World War III: the final exchange

We thank Steven Pinker and Michael Spagat for their reply (page 44, June 2016, in response to "What are the chances of war?", page 44, April 2016) but would like to point out some errors in their reasoning. Statistics is about tests of significance, not handwaving rhetoric: claims require comparison to a rigorously derived test statistic, not just making claims that "feel right", as any "*p*-hacker" (or data-hacker) can easily do.

Our work is based on extreme value theory (which wasn't fully developed in Richardson's time) supplemented with a novel adjustment of power laws to a non-infinite variable (casualties are bounded by the world's population), and incorporating techniques of robustness to account for imprecision in estimates of violence. We looked for non-randomness in sub-intervals and found no statistically significant ones for the large deviations that drive the properties of violence (since the data has about the fattest tails known to statistics, the tail *is* the driver). For a process that has inter-arrival times of 100 years, making claims of "changes" within a 70-year interval requires meeting some rigorous tests of significance.

More crucially, we would like to see something technical on the part of Pinker and Spagat, other than just beautifully crafted words. For our problem isn't that we haven't read Pinker's book, our problem is precisely that we have read it and (among other flaws) found such analysis – or, for that matter, *any* statistical analysis – wanting. Pinker's 800-page work contains no proper statistical research on his own and, when he deals with the Poisson nature of the number of armed conflicts, he uses Richardson's work then, inexplicably, contradicts it. Pinker refers to some yet-unspecified mathematical model that could support such a decline in violence, even if data confirms memorylessness. We would welcome some quantitative backup for that crucial point.

Our technical work is flushed out to a non-technical audience in "The decline of violent conflicts: What do the data really say?" (bit.ly/2dJD4Wi).
Nassim Nicholas Taleb, New York University,
and Pasquale Cirillo, Delft University of Technology

As usual, we find ourselves puzzled by Taleb and Cirillo's vociferous disagreement, since we ourselves have repeatedly emphasised both the Poisson nature of war timing and the power-law distribution of war magnitudes over the last two centuries. In particular, we have noted that global war death totals are driven by a small number of big wars. The battle death numbers that dominate the post-World War II time series are: China (1946–1949), 1.2 million; Korea (1950–1953), 1 million; Vietnam (1946–1975), 2 million; Cambodia (1967–1998), 370 000; Iran–Iraq (1980–1988), 650 000; Afghanistan (1978–2008), 540 000 (bit.ly/2dJGuIO). World War I was much bigger than these wars combined, and World War II was very much bigger than World War I.

It seems that big wars have grown weaker over the last seventy years (we never claimed that they have grown weaker over millennia). Perhaps this is a random interlude in an unchanging causal system, but changes in the international system suggest otherwise. Either way, throughout the ages really huge wars are low-frequency events and no one, including the four people in this exchange, would prophesy that another one is impossible.

We part company with Taleb and Cirillo by recognising a broad spectrum of evidence suggesting that humans have become less violent in recent centuries. Homicides, slavery, torture executions, corporal punishment, wife beating, extreme cruelty towards animals, and other forms of aggression are in long-term decline. Unlike wars, these forms of violence are not dominated by a small number of big events, so it would not be sensible to project that they might suddenly display massive surges. Moreover, to the extent that ascendency of the "better angels or our nature" drives this broad-spectrum decline in violence, as argued by one of us (Pinker), these angels could help us lower the probability of future massive wars.[1]
Michael Spagat, Royal Holloway University of London,
and Steven Pinker, Harvard University

Reference
1. Pinker, S. (2011) *The Better Angels of Our Nature*. London: Allen Lane.

Predictive policing

I don't doubt that there is bias in recorded crime statistics, but your article "To predict and serve?" (page 14, October 2016) does not make a good case for this belief. Authors Kristian Lum and William Isaac compare the locations of drug arrests in Oakland, California, with the locations of drug users' homes, the latter based on self-reports in the National Survey of Drug Use and Health (NSDUH). They leave "drug crimes" undefined, but the more salient problem is that the location of drug crime arrests and the location of drug users' homes are different constructs that should not be conflated, as the authors do.

People move around during the day and can get arrested for crimes anywhere, and possibly in several different locations – not just near their homes. In contrast, the NSDUH is a household-based in-person survey, with a single home address attributed to each respondent.

It is entirely conceivable, without the need to invoke biased enforcement, that most drug-related crimes are committed in areas 1 and 2 of Figure 1(a) in the article, while the home addresses of drug users are distributed more widely across all of Oakland as shown in Figure 1(b). For example, neighbourhoods 1 and 2 might be the epicentres of drug dealing, where users who indeed live all over Oakland go to buy drugs.
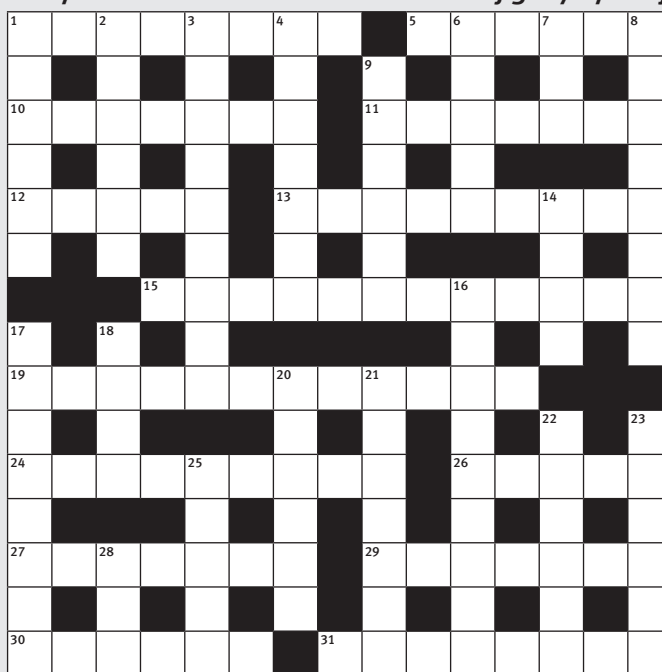
Inequities in the criminal justice system certainly warrant serious study. But the authors have not provided evidence to support their assertion that the contrasting spatial distributions of drug arrests and drug users' homes "suggest that drug crimes are much more evenly distributed across the city".
Christopher W. Ryan
Binghamton, New York

The authors respond: First, we would like to clarify that our study used incident-level crime reports collected by the Oakland Police

Department, which includes both arrests and reports of crime that did not result in an arrest or citation. We used the term "drug crimes" or "arrests" to simplify our jargon for readers who are not familiar with the subtle distinctions between the various types of criminal justice data.

Secondly, it is true that an assumption of our baseline comparison model is that drug crime occurs in proportion to the number of residents in an area that are drug users. While some drug use occurs in public spaces or areas away from the suspect's primary residence, research suggests that the majority of drug use takes place within indoor spaces such as private residences or in a social setting such as a party or nightclub.[1,2]

Given these findings, it is difficult to imagine a scenario where a significant number of users fail to have drugs at their primary residence, even if they use or purchase them elsewhere. Thus, we believe that residence-based estimates are a reasonable proxy for the distribution of drug crimes in Oakland. *Kristian Lum, Human Rights Data Analysis Group, and William Isaac, Michigan State University*

References
1. Dunlap, E., Johnson, B. D. and Benoit, E. (2005) Sessions, cyphers, and parties: Settings for informal social controls of blunt smoking. *Journal of Ethnicity in Substance Abuse*, **4**(3–4), 43–80.
2. Mayock, P., Cronly, J. and Clatts, M. C. (2015) The risk environment of heroin use initiation: Young women, intimate partners, and "drug relationships". *Substance Use & Misuse*, **50**(6), 771–782.

Correction

Readers are advised of a wording error in the description for calculating d^* on page 41 of the article "The promises and pitfalls of Benford's law" (June 2016). d^* measures a data set's non-conformance with Benford's law, so that magnitudes of non-conformance that are typical versus unusual can be compared. The text should have read: "Next, add the squared differences … and take the square root of that sum, then divide the result by …". The correct version of the formula was used for all the article's calculations and figures. An updated version of the article is online at bit.ly/2f6Gr8I. We apologise for the error.

Wiley Prize Crossword: *From the realms of glory* by Goujeers

Send your solution to: *Significance* Crossword Competition, Royal Statistical Society, 12 Errol Street, London, EC1Y 8LX or scan it and email to significance@rss.org.uk. The competition is sponsored by Wiley (wiley.com/statistics), who will give the winner £100 or $150 to spend on Wiley books. Closing date: 13 January 2017. The winner will be chosen randomly from the correct entries, and the correct solution published in a future issue. Photocopies are acceptable.

Nine solutions are of a kind which is clued only by their place in a hierarchy. Their clues have normal wordplay, and may or may not include another definition.

Across
1 Holes appearing in street. Nothing more frightening! (8)
5 Note reorganised personnel accepted >17 (6)
10 Sympathises with concerns (7)
11 They stop bridles (7)
12 Any with this may display weaponry >15 (5)
13 Switch between sides after a port >25 (9)
15 Assassin massacred laity in Wales? >13 (12)
19 Ruin sacrifice holding blasphemous rite (12)
24 I speak ill of loud countryman (9)
26 Isaiah, a book that's a reflection of faith (5)
27 For example replacing date in Tinder developing figure (7)
29 Emotion, right for love, must be earned (2,5)
30 Catnip pleasant with a source of milk (6)
31 Could be subject to 19, black time ahead (8)

Down
1 Phrase translated >22 (6)
2 Admits 'onours as 'oly (6)
3 Translate "printer" and French (9)
4 American looking back to spot bear (7)
6 Mostly share a sweet confection (5)
7 I may be solitary and eternal in tautology (3)
8 Says Yale orders people of slack morals (4,4)
9 Pretentious Greek character's energy (6)
14 Most of sad song echoing in the Matrix (4)
16 These produce a place of death, such places blowing head off (4,5)
17 Kill servant in satellite >23 (8)
18 Santa's entrance, and how he got there, say? (4)
20 Clauses to be carried on edges of reindeers (6)
21 Crop's environment I could be in awe (7)
22 Child holds woman > 5 (6)
23 Quality of Roman man on short day (6)
25 One set < 13 (5)
28 It could get you high, rising above all (3)

Solution to October issue's crossword:
A good idea? A great idea? by Sam Buttrey

Thematic clues led to capital cities. The entries were the associated countries.

Across: **1** HAVANA, hidden; **3** (sai)L LOW in FE SHIP; **10** UP ROARS; **11** L + anag; **12** (ou)TRIGGER; **13** OTTAWA hidden rev; **14** IRE in HR; **15** 2 defs; **18** anag; **20** 2 defs; **22** PARIS, IS after PAR; **24** hidden, ref Irving Berlin, songwriter; **26** RAM rev + GINS; **27** hidden; **28** WELLINGTON, anag; **29** initial letters.

Down: **1** COURT SHIP; **2** BARRI(st)ER; **3** 2 defs; **5** anag; **6** anag; **7** anag; **8** LIMA, hidden; **9** 2 defs; **16** EVER GREEN; **17** POP + anag; **19** anag; **21** AID rev GRAM; **23** EASE L; **25** MUSCAT, MUS CAT.

Winner: Dr C. A. Newbould, Cumbria