Terrorism and Weapons of Mass Destruction

Introduction

As a result of the events of 9/11, as well as the ongoing accounts of acts of terrorism in the media, we have seen rising national concerns about terrorists using sophisticated weapons (LaFree, Dugan, & Miller., 2015, p. 99). In response to these concerns, the U.S. government has invested more resources in counterterrorism measures, shifting the focus of the FBI from traditional crimes to counterterrorism after 9/11 (LaFree, Dugan, & Miller, 2015, p. 5). Beyond internal measures, Saddam Hussein's association with terrorists and the threat of weapons of mass destruction (WMDs) were the main reasons given in the rationale for the invasion of Iraq in 2003 (Otterman, 2003). An ongoing international concern is the damage terrorists could cause if they obtain WMDs (NATO, 2015). However, the definition of WMDs is unclear (Kaszeta, 2014), so we will look at a more specific group of weapons with the capacity to cause significant damages: chemical, biological, radiological, and nuclear (CBRN) weapons.

In this activity, we will study the extent to which CBRN weapons have been used so far, and analyze whether or not their past use fits with our perceptions. Have CBRN weapons been used successfully in the past? Are CBRN weapons historically more dangerous in the hands of terrorists than common weapons, such as firearms and explosives? What are the implications of past usage of CBRN weapons compared to other weapons in determining our priorities in counter-terrorism policies?

To answer these questions, we will use the Global Terrorism Database (GTD). The GTD contains information about more than 140,000 terrorist incidents occurring between 1970 and 2014.[1] The data in the GTD are gathered from news reports, which means they might not be the most comprehensive. The team managing the database tries to verify all the information they gather through multiple news sources (LaFree, Dugan, & Miller, 2015). Because of the large quantity of information contained in the GTD, we constructed an app to help visualize the data.

Part A: Using Scatterplots to Identify Extreme Events:

Go to the Grinnell College RStudio site, http://shiny.grinnell.edu/, and select the Global Terrorism Plots (it may take a few seconds to open). In the scatterplot, each point represents a particular country and year (referred to as a **country-year**), such as all the incidents that occurred in the US in 1984. Click the Variable Description link on the bottom left corner to understand the options within this app.

Before starting Questions 1-7, make sure the scatterplot is set with the following options:

- **X-axis variable**: *GDP Per Capita*
- **Y-axis variable**: *Incidents*
- **Type of Plot**: *ggvis*
- **Color By**: *None*
- **Success Only**: should not be checked
- **Year of Incidents**: 1970-2013
- **Filter by Weapon Type**: *CBRN* (so that we are only looking at attacks made with CBRN weapons).
- **Minimum number of Incidents**: 0

1) Notice that there are a fair number of points, showing that attacks with CBRN weapons do happen: there are several countries with one to five CBRN incidents, and a handful with 5 to 15 incidents, in the same year. Hover over some of the points. What is the largest number of attempted CBRN attacks in a particular country-year? What country and year did these attempted CBRN attacks occur?

2) Choose *Region* in the **Color By** menu. If these graphs appear too cluttered, you can select the *ggplot* option and select *Region* in the **Facet By** menu. Does this suggests that counter-CBRN policies may need to take place on a global scale or are there only a few regions that have experienced CBRN attacks?

3) Go back to the *ggvis* option. Select *Fatalities* in the **Y-axis variable** menu. We can see that most incidents have zero fatalities. Identify the two country-years with the most fatalities.

4) Go to the http://rstudio.grinnell.edu/Global_Terrorism_Map_Basic/ site. Select the Sub-Saharan Africa region and hit play to visualize attacks in this region. Click on the largest event in Uganda during 2000. You can choose to go to the GTD website (http://www.start.umd.edu/gtd) to find what events caused the fatalities in Uganda in 2000. If you research other major attacks, you would notice that the most deadly attacks so far were chemical attacks, suggesting that terrorists have never inflicted mass casualties (in the hundred-thousands or millions) with biological, radiological, or nuclear weapons. If they had, the event would likely have been reported and show up in the GTD. What events caused the fatalities in Columbia in 1999?

You can evaluate injuries instead of fatalities by repeating the previous questions and selecting *Wounded* for the **Y-axis variable** scatterplot menu. This information will reinforce what we found with fatalities. Whether we evaluate fatalities or injuries, we see that attacks with sophisticated weapons do happen, and on occasion they can cause a considerable number of deaths and injuries. However, the damage due to CBRN attacks is much less than other weapon types.

Part B: Using Stacked-Line Graphs to Compare Weapon Types

Another type of plot at our disposal is the stacked-line graph; it allows us to gain a better sense of how CBRN weapons compare to other weapons. The stacked-line graph takes the data from the GTD, organizes it by year and the chosen category (*region, religion, weapon, attack type, target,* or *success*), and tallies up the number of incidents, fatalities, or wounded in the given year and category. The Y-axis can be changed between percentage and absolute count.

5) First, select the *Stacked-line Plot* tab at the top of the app. Select the following parameters:
   - **Y-Axis Variable**: *Incidents*
   - **By Percentage (%)**
   - **Color By**: *Weapon Type*
   - **Facet By**: *None*
   - **Year of Incidents** 1970-2014

   Notice that use of CBRN weapons is rare (colored by the little bit of light blue at the bottom of the graph), usually less than 1% of all incidents. To better emphasize the rarity of CBRN weapons you can select *Weapon Type* in the **Facet By** menu and *By Count (#)* instead of the *By Percentage (%)*. The number of CBRN attacks are so low, in comparison to the others,

that they are nearly invisible. Does this support the media image that terrorists regularly rely on sophisticated weapons? Which two weapon types are used most frequently in terrorist attacks?

6) Select *Fatalities* in the **Y-axis Variable** menu, *None* in the **Facet By** menu, and the *By Percentage (%)* option. Notice there is a spike in CBRN fatalities in 2000. Based on your scatterplots in Part A, identify which event caused this spike. This event accounts for approximately 5% of the terrorism-related fatalities in that year. While 200 deaths are hardly insignificant, it is fewer than an attack like 9/11 which was classified as a melee attack) (LaFree, Dugan, & Miller, 2015).

Part C: Drawing Conclusions from our Graphs

These graphs and the GTD website allowed us to analyze CBRN attacks. We see that they typically resulted in a relative low number of deaths and injuries compared to other types of attacks. It is worth noting that the most harmful CBRN attacks used chemical weapons (with one exception), informing us that attacks with biological, radiological, or nuclear weapons were not attempted or failed. In *Putting Terrorism in Context*, LaFree, Dugan, & Miller confirm that few organizations are willing to adopt biological or chemical weapons (2015, p. 189) and that there are only 13 recorded cases of radiological weapons (out of the then 113,000 cases). There are also no cases of nuclear weapons, in part due to the difficulty of obtaining and weaponizing the materials involved (2015, p. 191). It is important to correct the image that terrorists routinely use sophisticated weapons. Resources are primarily needed in stopping terrorism using common weapons (explosives and firearms), which are currently causing considerably more deaths and injuries. However, given their high potential for damage, we can conclude that it is well worth taking preventative counterterrorism measures against future CBRN attacks. NATO's webpage "Weapons of Mass Destruction" reinforces that the use of CBRN weapons could produce "incalculable consequences for global stability and prosperity" (2015).

Part D: On your Own

Explore the plots and graphs within this app. Do you see any interesting patterns when trying different colors, filters, or facets for particular variables of interest? Submit one plot with a brief interpretation. If you need a place to start, read the Executive Summary section of the Global Terrorism Index report (Institute for Economics and Peace, 2014) (http://www.visionofhumanity.org/sites/default/files/Global%20Terrorism%20Index%20Report%202014_0.pdf) and look for interesting claims that you can investigate.

Endnotes

[1] For an incident to be categorized as a terrorist attack and included in this dataset, each incident must meet all three of these attributes 1) The incident must be intentional, 2) The incident must entail some level of violence or immediate threat of violence and 3) The perpetrators of the incidents must be sub-national actors. In addition each incident must include at least two of the following three criteria 1) The act must be aimed at attaining a political, economic, religious, or social goal, 2) There must be evidence of an intention to coerce, intimidate, or convey some other message to a larger audience (or audiences) than the immediate victims and 3) The action must be outside the context of legitimate warfare activities (see the GTD Codebook for more details). Data files from 1993 were lost by the company originally managing the database, so data from that year are missing.

[2]The one exception was the salmonella attack (classified as biological) by the Rajneeshee Cult in Oregon in an attempt to sway an election which injured several hundred people.

[3] This activity was created by Ying Long, Zachary Segall, and Shonda Kuiper. All rights reserved. Date: 7/25/2015

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