Making Sense of Syraq

March 8th, 2016
Overview

• Capacity vs. Capability
• Understanding the Contextual Environment
  – How does Syraq work?
  – What is ISIS?
  – What can this teach us about the Middle East?
• Analysis of factors and conditions driving outcomes
Capacity

• With currently available technology is it feasible to develop a scalable, dynamic, and versatile computational capacity for analysis of wicked problems faced by CTNA or by NA generally—problems not limited by narrow scope, cultural domain, or geographical area designations?
• Such a capacity, standing apart from the choice of a particular problem, implies exactly the “outside-in” approach to problem solving, one that begins with scientific knowledge about the world and how it works rather than with personal hunches or intuitions about the answer to the specific question at hand. Phil Tetlock in his new book has identified this as the “special sauce” of his “superforecasters.”
A Computational Model of ISIS (or Anything) Requires

- Identifying, mobilizing, and harnessing scientific knowledge about the kind of thing we are interested in:
  - Stability and group dynamics in a weakly organized and inter-penetrated political space
- About the kind of processes most powerfully at work:
  - federated theories operationalized within the V-SAFT model modules
    - generic political model
    - dynamic political hierarchy
- Acquiring and inputting real data
  - geospatial, demographic, cultural, political, military.
- Providing a realistic and appropriately articulated dynamic context for the specific target problem.
  - Syraq
Every specific problem exists within a context.

The computational **capacity** whose attainability we are investigating must be able to provide, as part of the **capability**, a context for the problem to be explored, not just a model of the problem.

First we will briefly explain the larger Syraq model as the computational context within which our ISIS model is embedded.

Then we will turn to the payoffs and limits of the pilot with respect to learning about Syraq as a whole and ISIS specifically, using as criteria those that must be applied to any simulation if it is to be judged credible:

- Recognition/familiarity
- Surprise/insight
ISIS in a Very Messy Context

• We wanted to learn as much as possible about ISIS, including its origins, evolution, and current status. Given complexly interdependent conflicts in Syria, learning about ISIS evolution and vectors of activity meant also investigating the structure of the Iraqi, KRG, and Assad regimes, and the history of the Ba’ath and Dawa parties in Iraq and Syria.

• We read a number of books on these topics, including
  – *ISIS: Inside the Army of Terror* by Michael Weiss and Hassan Hassan
  – *The ISIS Apocalypse: The History, Strategy, and Doomsday Vision of the Islamic State* by William McCants
  – *Iraq after America: Strongmen, Sectarians, Resistance* by Col. Joel Rayburn
  – *ISIS: A Short History* by Fawaz Gerges.

• We also read hundreds of articles from dozens of journalistic sources and think tanks, several provided by NCTC.
Model Building – Data Matrix

• **Syraq Data Matrix**: Our models usually depend on census data or country-wide polls such as the World Values Survey - sources that are distinctly absent from the continual war zones of Iraq and Syria.
  - Instead, we have created a matrix of all available data points - such as ‘90% of Anbar Governorate is Sunni’ and ‘90% of Yazidis are ethnically Kurdish’.
  - Using an R script, this matrix is cross-correlated and distilled into agent-level identity subscription data. As new pieces of data are found, they can be added to the data matrix with minimal effort.
  - Sources include quantitative data like surveys and open source estimates for specific values, as well as qualitative estimates by LC analysts and interns.
Syrian Civil War

From Wikipedia, the free encyclopedia

This article may be too long to read and navigate comfortably. Please consider splitting content into sub-articles, condensing it, or adding or removing subheadings. (December 2015)

This article may require cleanup to meet Wikipedia's quality standards. The specific problem is: See Wikipedia:ProseLine Please help improve this article if you can. (December 2015)

"War in Syria" redirects here. For other wars in Syria, see Syrian War (disambiguation).

The Syrian Civil War (Arabic: الحرب الأهلية السورية) is an ongoing multisided armed conflict with international interventions,[80] taking place in Syria. The unrest began in the early spring of 2011 within the context of Arab Spring protests, with nationwide protests against President Bashar al-Assad's government, whose forces responded with violent crackdowns. The conflict gradually morphed from prominent protests to an armed rebellion after months of military sieges.[81]

The Syrian government initially primarily relied on its armed forces, but since 2014 local protection units made up of volunteers known as National Defence Force have come to play a larger role, gradually becoming the primary military force of the Syrian state. From the early stages, the Syrian government received technical, financial, military and political support from Russia, Iran and Iraq. In 2013, Iran-backed Hezbollah entered the war in support of the Syrian Army.[82][83] Due to foreign involvement, the conflict had been called a proxy war between the regional powers.[84][85] In September 2015, Russia, Iran and Syria set up a joint operation room (information centre) in Baghdad to coordinate their activity in Syria. On 30 September 2015, Russia started its own air campaign on the side and at the request of the government of Syria. The resultant proxy war between the U.S. and Russia[86][87][88][89] led some commentators to characterise the situation as a "a proto-world war with nearly a dozen countries embroiled in two overlapping conflicts".[80]

In July 2013, the Syrian government was said to be in control of approximately 30–40% of the country's territory and 60% of the Syrian population.[91] In August 2015, the territory fully controlled by the Syrian Army was reported to have shrunk to 29,797 km², roughly 16% of the country.[92] The
## Territory Control Data (cont.)

### File history

File history

Click on a date/time to view the file as it appeared at that time.

(newest | oldest) View (newer 50 | older 50) (20 | 50 | 100 | 250 | 500)

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We geocode the Wikipedia map images and capture the most-common color per district in Syria, using Python’s NumPy and GDAL (Geospatial Data Abstraction Library) packages.
Maps from each available week are coded for each of the 162 districts in Syraq. Minimal manual editing is then applied to districts that are too small for this technique to work. The missing data is then filled in by carrying forward, and the full data is used to steer the model.
We then combine our data matrix output, population estimates, thickness scores, elite network linkages, and Wikipedia territory control maps into an agent-based model with about 5,200 agents, five DPH zones, and 53 identities.
**Key Model Elements**

- **Identities/Groups** – Agents are subscribed to a number of identities. At any given time, agents advertise and work to spread exactly one of these.

- **Dynamic Political Hierarchy** - The model endogenously constructs a hierarchy, from the central dominant identity down to alienated identities, which affects how agents mobilize and relate to each other politically.

- **Territorial Zones** - In a fractured region like Syraq, there are many political hierarchies, whose extent can shift over time.

- **Levels of Control** - In each zone, there are areas strongly and consistently controlled by the zone's dominant identity as well as areas rife with dissatisfied agents and at risk of capture by other zones.

- **Attack Tactics** – Agents use a variety of different tactics, including infantry, bombing, mechanized, and airstrikes, which have different levels of effectiveness.

- **Elite Listening Networks** – Networks of elite agents can spread influence and tactic expertise across long distances, reinforcing the group and maintaining cohesion.
Changing Guidance

• The computational component of the pilot began with a dual focus:
  – Comparing explanatory power of rival models of ISIS as a “Stasi” gang vs. a Jihadi movement
  – Assess tractability of ISIS as a threat to a variety of available CoA’s

• Focus adjusted with guidance to emphasize retrospective diagnosis and analysis of factors and conditions driving outcomes with special attention to indirect, interactive, and complex effects.
“Modeling” ISIS

A few potential models of ISIS from the literature:

1. **Caliphal Movement**: ISIS "boasts openly about its plans—not all of them, but enough so that by listening carefully, we can deduce how it intends to govern and expand." - Wood, *The Atlantic*; McCants, *The ISIS Apocalypse*

2. **Pragmatic Predator**: ISIS is "an organization that, while seemingly driven by religious fanaticism, is actually coldly calculating. ... There is essentially nothing religious in its actions, its strategic planning, its unscrupulous changing of alliances and its precisely implemented propaganda narratives." - Reuter, *Der Speigel*

3. **Coercive Statelet**: ISIS is "a terrorist organization, but it isn't only a terrorist organization." (It is also a mafia, conventional military, intelligence-gathering apparatus, propaganda machine, and ultimately Ba'athist.) - Weiss, *ISIS: Inside the Army of Terror*
Parameters for a Model

Instead of trying to pick a single model to use for analysis and understanding of ISIS, we’ve developed a set of parameters that we can use to test the implications of one or another form of ISIS.

- **Organization Shape** - Is the group more top-heavy or bottom-heavy?
- **Hierarchy Strength** - How much influence do elites have on those below them?
- **Horizontal Cohesion** - Do elites on the same level listen to each other?
- **Council to Leader Influence** - How much do the leader’s council influence the leader?
- **Centralization** - How much are the elites influenced by the leader directly?
- **Tolerance** - Can elites become part of a different network and still remain connected to ISIS?
- **Autonomy** - Can members be a part of multiple groups?
- **Hidden Identity** - Is there a cabal of insiders who drive the group’s actions?
- **Disciplining** - Can the group discipline its own members for not being politically active?
## Movement vs. Stasi

### Continuous Variables

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### Binary Variables

- **Movement** – Normal Shape, No Disciplining Attacks, No Network Tolerance, and No Hidden Identity.
- **Stasi** – Top Heavy Shape, Disciplining Attacks, Network Tolerance, and Hidden Identity.
“Natural Variation” of ISIS

- NumberOfISISIncumbents
- ISISExpertise
- ISISInfluence
- ISISInfantryUse
- ISISSize
Movement vs. Stasi Results

Key Outputs by Stasi

- **ISIS_Group_Size**
  - Graph showing variation with error bars.

- **ISIS_Territory_Size**
  - Graph showing variation with error bars.

- **ISIS_Attack_Likelihood**
  - Graph showing variation with error bars.

- **Attacks_Per_Week**
  - Graph showing variation with error bars.
• Although most of our Syraq runs experience very high levels of violence and attendant local disequilibration, ISIS and other key actors in Syraq are strikingly resilient.
Pillars of Control: Aprons of Influence and Contestation

Absent centralized political authority over a large territory, pillars of control operate within aprons of influence and contestation.

Before the Arab state system’s creation and now after its severe incapacitation, pillars seek to dominate aprons by controlling allies/rivals in their aprons, confronting external pillars, and supporting proxies in other aprons.

*Fractals of conflict and maneuver* in Syraq and the Middle East in general.
This chart shows the average number of attacks carried out by each zone’s pillar and apron. Light shades represent that zone’s apron, and darker shades represent that zone’s pillar.

Thicker lines represent a higher average level of violence.
Attack Locations in a Single Run
Analysis of Factors and Conditions Driving Outcomes

• To help understand the conditions under which we would expect certain outcomes, we punctuated the model in different ways and analyzed their impact.
• We investigated the effect of reducing sectarianism in Kurdistan and Iraq, reducing cross-zone violence, and weakening ISIS in a number of different ways.
• These punctuations are just a small subset of the parameter space of the model that we might like to explore.
• We used a pairwise analysis technique, where each run was compared to an identical baseline run that was punctuated at a particular timestep. This technique allows us to see the direct and indirect causal effects of a particular punctuation.
Reduction of Sectarianism in Iraq

In order to reduce sectarianism in Iraq and Kurdistan, a portion of alienated agents in Iraq and Kurdistan were given the Iraq State and Kurdish identities, respectively.

The visuals on the left show the effect of the punctuation on territory size and percentage of dominant agents in each zone.

We can see that even though the operationalizations were very similar, the broadening of government in Iraq had little impact while in Kurdistan we see a large increase in both territory size and dominance.
Importance of Cross Zone Attacks

On the left, we see that reducing cross-zone violence tends to help the non-state actors, ISIS, Kurdistan, and Syrian Rebels.

On the right, we can see the direct effect of reducing external violence, and the indirect effect of increasing the likelihood of internal zone violence.
External Attacks Against ISIS

External Attacks Against ISIS

Against ISIS in Iraq

Against ISIS Overall

Against ISIS Elites

ISIS_Group_Size

Average Effect

ISIS_Territory_Size

Assad_Territory_Size

Month
Degradation of ISIS Network

Degradation of ISIS and Tribes' Effect on the Network

- **ISIS**: Significant degradation over time, with a peak around month 15.
- **Shammar Tribe**: Minimal effect, relatively stable over time.
- **Jabbour Tribe**: No discernible effect.
- **Baggara Tribe**: Moderate degradation, peaking around month 10.
- **Nium Tribe**: Slight degradation, generally stable.
- **Dulaym Tribe**: Significant degradation, particularly noticeable around month 10.
• This operationalization limits tactics available to groups within ISIS-land by reducing their resources.
• This is one of the few punctuations that increases territory size of Syrian rebels without also increasing the size of other zones.
In this punctuation, we convert a subset of ISIS agents into Sunni agents. There is a brief partial recovery, but never a full recovery of the ISIS group size.
De-radicalize Sunnis

Difference from Baseline (% of Syria)

Month

Sunni_act_per

ISIS_Group_Size
Conclusions

• LC work under this pilot has used computational social science via ABM simulation to:
  – identify primary and secondary causal effect mechanisms.
  – explore the implications of contrary assumptions.
  – provide stimulating opportunities for inference and analysis despite incomplete or unavailable data.
  – establish the feasibility of producing scalable models of countries and regions of interest.
  – document the promise that this approach has for helping transform Net Assessment from a craft to a discipline.

• The credibility of the Syraq model, including its ISIS component, has been established via a mix of recognition/familiarity and surprise/insight.
Backup Slides
Average Attacks Per country

- Iraq
- Syrian Arab Republic

meanAttack

0 2 4 6 8
ISIS Attacks, Smoothed Over Time

![Chart showing the trend of ISIS attacks over time.](chart.png)