the likelihood of getting caught should they engage in various deviant acts, (e) assessment of how guilty they would feel if they engaged in various deviant acts, and (f) level of moral condemnation or moral beliefs about the wrongfulness of various deviant acts.

We employed a similar inventory of indirect measures of self-control desire. While our data lack measures of self-pride and praise from others for exercising self-restraint, it does contain measures of the other indicators used by Tittle et al. (2004) and adds an additional indicator. Thus, our measure of the desire to exercise self-control is also a composite measure (i.e., a weighted additive scale) comprised of five sub-scales. However, we must acknowledge that not only are our measures indirect, but, as with Tittle et al. (2004), our measures of the desire to exercise self-control can also be construed as factors imported from other theoretical perspectives (e.g., rational choice, social control, social learning). Because these measures are asked to carry a great deal of conceptual weight in our analyses, readers should be cautioned that our findings are not conclusive, but may, nonetheless, be rather provocative. After all, these measures do reflect what one would expect of a person with a strong desire to exercise self-control, and should the measures perform as expected, then our findings may be useful in showing that the Tittle et al. (2004) findings are somewhat robust. Moreover, as others have pointed out, many of

the independent variables used in tests of criminological theories are conceptually and/or empirically indistinct from concepts representing other theoretical perspectives (Agnew, 1995; Akers, 1985, 1990; Akers and Cochran, 1985; Conger, 1976, 1980). For instance, beliefs regarding crime are an element of the social bond, but they are also definitions from social learning theory (Akers and Cochran, 1985; Elliott, Huizinga, and Ageton, 1985; Marcos, Bahr, and Johnson, 1986). Likewise, perceptions about the consequences of crime are components of expected utility from rational choice and are also components of differential reinforcement in social learning theory (Akers, 1990). The current situation with Tittle et al. (2004) and our operationalization of the desire to exercise self-control is no different. Until more direct measures are available, we must rely upon such indirect measures when testing this element of self-restraint.

The first sub-scale comprising our measure of self-control desire is a set of items measuring respondents' perceptions of the likelihood that they "would get caught by your professors" if they were to engage in each of six forms of academic dishonesty. Responses were fixed along a four-point ordinal scale ranging from "definitely would not get caught" (coded 1) to "definitely would get caught" (coded 4). These items were standardized into z-scores and then entered into a principal components factor analysis. The results suggested a single-factor solution (only one factor with an eigenvalue greater than 1.00); this factor accounted for 51 percent of the total variation among these items with factor loadings ranging from .69 to .76. The alpha reliability estimate for the additive scale comprised of these six items was .80.

The second sub-scale comprising self-control desire is a set of six items measuring respondents' perceptions of "how big of a problem" it would be "if most of the people whose opinions matter to you lost respect for you" because you had engaged in each of six different forms of academic dishonesty. Response options to these six items were also fixed along a four-point ordinal scale: "no problem at all" (coded 1), "a fairly small problem" (coded 2), "a fairly big problem" (coded 3), and "a very big problem" (coded 4). These six items were also transformed into z-scores prior to entry into a principal components factor analysis. The results of this analysis revealed only one factor with an eigenvalue greater than 1.00; this factor accounted for 77 percent of the total variation among these six items, and factor loadings ranged from .84 to .91. The additive scale comprised of these six items had an alpha reliability of .94.

The third set of items comprising our measure of self-control desire measures respondents' sense of guilt or shame associated with engagement in various acts of academic dishonesty. Respondents were asked "How big of a problem would feeling ashamed of yourself be for you if you" engaged in each of six different acts of academic dishonesty. Response categories were exactly the same as those for the "lost-respect" items described above. As before, these six items were transformed into z-scores and entered into a principal components factor analysis. Once again a single-factor solution is observed; this factor accounts for 66 percent of the total variation among these items. Factor loadings ranged from .78 to .84 and the alpha reliability for the additive scale comprised of these six items was .90.

The fourth set of items comprising self-control desire includes measures of respondents' level of moral condemnation for academic dishonesty. Each student was asked to indicate the degree to which they agree or disagree with the following statements: (1) "I feel that it would be wrong for me to cheat on an exam for any reason," (2) "I feel that it would be okay to cheat if the professor had not done an adequate job teaching the course" (reverse coded), (3) "I feel it would be okay for me to cheat on an exam that I didn't have time to study for" (reverse coded), and (4) "I would cheat to avoid getting a poor or failing grade" (reverse coded). Response categories were fixed along a four-point Likert scale (1 = strongly agree to 4 = strongly disagree). Again these items were transformed into z-scores prior to entry into a principal components factor analysis. The results of the factor analysis revealed a single-factor solution, which accounts for 68 percent of the total variation among these items. Factor loadings ranged from .81 to .84, and the additive scale comprised of these indicators had an alpha reliability of .84.

The fifth component of our measure of respondents' desire to exercise self-control is a reduced form version of the California Personality Inventory (CPI) socialization scale; an additive combination of 40 true/false items (alpha reliability = .63) which reflects the degree of social maturity and integrity of the respondent. It measures the extent to which the individual has internalized conventional attitudes, social norms, and values (Groth-Marnat, 1984). This additive scale was transformed into z-scores.

Finally, desire for self-control is a composite measure (i.e., a second-order factor) made-up of these five sub-scales (alpha reliability = .90). A principal components factor analysis of these five sub-scales produced a single-factor solution which explained about 44 percent of the total variation among these five sub-scales. Factor loadings ranged from .54 to .85. Prior to summing, the five sub-scales were weighted by the values of their factor

loadings. High scores on this scale are indicative of a strong desire to exercise self-restraint.

Analytic Plan

As did those of Tittle and colleagues (2004), our analyses follow a multi-step process. First, we assess the degree to which the capacity for self-control and the desire to exercise self-control are indeed separate dimensions of self-control. To do so, we subject the various components of both scales to a principal components factor analysis. Second, we employ multiple regression techniques to assess the relative and interactive effects of both the capacity/ability for self-control and the desire to exercise self-control on respondents' self-reported frequency of academic dishonesty. Third, following the procedures suggested by Aiken and West for the presentation of interactive effects (1991), we center our component measures of self-control ability and desire in order to examine the nature of any significant interactions between them and academic dishonesty. Fourth, we portray these interactive effects for four different types/subgroups of respondents representing different combinations of self-control capacity/ability and self-control desire. Finally, we examine the degree to which the effects of self-restraint (itself a cross-product of the capacity for self-control and the desire to exercise self-control) are conditioned by the opportunity to cheat. In all of our regression models, we control for respondents' age (in years), sex (0=female, 1=male), race/ethnicity (0=racial/ethnic minority, 1=white), and class standing (five-point ordinal scale: 1=freshman to 5=graduate student).

Results

Tittle and his colleagues (2004:153-156) differentiate the desire to exercise self-control from Gottfredson and Hirschi's (1990) concept of self-control, which Tittle and colleagues view as reflecting one's ability or capacity for self-regulation. While the capacity for self-control is conceptualized as a "completely stable or 'inherent' quality," the desire to exercise self-control is both internally and externally driven. While "a desire to exercise self-control probably has some kinship with personality, it is also different in being more responsive to immediate social stimuli" (Tittle et al., 2004:153). As such, the capacity for self-control and the desire to exercise self-control are viewed as distinct dimensions of self-restraint/self-regulation.

Table 1 presents the results of a principal components factor analysis with an oblique rotation on the various scales and sub-scales which comprise our measures of respondents' capacity/ability for self-control and their desire/interest to exercise self-control. Doing so allows us to address whether or not the desire for self-control is distinct from the capacity for self-control as Tittle and his colleagues (2004) have argued and to match their analytic strategy. From this analysis, two oblique factors with eigenvalues greater than 1.00 emerged. Factor 1 (eigenvalue = 2.160), accounting for 36 percent of the total variation among these scales and sub-scales, is best represented by the sub-scales for our measure of respondents' desire to exercise self-control. Each of these sub-scales has a factor loading of .45 or higher while the scale representing respondents' capacity/ability for self-control loads onto this factor at only .01. Conversely, Factor 2 (eigenvalue = 1.234)**,** which accounts for 20 percent of the total variation among these scales and sub-scales, is best represented by respondents' capacity/ability for self-control (loading = .83); the desire for self-control sub-scales either load poorly on this factor (moral condemnation, informal social sanctions**,** and feeling ashamed), load negatively on this factor (feeling ashamed, and likelihood of getting caught), or load similarly on Factor 1 (CPI socialization scale). Thus, this analysis largely confirms the distinctive nature of a capacity for self-control and a desire to exercise self-control as Tittle et al. (2004) have argued.

Pearson's zero-order correlations between capacity for self-control, desire to exercise self-control, and our measure of academic dishonesty are presented in Table 2. Both a capacity/ability for self-control and the desire to exercise self-control are modestly and inversely associated with academic dishonesty ($-.26 < r < -.32$, $p < .0001$). In addition, respondents' capacity for self-control is moderately and positively associated with their

Table 1. Principal Components Factor Analysis of Capacity/Ability for Self-Control and Desire to Exercise Self-Control

	Factor loadings	
	Factor 1	Factor 2
Capacity/ability for self-control:		
G&H Cognitive Scale	0.011	0.828
Desire to exercise self-control:		
CPI socialization scale	0.454	0.510
Moral condemnation of cheating	0.627	0.207
Feeling ashamed for cheating	0.855	-0.025
Informal social sanctions for cheating	0.667	0.103
Likelihood of getting caught for cheating	0 634	-0.470
Eigenvalue	2.160	1.219
Proportion of variation	0.360	0.203

Table 2. Pearson's Zero-Order Correlations between Academic Dishonesty, Capacity for Self-Control, and Desire to Exercise Self-Control

	Academic dishonesty	Capacity for self-control
Capacity for self-control	-0.265 ($p < .0001$)	
Desire to exercise self-control	-0.323 ($p < .0001$)	0.479 ($p < .0001$)

desire to exercise self-control ($r = .48$, $p < .0001$). These findings suggest that these two dimensions of self-regulation, while correlated with one another, are sufficiently independent of one another as to be empirically non-redundant; moreover, both dimensions of self-restraint effectively inhibit academic dishonesty.

Table 3 presents the results of Ordinary Least Squares regression models testing the joint or interactive effects of the capacity for self-control and a desire to exercise self-control on academic dishonesty. Two models are presented; an additive effects model (MODEL 1) and an interactive effects model (MODEL 2). Across both models, our results are the same; the capacity/ability for self-control and the desire to exercise self-control exhibit statistically significant, independent, inverse effects on academic dishonesty. Diagnostics for these models indicate that there is no concern about problematic levels of collinearity (VIFs < 4.00). More importantly, the desire to exercise self-control and the capacity/ability for self-control interact to aid in the self-regulation of academic dishonesty in a manner consistent with the prediction of Tittle and his colleagues (2004). However, the explanatory power of these models is quite modest ($R^2 \leq .128$).

The significant interactive self-regulatory effects of the capacity for self-control with a desire to exercise self-control on academic dishonesty observed in Table 3 are illustrated in Tables 4 and 5. In Table 4, the columns represent the magnitude of the effects of the capacity/ability for self-control on academic dishonesty when the desire to exercise self-control is one standard deviation below the mean, at the mean (-0.043), and one standard deviation above the mean. In Table 5, the columns represent the magnitude of the effects of the desire to exercise self-control on academic dishonesty when the capacity for self-control is one standard deviation below the mean, at the mean (-.004), and one standard deviation above the mean. The effects of the capacity for self-control weaken as the desire for exercising self-control increases; its effects on academic dishonesty are quite strong under conditions of a low desire for exercising self-control (-.369), more modest at average levels of self-control desire (-.234), and weak when the desire for self-control is strong (-.099). Thus, "[b]eing able to restrain oneself apparently helps people actually restrain themselves ... [h]owever, when people strongly desire to exercise self-restraint, self-control ability apparently has much less predictive power" (Tittle et al., 2004:164). Hence, unlike the contentions of Gottfredson and Hirschi (1990), the effects of capacity for self-control are not uniform; instead, these effects depend on individuals' level of interest in exercising self-restraint. Moreover, the effects of such an internal capacity for self-control are almost irrelevant when one's desire for self-restraint is strong.

Similarly, the effects of the desire for exercising self-control dampen as the capacity for self-control increases. Its effects are quite strong under conditions of a low or average capacity for self-control (-.472 and -.352, respectively) and are more modest at low levels of self-control capacity (-.234). Thus, desiring to exercise self-constraint is effective in actually helping people to restrain themselves; however, when people lack such

Table 3. OLS Regression Models of the Relative and Interactive Effects of Respondents' Capacity for Self-Control and Desire to Exercise Self-Control on Academic Dishonesty*

	Model 1			Model 2		
	b	SE	p	b	SE	p
Capacity/ability for self-control	-.236	.084	.0025	-.235	.083	.0026
Desire to exercise self-control	-.371	.074	.0001	-.352	.074	.0001
Capacity * desire				.015	.007	.0231
Intercept	9.226			8.723		
R^2	.120			.128		

* All models control for respondents' age (in years), sex (0 = female, 1 = male), race/ethnicity (0 = racial/ethnic minority, 1 = white), class standing (five-point ordinal scale: 1 = freshman to 5 = graduate student)

Table 4. The Effects of Capacity for Self-Control on Academic Dishonesty at Different Levels of Desire to Exercise Self-Control**

	Levels of desire to exercise self-control:		
	One SD below mean	Mean	One SD above mean
Academic dishonesty scale	-.369 *	-.234 *	-.099 *

* $p < .05$

** All models control for respondents' age (in years), sex (0 = female, 1 = male), race/ethnicity (0 = racial/ethnic minority, 1 = white), class standing (five-point ordinal scale: 1 = freshman to 5 = graduate student).

Table 5. The Effects of Desire to Exercise Self-Control on Academic Dishonesty at Different Levels of Capacity for Self-Control**

	Levels of capacity for self-control:		
	One SD below mean	Mean	One SD above mean
Academic dishonesty scale	-.472 *	-.352 *	-.232 *

* $p < .05$

** All models control for respondents' age (in years), sex (0 = female, 1 = male), race/ethnicity (0 = racial/ethnic minority, 1 = white), class standing (five-point ordinal scale: 1 = freshman to 5 = graduate student).

an ability, even a strong desire to do so has only modest efficacy.

Up to this point, our findings have closely paralleled those reported by Tittle et al. (2004). That is, the elements which comprise the measures of respondents' capacity/ability for self-control and of their desire to exercise self-control form two separate dimensions of self-restraint. Scales produced from these elements of self-restraint are moderately correlated with one another, and are each modestly associated with respondents' self-reported frequency of academic dishonesty. Not only do these two dimensions of self-restraint evidence main effects, they also yield significant interaction effects, such that strength in one dimension dampens the efficacy of the other at inhibiting academic dishonesty. It is at this juncture that our findings depart slightly from those of Tittle and his colleagues. Whereas Tittle et al. (2004:164-165) observed declines in the mean level of offending for all seven offense measures as subject sub-groupings moved from low ability/ low desire to high ability/low desire to low ability/high desire and to high ability/high desire, the mean level of offending (i.e., academic dishonesty) follows a slightly different pattern in these data.

As is evident in Table 6**,** rather than a downward, stair-step or monotonic decreasing pattern of mean offending frequencies across these four sub-groupings, we observe that mean levels of academic dishonesty are much lower for the two sub-groups expressing above average capacity/ability for control, regardless of their level of desire to exercise control (mean frequencies of 5.0 and 6.0), than they are for the two sub-groups expressing below average capacity, again regardless of their level of desire to exercise such control (mean frequencies of 13.2 and 14.0). Note that the two sub-groups expressing above average levels of capacity for self-control not only have smaller mean frequencies of cheating, they also have less variation about these means (standard deviations of 7.7 and 11.0 versus 14.9 and 17.4). We reserve discussion of this pattern for the discussion section of this manuscript.

In their original test of this thesis, Tittle and his colleagues (2004) identify the lack of any measures of criminal opportunity as a weakness of their study; our data, however, do provide at least one measure of opportunity for academic dishonesty: total credit hours enrolled (opportunity). To test the effects of opportunity/

Table 6. Means and Standard Deviations of Academic Dishonesty Across Sub-Groups of Self-Restraint

	Academic dishonesty	
Sub-groups of self-restraint	Mean	SD
Low capacity & low desire (n = 164)	13.2	14.9
High capacity & low desire (n = 145)	5.0	7.7
Low capacity & high desire (n = 52)	14.0	17.4
High capacity & high desire (n = 86)	6.0	11.0

temptation on the relationship between both the capacity for self-control and the desire to exercise self-control on academic dishonesty, we first create a new composite measure we call self-restraint. Self-restraint is the cross-product of capacity and desire for self-control. We employ self-restraint as the cross-product of capacity and desire for self-control without including the main effects of these two component scales, because self-restraint is conceptualized as such by Tittle et al. (2004). Moreover, doing so for conceptually or theoretically sound purposes has been employed in analogous ways by others (see Grasmick and Bursik, 1990, Cochran et al., 1999). We then test a series of models regressing our measures of academic dishonesty onto self-constraint (centered), opportunity (student credit hours currently enrolled, transformed to z-scores and centered), and the cross-product of self-restraint (centered) with opportunity (centered) (see Table 7).

As is often the case with secondary data, our measure of opportunity is admittedly oblique and of limited face validity. The more courses one takes (credit hours), the more likely opportunities for cheating will present themselves; however, there is no necessary correspondence. Actual opportunities to cheat will likely vary with the diligence of the instructors, the nature of course assignments, the size of the class, etc. Clearly, it would have been much better to have measured perceived opportunities directly. Once again, given our reliance upon secondary data, this is the best we can do.

Across both models presented in Table 7, self-restraint is a significant (p = .0001) inhibitor of academic dishonesty. Likewise, across both models presented in Table 7, an opportunity to cheat, measured as students' credit hours enrolled, is significantly and positively associated with academic dishonesty. Diagnostics for Model 1 indicate no problematic levels of collinearity (VIFs $\leq$ 4.00). Moreover, self-restraint does appear to reduce the influence of opportunities for academic dishonesty (see parameter estimates for the cross-product term of self-restraint and opportunity in Model 2; it is negative in value and approaches statistical significance). Again, the explanatory power of these models is quite limited ($R^2 \leq$ .094).

Discussion

This study indirectly tests and extends an earlier study by Tittle et al. (2004). Tittle and his colleagues conceptualize self-control (also known as self-restraint or self-regulation) as a two-dimensional construct comprised of a capacity for self-control and a desire to exercise self-control. The capacity for self-control is conceptualized directly consistent with Gottfredson and Hirschi's (1990) concept of self-control, a "totally 'in the person' [and] lacking connection with future social environments or situational contexts" (Tittle et al., 2004:151). A desire to exercise self-control, while also an individual characteristic, is conceptualized to have "strong linkages with the immediate social world" (Tittle et al., 2004:151). These two dimensions of self-regulation are hypothesized to have both independent and interactive effects on criminal/deviant behavior. Tittle and his colleagues (2004) found that indicators of a capacity for self-control and of the desire to exercise self-control form separate, orthogonal factors, that separate scales comprised of these indicators independently predict self-reported criminal behavior, and that these two scales condition the effects of one another on criminal conduct.

Using self-report survey data from a sample of college students, we have replicated and extended the Tittle et al. (2004) study. We, too, find with very similar indicators (1) that the capacity for self-control and the desire to

Table 7. OLS Regression Models of the Relative and Interactive Effects of Respondents' Level of Self-Restraint and Opportunity to Cheat on Academic Dishonesty*

	Model 1			Model 2		
	b	SE	p	b	SE	p
Self-restraint	-3.106	.515	.0001	-3.059	.515	.0001
Opportunity to cheat	1.750	.595	.0017	3.800	1.445	.0045
Self-restraint* opportunity				-.824	.530	.0603
Intercept	16.508			16.449		
R^2	.089			.094		

* All models control for respondents' age (in years), sex (0 = female, 1 = male), race/ethnicity (0 = racial/ethnic minority, 1 = white), class standing (five-point ordinal scale: 1 = freshman to 5 = graduate student)

exercise self-control form independent, orthogonal factors**,** (2) that scales comprised of the items that load most strongly on these factors are modestly correlated with one another, (3) that each of these two scales is independently associated with students' self-reported frequency of academic dishonestly, such that those with a higher capacity for self-control and those with a stronger desire to exercise self-control are significantly less likely to report acts of academic dishonesty, and (4) that the effects of these two dimensions of self-regulation on academic dishonesty interact, such that a desire to exercise self-control conditions the effects of self-control capacity *and* that the capacity for self-control also conditions the effects of a desire to exercise self-control.

Our study extends the work of Tittle and his colleagues (2004) in two important ways. First we expand the theoretical scope of their study by testing it against data on a different form of deviant behavior derived from a different sample: academic dishonesty among college students. More significantly, we also were able to examine the extent to which the predictive efficacy of self-regulation, itself the cross-product of self-control capacity and desire, is conditioned by levels of opportunity. With regard to the latter, we found that the effects of self-regulation on academic dishonesty were moderated by opportunity, which was measured by student workload (i.e., credit hours enrolled).

One somewhat anomalous finding did emerge from our analyses relative to those of Tittle and his associates (2004). That is, in their sub-group analyses (see their Table VI on page 164), they report a consistent stair-step pattern of reduced mean frequencies of criminal offending from those with both a low capacity and low desire for self-control to those with both high capacity and high desire. We, however, found that the lowest mean frequencies of academic dishonesty were observed for both of the two "high capacity" sub-groups regardless of the level of desire for self-control (see Table 6). Thus, a high capacity for self-control effectively inhibits cheating, an effect that is only modestly enhanced by a strong desire to exercise self-control. Conversely, a high desire to exercise restraint inhibits cheating most appreciably when coupled with a capacity to do so. Title and his colleagues find a somewhat similar pattern for three of their sub-group analyses (i.e., those for theft, assault, and a six-item index of acts of force or fraud).

Neither the Tittle et al. study (2004) nor our replication and extension of it is without obvious limitations. Nevertheless, Tittle and his colleagues have introduced a very intriguing reconceptualization of self-control which they were able to support empirically. So, too, have we. We now invite others with access to other data sets to continue this line of inquiry. Importantly, the scholarly community should seek to do what Tittle et al. (2004) and we have failed to do; that is, to develop direct measures of the desire to exercise self-control. Relatedly, there may be an issue of causality between the capacity for self-control and the desire for self-control. As one of the reviewers pointed out, many of the items that comprise our (and the Tittle et al. 2004) measure of the desire to exercise self-control theoretically and, perhaps, empirically could be the consequence of one's capacity for self-control (see also Piquero and Tibbetts, 1996).

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Testing the General Theory of Crime: Comparing the Effects of "Imprudent Behavior" and an Attitudinal Indicator of "Low Self-Control"

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Abstract. *The strongest criticism of Gottfredson and Hirschi's (1990)* A General Theory of Crime *continues to be that it is tautological. The authors initially provided no operational definition of "low self-control" and, therefore, researchers could not really tell if an individual had this characteristic unless they committed crime. Investigators have attempted to circumvent this criticism by using either attitudinal indicators of low self-control or "analogous" behavioral measures (some of which have included illegal conduct). In this paper, we compare the efficacy of two such measures in predicting involvement in crime and other social outcome variables. In so doing, we specifically attempted to exclude illegal conduct in our behavioral measure of "imprudent behavior." The results of our study demonstrate that the attitudinal indicator of low self-control is a relatively stronger predictor of crime than imprudent behavior. The implications of testing the theory with these and other measures are discussed.*

Key words: tautology; low self-control; imprudent behavior

Introduction

The strongest criticism of Gottfredson and Hirschi's (1990) *A General of Crime* continues to be that the theory is tautological. The authors argued that individuals become involved in crime because they have "low self-control." However, they initially provided no operational definition for low self-control. Therefore, investigators could not really tell if an individual had this characteristic unless they committed crime. The theory, therefore, becomes tautological when involvement in crime is used as an indicator of low self-control, and that indicator in turn is used to predict involvement in other crimes; i.e., involvement in crime predicts involvement in crime. Because of this, critics argue that the theory does not say anything more than if an individual commits crime it is because of low self-control, and it is low self-control that causes an individual to commit crime (Akers, 1991; Barlow, 1991; Geis, 2000; Marcus, 2004; Tittle, 1991).

In order to confront the tautology inherent in the theory, Grasmick and his colleagues (1993) developed an attitudinal scale of low self-control drawn from theoretical discussions of the construct. Hirschi and Gottfredson (1993) subsequently argued that analogous behavioral measures are preferable for tests of the theory (and see Hirschi and Gottfredson, 1995; but see Tittle, Ward, and Grasmick, 2003a). Both types of indicators have been used independently in empirical tests of the theory (see Pratt and Cullen, 2002 for a review) and a few studies (e.g., Evans et al., 1997; LaGrange and Silverman, 1999; Paternoster and Brame, 1998; Tittle et al., 2003a; Wright et al., 1999) have incorporated both kinds of measures in their analyses. In this paper, we also compare the relative predictive powers of first, a self-reported analogous behavior measure and second, a self-reported attitudinal indicator of low self-control on crime and other general social outcomes (e.g., educational attainment, friendship quality, income, etc.). We diverge from some of the work that has used analogous behavioral measures, however, by intentionally excluding illegal conduct from our behavioral indicator of low self-control. To do otherwise, we believe, continues to invite and reinforce the criticism of tautology (Pratt and Cullen, 2000; Taylor, 2001; Tittle et al., 2003a**;** and see Peter, LaGrange, and Silverman, 2003FTN#9). Our procedures allow us to not only compare the relative effects of these two measures of low

self-control, but also to mitigate the criticism of tautology that has been leveled at the theory.

A General Theory of Crime

Due to the vast amount of research testing and discussing Gottfredson and Hirschi's (1990) theory (see Pratt and Cullen, 2000 for a review of empirical tests, and see Brannigan et al., 2002; DeLisi, 2001; DeLisi, Hochstetler, and Murphy, 2003; Gibson and Wright, 2001; Hay, 2001; Hirschi and Gottfredson, 1995; Tittle et al., 2003a; Tittle, Ward, and Grasmick 2003b; Turner and Piquero, 2002; Unnever, Cullen, and Pratt, 2003; Vazsonyi et al., 2001; Weibe, 2003), its tenets are well known. Gottfredson and Hirschi (1990) created a general theory of crime that uses the concept of low self-control to explain the commission of all criminal and analogous behavior. According to Gottfredson and Hirschi (1990:89-90), low self-control comprises six essential dimensions: impulsivity, preference for simple tasks, risk-seeking potential, preference for physical (as opposed to mental) activities, self-centeredness, and finally, the possession of a volatile temper (Arneklev et al., 1993; Arneklev, Grasmick, and Bursik, 1999; Delisi et al., 2003; Grasmick et al., 1993; Longshore, Turner, and Stein, 1996; Piquero and Rosay, 1998; Vazsonyi and Crosswhite, 2004; Wood, Pfefferbaum, and Arneklev, 1993). Low self-control is also described as a characteristic that is established early in life and remains relatively stable across the life-course. Given the opportunity to do so, individuals lacking self-control will engage in a wide range of criminal and analogous behaviors. For Gottfredson and Hirschi (1990:15) crime can largely be reduced to "acts of force or fraud undertaken in pursuit of self-interest," which is reflective of both cross-cultural and changing historical definitions of crime (and see Hirschi, 1986). Furthermore, "analogous behaviors" are acts, which though not illegal are similar to crime in that they also have immediate benefits and long-term consequences. However, individuals with low self-control will focus on the immediate benefits derived from such behaviors (just as they do with crime). For example, Gottfredson and Hirschi (1990:90, emphasis theirs) argue that people with low self-control "will also tend to pursue immediate pleasures that are *not* criminal: they will tend to smoke, drink, use drugs, gamble, have children out of wedlock, and engage in illicit sex." Finally, they also suggest that self-control acts as a "self-selection" mechanism in that individuals are "sorted into a variety of circumstances that are *as a result* correlated with crime" (Gottfredson and Hirschi, 1990:119, emphasis theirs). According to Gottfredson and Hirschi, people with high self-control should exhibit success in legitimate social institutions, educational arenas (1990:162-163), high income potentials (1990:165), quality of interpersonal relationships with others (1990:158), marriage (1990:165-167), and the like (Gottfredson and Hirschi, 1990; Evans et al., 1997). Conversely, those with low self-control will have poor friendships, fail in school, not fare well in economic arenas, and have unhappy marriages.

Empirical Tests and the Issue of Tautology

Despite the strength of parsimony, the tautological criticism has led analysts to use either attitudinal or analogous behavioral measures of low self-control in tests of the theory. Regardless of the measures used, the majority of empirical tests have been supportive of the theory's core propositions (Pratt and Cullen, 2000; Vazsonyi et al., 2001; Vazsonyi and Crosswhite, 2004). Grasmick and his colleagues (1993), for example, found that an attitudinal indicator of low self-control, in interaction with measures of criminal opportunity, predicted involvement in force and fraud in line with theoretical expectations (and see Tittle et al., 2004). Longshore and his colleagues (1996; 1998) found the same interaction in a sample of criminal offenders. Therefore, they argued that it is possible to create and obtain valid measures of an individual's self-control level using self-reported attitudinal measures, even among a sample scoring high on criminality (see Hindelang, Hirschi, and Weis, 1981; Gottfredson and Hirschi, 1990, p. 249; but see Delisi et al., 2003; and see Vazsonyi and Crosswhite, 2004; Vazsonyi et al., 2004). Arneklev and his associates (1993) also demonstrated that an attitudinal measure of low self-control predicted involvement in self-reported "imprudent" behavior (e.g., drinking and gambling), as the theory suggests it should (and see Keane, Maxim, and Teevan, 1993; Jones and Quisenberry, 2004). Consistent with this latter approach (i.e., no measure of opportunity), other less explicit tests with attitudinal indicators of low self-control have provided evidence that low self-control explains involvement in many forms of deviant behavior (Bolin, 2004; Brownfield and Sorenson, 1993; Cochran et al., 1998; Gibbs and Geiver, 1995; Longshore et al., 1996; Vazsonyi and Crosswhite, 2004; Wood et al., 1993). In fact, more recent research has argued that opportunities for crime are "ubiquitous, and therefore, probably not of great importance in explaining individual variation in misbehavior" (Tittle et al., 2003a:342) though others might point out that success in later life course events might be dependent on opportunities that are not equally

distributed across society. Finally, Turner and Piquero (2002) found that self-reports of an attitudinal indictor of low self-control are relatively stable across time (and see Arneklev et al., 1998; Nagin and Farrington, 1992; Nagin and Land, 1993; Nagin and Paternoster, 1991, 1993; Polakowski, 1994).

Empirical tests using behavioral measures have also been supportive of the theory. Keane and his colleagues (1993:42) found that observations of "failing to wear a seat belt reflects a lifestyle favoring risk taking and is a predictor, and not a result of DUI." Polakowski (1994) used both parental and peer reports of conduct disorder, hyperactivity and impulsivity measured at ages 8 to 10, and found that these behavioral indicators of low self-control predicted involvement in major (but not minor) deviance, at the ages of 16 and 17. However, when they introduced a measure of major deviance at the age of 14 to 15 into the analysis, the effect of self-control was reduced to insignificance. In line with Gottfredson and Hirschi's (1990:102) position, this study suggests that involvement in crime is a better predictor of (later) involvement in crime than other measures of low self-control. In a related manner, Paternoster and Brame (1998) found that a behavioral measure of self-control at ages 8 and 9 was comparably related to involvement in less serious deviance and serious crime at age 18. These authors, however, question whether analogous behaviors are the same phenomenon as crime (and see Hirschi and Gottfredson, 1993).

One of the more significant and encompassing research projects to date has been Pratt and Cullen's (2000) meta-analysis, which empirically summarized past tests of Gottfredson and Hirschi's (1990) theory. The authors demonstrated that, regardless of the type of low self-control measure used, the theory explains considerable variation in criminal and analogous behaviors (even when other theories have been included in past analyses). However, a conclusion that can be drawn from their research is that behavioral measures of low self-control provide stronger predictive power relative to attitudinal indicators. As Pratt and Cullen (2000:95) point out, this conclusion is not too surprising since behavioral indicators of low self-control have tended to include "deviant behaviors (crime)."

The Present Study

Studies by Evans and his colleagues (1997) and Tittle and his associates (2003) illustrate the controversy over the preference for attitudinal or behavioral indicators of low self-control in theoretical tests. Both studies include attitudinal and behavioral measures, yet draw opposite conclusions about the relative efficacy of each. The conflicting conclusions, we feel, are due to differences in the operationalization of the behavioral indicator of low self-control.

Evans and his associates (1997) examine the impact of behavioral and attitudinal indictors of low self-control on crime and other social outcomes (e.g., educational attainment, quality of friendships, etc.). At first glance, the findings appear to strongly support Hirschi and Gottfredson's (1993:48) contention that "observation of behavior (e.g., failure to wear a seat belt) and through self-reports of behavior suggesting low self-control (drinking) are recommended to test the theory." A closer examination of their indicators of analogous behavior, however, reveals that they include at least nine indicators of illegal behavior in their measure (many of which involve use of illegal drugs). The finding that self-reported behavioral involvement in some types of crime (use of illicit drugs, etc.) strongly predicts self-reported behavioral involvement in other forms of crime is not surprising. The inclusion of illegal conduct in their measure of analogous behavior also leaves the tautological criticism intact; i.e., using involvement in illegal behavior to predict involvement in other illegal behavior only "explains" that people involved in crime commit other crimes (and see Paternoster and Brame, 1998:639, FTN#4; Tittle et al., 2003a). That being said, the research does suggest that a behavioral indicator of low self-control is a much stronger predictor of criminal involvement than an attitudinal measure (and see Pratt and Cullen, 2000).

The study by Tittle and his colleagues (2003a) also examines the relative predictive power of cognitive and behavioral indicators of low self-control, yet they concluded that the measures are equally effective in predicting criminal involvement. One key difference between the two studies is that Tittle and his associates (2003a), unlike the Evans study (1997), excluded indicators of illegal conduct from their behavioral measure. The authors actually constructed three separate behavioral measures. The first, a factor scale, was composed primarily of measures of licit drug use, but also includes indicators of debt, seat belt usage, marital status, and the like. The second and third, a Guttman scale and a variety index, respectively, focused less on licit drug use, and incorporated other measures ranging from seat belt usage to investing in a retirement plan. Given Tittle et al.'s finding (1993a:353) that "the pattern of results is the same for all three, with the Guttman measure and the variety index showing somewhat lower predictive coefficients than the factor scale in almost all instances," the authors

only presented the results for the direct comparison between the cognitive measure and the factor scale. This comparison suggests that the behavioral measure does not exert a statistically stronger influence on levels of criminal involvement than the attitudinal indicator, contradicting Gottfredson and Hirschi's (1993) assertion that behaviorally-based measures are preferable for tests of the theory.

Therefore, it seems that any conclusion about the most efficacious measure for predicting crime and other social outcomes may be dependent on how theoretical concepts, specifically behavioral indicators of low self-control, are operationalized. Moreover, this issue is also relevant to the tautological criticism aimed at Gottfredson and Hirschi's (1990) theory. If behavioral measures continue to include illegal conduct, the tautological charge will remain valid, but if researchers develop measures of analogous behavior further removed from illegal conduct (e.g., Arneklev et al., 1993; Paternoster and Brame, 1998), that still fall within Gottfredson and Hirschi's (1990) discussion of specific activities that result in immediate gratification and have distal consequences, the theoretical charge of tautology can be reduced. We refer to these types of actions as "imprudent" behavior; i.e., analogous behaviors that are not illegal. The primary difference between imprudent behaviors and analogous (criminal) behaviors is that while the former are not illegal, they (apparently) provide immediate benefits and also distal (though not legal) consequences**.** We believe this procedure allows us to more closely follow the directives found in the theory in our empirical test.

Therefore, our test differs from that of Evans and his associates (1997), and is somewhat similar to that of Tittle and his associates (2003a), in that we exclude illegal conduct from our behavioral measure. At the same time, our behaviorally-based measure incorporates different imprudent behaviors than those utilized in the Tittle (2003a) study. All of our measures are specifically mentioned by Gottfredson and Hirschi (1990), they provide immediate benefits, and they have distal consequences (unlike a number of the behavioral items used by Tittle et al., 2003a). Finally, we examine the impact of our measures on social outcomes other than crime, as Evans and his colleagues (1997) did.

Methodology

Sample

Data for this project were derived from a 1991 survey of a large southwestern city with a population of approximately 400,000. This was a simple random sample of adults (18 and older), which was drawn from the R.L. Polk Directory for the city.[1] Respondents were initially contacted by a letter describing the annual survey. The letter also announced that a researcher would soon be visiting in order to arrange an appointment for a face-to-face interview. Members of the target sample who could not be reached or refused to participate in the survey were replaced by random selection. Interviews were conducted by trained interviewers.

When the target size of 394 was reached, the sample was compared to the 1990 Census. This comparison revealed no significant differences between the sample and the census in percent white (82% in the sample, 84% in the general population) or percent male (46% in the sample, 47% in the population). The sample was reduced to an *n* of 391, due to missing data.

Measures

Low Self-Control (Attitudinal Indicator). Six essential dimensions are hypothesized to constitute an invariant, multidimensional low self-control trait: impulsivity, simple tasks, risk seeking, physical activities, self-centeredness, and temper (Grasmick et al., 1993; and see Arneklev et al., 1999; Piquero and Rosay, 1988). We employ Grasmick et al.'s (1993) scale to operationalize the attitudinal indicator of low self-control. The Low Self-Control indicator is derived by creating an additive linear composite of z-scores (see Grasmick et al., 1993:117 for a discussion). All responses were initially given on 4-point scales of (4) strongly agree, (3) agree somewhat, (2) disagree somewhat, and (1) strongly disagree. Persons scoring high on the items score high on Low Self-Control. Means and standard deviations for the items are listed in Table 1.

Imprudent Behavior. The second indicator of low self-control is Imprudent Behavior. These actions are often referred to as behaviors analogous to crime (Evans et al., 1997; Paternoster and Brame, 1998). In order to tap this construct, respondents were asked whether they engaged in various behaviors that are not illegal but do have distal consequences. All of the measures used in this study have either been specifically mentioned by Gottfredson and Hirschi (1990), or are strongly implied by the theory. Respondents were asked whether they smoke (1990:90, 178), drink (1990: 90, 91, 178), eat things that they feel like eating (without being concerned with how it affects their health (1990:96), whether they wear a seat belt (1990:92; and see Hirschi and Gottfredson, 1993:48; Keane et al., 1993), if they gamble (1990:90, 178), and

Table 1. Low Self-Control Scale Items

(n = 391)

Item	Mean	SD
Impulsivity component		
I don't devote much thought and effort to preparing for the future.	1.797	.834
I often do whatever brings me pleasure here and now, even at the cost of some distant goal.	2.056	.913
I'm more concerned about what happens to me in the short run than in the long run.	1.921	.937
I much prefer doing things that pay off right away rather than in the future.	2.176	.940
Simple tasks component	2.107	.927
I frequently try to avoid things that I know will be difficult.		
When things get complicated, I tend to quit or withdraw.	1.693	.777
The things in life that are easiest to do bring me the most pleasure.	2.151	.856
I dislike really hard tasks that stretch my abilities to the limit.	1.928	.871
Risk taking component		
I like to test myself every now and then by doing something a little risky.	2.872	.966
Sometimes I will take a risk just for the fun of it.	2.359	1.056
I sometimes find it exciting to do things for which I might get in trouble.	1.798	.994
Excitement and adventure are more important to me than security.	1.627	.825
Physical activities component		
If I had a choice, I would almost always rather do something physical than something mental.	2.366	.886
I almost always feel better when I am on the move than when I am sitting and thinking.	2.903	.909
I like to get out and do things more than I like to read or contemplate ideas.	2.739	.911
I seem to have more energy and a greater need for activity than most other people my age.	—	—
Self-centered component		
I try to look out for myself first, even if it means making things difficult for other people.	1.639	.768
I'm not very sympathetic to other people when they are having problems.	1.585	.793
If things I do upset people, it's their problem, not mine.	1.726	.844
I will try to get the things I want even when I know it's causing problems for other people.	1.490	.676
Temper component		
I lose my temper pretty easily.	2.013	1.009
Often, when I'm angry at people I feel more like hurting them than talking to them about why I am angry.	1.613	.833
When I am really angry, other people better stay away from me.	2.146	1.119
When I have a serious disagreement with someone, it's usually hard for me to talk about it without getting upset.	2.341	1.002

All Likert items are answered on a 4-point scale of strongly agree (4), agree somewhat (3), disagree somewhat (2), and strongly disagree (1).

Alpha reliability for the entire Low Self-Control Scale = 0.8139.

if they had been in an accident or injured themselves so severely in the last year that they had to see a doctor (1990:88-91, 92, 129-130, 147). We created an Imprudent Behavior Index with these items, which is an additive composite (the range is from 0 to 6), since Gottfredson and Hirschi (1990:178) argue that "these… 'pleasures' do not substitute for one another but tend to come together in bundles and clusters."

Crime. We used Gottfredson and Hirschi's (1990) definition of crime to derive our criminal behavior measure, along with two more traditional measures of criminal activity. We included acts of force (Force) and fraud (Fraud) undertaken in the pursuit of self-interest, in addition to taking something worth less than 20 dollars (Theft) and taking something worth more than 100 dollars (Grand theft). Respondents were asked how many times they engaged in these behaviors in the last five years.

Examination of the univariate statistics indicates that the crime variables are highly skewed. Therefore, we recoded all responses to the 90th percentile (Nagin and Smith, 1990). A further problem, however, is that most of the respondents reported no criminal behavior. Therefore, a stringent following of this coding procedure would lead to the creation of dichotomous variables in certain instances. In this situation, the variables have been truncated to allow for three categories. This procedure follows the analytic strategy that was adopted by Grasmick et al. (1993) in their well-known early initial study. Theft ranges from 0 to 3, while Force, Fraud, and Grand Theft range from 0 to 2.

Table 2. Means and Standard Deviations for all Items

(n = 390)

Items	Mean	SD
Low self-control measures		
Low self-control scale	47.047	9.201
Imprudent behavior index	1.934	1.368
Smoke	.327	.470
Drink	.176	.382
Eat	.514	.500
Seat belt	.427	.495
Gamble	.366	.482
Accident	.123	.329
Crime measures		
Crime index	.560	1.228
Force	.126	.444
Fraud	.183	.517
Theft	.295	.694
Grand theft	.059	.303
Social consequences measures		
Quality of friendships*	9.606	1.867
Life satisfaction**	12.028	2.666
Marital status***	.606	.489
Religious attendance****	.813	.390
Educational attainment	13.563	2.687
Income	22,153.000	28.306
Controls		
Gender (male = 1, female = 0)	.453	.498
Age	46.492	17.754
White (white = 1, other = 0)	.816	.388

Note: *Because of missing data, the* ***n*** *for the Crime and Income Measures are 390 and 380 Respectively.*

* Alpha reliability for the quality of friendship scale = 0.7174.

** Alpha reliability for the life satisfaction scale = 0.8227.

*** Marital status is a dichotomous variable (1 = married).

**** Religious Attachment is a dichotomous variable (1 = yes, 0 = no).

As with Imprudent Behavior, we created a Crime Index. Prior to constructing this measure, we recoded Theft so that it also ranged from 0 to 2 to match the other three crime measures. In addition, we followed Evans et al.'s (1997:484-485) procedures and used factor (weighted) crime scores to construct our additive Crime Index. This Index can be seen as an indication of general criminal involvement. The means and standard deviations for Force, Fraud, Theft, Grand Theft, and the Crime Index are also listed in Table 2. The alpha reliability for the Crime Index is .68.

Social Consequences. To further examine the generality of Gottfredson and Hirschi's (1990) theory, as well as to compare the relative effects of our two indicators of low self-control, we predict a number of different social outcomes in our analysis: a Quality of Friendship measure, a Life Satisfaction scale, whether the respondent was married (Marital Status), a measure tapping Religious Attendance, level of Educational Attainment, and Income.[2] The means and standard deviations for the items are listed in Table 2. The specific survey questions for the Imprudent Behavior items, specific crimes, Crime Index, and Social Consequences variables are listed in Appendix A. All independent measures have been standardized.

Gender (1=male, 0=female), Race (1=white, 0=other) and Age are included as controls in the analysis (see Gottfredson and Hirschi, 1990:123-153).

Analysis

The analysis proceeds according to the following steps. First, we examine whether the attitudinal indictor of Low Self-Control significantly predicts Imprudent Behavior. This procedure allows us to determine whether the Low Self-Control scale has construct (and criterion) validity with Imprudent Behavior. Second, we compare the efficacy of predicting general crime with both the Low Self-Control and Imprudent Behavior Index. This allows us to differentiate between the relative effects of both methods of measuring low self-control. Finally, we evaluate which measure is more strongly predictive of general social outcomes, and whether Social Consequences might differentially mediate the effect of one or the other indicator of Low Self-Control on crime. Throughout the analysis we address the implications of testing the theory with these measures and also briefly compare our findings with those of Evans et al. (1997), since they included illegal conduct in their analogous behavior measure of Low Self-Control.

Findings

Model I in Table 3 reports the OLS results of the Imprudent Behavior Index regressed on Low Self-Control, while controlling for Gender, Age, and Race. (Due to space limitations, Pearson correlations are displayed in Appendix B). Model I reveals that the attitudinal indicator of Low Self-Control is a strong predictor of Imprudent Behavior (Beta = .259, $p<.001$). Consistent with Gottfredson and Hirschi's (1993:48) theoretical predictions, imprudent behavior (a measure designed to specifically exclude illegal conduct) seems to reflect the presence of low self-control and can be used to test the theory. At least for the authors, the use of such *legal*

Table 3. The Effects of Low Self-Control on Imprudent Behavior and Crime, and the Effects of the Imprudent Behavior Index on Crime (Betas Reported)*

(n = 390)

	Dependent variable					
	Model I		Model II		Model III	
	Imprudent behavior		Crime index		Crime index	
Low self-control	.259	(<.001)	.234	(<.001)	—	—
Male	.171	(<.001)	-.002	(.975)	-.016	(.749)
Age	-.264	(<.001)	-.237	(<.001)	-.206	(<.001)
White	.083	(.077)	.001	(.992)	-.009	(.885)
Imprudent behavior	—	—	—	—	.169	(.001)
R^2	.186	(<.001)	.119	(<.001)	.090	(<.001)

* This table approximates Evans et al.'s (1997) Table 1.

behavioral measures in tests of the theory can allow it to "survive" the charge of tautology.

Models II and III of Table 3 provide the results of a head-to-head comparison of the prediction power of both indicators of low self-control. As can be seen in the table, the attitudinal indicator of Low Self-Control predicts the Crime Index (Beta = .234, p. < .001) better than Imprudent behavior predicts the Crime Index (Beta = .169, p. = .001). Thus, the attitudinal indicator appears to be a stronger predictive measure for testing this portion of the theory. However, Imprudent Behavior does predict crime and, therefore, can be used as an indicator of Low Self-Control.

Even though the initial results appear to suggest that the attitudinal indicator is more strongly related to crime than Imprudent Behavior, we do not know whether the strength of the effects differ significantly. Therefore, we also conducted an R^2 comparison for the effects of the Low Self-Control scale and Imprudent Behavior on crime (Judd and McClelland, 1989:175-178). The test determines whether the R^2 in one model significantly differs from the R^2 in another model. In the first model, both indicators of low self-control are included as independent variables. In the second model, those two variables are replaced with their sum. The summed variable gets one coefficient, which is applied to both variables (i.e., the test is whether bx + bz = b (x + z)). If the model that applied the same coefficient to both variables significantly increases the R^2 over the model with two coefficients than the coefficients are significantly different. An F-test is then used to determine whether the R^2 for each of the models differ significantly.

The results of this test indicate that the R^2s differ, but not significantly (F* = 1.385; p. = >.05).[3] Therefore, our findings about the relative impact of attitudinal and behavioral measures contrast with the findings of Evans and his colleagues. In Evans et al.'s (1997: 489) study the Analogous Behavior measure appeared to be a much stronger predictor of crime (Beta = .61) than their attitudinal indicator of Low Self-Control (Beta = .30). Although they did not conduct any empirical tests, as we do, one would surmise that the differences in the magnitude of the Betas would be significant, and in the opposite direction.

The major conclusion drawn from this comparison is that if analogous behavior measures include illegal activities they are stronger predictors of crime than are attitudinal indicators of low self-control. However, including illegal behaviors in such measures revives the charge of tautology (i.e., using crime to predict crime). When stripped of illegal behavior, Imprudent (Analogous) Behavior is not as efficacious in predicting crime, yet is still significant. The Imprudent Behavior measure has the distinct advantage of enabling researchers to test the theory, while circumventing the tautological criticism.

In Table 4, we compare the predictive powers of both measures of low self-control on other social outcomes. The first model examines the efficacy of predicting each of the Social Consequences dependent variables with the Low Self-Control attitudinal scale. The second model does the same with the Imprudent Behavior Index. Finally, Model III includes both measures of Low Self-Control.

As can be seen in the Table, across all three models both measures of low self-control are equally related to the Social Consequences variables (as in Evans et al.'s 1997 research). People with Low Self-Control are less likely to have quality friendships, are less satisfied with their life, are less likely to be married, fail to be involved in religious activities, and have lower educational attain-

Table 4. The Social Consequences of Low Self-Control, Controlling for Gender, Age, and Race (Betas Reported)*

(n = 391)

	Model I		Model II		Model III			
Dependent variables	Low self-control		Imrpudent behavior		LSC		+ ImpBeh	
Quality of friendships	-.082	(.103)	-.117	(.029)	-.056	(.281)	-.100	(.071)
Life satisfaction	-.154	(.002)	-.226	(<.001)	-.103	(.042)	-.196	(<.001)
Marital status **	-.243	(.023)	-.183	(.102)	-.212	(.055)	-.124	(.288)
Religious attendance **	-.218	(.100)	-.288	(.035)	-.157	(.258)	-.247	(.081)
Educational attainment	-.274	(<.001)	-.082	(.122)	-.273	(<.001)	-.003	(.958)
Income	-.039	(.425)	.089	(.086)	-.068	(.185)	.109	(.044)

* This table approximates Evans et al.'s (1997) Table 2.

** Marital status and religious attendance are both dichotomous variables (0 = No, 1 = Yes); the B is the log odds in logistic regression.

ment. In Model I, the attitudinal indicator has significant effects in three (50%) of the six equations. In Model II, Imprudent Behavior is also significant three times (50%). Out of the eighteen regression equations, the Low Self-Control measures (both attitudinal and behavioral) have significant effects nine times. Both of our measures, then, seem to have comparable effects on Social Consequences. These findings are consistent with the results found in the Evans et al. (1997) study.

Coupled with the findings reported above, our results suggest that excluding illegal conduct from analogous behavior measures decreases their ability to predict crime. However, it does not seem to reduce the ability to predict Social Consequences.

There is one finding in Model III that is in stark contrast to Gottfredson and Hirschi's (1990) theory; imprudent Behavior is significantly related to respondents' income in a theoretically unexpected direction (Beta = .109, p. = .044). One interpretation of this finding is that the use of outcome measures of low self-control to predict other outcome measures creates a causal ordering problem. The relationship suggests that engaging in Imprudent Behavior (a proposed reflection of low self-control) results in higher economic status. Viewed differently, it could be argued that the income one receives influences the type of (Imprudent) behavior in which an individual with low self-control engages. For instance, people with higher incomes have the opportunity to engage in short-term immediately gratifying behaviors that are not illegal (e.g., drinking and gambling), though such activities have potential distal consequences. Put another way, some imprudent behaviors require income, while others (and crime) may not. Thus, one's position in the social hierarchy may have more influence on the type of behavior an individual engages in than Gottfredson and Hirschi's (1990) theory suggests. This seemingly straightforward argument, however, is not without theoretical and methodological importance because it illustrates that the indicators selected to represent analogous behavior can influence the level of empirical support Gottfredson and Hirschi's (1990) theory receives.

Our final comparison of the relative effects of both of our measures of low self-control can be found in Table 5. This comparison also allows for a brief test of what Evans et al. (1997) call the "spurious thesis." This thesis states that self-control is responsible for the social consequences variables, as well as crime (as opposed to social consequences being determinants of involvement in crime). To test this contention we examine whether social factors continue to predict crime after both self-control measures are included in the equation. If not, the relationship between social consequences and crime is spurious and due to low self-control (Evans et al., 1997). Viewed from a different angle, we also use this test to determine if the attitudinal indicator of Low Self-Control remains a stronger predictor of crime than Imprudent Behavior, controlling for Social Consequences. In Column 1 the Social Consequences variables are regressed on Crime excluding measures of Low Self-Control. In Column 2 the attitudinal indicator of Low Self-Control is added into the initial equation. Column 3 is the same as the second equation with the exception that Imprudent Behavior is the indicator of low self-control. Finally, in the last equation both measures of low self-control are included. The last model allows us to conduct our final comparison of the predictive power of each measure on crime (controlling for Social Consequences), as well as to test the "spurious thesis."

There are several important findings in Table 5. First, the Social Consequences variables are relatively weak predictors of crime (see Model I). In fact, only Life Satisfaction and Marital Status have significant effects

Table 5. The Impact of Low Self-Control on Crime, Controlling for Gender, Age, and Race (Betas Reported)*

(n = 390)

	No measure of self control		Low self-control		Imprudent behavior		Both measures of self-control	
Low self-control	—	—	.197	(<.001)	—	—	.179	(<.001)
Imprudent behavior	—	—	—	—	.129	(.016)	.087	(.108)
Quality of friendships	-.047	(.351)	-.032	(.513)	-.037	(.453)	-.027	(.579)
Life satisfaction	-.110	(.033)	-.088	(.083)	-.085	(.102)	-.074	(.153)
Marital status (1 = married)	-.156	(.002)	-.141	(.005)	-.151	(.003)	-.139	(.005)
Religious attendance	-.048	(.332)	-.033	(.506)	-.035	(.481)	-.025	(.609)
Educational attainment	-.056	(.281)	.000	(.999)	-.044	(.399)	.003	(.953)
Income	-.027	(.615)	-.039	(.453)	-.044	(.407)	-.050	(.343)
R^2	.121	(<.001)	.155	(<.001)	.134	(<.001)	.161	(<.001)

* This table approximates Evans et al.'s (1997) Table 3.

Note: Income is recoded so that missing equals the mean.

(33% of the equations). This is consistent with the study by Evans and his colleagues (1997), which found that only 3 (23%) of their 13 social consequences measures were significant in a similar equation. Therefore, the Social Consequences variables are relatively weak predictors of crime.

Second, one of the social consequences variables, marital status, is not reduced to insignificance in the final equation. Married respondents reported lower levels of involvement in crime, after controlling for their level of Low Self-Control. This could be the product of the social bond produced between married individuals, which could lengthen the time frame use in the calculus before committing crime (see Sampson and Laub, 1993:140-143 for an in-depth discussion of "attachment to spouse") or simply because being married might limit the number of criminal opportunities available. Whatever the case, this finding seems to challenge the "persistent heterogeneity" argument found in Gottfredson and Hirschi's (1990) theory because it suggests that later life course events might inhibit crime (Sampson and Laub, 1993).

Finally, the Low Self-Control Scale is significant in the second column (Beta = .197, p. < .001) and the Imprudent Behavior Index is significant in the third (Beta = .129, p. = .016), controlling for the Social Consequences variables. This demonstrates that the Social Consequences variables do not mediate much of the effects of either measure. In the fourth column, however, the effect of the Imprudent Behavior Index is reduced to insignificance (Beta = .087, p. = .108) once the attitudinal indicator (Beta = .179, p. = <.001) is included in the last equation. Therefore, the relationship between Imprudent Behavior and Crime is spurious and due to Low Self-Control.[4] Put differently, the attitudinal indicator of Low Self-Control is not only a strong predictor of crime but it is also responsible for imprudent behavior.

Discussion

Our results suggest several conclusions. First, behaviors that provide immediate short-term benefits, but also have distal consequences; i.e., imprudent behaviors, can be used to test Gottfredson and Hirschi's general theory of crime (Hirschi and Gottfredson, 1993). Therefore, we would recommend excluding illegal behavior in such measures. This method of operationalization *reduces* the tautological criticism aimed at the theory but does not eliminate it because low self-control is also responsible for imprudent behavior. Therefore, using an outcome of low self-control to predict other outcomes of low self-control can still be viewed as somewhat tautological (Paternoster and Brame, 1998). Second, attitudinal indicators of low self-control can also be used to test the theory, as previous research demonstrates. Third, our attitudinal indicator was a superior measure relative to imprudent behavior in terms of predicting crime; though this finding may reflect the types of imprudent behaviors included in our behavioral measures (see Tittle et. al., 2003a). Fourth, both indicators were just as efficacious in explaining other social consequences, which, in turn, did not mediate the effects of either self-control measure on crime. Regardless of the measure used, low self-control is a stronger predictor of crime than later life course influences, which is very consistent with Gottfredson and Hirschi's (1990) theory. In our analysis, however, there was one exception to this general tendency. Being married was associated with a significantly lower involvement in crime, which suggests that some later life course

events might reduce the possibility of crime (Sampson and Laub, 1993; and see Andrews et al., 1990; Gendreau, Little, and Goggin, 1996).

Finally, and perhaps most importantly, we draw different conclusions than both Evans and his associates (1997) and Tittle and his colleagues (2003a) about the relative predictive power of attitudinal and behavioral indicators. Our analysis, viewed in conjunction with the findings of Evans and his colleagues (1997), demonstrates that while analogous behaviors may be stronger predictors of crime when they include illegal activities, stripping them of such indicators reduces their efficacy. Our conclusion, therefore, is also contrary to Tittle et al.'s (2003a) assertion that it would seem to matter little whether researchers use (or have used) behavioral or attitudinal indicators of low self-control to predict involvement in crime or deviance. We believe it matters a great deal as to how the behavioral indicators are operationally defined. In this regard, however, one of our more surprising findings appears to be that our behavioral indicator of low self-control does not appear to be a stronger predictor of involvement in crime (which we thought it would) relative to the different measures used by Tittle et al. (2003a). This may be due to the fact that the imprudent behaviors that we had at our disposal were simply yes/no items rather than measures of intensity of imprudence. Future research should more closely examine different types and degrees of involvement in imprudent behavior and their relationship with crime and other social consequences.

As we have discussed, our test of Gottfredson and Hirschi's (1990) theory partially replicated the study conducted by Evans et al. (1997), although we specifically attempted to remove illegal behaviors from our measure. We do understand their justification for including drug offenses as indicators of low self-control. As Evans and colleagues (1997:484) point out that "as largely public order violations, (their items) seem to fall outside Gottfredson and Hirschi's (1990:15) definition of crime 'as acts of force or fraud undertaken in the pursuit of self-interest.' That is, they do not fall under the rubric of 'ordinary crimes'—essentially theft and violent offenses—discussed by Gottfredson and Hirschi." In fact, some might argue that it is not even tautological at all to use illegal activities as a behavioral indicator of low self-control as long as these indicators do not use "force" or "fraud" because those types of (criminal) activities fall outside of Gottfredson and Hirschi's (1990) discussion of crime. While this is true, to some extent, it is important to remind ourselves that Gottfredson and Hirschi (1990:117) are trying to use the concept of low self-control to "…explain all crime, at all times." Therefore, they allow for a more expansive definition of crime—not just one limited by force or fraud. Because of this, we believe that even the use of these types of crimes in empirical tests *is* tautological.

Furthermore, our reading of the Evans et al. (1997) study led us to believe that other researchers might view illegal analogous behaviors as preferable in tests of the theory (see Pratt and Cullen, 2000), which might lead to a decreased use of attitudinal indicators (but see Tittle et al., 2003a). From our perspective, this strategy may strengthen the tautological criticism. For example, this type of procedure seems to invite the same criticism that was once leveled against the Psychopathic Deviate subscale of the Minnesota Multiphasic Personality Inventory (MMPI) and the Socialization subscale of the California Personality Inventory (CPI). Gottfredson and Hirschi (1990:109), in fact, seem to almost solicit such a critique when they quote Wilson and Herrnstein's (1985:187) observation that the Psychopathic Deviate subscale includes "questions about a respondent's past criminal behavior," and then go on to argue that "if this is so, then scale scores obviously cannot be used to establish the existence of a trait of personality independent of the tendency to commit criminal acts" (Gottfredson and Hirschi, 1990:109). The same, they continue, can be said about the Socialization subscale of the CPI which uses items that are "indistinguishable from standard self-report delinquency items" (Gottfredson and Hirschi, 1990:109-110). Therefore, Gottfredson and Hirschi's (1990) own argument seems to suggest that the inclusion of criminal behaviors in "analogous" measures of low self-control is at least as tautological as the use of these instruments.

In hindsight, however, we must acknowledge that we are potentially, though to a lesser extent, guilty of the same thing; i.e., if one looks closely, the proposed legality of some of our measures might also be questioned. For example, our sample included young adults that may have consumed alcoholic beverages but were not yet of a legal age to do so, and not using a seat belt *is* an offense that individuals may be cited for. In addition, some of the other behaviors included in our imprudent behavior measure are prohibited in some areas or have been defined as a violation of the law in the past (and perhaps will be in the future). Smoking, for example, is currently prohibited in certain areas (e.g., planes, certain buildings, etc.), gambling is outlawed in some jurisdictions (though not where our respondents came from), and drinking alcohol was made illegal during Prohibition. Hence, to a certain extent, some of our indicators of imprudent behavior can be seen as reflective of the (illegal) analogous behaviors that we discussed.

So, where do we go from here? One additional area of interest would be to test the theory with self-reported imprudent behavioral measures that are derived early in an individual's life. This would be beneficial for two reasons. First, this procedure solves the causal ordering problem. Behavioral indicators of low self-control can be measured prior to the respondent's involvement in delinquency or crime (see Hirschi and Gottfredson, 1993). Second, the use of (imprudent) behavioral measures, as mentioned, reduces the tautological criticism aimed at the theory. Hirschi and Gottfredson (1993:48) "have proposed (using) such items as whining, pushing, and shoving (as a child); smoking and drinking and excessive television watching and accident frequency (as a teenager); difficulties in interpersonal relationships, employment instability, automobile accidents, drinking, and smoking (as an adult)," as examples of behaviors indicative of low self-control. They further argue that "none of these acts or behaviors is a crime. They are logically independent of crime. Therefore the relation between them and crime is not a matter of definition, and the theory survives the charges that it is mere tautology and that it is nonfalsifiable" (Hirschi and Gottfredson, 1993:51).

As with any procedure that brings with it advantages, however, so follow the potential drawbacks. While some might argue that a number of these activities are illegal (e.g., pushing and shoving as a child, and smoking and drinking as a teenager), what is equally problematic is that there is no definitive basis for concluding that such behaviors are the sole product of "low self-control." To be sure, scales designed to measure low self-control do predict these types of analogous behaviors, as we have seen in our analysis; so they can tentatively be used to test the theory. One should keep in mind, however, that no research to date has compared the theory of low self-control head-to-head with other theories to determine if it is the only cause of "analogous" behavior.

In fact, without an explicit operational definition of low self-control, as conceptualized by Gottfredson and Hirschi (1990), there are a number of alternative theories that are potentially tenable as explanations for these behavioral outcomes, and therefore the use of analogous (imprudent) behaviors in empirical tests still maintains, to a certain extent, the tautological criticism. It may be intellectually interesting to use proposed outcomes of self-control (e.g., analogous behaviors) to predict other outcomes (e.g., crime), but such a procedure seems to lack much meaningful scientific rigor as to whether "low self-control" is actually the sole causal agent of interest in such "tests." This contention, therefore, seems to bring us back full circle to reconsidering how to operationalize low self-control without using one or more of its proposed outcomes in empirical analyses. Seemingly, it leads to the conclusion that measures, other than those that are behavioral, that tap the characteristics of crime and the characteristics of offenders, can be viewed as less tautological indicators of low self-control for tests of the theory. Therefore, attitudinal indicators of low self-control can help to reveal whether something akin to low self-control, as conceptualized by Gottfredson and Hirschi (1990), actually exists. Furthermore, such measures can help to reveal just how powerful Gottfredson and Hirschi's (1990) theory is in comparison with other explanations for crime, because the actual concept of low self-control is being operationalized. Finally, attitudinal indicators of low self-control can eliminate the criticism of tautology, and therefore allows the theory to survive as an explanation of crime.

Endnotes

1. It is important to point out that these are not the same data that were used in the Tittle et al. (2003a) study. Tittle et al. used data derived from a completely different sample during a different year. Rather, the data analyzed in this research are the same data that have been used in some of the more widely cited studies testing various propositions found in Gottfredson and Hirschi's (1990) theory (e.g., Grasmick et al., 1993; Arneklev et al., 1993).

2. During our deliberations as to which concepts to include as reflections of positive social outcomes (as well as how they should be operationally defined) we paid close attention to Evans et al.'s (1997:480) study and attempted to tap as many of the "social consequences" factors that they used in their research.

3. The difference in coefficients is determined by:

$$\text{PRE} = 1 - \frac{\text{[Sum of Squares (Residual) LSCandImp.B.]}}{\text{[Sum of Squares (Residual) LSC + Imp.B.]}} = 1 - \frac{268.961}{269.931} = .0035$$

$$F^* = \frac{\text{PRE}/1}{(1-\text{PRE})/(n-6)} = \frac{.0035936/1}{(1-.0035936)/(390-6)}$$

$$= \frac{.0035936}{(.9964064/384)} = \frac{.0035936}{.0025948} = 1.3849237\ (p \geq 05)$$

4. The "spurious thesis" suggested by Evans et al. (1997) can only be made if one assumes a certain time/causal ordering between the indicators. If this assumption cannot be made, then researchers should be looking at independent rather than causal effects.

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Appendix A. Imprudent Behavior, Crime, and Social Consequences Items

Imprudent Behavior Items*

Do you smoke tobacco products? **(Smoke)**

Do you usually drink more than two or three alcoholic beverages over the span of a week? **(Drink)**

Do you pretty much eat what you feel like eating without being concerned with how it affects your health? **(Eat)**

When you are in an automobile, do you always use the seat belt? **(Seat Belt**)

Do you now and then like to gamble? **(Gamble)**

During the past year, have you been in an accident or injured yourself so severely that you had to see a doctor? **(Accident)**

Crime Measures

How many times in the past five years have you used or threatened to use force against an adult to accomplish your goals? **(Force)**

How many times in the past five years have you distorted the truth or falsely represented something to get something you couldn't otherwise obtain? **(Fraud)**

How many times in the past five years have you taken something worth less than $20 that did not belong to you? **(Theft)**

How many times in the past five years have you taken something worth at least $100 that did not belong to you? **(Grand Theft)**

Social Consequences Measures

Friends**

Now thinking of the people whom you interact with most often, not counting those you live with – people like friends, neighbors, or relatives. Please answer the next three items in terms of your relationships with these people.

On the average, my relationships with these people are very close.

I often share my inner-most thoughts and feelings with them.

When I need help, I can turn to these people.

Religious Attendance*

Do you ever attend church, watch church services on television, or listen to church services on the radio?

Income

How much income did you personally earn from all sources last year?

Life Satisfaction**

In most ways my life is close to my ideal.

The conditions of my life are excellent.

I am satisfied with my life.

So far I have gotten the important things I want in life.

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* The response categories are: 1) Yes, 0) No.

** The response categories are: 4) Strongly agree, 3) Agree somewhat, 2) Disagree somewhat, 1) Strongly disagree.

Appendix B. Correlations Among the Low Self-Control Scale, Imprudent Behavior Index, Self-Reported Crimes, Crime Index and Control Variables

One-tailed tests of significance in parentheses.
(n = 390)

	Low self-control	Imprudent behavior	Force	Fraud	Theft	Grand theft	Crime index	Male	Age	White
Low self-control	1.000									
Imprudent behavior	.293 (<.001)	1.000								
Force	.160 (.001)	.102 (.022)	1.000							
Fraud	.261 (<.001)	.250 (<.001)	.387 (<.001)	1.000						
Theft	.140 (.003)	.124 (.007)	.221 (<.001)	.384 (<.001)	1.000					
Grand theft	.139 (.003)	.171 (<.001)	.480 (<.001)	.367 (<.001)	.419 (<.001)	1.000				
Crime index	.251 (<.001)	.223 (<.001)	.715 (<.001)	.781 (<.001)	.673 (<.001)	.723 (<.001)	1.000			
Male	.073 (.060)	.199 (<.001)	-.107 (.017)	.030 (.279)	.118 (.010)	.044 (.195)	.025 (.310)	1.000		
Age	-.073 (.074)	-.276 (<.001)	-.110 (.015)	-.207 (<.001)	-.269 (<.001)	-.119 (.009)	-.254 (<.001)	-.035 (.247)	1.000	
White	-.010 (.418)	.040 (.215)	.014 (.393)	-.026 (.306)	-.020 (.348)	-.062 (.112)	-.035 (.248)	-.024 (.320)	.158 (.001)	1.000

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The "Rural Mystique": Social Disorganization and Violence beyond Urban Communities

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Abstract: *Most studies of social disorganization theory have focused exclusively on urban areas. Few researchers have asked whether the concepts of social disorganization would apply as well in rural or non-metropolitan areas. The current study expands on previous research by asking two distinct questions. First, is social disorganization theory generalizable to rural as well as urban communities? Second, are the concepts derived from social disorganization theory generalizable across violent offense types? Based on non-metropolitan counties in the upper-Midwest region of the United States (N=221), a series of overdispersed Poisson regression models indicate that social disorganization explains geographic variation in violent crime rates in non-metropolitan counties. Implications of these findings are discussed as well as suggestions for future studies.*

Keywords: Social disorganization, violence, rurality, non-metropolitan counties

Introduction

For decades, social disorganization theory has been used to explain geographic variation in crime rates. However, most studies have focused exclusively on urban areas. Few researchers have asked whether social disorganization also applies in areas removed from large, densely-populated cities. Of the studies that have attempted to do this, most have focused exclusively on the southern region of the United States (Lee, Maume, and Ousey, 2003; Osgood and Chambers, 2000). This study expands on previous research by asking two distinct questions. First, are the concepts derived from social disorganization theory generalizable across geographic regions? Second, are the concepts derived from social disorganization theory generalizable across offense types? This study examines counties in the upper-Midwestern region of the United States to determine whether social disorganization applies equally well in this region of the country among non-metropolitan counties. Additionally, we examine whether the concepts are able to explain variation in a variety of violent offense types.

Explicating Social Disorganization Theory

Shaw and McKay's (1942) social disorganization theory contended that crime rates can be explained by the structural characteristics of a community. In particular, Shaw and McKay pointed to economic disadvantage, racial and ethnic heterogeneity, and residential mobility as three features of a community that impact its ability to regulate the behavior of community members. The theory relies on a consensus perspective in which there is widespread agreement that crime is an immediate threat to the community and must be addressed, primarily through informal social control mechanisms (Bursik, 1988). In socially disorganized communities, disadvantage, heterogeneity, and mobility all interfere with the community's ability to exert informal control over behavior. In particular, the impact of economic disadvantage is indirect through ethnic heterogeneity and residential mobility, both of which hinder communication among community members and impede the development of social relationships likely to provide informal control mechanisms (Bursik, 1988; Lee et al., 2003; Sampson and Groves, 1989). The inability to exert informal social controls results in ineffective monitoring and socialization of juveniles within the community. Delinquency arises from the unsupervised activities of these youth and the emergence of a normative system that encourages or tolerates criminal and delinquent behavior (Lee et al., 2003; Shaw and McKay, 1942).

The Role of Social Isolation

Since its original development, social disorganization theory has been clarified and extended by numerous researchers. Of particular interest for this study is the

consideration of the role of social isolation in disorganized communities. Building on the work of Sampson and Wilson (1995), Lee et al. cited research highlighting the importance of population density and the "spatial concentration of disadvantage" (2003:108). They argued that in areas where economic disadvantage is more concentrated, community members have less contact with mainstream, middle-class institutions and norms. This reduces the ability of the community to build social capital and mobilize resources on its behalf, referred to as public control (Taylor, 1997). In addition to the importance of intimate primary groups (private control) and local institutions (parochial control) in exerting social control, the connection of a community to outside communities and its use of those connections to mobilize resources are important sources of social control (Taylor, 1997). To the extent that a community is isolated from other communities, from mainstream social norms, and from outside resources, social and spatial isolation allows for the emergence of a cultural value system that legitimates, or at least tolerates, crime and delinquency (Sampson and Wilson, 1995).

While Sampson and Wilson (1995) discussed social isolation among the urban poor, Lee et al. (2003) suggested that it may also play a role in rural communities. Many non-metropolitan communities have high levels of poverty, often higher than urban poverty rates. Although a lower degree of population density may preclude extreme spatial concentration of disadvantage in rural communities, these communities are often socially and geographically isolated. As a result of much lower population density, residents of rural areas may be just as isolated, if not more so, from mainstream social institutions and also may have limited ability to mobilize resources on their behalf (Lee et al., 2003). A focus on the intersection between population density and the concentration of economic disadvantage suggests the importance of considering social disorganization in rural communities.

Since its initial development and application in Chicago, subsequent tests of the theory have continued to focus on large urban communities while virtually ignoring smaller communities and rural areas (for example, Bursik and Webb, 1982; Heitgerd and Bursik, 1987; Sampson, Raudenbush, and Earls, 1997). To some extent, this may be due to lower crime rates, especially violent crime rates, in rural areas (Bachman, 1992; Laub, 1983; Weisheit, Falcone, and Wells, 1994). However, a large proportion of the U.S. population resides in non-metropolitan areas (Osgood and Chambers, 2000), and Lee et al. (2003) note that social disorganization was developed as a general theory to explain crime in both rural and urban areas. Thus, it is important to consider the different features of urban and rural communities, how those differences impact crime rates, and how the features of rural communities fit into a social disorganization framework.

Variation in Rural and Urban Communities

Urban and rural communities differ in many ways. The stereotypical characterization of rural life encompasses both positive and negative features. For example, in a public opinion study, Willits, Bealer, and Timbers (1990) found that rurality is characterized by positive images of pastoral life, honesty, individualism, and religiosity. Tickamyer and Duncan (1990) also note a tendency to romanticize rural society (see also Hogg and Carrington, 2003). On the other hand, rurality is also often viewed as simply the opposite of modern, urban society, including images of rural residents as disadvantaged, unable to cope, and backwards (Willits et al., 1990).

Websdale (1995) reports that rural communities are characterized by more homogeneous populations and a greater level of social cohesion and shared values (see also Barnett and Mencken, 2002). The social climate in rural areas tends to be more personal with a greater number of community members having intimate or personal relationships with other community members. Rural areas also tend to be both geographically and socially isolated (Feyen, 1989). This combination of factors may lead to suspicion of outsiders and the government and to a greater reliance on informal social control mechanisms in rural communities (Barnett and Mencken, 2002; Websdale, 1998; Weisheit and Donnermeyer, 2000). In contrast, urban centers may be better characterized by anonymity and privacy. Urban communities typically have a greater heterogeneity of values and consequently, greater tolerance of diversity and deviation from those values (Websdale, 1998). Thus, rural areas are generally recognized as being more socially organized than urban areas because they are more homogeneous, have less mobility, and rely more on informal social controls. From a social disorganization perspective, it is not surprising that rural areas have lower crime rates.

The features of rural communities described above point to social organization and a reliance on informal control mechanisms as an explanation of lower violent crime rates in rural compared to urban areas. However, rural communities may also be characterized by extreme poverty (Lee et al., 2003; Tickamyer and Duncan, 1990), a key feature of social disorganization presumed to increase crime rates. The geographic and social isolation of these areas from larger communities also allows for the possibility of concentrated disadvantage as described

by Lee et al. (2003). However, in two studies of rural counties, neither Petee and Kowalski (1993) nor Osgood and Chambers (2000) found a significant impact of poverty on violent crime rates. Bursik (1988) notes that social disorganization theory, as originally presented by Shaw and McKay (1942), never implied a direct effect of poverty on crime. Instead, economic disadvantage was presumed to be related to higher levels of mobility and ethnic heterogeneity which in turn impacted the ability of the community to exert informal control over delinquent behavior. Osgood and Chambers (2000) suggest that this may not be the case in rural communities. Rather, higher levels of poverty in rural areas may be correlated with a greater degree of stability (less mobility and more homogeneity) in the community. Thus, a null finding with respect to the impact of economic disadvantage is not necessarily a fatal flaw for the theory and highlights the need to examine how the features of social disorganization are interrelated in various types of communities.

Hypotheses

Tests of social disorganization theory have primarily relied on the analysis of urban areas (Shaw and McKay, 1942; Bursik and Webb, 1982; Heitgerd and Bursik, 1987). To date, only a few studies have examined the impact of structural factors on violent crime rates in rural areas (Petee and Kowalski, 1993; Osgood and Chambers, 2000). Lee and colleagues (2003) also note that most of this research has been regionally concentrated in the South. Census data indicates that the southern region of the U.S. may be structurally different from other regions of the country. In particular, the upper Midwest tends to have proportionately more white people, be less populated, have a lower percentage of residents in poverty, and be experiencing negative or minimal population growth compared to the South (www.census.gov). Thus, questions about the applicability of social disorganization theory across various types of communities linger. The current study expands on current understanding of the relationship between rurality, social disorganization, and violence by examining whether measures of social disorganization are capable of explaining various forms of violence in non-metropolitan communities in the upper-Midwest region of the U.S.

In line with the study conducted by Osgood and Chambers (2000), this study presents six specific hypotheses derived from social disorganization theory. Social disorganization suggests that violent crime will be positively related to (1) economic disadvantage, (2) residential instability, and (3) racial/ethnic heterogeneity. Sampson (1987) also notes that family disruption may weaken the ability of the family to impose informal control, and family disruption has been incorporated into various studies as an additional feature of social disorganization (Osgood and Chambers, 2000; Petee and Kowalski, 1993). Thus, we also propose that violent crime will be positively related to (4) family disruption.

Additionally, research on the spatial concentration of disadvantage (see Lee et al., 2003) suggests that the absolute poverty level of a community is less important in predicting violent crime than the concentration of economic disadvantage. In communities with highly concentrated poverty, community members may be isolated from conventional, middle-class institutions and values, allowing the breakdown of informal social controls and the emergence of pro-violence social norms. Thus, we also propose that violent crime will be positively related to (5) population density and (6) proximity to urban areas. Both of these could be indicators of spatial isolation consistent with Lee et al. (2003).

Methods

The purpose of the current study is to discern the impact of social disorganization on violent offending in non-metropolitan communities. The sample consists of all 221 non-metropolitan counties in four Midwestern states: North Dakota, South Dakota, Minnesota, and Wisconsin. As noted previously, this region of the country is demographically different from other regions that have received the bulk of the research attention. Thus, it is important to explore whether social disorganization operates similarly here. County-level data addressing features of social disorganization, rural/urban categorization, and crime rates were collected from the Census Bureau, the Department of Agriculture, and the 2000-2002 Uniform Crime Reports (UCR).

Social Disorganization Variables

Using previous studies as a guide, four features of social disorganization were identified: residential instability, family disruption, low socioeconomic status, and ethnic heterogeneity. Data were collected from the 2000 Census reflecting each of these variables. Residential instability was measured as the percent of households that had moved within the previous five years. Higher values indicate a more transient community. Family disruption was measured as the percent of single-mother families in relation to the number of families with children. Socioeconomic disadvantage was measured with two

variables. First, we included an indicator of the proportion of the population living below the federal poverty level. Second, we included the average annual unemployment rate for each county.

The Census also provided data on the percent of the population in each racial group: white, African-American, Asian, and American Indian. The population in this region of the country is predominantly white with a very small representation of African-Americans and Asians (both average below one percent of a county's population). The largest minority group in this region is American Indians, who represent about six percent of the population. We categorized these groups in terms of the proportion of white versus non-white individuals in the county. Following previous researchers, we created an index of diversity, "calculated as $1 - (\sum p_i^2)$, where p_i is the proportion of [individuals] of a given ethnic group, which is squared and summed across the groups that are distinguished (here only white and nonwhite). This index reflects the probability that two randomly drawn individuals would differ in ethnicity" (Osgood and Chambers, 2000:93). Scores on this variable range from 0 to 0.5 with higher values indicating greater diversity. Counties in these four states had an average score of 0.1, indicating a fairly homogeneous population (see Appendix A).

Urban/Rural Variables

In practice, defining urban and rural communities is a difficult process. Different government entities have differing definitions, and these definitions do not always consider those features in our common understanding of rurality. Historically, definitions considered communities with fewer than 2,500 residents as rural, and everything else was urban. Logan, Walker, and Leukefeld (2001) suggest that this strict urban-rural dichotomy does not realistically represent the variety in communities. They suggest instead looking at urban (primarily metropolitan), urban-influenced, and rural communities. This classification scheme takes into account smaller communities within fairly close proximity of a metropolitan area and thus able to access urban resources (Logan et al., 2001). Similarly, Lee and colleagues (2003) note that spatial and social isolation may be a crucial factor compounding the impact of structural disadvantage on crime rates. A classification scheme that distinguishes the connections between counties would be important in assessing the isolation of that population. The Economic Research Service (ERS) of the U.S. Department of Agriculture attempts to measure rurality in such a way.

The ERS Urban-Influence Codes were developed to take into account factors such as population size, urbanization, and access to larger economies (Economic Research Service, 2002a). This strategy resulted in a scale from 1 to 12 that allows for the categorization of counties. Categories 1 and 2 refer to large (one million residents or more) and small metropolitan counties respectively. Categories 3 through 7 refer to counties that are adjacent to metropolitan counties. The specific numerical ranking is determined by the size of the metropolitan county to which they are adjacent and whether the county has its own town. Categories 8 through 12 refer to counties that are not adjacent to metropolitan counties. The specific ranking is determined by the size of the county and whether it has its own town. The non-metropolitan counties in this sample were coded using these Urban-Influence Codes (Economic Research Service, 2002b). Five specific categories were then derived from these codes based on the size of the largest city within the county (micropolitan or not) and adjacency to larger counties (adjacent to metropolitan, adjacent to micropolitan, or not adjacent). About 11 percent of counties were micropolitan (having an urban cluster of at least 10,000) and adjacent to a metropolitan county, and about 14 percent were micropolitan, non-adjacent counties (see Appendix A). The majority of counties in this sample were non-core with 31 percent adjacent to a metropolitan county, 24 percent adjacent to a micropolitan county, and 21 percent not adjacent (i.e., the most rural and isolated).

In addition to the Urban-Influence Codes, the population density of each county (population per square mile) was also included. Due to the variability in the geographic size of counties in this sample and in population density (see Appendix A), it appears that density is a better indicator of rurality than the overall population. Additionally, social and spatial isolation may play an important role in predicting crime rates, and isolation may be better indicated by density.

Crime Variables

Hogg and Carrington note that violence in rural communities has often been ignored because of "deep-rooted cultural assumptions about the nature of community" (2003:294), especially the image of rural communities as peaceful and wholesome. Their analyses of crime and violence in Australia indicate that standard comparisons of crime rates between urban and rural communities tend to be overwhelmed by property crimes, obscuring patterns of violent crime in rural areas deserving of more research attention than has typically been paid (Hogg and Carrington, 2003). Additionally, Lee et al. (2003) point

out that the concentration and isolation of disadvantage may lead to the emergence of an oppositional culture that finds expression through violence. Therefore, these analyses focus on four violent offense types: aggravated assault, other types of assault, robbery, and rape. For these violent offenses, official data on crimes reported to police in each county were collected from the 2000-2002 UCR and were then summed over the three years (see Osgood and Chambers, 2000). Wiersema, Loftin, and McDowall (2000) note that count data are preferable to crime rates because the former are better suited to handle variance in population sizes across small geographical areas (see also Nolan, 2004). Rates tend to be inflated with very small population sizes. Because of the small population size of a majority of the counties in this region (see Appendix A), count data are more appropriate than rates for the purposes of this study.

Results

This study began with a consideration of whether social disorganization variables account for variation in violent offending in non-metropolitan communities in the upper-Midwestern United States. Overdispersed Poisson regression models were estimated to test each of the six hypotheses. Poisson models are more appropriate for count data than OLS regression because the distribution of count data requires that predicted values must be non-negative. OLS regression assumes a continuous, unbounded, and normally distributed dependent variable, which is unrealistic in this situation (see Gardner, Mulvey, and Shaw, 1995; Lee et al., 2003). Additionally, errors in OLS analyses with count data are inherently non-normal and heteroscedastic, violating key assumptions of OLS regression (Gardner et al., 1995). Using a Poisson modeling strategy also accounts for the highly skewed nature of the count data (i.e., many counties report few offenses with a few counties reporting high counts).

Social Disorganization and Violent Offending

The first set of hypotheses suggests that violent crime will be positively related to (1) socioeconomic disadvantage, (2) residential instability, (3) ethnic heterogeneity, and (4) family disruption. In other words, the number of violent crimes committed will be higher in counties that are more unstable and more diverse and that have a higher level of family disruption and poverty. Table 1 presents the overdispersed Poisson regression results for aggravated assault, other assaults, robbery, and rape.

Table 1. Overdispersed Poisson Regression Models Predicting Aggravated Assault, Other Assaults, Robbery, and Rape

(n = 221)

	Aggravated assault		Other assaults		Robbery		Rape	
Variables	b (Std. error)	t-value	b (Std. error)	t-value	b (Std. error)	t-value	b (Std. error)	t-value
Constant	3.986 (1.794)	2.22 *	4.84 (1.777)	2.72 **	-1.814 (2.814)	-0.65	2.487 (3.099)	0.80
Mobility	0.063 (0.018)	3.56 ***	0.07 (0.017)	4.10 ***	0.079 (0.029)	2.74 **	0.067 (0.031)	2.18 *
Index of diversity	2.025 (1.064)	1.90	1.803 (1.031)	1.75	2.196 (1.978)	1.11	2.386 (2.007)	1.19
Single mother	0.101 (0.026)	3.89 ***	0.128 (0.025)	5.10 ***	0.124 (0.045)	2.75 **	0.088 (0.048)	1.86
Poverty	-0.145 (0.021)	-7.05 ***	-0.152 (0.020)	-7.66 ***	-0.236 (0.039)	-5.98 ***	-0.206 (0.041)	-5.04 ***
Unemployment	0.066 (0.034)	1.96 *	0.074 (0.033)	2.26 *	0.096 (0.050)	1.90	0.094 (0.055)	1.71
Percent 18-24 years old	0.017 (0.021)	0.81	0.025 (0.020)	1.23	0.049 (0.034)	1.45	0.039 (0.037)	1.07
Male	-0.037 (0.017)	-2.20 *	-0.038 (0.017)	-2.26 *	-0.011 (0.026)	0.41	-0.035 (0.029)	-1.22
Scale parameter	4.443		9.076		1.923		3.425	

***p < .001; **p < .01; *p < .05.

In addition to the social disorganization variables, the regression models included controls for the male/female ratio in the county and for the percent of the population between 18 and 24 years old. Consistent with two of the hypotheses, residential instability and family disruption significantly predicted assaults controlling for other factors. Higher levels of residential instability significantly increased both aggravated assaults (b = 0.063, t = 3.56) and other assaults (b = 0.070, t = 4.10). A higher percentage of single-mother families also significantly increased both types of assaults (b = 0.101, t = 3.89 for aggravated; b = 0.128, t = 5.10 for other). However, racial heterogeneity had no significant impact on either type of assault.

The two measures of low socioeconomic status were significantly related to assaults, but in opposing directions. As expected, higher levels of unemployment significantly increased both types of assault (b = 0.066, t = 1.96 for aggravated; b = 0.074, t = 2.26 for other). However, a higher proportion of families in poverty significantly reduced the number of both aggravated (b = -0.145, t = -7.05) and other assaults (b = -0.152, t = -7.66). Contrary to our hypothesis and to the predictions of social disorganization theory, increased poverty does not predict higher crime rates in non-metropolitan counties in the upper Midwest. Rather, it is significantly related to fewer assaults in this region.

A similar pattern of results emerges with robbery and rape offenses. Residential instability significantly increased the number of robberies (b = 0.079, t = 2.74) and rapes (b = 0.067, t = 2.18). A higher percentage of single-mother families increased the number of robberies (b = 0.124, t = 2.75), but the impact on rapes was not statistically significant. The index of diversity was not significantly related to either the number of robberies or rapes. The pattern of results for poverty uncovered in the analysis of aggravated and other assaults also appears here. While unemployment rates do not significantly predict either offense type, higher levels of poverty predicted significantly fewer robberies (b = -0.236, t = -5.98) and rapes (b = -0.206, t = -5.04).

In these analyses, the structural social disorganization variables were found to be consistently related to violence across all offense types with a couple of exceptions. As predicted by the theory, residential mobility and family disruption were found to increase violence. As expected, unemployment significantly increased assaults, but there was no significant effect for robbery or rape. Poverty, on the other hand, was found to be negatively correlated to violent crime. Regardless of crime type, violent crime was higher in counties that were more unstable, that had a higher level of family disruption, and that were less poverty stricken. Contrary to the hypothesis and the theory, racial heterogeneity was not related to violent offending in these models. Thus partial support was found for the structural hypotheses.

Rurality and Violent Offending

Two additional hypotheses addressed rural/urban differences in social disorganization and violent crime and the role of social isolation. Hypotheses 5 and 6 suggest that violent crime will be related to population density and proximity to urban areas (i.e., counties with greater density and closer to urban areas will have higher violent crime rates). Table 2 presents a comparison between the different county types in terms of the numbers of each

Table 2. Average Offenses (Natural Logged) by Urban-Influence Code Categories

UIC categories		Aggravated assault	Other assaults	Robbery	Rape
Micropolitan, adjacent to metro		3.82	5.02	1.52	2.09
Micropolitan, not adjacent to metro		3.11	4.88	1.03	1.62
Non-core, adjacent to metro		2.44	3.58	0.44	1.02
Non-core, adjacent to micro		1.69	2.83	0.27	0.66
Non-core, not adjacent to metro or micro		1.78	3.00	0.13	0.52
	F-ratio	19.71 **	18.71 **	22.69 *	14.78 **
Adjacent to metropolitan		2.80	3.96	0.72	1.30
Not adjacent to metropolitan		2.05	3.37	0.40	0.83
	t-ratio	4.20 **	2.73 **	2.83 **	3.17 **
Micropolitan		3.43	4.94	1.25	1.83
Non-core		2.02	3.18	0.30	0.77
	t-ratio	7.40 **	7.95 **	6.59 **	5.67 **

**p < .01.

violent offense. For all four offenses, micropolitan, metro-adjacent counties have the highest number of offenses, followed closely by micropolitan, non-adjacent counties. The non-core counties have significantly fewer offenses for all four violent crimes.

Table 3 presents the results of Poisson regression models predicting aggravated assaults, other assaults, robbery, and rape, with the structural social disorganization variables and including population density and categories derived from the Urban-Influence Codes. In these models, the effect of the social disorganization variables remains largely the same. Controlling for population density and proximity to urban areas, racial heterogeneity, single-mother households, and unemployment significantly increase the numbers of aggravated and other assaults. Higher levels of poverty significantly reduce the number of assaults. Additionally, residential mobility affects assaults in the expected direction, but the impact is only significant for other assaults.

In terms of "rurality," higher levels of population density significantly increase the numbers of both aggravated (b = 0.656, t = 8.31) and other assaults (b = 0.382, t = 4.81). When counties were categorized according to their urban influence code, an interesting pattern of results emerged. Micropolitan counties did not differ, regardless of whether they were adjacent to a metropolitan county or not. However, all of the non-core counties had significantly fewer aggravated (b = -0.487, t = -3.30 for non-core, metro-adjacent; b = -0.542, t = -2.79 for non-core, micro-adjacent; b = -0.778, t = -3.17 for non-core,

Table 3. Overdispersed Poisson Regression Predicting Aggravated Assault, Other Assaults, Robbery, and Rape with Urban Influence Variables

(n = 221)

	Aggravated assault		Other assaults		Robbery		Rape	
Variables	b (Std. error)	t-value	b (Std. error)	t-value	b (Std. error)	t-value	b (Std. error)	t-value
Constant	2.454 (1.366)	1.80	2.992 (1.506)	1.99 *	-6.938 (2.401)	-2.89 **	-1.004 (2.150)	-0.47
Mobility	0.021 (0.014)	1.47	0.034 (0.015)	2.19 *	0.001 (0.028)	0.00	0.011 (0.024)	0.47
Index of diversity	2.548 (0.718)	3.55 **	1.790 (0.807)	2.22 *	2.134 (1.571)	1.36	2.405 (1.283)	1.88
Single mother	0.060 (0.020)	2.91 **	0.101 (0.022)	4.59 ***	0.087 (0.044)	1.97 *	0.043 (0.037)	1.17
Poverty	-0.035 (0.016)	-2.23 *	-0.069 (0.018)	-3.89 ***	-0.046 (0.036)	-1.30	-0.038 (0.030)	-1.27
Unemployment	0.073 (0.026)	2.79 **	0.074 (0.027)	2.72 **	0.122 (0.045)	2.70 **	0.121 (0.041)	2.99 **
Population density (natural log)	0.656 (0.079)	8.31 **	0.382 (0.080)	4.81 ***	0.997 (0.169)	5.90 ***	0.941 (0.142)	6.64 ***
Percent 18-24 years old	-0.028 (0.017)	-1.64	-0.010 (0.018)	-0.54	-0.003 (0.031)	-0.10	-0.011 (0.028)	-0.40
Male	-0.026 (0.013)	-1.95	-0.017 (0.014)	-1.16	0.030 (0.022)	1.34	-0.015 (0.021)	-0.73
Urban influence categories								
Micro, not adjacent to metro	-0.097 (0.136)	-0.72	0.249 (0.142)	1.75	0.322 (0.232)	1.39	0.040 (0.212)	0.20
Non-core, adjacent to metro	-0.487 (0.147)	-3.30 **	-0.519 (0.170)	-3.06 **	-0.672 (0.280)	-2.40 *	-0.481 (0.236)	-2.03 *
Non-core, adjacent to micro	-0.542 (0.194)	-2.79 **	-0.557 (0.218)	-2.56 *	-0.703 (0.396)	-1.77	-0.133 (0.298)	-0.45
Non-core, not adjacent to metro or micro	-0.778 (0.245)	-3.17 **	-0.821 (0.267)	-3.08 **	-0.760 (0.538)	-1.41	-0.496 (0.425)	-1.17
Scale parameter	3.161		7.337		1.559		2.265	

***p < .001; **p < .01; *p < .05.

neither adjacent to metro or micro) and other assaults (b = -0.519, t = -3.06 for non-core, metro-adjacent; b = -0.557, t = -2.56 for non-core, micro-adjacent; b = -0.821, t = -3.08 for non-core, neither adjacent to metro or micro) compared to micropolitan counties adjacent to metropolitan counties. Given the similarity in magnitude for the non-core counties, these results might suggest that proximity to metropolitan areas is less important in predicting violent crime than the size of cities within the county. Additional analyses exploring the nature of this effect (comparing micropolitan to non-core and adjacent to not adjacent) appear to support this contention. (Analyses are not presented here, but are available on request.)

In the Poisson regression models predicting robbery and rape, a different picture emerges. Unemployment is the only structural social disorganization variable that maintains an effect when population density and urban influence code categories are added. Higher levels of unemployment are significantly related to higher levels of robbery (b = 0.122, t = 2.70) and rape (b = 0.121, t = 2.99). Percentage of single-mother families significantly predicts robbery (b = 0.087, t = 1.97) but not rape. Of the population variables, population density significantly impacts the numbers of both robberies (b = 0.997, t = 5.90) and rapes (0.941, t = 6.64). Only one significant impact was found among the Urban-Influence Code categories. While micropolitan counties were again similar regardless of whether or not they were adjacent to a metropolitan county, non-core, metro-adjacent counties had significantly fewer robberies (b = -0.672, t = -2.40) and rapes (b = -0.481, t = -2.03) compared to micropolitan, metro-adjacent counties. The coefficients for the other non-core counties were of similar magnitude but not significant. Methodologically, the lack of significance for these groups may be related to the extremely limited variability within the most rural counties.

Discussion and Conclusions

This study examined the impact of structural characteristics on violent offending in the upper Midwest. The results are largely consistent with other studies exploring social disorganization in non-metropolitan communities. Violent offenses were significantly associated with residential instability and family disruption. As expected by social disorganization theory, these results would suggest that communities that are more unstable and experiencing higher levels of family disruption are less able to exert formal and informal social controls over violent offending. However, there was no relationship between heterogeneity and violent offending in this region with the exception of models predicting assaults and controlling for population density. This may be a result of the unique racial structure of counties in this region. This region of the country tends to be very homogeneous with a small minority population. It may be that there is too little variation in this variable to detect any impact. Alternatively, the lack of a significant effect may be reflective of the overall racial stability in this region. As Bursik and Webb (1982) note, the racial distribution of a community is less important than the speed of racial change within the community. Rapid racial change (turnover) is predictive of higher crime rates. With such small minority populations in this region, most counties never even approach the racial distribution characteristic of turnover. Therefore, we would not expect an impact of race on violent crime.

Similar to Osgood and Chambers (2001) and Petee and Kowalski (1993), our results diverge from the existing literature in terms of the impact of poverty on violent crime. Research on social disorganization in urban areas has found an expected positive relationship between poverty and crime rates (i.e., higher levels of poverty are associated with higher crime rates; see discussion in Osgood and Chambers, 2000). As noted, studies of social disorganization in rural counties, however, have found no effect of poverty. In this study, poverty was negatively correlated with violent offending. Poorer counties had significantly fewer violent crimes controlling for other structural factors. As Osgood and Chambers (2000) note, this may still support the underlying reasoning of social disorganization theory that the impact of poverty is mediated by residential instability and ethnic heterogeneity. For example, poorer, rural communities may be more stable and homogeneous. Thus, we might expect that these counties would have lower violent crime rates. In particular, residential mobility appears to be a key factor here, correlating negatively with poverty ($r = -0.19$, $p < .01$). Poorer counties in this region are more stable. From a social disorganization perspective, it is not surprising to see lower violent offending in these counties. We did find a significant effect of unemployment in the expected direction. Lee et al. (2003) discuss the impact of deindustrialization in rural communities producing economic disadvantage as evidenced by unemployment rates. From their perspective, this may reflect a strain argument that communities experiencing higher levels of unemployment are more strained, which produces higher levels of violent crime.

It is interesting to note the impact of urban-influence code categories in these models. It seems that whether a county is adjacent to larger counties or economies is less important in predicting violent offending than a simple

consideration of the size of the town within the county. This classification is admittedly an incomplete measure of social and geographic isolation, but the results suggest further research is necessary in this direction to more fully explore the suggestions of Lee and colleagues (2003). Additionally, the social disorganization model appears to break down for robbery and rape when the county classifications are added. Robbery, in particular, is largely an urban crime, and when categories are created in this way, this distinction becomes very obvious. Robbery is an extremely rare event in non-core, non-adjacent counties; there is little variance for social disorganization to explain. Methodologically, rape is also a very rare event in the smallest, most rural counties. It is important to explore this more fully with additional research to determine whether this is an artifact of using official data.

One major limitation of this study is its reliance on official data. As Felson et al. (2002) note, there may be differences between individuals who report their victimization to police and those who do not. If individuals in rural areas rely more on informal social control, it may be that they are less likely to report offenses to police, preferring to deal with incidents outside of the formal criminal justice system (Weisheit et al., 1994). Additionally, residents and police may have more personal relationships in rural communities, leading police to respond more informally in certain situations (Weisheit et al., 1994). In other words, police in rural areas may be more likely to issue warnings without filing an official report because they know the individuals involved. Therefore, it is important to examine differences in victimization data across counties as well.

An additional limitation is county-level data which may lead to a false sense of similarity within these fairly large geographic units. It is possible that certain towns or neighborhoods within counties are more rural and isolated than others. The research on collective efficacy highlights the need to look beyond the county level at the level of towns or neighborhoods (see, for example, Benson et al., 2003; Van Wyk et al., 2003). Studies should also include individual-level measures of collective efficacy and social isolation as well as offending. While this study explores the spatial isolation of smaller counties from larger ones, the data cannot address the concentrated disadvantage described by Lee et al. (2003) on a smaller scale. Statistical models, such as Hierarchical Linear Modeling (see Bryk and Raudenbush, 1992), would also aid in examining the interplay between structural features of geographic areas and individual offending. This strategy would permit an exploration of whether the impact of structural factors is mediated by collective efficacy and/or social isolation. Thus, future research should incorporate other measures of violent offending (i.e., victimization or self-report data) and measurement at the individual or neighborhood level.

Results from this study provide support for the basic tenets of social disorganization theory. In addition, it is apparent that the theory's framework applies across various types of violent offending as well as across different regions and population types.

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Appendix A. Descriptive Statistics for Variables

(n = 221)

Variables	Mean	Standard deviation	Minimum	Maximum
Offenses (summed 2000-02)				
Aggravated assault	22.69	30.85	0	166
Other assaults	101.28	143.78	0	722
Robbery	1.63	3.42	0	21
Rape	4.63	8.66	0	61
Social disorganization				
Percent living in different house	35.19	6.37	19.4	60.6
Percent single mother families	14.32	5.11	4.5	33.7
Percent below poverty level	13.37	7.92	4.4	56.9
Annual unemployment rate	4.66	2.02	1.3	16.5
Index of diversity	0.10	0.11	0.01	0.5
Urban/rural variables				
Population	16,655	17,241	767	93,759
Population density	21.03	25.44	0.5	168.9

UIC categorical	N	Percent
Micropolitan, adjacent to metro	24	10.9 %
Micropolitan, not adjacent to metro	30	13.6
Non-core, adjacent to metro	68	30.8
Non-core, adjacent to micro	53	24.0
Non-core, not adjacent to either metro or micro	46	20.8

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The Criminal Justice Response to Elder Abuse in Nursing Homes: A Routine Activities Perspective*

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Abstract: *Politicians and researchers have begun to pay more attention to elder abuse in recent times. Most of the research on elder abuse has focused on cases of abuse perpetrated by family members, treating the phenomenon as a social problem, but it is increasingly being conceptualized as a crime problem. The current study examines elder abuse in nursing homes from a criminological perspective. Using routine activities theory as a guide, particular attention is given to the criminal justice system's response to abusive activities committed by nursing home employees. In all, 801 cases of abuse investigated by Medicaid Fraud Control Units are examined. Results suggest that past research has mischaracterized "the motivated offender" and that legislative policies fall short of providing capable guardianship. In addition, increases in vulnerability are related to abuse type. Implications are provided.*

Keywords: elder abuse; routine activities; nursing homes

Introduction

In the past two decades, scholars have begun to pay more attention to the way crime influences elderly persons. A tendency to dismiss the importance of the crime problem among older victims is, in part, based upon official statistics, such as the Uniform Crime Reports (UCR) and National Crime Victimization Survey (NCVS). These data sources suggest that elderly persons are rarely victimized in comparison to younger persons (Payne, 2000). Relying on official statistics to define the crime problem is misleading (Friedrichs, 1996) and when behaviors outside of these official statistics are considered, the number of older victims increases significantly.

From a criminological perspective, elder abuse can be defined as "any criminal, physical, or emotional harm or unethical taking advantage of that negatively affects the physical, financial, or general well-being of an elderly person" (Payne, Berg, and Byars, 1998: 82). Estimates about the extent of elder abuse range from 500,000 to two million cases a year (Payne, 2000), though it is difficult to determine the precise extent of abuse because of varying definitions of abuse and a lack of reporting (Arnovitz, 2002; McCarthy, 2002). Also, like the UCR and NCVS, these estimates are also flawed, primarily because they often exclude cases of elder abuse occurring in long-term care settings such as nursing homes and adult day care centers. When these other settings are considered, research suggests that abuse in institutions is extensive and alarming. Some studies suggest that between 81 and 93 percent of nurses and nurses' aides have personally seen or heard about abuses in the previous year (Crumb and Jennings, 1998; Mercer, Heacock, and Beck, 1996). Another study found that nearly one-half of nursing homes in Connecticut had at least one incident of abuse reported to the state's ombudsman reporting system over a two-year time span, and nearly 70 percent of the homes had quality-of-care complaints (Allen, Kellett, and Gruman, 2003). Focusing solely on theft in nursing homes, estimates from Harris and Benson (1999) suggest that as many as two million instances of theft may occur in nursing homes in the United States each year.

With more and more individuals requiring some form of long-term care each year, it is prudent that criminologists increase their understanding of cases of abuse occurring in long-term care settings. The current study focuses on cases of patient abuse investigated by fraud control units across the United States. In addition, we develop routine activities as a theory useful for understanding elder abuse in long-term care facilities and developing policy as a guide to prevent elder abuse. We analyze data from Medicaid Fraud Reports to address several research questions developed in the following review of the literature.

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Review of Literature

Stannard (1973) conducted one of the first studies on patient abuse over three decades ago. Since then, only a handful of sociologists and criminologists have studied elder abuse and even fewer have considered elder abuse in long-term care settings. To be sure, other disciplines such as nursing, legal studies, and gerontology have devoted a significant amount of attention to elder abuse, and these studies have guided the criminological efforts in this area (see Allen et al., 2003; Castledine, 2005; McCarthy, 2002; Northway et al., 2005; Payne, 2005; Shaw, 1998). Studies in these other fields have addressed a number of different issues such as the health consequences of elder abuse, the legal ramifications, and strategies to identify cases of elder abuse. Of the criminological studies conducted on this topic, attention has been given to the dynamics surrounding patient abuse and effective strategies to respond to abuse.

The Dynamics Surrounding Patient Abuse

After Stannard's classic study, Pillemer and Moore (1989; 1990) and Pillemer and Bachman (1991) were among the first researchers to empirically examine patient abuse in nursing homes. Both studies relied on data from phone surveys with 577 nursing home professionals employed in Massachusetts. Pillemer and Moore (1989) reported that over one-third of the professionals indicated that they had seen a fellow employee commit an abusive act in the previous year and fully ten percent of the respondents reported that they themselves had been abusive. The activities they reported included hitting or slapping patients, excessive use of restraints, grabbing and shoving patients, and throwing items at patients.

Pillemer and Bachman (1991) focused on the impact of institutional, staff, and situational characteristics. Each of these factors was theoretically linked to elder abuse. *Institutional factors* include the size of the institution, whether the institution was private or public, and the rates charged for the institution's services. While Pillemer and Bachman (1991) found that these factors were not empirically related to patient abuse (defined solely as physical assaults against patients), other research focusing on patient neglect has suggested a relationship between these factors and mistreatment (Jenkins and Braithwaite, 1996). According to research by Shaw (1998) structural factors such as the number of employees, low wages, and types of nursing home policies are related to patient abuse.

Staff characteristics are concerned with the characteristics of employees working in nursing homes (Pillemer and Bachman, 1991). These characteristics include age, gender, level of pay, education, occupational position, and attitudes toward patients. Again, Pillemer and Bachman (1991) found minimal effects of these characteristics on assault rates. However, other research by Harris and Benson (1998) found that negative attitudes toward patients and job satisfaction among staff are positively and negatively related to rates of theft in nursing homes, respectively. Further, nurses' aides have been found to be the group implicated most often in cases of financial and physical abuse of patients (Harris and Benson, 1996; Payne and Cikovic, 1995).

According to Pillemer and Moore (1990) and Pillemer and Bachman (1991), situational factors are the strongest predictors of patient abuse. *Situational factors* refer to factors such as the level of conflict, the presence of alcohol use, stress, burnout, and responses to aggression. Results of the interviews with nursing home professionals in both studies by Pillemer and his associates showed that stress, patient conflicts, and patient aggression toward staff were contributing factors to the physical abuse of residents. Regarding stress, the authors suggest that the respondents felt "burned out" because they did not have enough time to perform their expected duties. Patient conflict entailed conflicts over eating habits, hygiene, toileting, and unwillingness to dress.

Official Response to Patient Abuse

Initial efforts to control patient abuse entailed policies and laws that tended to keep these cases out of the criminal justice system. The 1976 Older Americans Act resulted in the creation of nursing home ombudsmen programs. The word "ombudsman" is a Swedish word meaning "a public official appointed to investigate citizens" (Administration on Aging, 1998). These programs were designed as a strategy to control abuse and neglect in nursing homes. The programs use paid employees and unpaid volunteers to receive and handle suspected allegations of nursing home abuse (Lachs and Pillemer, 1995; Paton, Huber, and Netting, 1994). In 1997, 880 paid employees and 6,800 certified volunteers handled 191,000 complaints and shared information with 201,000 citizens (Administration on Aging, 1998). The duties of ombudsmen include investigating complaints, reviewing nursing home licenses, and protecting the rights of nursing home residents (Netting et al., 1992; Vladeck and Feuerberg, 1995). Not surprisingly, the presence of ombudsmen is related to increases in complaints of abuse and regulatory penalties from the Department of Health

and the Health Care Financing Administration (Nelson, Huber, and Walter, 1995).

The National Citizens' Coalition for Nursing Home Reform (NCCNHR) has also been instrumental in developing strategies to prevent abuse against nursing home residents. Among other things, the NCCNHR has been influential in increasing awareness about the rights of nursing home residents. For example, the rules guiding the provision of services to elderly persons in nursing homes can be traced to the Nursing Home Reform Law of 1987. The NCCNHR devotes a great deal of effort to ensuring that residents, workers, and citizens are aware of the rights stemming from this law.

By the early 1990s, legislators and policy makers had become concerned with the criminal justice system's minimal response to elder abuse cases. As a result, elder abuse became criminalized through various strategies such as the passage of penalty enhancement statutes, enforcement of mandatory reporting legislation, and increased police officer presence in response to elder abuse and neglect allegations. These changes occurred despite the fact that little or no research had considered the need for the criminalization of elder abuse.

More recently, researchers have considered various issues arising as a result of the criminalization of elder abuse. These issues include police officers' attitudes about elder abuse and neglect and obstacles that police officers face in responding to elder abuse and neglect cases. Research on police officers' attitudes about elder abuse and neglect has focused on their definitions of elder abuse as well as their attitudes about various elder abuse policies. For instance, Payne, Berg, and Byars (1999) surveyed police chiefs from the Commonwealth of Virginia to see how their definitions of elder abuse compared to those offered by social service professionals. Their research found that police chiefs defined the crime from a legal orientation while social service professionals tended to define the crime from a moralistic perspective.

Using the same data set, Payne, Berg, and James (2001) examined how these groups justified punishing elder abusers. They found that justifications varied by abuse type, but that all groups supported rehabilitative ideals at least to a degree. In a more recent study, Payne and Berg (2003) examined how police chiefs (from California, Alabama, New York, and Colorado) and nursing home ombudsmen (from 26 states) viewed the criminalization of elder abuse policies. This more recent study reveals that the groups supported the criminalization policies, but they did not necessarily support stiff penalties for abusers. The authors concluded that police chiefs and ombudsmen do not support a "war on elder abuse."

Research has also considered the obstacles that police officers face when responding to elder abuse and neglect cases. Payne, Berg, and Toussaint (2001) examined the policies 119 police chiefs reported following in elder abuse cases. They found that about a third of the departments had specific elder abuse programs, but problems such as limited funding, inadequate training, communication problems between younger officers and older victims, and family cover-ups hindered investigations. A specific concern noted by the chiefs was that victims' cognitive impairments made it difficult to gather evidence.

Given that elder abuse has become criminalized, and criminal justice involvement in patient abuse has increased, research needs to consider the role of the criminal justice system in responding to patient abuse cases. We find the routine activities approach to be a valuable guide to better understand elder abuse cases that occur in long-term health-care facilities, and to examine the system's response to patient abuse. The following describes the utility of the routine activities perspective in the study of elder abuse.

Routine Activities and the Victimization of Elderly Persons: Conceptual Framework

The routine activities approach suggests that crime occurs when three elements are present at a given time and in a given situation—a motivated offender, the absence of a capable guardian, and a suitable target (Cohen and Felson, 1979). A *motivated offender* can really be anyone. Marcus Felson (1998:11), a prominent routine activities theorist, states explicitly, "Everybody could do at least some crime at some time." Of course there is considerable variation in criminality across individuals, but there are ample pressures and allures for engaging in various crimes. Furthermore, certain institutions, like nursing homes, may put pressures on citizens who normally would not typically engage crime against in elders but may react negatively in that environment. Furthermore, such institutions may even draw in motivated offenders who want to have power over those weaker than themselves. *Suitable targets* is also a varied category that could be anything the offender is interested in, such as a commodity they want or can sell or trade for something else, or a victim they wish to or can harm. In the case of long-term care settings, the suitable target could be possessions of elderly residents or the residents themselves. Finally, a *capable guardian* can be anyone including the potential victim, a "place manager" such as an orderly or nurse's assistant responsible for maintaining

order and discouraging crime, or a non-human entity such as a locked door or a camera monitor (Eck, 1998).

Official statistics suggest that in comparison to the younger population, the elderly population has an extremely low victimization rate. At first glance, routine activities theory would appear to explain this low victimization rate. After all, the kinds of activities older persons engage in would theoretically place them at less of risk for victimization. Alternatively, in delving into the routine activities of elderly persons, it is reasonable to suggest that their lifestyles place them at risk for certain types of victimization. For example, elderly persons who live alone are more likely to be harmed or even killed during burglaries than are younger persons (Kennedy and Silverman, 1990). Other research suggests that the risk of theft-related homicides for elderly persons is "relatively high because they are more likely than younger persons to lack capable guardians and to be perceived as suitable targets" (Nelsen and Huff-Corzine, 1998:130).

Along similar lines, routine activities theory has been used to explain robbery of older persons. One study finds that those 85 years of age and over are more likely to be robbed at home while other groups are more prone to be robbed while away from the home (Faggiani and Owens, 1999). Some have suggested that older persons confine themselves to their homes in an effort to prevent victimization. Unfortunately, this particular precautionary strategy does not always reduce victimization risk (Miethe, Stafford, and Sloane, 1990).

Studies focusing on the victimization of elderly persons from a routine activities perspective have typically examined the victimization of older persons living in domestic settings (Faggiani and Owens, 1999; Nelsen and Huff-Corzine, 1998). Few studies have used routine activities theory to consider the victimization of a growing segment of the elderly population—those living in long-term care settings. A number of aspects about the long-term care situation seem to parallel ideas from routine activities theory. Focusing specifically on capable guardians, vulnerable targets, and motivated offenders provides a foundation for understanding patient abuse in long-term care facilities.

Capable Guardians and Patient Abuse

As mentioned previously, potential guardians are generally seen as persons or physical conditions that thwart the potential offender from committing the act. Although routine activities theorists tend to downplay the role of the criminal justice system as capable guardians (see especially Felson, 1998), at least two overlapping components of the criminal justice system may potentially act as capable guardians, albeit indirect guardians, insofar as patient abuse cases are concerned—laws and activity of the criminal justice system. Mandatory reporting laws and penalty enhancement laws are the cornerstone of criminal protections in elder abuse cases. Mandatory reporting laws require certain professionals to report suspected cases of elder abuse to the authorities. Professionals who fail to report suspected cases of elder abuse can be held criminally and/or civilly liable. These laws are criticized on a number of grounds, including suggestions that they are unenforceable, baseless, and ageist (Moskowitz, 1998). Alternatively, penalty enhancement laws call for increased penalties for offenders who victimize elderly persons. Surveys of police chiefs by Payne and Berg (2003) reveal very little support for penalty enhancement statutes, but they have been implemented in a number of states. If mandatory reporting and penalty enhancement laws are not supported by criminal justice professionals, one has to question their utility as capable guardians; however, to date there is little empirical evidence one way or another. From our perspective, to the extent that mandatory reporting laws are covered in basic training of workers in long-term-care settings, they may increase the ability of place managers (such as doctors, nurses and administrators) to act as capable guardians.

Activity of the criminal justice system in patient abuse cases can also be seen as a potential candidate for capable guardianship. Generally, when victims or witnesses decide to involve the justice system in patient abuse cases, either the local police or Medicaid Fraud Control Units (MFCU) are notified. The latter are more commonly used in physical and sexual abuse cases and even when police are first notified they often call the MFCU because they are more familiar elder abuses (Payne and Cikovic, 1995). Medicaid Fraud Control Units are state-authorized agencies generally housed within a state's attorney general's office. They exist to detect, investigate, and prosecute crimes occurring in nursing homes, especially Medicaid fraud and abuse. While traditional reactive policing styles are used, in some situations undercover law enforcement officers have infiltrated nursing homes as workers to investigate whether mistreatment is occurring (Hodge, 1998).

A recent investigation by the United States Government Accounting Office (2002) revealed patient abuse cases are often not prosecuted because of evidentiary problems, trouble with witnesses, and delays in reporting. Thus, not prosecuting "affects [residents'] vulnerability to abuse in that perpetrators perceive them to be less able to report the abuse and therefore have little

fear of retribution" (Petersilia, 2001:684). As Stafford and Warr (1993) persuasively argue, deterrence is affected not only by punishment of the offender, but by avoiding punishment as well. However, the presence of penalty enhancements and especially mandatory reporting laws may be important in that the reporting of an incident may be punishment enough, by shaming the offender and warnings of the possible repercussions.

Vulnerable Targets and Patient Abuse

In addition to the justice system's inability to sometimes prosecute cases, two related factors appear to increase the vulnerability of elderly patients—lifestyle and impairments. Lifestyle has long been seen as the central element of routine activities theory, usually focusing on youthful victims who frequent dangerous places that lack capable guardians and put them in close proximity to motivated offenders. Such lifestyles increase individuals' risk of victimization (Lasley, 1989; Miethe et al., 1990). For some nursing home residents, their lifestyle or "routine inactivity" may make them suitable and vulnerable targets for both personal and property crime. For example, shared quarters where other patient's families visit may make personal possessions suitable targets, and being in the care of others puts one at risk of being victimized by the caregiver (Payne and Gainey, 2005). Perhaps more importantly, routine activities theorists have pointed to the role that potential victims can play as capable guardians. For those residents with various physical and cognitive impairments, exposure to possible motivated offenders and the absence of capable guardians may be the norm rather than the exception. Indeed, research shows that those with cognitive disabilities are more likely to be victimized than those without disabilities (Petersilia, 2001).

Motivated Offenders and Patient Abuse

Of the limited research that has been done on crimes against nursing home residents, most has painted a picture of poorly paid and inadequately trained staff (Payne and Cikovic, 1995; Harris and Benson, 1998). Employee stress is often offered to explain physical abuse cases especially in dealing with the occasionally aggressive patient (Payne and Cikovic, 1995). For theft cases, low pay along with negative attitudes about older persons have been seen as common qualities of abusive staff (Harris and Benson, 1998; Harris and Benson, 1999). Also, males, minorities, new employees with less experience, and aides have been overrepresented in allegations of abuse (Harris and Benson, 1998; Harris and Benson, 1999; Payne and Cikovic, 1995).

The three elements of routine activities theory work together to increase the victimization risk of nursing home residents. As an illustration of the interconnections among these elements, consider the following comments from Petersilia concerning the risk of victimization among children and adults who are institutionalized because of a developmental disability (2001:673):

> Institutional care may function to both increase the exposure of people with disabilities to potential offenders and may isolate them from sources of protection, such as the police. An offender may choose an individual with a disability as a victim out of a belief that apprehension is less likely and that punishment will be less severe if apprehension occurs.

Although the relationship between routine activities theory and patient abuse can be pieced together hypothetically, no empirical research has used this approach to examine the criminal justice system's response to patient abuse. Using routine activities theory as a guide, the current study examines who is involved in patient abuse cases, the kinds of activities they commit, how vulnerability influences the existence of abuse as well as the ability of the system to serve as a guardian, and whether certain policies offer capable guardianship to residents. The following five research questions are addressed: (1) What are the characteristics of motivated offenders in patient abuse cases? (2) How can the actions of the motivated offenders be characterized? (3) How does vulnerability relate to victimization? (4) How does the criminal justice system handle the motivated offenders? and (5) How effective are the "capable" guardians?

Method

To address these questions, patient abuse cases described in the *Medicaid Fraud Report* (n = 801) between January 1997 and May 2002 were content analyzed. Medicaid Fraud Control Units, which provide data for the report, are the primary agencies involved in responding to patient abuse allegations. The fraud report describes the activities of Medicaid Fraud Control Units who share information about active investigations and prosecutions across the United States. Thus, data about offenses occurring in nursing homes in the United States are available from the reports.

Some of the descriptions described cases in which a

conviction was obtained, usually providing the sentence given to the offender, while some descriptions are of cases that are in preliminary stages of the justice process. Case descriptions from the fraud report are somewhat brief, usually including the name of the offender, his or her offense, the status of the case, and the nature of the offense. Sometimes the descriptions include information about the victim (e.g., age, gender, and whether they suffer from a cognitive impairment). Thus, the data were not collected as rigorously as social scientists might like. However, the data do provide a window to view this emerging issue in criminology and criminal justice.

Analysis

Manifest and latent content analyses were conducted on the patient abuse reports. Manifest content analysis was conducted by counting specific terms and phrases, such as the characteristics of the victims and the offenders. Latent content analysis involved considering the underlying themes that surfaced in the case descriptions. The variables analyzed in the current study included offender gender, victim gender, occupation, abuse type, abuser type, state and region, sentence, and presence of victim impairment.

Comments from the case reports are integrated in the findings section with statistical analyses to demonstrate patterns uncovered in the data. Univariate, bivariate, and multivariate analyses were conducted to address the questions set forth in this study. Univariate statistics are reported to describe the motivated offenders, their characteristics, and their actions. Bivariate and multivariate statistics are used to examine relationships between the variables and more thoroughly evaluate routine activities theory as platform for understanding nursing home abuse and criminal justice response.

Findings

Motivated Offenders in Patient Abuse Cases

Table 1 describes the characteristics of the patient abuse offenders. As shown in the table, nearly two-thirds of the offenders were female, and about three-fourths were aides or assistants. About ten percent were nurses and a handful of the offenders were doctors. In case descriptions where the underlying motivation for the misconduct was implied, offenders were characterized as serial abusers, pathological tormentors, or stressed-out abusers.

The empirical literature tends to describe the patient abusers as a stressed-out worker. Fifty-nine (24.6%) of the case descriptions supported this assumption about the situational dynamics surrounding patient abuse. Consider the following four cases:

Table 1. The Motivated Offender: Offender Characteristics

	N	%
Gender		
Female	504	62.9 %
Male	283	35.3
Organization	10	1.2
Missing	4	0.5
Total	**801**	
Occupation		
Aide	468	73.0 %
Nurse	79	12.3
Doctor	8	1.2
Supervisor	3	0.5
Other	83	12.9
Total	**641**	
Abuser type		
Serial	115	47.9 %
Pathological/tormentor	66	27.5
Stressed-out	59	24.6
Total	**240**	

Note: Percentages may not total 100 due to rounding.

- [The aide] was preparing to give a 92-year-old disoriented resident a shower when he struck [the aide] on the face…When [the resident] felt the water on his body, he hit [the aide]. Without hesitation, [the aide] slapped the resident with an open hand (MFR, October 1997:20).
- When a resident refused to take her medication because the dosage was incorrect, [the registered nurse] grabbed her hand and twisted it. At the same time, [the nurse] spilled a cup of water. She then slapped the resident in the face causing her to scream (MFR, May 2002:10).
- [The employee] became angry with a resident when she tried to leave the facility without permission. He yelled at the resident while hitting her with his hand on the resident' right buttock (MFR, May 2002:11).
- A caregiver kicked and choked a client because the client would not sit still to eat his food (MFR, March 2002:10).

The stress explanation usually conveys situations in which a seemingly stressed staff abuser immediately reacts negatively or even violently in retaliation to some relatively innocuous or common behavior of the resident.

Stressed abusers, however, do not always appear to act out immediately, nor can their actions be seen simply as retaliatory measures because they often go far beyond the initial action by the resident. The following two cases demonstrate how stress, while initiating the anger, appears to go beyond the typical picture of a reactive abuser:

- Apparently frustrated that the patient did not or could not relieve herself, [the caregiver] continued her verbal assault and pushed the patient back into her wheelchair. [The caregiver] then slapped the patient on the hand when she would not stop crying. The patient asked [the caregiver] not to hit her again. Shortly thereafter, two witnesses saw [the caregiver] slap the patient in the face so hard that it left a handprint on the patient's face (MFR, December 2001:10).
- [The resident] got into a confrontation…with [the employee] after he was denied a cigarette. After the confrontation, [the employee] approached [the resident] in the corner of his room and punched him with his fists approximately three to four times in the face (MFR, July 2000:5).

While clinical psychological diagnoses were unavailable, other offenders were characterized as pathological tormentors because of the severity of the acts and the lack of apparent provocation (at least as depicted in the fraud report). Sixty-six (28%) of the cases reviewed described offenders who could be characterized as pathological tormentors and whose actions can be characterized as callous and cruel. Consider a case in which "[an aide] taped a resident's buttocks together with masking tape" (MFR, March 1996:10). In another case "[The aide] was watching television in the resident's room when the resident coughed to clear her throat. Not wanting to be interrupted, [the aide] allegedly struck the patient on the shoulder, knocking her into the bed, and told her to 'shut up'" (MFR, November 1998:11). A third case description provides even more detail about the pain and anguish pathological tormentors cause:

> A certified nursing assistant found the…resident with a washcloth stuffed inside her tracheotomy mask, which effectively cut off her oxygen supply…Interviews with employees placed defendant in the residents' room approximately ten minutes prior to the discovery of the washcloth. [The aide] was not assigned to this resident and was under orders she was not to care for the resident because of past incidents…Interviews with facility employees stated the parents of the victim would leave a note on a chalk board in the victim's room saying, "Terri, we love you." When the family would leave, [the aide] would go into the victim's room and erase the message. Employees have seen her turn the television set away from the resident so she could not see the screen and turn family photographs face-down so the resident could not see the photographs (MFR, September 1998:13).

While many of the actions of pathological tormentors can be seen as emotional abuse, they are often extremely physically harmful to residents. The following case descriptions illustrate the physical harm perpetrated by pathological tormentors:

- [The aide] yanked the 80-year-old resident out of his wheelchair and slammed him into a metal armoire, then a bedrail at the head of the bed, then flung the victim down onto the bed, twirled him around and pulled his feet up to his head (MFR, May 2002:9).
- The patient's head was grabbed and pounded on the floor several times after he was struck with a knee to the midsection. Witnesses also claim they saw the suspect kick and 'stomp' the resident who offered no resistance (MFR, March 2002:9).
- According to a sworn affidavit by an eyewitness, [the defendants] waited for an 89-year-old patient of the facility to enter her room, wrapped a towel around her head and began hitting her in the face and arms (MFR, October 1999:10).
- The 77-year-old resident was smoking in a designated outside smoking area during unauthorized hours when [a security guard] allegedly told him to put out his cigarette. When the resident attempted to put the cigarette to his lips, [the security guard] grabbed the burning cigarette from his hands, threw it to the ground and crushed it with her foot. When the resident became agitated at the guard's actions, [the guard] grabbed his wrists, swung at him, and subsequently forcefully pushed him to the ground (MFR, March 1999:9).

While stress may be one source of the victimizations, it is more than plausible that the acts were committed for reasons other than stress.

In all, 115 of the cases (25%) included details suggesting that the offender had committed other offenses in the past. While these cases may involve pathological offenders, we label serial offenders as such because of their abusive history. Here are a few examples of serial abusers from the fraud report:

- The former mobile x-ray technician pleaded guilty on April 6, 2000, to charges of Lewd and Lascivious Conduct based on his visit to a nursing home when he inserted his tongue in the elderly person's mouth and touched her breast during an e-ray for a broken hip. On August 9, 1999, [the former technician] also pleaded guilty to three counts of simple assault for a similar incident at a nursing home in New Hampshire just ten days after the molestation (MFR, August 2000:7).
- In conducting a criminal background check on [the aide]…it was discovered that he previously had been court-martialed from the U.S. Army for lewd and lascivious contact with a minor and sentenced to federal prison. In his nursing home employment application, [the aide failed to note any prior criminal convictions. [The aide] while employed at the facility, forcibly raped a 92-year-old patient on five separate occasions between September and October 1997 (MFR, July 2000:17).
- [The investigator] interviewed six staff members who witnessed [the aide] physically abuse patients by striking them with a closed fist or open hand. They also witnessed [the aide], while assisting patients with showers, spray them in the face to quiet them and control them and witnessed several instances of verbal abuse (MFR, July 1998:10).
- The complaint alleged that [the employee] abused eight patients. The abuse ranged from harassing patients by flicking water in their faces, to striking one extremely vulnerable resident in the head. The complaint alleged that [the employee] threw a resident with acute osteoporosis several feet across a room (MFR, April 1996:13).

Serial abusers appear more similar to pathological tormentors than stressed abusers. Their actions generally appear to be particularly sadistic with little or no precipitating actions by victims. For example, one offender was accused of taking a wooden clothespin from the patient's closet and clipping it to his scrotum, and on another occasion, taking the top sheet on the patient's bed, wrapping it around his ankles, and pulling his legs up over his head (MFR, January/February 2000:25). An offender was seen on several occasions bracing himself "against a wall to gain leverage and push on a resident's bladder with his fist" (MFR, May/June 1999:15).

Like pathological tormentors, serial abusers also tended to commit physically harmful acts. A few case descriptions from the fraud report illustrate this pattern:

- He transported residents to the dining room but would not seat them at the table and would not assist residents when they asked for help in transporting and toileting. He told another certified nurses aid to shave a resident's legs using a pig knife (the type of knife used to slaughter pigs in Mexico). He scolded elders for needing PERI care, threw a soiled diaper at one resident and on more than ten occasions "pushed and slammed" another in her bed while assisting her. (MFR, September/October, 2000:23).
- The defendants repeatedly and intentionally harmed a 60-year-old dementia resident by physically and verbally abusing him. The assaults occurred on two separate occasions. Details of the assaults included hitting, kicking, and kneeing the resident, dragging him up a flight of stairs and down a hall by his feet, hitting him with a toilet plunger and throwing him into a tub and spraying him with cold water (MFR, September 1999:9).
- [The aide] was witnessed assaulting five elderly residents, all of whom are over 80 years of age, on seven different occasions. The most disturbing of the allegations…involves an incident in which another employee witnessed [the aide] forcing an 83-year-old female patient to eat her own feces. [The aide] allegedly took a handful of the patient's feces and shoved it into her mouth, making her chew and swallow it. [The aide] then allegedly used a towel to wipe the corners of her mouth. When the coworker questioned [the aide] on how she could do such a thing, she allegedly laughed (MFR, June 1998:9).
- [The aide] was accused of four separate attacks including one in which he groped the breast of an 84-year-old woman, and the repeated attack on a screaming 93-year-old female patient by inserting his fingers in her rectum. [The aide] is also charged with shoving a 100-year-old woman into a chair…and hitting an 83-year-old male patient repeatedly on the head, legs, and arms (MFR, April 1998:7).

Characterizing the Actions of the Motivated Offenders

Table 2 shows the primary types of offenses committed by the patient abusers. Over two-thirds of the cases involved physical abuse cases, with about half being instances where abusers were accused of hitting residents. A handful of physical abuse cases involved offenders pushing (n = 25) or kicking (n = 20) residents, while six involved situations in which aggressors forcefully rubbed the residents' feces on the resident.

Nearly ten percent of the cases were sexual abuse cases. Using a classification scheme describing elder sexual abuse set forth by Ramsey-Klawsnick, sexual

abuse cases were classified as hands-on (n = 42), harmful genital contact (n = 18), and hands-off (n = 2). Hands-on sexual abuse cases involve situations in which the offender touches the victim sexually, but sexual intercourse does not occur. The following three cases illustrate the kinds of behaviors characterized as hands-on sexual abuse cases:

- A certified nurse's aide for sexually fondling an elderly mentally retarded patient at a nursing home (MFR, September/October 2000:12).
- According to the Department of Justice's criminal complaint, in August 2000, [the offender], while employed as a certified nursing assistant at Meadow Park Health Care Center, masturbated a developmentally disabled patient who was in his care and allowed the patient to masturbate him (MFR, January 2002:11).
- A nursing assistant at a health care and rehabilitation facility. After [the aide] bathed a vulnerable adult (VA), the VA asked him to shave her legs. Sawyer refused, but stated that he needed to shave her "uterus area." The VA had pointed to her pubic region and said that [the aide] shaved her there and then began rubbing the opening of her vagina, claiming he needed to get a "specimen," and digitally penetrated the VA. [The aide] also rubbed the VA's breasts, telling her not to tell anyone. The VA told [the aide] not to rub her clitoris and [the aide] told her to be quiet. (MFR, March April 2001:13).

Harmful genital contact cases involve sex abuse cases in which intercourse (including oral, vaginal, and anal sex) occurs. About one in fifty of the patient abuse cases involved some form of harmful genital contact. Hands-off sexual abuse occurs when offenders commit some sexually abusive act without touching the patient. This study revealed two hands-off sexual abuse cases, both involving instances where an aide exposed himself, and were handled by the fraud control units.

Nearly ten percent of the offenders were involved in cases characterized as duty-related abuse. Duty-related abuse cases are those in which offenders failed to perform some specific function of their jobs. Failure to report abuse was the most common duty-related offense (approximately 25%). Duty-related abuses were also characterized as accidental and intentional abuses. Accidental duty-related abuse occurred when patients failed to do their job in unintentional ways. For example, one patient did not know that a valve on the hot tub was broken and subsequently placed an elderly resident in the tub without verifying that the equipment was functioning correctly.

Table 2. Offense Types

Offense type	N	%
Physical	542	67.7 %
Sexual	78	9.7
Duty-related	78	9.7
Neglect	54	6.7
Drug Theft	15	1.9
Emotional abuse	13	1.6
Financial abuse	10	1.2
Unclear	11	1.4
Total	**801**	

Note: Percentages may not total 100 due to rounding.

The resident suffered severe burns. In intentional duty-related abuse cases, the intent is clearly established. In a handful of cases, for example, aides tried lifting patients on their own without the assistance (which is required by law for certain patients) of others. These sorts of cases generally only come to the attention of the authorities when the victim experiences some form of harm from the duty-related abuse. They are intentional in the sense that they intentionally violate some rule, not that they necessarily intend to harm.

Neglect was reported in about seven percent of the cases. Neglect occurs when caregivers fail to provide proper care to residents. “Good employee” neglect involved instances when offenders were failing to provide care because they were busy to meet other demands of the workplace. This generally entailed situations in which workers were cleaning a resident’s room or feeding one patient when they were supposed to be providing some form of care to another patient. Of greater concern were cases of neglect where workers were failing to provide care in a way that ran completely counter to the goals of the administrators. Neglect cases of this sort included cases where the worker simply fell asleep on the job or left work hours before their shift was over.

Nursing home staff personnel were also responsible for a handful of drug theft (n = 15), emotional abuse (n = 13), and financial abuse (n = 10) cases. Such offenses are likely far more common than these figures indicate because, if reported at all, many of these offenses would be handled by local authorities, not the fraud control units.

Vulnerability and Victimization

Table 3 shows the characteristics of the victims for those cases in which this information was available. As shown in the table, victims were almost evenly split in terms of gender. Most of the victims were 70 years of age

or older, though a sizeable proportion of them were below the age of 50 (n = 58).

The fraud report described 196 cases with patients suffering from some form of cognitive impairments. Impairments were evenly split between Alzheimer's, dementia, mental retardation, and other cognitive impairments. While abuse type did not vary by impairment type, the mere presence of impairment was found to be related to the type of abuse. Approximately 36% of sexual abuse victims had some form of a cognitive impairment compared to about 23% nonsexual abuse victims (Chi-square = 6.27, $p < .01$, phi = .09).

The Criminal Justice System Response to Motivated Offenders

We selected out cases where the sanction(s) the offender received was provided (n = 467). As is standard in the literature, we focused on two types of sanctions—one qualitative and one quantitative. The qualitative measure differs from most studies by moving beyond a simple dichotomy (the in/out incarceration decision) to an ordinal trichotomy (probation, community service or fine, or a period of incarceration). Like other studies of sentencing, the quantitative variable is length of incarceration and only includes those sentenced to a period of incarceration. As is common in this type of study, we included a hazard rate variable to at least partially control for sample selection biases (see Berk, 1983).

Independent variables were limited because there were considerable missing data on cases in which sentencing data were available. Importantly, missing data on the severity of the offense and type of offender and criminal histories precluded the use of these variables. We were, however, able to include sex of the offender, whether the offense was a sex offense or nonsex/nonphysical offense (physical offense was the reference category), whether the victim was cognitively impaired, whether the offense was negotiated through a plea agreement, and whether the case took place in a state with mandatory reporting laws or penalty enhancement statutes. With listwise deletion, we were able to maintain 413 cases (88%) of the cases where sentencing data were available. Descriptive data are presented in Table 4.

Given the nature of the dependent variables (no sanction, fine or community service, or incarceration) we first used ordinal logistic regression to assess the independent effects of case characteristics on sanction severity. A test of the proportional odds assumption of the model suggests that the assumption may not be reasonable (Chi-square = 44.99, df = 7, $p < .01$). Because this test is somewhat conservative in that it is perhaps to easy to reject the null hypothesis with consequences of little import (Peterson and Harrel, 1990), we also ran a standard logistic regression model that predicted incarceration against the other more lenient sentences, as is common in the literature (e.g., Engen and Gainey, 2000). The data are presented in the first column of Table 5.

In contrast to much of the general research on sentencing (see Daly and Tonry, 1997 for a recent review), both models suggest that females are not sentenced on average any less severely than males in cases of nursing home abuse. The model shows some evidence that the type of offense was related to sentence severity in that sex offenses were sentenced somewhat more severely than physical abuse cases (both models). The "other" category

Table 3. Suitable Targets: Victim Characteristics

Characteristic	N	%
Gender		
Female	218	52.7 %
Male	196	47.3
Total	**414**	
Age		
Below 60 years	71	20.6 %
61-70 years	24	7.0
71-80 years	69	20.1
81-90 years	112	32.6
91-99 years	64	18.6
100+ years	4	1.2
Total	**344**	
Impairment		
Mental illness	57	29.1 %
Alzheimer's	47	24.0
Dementia	47	24.0
Other	45	23.0
Total	**196**	

Note: Percentages may not total 100 due to rounding.

Table 4. Descriptive Statistics on Sentencing and Factors Related to Sentencing

	Proportion	(SD)
Female offender	.64	(.48)
Offense type		
Sex offense	.10	(.29)
Other offense	.17	(.38)
Cognitive impairment	.25	(.43)
Plea agreement	.70	(.46)
Mandatory reporting	.70	(.46)
Penalty enhancement	.43	(.50)

of offenses (generally seen as less severe) was sentenced similarly to cases of physical abuse in the first model, but the second model showed that these cases were less likely to result in incarceration than physical abuse cases. In both models there was some evidence that abusers of the cognitively impaired received more lenient sanctions than those who abused those with normal mental functioning. As previous research shows (e.g., Albonetti, 1997), cases that are resolved through plea agreements tend to result in less severe sanctions than those that go to trial. Finally, we find little effect of legal guardians of the elderly. Both models show similar sentencing practices in states with mandatory reporting statutes as in those without them. The influence of penalty enhancements is even more disturbing, as states with penalty enhancements actually have mete out lower sentences than states without these enhancements. There is some evidence that the sanctions carried out in states with penalty enhancement are lower than in states without them.

Discussion

The results of this study call into question current understanding of patient abuse, as well as the usefulness of laws designed to protect the elderly. While some of the motivated offenders can be characterized as stressed abusers, more of them can be seen as either pathological tormentors or serial abusers. It is important to point out that the distinction drawn between pathological tormentors and serial abusers may be an artifact of coding as the availability of information was limited. Serial abusers are those who got caught more than once committing harmful acts. Pathological tormentors simply were caught once and it is entirely likely that many of the pathological tormentors are actually serial abusers who have, to date, gotten away with their misconduct. This does not appear to be a major flaw of the data, and the fact remains that a majority of motivated offenders in patient abuse cases do not appear to be stressed abusers as is often portrayed in the literature. Rather, they appear to be motivated by power and control desires.

Table 5. Ordinal Logistic Regression of Sentence Type and Logistic Regression of the Incarceration Decision

	Ordinal logistic estimates (SE)			Logistic incarceration estimates (SE)		
Female	-.27	(.22)		-.27	(.26)	
Sex offense	.77	(.38)	*	1.19	(.41)	*
Other offense	-.26	(.25)		-.83	(.37)	*
Cognitive impairment	-.74	(.23)	*	-.52	(.29)	*
Plea agreement	-.51	(.22)	*	-.49	(.25)	*
Mandatory reporting	.17	(.23)		-.18	(.28)	
Penalty enhancement	-.41	(.22)	*	.02	(.26)	
Nagelkerke r-square	.08			.11		

* one-tailed test, significant at $p < .05$

The three types of offenders discovered in the data also provide theoretical fodder for the routine activities approach. Specifically, the first two types of offenders, stressed-out abusers and pathological tormentors, provide insights into the structural and psychological factors that may encourage or motivate potential offenders. The fact that the empirical evidence documents the existence of serial abusers suggests that while most anyone can commit crimes (Felson, 1998), there is clear variation across individuals in their propensity to commit crimes against the elderly, and that research on motivated offenders should move beyond either a description of the motivated offender as a constant or as simply a dichotomous vision of motivated offenders and others.

As far as vulnerability is concerned, the results uncovered in this study, like previous research (see Petersilia, 2001), suggest that those with certain impairments are more prone to sexual abuse than others. From a routine activities perspective, it is important to note that this vulnerability works in conjunction with other elements to increase victims' risks. Some potential victims may take preventive measures to reduce risk (Cohen and Felson, 1979; Mesch, 2000; Rountree, Wilcox, and Land, 1996). Those with certain disabilities may be unable to take measures that would provide them with capable guardians. Residents of long-term care settings are forced to rely on formal measures to prevent victimization.

As shown in this study, formal remedies such as penalty enhancement statutes and mandatory reporting laws do not appear to effectively serve as capable guardians. This is not entirely unexpected. Felson (1998) argues quite persuasively that the criminal justice system is unlikely to be a very capable guardian, since so much crime is undetected and unreported, and even if someone is apprehended and punished, the punishment is unlikely to be swift. Furthermore, our measures of the presence of mandatory reporting and penalty enhancements are clearly not very direct measures of capable guardianship. Examples of more direct measures are the staff-to-patient ratio or the number of place managers who can monitor the activities of other workers who may be potential offenders. On a more positive note, while these legal sanctions are certainly not adequate capable guardians, they may lay a foundation that helps potential guardians.

Based on these findings, a number of implications for theory, policy, and research arise. There are at least two implications for policy, each of them dealing with specific elements of routine activities theory. First, traditionally patient abuse has been explained by stress explanations, and prevention strategies recommended in the literature have suggested practices in line with these explanations, such as better training and increased pay. In terms of policy, we would not suggest that such practices be hindered. Rather, we suggest that other avenues should be explored as well, such as informing administrators of the importance of place managers in controlling the environment and monitoring potentially stressed-out workers. Empowering place managers so they know that reporting problems is a good thing and that their reports will be taken seriously, as opposed to something that will come back to haunt them, can also be important.

Second, if training, better pay, mandatory reporting laws, and penalty enhancement statutes do not act as effective guardians, one must look to other strategies for effective guardianship. Vulnerability is not a random situation, but is created by practices and strategies that have been implemented. What practices and strategies could control patient abuse? One possibility is to increase the presence of the criminal justice system in institutional settings. More realistically, more hiring and better training of place managers may play a more direct role in monitoring potential offenders and victims. Better screening of applicants, including criminal background checks and psychological evaluations may help. As Arnovitz (2002:4) points out, "federal law requires states to maintain a registry of nurse aides—specifically, all individuals who have completed an approved nurse aide training and competency program." Very few states, however, require criminal background checks. Thought should be given to increasing the use of criminal background checks. Training programs or nursing homes could be given the task of doing the checks. Given that our research shows that many of the offenders committed their offenses after completing the training programs, assigning this task to nursing homes seems to be a better strategy.

Others have suggested that nursing aides work in teams to ensure the presence of witnesses (i.e., guardians) should conflict occur (Payne and Cikovic, 1995). Teams assigned by management should help to address the influence that staff characteristics might have in contributing to abuse. Whatever the strategy, it seems prudent that long-term care settings take actions to keep motivated offenders away from residents.

Two related theoretical implications arise. First, Kennedy and Baron (1993) have recommended adding a choice element and a subcultural theme to routine activities theory to broaden its explanatory power. We join them in calling for an integration of these approaches with routine activities theory. The notion of choice is particularly important. According to Felson (1986:119), "People make choices, but they cannot choose the choices available to them." This assumes that there are no ways to affect individuals' choices beyond strategies that alter available choices. We believe that offenders often choose to abuse patients, and measures can be taken to make them choose other employment or to restrain their motivations.

On a related point, routine activities theory is more concerned with the situational aspects of the crime rather than the intent of the offender (Felson and Cohen, 1980). We believe this is a limitation of standard uses of routine activities theory. Both formal and informal crime prevention strategies are based, in part, on the intent of the offender (e.g., because it was believed that stress caused patient abuse in the past, recommendations to reduce it included better training, support, and increased pay). Ignoring the role of intent possibly overlooks the most dangerous motivated offenders and does not necessarily point us to the most appropriate or effective guardians.

A number of questions remain for future research. Penalty enhancement and mandatory reporting laws are designed to prevent cases of elder abuse in the community as well as those occurring in long-term care settings. Although our results do not suggest strong effects, it may be that such legislation is important but the laws are not causally proximate factors affecting victimization. More research should examine both mediating and moderating effects of these types of laws. For example, on the grounds that capable guardianship varies from community to community (Miethe and McDowall, 1993), research should address whether guardianship effectiveness varies across communities. For example, how does routine activities theory fare in explaining patient abuse in socially-disorganized communities? These and other questions remain for future researchers to address.

This study is not without limitations. First, the data are derived from Medicaid Fraud Reports, which do not necessarily reflect a representative sample of cases. Indeed, they exclude cases that are reported directly to the local police, unless the police notify or consult with Medicaid Fraud Units. Furthermore, the data were not collected by and for social science or criminal justice research purposes and the quality of data may be limited. Yet we argue the reports offer rich qualitative data, through which quantitative data can be produced through content analyses. These data can be used to provide an

important and timely look at a neglected area of criminal abuse.

In closing, Felson (1986:21) points out that "changes in the daily life of the community alter the amount of criminal opportunity in a society, hence altering crime rates." The graying of America has led to "changes in the daily life" for members of society. With even more elderly persons in the future, more changes are sure to come. In particular, more elderly persons mean more elderly victims. It is imperative that criminologists and criminal justice practitioners better understand the victimization experiences of elderly persons, as their routine activities are not the same as those of the younger population.

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