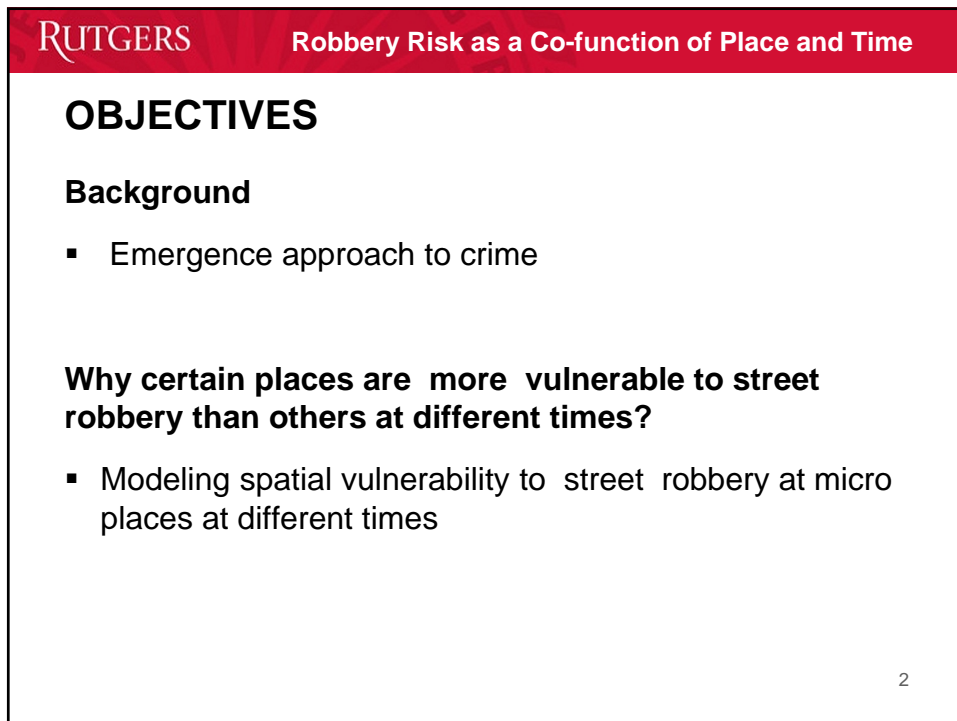


RUTGERS
THE STATE UNIVERSITY
OF NEW JERSEY

**Robbery Risk as a Co-function of
Place & Time**

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OBJECTIVES

Background

- Emergence approach to crime

Why certain places are more vulnerable to street robbery than others at different times?

- Modeling spatial vulnerability to street robbery at micro places at different times

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WHY STREET ROBBERIES?

- Robberies are the 2nd frequently reported violent crime
FBI Uniform Crime Reports (2010)
- “Place” plays an important place in robber’s decision
Braga et al. (2011); Conklin (1972); Wright & Decker (1997)
- Robberies in metropolitan cities account for 95% of all incidents, with streets being the main locale (43%)
FBI Uniform Crime Reports (2010)
- Robberies are high volume crimes ideal for statistical testing
Van Patten et al. (2009); Sherman (1992)
- With the fear it induces, robberies affect the quality of life
Braga et al. (2011)

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STREET ROBBERIES IN CRIME & PLACE LITERATURE

- Concentration of street robberies at micro places
 - Braga et al. (2011)
 - St.Jean (2007)
 - Weisburd et al. (2004)
- Environmental features & street robberies
Spatial distribution of street robberies is related to the presence and proximity to several features such as: commercial businesses, illegal drug, prostitution, gambling markets, public transportation hubs, schools, banks, cash points, bars, liquor stores, fast food restaurants, vacant land, and public housing.
Bernasco & Block (2009); St.Jean (2007); Tilley et al. (2004); Wright & Decker (1997)

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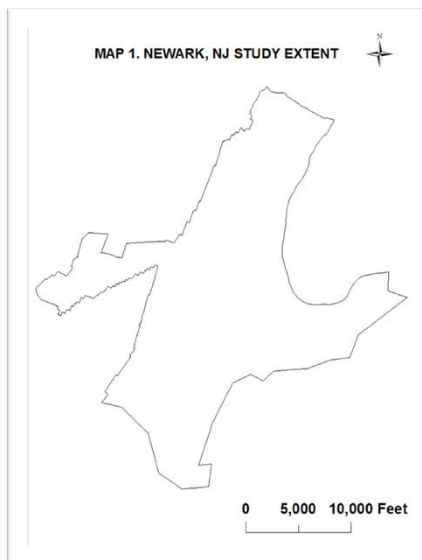
RESEARCH QUESTION

WHY CERTAIN PLACES ARE MORE VULNERABLE TO STREET ROBBERY THAN OTHERS AT DIFFERENT TIMES?

- **RQ. To what extent do the spatial influences of criminogenic features of the landscape affect the occurrence of street robbery incidents at micro places at different times of the day and week?**

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STUDY SETTING



Study extent: Newark*

Unit of analysis: 145 ft.x145 ft. cells (N=21,375)

*Areas of Port Authority and Newark Liberty International Airport are excluded from the study extent

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DEPENDENT VARIABLE

- Presence/absence of street robbery incidents in Newark NJ, in 2010 (N=1,371) at micro places
- Data source: Newark Police Department
- Definition of robbery (FBI):
 - The taking or attempting to take anything from the care, custody or control of a person or persons by force, or threat of force or violence and/or by putting the victim in fear
- Only robberies that took place in public space (i.e., streets, sidewalks) were included in the analysis.

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TEMPORAL GROUPINGS FOR STREET ROBBERIES

Model #	Model Name	Day of the Week & Time of the Day	# of Robberies in 2010
0	Base Model	All days and all times	1371
1	Daytime Work_Weekday	Monday 6 AM-5.59PM Tuesday 6 AM-5.59PM Wednesday 6 AM-5.59PM Thursday 6 AM-5.59PM Friday 6 AM-5.59PM	371
2	Happy Hours_Weekday	Monday 6 PM-11.59 PM Tuesday 12 AM - 1.59 AM & Tuesday 6 PM - 11.59 PM Wednesday 12 AM - 1.59 AM & Wednesday 6 PM - 11.59 PM Thursday 12 AM - 1.59 AM & Thursday 6 PM - 11.59 PM Friday 12 AM- 1.59 AM	344
3	Bed Time_Weekday	Tuesday 2 AM - 5.59 AM Wednesday 2 AM - 5.59 AM Thursday 2 AM - 5.59 AM Friday 2 AM - 5.59 AM	99
4	Daytime Work_Weekend	Saturday 6 AM-5.59PM Sunday 6 AM-5.59PM	129
5	Happy Hours_Weekend	Friday 6 PM- 11.59 PM Saturday 12 AM - 1.59 AM & Saturday 6 PM - 11.59 PM Sunday 12 AM - 1.59 AM & Sunday 6 PM - 11.59 PM Monday 12 AM - 1.59 AM	291
6	Bed Time_Weekend	Saturday 2 AM - 5.59 AM Sunday 2 AM - 5.59 AM Monday 2 AM - 5.59 AM	137

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ANALYTICAL STRATEGY

For each time model

1. Newark was modeled as a continuous surface grid (145 ft.x145 ft.).
2. The spatial influence of each risk factor on street robberies was derived from prior empirical literature as well as practitioner justification.

Layer Name	Operationalization of Spatial Influence	Search Radius
Bars_Social Clubs	Distance	290 feet
Bus Stops	Distance	145 feet
Banks	Distance	290 feet
Corner Stores	Distance	145 feet
Drug Arrests	Density	870 feet
Grocery Stores	Distance	290 feet
Gun Arrests	Density	870 feet
Liquor Stores	Distance	290 feet
Prostitution Arrests	Density	870 feet
Sit Down Restaurants	Distance	290 feet
Take Out Restaurants	Distance	290 feet
Vacant Buildings	Distance	290 feet
At Risk Housing	Distance	290 feet
Parking Lots	Distance	290 feet
Gas Stations	Distance	145 feet
Schools	Distance	290 feet
Light Rail Stations	Distance	145 feet
Pawn Shops	Distance	290 feet
Retail Stores	Distance	290 feet

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ANALYTICAL STRATEGY

For each time model

3. The spatial influence of each risk factor was digitized in ArcMap.
4. The significance of the spatial influence of each risk factor on street robberies was tested with chi square test.
5. The spatial influence of significant criminogenic features was combined.
6. A spatial lag variable was created.
7. The vulnerability to the combined spatial influence of the criminogenic features of the landscape was tested with logistic regression controlling for spatial lag.

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RESULTS

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Significant risk factors according to Chi-square test results

Table 1. Significant Risk Factors according to Chi Square Test Results

	Model 0 All times	Model 1 Daytime Work (Weekday)	Model 2 Happy Hours (Weekday)	Model 3 Bedtime (Weekday)	Model 4 Daytime Work (Weekend)	Model 5 Happy Hours (Weekend)	Model 6 Bedtime (Weekend)
Bars	X	X		X		X	X
Bus Stops	X	X	X	X	X	X	X
Banks							
Corner Stores							
Drug Arrests							
Prostitution Arrests							
Sun Arrests							
Grocery Stores	X	X	X	X	X	X	X
Sun Arrests							
Liquor Stores							
Sit Down Restaurants	X		X		X	X	X
Take Out Restaurants		X				X	X
Vacant Buildings							
At Risk Housing		X	X	X		X	
Parking Lots							
Gas Stations							
Schools							
Light Rail							
Lawn Shops							
Retail Stores							

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LOGISTIC REGRESSION RESULTS

	Exp(B)						
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Composite Risk Value	1.35***	1.42***	1.397***	1.509***	1.519***	1.338***	1.457***
Spatial Lag	0.989	2.11E+10	2.73E+10	2.85E+11	7.83E+10	5.20E+10	1.38E+11
Constant	0.037***	0.009***	.010***	0.002***	0.004***	0.008***	.004***
	R ² = .193	R ² = .193	R ² = .159	R ² = .27	R ² = .069	R ² = .173	R ² = .166

***p<.001

Δ Exp (B) relative to model 0 (All robberies)

Model 1: + 7%
 Model 2: + 4%
 Model 3: + 15%
 Model 4: + 16%
 Model 5: - 2%
 Model 6: + 10%

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THEORY, RESEARCH, & POLICY IMPLICATIONS

- Reducing spatial influence of features and crime outcomes through:
 - Spatio-temporally focused proactive policing interventions
 - Target hardening
 - Surveillance
 - Modifying rules of order for facilities
 - Improving the conditions and empowering the residents at problem micro places
- The potential of the coupling of this approach with hotspot and near repeat analysis for a joint utility
- Contribution to the environmental backcloth approach and theory of risky places
- Other policies that can benefit: residency restrictions, drug free zoning

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THANK YOU!

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