

Effects of Weather on Crime

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Abstract

This research paper analyzes archival and quantitative data from multiple research studies from various areas around the world. According to research, weather and crime have been found to have a significant correlation. This review essays advocates for further research regarding the correlation between weather and crime. The studies mentioned below, show evidence of a positive relationship between weather and crime. Studies of this nature are important baseline however, further research needs to be done to better enhance research resources for police departments.

Introduction

The study of criminology and criminological theory as well as the factors driving it has been researched in a variety of areas and techniques worldwide. One factor that is believed to affect criminal activity is weather. The majority of the literature that has investigated the relationship between weather and crime support the theory that weather does affect criminal activity. The purpose of this analysis is to attempt to gather facts and information to better correlate weather and crime. By researching and studying patterns involving crime and the weather conditions during the criminal activity will help better understand the relationship between the two. Research has identified correlation between weather and crime, understanding more about the weather variable of crime will enhance the research of criminology; Crime occurs all over the world, there are many variables that can play a role in the event of a crime being committed.

By researching new variables such as weather, will give law enforcement a better understanding of how the weather affects crime and a chance for authorities to better prepare their departments during weather conditions that influence certain criminal activity. This type of research and knowledge will give police departments a chance to adjust their man power appropriately based on the short term increase or decrease in calls for service. This analysis will focus on prior studies involving weather variables such as climate, temperature, season, and static weather conditions in certain geographical areas. Quantitative data that has been previously gathered by researchers will be analyzed. Statistics were employed to analyze for relationships and trends between weather conditions and crimes committed. Previous research involving the effects of weather on crime focuses their studies on earlier time periods prior 1990's. The results of these previous studies showed a positive relationship between weather and crime. The results of these previous researches did not have the same technology as we do today and the results may not be accurate to rely on in the current time period. Our modern day technology has dramatically improved and weather conditions have also changed in the last two decades and it is projected to continue to change in the near future. We have access to more detailed criminal data via the internet which will help to better analyze the relationship between weather and crime. The update of research on the weather variable is vital in order to keep up with the fast pace world of criminology and discovering better techniques to control crime.

Literature Review

In the winter 1990 publication of the *British Journal of Criminology* the article *Weather and Crime* by Ellen G. Cohn, discusses the methods of archival data of serious civil disorders in the United States in order to analyze the effects of heat and violence. Cohn stated the Archival data between 1967 and 1971 suggested there was a relationship between ambient temperature and the incidence of collective violence (Cohn, 1990). The probability of a riot increased steadily with temperature rising up to 85* F. Cohn also found a positive relationship between temperature and assault rate (Cohn, 1990). Evidence showed a positive relationship between heat and crime when the probability of riot steadily increased with the temperature rise up to the mid-90's which gave the conclusion that collective violence tends to increase with the rise of temperature (Cohn, 1990). With the relationship between violence and heat being evident Cohn also analyzed the relationship between assaults and heat. Cohn (1990) analyzed the daily assaults in Newark, New Jersey during a one year time period.

The researched showed that the heat variables were the most important predictors of assault rates, the other variables analyzed during this time were "...precipitation, air pollution, and barometric pressure" (Cohn, 1990). The discomfort index which is a combined measure of temperature and humidity is a methods tool used in analyzing the relationship of heat and violence. This was used in Dallas, Texas over an eight-month period in 1980 which also resulted in evidence favoring heat influencing assaults. Cohn (1990) also analyzed the relationship between heat and robbery, homicide, domestic violence, and rape. Using the same methods, Cohn discovered a positive correlation between heat and domestic violence and rape. Robbery and homicide did not show relevant correlation with heat in the studies (Cohn, 1990). Cohn's research provided evidence that heat does affect crime in the areas of aggression and violence which proves the reasoning for the correlation between heat and aggressive related crimes.

In the *Journal of Applied Social Psychology* John Cotton discusses high temperature and violent crimes in his article *Ambient temperature and violent crime*. Cotton also studies the research of Baron and Ransberger (1978) in order to set up his own research (Cotton, 1986). The methods he uses consists of collecting data of temperature during summer months and also dividing the types of crimes into two categories which include: violent and nonviolent crimes. Cotton also correlated the minimum, average and maximum temperatures in the two Midwestern cities that he used in his research (Cotton, 1986). The outcome of the research was slightly different from the research of Baron and Ransberger (1978), Cotton found that the aggressive behavior does not drop off in the mid 80's which were the results of Baron and Ransberger (Cotton, 1986). Cotton's research findings suggested the aggressive behavior increases as temperatures raise into the 90's, the mean for violent crimes was higher during days with temperatures in the 90's (Cotton, 1986). The overall study showed the positive relationship between heat and aggressive behavior that result in criminal activity.

Keith Harries and Stephen Standler affiliates of Maryland University and Oklahoma University published an article in the *Journal of Applied Social Psychology* in 1988 titled *Heat and Violence: New Findings from Dallas Field Data, 1980-1981*. Harries and Standler discuss both laboratory research and field setting research to link temperature to aggressive behavior. They focused their study in the city of Dallas, Texas during the summer of 1980 and 1981. Harries and Standler measured thermal stress by Discomfort Index (DI) which involves the influence of humidity acting in concert with temperature and ambient temperature (Harries & Standler, 1988). They also placed neighborhoods into three social economic levels including Low, Medium, and High status. Their research findings suggested the reduction of aggression with increasing temperature does not occur within the normal range of temperatures. Their analysis suggests that there is no curvilinear effect between temperature and aggression, even during conditions of extreme heat (Harries & Standler, 1988). This research method is different from other research methods because the time frame of the study is shorter, the study was conducted during the three month period of summer in 1980 and 1981 which only gives the study a six month period of data to analyze.

James Horrocks and Andrea Menclova affiliates of the University of Canterbury performed a study involving the effects of weather on crime in New Zealand. The weather variables that were used consisted of: temperature and precipitation which they found evidence that supported violent crimes and property crimes were caused by the weather variables under study. The methods that were involved in this research consisted of obtaining violent crime data from three Canterbury police districts (Horrocks & Menclova,). The methodology of the research paper used "... panel econometric techniques on daily crime and weather data from New Zealand from 2000 to 2008" (Horrocks & Menclova). The study measured the individual-specific costs and benefits of crime.

A crime will be committed if the expected utility of committing a crime exceeds the cost e.g. if the chances of being caught increases, the expected cost of committing the crime also increases (Horrocks & Menclova). The theory of weather correlating with violent crime was analyzed with the research data of Bell (1992) the relationship between weather and crime increases with temperature because of increase in irritation and discomfort. As aggression increases/decreases, the crime which releases that aggression also increases/decreases (Horrocks & Menclova). The study also analyzed the relationship of property crime and weather. If the weather is 'fine' people are more likely to be absent from their home which gives the opportunity for theft and burglary to occur. Horrocks & Menclova suggest that when houses on a street are unoccupied, the burglar can choose the most expensive house on the street, which involves the theory the expected benefits of the crime (Horrocks & Menclova). They also theorize that bad weather reduce the crime rate of property crime because criminals are less motivated to commit crimes during bad weather and also because houses are more likely to be occupied during these weather conditions (Horrocks & Menclova). This information can help law enforcement prepare for service calls depending on the bad or good weather conditions.

Simon Field discusses his research findings in *The British Journal of Criminology* in his article *The Effects of Temperature on Crime*. Field's research focused on locations in England and Wales. The weather variables that were used in his research study included: rainfall, hours of sunlight, and temperature. The timeframe used in the methodology was based on quarter-to-quarter police data and month-to-month (Field, 1992). Like the study performed by Horrocks & Menclova, Field found a positive relationship between higher temperatures and property crime. When the temperatures increased people spent more time outside their home, this also increased the rate of property crime such as car theft and burglary (Field, 1992). The significance of this study is the locations in which the study was performed. England and Wales are located in Europe; the results confirmed a positive relationship between weather and crime. This evidence enhances the probability of weather effecting crime to be true because the location is in another country with different cultural aspects and still weather seems to affect the results of crime.

Brian Jacob, Lars Lefgren, and Enrico Moretti affiliates of the University of Wisconsin performed a study titled *The Dynamics of Criminal Behavior: Evidence from Weather Shocks*. The purpose of their study involved the correlation between weather and crime in order to examine the short-run dynamics of criminal behavior (Jacob et al. 2007). Their methodology consisted of gathering data from the FBI's Uniform Crime Reports. They analyzed weekly crime data from 116 jurisdictions around the United States. Their quantitative data showed a ten percent increase in violent crime one week and a reduction of crime by 2.6 percent the following week. The weather between these two weeks did not change (Jacob et al. 2007). The remaining results of the study showed a negative relationship between crime and weather. The overall findings of this research suggested that the long-run impact of weather on crime is less correlated than the short-term impact of weather on crime. This study gives evidence that short term weather changes impacts weekly or daily rates of criminal activity but in the long run the correlation is not linear (Jacob et al. 2007).

Methodology

The methodology of this research consisted of variables involving both weather and crime. The research for these studies often used methodology approaches involving using quantitative data. Jacob et al. (2007) used the uniform crime reports from the FBI data base. Cotton (1986) separates crime into two categories, violent and non-violent crimes. Aggression based crimes such as homicide, rape, robbery, domestic violence, assault etc. will be put into the violent crimes category, the non-violent crimes will consists of burglary, theft, fraud etc. These categories were already provided for these studies by the FBI's Uniform Crime Report.

The location of these studies come from various regions of the world which gives a significant point in the research, the outcomes are fairly similar. This shows evidence that crime correlates with weather in various regions and areas of the world. The weather variables are important to measure and organize the different types of weather conditions, in order to analyze the relationship between certain weather conditions and the types of crimes that are being committed. Cotton (1986) uses weather variables such as temperature. Field (1992) uses the weather variable hours of sunlight, and rainfall. These will be an important variables because certain times of the year (summer) have longer days, by analyzing the amounts of crime committed during the longer hours of day compared to shorter hours of day (daylight savings) studies determine if sunlight has an effect on the types of crimes that are committed if any effect at all.

Other variables that were used to measure weather conditions are seasons, and humidity. Cohn (1990) uses the discomfort index which is a combined measure of temperature and humidity is a methods tool used in analyzing the relationship of heat and violence. Overall the weather variables that were used to conduct this research are: temperature, humidity, and hours of sunlight, seasons, and discomfort index. As previously mentioned by John Cotton, crime is separated into two categories, violent and non-violent (Cotton, 1986). Fortunately crime has already been measured by the FBI uniform crime report and the crime statistics generated by police departments around the country. Archival data was used by Ellen Cohn in her research (Cohn 1990). Archival data seemed to be the main source of information in the majority of the studies involving crime and weather.

The quantitative data that was used in this research consisted of the information provided by the FBI's uniform crime reports which is statistics of crime all over the country that are voluntarily sent in by police departments around the country. Brian Jacob and his associates used the Uniform Crime Report in their study on weather and crime (Jacob et al. 2007). With our modern technology these agencies are able to provide detailed information on when these crimes occur and how many times and they can keep the data in archives in order to analyze them at a later time. This is an important factor in the research because with modern technology available, new data can be collected and more agencies will be able to provide their data that weren't available in the past.

Harries & Standler (1988) only used a six month period to analyze crime data and weather conditions, the results seemed to be unclear which is the reason a longer time period seems to give more accurate results. James Horrocks and Andrea Menclova gathered their data from three different police agencies (Horrocks & Menclova). Overall the majority of data collected in these studies consisted of archival data and quantitative data from various law enforcement agencies; after the data was collected the weather variables were compared to correlate any patterns between the two. The studies have shown evidence of weather variables affecting the types of crimes committed.

Results

The results of these studies show both negative and positive outcomes involving the correlation between weather and crime. Ellen Cohn's studies showed positive correlation between heat and crime and also a positive correlation between violence and heat. The research Cohn used showed evidence of heat variables being predictors of assaults and also a positive correlation between heat and domestic violence and rape (Cohn 1990). John Cotton conducted his study in 1986 and showed results of correlations between heat and aggressive crimes as temperatures increased to the 90's (Cotton 1987). Keith Harries and Stephen Standler's studies suggested that there is no curvilinear effect between temperature and crime (Harries & Standler, 1988). James Horrocks and Andrea Menclova conducted their study in New Zealand.

The results of their study showed a positive correlation between high temperatures and crime. Their study showed as temperatures increased so did aggression, that aggression also increased crime (Horrocks & Menclova). They also discovered in their study that property crime and weather correlate. Their theory suggests that during "fine" weather people are more likely to be absent from their home which causes more theft and burglary crimes (Horrocks & Menclova). Simon Field also found a correlation between crime and weather. In his study field found a positive relationship between high temperatures and property crime (Field, 1992). Brian Jacob Lars Lefgren and Enrico Moretti found in their study no correlation between crime and weather; their theory suggests that the long run impact of weather on crime is less correlated than the short term impact of weather on crime (Jacob et al. 2007). Their research only involved a two week period, although they found no correlation they still suggest weather affects crime in short term impacts. According to the mentioned studies, the majority of the results favored the theory that weather does affect crime in some form.

Conclusion

If the data collected for both weather and crime variables are successfully obtainable and correctly analyzed the comparison between the two should give evidence of how weather effects crime in the first decade of the 20th century. Recommendations to further enhance the accuracy of this study would be to update the data that has currently been obtained. Retrieving the most up to date FBI uniform crime reports would be a start. Also networking with as many county and state law enforcement agencies to gather their most current data is another resource that could help achieve optimum accuracy of this study.

The previous studies mentioned are some of the main studies on the variable of weather and how it affects crime, the outcome of these studies show evidence of correlation between weather and crime. Unfortunately the above studies are not the most current. The advancement of technology and globalization has made new resources available to enhance these studies in order to get more accurate information. As society evolves, so does crime, in order for the justice system to keep up with the rapid pace of crime it's important to constantly study crime and various methods to better handle the advancing situations of crime and the advancement of criminal methods. It is evident that weather does impact crime. By studying current data and patterns of weather and crime, the outcome should show even more evidence of a correlation between weather and crime than ever before.

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