A TIME FOR CRIME: SEASONAL VARIATION OF SIMPLE ASSAULTS ACROSS FIVE PORTLAND NEIGHBORHOODS (2010-2014)

Molly Christmann *Jaycee Elliott*

INTRODUCTION

Weather and climate have long been thought to influence the behavior of humans (Harries et al., 1984). Scholars often cite Routine Activities Theory's (RAT) as an explanation of these behavioral influences. RAT theorists argue that criminal opportunities arise at the temporal and spatial intersection of three factors: the presence of a motivated offender, the presence of a suitable victim, and the lack of a capable guardian (Cohen et al., 1979). The literature supports a positive relationship between warmer weather and increased crime rates, for certain types of crime, because warmer weather draws people out of the home and into social environments that increase crime opportunities at the intersection of the RAT factors.

This relationship between crime and seasonality has been discussed in the literature, but little empirical research exists that discusses the seasonality of crime in meso-places (Weisburd, 2015). Furthermore, the existing meso-place research tends to analyze general offense categories of assault that encompass many categories such as simple assault, aggravated assault, and even homicide (Breetzke et al., 2011). These broad categories do not offer researchers the ability to draw conclusions about the seasonality of more refined categories like simple assaults (McDowall et al., 2015). Furthermore, if this enhanced seasonality exists in meso-places for broad categories of assault, it is necessary to know whether this pattern exists for less serious simple assaults to target prevention efforts. This project addresses the question: Do simple assault incidents in five Portland neighborhoods experience spatial variation across seasons?

METHODOLOGY

Crime data was obtained through CivicApps.org, provided by the Portland Police Bureau, for all offenses reported to the Uniform Crime Report between 2010 and 2014. The data was filtered to only include those offenses that were categorized as simple assaults (n = 20,097). Next, the data was filtered to include only those simple assaults that had recorded X-Y coordinates (54.4% of all simple assaults; n = 10,935). The next filtering of data occurred by identifying five neighborhoods to analyze. Four of the five neighborhoods selected (Hazelwood, Powellhurst-Gilbert, Lents, and Centennial) were among the top five neighborhoods with the greatest number of recorded simple assaults. The fifth neighborhood (Mill Park) was included in the analysis because of its shared borders and central location to the other four neighborhoods. Then, all simple assaults from 2010 to 2014 with known X-Y coordinates were imported into ArcGIS. The final filtering of the data occurred by creating a 1,000 ft. buffer around the exterior neighborhood boundaries and selecting only those simple assaults that fell within the buffer (13.3% of all simple assaults; 24.4% of simple assaults with known X-Y coordinates; n = 2,663).

Point Pattern Analysis

Point pattern analyses were conducted using the average nearest neighbor spatial statistics tool in ArcGIS. The analyses were conducted on the aggregate simple assault data for all seasons and for each individual season over the five year time period. Seasons were defined as follows:

- Winter (December - February)
- Spring (March - May)
- Summer (June - August)
- Fall (September - November)

The average nearest neighbor tool creates an index statistic, the nearest neighbor ratio (NNR), that indicates the dispersion of the data. The seasonal NNRs enable comparison to determine meaningful differences in the simple assault patterns.

Kernel Density Analysis

Kernel density (KD) analyses were conducted using the spatial analyst tool in ArcGIS. The analyses were conducted on the aggregate simple assault data for all seasons and for each individual season over the five year time period. The mean was derived utilizing the aggregate simple assault data for all seasons to contribute to a uniform classification for all maps. Seasonal KD analyses used an individual season mean (ISM) that was equivalent to the all seasons mean (ASM) divided by four (ASM = 131.2; ISM = 32.8). Kernel density analyses classification:

- Below Average (below the mean)
- Average (mean to +1σ)
- Above Average (+1σ to +2σ)
- Well Above Average (greater than +2σ)

RESULTS

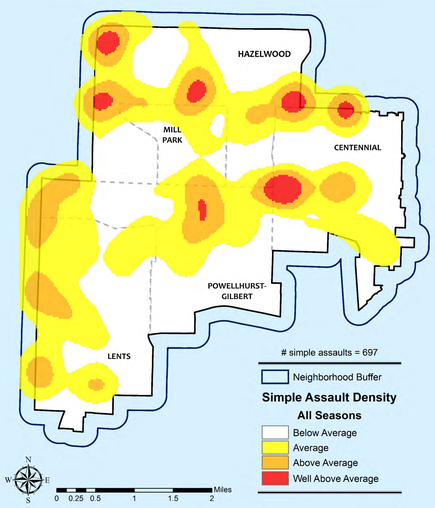
	Average Nearest Neighbor Summaries				
	Fall	Winter	Spring	Summer	All Seasons
OMD	213.64	238.02	262.42	230.46	69.39
EMD	487.78	515.11	510.15	493.98	256.99
NNR	0.44	0.46	0.51	0.47	0.27
z-score	-28.39	-25.74	-23.32	-27.19	-72.07
p-value	<0.001	<0.001	<0.001	<0.001	<0.001
Conclusion	Clustered	Clustered	Clustered	Clustered	Clustered

The results of the average nearest neighbor analysis are displayed in the table above. All five maps produced NNR's that were less than 1 suggesting that they all exhibit clustered patterns. Upon visual inspection of the kernel density analyses, the location of simple assaults across seasons does not tend to vary; however, the density at given locations does.

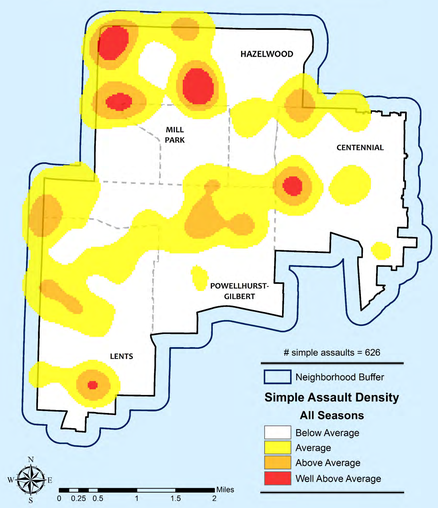
DISCUSSION

In an effort to conduct an analysis on simple assaults in a meso-place (five neighborhoods in Portland, OR) for seasonal variation across space, the researchers found no support suggesting that any meaningful variations exist. While seasonal density differs slightly, simple assault locations remain static. Although this work contributes to a growing body of research in criminology, a few limitations to the data must be observed: official crime data was used, much of the original data failed to record X-Y coordinates, and data was geomasked to street segments prior to retrieval.

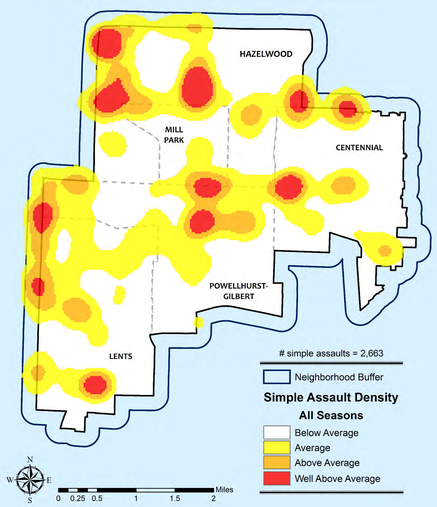
Fall (2010-2014)



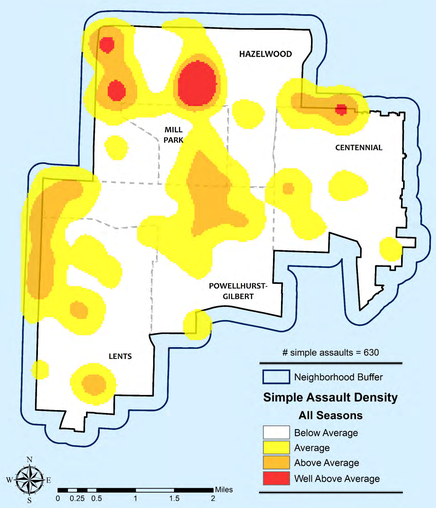
Winter (2010-2014)



All Seasons (2010-2014)



Spring (2010-2014)



Summer (2010-2014)