



Risk Factors for Fatal Domestic Violence in Puerto Rico: A Case-control Study Using Data from a 5 Year-Period (2010-2014) to Identify Potential Risk Factors Leading to Victims' Fatality

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Introduction

- Interpersonal violence (IPV) “refers to everyday violence such as sexual and physical assault that occurs between family members, intimates and acquaintances, consequently IPV includes gender-based violence, domestic violence, sexual harassment, sexual violence and rape” (Montesanti,2015).
- More specifically, intimate partner violence on women is defined as “abuse of a woman by a male or female partner who currently is, or formerly was, in an intimate relationship with the woman” (Ramsay, et.al., 2009), and it is often referred as domestic violence.
- Domestic violence (DV) is the most commonly term used in Puerto Rico.

Background



Women is the primary victim

- Global
- United States
- Puerto Rico



1:3 women have experienced violence by an IP in their lifetime

- Global
- United States
- Puerto Rico (not clear)



DV was the reason of homicide for women

- Global (30%)
- United States (63.7%)
- Puerto Rico (33%)

DV in Puerto Rico

- Women are the primary victims of DV in Puerto Rico. (Servicios Legales de Puerto Rico, n.d.)
- Information collected by police investigations is recorded in a specifically form designed for documenting DV cases. In 2010, about 17,700 DV incidents were reported to the police. Of these, 17 victims were fatal. (Policia de Puerto Rico, 2016).
- The Forensic Sciences Institute of Puerto Rico (2016) reported 337 female homicides in Puerto Rico for the period 2010-2014.
- In the period of 2010-2014 a total of 73,075 incidents of DV including 106 fatal incidents were reported by the police.

Puerto Rico's Law 54 of 1989

Puerto Rico

- Law for the intervention and prevention of DV.
- Latest amendment was in 2011. Related to the formality of citations.

Study General Objective

- Evaluate the potential risk factors associated to fatal DV incidents in Puerto Rico based on DV police reports for the period 2010-2014 using the ecological model as a framework of the analysis.

Significance

- First study that proposes to analyze fatal DV incidents in Puerto Rico applying the ecological model to understand the context in which these events occur.
- Data from the Police of Puerto Rico (2015), shows that 1.9 of each 1,000 DV victims were murdered in 2012.
- This in turn means that 25 out of the 71 (35.2%) victims of homicides during that year were due to DV.
- Results will serve as scientific evidence to improve
 - Police DV victims screening assessment for death risk
 - Understand DV's epidemiology in Puerto Rico

Specific Aims

- Describe the demographic profile of fatal and non-fatal domestic violence female victims in Puerto Rico in a five-year period of analysis (2010-2014).
- Determine if there is an association of fatal female domestic violence victims and demographic characteristics.
- Identify potential risk factors at every level of the ecological model that may be associated with fatal domestic violence incidents in Puerto Rico such as education level (individual), time length of relationship (family), social vulnerability index (community) or legal determination (societal).

METHODOLOGY

Study Design

- Case definition
 - A fatal female victim of DV in Puerto Rico over 18 years old from the period of 2010-2014.
- Control definition
 - A non-fatal female victim of DV in Puerto Rico over 18 years old from the period of 2010-2014.
- Case: Control ratio: 1:3 matched for age (+/- 5 years of age, municipality of residence and month/year of incident)

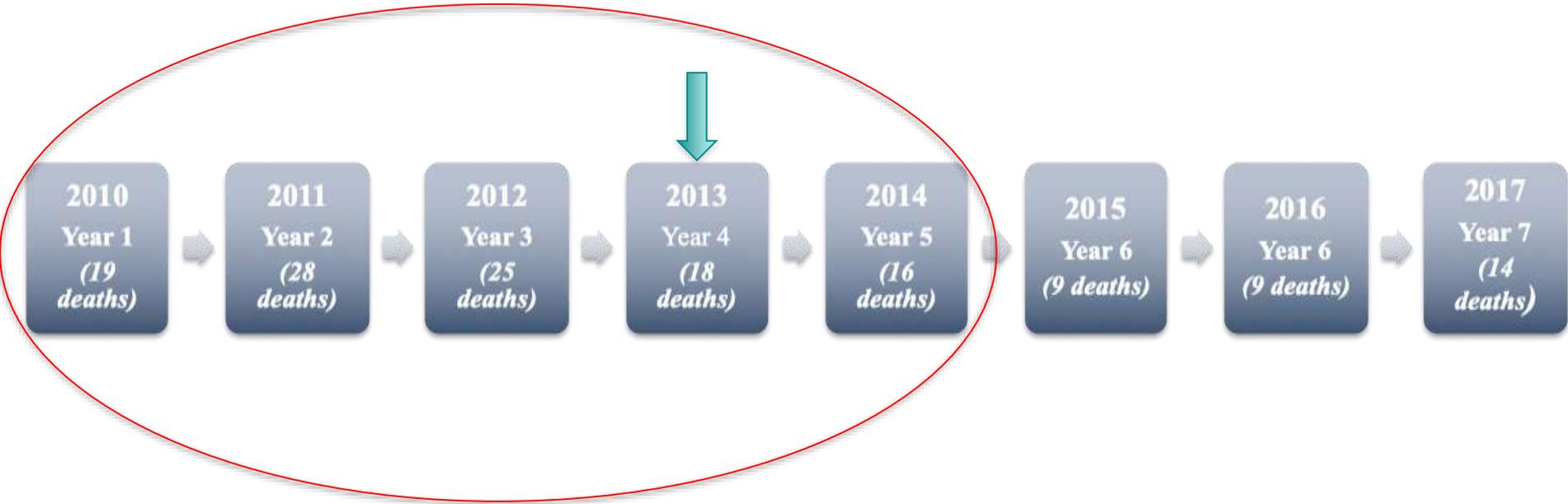
Study Population

Domestic Violence Incidence and Deaths in Puerto Rico 2010-2014

Police of Puerto Rico Reports				Puerto Rico's Institute of Forensic Sciences
Year	Total DV Reported Incidents	Total DV Deaths	Rate of DV Deaths (x1000)	Total Women Homicides
2010	17,700	19	1.1	66
2011	16,311	28	1.7	81
2012	13,453	25	1.9	71
2013	12,843	18	1.4	55
2014	12,768	16	1.3	52

Average Annual Rate of Death of DV = 1.5 x 1000 incidents

Timeframe



Sample Size

- The number of reported fatal cases for the period of analysis is 65, thus 192 controls were included using 1:3 control allocation ratio for a total of 257 study subjects.
- Thus an OR =2.0 is expected to be detected as significant if the prevalence of any risk factor is approximately between 31% and 46%.

Classification of Study Variables in the Ecological Model

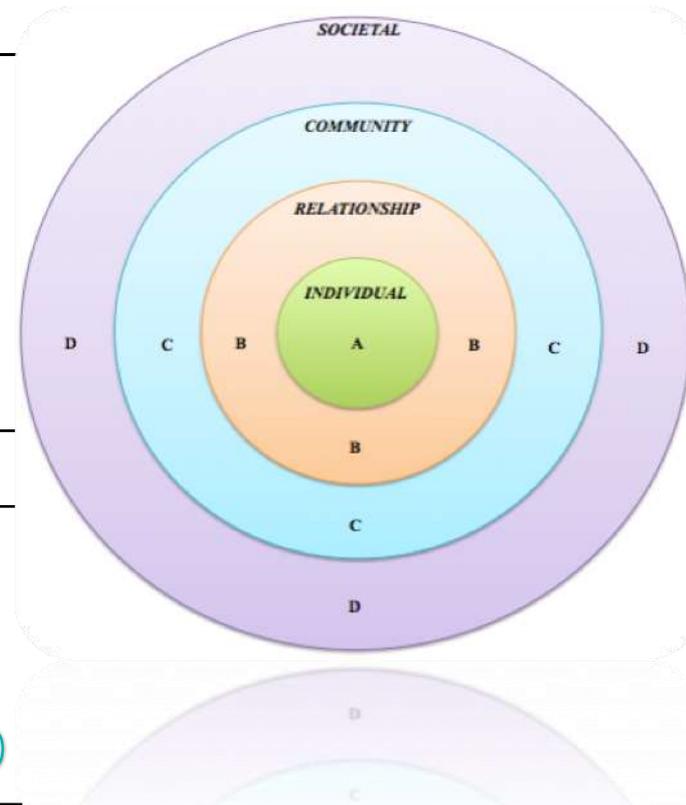
Individual Level Variables	Relationship Level Variables
<ol style="list-style-type: none"> 1. Education level of the victim 2. Pregnancy status of the victim 3. Age discrepancy 4. Disability of the victim 5. Place of incident 6. Use of fire gun 7. Use of sharp weapon 	<ol style="list-style-type: none"> 1- Physical aggression 2- Type of relationship 3- Length of relationship 4- Number of children at household 5- Education disparity between victim and offender 6- Offender's age 7- Sexual abuse by offender 8- Threat by offender 9- Emotional abuse by offender
Community Level Variables	Societal Level Variables
<ol style="list-style-type: none"> 1- Social Vulnerability Index 2- Socioeconomic theme SVI 3- Housing composition and disability theme SVI 4- Population density 5- Offender's employment status 6- Victim's employment status 7- Residential zone of living 	<ol style="list-style-type: none"> 1- Legal access to guns 2- Recidivism 3- Legal determination

A

B

C

D



RESULTS

Descriptive or univariate analysis

Bivariate and unadjusted hypothesis testing

Multivariate Analysis

Contrast of Available Fatal Complaints of Women's Victims of Domestic Violence and Fatal Complaints Reported to the Domestic Violence Division of the Police of Puerto Rico by Year of Study

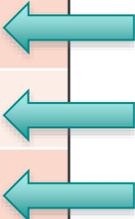
Year of Study	Fatal Complaints Available (Cases)	Fatal Complaints Reported to DV Division	Proportion of Cases Available
2010	17	19	17/19= 89.5%
2011	13	28	13/28= 46.0%
2012	19	25	19/25= 76.0%
2013	0	18	0%
2014	6	16	6/16= 38.0%
2015	2	9	2/9= 22.0%
2016	7	9	7/9= 78.0%
2017	1	14	1/14= 7.0%

Age Distribution of Victims (Cases and Controls)

Age Group	n of Cases	n of Controls	Percent
18-29 years	16	52	26.5%
30-39 years	22	69	35.4%
40-49 years	16	38	21%
50-59 years	8	24	12.5%
60-69 years	2	8	3.9%
70-79 years	1	1	0.8%
Total	65	192	100%

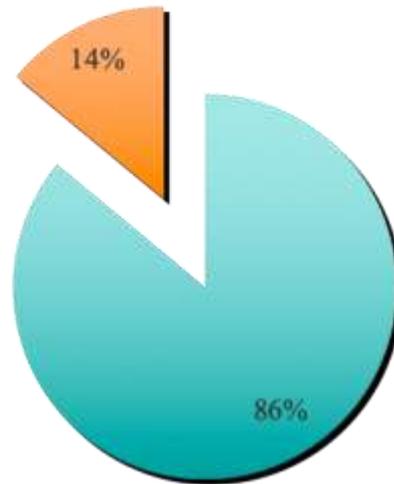
Age Distribution of Offenders (Cases and Controls)

Age Group	n of Cases	n of Controls	Percent
18-29 years	6	50	26.0%
30-39 years	17	56	29.2%
40-49 years	21	51	26.6%
50-59 years	14	20	10.4%
60-69 years	5	8	4.2%
70-79 years	2	7	3.6%
Total	65	192	100%



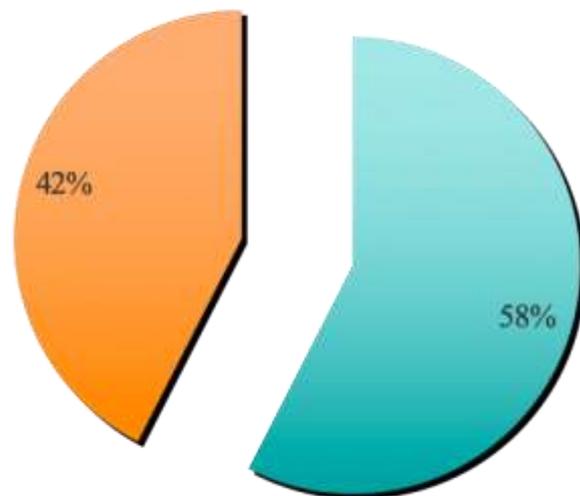
Amount of Domestic Violence Victims at Risk due to Age Discrepancy

■ No Risk ■ At Risk



Education Level of Domestic Violence Victims

■ Above High School ■ Below High School



Legal Access to Guns by Offenders of Domestic Violence Victims

Cases

Access to Guns	n	Proportion
Yes	15	24.6%
No	46	75.4%
Total	61	100%

Controls

Access to Guns	n	Proportion
Yes	13	7.2%
No	168	92.8%
Total	181	100%

Recidivism of Offenders

Cases

Recidivism	n	Proportion
Yes	9	15%
No	51	85%
Total	60	100%

Controls

Recidivism	n	Proportion
Yes	72	37.9%
No	118	62.1%
Total	190	100%

Use of Fire Gun by Offenders

Cases		
Use of Fire Gun	n	Proportion
Yes	32	49.2%
No	33	50.8%
Total	65	100%

Controls		
Use of Fire Gun	n	Proportion
Yes	7	3.7%
No	184	96.3%
Total	191	100%

Use of Sharp Weapon by Offenders

Cases		
Use of Sharp Weapon	n	Proportion
Yes	25	38.5%
No	40	61.5%
Total	65	100%

Controls		
Use of Sharp Weapon	n	Proportion
Yes	20	10.5%
No	171	89.5%
Total	191	100%

Sexual Abuse by Offender to the DV victims

Cases		
Sexual Abuse	n	Proportion
Yes	1	1.5%
No	64	98.5%
Total	65	100%

Controls		
Sexual Abuse	n	Proportion
Yes	2	1.1%
No	189	98.9%
Total	191	100%

Emotional Abuse by Offender to the DV victims

Cases		
Emotional Abuse	n	Proportion
Yes	9	13.9%
No	56	86.1%
Total	65	100%

Controls		
Emotional Abuse	n	Proportion
Yes	87	45.6%
No	104	54.4%
Total	191	100%

RESULTS

Descriptive or univariate analysis

Bivariate and unadjusted hypothesis testing

Multivariate Analysis

Table 12. Summary of Bivariate Analysis
(Statistical significant variables)

Individual Level	Relationship Level	Community Level	Societal Level
Education Level of Victim- Main Independent (OR= 0.52, p= 0.00, CI: 0.4-0.8)	Physical aggression (OR= 0.22, p= 0.00, CI: 0.1-0.3)	SVI (OR= 6.67, p= 0.00, CI: 3.3-15.3)	Legal access to guns (OR=, 3.54 p=, 0.00 CI: 1.9-7.1)
Pregnancy status (OR= 12.4, p=, 0.00, CI: 5.0-39.5)	Type of relationship (OR= 0.07, p= 0.00, CI: 0.03-0.1)	Socioeconomic SVI (OR= 3.11, p= 0.00, CI: 1.8-5.6)	Recidivism (OR= 0.71, p= 0.04, CI: 0.5-0.9)
Age discrepancy (OR= 2.53, p= 0.00, CI: 1.5-4.6)	Length of relationship (OR= 0.36, p= 0.00, CI: 0.2-0.5)	Housing SVI (OR= 3.65, p= 0.00, CI: 2.1-6.7)	Legal determination (OR= 0.66, p= 0.02, CI: 0.4-0.9)
Disability of the victim (OR=6.78, p= 0.00, CI: 3.3-15.5)	Number of children in household (OR= 3.56, p= 0.00, CI: 2.0-6.6)	Offender's unemployment (OR= 0.55, p= 0.00, CI: 0.4-0.8)	
Place of incident (OR= 0.09, p= 0.00, CI: 0.04-0.2)	Education disparity (OR=0.37, p= 0.00, CI: 0.2-0.6)	Victim's unemployment (OR= 0.22, p= 0.00, CI: 0.1-0.3)	
Use of firearm (OR= 4.7, p= 0.00, CI: 2.1-12.6)	Sexual abuse (OR= 32.0, p= 0.00, CI: 8.5-269.9)	Zone of living (OR= 0.27, p= 0.00, CI: 0.2-0.4)	
Use of sharp weapon (OR=2.0, p= 0.01, CI: 1.1-3.6)	Threat (OR= 0.63, p= 0.00, CI: 0.4-0.9)		
	Emotional abuse (OR=0.64, p= 0.00, CI: 0.4-0.9)		

RESULTS

Descriptive or univariate analysis

Bivariate and unadjusted hypothesis testing

Multivariate Analysis

LOGISTIC REGRESSION ANALYSIS INDIVIDUAL LEVEL

(Factors included: Victim's Level of Education [Main independent variable] + Independent variable)

Dependent variable	Independent variable	Pseudo R ²	Adjusted OR	p-value
Case or Control	Pregnancy	0.0028	3.28	0.48
<i>Case or Control</i>	<i>Age discrepancy</i>	<i>0.0586</i>	<i>3.80</i>	<i>0.00</i>
Case or Control	Disability	0.0000	1.27	1.00
Case or Control	Place of Incident	0.0130	1.61	0.13



Logistic Regression Individual Level

LOGISTIC REGRESSION ANALYSIS RELATIONSHIP LEVEL

*Model 1: Logistic Regression Analysis with Relationship Level Variables (Factors included: Victim's Level of Education, Threat + Independent variable **below**)*

Independent variable	Pseudo R²	Adjusted OR	p-value
<i>Type of relationship</i>	0.2922	2.68	0.00
<i>Length of Relationship</i>	0.2969	0.42	0.00
<i>Education disparity</i>	0.3830	3.81	0.00
<i>Emotional abuse</i>	<i>0.4121</i>	<i>0.11</i>	<i>0.00</i>
?			

Logistic Regression
Relationship Level

LOGISTIC REGRESSION ANALYSIS COMMUNITY LEVEL

(Factors included: Victim's Level of Education [Main independent variable] + Independent variable)

Independent variable	Pseudo R ²	Adjusted OR	p-value
SVI	0.0196	1.32	0.19
Socioeconomic theme	0.0210	1.40	0.17
SVI			
Housing Disability	0.0403	0.26	0.35
SVI			
<i>Offender's unemployment</i>	<i>0.0458</i>	<i>0.53</i>	<i>0.02</i>
Victim's unemployment	0.0340	1.63	0.06
Zone of living	0.0236	1.31	0.13



Logistic Regression
Community Level

LOGISTIC REGRESSION ANALYSIS SOCIETAL LEVEL

Model 1: Logistic Regression Analysis with Societal Level Variables (Factors included: Victim's Level of Education, Recidivism + Independent variable)

Independent variable	Pseudo R ²	Adjusted OR	p-value
<i>Legal access to guns</i>	<i>0.1677</i>	<i>3.58</i>	<i>0.00</i>
Legal determination	0.1320	0.56	0.00
?			

Logistic Regression
Societal Level

Model 4: Step Wise Model Logistic Regression Analysis (Factors included: Victim's Level of Education, Threat, Emotional abuse, Legal access to guns, Recidivism + Independent variable)

Independent Variable	Pseudo R ²	Adjusted OR	p-value
Age discrepancy	0.5171	3.39	0.00
Unemployment aggressor	0.5080	0.51	0.00

Logistic Regression Analysis Results:

Case Control, Victim's level of education, Threat, Emotional abuse, Legal access to guns, Recidivism and Age Discrepancy

Key Findings

- This case-control study was able to assess statistical significant associations that were not studied before in Puerto Rico.
- Victims who may have a high level of education are likely to be fatal DV victims.
- Any threat, emotional abuse and recidivism may decrease the risk of a fatal DV victim in Puerto Rico.
- **The legal access to guns and age discrepancy between victim and offender was found to be a risk factor for the DV fatalities in this sample of DV incidents in Puerto Rico.**

Limitations

- The completed reports for the DV incidents were only available in paper.
- Limited access to fatal DV reports available at Police of Puerto Rico.
- Results are not representative of all DV incidents in the period of analysis.
- Lack of consistency in detailed information in the reports.
- Other possible predictor variables are not being collected by the Police of Puerto Rico.
(Injured body part, alcohol consumption history, HIV status, etc.)
- Only part of the data collected is stored in an electronic database.
- Police database is not easily accessible for statistical analysis.

Recommendations

- Evaluate the implementation of data delivery or transfer from area police offices to headquarters.
- Try to differentiate in the report between children in the household procreated in the relationship, and those that are not product of the relationship.
- Consider inclusion of additional key information in the DV incident report.
- Quality assurance of missing data with focus on the part of the body where the DV victim was physically injured.
- Community development funding for design tailored behavioral interventions for victims and aggressors.
- To have publicly available public health statistics of the DV epidemic in Puerto Rico.

Acknowledgments

Sexual Violence Research Initiative

Academic Advisor: Dr. Diego Zavala

Committee Members: Dr. Juan C. Orengo and Dr. Felix Ramos

Police of Puerto Rico: Lt. Alvarado, Lt. Melendez and Claudia E. Sotomayor

Doctorate's Degree Coordinator: Dra. Mayra Roubert

Dedicated to the memory of:

Migdaly Hernández-Burgos

06/24/1982-02/23/2004



Thank You!

EXTRA SLIDES

Background

- According to United Nations (UN) in 2010, DV comprehends 4 types of abuse:
 - **Physical abuse:** Easy to recognize when the offender push, restrain, shake, slap, punch, strangle, do not help in sickness, restrain from eating, use weapons to injure, etc.
 - **Sexual violence and abuse:** Jealousy, pressure the victim into having sexual intercourse, coerces her into uncomfortable sexual acts like having a third partner in the act.
 - **Psychological abuse:** A way to control the victim. The offender does ignore the feelings of the victim, also bribes the victim on leaving.
 - **Economic abuse:** Offender's control of finances, also does not contribute to the household and may make the victim to support the family.

Inclusion and Exclusion Criteria

■ Inclusion Criteria

- Fatal o non-fatal female DV victim in Puerto Rico residents in the period of **2010-2017**.
- 18 years old or older
- Have a report of DV incident filed at Police of Puerto Rico (Form PR-790)

■ Exclusion Criteria

- Non DV victim from Puerto Rico in the period of **2010-2017**.
- Male victims of DV
- DV cases under 18 years of age
- Have an incomplete/unavailable report of domestic violence incident filed at Police of Puerto Rico (Form PR-790)
- Non residents

Study Design

- Case-control Matched Study
 - Ponce Health Sciences University in collaboration with the Police of Puerto Rico established an educative agreement for this research.
 - All variables for this research will be collected from the Police of Puerto Rico forms used for investigation purposes that are filled at the moment of the DV incident.
 - The Police of Puerto Rico collects data from all DV incidents in 3 primary forms called Form PR-790 A, B and C.
 - ***Cases and controls will be matched by age, ± 5 years, date (month ± 3) of incident and municipality of residence.***
 - Case: Control allocation 1:3

Table 1. *Distribution and Proportion of Cases and Controls Per Year of Study*

Year of Study	Cases	Controls	Total	Proportion of Cases and Controls by Year of Study
2010	17	51	68	26.5%
2011	13	39	52	20.2%
2012	19	54	73	28.0%
2013	0	0	0	0%
2014	6	18	24	9.3%
2015	2	6	8	3.0%
2016	7	21	28	11.0%
2017	1	3	4	2.0%
Total	65	192	257	100%
?				

Summary of Statistical Significant Variables by Levels of the Ecological Model

Level	Independent Variable	Pseudo R ²	Adjusted OR	p-value
Individual	Age	0.0833	3.80	0.00
	Discrepancy			
Relationship	<i>Threat</i>	<i>0.2643</i>	<i>0.08</i>	<i>0.00</i>
	Emotional	0.1857	0.14	0.00
Community	Unemployment status of aggressor	0.0458	0.53	0.02
Societal	Legal access to guns	0.0989	4.25	0.00
	Recidivism	0.1006	0.24	0.00

