EC3320

2016-2017

Michael Spagat

Lecture 1

Welcome!! This will be the best year of your lives.

I expect that a big part of your fun year will be the Economics of Warfare course.

The next slide shows you one person who took the course and one person who didn't.

I took Economics of Warfare

I didn't take Economics of Warfare

Here are the mechanics of how the course will run.

I will give a two hour lecture every Monday.

You then break out into seminars with an advanced PhD student, Nathan Wooley. These start next week.

You are always invited to speak up in the lectures – ask questions, make comments, etc..

In seminars you must speak up. These will be discussions and we are counting on you to make these discussions interesting. THIS MEANS THAT YOU HAVE TO PREPARE IN ADVANCE FOR THE SEMINARS.

Seminar preparation will usually involve some short reading, viewing or listening plus a worksheet with some questions for you to answer. Some seminars will depart a bit from this standard model since they will be dedicated to exam revision or preparing you to write essays.

Marks are based 60% on the final that will be given at the end of the course.

There will also be two in-class midterms and two essays, each worth 10% of your final grades.

You can see the dates for the exams and the due dates for the essays in your course outline.

The essays will be short, a maximum length of 1,200 words.

Do not let the essay length fool you. It is hard to write a good, short essay. We will devote some effort to bringing you up to speed on how to do this.

The **course blog** will be a major focal point for our interactions throughout the year.

When you email questions to me I will post your questions together with my answers on the blog (without your name) as long as I think these exchanges are of general interest for all students, which is the case for almost all questions.

I'm less inclined to post answers to questions about your essays since I don't want to share your research with everybody but I will still post questions and answers on essays that are of general interest.

By the way, I have a public blog as well: https://mikespagat.wordpress.com/ . You are not in any way required to read this blog but doing so will help with the course.

Every reading on the course outline is required except in a few cases for which I say otherwise. In particular, I sometimes list short background pieces on various conflicts we study because economics students generally do not have such background because it is not part of their training.

I guess I should apologize for the fact that I assign quite a few articles for which I am one of the authors. However, in the end I think that most people will like this practice because this work is readily understandable for students with your backgrounds, I know the material very well and, you will see, I will get very excited about it.

We will record the lectures and post them on the Moodle site. Students report that these recordings are particularly helpful for course revision.

Speaking of revision here are the priorities in order:

1. Make sure you understand everything that goes on in all the lectures.

2. Make sure you understand everything that goes on in the seminars. In particular, master the seminar worksheets. These will include exam revision worksheets.

3. Master the Q and A on the course blog

4. Reading for seminars is crucial. The other reading is less important and is the lowest priority when preparing for exams. Sometimes the readings get very technical. Don't get lost in the details. The lectures distil the crucial bits of the readings. Readings can be useful for finding perspectives and explanations that are different from mine but they give too many details that are not central to the course.

Overview of the Course

The course proceeds along two parallel, but related, paths.

1. There is material specifically on war and terrorism. Not all of this is on the *economics* of war and terrorism in a strict sense but all of the material is quantitative.

2. There is general material on numbers and statistics. If your first thought upon hearing this is that "statistics are boring" then, absolutely, you need to take this course. One thing I can guarantee is that everyone who stays in place will finish the year with a deep appreciation for the sheer drama of numbers and statistics. A central part of the course will be about learning where numbers come from, how they are manipulated and what they really mean. This is a vital skill that will serve you well for the rest of your life.

The material in the autumn will be mostly micro studies, focusing on one conflict at a time – the main ones are Iraq, Kosovo, the Democratic Republic of Congo, Rwanda, and the Palestinian-Israeli conflict. But we'll make some short excursions to conflict in Angola, Colombia, Northern Ireland and Syria. You can go into more depth on any of these conflicts, or some others not covered, in your essays if you like.

We will discuss terrorism next week and then come back to terrorism at the very end of the course.

There will be some other mini topics such as war and development, war and health, coups, assassinations and asset markets.

The other main component of the autumn will be some simple techniques for comparing and sorting conflict participants and their methods by how "dirty" their practices are and the extent to which they target civilians.

In parallel we will cover the basic statistical ideas that we will use in the course.

In the spring we spend a lot of time examining the causes of conflict. Key candidates we consider are economic factors as well as climate, e.g., global warming and conflict.

We will discuss foreign aid and conflict, rape and conflict and the prediction of conflict.

We will finish with three weeks on the economics of terrorism.

Again, we will continue to develop the necessary statistical concepts in parallel with the economics material.

That is the course in a nutshell.

Let's dive in!!

Iraq

We use the data of Iraq Body Count (IBC). The IBC methods are described in detail in the papers assigned for this week. You can also get a one-page description of the methodology here.

Very briefly, IBC records only deaths of civilians using information that comes mostly from media sources but that is supplemented by information from places like morgues, hospitals, NGO reports and Freedom of Information requests made to the US and UK governments.

The part of the database we work with is essentially a list of discrete events such as shootings, suicide bombings and aerial bombings.

Consider the following table from "The Weapons that Kill Civilians"

	Total No. (%) of Civilians Killed (N=60,481)	No. of Events	Mean No. of Civilians Killed per Event	No. (%) of Female Civilians Killed (N=2396)	No. of Female Civilians/No. of Civilians of Known Sex Killed (% female)	No. (%) of Children Killed (N=2146)	No. of Children/No. of Civilians of Known Age Killed (% children)
Numbers of Iraqi Civilians, Female Civilians, and Children Killed by Particular Weapons in Short-Duration Events of Armed Violence, March 20, 2003, through March 19, 2008.*							
Method							
Execution							
Any	19,706 (33)	2,844	7±0.2	300 (13)	300/6,592 (5)	124 (6)	124/6,687 (2)
With torture	5,760 (10)	714	8±0.4	49 (2)	49/1,906 (3)	16 (1)	16/1,882 (1)
Small-arms gunfire	11,877 (20)	5,943	2±0.03	660 (28)	660/7,220 (9)	416 (19)	416/7,963 (5)
Suicide bomb							
Any	8,708 (14)	725	12±1.0	266 (11)	266/2,535 (11)	340 (16)	340/2,734 (12)
Bomber in vehicle	5,401 (9)	514	11±1.2	142 (6)	142/1,440 (10)	234 (11)	234/1,607 (15)
Bomber on foot	3,293 (5)	210	16±1.5	124 (5)	124/1,086 (11)	106 (5)	106/1,118 (9)
Vehicle bomb	5,360 (9)	866	6±0.4	244 (10)	244/859 (28)	216 (10)	216/1,053 (21)
Roadside bomb	2,854 (5)	1,404	2±0.1	126 (5)	126/1,230 (10)	149 (7)	149/1,409 (11)
Mortar fire	2,079 (3)	786	3±0.1	170 (7)	170/386 (44)	231 (11)	231/556 (42)
Air attack without ground fire							
Any	2,363 (4)	253	9±0.9	258 (11)	258/564 (46)	277 (13)	277/703 (39)
Bomb only	479 (1)	28	17±3.6	28 (1)	28/67 (42)	34 (2)	34/88 (39)
Missile only	357 (1)	45	8±2.3	36 (2)	36/115 (31)	35 (2)	35/118 (30)
Air attack with ground fire	687 (1)	41	17±6.5	63 (3)	63/177 (36)	66 (3)	66/234 (28)
Total for all methods	60,481 (100)	14,196	4±0.1	2396 (100)	2,396/21,448 (11)	2146 (100)	2146/23,581 (9)

* Plus–minus values are means ±SE. Short-duration events are defined as those ascribable to no more than two calendar dates and causing at least one reported civilian death; deaths from prolonged events and aggregate reports are excluded. Unless noted, results are for single methods only. The methods listed were included because they caused more than 0.5% of the total reported civilian deaths and because data on their effects, with the necessary level of detail, were available. Included in the "Total for all methods" are 1334 events involving other, unknown, or combined methods that killed 6847 civilians, 309 female civilians, and 327 children. "Execution" denotes the killing of any captured person by any method; this category includes combatants who were executed after being captured, since once they were captured they became noncombatants, who are protected under international humanitarian law.[4] For executions, the mean number per event is the mean number of executed persons reported found (e.g., "seven bodies found tortured and shot"), since the event of killing is usually hidden. "Small-arms gunfire" refers only to open gunfire and does not include executions of captured persons by gunfire. "Air attack with ground fire" involves any combination of air-fired weaponry (e.g., bombs or missiles) and ground-fired weaponry (e.g., mortars or gunfire).

Here are the first set of key points coming from the table.

1. 33% of the deaths are due to execution (overwhelmingly with guns) with at least 29% of these showing evidence of torture.

2. A further 20% are killed with guns.

3. 14% are killed in suicide bombs.

4. 17 civilians are killed per lethal aerial bombing.

5. 16 civilians are killed per lethal suicide bombing on foot

Now let's look at some proportions. For future reference I note here that these are examples of what, in a few weeks, we will call a "Dirty War Index" with the acronym "DWI".

Look at the columns labelled "Number (%) of Female Civilians Killed (N = 2396)" and "Number of Female Civilians/Number of Civilians of Known Sex Killed (% female)." How do we read these numbers?

Let's start with executions. There are 2,396 females recorded as killed in the database. The first column mentioned above breaks these numbers down by method, with the numbers in parentheses being the percentages of all females accounted for by each method.

Let's now consider the second column mentioned on slide 15. We would like to know for each method the percentage of all people killed by this method who are females, that is:

$$100 * \frac{(number\ of\ female\ civilians\ killed\ by\ method)}{(number\ of\ civilians\ killed\ by\ method)}$$

Unfortunately, we cannot calculate this because we do not know the genders (i.e., male or female) of most of the victims. So the number in the numerator of the above expression is not known. We address this missing-data issue by only including in the denominator civilians of known gender. In particular, we calculate:

$$100 * \frac{(number\ of\ female\ civilians\ known\ killed\ by\ method)}{(number\ of\ civilians\ of\ known\ gender\ killed\ by\ method)}$$

In the last two columns of the table we make similar calculations but for children

Make sure that you know what the numbers in the table mean and how they are calculated.

16

Here are the key results for these proportions:

1. Air Attacks - female proportion of 46 and child proportion of 39
2. Mortars - female proportion of 44 and child proportion of 42
3. Vehicle bombs - female proportion of 28 and child proportion of 21
4. Overall - female proportion of 11 and child proportion of 9
5. Gunfire - female proportion of 9 and child proportion of 5
6. Execution - female proportion of 5 and child proportion of 2
7. Execution with torture - female proportion of 3 and child proportion of 1

Generally speaking, *as you move from 1 to 7 the perpetrators have more control over whom they kill and it turns out that they kill a lower percentage of females and children*.

But bear in mind that for most deaths the age and sex of the victim are unknown so we need to be aware that the calculated proportions can be sensitive to this incompleteness in the data (We will follow up on the incompleteness issue in lecture 7)

"[Violent Deaths of Iraqi Civilians](…)…" adds detail on perpetrators, time and location.

Note, though, that 74% of the deaths in the IBC database are attributed to "unknown perpetrators." So the perpetrator information is highly incomplete.

Most methods are already linked with a particular type of perpetrator. For example, only coalition forces do aerial bombs while the coalition never uses suicide bombs. In these cases adding perpetrator information to the methods information does not actually add anything new. However, both sides use small-arms gunfire so it is interesting to compare coalition forces with anti-coalition forces on small-arms gunfire. One way to make this comparison is to use a proportion like the one above but mixing together women and children. For the method "small-arms-gunfire" we calculate the proportion:

$$100 * \frac{Women\ Killed\ + Children\ Killed\ by\ small-arms\ gunfire}{Women\ Killed\ + Children\ Killed\ +\ Men\ Killed\ by\ small-arms\ gunfire}$$

This number turns out to be 31 for coalition forces and just 2 for anti-coalition forces. This is quite a striking difference, even allowing for the fact that the coalition forces wear uniforms and the anti-coalition forces don't wear uniforms.
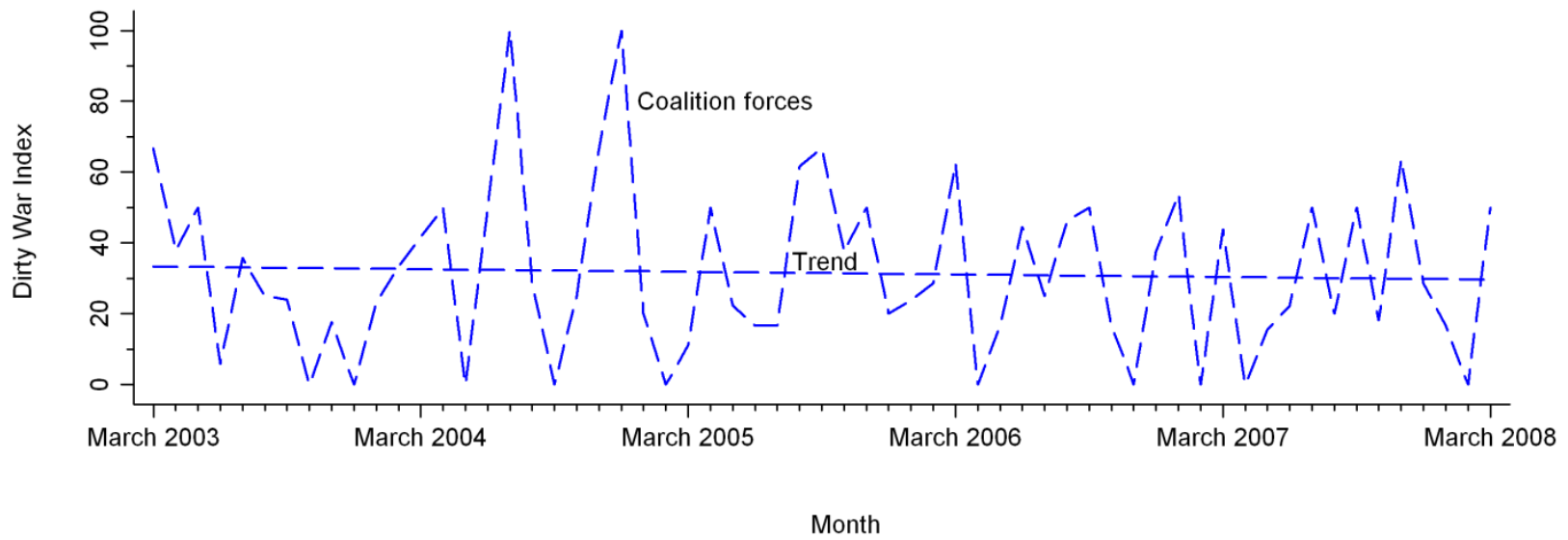
In addition, the coalition forces don't seem to have improved over time (panel B on slide 20 below). (Note that the axis labelled "Dirty War Index" in panel B on slide 20 is giving exactly the proportions defined above in slide 18.)

Panel A in slide 20 shows that after 2004 coalition forces have tended to gun down fewer civilians than anti-coalition forces have.
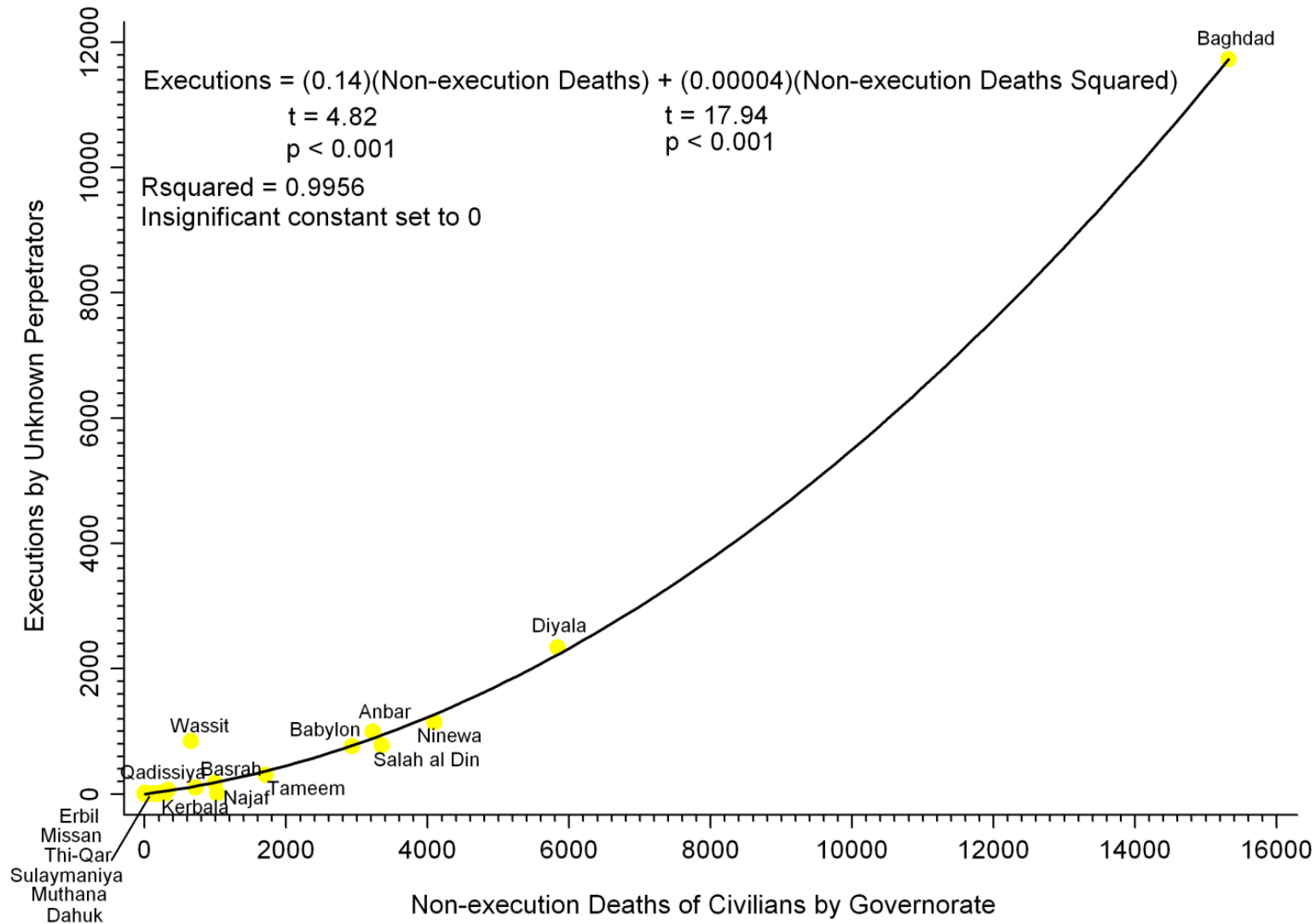
A
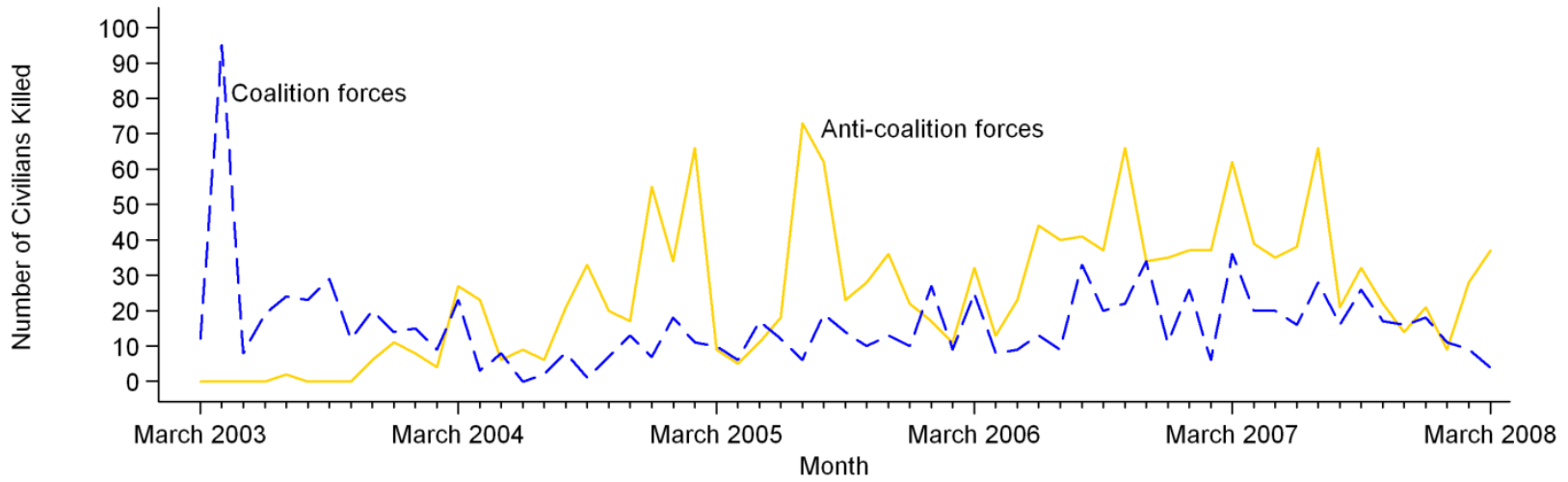
B

Another interesting finding comes after breaking the data down by governorate: execution deaths rise disproportionately with non-execution deaths:

Executions = (0.14)(Non-execution Deaths) + (0.00004)(Non-execution Deaths Squared)

t = 4.82   t = 17.94
p < 0.001   p < 0.001

Rsquared = 0.9956
Insignificant constant set to 0

y-axis: Executions by Unknown Perpetrators
x-axis: Non-execution Deaths of Civilians by Governorate

Data point labels: Baghdad, Diyala, Anbar, Wassit, Babylon, Ninewa, Salah al Din, Qadissiya, Basrah, Tameem, Kerbala, Najaf, Erbil, Missan, Thi-Qar, Sulaymaniya, Muthana, Dahuk

I would speculate that the number of non-execution deaths is a kind of barometer of how out-of-control a governorate is, with executions thriving in out-of-control spaces.

The governorate, Wassit, is above the curve because bodies of people executed in Baghdad are often dumped into the Tigris River. They then flow downstream until they are caught in a system of weirs in neighbouring Wassit governorate. (The weirs are meant to prevent lily pads from clogging up the river.)

There are two notable findings in "[Casualties in civilians and coalition soldiers from suicide bombing]...."

1. Suicide bombs have hit Iraqi civilians much harder than they have hit coalition soldiers. I think that pretty much everybody knew this fact in a general way but I am not sure how many people really grasped the *extent* to which this is true. We found 200 coalition soldiers killed and 12,284 Iraqi civilians killed in suicide bombs between 2003 and 2010.

2. The injured-to-killed ratio for children (1.0) is well below what it is for men (1.3) or women (1.5). We think this is because children are more vulnerable than adults are to succumb to blast wounds so that children injured in blasts are more likely to die than adults are.

Military Database on Iraq

The US military has maintained a vast database, called "SIGACTS", on incidents in the Iraq war (Afghanistan too, actually) since 2004. Over the years they have put out some aggregate figures based on this database but they never made the whole thing public.

Then along came the computer-hacking group Wikileaks which somehow obtained the SIGACTS database and released it in 2010. There is a vast amount of data there on the Iraq war. However, there are a couple of problems:

1. There is so much new information that it is hard to process it all and figure out what it actually means.

2. It overlaps with IBC to a considerable extent so it is hard to figure out exactly what is new and what was already known.

IBC had a crack at analysing the new data in 2010 and posted its results here.

So a key question is: what is new? This question can only be answered completely with painstaking incident-by-incident matching of events across the two databases. But we can predict what the outcome of the incident-by-incident matching will be by drawing a random sample of SIGACTS incidents and comparing this sample with the IBC data. This analysis led to two main conclusions:

1. SIGACTS contains an estimated 15,000 deaths of civilians that were not present in the IBC database back in 2010. IBC is still adding these as of 2016.

2. Most of these missing deaths are in small incidents in which 1, 2, or 3 people were killed.

A third benefit of SIGACTS is that its information on deaths of combatants (not recorded by IBC which focuses on civilians) can be used to augment the IBC numbers to produce a count of fatalities in the Iraq war that covers both civilians and combatants. The most recent such count is posted here.

switch gears

Central Tendency

Here are some numbers. They are taken from real conflict data and we will see them later in the course but for now they are just numbers.

4.6   3.2   0.8   2.1   12   0.6   3.1   0.3   0.6   0.7   3.6   1.8   5.1

What is the average?

   a. 2.1
   b. 3.0
   c. Both of the above
   d. None of the above

Take your time and think about this.

The best answer here is "c".

The key is to remember that there are multiple concepts of "average."

The mean of the numbers is 3.0 and the median is 2.1.

Why is there such a big difference between the mean and the median for this set of numbers?

It's because of the 12 which is an "outlier", i.e, 12 is very different from all the other numbers.

When you have an outlier it is always worthwhile to *do all calculations both with and without the outlier* so that you can see clearly the influence that this one number is having.

What is the mean of the above numbers without the outlier?

The answer is 2.2.

2.2 is much closer to the median of all the numbers (2.1) than it is to the mean (3.0). This shows how influential this one observation (12) is.

Moral of the story – *It is not wrong to say that the average of the 13 numbers is 3.0 but it is potentially misleading to do so, depending on the context. It is also not wrong to say that the average is 2.1.*

A good answer to the question about the average of these numbers would have to come with some nuances.
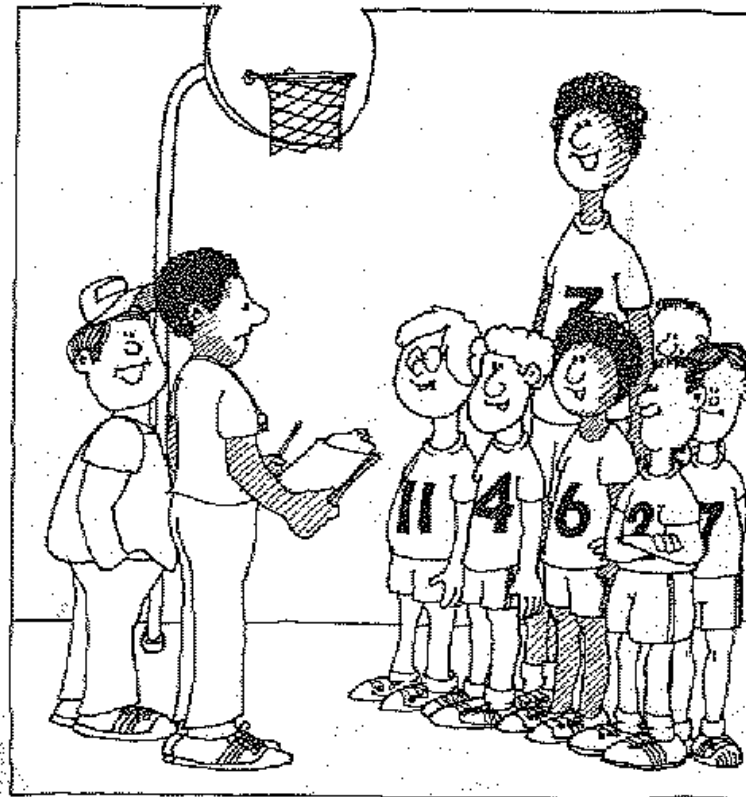
" SHOULD WE SCARE THE
OPPOSITION BY ANNOUNCING
OUR MEAN HEIGHT OR LULL THEM
BY ANNOUNCING OUR MEDIAN
HEIGHT ? "   moore

I did some quick computations for the IBC database and find that the mean event size is 3.1 but the median is 1. In fact, nearly 60% of the events in the database are events with 1 person killed. Events with 1 or 2 civilians killed account for more than ¾ of the events. Yet the mean event size is above 3 because there are a fair number of very large events.

What is the modal event size for IBC?

The answer is 1.

Recall that the modal observation is the most common observation. For these 13 numbers the mode is 0.6. The "mode" is a third concept of average although "mean" and "median" are used much more frequently in this way.

(Side note - Why did I put this last section under the heading of "central tendency"? The reason was not to demonstrate my cleverness by using some jargon. It is just that you need a general term to cover means, medians and modes. The word "average" is not great because, as discussed above, its meaning tends to drift back and forth between median and mean.)

IMPORTANT WARNING NOTICE – BEWARE THE WELL-CHOOSEN AVERAGE

Think of the 13 numbers above. If I want you to think that their average is high I can say it is 3.0. If I want you to think the average is low I can say that the average is 2.1.

Same with IBC – I can claim the average is 1 or I can claim it's 3. I can then be vague about whether I am talking about a median or a mean.

This relates to the old joke about how when Bill Gates walks into a bar the average person in the bar becomes a millionaire. This can only be true if the average is a mean rather than a median.