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Research Statement

My research interests are broad and as a result I have studied a number of topics including domestic violence, public perceptions of forensic evidence, and the effect of law enforcement on incarceration. However, the bulk of my research has concentrated on evaluating the effect of place-based interventions as these policies have the potential to keep crime low without the need for costly enforcement. In particular, my research has focused on evaluating the effect of outdoor lighting on crime.

Outdoor lighting presents an interesting paradox in criminology as street lights are a tool that have, for hundreds of years, been used by policy makers for the explicit purpose of improving public safety, yet still have relatively little rigorous analysis of their effectiveness. The installation and maintenance of street lighting by local governments – one of the earliest expansions of the government’s role in crime control - in Europe and the United States began in the 17<sup>th</sup> century for the purpose of allowing nighttime activity without the threat of crime – and has continued unabated ever since. While a number of studies have been conducted on the effect of street lights on crime, they are primarily pre-post comparisons of a single community or non-random treatments of areas without adequate lighting, and thus have poor comparison groups. The result is that while policy makers continue to use outdoor lighting as a crime control measure, our field cannot be confident in what effect it has on crime. What I find interesting about this topic is that rigorous evaluations of a centuries-old tool have been stymied by data and computational limits – until very recently.

In the absence of a randomized control trial – which is limited both by the high cost of implementation and that street lights are already ubiquitous in nearly every city – the presence of a natural experiment altering the amount of light at night is required to measure lighting’s effect on crime. This requires detailed crime data to measure the number of outdoor nighttime crimes and a data set with some variable to measure outdoor lighting – this data must also be large enough to have power to detect an effect. My current research seeks to understand whether outdoor lighting can prevent crime through two papers. In the first paper I use the natural variation in outdoor lighting caused by moonlight – after interacting moonlight with the percent of the night clear of clouds – to measure the effect of a low dosage, wide area of effect light on nighttime outdoor crime. For this paper I merged data from the FBI’s National Incident-Based Reporting System (NIBRS) with weather and moonlight data that I scraped from the website [Weather Underground](#) to create data that had both crime and a measure of lighting. While past papers have studied moonlight’s effect on crime, they did so without controlling for cloud coverage. As every city in the United States has nearly identical moonlight illumination on the same night, only through controlling for that city’s cloud coverage can there be variation in the amount of actual moonlight the city experiences. Contrary to prior studies on lighting, I find that nights with more moonlight had higher crime, suggesting that dosage is an important factor in the effect of light.

In my second paper on this topic, I use street light outages as a natural experiment to measure the effect of street lights on crime at a very local level – the street that the outage occurred on. To do this, I combined data from Chicago on crime incidents and 311 calls about street light outages with the city’s shapefile to find out which street each incident occurred on. I find evidence that when a street experiences multiple light outages, there is no change in crime on the affected street, but an *increase* in crime on nearby streets – a finding that suggests that people respond to dark streets by moving to nearby streets and that the increase of people on these streets increases the number of crimes. This paper will be the most comprehensive study ever done on street lighting, in large part because the size of the data – this data has approximately 140 million rows – was impossible to use without the computing power made available in the last several years. These studies contribute to the crime prevention through environmental design (CPTED) subfield of criminology by providing evidence of the role of a largely understudied place-based intervention on crime.

In addition to my research portfolio, I have spent a portion of my time at Penn working to make crime data more accessible both to researchers and to the general public. While conducting research, I found that there were a number of limitations in the accessibility of commonly used crime data for researchers. In particular, data sets from the FBI’s Uniform Crime Reporting (UCR) Program Data that were available either from the FBI directly or from NACJD (for years earlier than 2005) came as a single file per year and in a format that was not able to be read into the programming language R without substantial work on the user’s end. These files came as fixed-width text files with accompanying setup files that allow the data to be read in through SPSS or SAS. To address this limitation, I wrote the R package [asciiSetupReader](#) which allows R to easily read in this format of data using the SPSS or SAS setup files that accompany the data.

As a result of being able to read this data into R, I created – and made publicly available on openICPSR – a number of data sets in which I have concatenated every year together into a single file and lightly cleaned the data to exclude obvious outliers. While this data is useful to researchers, it is still largely inaccessible to those without programming experience. To make this data more accessible, I created the website [Crime Data Tool](#) which lets people choose the type of data they want to see, select an agency or state, and the variable they wish to see, and the site will present a time-series graph of that variable along with a table showing each individual value.

This work benefits the field of criminology in two ways. First, it allows researchers to focus on the study at hand by using the already concatenated and cleaned data that I have made available, avoiding the largely duplicative work that each individual researcher would have to do otherwise. Second, the tools that I have made available at Crime Data Tool allow members of the public or policy makers to see general descriptive information about crime in their city without needing any data skills themselves. The site also serves as an important tool for researchers by allowing them to visually examine the data – including any quality issues in the data – without the use of programming at this time. This work also contributes to the growing field of government agencies, academics, and research organizations that are making crime data more accessible to the general public.

My current research portfolio continues my research in outdoor lighting by evaluating whether the likelihood that a crime ends in an arrest changes as a result of daylight savings time moving an hour of daylight from the morning to the evening. I am also working on expanding research on policy-relevant questions that I have begun during my time at Penn. To give two examples, I am working on a project that measures the role of police manpower on incarceration, examining whether more police officers affect jail admissions, and working with the Philadelphia District Attorney's Office to begin a study of prosecutor perceptions of the importance and quality of forensic evidence.