



## VISUALIZATION OF A SOCIAL PROBLEM: SPATIO-TEMPORAL ANALYSIS OF SEXUAL ASSAULTS IN TURKEY

TÜRKİYE'DE YAŞANAN CİNSEL TACİZ OLAYLARININ ZAMANSAL VE MEKANSAL  
ANALİZİ: SOSYAL BİR PROBLEMİN GÖRSELLEŞTİRİLMESİ

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### Öz

Bu çalışma, Türkiye'de yaşanan cinsel taciz olaylarının, sosyal bir problem olarak gündeme getirilmesini amaçlamaktadır. Çalışmada, Milliyet gazetesinde 1997-2008 yılları arasında yayınlanan haberlere göre tecavüz iddiaları ve cinsel taciz olaylarının, Coğrafi Bilgi Sistemi (CBS) kullanılarak zamansal ve mekânsal dağılımları incelenmiştir. Elde edilen yoğunluk haritası, cinsel taciz ve tecavüz olaylarının genellikle metropol alanlarda ve gelişmiş şehirlerde yaşandığını göstermektedir. Coğrafik olarak, bu tip olayların ülkenin batı ve güneyindeki sahil kentlerinde yoğunlaştığı gözlemlenmiştir. Bulgulara göre, cinsel taciz kurbanlarının yüzde 63'ünü 19 yaş ve altı bayanlar oluşturmakta, çoğunluğu öğrenci olan bu grup içerisinde de kurbanların yüzde 60'ı metropol şehirlerde ikamet etmektedirler. Yine verilerden elde edilen sonuçlara göre, olayların yaklaşık yüzde 80'i, öğretmen-öğrenci, işveren-işçi gibi birbirini tanıyan veya günlük hayatta ortak mekânları paylaşan kişiler arasında yaşanmıştır.

**Anahtar Kelimeler:** CBS, Zamansal ve Mekânsal Suç Analizi, Cinsel Taciz, Türkiye, Milliyet

### Abstract

Our study aims to visualize the social problem of sexual offences in Turkey. We utilized GIS to investigate the spatio-temporal distributions of reported sexual offence incidents, including allegations of rape that are published online by Milliyet (1997-2008), a leading national newspaper in Turkey. Density mappings of sexual offences and rape-related reports indicate that these criminal acts mostly originate from, and agglomerate in, the metropolitan and more developed areas of the country. Geographically, the cases are concentrated in Turkey's western and southern coastal cities. Another finding is that 63 percent of sexual-offence victims are 19 years old and younger; within this age group, 60 percent of the victims reside in metropolitan areas, and many of them are students. Almost 80 percent of the total incidents occurred between people who had already known each other or shared enclosed space together, such as persons involved in instructor-student and/or employer-employee relationships.

**Key Words:** GIS, Spatio-Temporal Crime Analysis, Sexual Assaults, Turkey, Milliyet

## 1. INTRODUCTION

There are 22 loathsome sexual assault incidences that have been reported in different cities in Turkey during the second half of 2008, according to an online archive of one of the best selling newspapers in Turkey. There are also some columnists who have written about these incredible trends around the country and a few of them consider this to be a social problem which has existed for hundreds of years; but is now known through the development of the communication technologies, even though public opinion shows that this is a result of visual media's effect on society-- based on readers comments on these instances. . This study is not dependent on whether or not their assumptions are true. This study focuses on the documented and recorded incidents, and does not include historical background of the problem, at least not before 1997 which is the oldest date that we could reach online archives.

It is really mind bending to see there are lots of educated people and people who are of high social status, who have been marked as sexual offenders. . At first glance, the highest percentage of victims is students from primary and high schools. There is wide ranged age group for offenders and victims. Although there is no relationship between the offenders and the victims in some of the incidents, most of them share a social relationship such as: a relative, a coworker, an educator or a student, some business relationship, and so on. When looking at the locations of the incidents, developed city's districts and touristic places are dominant.

This study includes background information about spatio-temporal analysis, crime analysis by GIS, crime geography, communication and framework analysis. The methodology section includes information about how the data for this study was gathered, transformed into different software based on different purposes, how GIS applications contributed to the results and how online archived news reports were analyzed based on communication approaches. At the end of the study, spatio-temporal distributions of the sexual assaults were presented based on location, occupation, social statuses, age groups and the relationship of the offenders to the victims. Also, the approach and influence of these reports in the media are discussed.

As interdisciplinary research, this study is includes spatio-temporal analysis in the case of crime geography and framework analysis in the case of communication. The research questions are: a) How do sexual assault incidents spatially distributed in Turkey during last 12 years? b) What are the basic features of the relationship and distributions of age, education level and occupation of offenders and victims?

## 2. BACKGROUND

The spatial analysis of crime is not a new research area. Even the before computer age, there were several papers that were published about this topic. For example, Gregory Kowalski wrote about the crime

distribution at the state level and how crimes are aggregated around the country (Kowalski, 1979). He gathered the crime rates from the Uniform Crime Rates and mathematically combined them with groups and regions by using linear functions. Of course, the results did not show any visual output or mapping except for math results.

One of the best definitions of crime mapping is “crime mapping involves the manipulation and processing of spatially referenced crime data in order for it to be displayed visually in an output that is informative to the particular user.” (Hirschfield and Bowers, 2001). In the same books, editors have classified different usages of crime mapping such as, for operational policing purposes, informing and targeting of resources for crime prevention, police investigation, inform and interact with the community, monitoring distribution of crime over time and evaluate the effectiveness of preventions. In the case of this study, maps provide information for the community and distributions of the incidents are monitored.

Even though computer based crime tracking and analyzing are not new techniques, GIS is becoming a bigger part for the supporting operations, crime mapping and analysis, detection, and strategic analyses, especially in the last 15 years (Chainey and Ratcliffe, 2005). GIS provides a very efficient tool to display and apply spatial analysis through the mapping of criminal activities, locations and the distributions of incidents. It is becoming stronger through the use of an additional database, types of the roads, features of the buildings and neighborhoods, etc (Krish, 2003). The availability of high performance computers, affordable software, easily gathering data and lower costs can be listed as some of the main reasons for this broader consideration of GIS.

STAC was one of the very first software packages that was developed by the Illinois Criminal Justice Information Authority in 1988 (Official web site of the Authority). It is a combination of two software which are the Time Analyzer and Space Analyzer. Currently, there is a lot of software to use for spatio-temporal analyses which were developed for similar purposes but with more advanced techniques.

Today, spatio-temporal analyses for different purposes are becoming more common and easy to utilize through the help of technological development. Even blog activities can be tracked and mapped as spatio-temporal approaches. Bansal and Koudas have done spatio-temporal textual analyses based on the BlogScope and they were able to present the categories: what, when, why and where the things are are considered to be interesting (Bansal and Koudas, 2007).

Most police departments, especially those in the United States, track crimes by using information about crime type, location of crime, modus operandi, method of attack, point of attack, weapon used (if any), features of weapon (if any), vehicle used (if any), history of arrestees, age details, actual address of incident's location and actual address of the victims (Krish, 2003). In our study, we have information

about age, education, professions, date, location of the city, county and village, since data was taken from the news.

There are lots of spatial analysis techniques to figure out the location of the offenders based on their original location and the location of the previous incident such as Brent's and friends (Snook, 2005) study about the crime location choice and effective factors. Again, since we do not have the exact addresses of the offenders and the incidents, we simply are not able to do this kind of detailed analysis on a small scale area.

## **METHODOLOGY**

### **Principles**

In order to investigate a social problem in a country where circulation and dissemination of statistics of criminal data is very restricted by the government, the researcher (s) must deploy alternative ways of acquiring credible data. To collect useful data, we employed indirect methods of data collection to investigate a social problem, sexual assault incidents in Turkey. We identified (Milliyet) one of the best selling newspapers' online archive as our investigation site. We had several rationales in choosing Milliyet as our data mining site. First, the newspaper has the oldest online archive system among daily Turkish newspapers. The time of the study is limited to 12 years because there was no news archived online before 1997. At the time of research progress, Milliyet was the only daily Turkish newspaper which had 12 years of accessible online archives and published sexual assaults in associated news, mostly as a third page content. Second, Milliyet is one of the widely read newspapers in Turkey although it is difficult to identify specifically how many readers click on the newspaper's website. Our assumption was built around the fact that the newspaper has been one of the oldest (since 1950) newspapers that still continues to be sharing a large news market in Turkey. Finally, our initial investigation showed that Milliyet had the tendency to report sexual criminal events more than that of any other national newspapers. This particularity of the newspaper was crucial for our investigation since our goal is to access the most available and credible news source about sexual assaults in Turkey.

### **Data acquisition**

Our goal is to access all published news that deals with 'rape, sexual assaults, and sodomy.' We typed the words 'rape, sexual assault and sodomy' in the archive search section of online Milliyet to find all of the related news. Our initial data set revealed this result. The words 'rape, sexual assaults and sodomy' were used in the newspaper 1989 times from 1997 to 2008 inclusive. From those excavated news articles that contained our key words, we read each of the news articles one by one and excluded news that

did not relate to the first meaning of sexual assaults, rape and sodomy. At the end, 305 news reports that directly related our intent of investigation remained.

The results of this search were read and the information about the details of the location (city, district, and village), personal information of offenders and victims (age, nationality, occupation, and education), pregnancy, marriage and death were recorded one by one. The data was stored using MS Excel, then it was converted to .dbf format for the GIS application and .sav for SPSS analysis.

We collected and codified every useful demographic and the geographical information for every incident separately and then aggregated them into a spreadsheet to be converted into the GIS environment (see table X –enter the data collection table-). Presumably some of our codifications are based on the assumptions. For instance, if a person is identified as a school principle, we assumed that his/her educational background is at least some level of college graduate since all principles are required to have a four-year accredited degree. We disqualified mundane news that had no credible data in it.

Collected data which was in .xls format was uploaded to GIS environment. The current country map with cities and districts has been joined with a data chart by using city tag number. The locations of the incidents were created as points by using X and Y coordinates for each of them. Each point has attributes that include all of the recorded information on it. ArcGIS 9.3 version was used for the study. Spatio-temporal maps of the incidents were created based on the specific spatial and non-spatial data.

### **3. RESULTS**

Based on the analysis, 63 percent (195 out of 305) of victims are in the age group of 19 and younger. 89 percent of those victims were students and 9 of them were from another country. 57.7 percent (176 out of 305) of the total number of victims were students, while this amount is just 10.8 percent for offenders. The density distribution of the age groups of victims is between 10 and 30 years old, while the density age group of the offenders is between 15 and 40 years old based on the scatter plots analysis. 8.5% percent of the offenders and 5.2% percent of the victims have graduated from university or were university students. According to the results, the number of offenders is mostly concentrated in a low income and less educated demographic. 11 percent of the incidents have 2 or more victims while 19 percent of total incidents have 2 or more offenders. Only 9 of total news reports have mentioned matching 2 or more offenders and victims at the same time. There were 4 offenders and 29 victims murdered. 36 of the victims became pregnant. 4 cases resulted in the offenders marrying their victims.

10.4 percent (32 incidents) of the offenders were pointed as public officers. Their victims included a teacher, a travel consultant, a b-girl, a secretary while the rest of the victims were students. 4 of the victims were not Turkish. 78.6 percent of the offenders are reported to have been in the working and low

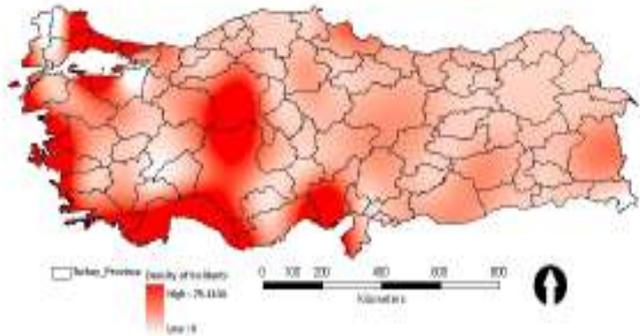
income class, and had an occupation that does not require a university degree. Students are also significant targets in this demographic.

There are some weaknesses of the data based on the online news. 103 of the offenders' and 29 of the victims' ages were not mentioned, the unmentioned victims are give a "0" value, during the processing of statistical analysis and GIS applications. We do not have information on educational level for 225 offenders and 113 victims. Since most of the victims were students, it was easy to use age as a demographic; even though age is not given in the news reports. There was also no information about the occupation or proficiency of 117 offenders and 89 victims.

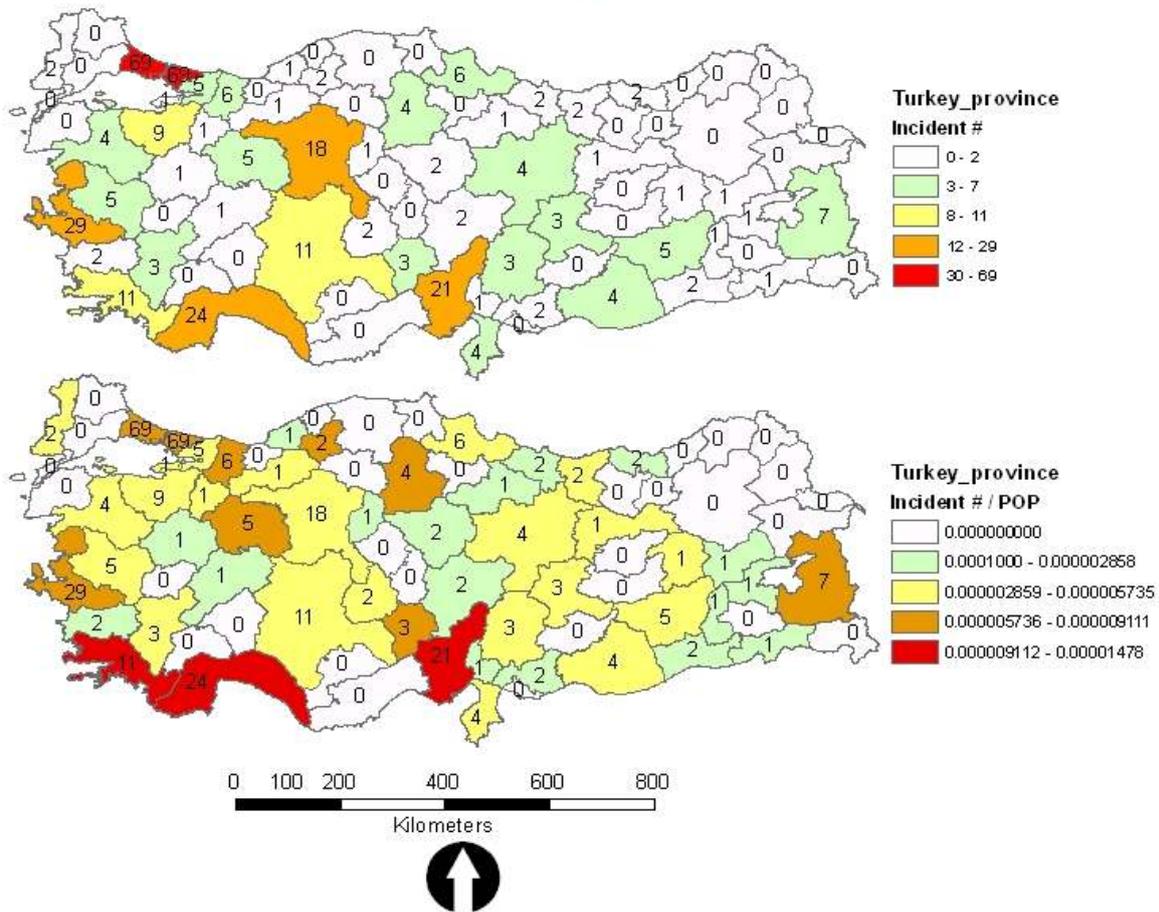
At first glance, developed cities, metropolitan areas, south and west coastal zone of the country have more sexual assault incidents than other regions in the country (Figure 1). İstanbul, İzmir, Antalya, Adana, Ankara, Konya, Bursa and Muğla are the most frequent cities based on the sexual assaults news on the publishing. Even though quantitatively, the largest number of incidents occurs in İstanbul: 69 incidents in the last 12 years. When we normalized the data by population, Muğla, Antalya and Adana had the highest percentages for sexual assaults (Figure 2). Most of the eastern and southeastern cities have no records.

The lesser number of incidents in the eastern and southeastern part of the country might cause some discussion about the accuracy of the analysis or data of the study. According to several academic researches and national reports, people in the east and southeastern part of the country do not report sexual assaults to an official department, like the police or military headquarters, because of the pressures of traditional social structure (feudalism) and conservative family form (Department of Common Rights of the Prime Ministry, 2008). Cansunar and friends also had a lower number of incidents than reality for east and southeast region compared to the west, northwest and southwest part of the country (Cansunar, 1995). Besides that education level is also play an important role on to females who does not know what to do after experience a sexual attack (Kardam, 2007; Sacaklioglu, 2006).

The occupations of the offenders and victims were classified based on the income group. According to this classification there are 4 groups: low income (e.g, drivers, security, and construction workers), public officers, middle class (e.g., policemen, teachers, and soldiers), students and high income (e.g., managers, contractors, and proprietors). When we look at the distribution, it is easy to identify how



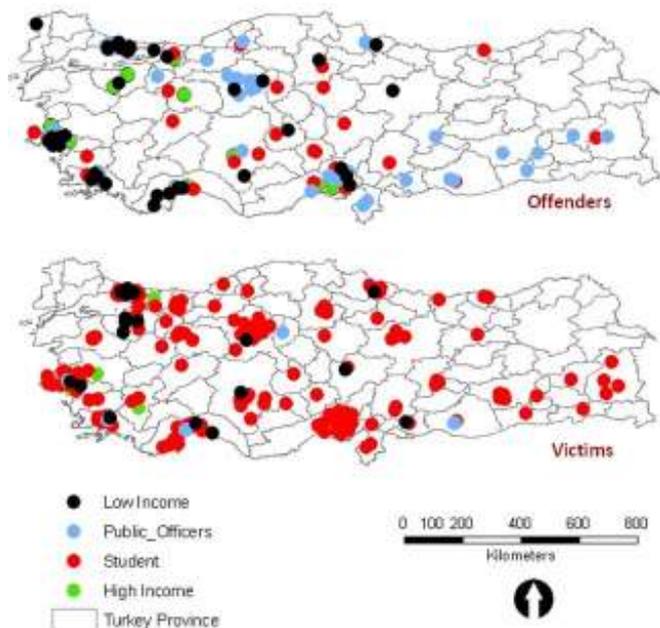
**Figure 1:** General Distribution of Incidents



**Figure 2:** Distribution of Incidents by Number and Normalized by Population

dominant students are as victims all over the country, and then low income victims follow them, especially in the metropolitan areas. The distributions of the public officers as offenders show remarkable dominancy in the southeastern part of the country, where only student victims have been reported. In other cases, low income offenders are of a high percentage in some developed cities, such as Istanbul, Izmir, Mugla, Antalya and Adana.

As we mentioned earlier, there is no educational level information about 74 percent of the offenders in the news. 25 percent of the

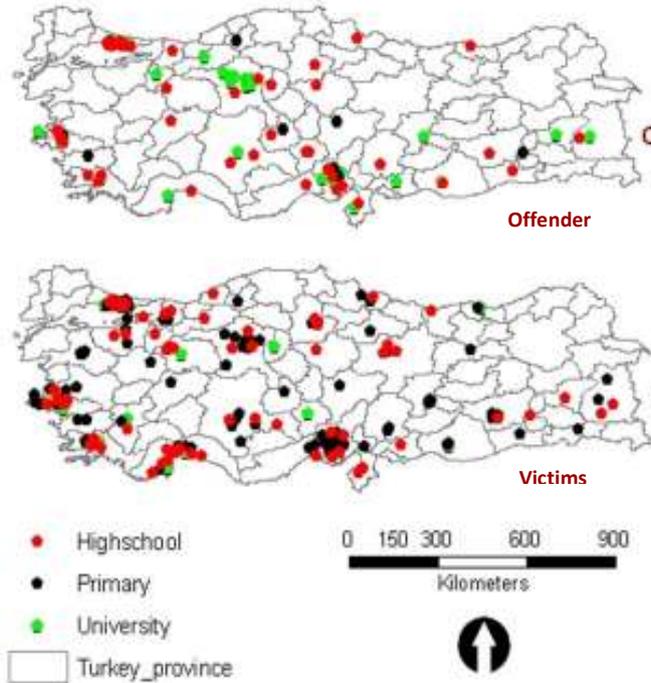


**Figure 3:** Distribution of Incidents based on Occupations of Offenders and Victims

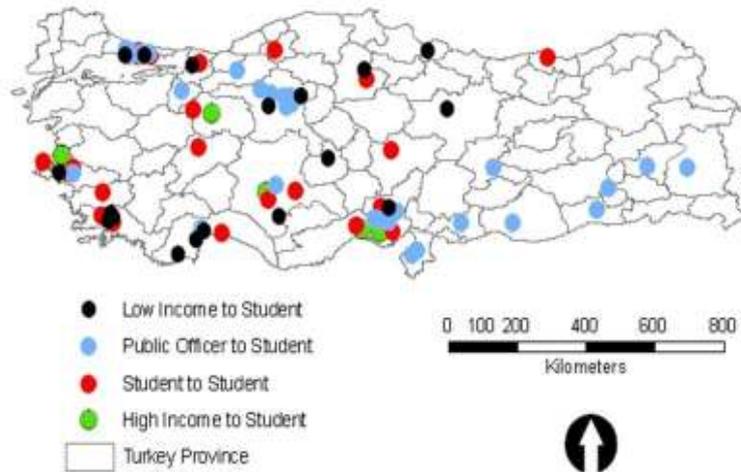
offenders have either a high school diploma or a university degree, or they are still students (this counts for at least 80 incidents where we have gathered the educational information of the offenders.) 36 percent of the victims are primary school students and 22 percent of them are high school students. In the southeastern part of the country the distribution of primary and high school students are almost even. High school students have high percentages in Izmir, and Antalya, while primary school students are dominant in Istanbul, Ankara and Adana as victims.

Since a remarkable percentage of students are victims, we'd like to see the ratio of the most frequent offender groups on students. Based on the results, the low income demographic has 22%, public officers 40%, students 31% and high income group 7% as offender. Istanbul, Ankara and southeastern cities have the greatest density in the case of public officer offenders and student victims.

When we look at the spatial closeness of offenders to victims, we found a 71 percent positive relationship. This percentage was taken out of 98 incidents where we know both the offender's and victim's occupations. Samples for the relationships are teacher and student, student and student, client and lawyer, receptionist and hotel guest, security guard and worker, employer and employee, etc.



**Figure 4:** Distribution of Incidents based on Education Level of Offenders and Victims



**Figure 5:** Distribution of Occupations based on Student Victims

#### 4. CONCLUSION

Sexual assault is very serious problem, not only in Turkey but around the world. In our study, women and students under the age of 19 are the main victims. High percentages of the offenders to students are either student or public officers. It might be because of the publishing principles of the news paper or people report authorities if public officers or students are accused as an offender. Another common outcome is the victimization by acquaintances. Education plays crucial role.

It is important to mention here that our collected data is not nearly exhaustive, nor is it geographically representative. However, we still believe that our collected data set is statistically significant and spatially illustrative from which we can draw valuable conclusions. Our second hand data mining study indicated that there have been more sexual assault cases in the Eastern part of Turkey where our data showed there were almost no incidents occurring in this region. People around that part of Turkey just do not report the assaults to authorities.

There are difficulties in the investigation of sexual assault incidents for a couple of reasons. First, newspapers do not report every incident because of lack of accessibility, technology, etc. Second, as we already mentioned people do not report the incidents to the local authorities. Cultural factors play an important role in the investigation, such as cultural shame, parental coercion, honor killing, etc.

Follow up studies are necessary in order to properly illustrate the visualization of rape crime accurately by matching our data with police reports. Police reports are a very important data source in this matter but it is very hard, if not impossible, to reach them. For future studies, an analysis would be extended by applying a public survey based on the public perception about sexual assault locations, possible features of offenders, such as education level and occupations. Also, the study can be compared by the spatial and non-spatial incidence data of the Security Department of Country.

It is our understanding that mapping out a social problem comes first before even talking about solving the problem. Our study may not contribute to the scholarship theoretically but it will disturb the conventional thinking about the crime.

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