

Project Proposal

How actual crime level in the region corresponds to subjective feeling of unsafety in it?

INTRODUCTION

Crime studies have repeatedly demonstrated that individuals believe the crime is getting worse, regardless of the rate at which it occurs. Police reports are used to measure the actual crime rates, but for studying the subjective fear of “street crime” researchers had to invent specific questions:

"Compared to a year ago, do you personally feel more afraid and uneasy on the streets today, less uneasy, or not much different from the way you felt a few years ago?" (The Harris Poll)

"In the past year do you feel the crime rate in your area has been increasing, decreasing, or has it remained the same as it was before?" (The Harris Poll)

"How safe do you feel or would you feel being alone in your neighborhood after dark?"
(Census Bureau's National Crime Panel Surveys)

Some researchers (Baumer & DuBow, 1977) argue that the first two questions do not reflect the feeling of safety, but show people’s opinions on actual crime rates. Considering that, for this survey the question about feeling safe in the neighborhood after dark was taken as an estimate of “street crime” fear.

Necessity of studying perception of crime is explained by the Thomas Theorem (Merton, 1995) - if people feel unsafe in the streets they will behave according to that fear regardless of the actual crime rates. As many researchers admit (Valentine, 1992; Stanko, 1995; Багина, 2019), irrational dismay, especially for women, leads to higher costs of safety - emotional discomfort, time spending (to search for the safest route), and actual money expense (to buy means of self-defense).

The dynamics of feeling safe in the streets is not defined by crime rates, but depends on many other factors. Several considerable variables were distinguished by researchers as determinants of unsafety feeling, which are: age, sex, type of locality where the respondent is from, educational level, and subjective estimate of health (Hummelsheim et al., 2011; Rader et al., 2012; Visser et al., 2013).

Age. There is the U-shaped dependence between age and feeling unsafe (Reese, 2009; Krulichová, 2019). Among all respondents, children and elderly people feel the least safe, which is explained by their vulnerable position in the society.

Sex. In comparison to men, women feel more unsafe in the dark streets (Hummelsheim et al., 2011; Rader et al., 2012; Semyonov et al., 2012; Visser et al., 2013). Because most crimes are committed by men, and, in general, women are physically weaker, they cannot expect to survive if a stranger attacks them in the dark neighborhood.

Type of locality. Citizens of big localities feel unsafer in comparison to respondents from the small towns (Visser et al., 2013; Krulichová, 2019). This can be explained by the fact that villagers tend to know more people in the neighborhood, thus they would not expect crime from the acquaintants.

Education. Level of education is negatively correlated with unsafety feeling (Hummelsheim et al., 2011; Visser et al., 2013), because education is considered a proxy of social integration, which decreases anxiety, and influences the perception of dread.

Estimate of health. People with higher subjective estimates of their health tend to be less concerned in the dark street (Rader et al., 2012). The feeling of low health level makes people feel more vulnerable, which increases the unsafety perception.

In the recent study of unsafety feeling in Russian realities (Бепкеев, 2021), it was shown that all these variables, except for education level, have significant influence on the dependent variable. The purpose of this study is to consider a new determinant for street crime fear, which is terrorism. Although actual crime level is not supposed to correlate with feeling unsafe, terrorism is a broadly publicized phenomenon - most people know about terrorist attacks in their localities, so it may be a significant determinant of people's unsafety perception. Also, the difference between actual crime and feeling unsafe varies from region to region, from year to year. Another aim for the study is to define the reasons why people in some regions feel very safe, while the crime rates are highest, and vice versa.

METHODOLOGY

The data from Russian Monitoring of the Economic Situation and Health of the Population, HSE University will be considered¹. For the research I will use 18, 19, 25 and 26 waves of representative samples on individuals, for the years of 2009, 2010, 2016 and 2017 respectively. The variables: age, sex, locality type (regional center, city, urban-type settlement, village), education, health esteem².

Data for crimes is obtained from Crimestat³ (for 2016 and 2017, total number of: economic crimes, moredate crimes, and terrorism crimes) and Russia Duck Consulting⁴ (for 2009, 2010, 2016 and 2017 - terrorism crimes relative to population).

¹ The HSE RMEH Longitudinal Household Survey is a series of annual nationwide representative surveys based on a probabilistic stratified multistage territorial sampling, developed with the participation of the world's leading experts in this field. [Link to the source](#)

² Description of the variables is available at the [link](#).

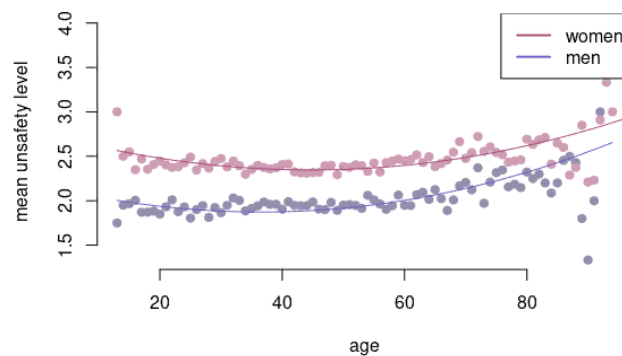
³ Crimestat. [Link to the database](#)

⁴ Russia Duck Consulting. [Link to the database](#)

Before driving the regression equation, we should check whether the non-linear effect of age, found by previous researchers, holds within the particular data.

As it is observed from the graph №1, the dependence between age and unsafety level is non-linear and also slightly differs from men to women - men's feeling of unsafety increases faster than women's with age. So, non-linear and cross-effects will be included in the model.

Graph №1.



For the regression 2 periods are constructed: 2009-2010 and 2016-2017 - to observe how effects change within the time. Due to the absence of 2009-2010 data for total economic, moderate and terrorism crimes, regression equations will differ a little for the two periods.

2009-2010:

$$\text{unsafety level} = a_0 + a_1 * (\text{age}) + a_2 * (\text{age}^2) + a_3 * (\text{sex}) + a_4 * (\text{sex} * \text{age}^2) + a_5 * (\text{locality type}) + a_6 * (\text{education}) + a_7 * (\text{health}) + a_8 * (\text{terrorism to population}) + U_i$$

2016-2017:

$$\text{unsafety level} = b_0 + b_1 * (\text{age}) + b_2 * (\text{age}^2) + b_3 * (\text{sex}) + b_4 * (\text{sex} * \text{age}^2) + b_5 * (\text{locality type}) + b_6 * (\text{education}) + b_7 * (\text{health}) + b_8 * (\text{terrorism to population}) + b_9 * (\text{terrorist crimes}) + b_{10} * (\text{economic crimes}) + b_{11} * (\text{moderate crimes}) + V_i$$

Regression results:

Dependent variable: unsafety_level	(I) 2009 - 2010		(II) 2016 - 2017	
age	-0.0090	***	-0.0110	***
age ^2	0.0001	***	0.0001	***
sex_female	0.5450	***	0.3830	***
locality, city	-0.0050		-0.0400	*
locality, urban_type	-0.1980	***	-0.1740	***

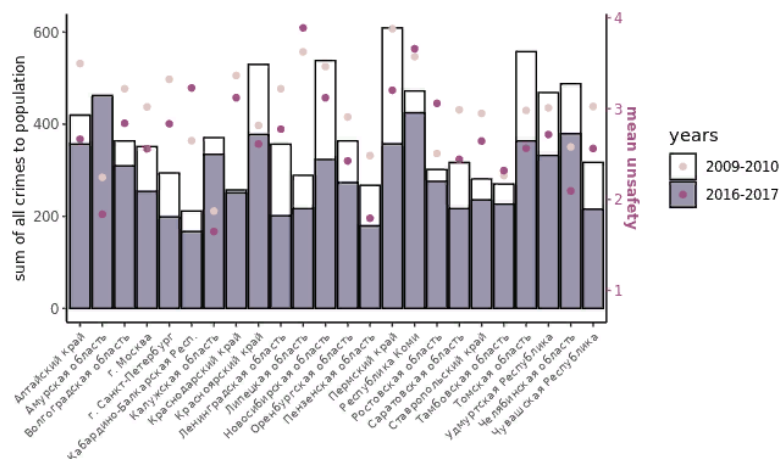
locality, village	-0.2630 ***	-0.3830 ***
education	0.0030	0.0000
bad health	0.1280 ***	0.1870 ***
economic crimes		-0.0001 ***
moderate crimes		0.0000 ***
terrorist crimes		0.0040 ***
terrorism_to_population	0.9330 ***	0.1350 ***
age^2*sex_female	-0.0003 ***	-0.0002 *

Both models have positive and significant coefficients for the terrorism_to_population variable. The first model showed suspiciously high value, which probably requires deeper investigation, while the second one demonstrated adequate coefficient. As previous researchers admitted, other crimes do not have considerable influence on the unsafety level.

Thus, a new determinant for the dependent variable was established - number of terrorist attacks, relative to population. In this paper the reason for such influence will be researched by reading articles on how terrorism can affect people's perception of safety. Regions with highest unsafety level scores will be studied closer on the subject of terrorist attacks, and if their perception of fear correlates with the number of victims.

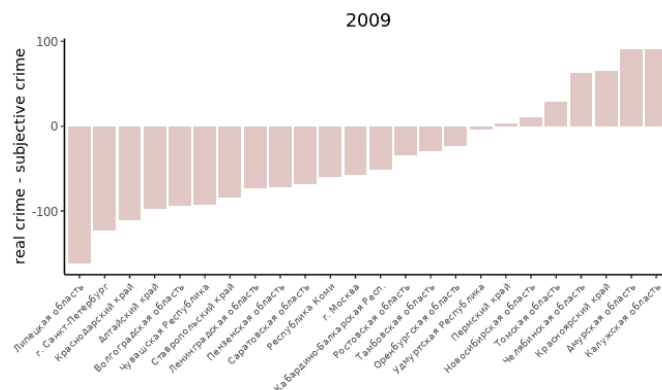
Graph №2 shows⁵ that feeling of unsafety and crime rates vary widely from 2009-2010 to 2016-2017. Also, it is clear that some regions show too little anxiety for crime situation (Amurskaya, Kaluzhskaya Oblast: level of unsafety is relatively small in comparison to number of crimes), and some - too much (Krasnodarskiy Krai, Lipetskaya Oblast).

Graph №2.



⁵ Graph №2, detailed for each year is in the Appendix (I).

Relative difference between actual crime and perception of it was calculated for each subject of the Russian Federation. Graph №3 shows the distribution for 2009⁶.



To understand why some regions feel safer than others with the same level of real crime, we should define the factors that affect people’s perception most. The two periods data - 2009-2010 and 2016-2017 - will be split to test and train, and then predicted by several machine learning models: Logistic Regression, Boosting, Decision Tree, and Random Forest. Among all, there will be chosen the best models for both periods - according to accuracy, sensitivity and specificity parameters. Then, variables which impact the predicted variable the most will be detected - using the “importance” metrics. Factors with highest importance values will be analyzed. They might vary from year to year, from region to region, thus, conclusions about specifics of the regions will be drawn.

EXPECTED RESULTS

The study defines an important factor for fear of street crime in Russian realities - terrorism relative to population. It is expected that people’s anxiety rises with the number of victims of such crimes, and fear levels gradually decrease with the time after a terrorist attack, before the new one happens.

The research will also distinguish factors that affect perception of fear in different regions and periods and come up with the reasons for such a state of affairs. Some regions can have age as a prevailing factor, others - health esteem. Factors can change within the time for some regions, and stay the same for the others. The logic behind such a distribution will be studied in the deeper analysis.

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⁶ Relative difference graphs for all years are in the Appendix (II).

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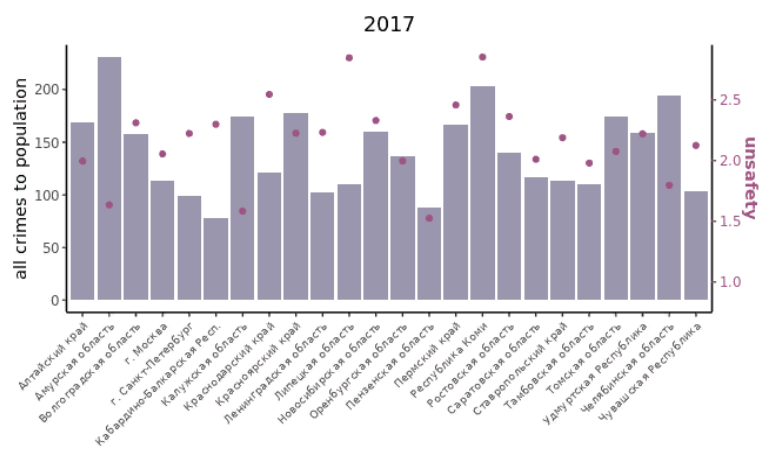
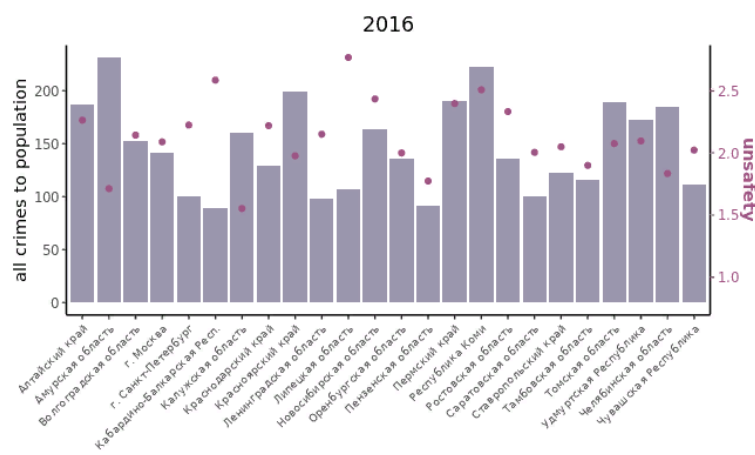
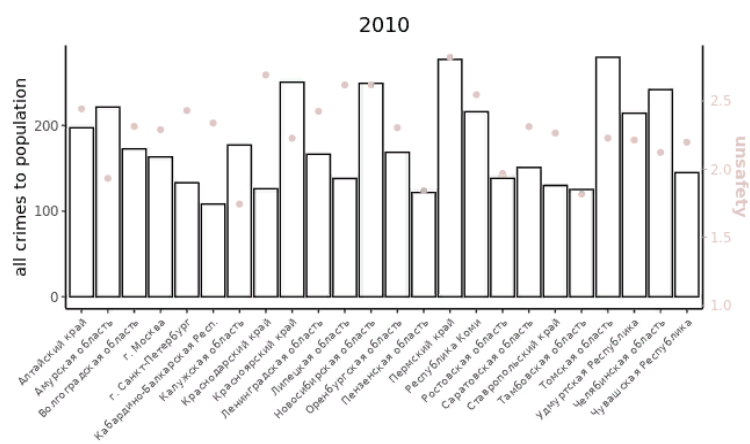
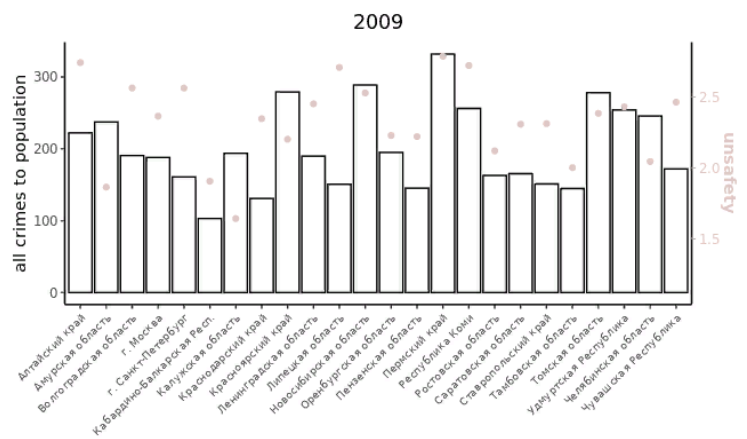
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APPENDIX

I. Graph №2, detailed for each year



II. Relative difference graphs

