



QUANTITY AND DENSITY OF POPULATION IN THE INFLUENCE ON CRIME

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Summary

The article presents arguments in favor to the fact that the measurement of crime in criminology does not properly address the universal quantitative laws that are inherent in all natural systems. At the same time there is a paradox, which is characteristic of the human population. For some unknown cause, the population density does not affect the quantitative condition of crime. Traditional view on this question is rejection. Traditional error linked with the fact that the researchers used an incorrect method to verify the presence of correlation between population density and the number of crimes committed.

Key words: analytical unit, correlation, population, population density, crime.

Аннотация

В статье представлены доводы в пользу того, что в криминологии при измерении преступности должным образом не учитываются универсальные количественные закономерности, которые присущи всем природным системам. В то же время отмечается парадокс, который характерен для человеческой популяции. По неизвестной причине плотность населения не влияет на количественные показатели преступности. Опровергается традиционный взгляд на этот вопрос. Традиционная ошибка связана с тем, что исследователи применяли некорректный метод для верификации наличия корреляции между плотностью населения и количеством совершенных преступлений.

Ключевые слова: аналитическая единица, корреляция, популяция, плотность населения, преступность.

The statement of the problem.

It is important that researchers human's society understand, that our species is characterized by the same patterns of population phenomena, as for the other animals. Those who research socio-demographic characteristics of our species have many difficulties. But researchers by population characteristics of other animals have are no less difficulties. In particular, they have to use indirect methods of counting individual, ranging from the number of eggs to the excrements or dead animals a certain type per hectare or square kilometer, as well as the fact that it is difficult to counts the frogs in the swamp. The animal does not have to register; it does not need documents to participate in public relations. But it is studying of social phenomena in human society also characterized by difficulty understanding. Conducted the census and maintaining public and private accounting of the population, consumers, etc. facilitate research, but, unfortunately, do not deprive deep-rooted misconceptions.

Statistical science gives us the opportunity to learn not seen anything about a large number of animals, while we have the opportunity to watch the very small number of samples [1, p. 45]. Indeed, the correct analysis of quantitative characteristics of the population is very important for accurate conclusions about what takes place in the social life of

the species. For example, we estimate the absolute and relative indicators of population and determine its boundaries. Humans have for this is the so-called "statistical regions", and to study the characteristics of other populations, science uses the natural boundaries of this species.

One of the masterminds of the institution of criminal statistics in France and the publication in 1827 of the first official report on crime is Andre-Michel Guerry called statistics by biological because that reflect the deep elements of population in its various states, referring to the contemporary him English statistics [2, p. 53]. It is clear that the taking into account of the number of population is directly related to the assessment and forecast of the desired demonstrations of social activity in the population.

However, that no matter how insulting it sounded for social statisticians, analysts animal populations is much less committing serious errors in method accounting of population. In particular, to determine the absolute and relative characteristics of the population, they use another kind of animal for relative measurement, such as predators and prey, symbiotic species, parasites and "owners" and others. In any case, this approach is more productive in conditions of taking into account socio-biological, mathematical, and other laws of life of the species. Assessment of the facts based on

its representation at 100,000 individuals, exists only in our imagination [3, p. 28]. In real life, these speculative 100,000 do not play the socio-demographic role, since social and other relationships exist in the population within its habitat and quantitative real representation. This is only an analytical alignment, which is actually a fully speculative. Using the relative analogue, we thus aim to give our vision orderly, but we forget that the reality we do not forgive it.

The idea of proportional metering population with reference to the proportional counting objects habitat is a very good idea, which allows for a much smaller error in measurement. Such a correct comparison shows an example of how to take into account the number of people in the region in order to adequately assess its activity, not based on some artificial analytical unit, which does not take into account the factor of the number of social relationships, competition, and so on.

The purpose of the article. The purpose of this article is to present the results of my research, which, contrary to the prevailing dogma in criminology, prove quantitative influence the number of population on characteristics of crime, as well as refute the correlation between population density and crime.

The main material. There is nothing wrong in the fact that we, for example,



count the number of deaths per 1,000 or 100,000 people, but the bad thing is that we have compare this 1,000 or 100,000 with other populations in which the habitat and population density are different, especially when essential. If we study some characteristic of the population, in particular, adaptation of the population as a whole, the accounting should be taken not only the characteristics of the environment, but also the number of all groups within the population. The specific dependence of the adaptation from the population size and parameters of the environment is what is called the "law of nature" [4, p. 26]. It is known that for many species characteristic of the so-called "territorial" when the animals in advance reduce their numbers, received signals that it is close to the limit. In humans, the territorial programs are not completely destroyed. People do the isolated group and defend their territory very active [5, p. 9].

In large groups feel at ease "liars", that is a selfish, parasitic on altruism another individuals [6, p. 351]. On the contrary, in small communities, a large number of egoists survive much harder, so it is natural when a lesser population will be much smaller proportion of social parasites, to which, of course, can be attributed to the criminals.

We can, for example, to compare the fertility rate among people in different regions. For example, in the Ukrainian regions, whose population differs quantitatively to 3 million people, less on the number of the region's population is born to 446 more children, based on the relative unit born per 100,000 populations. But this figure gives us a little, because we do not taking into account the situation related to increasing competition in the populous region. In the animal world, it causes a reduction in the population in this habitat due to births and deaths. Additionally, at experimental studies it is known that in a population of animals, even provided with an abundance of nutrition, fertility starts to decline after a population adds significant amount. Initially, when the population is still relatively high, the sizes of the adrenal glands in individuals are normal, but with the increase in population size adrenal glands are rapidly increasing in volume. This in turn affects the production of hormones and affects the dynamics of

fertility. The aforesaid mechanism is well studied in mammals, but, unfortunately, it is not known whether similar studies conducted on humans. In any case, only arrogance makes people think that their biological instincts and mechanisms of biological regulation are above all the wildlife and these mechanisms do not apply. But, obviously, it is not that. It is these mechanisms account for this difference in fertility. The above-mentioned areas are really quite difference in population density. In the area in which the higher proportion of the population density, the population is almost twice as high, and therefore fertility in there.

World literature is rich in studies depending on population density and its dynamics. In this sense, an interesting model that takes into account the presence of feedback that suggested by the Belgian mathematician Pierre Franois Verhulst, calling it the logistic model. This model has an exponential part describing the rapid growth of low population density, and slowing population growth with increasing population density. The logistic curve is well described the growth of population in the United States at the beginning of 1900s. But in later years the US population grew much faster than one would expect on the basis of a logistic curve [7, p. 91].

But why this should not affect the crime rate? At low population density intraspecific competition is reduced, and the birth rate exceeds the death rate, while increasing the density, on the contrary. Does this mean that the population density and the estimated degree of intraspecific competition will affect, for example, to crime? The population density affects all social conflicts positively. But this position is disputed, claiming that the increase in population density for 1 person/km² leads to a decrease in crime by 1.82 units. The question arises, rather than whether the researchers have made a mistake in the approach? The irony is that they rightly emphasized the primary reason for the contradictory results of some criminological analysis that is divorced from his statistical analysis based on modern means of summarizing information [8, p. 49, 51]. Although the authors claimed that used cluster analysis, the accuracy of their findings is questionable, but do not expect that the correlation between population density

and the current crime will always work. The data presented further evidence that the greater or lesser density of human population does not directly affect the recorded crime. It may be higher in sparsely populated cities and in densely populated cities below. In this case, more important is the sheer number of the population is in effect on the crime rate, rather than the population density of the city. Probably, it is fact that density of population not affects the crime, but the number of individuals in the population it is.

In the mid and late 1970s in the Soviet Union on this issue said with a sure voice, because without a doubt was noted that the increase in the number of young men, or an increase in population density, alas, no visual evidence, are the conditions that contribute to an increase in the number of crimes committed. Conversely, among the most significant factors influencing the urban crime is not allocated the amount of population and higher population density compared to smaller cities or rural areas.

There was a unique argument that low population density reduces the frequency of social contacts, and leads to a weakening of social control [9, p. 76]. Far-reaching assumption, if we forget that in the cities, especially large ones, where high population density, informal social control, and it was he who played a leading role, is reduced, but the frequency of social contacts is high, which increases the likelihood of conflicts.

This situation, in which the density of the population does not show an increase crime, as well-known manifestations of conflicts over resources, should give rise to justifiable doubts. There is a temptation to fend off the good old argument about the "dark figure" of crime. However, the bright figure should respond to this factor. Apparently, we have a puzzle. Here it would be appropriate to bring the claim that fluctuations in the number of human population does not represent a rigorous, mathematically precise cycles. Rather, they seem to have quite widely varying around a mean value. This pattern would be expected, because human societies are complex dynamical systems, many parts of which are cross-linked to each other by non-linear feedback [10, p. 15]. Perhaps under a cross-fire hit and the population density in the impact on crime, and the obvious fluctuations between dispersion



mathematically expected number of delicts and crimes.

There is a possibility that this result was due to use by researchers a coefficient crime in the region, rather than absolute quantity of crimes. If researchers ignore this law, then they take as a basis the number of population, which exists as a result of analytic alignment. Without taking into account the specific characteristics of life, which are due to the size of the habitat and the number of individuals who come in contact, living, acting, in general, giving figures for the statistics.

I think it did that researcher who cites most other exploring the issues of regional crime. Armed with census data and reports on the rate of crime in St. Petersburg and Leningrad Region (Russian Federation) for 1989 and, using correlation analysis, emphasized the close link population density and crime in the region from 0.63 to 0.80, which indicates a strong degree of correlation [11, p. 202]. This result in under suspicion, because if the effect of population density on crime plays a role, this effect should be supported in all social systems and states.

If you take the trouble to re-check the correlation using the method of correlation analysis in any country, for whatever year, you will find often a strong correlation or high correlation, or, less frequently, and a weak correlation. I did so. Took data on the countries studied, and calculated according to the formula, the correlation coefficient (r) between the population density in the regions and the number of registered crimes in countries.

To recognize the existence of at least a weak positive relationship between the variables (r), the coefficient should be from 0.00 to 0.24.

Take the graphics data for the Republic of Poland (2012). The correlation between population density and crime is obvious even graphically. Why it has happened:

$$r = \frac{16 \times 184228367 - 1119803 \times 2075}{\sqrt{16 \times 105480748165 - 1119803^2} \times \sqrt{16 \times 357247 - 2075^2}} = 0.797$$

But graphics for other countries are not as promising, and most of those. A similar result was released in the United Kingdom – $r = 0.792$, and in Germany – 0.732 , and in the Czech Republic – 0.826 , and in Finland – 0.735 , and in Russia – 0.613 . There is an example and a weak correlation (Canada, 2012):

$$r = \frac{13 \times 16234364 - 2235325 \times 86.86}{\sqrt{13 \times 868319566053 - 2235325^2} \times \sqrt{13 \times 1319.26 - 86.86^2}} = 0.068$$

What it can speak? The fact that the correlation analysis method is not suitable for the calculation of the effect of population density on the number of crimes committed, as estimated in the coefficients do not correspond to the results shown in the graphs. In the graphs can be observed that the proportion of the population density does not always affect the crime rate compared to other regions, it has a large population density does not mean that the number of reported crimes is greater than the number of crimes in the comparison area. Not uncommon in the region with much greater population density is recorded slightly more crimes than in the comparison region with much lower density. This is probably due to the fact that the coefficient of correlation yields averaged results over all regions, and more importantly, in this situation, a greater importance is not in itself the population density and the number of the population. This averaging repays fluctuations that may exist in reality, and, in fact, may be sensitive mainly to the most dramatic indicators of population density and crime. This deprives the method of correlation analysis in assessing the effect of population density on the crime of its appeal, but gives confidence that the independent correlates role here still plays a number of populations. Therefore, with a population density turns out that equal proportions does not happen often, and this is evident in the absence of painting, which would have been the population density column is equal the column number of registered crimes. However, there is no strict relationship between population density and the number of reported crimes. Here, as with changes in the number of population, direct proportion had not expected. Here dominate fluctuations. But the force is maintained just at the number of people, and not from its density.

This approach of it supporters who saw strong correlation can be understood. But as you can see, their result is based on an error. Their arguments boil down to the fact that under the conditions of the territory with a high degree of urbanization, population density expresses the closeness of the social environment. The population density is having an impact on criminal behavior is not in itself, it is only

a condition that leads to the deterioration of living space, and contributes to the possibility of increasing the frequency of social contacts [11, p. 202]. It's a great guess, which, among other things, is also confirmed by computer models. But in real life, a phenomenon more frequent contacts, oddly enough, is not due to the density of living of the population, but with the absolute number of people in the region. Here is a contradiction dropped us.

For the properly assess the impact of population density on the number of recorded crimes, you need to compare regions with the same number of people. Because within the same country to find regions with the same number of population is highly unlikely, it is necessary to try to compare regions with similar population size, the difference in rankings from 2,000 to 20,000 people. It is obvious that not all states can find a quantitative affinity. In those countries where more regions, there is a good chance to find the required number of such regions. However, there is no city administrative value. In such a case is always difficult to know the statistics of crime in the cities.

In the many cities of different countries can be seen that there is not always a correlation between high population density and a large number of reported crimes in cities with similar population size. It happens when the city with a much higher population density number of reported crimes significantly less than in the city with lower population density. But in many cases, if not to say that most, the opposite happens. However, quantitative preponderance of reported crimes under these conditions shows small differences. Often the quantitative advantage can be seen when the difference in population density in cities close to his number is 50% or higher. It is likely that not all overweight population density can have a significant impact on socially significant figures. In addition, it is obvious that crime, and therefore its registration and, subject to significant fluctuations depending on many factors, but still remains within the mathematically expected number, and is subject to disperse influence. Thus, cannot be considered conclusive arguments of those researchers who argue that population density have the opposite effect on the growth of registered crimes.



Nature is very sensitive to the quantitative characteristics of the population. There are survival strategies that are directly used quantitative laws populations in natural interaction. For example, an amazing, survival strategy that uses three kinds of periodical cicadas belonging to the genus *Magicicada*. They use a 13-year-old and 17-year life cycle and reproduction. Accordingly, 13 or 17 years as larvae live under the ground, and on the 13th or 17th year, crawl out of the ground and the area of the event is going through the whole invasion of tens or even hundreds of millions of periodical cicadas that envelop their own marriage trills. Presumably, the biological significance of this phenomenon lies in the fact that potential predators or parasites were few in number compared to the cicadas during their invasion, and in the intervals between the invasions, would starve [12, p. 119–120]. This allows controlling the population of predators, because without an abundance of food they multiply so intensively. In addition, during the invasion of numerically small predators and parasites cannot cope with the entire colony of cicadas, and they can leave more offspring. We see that in this strategy the main idea is that the amount determined by the possibility of the population to survive in the risks associated with predators and parasites.

If you move this strategy in the human population, the predators and parasites usually considered as the criminals. While this is not quite true, because to social parasites can be attributed not only to those who are in trouble with the law. A large population within the habitat, such as the city, will mean that predators and parasites will be more because the entire population of the city is not hidden for years under the ground, and then appear to the Sun and Moon for a short period of time. This intraspecific relationship, so mankind uses other strategies. Nevertheless, the number of pattern in the human population has a direct role for the number of social parasites and predators. Of course, I do not mean that they are born, incorrigible predators or parasites, at least, those who commit crimes. There is not even appropriate the word “incorrigible” as a crime and parasitism are natural coping strategies for people, even though they seem to be less effective.

Conclusions. Population size continues to play a role in the dynamics of

social phenomena. Such as intraspecific struggle for survival, this is manifested not least in the parasitic behavior of individuals. And therefore, the taking into account number of the population in a particular habitat, such as a city, district, region relevant for the determination of the quality indicators of social activity of the inhabitants. Therefore, the relative measurement, such as we know it, distorts the objective laws of social life. We can compare one species to another in their interactions or in isolation, and it will be adequate for measuring, but if we compare one species, then we have to consider the scope of its habitat and the number of individuals in it, rather than analytical unit of 10,000 or 100,000. Such an adequate measurement in social and biological sense allows the take into account the dynamics of social relations, which have a decisive impact on the manifestation of social facts. Therefore it is so important to account of the specific amount of the population, inhabiting a certain areal, because it is the number of the population gives rise to a known and an unknown number of accidents in it.

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