

# **The fear factor: Examining the spatial variability of recorded crime on the fear of crime in New Zealand**

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## **1.0 INTRODUCTION**

In this work we attempt to gauge the effect that recorded crime at three different spatial levels (own neighbourhood, surrounding neighborhoods, and broader region) has on fear of crime among the citizens of New Zealand. We do this drawing on data from a national social survey of 7249 residents and using reported crime obtained from the New Zealand Police service.

## **2.0 MATERIAL AND METHODS**

### **2.1 Data**

The data used to measure recorded crime in New Zealand was obtained from the New Zealand Police. The crime information obtained included the location (x, y coordinate), date, time, and hour of day as well as a unique code for each crime incident for the years 2008-2010 for the whole country. Other neighborhood-level data for this project was obtained from the Statistics New Zealand census dataset for 2006. Both the crime and census data were aggregated to the census areal unit (CAU) level. Individual-level data was obtained from the New Zealand General Social Survey (NZGSS) of 2010.

### **2.2 Dependent variable**

Fear of crime data was measured using two items extracted from the NZGSS:

- 1. How safe do you feel walking alone during the day in your neighborhood?*
- 2. How safe do you feel walking alone at night in your neighborhood?*

Respondents were asked to indicate a response to the above questions on a 4-point Likert-type scale, where 1 was “very safe” to 4 being “very unsafe” (alpha = 0.66). To aid analysis, the items were combined into a continuous scale using principal components analysis (mean = 0; standard deviation = 1; and range -0.985 to 2.603). Higher values provided an indication of greater fear.

## 2.3 Independent variables

### 2.3.1 Individual level variables

A total of ten individual-level variables were utilized in this research. *Gender* was a dummy variable (male = 1; female = 0). A measure of *Prior Victimization* was employed to determine whether the respondent had previously been a victim of crime. *Prior Discrimination* was extracted from the NZGSS (yes = 1; no = 0). Both *Employment status* (employed = 1; unemployed = 0) and *Social marital status* (with partner = 1; without partner = 0) provided an indication the economic and social state of respondents. The *Length of stay in New Zealand* was a continuous variable. *Median income* provides a measure of wealth of each respondent; *Dependent children* (yes = 1; no = 0), *Age* (continuous variable) and *Maori/Non-Maori* (yes = 1; no = 0) conclude the list of individual-level independent variables.

### 2.3.2 Neighborhood level variables

Neighborhood-level variables include *NZDep.* The *Social fragmentation index* is an index of neighbourhood-level social fragmentation developed by Ivory *et al* (2012): the higher the measure, the higher the social fragmentation. *Racial heterogeneity* was created by multiplying the percentage Maori by the percentage non-Maori. Higher values indicated more racially mixed neighborhoods. *Residential stability* was measured as the percentage of residents within the CAU that had been living there for less than five years. Lastly, the *Total alcohol outlets* measure assessed the total alcohol outlets in the individuals' CAU. The crime rate was calculated using New Zealand Police crime data for average over 2008-2010. The *Crime* rate was calculated as the number of crimes per 100,000 people per CAU. Three separate spatially lagged variables were next created each providing an increasingly diffuse measure of crime in the country: *Crime (lag1)* was created using a first order rooks contiguity matrix; *Crime (lag3)* contained a third order rook contiguity weights whilst the final crime measure, *Crime (lag10)* was intended to measure crime levels over a broader area, and was calculated using a tenth ordered rooks contiguity weight. The descriptive statistics for the neighborhood level independent variables used in the analysis are presented in Table 1.

## 2.4 Modelling framework

The first baseline OLS multiple regression model examined the relationship between the fear of crime and the combined individual, and neighborhood level variables. The crime variables were then added separately and distinctly to the baseline model in columns 1 to 4 of Table 2. Last, all four crime variables were added to the baseline model in column 5.

## 3.0 RESULTS

The crime rate within the individuals' own neighborhood was found to have a weak but positively significant effect on fear of crime ( $\beta=0.103$ ; significant at  $p < .01$ ). The independent inclusion of the spatially lagged crime variables (Table 2, columns 2-4) resulted in only one other significant finding and that was for the variable *Crime (lag10)* in column 4. In this instance crime within the broader environment was found to be negatively associated with feelings of fear and vulnerability among respondents. All of the models constructed exhibited a moderately weak fit to the fear of crime data ( $R^2$  adjusted for degrees of freedom ranged from 0.147 for the baseline model to 0.150 for the full model (column 5)).

## 4.0 DISCUSSION

### 4.1 Individual level

Being male was found to be positively and significantly related to fear of crime. Individuals who had previously been a victim of crime or have previously been discriminated against also were found to be more fearful. Similar to previous work both locally and internationally older and poorer people were found to be more fearful of crime (see Evans and Fletcher, 2000; New Zealand Ministry of Social Development, 2010). Last, non-Maoris were found to be significantly fearful of crime.

### 4.2. Neighborhood level

With the notable exception of the residential stability measure, all other neighborhood level variables were found to be significantly related to fear of crime. The neighborhood deprivation score was found to be positively

associated with fear of crime suggesting that individuals residing in more deprived neighborhoods experience significantly greater fear of crime. A positive relationship was found between the social fragmentation index and fear suggesting that individuals residing in socially fragmented neighborhoods exhibit more fear. Interestingly, the total number of alcohol outlets was found to be negatively associated with fear of crime suggesting that individuals residing in neighborhoods with high numbers of alcohol outlets experience significantly lower fear of crime. This finding was consistent across all models.

Regarding the substantive aim of this study, the crime rate within an individuals' own neighborhood was found to be positively and significantly associated with fear after controlling for various individual and neighborhood level predictors. Individuals residing in high crime neighborhoods, report higher levels of fear. Crime occurring within the surrounding neighborhoods of individuals was not found to be related to self-reported feelings of fear. This finding suggests that individuals are more concerned about events, particularly crime, occurring within their neighborhoods than in those adjacent to them. Finally, the results of this research indicate that crime occurring within the broader spatial setting of the individual has a negative association with fear of crime. The higher the crime across a large swathe of the city, the lower the feelings of fear exhibited. One possible explanation for this finding could be that individuals may perceive crime occurring outside their own immediate and/or surrounding neighborhoods as being a problem for 'them' and not for 'us'. Why worry about crime and its effects when it is not occurring near to me?

## **5.0 CONCLUSION**

This article has made several important contributions to the existing literature on fear of crime research. First, this study demonstrated a direct link between neighborhood crime rates and fear of crime in New Zealand. Second, the study has demonstrated that neighborhood crime levels impact fear of crime among residents of a neighborhood differentially. Crime within an individuals' own neighborhood influences their fear of crime but crime occurring within neighboring communities have little or no effect on feelings of safety and security. Third, it is clear from this research that other individual- and neighborhood level factors, such as gender, age, and racial heterogeneity, can impact an individuals' fear of victimisation. We believe however that the results presented here are sufficiently valuable to merit further investigation; and that they provide an important empirical platform for future fear of crime research in New Zealand.

## **6.0 REFERENCES**

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**Table 1:** Descriptive statistics of the neighbourhood-level independent variables

	Mean	SD	p25	Median	p75
Deprivation score	995.09	68.91	941	983	1034
Social fragmentation	0.11	0.88	-0.5	-0.1	.5
Racial heterogeneity	2717.13	3066.91	702	1656	3600
Total alcohol outlets	6.46	14.61	1	3	6
Residential stability (%)	53.86	12.01	45.83	53.57	61.11
Crime	2687.22	3840.86	1047.84	1972.63	3225.81
Crime (lag 1)	2556.23	2796.85	1050	1804	3131
Crime (lag 3)	2099.03	1875.12	1059	1657	2546
Crime (lag 10)	2079.15	2610.34	1044	1554	2389

**Table 2:** Regression models of rates of crimes on the fear of crime ( $n = 8552$ )

	Variables	Baseline model	(1)	(2)	(3)	(4)	(5)
<i>Individual level</i>	Gender	.338**(.016)	.338**(.016)	.338**(.016)	.338**(.016)	.337**(.016)	.336**(.016)
	Prior victimisation	.116**(.020)	.112**(.020)	.112**(.020)	.112**(.020)	.111**(.020)	.111**(.020)
	Discrimination	.085**(.025)	.084**(.026)	.085**(.026)	.085**(.026)	.087**(.026)	.086**(.026)
	Employment status	-.022(.020)	-.014(.021)	-.015(.021)	-.015(.021)	-.014(.021)	-.013(.021)
	Social marital status	-.002(.016)	-.002(.017)	-.003(.017)	-.003(.017)	-.003(.016)	-.002(.017)
	Dependent children	-.003(.010)	-.002(.010)	-.002(.010)	-.002(.010)	-.002(.010)	-.002(.010)
	Length of stay in New Zealand	.028(.052)	.031(.054)	.030(.054)	.030(.054)	.028(.053)	.030(.054)
	Median income	-.103**(.018)	-.106**(.019)	-.106**(.019)	-.105**(.019)	-.106**(.019)	-.108**(.019)
	Age	.003**(.001)	.003**(.001)	.003**(.001)	.003**(.001)	.003**(.000)	.003**(.001)
	Maori/Non-Maori	-.094**(.025)	-.092**(.026)	-.091**(.026)	-.089**(.026)	-.084**(.026)	-.086**(.026)
<i>Neighbourhood level</i>	NZDep	.002**(.000)	.002**(.000)	.002**(.000)	.002**(.000)	.002**(.000)	.002**(.000)
	Social fragmentation index	.029*(.011)	.033**(.012)	.031**(.011)	.031**(.011)	.027*(.011)	.027*(.012)
	Racial heterogeneity	.084**(.025)	.089**(.026)	.086**(.026)	.086**(.026)	.084**(.026)	.086**(.026)
	Residential stability	.001(.001)	.001(.001)	.001(.001)	.001(.001)	.001(.001)	.001(.001)
	Total alcohol outlets	-.003**(.001)	-.004**(.001)	-.003**(.001)	-.003**(.001)	-.003**(.001)	-.004**(.001)
<i>(Crime variables)</i>	Crime <sup>a</sup>	-	.103**(.318)	-	-	-	.107**(.330)
	Crime (lag1)	-	-	.512(.282)	-	-	.219(.330)
	Crime (lag2)	-	-	-	-.494(.442)	-	.745(.603)
	Crime (lag10)	-	-	-	-	-.131**(.387)	-.201**(.542)
	Adjusted R <sup>2</sup>	.147	.148	.147	.147	.148	.150
	Akaike Info Criterion	14283.93	13782.57	13793.02	13791.77	13781.12	13772.42

\*p &lt; .05, two-tailed test; \*\* p &lt; .01, two-tailed. Standard error in parenthesis; a. Coefficients and SE multiplied by 10,000