Online Appendix

For the paper "The Enemy of my Enemy Is Not My Friend: Arabic Twitter Sentiment Toward ISIS and the United States" by David Romney, Amaney Jamal, Robert O. Keohane, and Dustin Tingley

1   Introduction

This appendix provides additional analyses and data for the paper "The enemy of my enemy is not my friend: Arabic Twitter sentiment towards ISIS and the United States." In addition to what is available in this appendix, our replication files[1] reproduce the numbers and figures within the paper itself as well as those in this appendix. Note that, because of Twitter's terms of service, we cannot include large datasets of the Twitter posts we used for our analyses. Instead, we provide examples when necessary and include all other data possible.

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[1] Available in the Dataverse for International Studies Quarterly: https://dataverse.harvard.edu/dataverse/isq.

2 Textual Analysis Models

We use computational textual analysis to estimate several different quantities of interest in the analyses for the paper. We employ three different textual analysis methods, each of them suited to a different purpose in our project. Many elements of the algorithms used in these models are proprietary—we gained access to them as subscribers to Brandwatch's (formerly Crimson Hexagon's) social media analytics platform, ForSight—and we are therefore limited in the amount of detail we can provide. However, we describe them in as much detail as possible below.

The first model (the *ReadMe-Based Model*) we use is a proprietary supervised model based on the ReadMe algorithm of Hopkins and King (2010). For this model, the user hand codes a set of documents into pre-determined categories, and the algorithm uses this set to estimate category proportions for the set of texts as a whole. Notably, this model does *not* classify individual documents. Instead, the algorithm produces daily population-based estimates. In the paper, the results of this model are often presented as daily counts; those counts are merely the product of the estimated category proportion and the total number of posts for a given day/period. In the paper, we use this model for the US, ISIS, and Combined Analyses.

The second model (the *Researcher-Trained Classifier*) we use is a proprietary supervised classifier, also available through Brandwatch's ForSight platform. To understand our use of this model, it helps to understand the access the platform provides for downloading and analyzing Twitter posts off of the platform. Access to the raw data is limited to 10,000 posts per day for any given analysis. These 10,000 posts per day are chosen at random from the posts that match one's criteria for that analysis. The downloaded posts include a number of pieces of metadata estimated by the ForSight platform, including the geographical location of the user, a measure of the user's social media influence, and (most importantly for our purposes) an estimate of the category of the post in the analysis. It is this category metadata that is estimated using the second model. This model uses the same training set and user-defined categories as the first model, and it is only the output of the models that differs (category proportions for the first vs. document-level classification for the second). In the paper, we use the results of this model to estimate user-level negativity toward ISIS for the users in Twitter posts we downloaded from our ISIS Analysis. As noted in the paper, we divide users into 16 groups based on the number of their posts in our downloaded sample as well as the estimated negativity of their posts. Then, for each group of users, we run the US Analysis model on their posts that include our US-related keywords. This allows us to correlate, at the group level, sentiment toward ISIS and the US.

The third and final model (the *Sentiment Classifier*) we use is another proprietary supervised sentiment classifier. This model uses over 500,000 Arabic training texts that were human-coded by Brandwatch as having positive, neutral, or negative sentiment. These texts are not limited to Twitter and include posts from Facebook, online blogs, reviews, and news items, representing a broad swathe of online media. Like the second model, the output of this third model is a document-level classification of texts. In the paper, we use this model to address the alternative hypothesis that the correlation between negativity toward ISIS and the US that we observe in the group-based analysis is merely a function of negativity toward ISIS being associated with general negativity (the "Angry Uncle" hypothesis, see Section 6.3 of this appendix).

3   Training for Main Analyses

3.1   General Procedure

We conduct three main analyses using the ReadMe-based model: One examining posts about the US, a second examining posts about ISIS, and a third examining posts that mention both entities. Throughout our paper, these are referred to, respectively, as the US, ISIS, and Combined Analyses. For each of these analyses, we adhere to the following procedure.

First, we specify a set of parameters that determines the texts included in our analysis. This involves specifying:

- A date range of interest—we restrict this to January 1, 2014 to December 31, 2015.
- Textual sources—we restrict this to Twitter only.
- Language—we do not restrict language because our keywords, being mostly unique to Arabic, are sufficient to restrict our analysis to Arabic results (any Farsi results are trained into an "irrelevant" category).
- Geographical restrictions—we do not restrict geographical location, meaning our results apply to the Arabic Twitter universe as a whole.
- Keywords—the keywords varied by analysis, and we include the keywords for each analysis in its respective section below. Keywords for Brandwatch's online platform use common Boolean expressions (AND/OR) to specify relationships between expressions, quotation marks to note expressions to be matched, mathematical operators (e.g. -) to exclude expressions, and parentheses to combine expressions. Brandwatch does not allow wildcards for Arabic language searches, meaning that we have to include a large number of iterations of each keyword to ensure that we are capturing all relevant traffic.

Second, we train randomly selected documents into a set of user-defined categories. For the US and ISIS analyses, two of the researchers train the same posts for each of the three main analyses. This training is done blind to the categorization of the other researcher. After training, we reconcile any disagreements between the researchers' training, coming to a unanimous agreement about disputed texts until we reach a final categorization for every text. Before this reconciliation procedure, the researchers coding matched 65.0% and 64.2% of the time for the US and ISIS Analyses, respectively. However, after considering the fact that half of the disputed texts were reconciled with little disagreement, the match rate reaches around 80%.

Third, we worked within the restrictions of our platform to verify our results. Because we used a proprietary platform and algorithm, and because the ReadMe-based model estimates category proportions rather than document classification, we cannot validate our results in a traditional manner. However, as noted in Section 2 of this Appendix, our training texts were used to train both the ReadMe-based model as well as a Researcher-trained Classifier. Examining the results of the Researcher-trained Classifier, we found that the classifier was at least 70% accurate for each category from the US and ISIS Analyses. Additionally, one validation of our models is in finding expected reactions to events that are widely recognized to have caused particular reactions. In our case, we find the largest amount of anti-ISIS traffic in response to the release of a video showing the beheading of a downed Jordanian pilot on February 3, 2015, and we find the largest amount of anti-US content in response to the beginning of US intervention in the Middle East in 2014. Of course,

the fact that these results align with prior expectations is not proof of accuracy, but it would have been extremely suspect if, for instance, the release of the beheading video, widely condemned in Arabic-language media across all countries of the Arab Middle East, did not see a similarly overwhelming negative response on Twitter.

The following sections provide details for each of our aggregate analyses.

3.2   US Analysis

The purpose of this analysis was to provide a summary of the sentiment of Tweets about the US in Arabic. Additionally, we also categorized Tweets based on whether the subject matter was social or political. Our two coders trained 753 texts total for this analysis; these Tweets were randomly selected from the approximately 88 million total Tweets that matched our keywords. The subsequent parts of this section provide further detail on the keywords used to select training texts (3.2.1) and provide Tweets that exemplify the type of content trained into each category (3.2.2). Additionally, Figure 1 provides a numerical summary of how specific words are associated with sentiment among our training texts. The figure uses, as its summary metric, the product of each term's frequency and the inverse category frequency. This metric is commonly used because it balances two important characteristics of the words that appear in our texts: The frequency with which they appear in a category and the uniqueness of the word to that particular category. Frequently appearing terms are important because of their ubiquity, but they are often not unique to a given category and, therefore, are less helpful in differentiating between them. Unique terms, on the other hand, uniquely identify categories but are often one-off occurrences and are less informative for the average text of a category. The product balances these two considerations.

The example texts and Figure 1 provide a substantive summary of differences between the sentiment categories. Tweets categorized as irrelevant were primarily either pornographic ("sex") or related to sports ("match", "ittihad (soccer club)", "cup", "player"). Those categorized as negative often focused on negative aspects of US intervention in the region, e.g. ignoring humanitarian needs ("silence", "people"), associating the US with violence in the region ("terrorism", "attack"), meddling in local affairs for selfish reasons ("alliance", "interests"), or noting other negative aspects of US influence ("intolerance", "expose"). Tweets categorized as neutral generally focused either on political goings-on in the US and the region (country names, "president", "government", "news", "official", "visit", "borders") or on reporting interesting and useful scientific discoveries from the US ("study"). Lastly, Tweets categorized as positive generally focused on the US as a place where immigrants and others can realize their potential ("success", "fight", "genius", "your dreams") and overcome struggles those in the Middle East face ("failure", "poor"), as well as receptivity toward differing viewpoints ("religion", "secular").
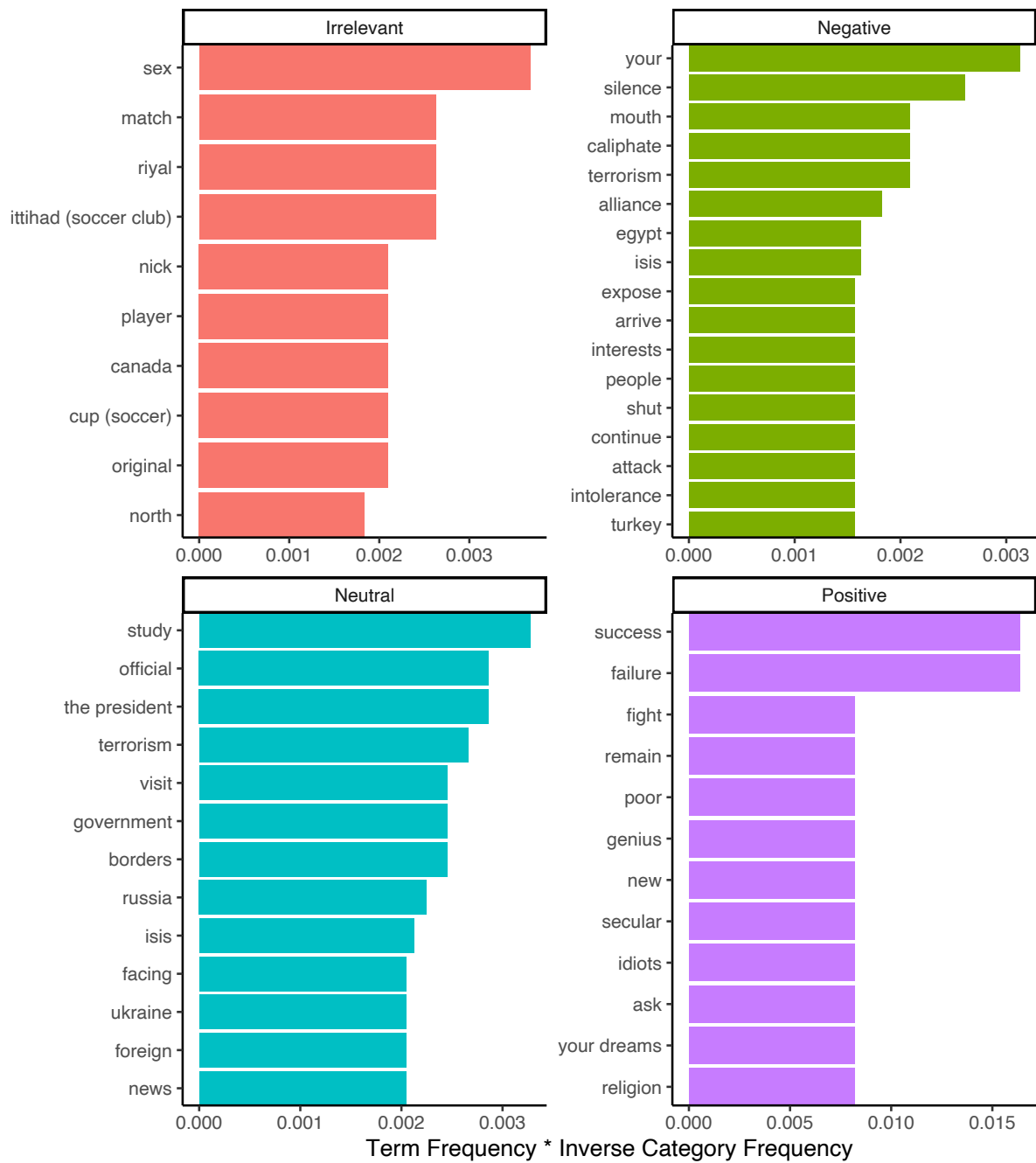
Figure 1 - Association of Words with Sentiment, US Analysis

3.2.1 Keywords

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3.2.2 Example Training Texts

3.2.2.1 Negative Political (161 posts)

America supports Israel with weapons to pre-pare against what is left of the Muslims… this is the sham that is American democracy and #justice…!! #Gaza resists	أمريكا تدعم إسرائيل بالذخيرة لتجهز على ما تبقى من المسلمين... هذا هو زيف الدمقراطية و #العدالة_الأميركية...!! #غزة_تقاوم
The two prominent options available to any re-gime to protect its safety and stability: allying with America or allying with the people. America has been tried… it betrays and de-ceives. Allying with the people has not yet been tried.	أبرز خيارين لأي (نظام) لحماية أمنه واستقراره: التحالف مع أمريكا، أو التحالف مع الشعب. أمريكا جُربت.تخون وتغدر التحالف مع الشعب لم يجرب.
In this manner America pays its mercenaries, tempting them with this money to carry out its desires and to kill Jihadis instead of it #The_Awakening	هكذا تشتري أمريكا مرتزقتها وتغريهم بهذه الأموال لتنفذ رغباتها و لكي يقاتلون المجاهدين بدلاً عنها #الصحوات

3.2.2.2 Negative Social (33 posts)

To those who have been deceived by those from Western cultures, possessors of crooked ways. #The_Emirates #Secularism	للمخدوعين من الذوي الثقافات الغربية وأصحاب الاتجاهات المنحرفة. #الإمارات #العلمانية #الدمية #التيس_الصومالي
This is what the infidels want—they, the ene-mies of religion, their ilk the liberals and the secularists, and those who follow their foot-steps, both those in Muslim countries who do it just like their parents and [those in] the infi-del West and the atheist East.	هذاماير يدالكفرةأعداءالدين وأذنابهم ليبراليتوعلمانيتومن نهج نهجهم في بلادالمسلمين على خطى آبائهم م الغرب الكافروالشرق الملحد

3.2.2.3 Neutral Political (254 posts)

The [US] Department of State: We will not be announcing a state of emergency in the Penta-gon, and we are closely watching what's hap-pening in the Naval Headquarters in DC	RT @B_Eltaweal وزارة الدفاع: لن يتم إعلان حالة الطوارئ في مقر البنتاجون.. ونتابع عن قرب ما يحدث في مركز قيادة البحرية في #واشنطن
ISIS has gained possession of a container of American missiles in Iraq: ISIS has gained possession of a container of American missiles in Iraq, by… #Libya #Egypt	Libya# داعش يستولي في العراق على شحنة صواريخ امريكية: داعش يستولي في العراق على شحنة صواريخ امريكيةكتاب... #Egypt
#News An American agency has revealed the details of a joint American-Egyptian agree-ment regarding monitoring systems	#اخبار وكالة أمريكية تكشف تفاصيل صفقة أنظمة المراقبة بين واشنطن والقاهرة

3.2.2.4 Neutral Social (64 posts)

"Popcorn Movies" series: Today is the airing of E1.S8 of the series "The Big Bang Theory" in America on the CBS channel	مسلسلات موفيز بوب كورن : يبدأ اليوم عرض الحلقة الاولى من الموسم الثامن من المسلسل The Big Bang Theory في امريكا على قناة CBS
The first oil well in the world was dug in the USA in 1859	أول بئر بترول حفر في العالم حفر في الولايات المتحدة الامريكية عام 1859ميلادى.
An American study concluded that e-cigarettes contain a number of poisonous chemical elements and that they are not a safe substitute for smoking regular tobacco cigarettes	توصلت دراسة أمريكية إلى أن السجائر الإلكترونية تحتوي على بعض المواد الكيماوية السامة، كما أنها ليست بديلا آمناً عن تدخين سجائر التبغ العادية

3.2.2.5 Positive (18 posts)

What's great about Western countries is that a large portion of the people don't live in ignorance… their lives are very organized	الحلو ببلاد الغرب إنو نسبة كبيرة من الشعب مش عايش بالمجهول.. حياتهم منظمة كتير
Secular Arab people get into alcohol and girls and fighting religion; secular Westerners, on the other hand, get into development and equality for religions and living in accordance with the law	العلماني العربي يبحث عن الخمر والنساء ومحاربة الدين ، العلماني الغربي يبحث عن التطور ومساواة الأديان وحياة الإنسان وفقاً للقانون
People in the West aren't geniuses, and we aren't idiots—it's just that they support those who are failing until they succeed, while we attack those who are successful until they fail	الغرب ليسوا عباقرة ونحن لسنا أغبياء ، هم فقط يدعمون الفاشل حتى ينجح ونحن نحارب الناجح حتى يفشل

3.2.2.6 Irrelevant (223 posts)

The former American basketball player Moses Malone has passed away—for more details see this link	وفاة لاعب السلة الأمريكي السابق موسيس مالون المزيد من التفاصيل على
15 million followers for the Catholic pope on Twitter during his visit to South America	15 مليون متابع لبابا الفاتيكان على "تويتر" خلال زيارته لجنوب أمريكا
Look at the size of this meteor compared to the American city of Los Angelos – Wow!!	شاهد حجم النيزك مقارنة بمدينة لوس انجلوس الأمريكية ..!! سبحان الله

3.3   ISIS Analysis

The purpose of this analysis was to provide a summary of the sentiment of Tweets about ISIS in Arabic. Our two coders trained 621 texts total for this analysis; these Tweets were randomly selected from the approximately 103 million total Tweets that matched our keywords. The subsequent parts of this section provide further detail on the keywords used to select training texts (3.3.1) and provide Tweets that exemplify the type of content trained into each category (3.3.2). Additionally, Figure 2 provides a numerical summary of how specific words are associated with sentiment among our training texts, using as its summary metric the product of each term's frequency and the inverse category frequency (TF-IDF). We removed our keywords before producing this figure.

Note that, in contrast to some researchers, we do not incorporate specific references to the Islamic State—i.e. referring to it as the "Islamic State" (الدولة الإسلامية, the "pro-ISIS" label) versus using the acronym "Daesh" (داعش, the "anti-ISIS" label)—as an indication of sentiment, or at least we do not bias our results toward finding such an association. We do this because there is no similar usage of terms for the US in our US Analysis, and, therefore, using terms in this manner in the ISIS Analysis could make our results incomparable. For instance, many of the types of Tweets that we wanted to categorize as neutral in both analyses, such as news stories describing military operations or political goings-on in the area, used the negative reference (Daesh) to the Islamic State in spite of a lack of other content with negative sentiment.

The example texts and Figure 2 provide a substantive summary of differences between the sentiment categories. Tweets categorized as irrelevant were primarily Farsi-language posts, spam-like attempts at garnering social media followers ("instagram", "followers"), or related to sports ("al ahli", "al-hilal", "victory"). Those categorized as negative often focused on the acts carried out by ISIS ("terrorism", "kill", "protect", "children", "jihad", "atrocities", "severe") and locations primarily of Shia Muslims affected by attacks ("qatif", "al-ahsa", "saudi"). Tweets categorized as neutral generally focused providing news updates on the location and status of ISIS control and fighting in the region, discussing aspects of the group ("organization", "alliance"), progress ("fighters", "fight", "fall"), and important locations ("ramadi", "mosul", "nineveh"), as well as including news-related keywords ("news", "article"). Lastly, Tweets categorized as positive often included the Twitter handles of ISIS-related accounts ("@wa3tasimu", "@dwltalkhlafa"—note that this is unique to this category), referenced specific figures ("al-adnani"), asked followers to spread knowledge of the group to the uninitiated ("publish", "prove"). Other positive keywords were often very specific to the context. For instance, these Tweets often referred to ISIS as the "State of Goodness", hence the word "goodness" appearing in this category.
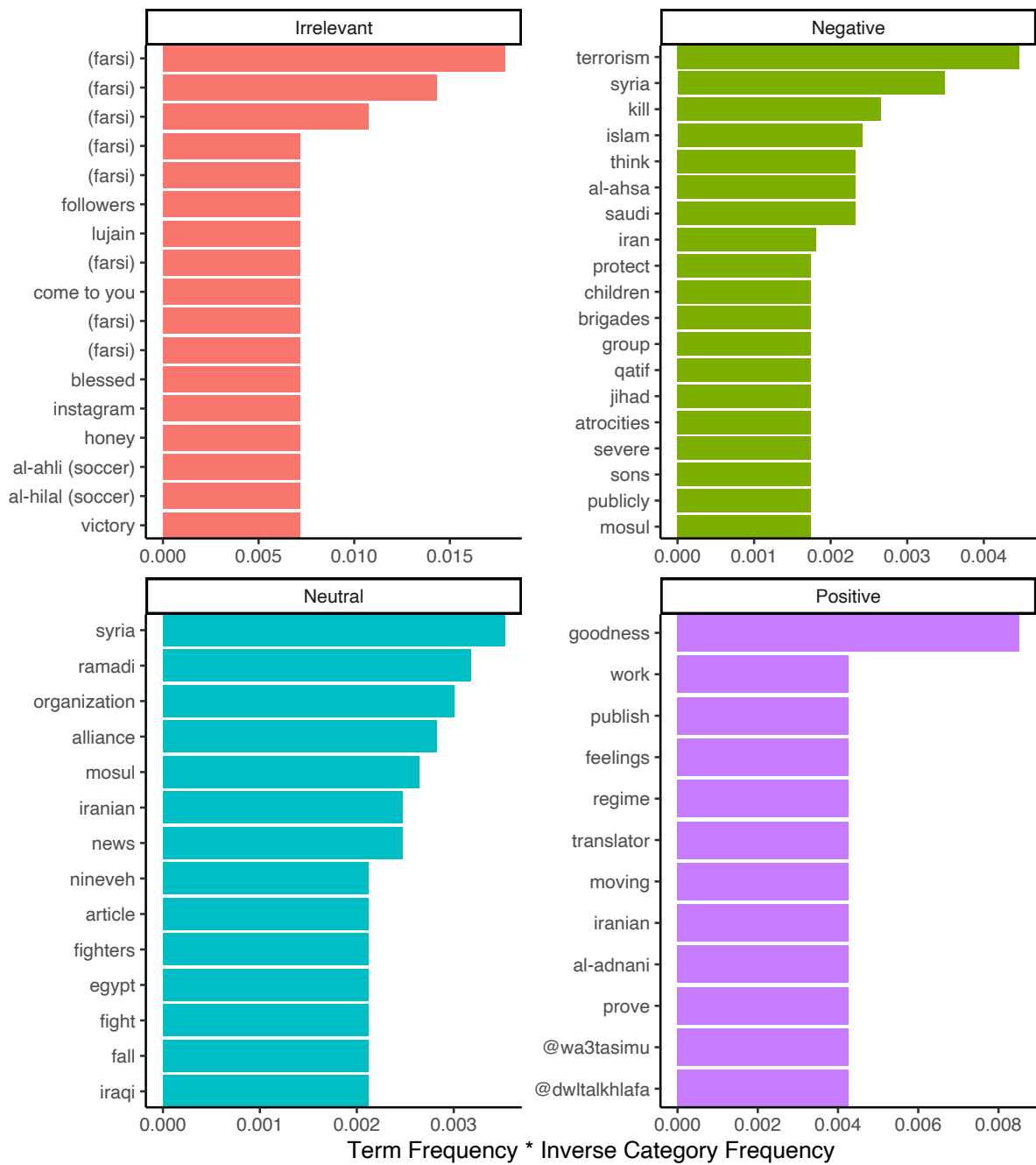
Figure 2 - Association of Words with Sentiment, ISIS Analysis

3.3.1 Keywords

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3.3.2 Example Training Texts

3.3.2.1 Negative (175 posts)

#ISIS themselves are from the American intelligence agencies – the picture speaks for itself #know_your_enemy	#داعش هم نفسهم المخابرات الإمريكيه #أعرف_عدوك والصوره تتحدث
This while ISIS's thinking is spreading among our youth and Israel's closing the al-Aqsa mosque; every day I'm shocked at the priorities of the national religious leadership! Even you, soccer's all you care about!	في الوقت الذى يتغلغل فكر #داعش بشبابنا وإسرائيل تغلق المسجد الأقصى؛كل يوم يفاجئنا بعض من علماء الأمة بأولوياتهم! حتى أنتم أشغلتكم"الكورة"!
Accounts of ISIS's atrocities against Sunnis must be collected and publicized – the atrocities must be explained to the Sunni public, and the reality of ISIS's derangement must be forced upon them, just like what happens when someone makes a mountain out of a molehill! #Albu_Nimr_Massacre	يجب جمع ونشر مجازر داعش بحق اهل السنة وبيانها للرأي العام السني ودفع التشويش الداعشي عليها كما يفعلون عندما يجعلون الحبة قبة! #مجزرة_البونمر

3.3.2.2 Neutral (359 posts)

French fighters bombard ISIS's bases in Raqqa, Syria	مقاتلات فرنسية تضرب معقل تنظيم ''داعش'' في الرقة بسوريا
For the first time, Saudi Channel 24 broadcasts footage of operations to capture ISIS terrorists in Saudi Arabia #Kidnappings_of_Women_in_Saudi	لاول مرة قناة 24 سعودي تبث تصوير عمليات القبض على ارهابيين داعش بالسعودية #اختطاف_نساء_بلاد_الحرمين #انسعار_الداخلية

3.3.2.3 Positive (54 posts)

English	Arabic
ISIS has achieved the dream of all Muslims in announcing the caliphate. Praise to God now and forevermore.	حققت الدولة الإسلامية حُلم المسلمين بإعلان الخِلافة. فاللهم لك الحمد من قبل ومن بعد.
Breaking: Members of Al-Nusra Front in Diban, on the outskirts of Deir ez-Zor, are pledging themselves to ISIS – guide and correct us, oh God, and unite the ranks	عاااااجل عناصر جبهة النصرة في ذيبان بريف دير الزور يعلنون البيعة للدولة الاسلامية اللهم اهدي واصلح الجميع و وحد الصفوف
To all our brothers and sisters: We will support our ISIS stalwarts and we will fight to close the accounts of those who disparage "the Awakening" – retweet and share	الى كل الاخوة والاخوات سوف نعمل على دعم انصار الدولة الاسلامية سوف نعمل على اغلاق حسابات المسيئين من الصحوجية رتويت نشر

3.3.2.4 Irrelevant (33 posts)

English	Arabic
Selling retweets and followers from the gulf [*series of unrelated hashtags*]	بيع رتويت ومتابعين خليجين #دعاء #بوح #درر #دبي #حفر_الباطن #داعش #حكم #حقيقه #حائل #إنستغرام #بيع رتويت #بيع متابعين
Pictures youth girls Twitter follow Riyadh… [*additional words unrelated to each other…*]	صور شباب بنات تويتر فولو الرياض الحزم داعش مكياج رمضان مسلسل الاتحاد الهلال النصر الاهلي اهداف سناب شات فيديو 261 http://t.co/skqN224ibM
[*something in Farsi*]	وزير جنگ داعش در موصل به هلاکت رسید #خارجی #عر_اق #داعش http://t.co/rCLCj0wsVR

3.4   Combined Analysis

The purpose of this analysis was to provide a summary of the sentiment of Tweets about the US and ISIS. Our two coders trained 152 texts total for this analysis; these Tweets were randomly selected from the approximately 6 million that matched our keywords. The subsequent parts of this section provide further detail on the keywords used to select training texts and provide Tweets that exemplify the type of content trained into each category.

3.4.1   Keywords

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OR "والدولة_الإسلامية" OR "للدولة_الإسلامية"
)

3.4.2 Example Training Texts

3.4.2.1 Negative – US & ISIS (28 posts)

The US wants to empower ISIS not end it – first the US leads the alliance against ISIS, then it exerts pressure on its related factions in Syria to prevent them from fighting ISIS!	RT @saleelalmajd1 أمريكا تسعى لتوظيف داعش وليس للقضاء عليها ، فهي تزعم قيادة تحالف ضدها ثم تمارس ضغوطا على الفصائل المقربة منها في سورية لمنعها من قتال داعش !
ISIS is an Iranian and American creation, under the veil of Sunni Islam, created to achieve the goals of the Jewish Zionist plotter – oh God may their plans come to naught	@ManalAlawadhi داعش صناعه ايرانيه وأمريكية بغطاء ديني سني للوصول لأهداف المخطط اليهودي الصهيوني اللهم اجعل كيدهم في نحورهم

Baghdadi's gang, ISIS, are fighting on the outskirts of Aleppo using American-made Humvees – they were supplied with them by America, through al-Maliki in #Iraq	منقول// عصابة البغدادي #داعش تقاتل في ريف #حلب بعربات امريكية من نوع هامفي تم تزويدها بها من قبل #امريكا عن طريق المالكي في #العراق

3.4.2.2 Negative – US & Syria/Iran/Shia (10 posts)

America wants to train the Syrian Free Army to fight ISIS in Syria – okay, and what about Asad's regime, who's going to fight them? What are the West's priorities in this war that's been going on now for five years?	امريكا تريد تدريب الجيش الحر لمقاتلة #داعش في #سوريا طيب ونظام #الاسد من سيحاربه ؟ ماهي اولويات الغرب في الحرب الدائرة هناك منذ 5 سنوات ؟
Sheikh Abd al-Aziz al-Fouzan: The gang ISIS is a creation of the American and Iranian intelligence agencies – ISIS doesn't attack Iran	الشيخ عبدالعزيز الفوزان: عصابة #داعش صناعة استخبارتية أمريكية إيرانية #داعش_لا_تهاجم_ايران
The USA has changed its priorities in Syria from toppling the regime to getting rid of ISIS, and they are on the verge of crowning Iran as the most powerful state in the region	الولايات المتحدة الامريكية غيرت اولوياتها في سورية من اسقاط النظام الى اسقاط داعش وباتت على وشك تتويج ايران الدولة الاقليمية العظمى

3.4.2.3 Negative – Other (25 posts)

Up to now there have been 4,100 air strikes on ISIS and not a single person has died – 100 martyrs were killed in a single American strike in Iraq, 200 were wounded in a single Israeli strike in Gaza – how is this possible? #crazy_laughing	حتى الان 4100 غارة للتحالف على داعش و لم يمت احد غارة على العراق من امريكا 100 شهيد غارة على غزة من اسرائيل 200 جريح انو كيف؟!! #مجنون_يحكي
Yesterday, America invaded Afghanistan on the pretext of fighting al-Qaeda terrorists. After that, they invaded Iraq on the pretext of weapons of mass destruction. And now Russia is invading Syria on the pretext of combatting ISIS.	بالأمس غزت أمريكا أفغانستان بحجة محاربة إرهاب القاعدة. وبعدها غزت العراق بحجة اسلحة الدمار الشامل. والآن روسيا تغزو سوريا بحجة مكافحة داعش
For four years the Syrian people have called for aid in vain, then Iran takes a small group of men, calls them ISIS, and Arabs everywhere ally with America to fight them – where are you when it comes to Bashar and his ilk?!	أربع سنوات والشعب السوري يستغيث بلا جدوى،، بضعة رجال صنعتهم أيران باسم داعش تحالفوا كل العرب مع أمريكا لقتالهم ،، وينكم من بشار وزبانيته،،؟!

3.4.2.4 Neutral (76 posts)

Obama's decision guarantees an increase of air strikes from #Turkey against ISIS and an increase of pressure on the main cities controlled	قرار اوباما يتضمن زيادة الغارات الجوية ضد #داعش من #تركيا وتكثيف الضغط على مدن #داعش الرئيسية داخل #سوريا و #العراق - نيويورك تايمز

by #ISIS in #Syria and #Iraq – New York Times	
The White House confirms the death of a second #ISIS member in an air strike in Iraq #happening_now	البيت الأبيض يؤكد مقتل الرجل الثاني بـ #داعش بغارة بالعراق #يحدث_الآن http://t.co/YGYENrTG81
Video: Clips of the American journalist "James Foley" from two years ago during his coverage of the events in Syria, before his death at the hands of ISIS	فيديو: لقطات قبل عامين للصحفي الأمريكي "جيمس فولي" اثناء تغطيته للأحداث في سوريا قبل نحره على يد داعش

3.4.2.5 Irrelevant (13 posts)

ISIS threatens anyone who watches the Real Madrid and Barcelona match with 80 lashes because soccer is a product of the despicable West	داعش تهدد اي شخص يشاهد مباراة ريال مدريد وبرشلونه بـ"80 جلدة" لأن كرة القدم من انتناج الغرب السافل
A dangerous Egyptian equilibrium and only the smart #Sisi #Brotherhood #ISIS #America #Egypt Retweet	waiel65@ معادلة مصرية خطيرة و للأذكياء فقط #السيسي #الاخوان #داعش #امريكا #مصر رتويت
Video: An American research who was a friend of the slain journalist challenges the "ISIS caliphate" to a debate about Islam	فيديو: باحث أميركي صديق الصحافي المذبوح يتحدى "الخليفة الداعشي" بمناظرة عن الإسلام

4 Additional Results from Main Analyses

4.1 Temporal Variation in US and ISIS Analyses

In the paper, we note, in very general terms, the temporal patterns in negative traffic related to the US and ISIS. In this section, we use more detailed figures to provide a more in-depth analysis of these patterns. These figures—Figure 3 and Figure 4—show the volume of posts per category for the US and ISIS Analyses from January 1, 2014 to December 31, 2015. The volume of traffic estimated to be irrelevant by the ReadMe-Based Model is excluded from analysis.

As noted in the paper, negative traffic in both analyses increases dramatically in mid-2014, coinciding with the beginning of non-covert US involvement against ISIS in Iraq and Syria. In mid-June, numerous Western and non-Western news sources reported requests from the Iraqi government for limited US air strikes, prompting negative responses on Arabic Twitter (e.g. أمريكا تستعد لغزو العراق مرة ثالثه لتدمره تدميرا بحجة داعش, i.e. "America is preparing to invade Iraq for a third time to completely destroy it for the sake of [destroying] ISIS"). This resulted in a high amount of sustained negative traffic about the US from early June to early August, with a peak in mid-June of approximately 170k negative posts about the US. This negative traffic tapered off until, on August 8, the US began to carry out air strikes against ISIS targets in Iraq, spurring another surge of negative traffic about the US. In fact, August 8 saw the highest amount of negative traffic about the US—approximately 300k posts—for any single day. Similar spikes in traffic occur on September 11, on the anniversary of the 9-11 attacks, and on September 23, when the US begins air strikes in Syria. As US involvement remains ongoing, intermittent spikes in negative traffic occur throughout the time period of our analysis.

In the ISIS Analysis, some of the spikes in negative traffic toward ISIS occur at the same time because of developments in ISIS's control over the region as well as atrocities ISIS carried out during this time period. For instance, the first spike in negative traffic occurs as ISIS takes Mosul in early June, and another spike occurs in response to ISIS posting images of Shiite shrines being destroyed on August 5. However, the largest spikes in negative traffic about ISIS occur much later in our date range of interest and correspond to ISIS attacks and killings either in the West (e.g. the November 2015 attacks in France) or in the Middle East (e.g. the killing of a downed Jordanian pilot). The largest number of negative posts about ISIS for a single day occurs on February 3, 2015, when a video of downed Jordanian pilot Muath Al-Kasasbeh was distributed by an ISIS-linked account on Twitter and over 600k negative Arabic posts were produced in response.

Two additional patterns are worth noting. First, although peaks in negative traffic toward ISIS are generally larger than those toward the US—600k posts for the highest volume day in negative traffic toward ISIS, vs. 300k posts for the US—there is a larger baseline of negative traffic about the US. Low-volume days for negativity in the US Analysis are still much higher than low-volume days for negativity in the ISIS Analysis. Second, there is a noticeable downward trend in positive traffic in the ISIS Analysis. ISIS has gained notoriety for its astute social media recruitment strategies, and much ISIS activity went unchecked on Twitter even up to mid-2014. However, after ISIS's main Twitter account (@Nnewsi) live-Tweeted its advance on Mosul in June 2014, Twitter

shut down the account due to violations of its terms of service.[2] Since that point in time, Twitter has periodically cleared out ISIS-associated accounts, including during our date range of interest.[3] This periodic deletion of ISIS-related accounts, as well as users' reactions to increasing attacks in Middle Eastern countries, both likely influence this downward trend.
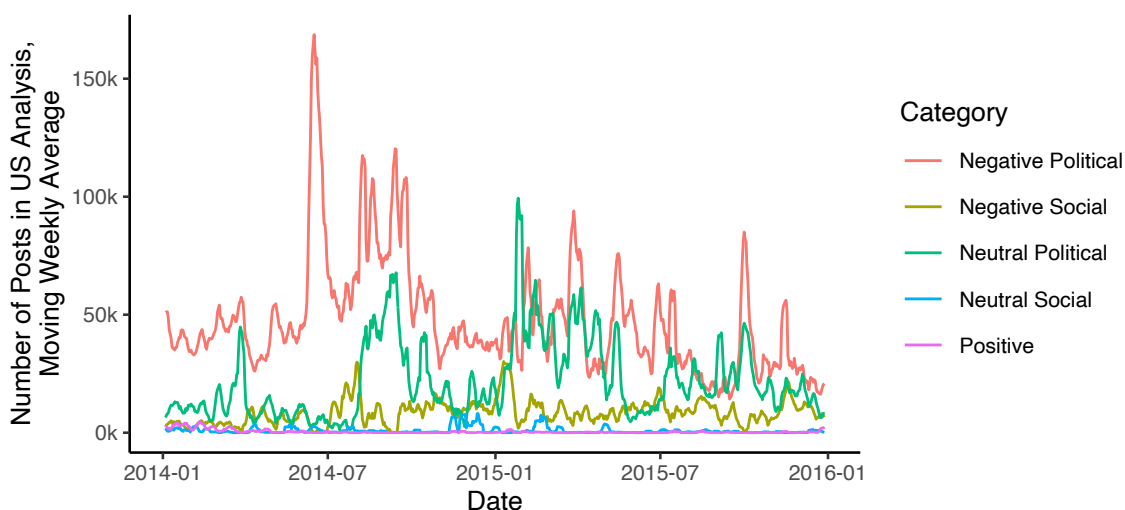

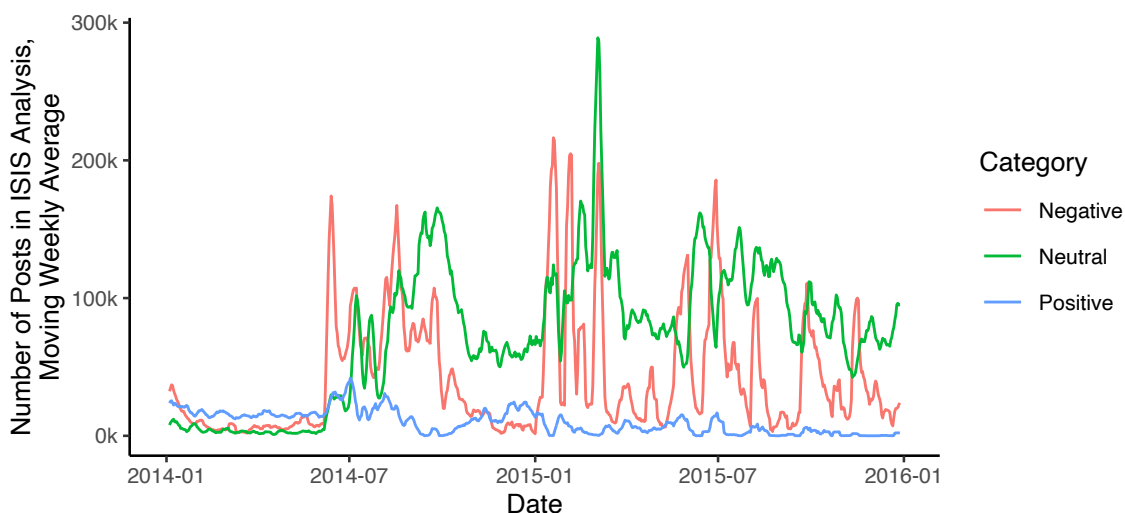*Figure 3 – US Analysis, volume over time by category*

Figure 4 – ISIS Analysis, volume over time by category

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[2] The following link summarizes the suspension of the account in response to graphic images Tweeted at the time: https://www.theatlantic.com/international/archive/2014/06/should-twitter-have-suspended-the-violent-isis-twitter-account/372805/

[3] See https://nyti.ms/2kKeJkX for an example.

4.2　　　Aggregate Analysis of US-ISIS Sentiment Correlation

To look at correlation between sentiment toward the US and ISIS at the aggregate level, we calculate the correlation between the daily volumes for categories in the *US Analysis* and the *ISIS analysis*, resulting in the 5x3 correlation matrix found in Table 1. The categories from the *US Analysis* compose the rows, and the columns are comprised of categories from the *ISIS Analysis*. Some of the results from this table are unsurprising; for instance, Neutral traffic in the General ISIS analysis is weakly correlated with Neutral Social traffic, and strongly correlated with Neutral Political traffic, in the General US analysis. But the results for Negative Political traffic in the General US analysis were surprising: this traffic is strongly correlated with both Negative ISIS traffic (with the highest correlation value in the matrix, at 0.41) and Positive ISIS traffic (at 0.31). This indicates that, at the aggregate level, peaks in negativity towards the US tend to occur simultaneously with peaks in negativity and positivity towards ISIS.

It was a desire to further explore this aggregate correlation that led us to conduct the Group-Based Analysis in the paper. However, before doing so, we checked evidence for a couple of theories that might explain the aggregate correlation. First, we considered the possibility that ISIS-related attacks and killings spur the results, as those condemning the attacks express negativity towards ISIS and those celebrating them express positivity towards ISIS and negativity towards the US. As outlined in Section 7 of this document, we examined the correlation between US and ISIS negative traffic surrounding a set of 77 ISIS-related attacks and killings, and we find little evidence for this explanation of the correlation.

Another explanation for the coincidence of negativity towards the US and ISIS in this aggregate analysis is that US intervention against ISIS spurs both reactions. Such intervention is controversial given past US involvement in the region, thus producing negativity towards the US; in addition, intervention against ISIS may bring the Islamic State and its violent acts more prominently into the news and the ire of the public, thus increasing negativity towards ISIS. US intervention against ISIS was not a one-time occurrence, and for this reason we explore this explanation by examining moving correlation values across the time range of our analyses. In Figure 5, we plot negative political US traffic with negative ISIS traffic, and include shaded vertical lines for each day. The darker the shade of the line, the higher the moving monthly correlation between the two trends. Examining the figure, we find that positive correlation between negative political US traffic and negative ISIS traffic seems to cluster around particular periods of time. For instance, there is high correlation between negative US and negative ISIS traffic during the lead-up to (June 2014) and beginning of (August to October 2014) the U.S. military campaign against ISIS. These results provide preliminary evidence for a correlation between US intervention and negative sentiment towards both the US and ISIS.

Table 1 – Correlation between daily volumes for categories in the General US and ISIS analyses.

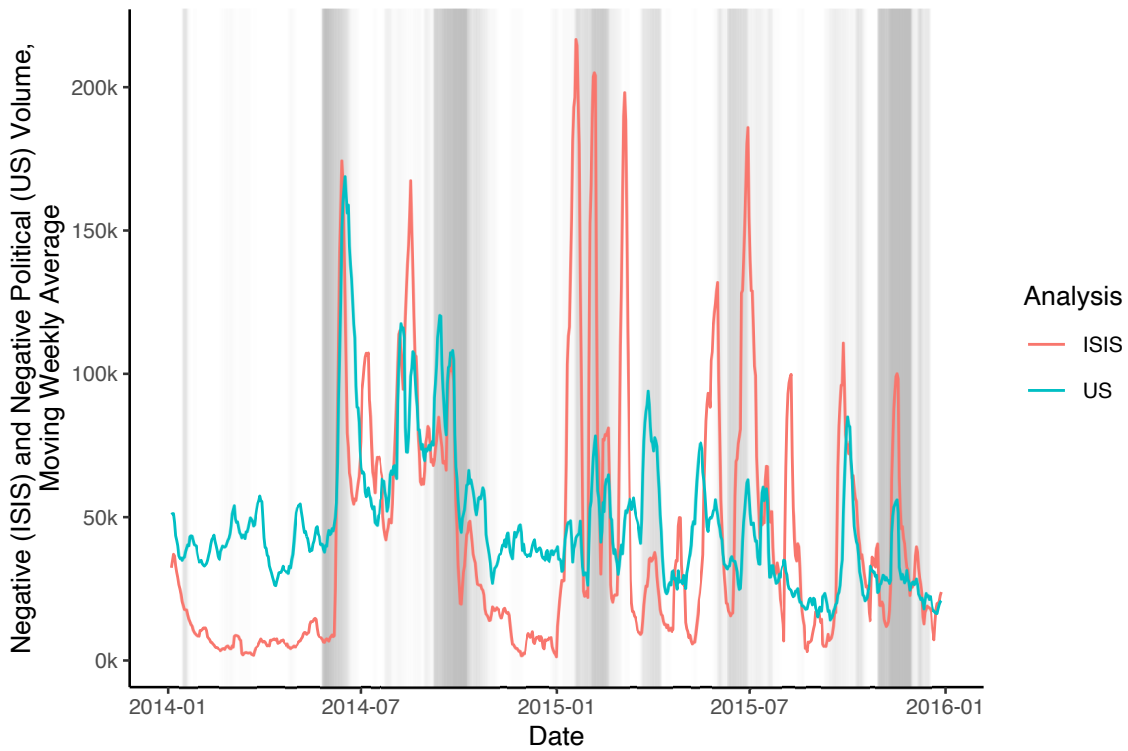| Gen. ISIS Cat. Gen. US Cat.	Negative	Neutral	Positive
Negative Political	0.41	0.06	0.31
Negative Social	0.09	0.16	-0.13
Neutral Political	0.17	0.37	-0.23
Neutral Social	-0.05	-0.04	0.10
Positive	-0.10	-0.33	0.17

Figure 5 – Temporal trends for negative traffic in the US and ISIS Analyses. The grey vertical lines are darker in areas where there is a higher value for the moving monthly correlation value between these two quantities.

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4.3 Additional Results from the Group-Based Analysis

Figure 6 and Figure 7 provide a more in-depth view of the results of the Group-Based Analysis than what was featured in our paper. Figure 6 shows the correlation between negativity toward ISIS and each category of traffic in the US Analysis, with the top panel corresponding to the figure presented in the paper that summarized these results. Of note from this figure is the fact that negative social traffic about the US is, similar to negative political traffic, positively correlated with negativity toward ISIS. All other categories of US-related traffic are negatively correlated with negativity toward ISIS.

Figure 7 shows temporal variation in the Group-Based Analysis, with each colored line corresponding to one of our 16 analysis groups and the gray line present in all four frames corresponding to the overall trend. This figure corresponds to the third panel of Figure 2 in the paper, which shows the same results for all high-ISIS negativity users as a single group. The main patterns of note in this figure are that (1) for almost all of the 16 groups, negativity toward the US peaks during the period of initial intervention, and (2) this peak reaches almost 100% of traffic for those who are more negative toward ISIS. This second point is especially notable in the period of initial US airstrikes against ISIS in Iraq and Syria (August to October 2014). For the eight lower-negativity groups of users, it is only the mid-June leadup to the airstrikes that elicits additional negativity. For the eight higher-negativity groups of users, this August to October period is a sustained period of anti-US sentiment, and this sentiment appears to be higher for those with a larger volume of Twitter posts.
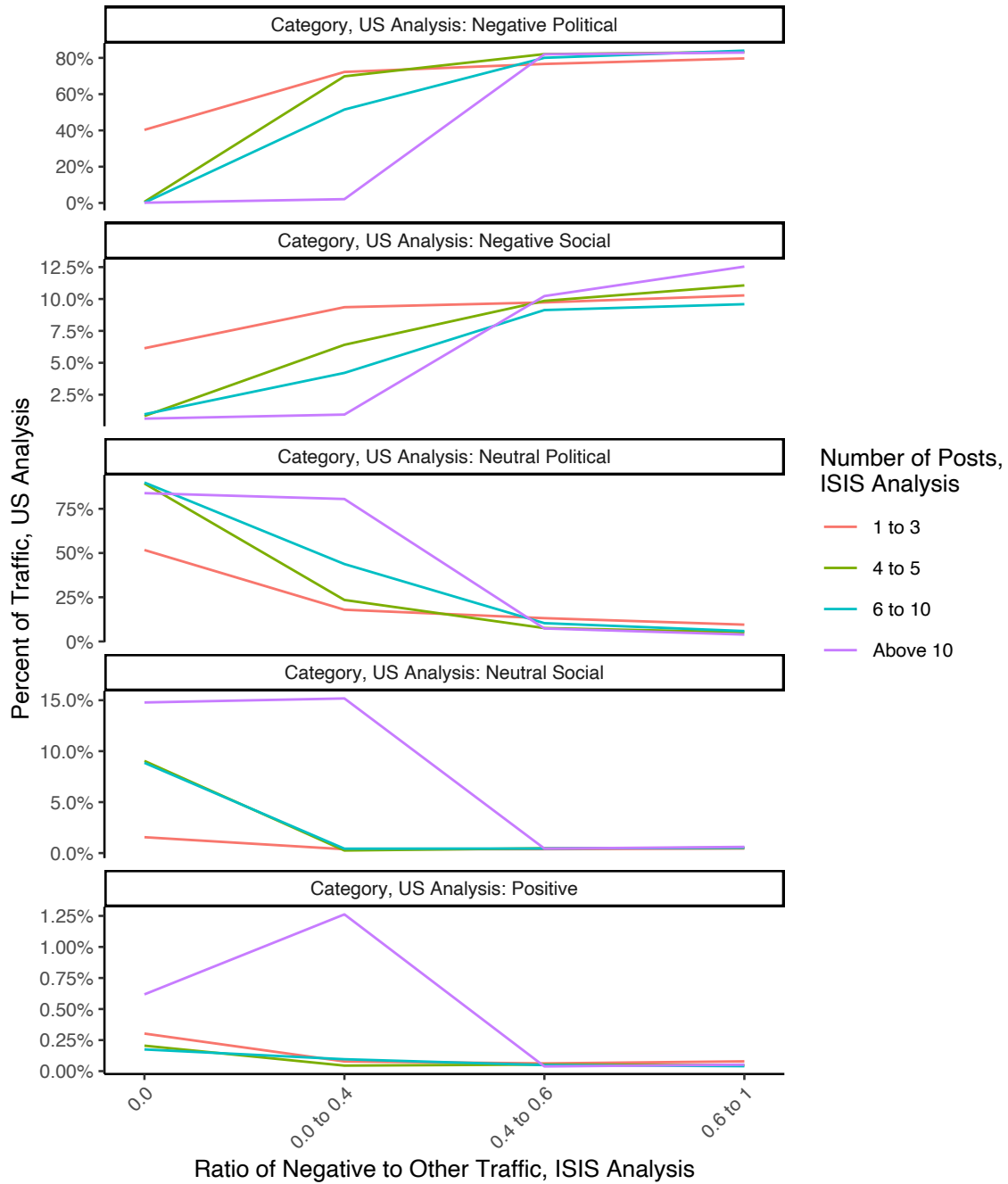
Figure 6 – General US Analysis, by ISIS sub-groups. On the x-axis, users are categorized by the ratio of their negative to non-negative Tweets in the General ISIS sample. The colors represent the number of posts in the ISIS Analysis sample, and results show the percent of traffic in the General US Analysis. The key panel is the one at the top, which shows that the more negative individuals are toward ISIS (on the horizontal axis), the greater the proportion of negative political content in the General US analysis, on average, from those individual.
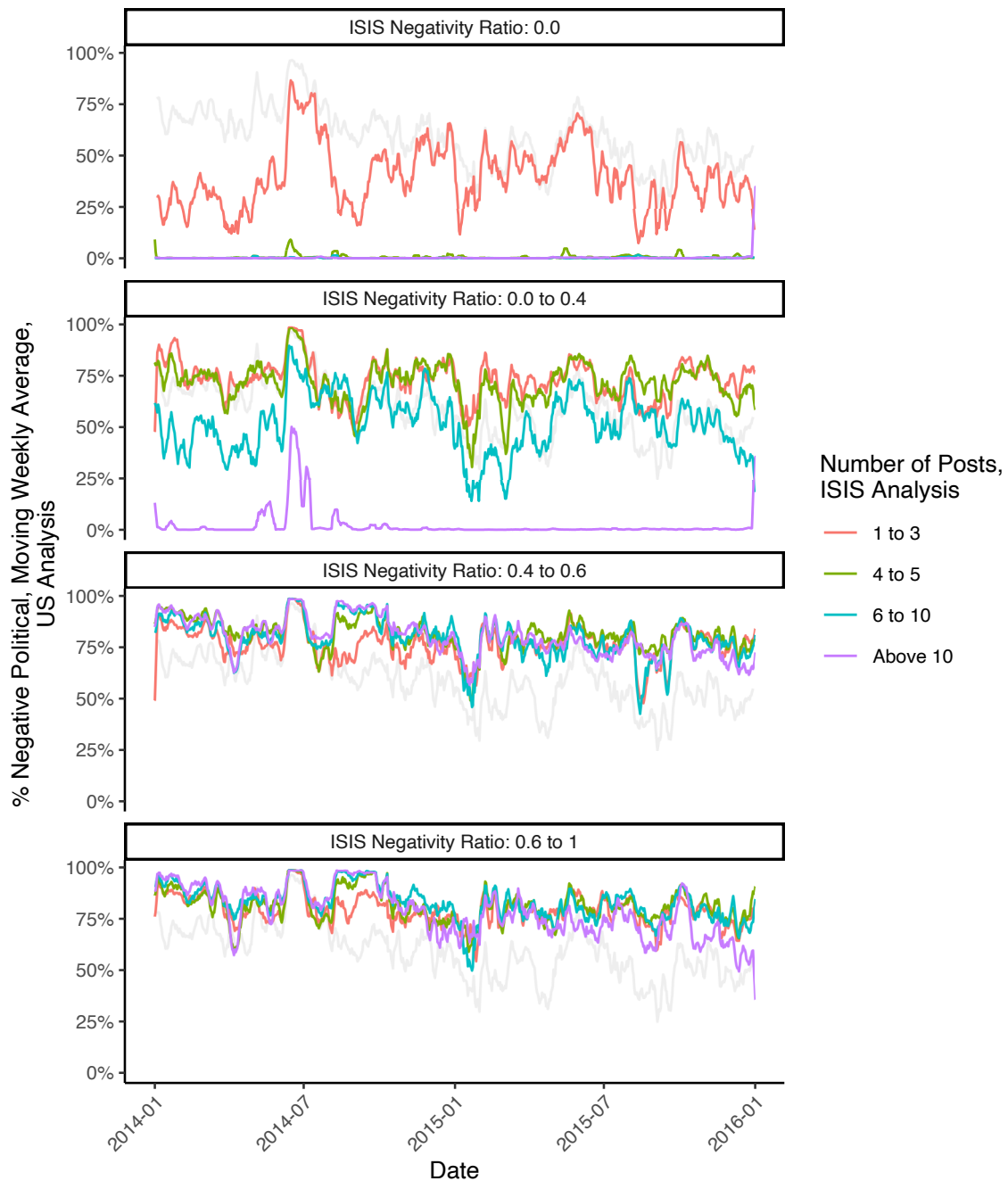
Figure 7 – This figure shows the trend lines for each of the points in Figure 6. The key point is that the correlation between anti-ISIS and anti-US sentiment is highest, especially for users with high negative sentiment towards ISIS, in early stages of the US offensive against ISIS, June-October 2014. The faint gray line in each panel shows the overall trend for all users during the time period.

5 Detailed Content Analysis

5.1 Conspiracy Theories in Training Texts

Throughout our training of Tweets for our models, our coders noticed a pattern of conspiratorial discussions of the US and ISIS and their involvement in the Middle East. Our coders also noted that the US and ISIS were frequently named as being in league together when conspiracy theories were discussed. These observations affected two aspects of the research project in particular. First, they led us to analyze Tweets that contained references to both the US and ISIS, i.e. the Combined Analysis mentioned in Section 3.4 of this Appendix. However, we found that computational textual analysis was not suited for the distinctions we were trying to make between different types of texts—in particular, for distinguishing Tweets claiming that US actions inadvertently *led* to the creation of ISIS versus Tweets claiming that the US purposively *created* or *supported* ISIS. For this reason, we supplemented our quantitative analysis with a qualitative look at the posts of 100 users who were extremely negative toward ISIS, the details of which are outlined in Section 5.2.

We focus on users from negative sentiment categories for the qualitative analysis because the majority of the conspiratorial content our coders came across was in documents classified as negative in sentiment. To quantify this observation for the reader, we coded the training texts used for our US and ISIS Analyses as either conspiratorial or non-conspiratorial and noted the sentiment categories in which they were found. We counted as conspiratorial texts that posited directly or indirectly the existence of sinister, secretive, and/or all-powerful plots, often containing easily disproven misinformation, involving the US or ISIS. This coding was done blind to the sentiment classification of the Tweet. The results of this analysis can be seen in Table 2. Particularly for the training texts in the US Analysis, a very large proportion (93%) of Tweets containing conspiracy theories is found in one of the two negative sentiment categories (political and social). In the ISIS Analysis, the pattern is still strong though not overwhelmingly so, with a majority (57%) of Tweets containing conspiracy theories falling in the negative category.

What accounts for conspiratorial content in the positive and neutral categories for the ISIS Analysis? Some of these Tweets contain misinformation that could be classified as a conspiracy theory, but this misinformation is repeated like a news story in a neutral manner; for instance, one such Tweet notes an interview where an official discusses the foiling of plots against ISIS, but this is done in a neutral manner. It is Tweets like these that account for the conspiratorial content categorized as neutral. Additionally, some Tweets in the ISIS Analysis discussed conspiracies against ISIS while also noting positive support for ISIS. The two positive conspiratorial posts in the ISIS Analysis are of this type.

Table 2 - Conspiracy Theories in Training Texts for US and ISIS Analyses

	Category		
	Positive	Neutral	Negative
US Analysis	0 (0%)	3 (7%)	42 (93%)
ISIS Analysis	2 (10%)	7 (33%)	12 (57%)

5.1.1   US Analysis: Examples of Conspiratorial Content in Training Texts

Obama and his "Muslim Brotherhood" administration severely misunderstood the situation – they thought that Egypt was just like every other country, that they could force on [Egypt] the same logic and Arab Spring plans – they will severely regret it!	اوباما وادارته الاخوانيه اخطات بتقدير الموقف انها رات ان مصر كباقى الدول يمكن ان يطبق عليها نفس المنطق ونفس خطط الربيع العربى ستندم كثيرا
America and Israel and [their] Arab lackeys incited sectarianism and hate between Muslims, and now they want to turn Iraq into three smaller countries – fools	امريكا واسرائيل وعملاء العرب زرعوا الطائفيه والكراهيه بين المسلمين والان يريدون ان يجعلوا من العراق الي ثلاث دويلات حمقي
We've said it a dozen times, and we've called for an end to the war – it's all an American game for its own filthy purposes – America's shadow looms large	قلنا هذا الكلام عدة مرات وناشدنا في إيقاف الحرب كلها لعبه اميركيه لغايات قذره تظليلها كبير امريكا

5.1.2   ISIS Analysis: Examples of Conspiratorial Content in Training Texts

A picture of Baghdadi in Camp Bucca Prison in Iraq in 2004, graduate of the CIA, the Americans in cahoots released him as part of an agreement whose ramifications we still see to this day!	صورة البغدادي في سجن بوكا في العراق ٢٠٠٤م خريج الـ CIA، والعميل الأمريكي أطلق سراحه بصفقة نرى نتائجها اليوم!
ISIS proved that it is an Iranian creation, therefore the one who blew up the mosque and killed our Shiite brothers is [really] Iran—may every sane Shiite know that his true enemy is Iran.	داعش ثبت بالادلة انها صنيعة ايران اذا من فجر المسجد وقتل اخواننا الشيعة هي ايران فليعلم كل شيعي عاقل ان عدوه الحقيقي هو ايران
Lavrov: Russia possesses intelligence [indicating] that the United States of America knows the location of ISIS sites but is avoiding bombing them.	لافروف: روسيا تملك معلومات حول معرفة الولايات المتحدة بمواقع «داعش» وتجنب قصفها.

5.2   Qualitative Content Analysis of 100 Users' Posts

We wanted to investigate the ways in which users connect the US and ISIS in their Twitter posts, a task we felt to be best suited to qualitative analysis. We randomly sampled 25 users from each of the high ISIS-negativity groups, for a total of 100 users, and then manually examined all of their Twitter posts in our US, ISIS, and Combined Analyses.

We tracked this content analysis using the spreadsheet called "Detailed Content Analysis.xlsx", which is included in our replication folder. We kept track of the following data points for each individual:

- Did the user have any posts that connected the US and ISIS in a conspiratorial manner? (saved as column "Causal – Consp")
- If the user did not have any conspiratorial posts, did they have posts that connected the US and ISIS in a non-conspiratorial manner? (saved as column "Causal – Non-Consp")
- If the user did not have any posts connecting the US and ISIS, did they mention both entities negatively in an independent manner? (saved as column "Independent")
- Did the user only have posts that were neutral or news-related? (saved as column "News/Neutral")
- Did the user have posts that mentioned both entities in another manner? (saved as column "Other")
- Was it impossible to determine the correct classification for the user? (saved as column "Can't Determine")

The full results are included in the spreadsheet; as a summary, 43 users had at least one post causally connecting the US and ISIS in a conspiratorial manner. Within the spreadsheet, example posts are included in the "Examples 1" and "Examples 2" columns showing the posts that led to the classification of that user.

6   Alternative Hypotheses

We were surprised by the finding that negativity towards the US is correlated with negativity towards ISIS; our own surprise led us to rigorously consider five alternative hypotheses for this correlation. In the paper, we outline the alternative hypotheses and our evidence against them very briefly. Here, we provide more details on the steps we took to address the alternative hypotheses.

6.1   The Ecological Fallacy Hypothesis

As noted in the paper, we considered a *Group-Based Analysis* superior to other potential approaches to studying the correlation between sentiment towards the US and ISIS. Two other approaches could be considered in this context. The first is an aggregate level approach, where temporal correlation between negativity towards the two entities in our *US Analysis* and *ISIS Analysis* is taken to indicate correlation in sentiment—we conducted such an analysis, and our results can be found in Table 1 and Figure 5. However, this approach is flawed due to a lack of ecological validity—we are really interested in correlation at the individual level. The second potential approach is an individual-level approach, where sentiment towards the US and ISIS is estimated for each individual in the dataset and then a correlation is calculated. This analysis is attractive because it measures attitudes at the appropriate level, but it is also unfeasible for most users because estimating sentiment based on Twitter posts requires a large number of texts per individual, which we do not have in our dataset (and usually does not exist given the frequency with which users Tweet). For these reasons, we decided that the *Group-Based Analysis* was the best compromise between these two options, and it is the analysis that we use to establish correlation between anti-US and anti-ISIS sentiment in the paper.

However, because the *Group-based Analysis* is not truly individual-level, it may also suffer from ecological validity. Perhaps our results are driven by something at the group level, such that we are detecting a confluence of negative views at the group-level even though none exists at the individual level. To test this hypothesis, we decided to conduct a truly individual-level analysis among the subset of Twitter users for whom this is possible—those with a large number of posts. To do this, we randomly selected 80 high-volume (10+ posts in our sample) users, 20 from each ISIS negativity level. We then estimated the *US Analysis* category proportions for each of them individually and average the results within ISIS negativity level. The results appear in Figure 8 and largely confirm the results of the *Group-based Analysis* in our paper. On average, the US-related traffic for the 20 users in the lowest ISIS negativity level constituted only ~20% of their total US-related traffic, whereas for those in the highest ISIS negativity level the corresponding proportion is ~80%, representing a 60 percentage point increase as you move from the lowest to the highest ISIS negativity level. This is lower than the 83-percentage point increase estimated from the *Group-based Analysis*, but it is still clearly a significant increase.

One important difference to note between this individual-level analysis and the *Group-based Analysis* are the differing findings for content in the negative social category. The individual-level analysis in this section finds a negative correlation between ISIS negativity and the proportion of a user's US-related traffic that is categorized as negative social, whereas the *Group-based Analysis* found the opposite (compare to Figure 6). We do not know the reason for this difference, but

because negative political traffic is the main focus of our analysis (as well as the larger of the two negative categories in the US analysis), we do not consider this difference to be a major issue.
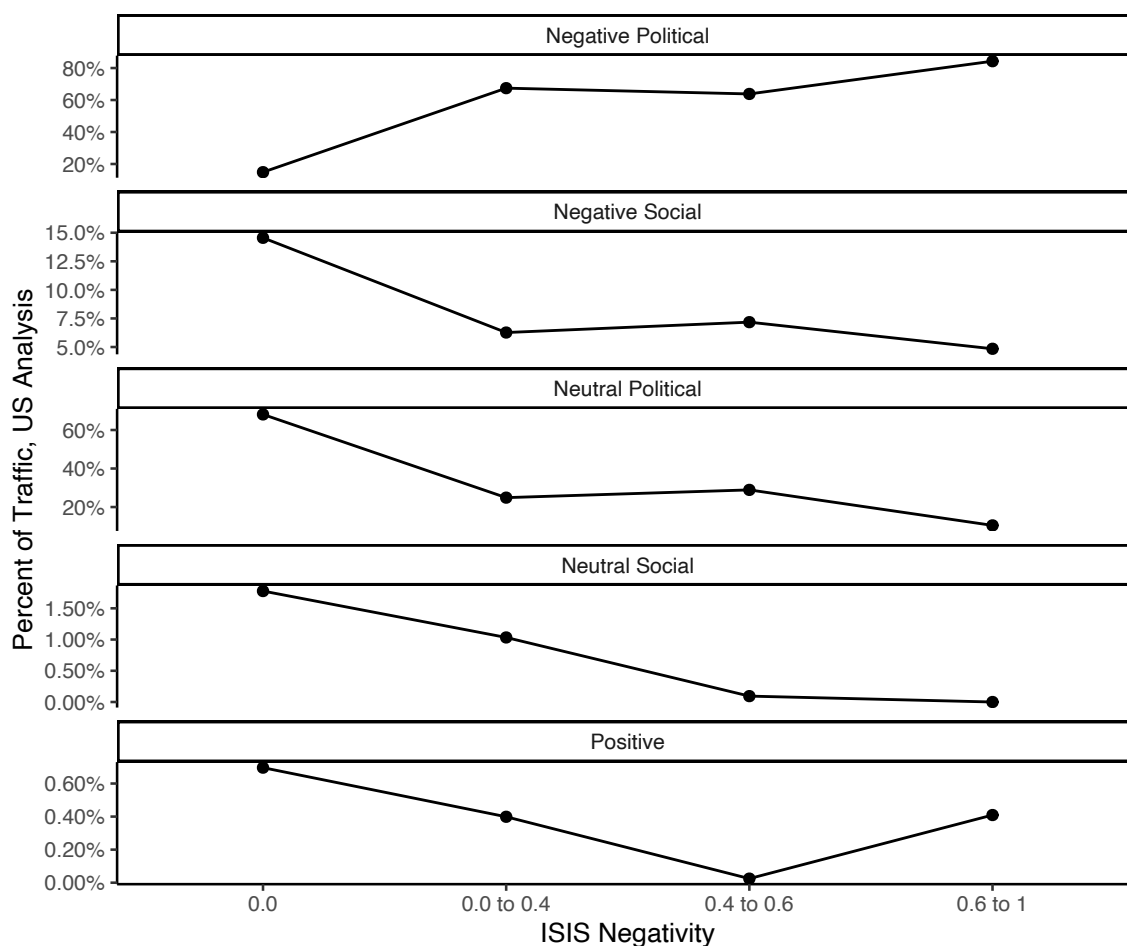
Figure 8 – Correlation between negativity toward ISIS and the US at the individual level.

6.2   The News Organization Hypothesis

News organizations and aggregators are a major source of content on Twitter, and we were worried that news organizations in and of themselves might account for the correlation between negativity towards the US and ISIS. Under this explanation, "not being a news organization" is a confounder in the correlation we observe. All of the neutral traffic in both analyses could be dominated by news organizations, and the negative traffic just represents anyone expressing an actual opinion. To address this alternative hypothesis, we conduct our analysis across different volume levels. We argue that news organizations generally Tweet at a much higher volume than others; therefore, if news organizations were driving our results, we would expect the correlation we observe to not exist (or be much weaker) for high-volume accounts. However, as shown in figures in the paper as well as Figure 6 and Figure 7 in this Appendix, we find that the opposite is true. The smallest correlation we observed was with the lowest volume accounts, and high-volume accounts drive much of the correlation we actually observe.

6.3　　The "Angry Uncle" Hypothesis

Perhaps a general predisposition towards negativity characterizes our anti-ISIS subgroups, such that the correlation we observe is not limited to ISIS and the US (imagine the social media tirades of an "angry uncle").

The most obvious empirical implication of this theory is that we should see a correlation between negativity towards ISIS and the negativity of non-US and non-ISIS traffic. The strongest empirical evidence in favor of this claim would be a correlation as strong as the one between negative ISIS and US traffic; the strongest evidence against this claim would be no correlation, in spite of that between negative ISIS and US traffic. Testing these correlations requires conducting an analysis of non-US and non-ISIS traffic from our 16 groups of users and then comparing the correlation between ISIS negativity and negativity in this new analysis to the correlation between ISIS negativity and negativity in the US analysis.

To conduct this analysis, we queried non-US and non-ISIS traffic for our users by using the top 30–40 words from a popular Arabic frequency dictionary (Buckwalter and Parkinson 2011) and excluding results that contain our US and ISIS keywords. This produces an analysis on, effectively, the universe of users' non-US and non-ISIS posts. This traffic is so varied that training an analysis ourselves was not feasible; for this reason, we used the Sentiment Classifier (the third model discussed in Section 2 of this Appendix) to determine the percentage of the traffic that is negative. We also ran this third type of model on US traffic, and we use the US sentiment analysis in this section to allow for a fair comparison.

The results of these sentiment analyses can be found in Figure 9. The results of these sentiment analyses indicate that general negativity may account for some, but not all, of the relationship we observe between negativity towards ISIS and the US. Across each of the four volume groups, going from the lowest to the highest ISIS negativity level was associated with in increase on average of 10 percentage points in the negative proportion of non-ISIS/non-US traffic. However, this increase in negative traffic is overshadowed by the corresponding increase in the negative proportion of US-related traffic, where going from the lowest to the highest ISIS negativity level is associated with an average increase of 17 percentage points. It should be noted that the average increase in negativity we observed in our user-trained analysis of US traffic was much larger, and therefore this test may be underestimating the proportion of correlation that can be explained by this alternative hypothesis. However, that aside, the results of the test itself provide evidence that the "angry uncle" hypothesis does not fully explain our findings.

Figure 9 – Sentiment analysis showing correlation between ISIS negativity and US/non-US traffic

6.3.1 Keywords for "Angry Uncle" Analysis

Below are the keywords and Boolean operators that we used to select Arabic traffic that did not include our US or ISIS keywords.

("في" OR "وفي" OR "ففي" OR "ففى" OR "من" OR "ومن" OR "لمن" OR "بمن" OR "فمن" OR "على" OR
"وعلى" OR "فعلى" OR "علي" OR "عليا" OR "عليكي" OR "عليك" OR "عليي" OR "عليه" OR "عليها" OR
"علينا" OR "عليكم" OR "عليكو" OR "عليهم" OR "عليهن" OR "وعلي" OR "وعليا" OR "وعليي" OR
"وعليك" OR "وعليكي" OR "وعليه" OR "وعليها" OR "وعلينا" OR "وعليكم" OR "وعليكو" OR "وعليكن"
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OR "إلي" OR "الي" OR "والي" OR "وإلي" OR "فالي" OR "فإلي" OR "إليك" OR "اليك" OR "وإليك" OR

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"إليها" OR "فاليه" OR "فإليه" OR "واليه" OR "وإليه" OR "اليه" OR "إليه" OR "فاليك" OR "فإليك" OR "واليك" OR
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6.4　　The Salience of International Politics Hypothesis

Perhaps the salience of international politics constitutes an omitted variable explaining our correlation. According to this interpretation, those who Tweet negative sentiments towards the US do so because issues of Middle Eastern international politics are more salient to them. Those who do not Tweet such sentiments may still feel just as negatively towards the US; however, because issues of Middle Eastern international politics are less salient for them, they do not express such sentiments, only Tweeting neutral news articles about the US. Thus, if the salience of international politics co-varies with negativity towards ISIS and the US, then perhaps it is individuals' interest in international politics that explains our relationship.

One implication of this hypothesis is that those who are more negative about ISIS will post more often about the US. This assumes that frequency of posting about the US is an indication of the salience of international politics to a given user. We calculated the average number of posts per user in the US Analysis for each of our 16 groups of Tweeters, to see if there was a positive relationship between negativity towards ISIS and how much you post about the US. The results are mixed but overall provide evidence against this explanation. On the one hand, there is a positive relationship for some groups. For instance, for the lowest-volume group (1–3 posts in the sample), a move from the lowest to the highest ISIS negativity group corresponds to an increase from 46 to 64 posts about the US per user; the increase for the next volume group (3 to 5 posts in the sample) is similarly small, going from 262 to 287 posts per user. However, the other two groups show a much stronger relationship in the opposite direction. For the next volume group (5 to 10 posts in the sample), going from the lowest to the highest ISIS negativity group corresponds with a large decrease from 592 to 383 posts per user, while the decrease for the highest-volume group (10+ posts in the sample) is an even larger drop from 1,885 to 555 posts per user.
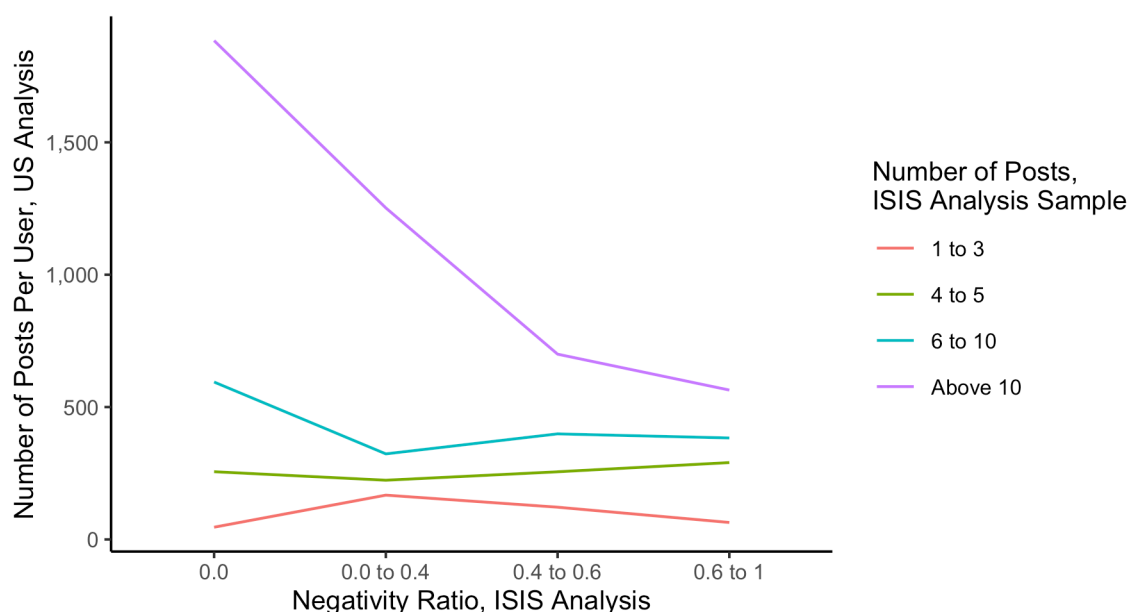
Figure 10 – Relationship between ISIS negativity and number of posts in the US analysis

6.5   The Sunni-Shia Hypothesis

One final hypothesis is that the correlation between negativity toward the US and ISIS is driven by Shia Twitter users, who could be both more negative towards the US and ISIS than their Sunni counterparts. Although we cannot measure Sunni/Shia identity at the individual level, we can address this alternative hypothesis at the country level. Our Tweets and analyses can be examined while geographically restricting results to certain countries. For each country, we calculated the correlation between ISIS negativity ratio (using the four levels used throughout the rest of this paper) and the percent negative traffic in the General US analysis. We then looked at whether this correlation was higher for Middle Eastern countries with bigger Shia populations. It is not; on average, countries with small Shia populations have the same correlation as those with high Shia populations. See Figure 11 for the results of this analysis, with a LOESS line showing the pattern for the 17 countries we include in this analysis.
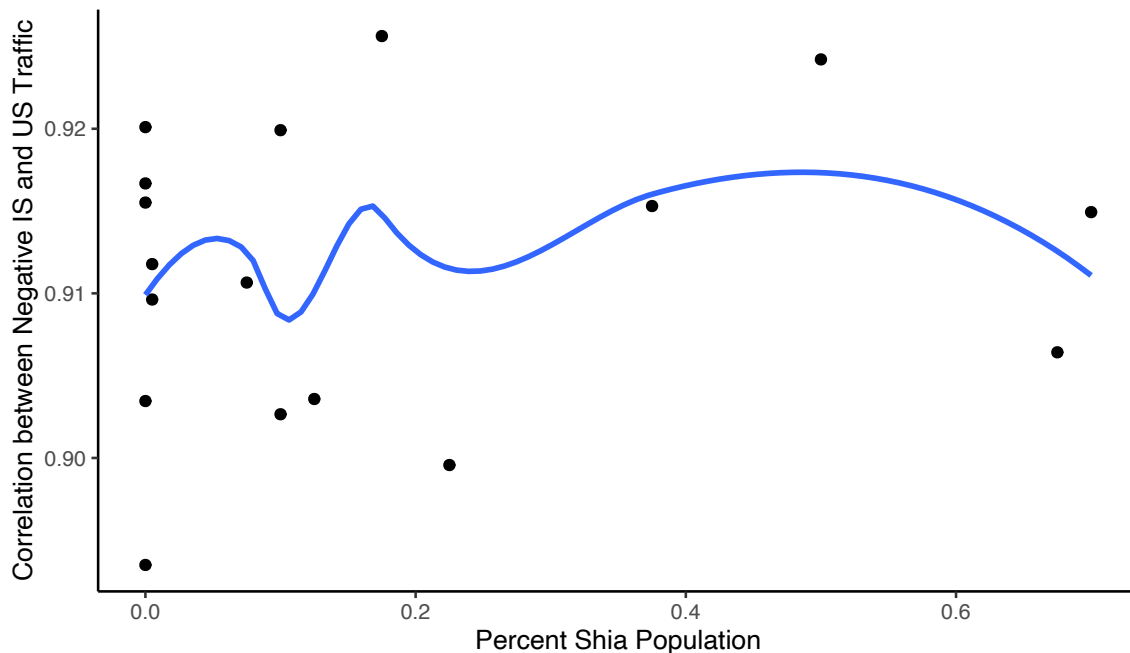
Figure 11 – How correlation varies as a function of the percentage of a country's population that is Shia Muslim.

7   ISIS Attacks

When examining the aggregate-level correlation between negativity toward the US and ISIS, we thought that ISIS-related attacks and killings might be spurring these results, as those condemning the attacks express negativity towards ISIS and those celebrating them express positivity towards ISIS and negativity towards the US. To explore this possibility, we examined how trends in negative traffic in the two monitors appear around the time that ISIS attacks take place. The data consists of a list of ISIS-related attacks and killings that took place during our time frame of interest (2014 to 2015), which we gathered to inspect how reactions to these incidents affects traffic in our General US and ISIS analyses. This list was culled from two online sources: (1) a New York Times list of ISIS attacks maintained by three reporters[4] and (2) Wikipedia's lists of non-state terrorist incidents.[5] After filtering out non-ISIS attacks, removing attacks that took place in Iraq and Syria,[6] and correcting a few of the dates as needed, we combined these lists to come up with a total of 77 events that took place during our time frame of interest. In our analyses, we use these events to examine how results in our monitor vary as a function of ISIS-related attacks and killings

Figure 12 presents these trends for all 77 events in our list (numbered for space considerations, the full list being available in the appendix). Negative traffic in the General ISIS analysis behaves the way you might expect, peaking for several of the most prominent events, such as the killing of the Jordanian Pilot in February 2015 (event 25) or the June 2015 mass shooting at a Tunisian resort (event 50). But negative traffic in the General US analysis barely peaks, if at all, for most of these events. The main exception to this pattern is the November 2015 Paris Attacks (event 72), in which negative political US traffic peaks with negative ISIS traffic. This may indicate that co-occurring negativity is partially a result of large-scale ISIS attacks against the West. However, this explanation is complicated by the lack of negative peaks in reaction to the dates for the San Bernardino attack, where we examined traffic on the date of the attack (event 75) as well as on the date when Obama declared the incident a terror attack (event 76). Additionally, there was no negative reaction in either analysis to the Charlie Hebdo attack (event 16). This seems to indicate that the correlation between negative traffic in the two analyses is not primarily due to reactions to attacks or killings by ISIS, including large-scale attacks against the West.

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[4] http://www.nytimes.com/interactive/2015/06/17/world/middleeast/map-isis-attacks-around-the-world.html
[5] https://en.wikipedia.org/wiki/List_of_non-state_terrorist_incidents
[6] We saw such attacks as fundamentally different from attacks outside of ISIS's warzone, and we decided that they were not relevant to our analysis.
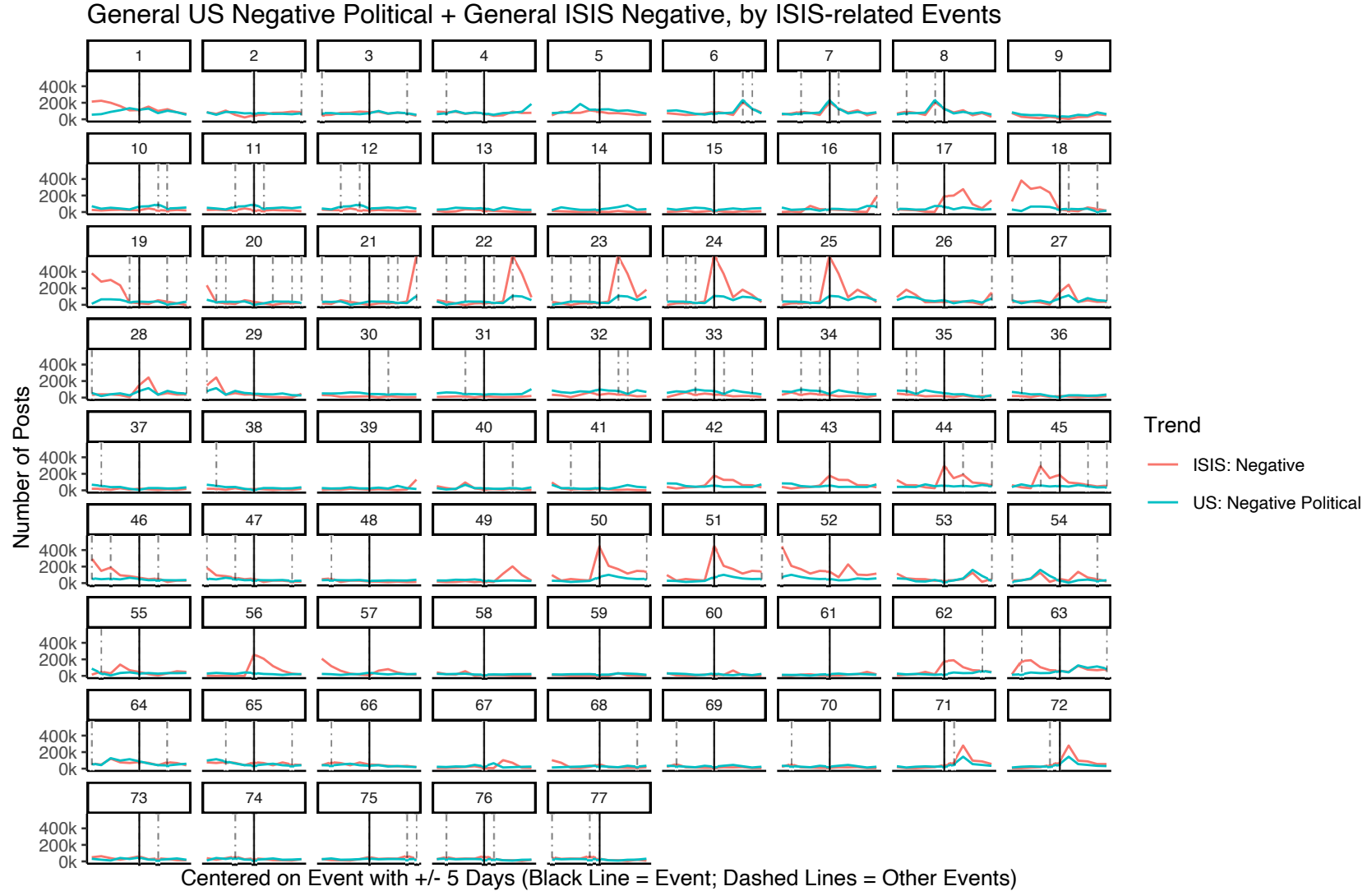
Figure 12 – Trends in negative traffic about ISIS and negative political traffic about the US during time periods where an ISIS-related attack occurred. Each plot shows the 5 days before and after the event. The solid black lines mark the event itself; the dashed lines mark the dates of other events if they fall during the same 11-day period. Note that several events occur on the same date as others, so some of the plots are repeated. The list of events is found in the appendix.

Below is the full list of ISIS-related attacks used in our analysis. Most of the event descriptions are taken from the related Wikipedia articles.

- 01. US civilian 01
    - 8/19/14
    - James Wright Foley was an American freelance journalist and photojournalist of the Syrian Civil War when he was abducted on November 22, 2012, in northwestern Syria. Foley was the first American citizen to be killed by "Jihadi John." James Foley's beheading by ISIL received wide condemnation in the United States.
- 02. Lebanese soldier 01
    - 8/28/14
    - Lebanese Army Sergeant Ali al-Sayyed was beheaded following his capture by ISIL during the Battle of Arsal. ISIL member Abu Musaab Hafid al-Baghdadi posted pictures of his beheading on Twitter. The beheading sparked public outrage in Lebanon.
- 03. US civilian 02
    - 9/2/14
    - Steven Joel Sotloff was an Israeli-American journalist for Time magazine and The Jerusalem Post, although the Post disavowed any relationship once Sotloff's life was threatened. In 2013, he was kidnapped in Aleppo, Syria. On September 2, 2014, a video was released purporting to show "Jihadi John" beheading Steven Sotloff.
- 04. Lebanese soldier 02
    - 9/6/14
    - Lebanese Army soldier Abbas Medlej is believed to have been beheaded following an attempted escape from his captors. ISIL members claim that he was contained following an escape attempt, where he fired upon his captors, according to comments made by an ISIL Leader on the Turkish Anatolia news channel. Gruesome photos of the dead soldier were posted on several pro-jihadist Twitter accounts on September 6.
- 05. UK civilian 01
    - 9/13/14
    - David Haines was abducted in March 2013 while working in Syria for the humanitarian aid group Agency for Technical Cooperation and Development assessing the Atmeh refugee camp near the Turkish border and the Syrian province of Idlib. A video of the lead-up and aftermath of David Haines' beheading, entitled "A Message to the Allies of America", was released by ISIL on September 13, 2014.
- 06. Afghani civilian beheadings
    - 9/20/14
    - On September 20, 2014, local officials in the Ghazni Province of Afghanistan reported that Taliban insurgents from different regions of the country led by

camouflaged men wearing black masks had captured several villages, set at least 60 homes on fire, killed more than 100 people and beheaded fifteen family members of local police officers. The masked insurgents reportedly carried the black flag of ISIL, openly called themselves soldiers of Da'esh, and did not speak any local languages.

- 07. Melbourne police stabbing
  - 9/23/14
  - An 18-year-old ISIS sympathizer was shot dead after stabbing two counterterrorism officers outside a Melbourne police station.
- 08. French tourist in Algeria
  - 9/24/14
  - Militants kidnapped and beheaded a French tourist shortly after the Islamic State called on supporters around the world to harm Europeans in retaliation for airstrikes in Iraq and Syria.
- 09. UK civilian 02
  - 10/3/14
  - Alan Henning was a British humanitarian aid worker. Henning was the fourth Western hostage killed by ISIL. Henning was captured during ISIL's occupation of the Syrian city of Al-Dana in December 2013, where he was helping with humanitarian relief. Alan Henning was shown at the end of David Haines's beheading video, released on September 13, 2014, and referred to by "Jihadi John" as the next victim. A video of Henning's beheading was released by ISIL on October 3, 2014.
- 10. Montreal car attack
  - 10/20/14
  - A 25-year-old man who had recently adopted radical Islam ran over two soldiers near Montreal, killing one.
- 11. Ottawa attack
  - 10/22/14
  - An Islamic convert shot and killed a soldier who was guarding the National War Memorial in Ottawa, stormed Canada's parliament and fired multiple times before being shot and killed.
- 12. Queens hatchet attack
  - 10/23/14
  - A hatchet-wielding man charged at four police officers in Queens. ISIS said the attack was the "direct result" of its September call to action.
- 13. US civilian 03
  - 11/16/14
  - Peter Edward Kassig, also known by the name Abdul-Rahman Kassig, which he assumed in captivity, was 26 years old at the time he was beheaded. Kassig worked in Syria and Lebanon as a humanitarian worker. On October 1, 2013, as he was on his way to Deir Ezzour in eastern Syria to deliver food and medical supplies to refugees, Kassig was taken captive by ISIL. On November 16, 2014, ISIL posted a video showing "Jihadi John" standing over a severed human head. The beheading itself was not shown in the video. The White House later confirmed the person killed was Kassig.

- 14. Danish man shot, Saudi Arabia
  - 11/22/14
  - A Danish executive was shot in his car. A group of ISIS supporters later claimed responsibility.
- 15. Sydney siege
  - 12/15/14
  - A gunman who said he was acting on ISIS's behalf seized 17 hostages in a Sydney cafe.
- 16. Charlie Hebdo attack
  - 1/7/15
  - On January 7, 2015 at about 11:30 local time, two brothers, Saïd and Chérif Kouachi, forced their way into the offices of the French satirical weekly newspaper Charlie Hebdo in Paris. Armed with assault rifles and other weapons, they killed 12 people and injured 11 others.
- 17. Coptic kidnappings announced
  - 1/12/15
  - ISIS's Tripoli affiliate said they were holding 21 Egyptian Christians captive.
- 18. Lebanese army outpost attack
  - 1/23/15
  - ISIS attacked an outpost of the Lebanese Armed Forces.
- 19. Japanese civilian 01
  - 1/24/15
  - Haruna Yukawa was a Japanese national reported to be beheaded in January 2015. In April 2014, he was in Syria where he was captured by the Free Syrian Army; Japanese journalist Kenji Goto was brought in to interpret, and Goto secured Yukawa's release. Both Yukawa and Goto went back to Japan, but Yukawa soon returned to Syria, where he disappeared after July 2014; ISIL released a video on YouTube of Yukawa on the ground bleeding. In October 2014, Goto returned to Syria to try to secure Yukawa's release; he was soon captured. The two appeared in a video in January 2015 in which ISIL gave the Japanese government a deadline of 72 hours for a ransom of $200 million. The deadline passed without fulfillment of the ransom, and a video of Yukawa's beheading was released.
- 20. Libya luxury hotel armed assault
  - 1/27/15
  - ISIS's Tripoli affiliate claimed credit for an armed assault on a luxury hotel that killed at least eight people. It was the deadliest attack on Western interests in Libya since the assault on the American diplomatic mission in Benghazi.
- 21. Sinai coordinated attacks
  - 1/29/15
  - ISIS's Sinai affiliate claimed responsibility for coordinated bombings that killed 24 soldiers, six police officers and 14 civilians.
- 22. Japanese civilian 02
  - 1/31/15
  - [*Continued from event 19 above.*] By the end of the month, the group released another video of the beheading of Goto, in which Jihadi John proclaimed to

Japanese prime minister Shinzo Abe "because of your reckless decision to take part in an unwinnable war, this knife will not only slaughter Kenji, but will also carry on and cause carnage wherever your people are found. So let the nightmare for Japan begin."

- 23. Alleged Egyptian/Israeli spies
  - o 2/1/15
  - o In February 2015, in response to the buffer zone the Egyptian government placed along the Gaza-Egypt border, ISIL members beheaded 10 men they believed were spies for Mossad and the Egyptian Army.
- 24. Libya oil field attack
  - o 2/3/15
  - o ISIS militants were suspected of killing 12 people, including four foreigners, in an attack on an oil field.
- 25. Jordanian pilot
  - o 2/3/15
  - o https://en.wikipedia.org/wiki/Muath_al-Kasasbeh
- 26. US civilian 04
  - o 2/10/15
  - o https://en.wikipedia.org/wiki/Kayla_Mueller
- 27. Coptic beheading in Libya
  - o 2/15/15
  - o ISIS released a video that appeared to show its militants in Libya beheading a group of Egyptian Christians who had been kidnapped in January.
- 28. Copenhagen shooting
  - o 2/15/15
  - o A Danish-born gunman who was inspired by ISIS went on a violent rampage in Copenhagen, killing two strangers and wounding five police officers.
- 29. Libya car bombings
  - o 2/20/15
  - o ISIS's Derna affiliate claimed responsibility for three car bombs that killed at least 40 people.
- 30. Bardo museum shooting
  - o 3/18/15
  - o ISIS claimed responsibility for an attack on a museum that killed 22 people, almost all European tourists.
- 31. Yemen shiite mosques bombings
  - o 3/20/15
  - o An ISIS affiliate claimed responsibility for coordinated suicide strikes on Zaydi Shiite mosques that killed more than 130 people during Friday Prayer.
- 32. Sinai car bombs at checkpoints
  - o 4/2/15
  - o Sinai's ISIS affiliate killed 13 people with simultaneous car bombs at military checkpoints.
- 33. Kidnapping of Afghani civilians
  - o 4/4/15
  - o The Afghan vice president accused ISIS of kidnapping 31 civilians in February.

- 34. Libyan checkpoint attack
    - 4/5/15
    - ISIS killed at least four people in an attack on a security checkpoint.
- 35. Police attack in Saudi Arabia
    - 4/8/15
    - Gunmen opened fire on a police patrol, killing two officers.
- 36. Moroccan embassy in Tripoli
    - 4/12/15
    - ISIS's Tripoli affiliate claimed credit for a bomb that exploded outside the Moroccan Embassy.
- 37. Mult. attacks, Egyptian sec. forces
    - 4/12/15
    - ISIS militants killed at least 12 people in three separate attacks on Egyptian security forces.
- 38. Korean embassy in Tripoli
    - 4/12/15
    - ISIS's Tripoli affiliate claimed responsibility for an attack on the South Korean Embassy that killed two local police officers.
- 39. Ethiopian Christians in Libya
    - 4/19/15
    - ISIS released a video of militants from two of its Libya affiliates killing dozens of Ethiopian Christians, some by beheading and others by shooting.
- 40. Yemen soldiers killing
    - 4/30/15
    - One of ISIS's Yemen affiliates released a video showing the killing of 15 Yemeni soldiers.
- 41. Garland, Texas center shooting
    - 5/3/15
    - Two men who reportedly supported ISIS and were later acknowledged by ISIS as "soldiers of the caliphate" opened fire in a Dallas suburb outside a Prophet Muhammad cartoon contest.
- 42. Yemen shiite mosque bombing
    - 5/22/15
    - ISIS claimed responsibility for a bomb attack on a Shiite mosque that injured at least 13 worshipers.
- 43. Saudi shiite mosque bombing
    - 5/22/15
    - In what appeared to be ISIS's first official claim of an attack in Saudi Arabia, a suicide bomber detonated an explosive at a Shiite mosque during midday prayer, killing at least 21 and injuring 120.
- 44. Saudi mosque suicide bombing
    - 5/29/15
    - One week after a similar attack in the same region, a suicide bomber dressed in women's clothing detonated an explosive belt near the entrance to a Shiite mosque, killing three people.
- 45. Libyan checkpoint bombing

- o 5/31/15
- o A suicide bomber from an ISIS affiliate killed at least four Libyan fighters at a checkpoint.
- 46. Beheading of Taliban members
  - o 6/3/15
  - o ISIS is suspected of beheading 10 members of the Taliban.
- 47. Kurdish political rally explosion
  - o 6/5/15
  - o An explosion at a political rally in the predominantly Kurdish city of Diyarbakir killed two people and wounded more than 100. Turkish officials have said ISIS was behind the attack.
- 48. Sinai air base bombing
  - o 6/9/15
  - o ISIS's Sinai province claimed responsibility for firing rockets toward an air base used by an international peacekeeping force.
- 49. Yemen car bombings
  - o 6/17/15
  - o An ISIS branch claimed responsibility for a series of car bombings in Sana, the capital, that killed at least 30 people.
- 50. Tunisian hotel mass shooting
  - o 6/26/15
  - o At least one gunman disguised as a vacationer attacked a Mediterranean resort, killing at least 38 people at a beachfront hotel, most of them British tourists, before he was shot to death by the security forces.
- 51. Kuwait mosque bombing
  - o 6/26/15
  - o A suicide bomber detonated explosives at one of the largest Shiite mosques in Kuwait City during Friday Prayer.
- 52. Army and security killings, Egypt
  - o 7/1/15
  - o Militants affiliated with the Islamic State killed dozens of soldiers in simultaneous attacks on Egyptian Army checkpoints and other security installations in Egypt's northern Sinai Peninsula.
- 53. Italian consulate in Egypt
  - o 7/11/15
  - o ISIS claimed responsibility for an explosion outside the Italian Consulate's compound in downtown Cairo that killed one person.
- 54. Egypt naval vessel
  - o 7/16/15
  - o In what appeared to be the first attack on a naval vessel claimed by Sinai Province, the ISIS affiliate said it destroyed an Egyptian naval vessel and posted photographs on social media of a missile exploding in a ball of fire as it slammed into the vessel.
- 55. Turkey cultural center mass killing
  - o 7/20/15

- o A Turkish citizen believed to have had ties to ISIS killed at least 32 people at a cultural center.
- 56. Saudi mosque bombing
  - o 8/6/15
  - o ISIS claimed responsibility for a suicide bombing at a mosque that killed at least 15 people, including 12 members of a Saudi police force.
- 57. Egypt Croation beheading
  - o 8/12/15
  - o An ISIS affiliate said it had beheaded a Croatian expatriate worker because of Croatia's "participation in the war against the Islamic State."
- 58. Egypting sec. agency bombing
  - o 8/20/15
  - o An ISIS affiliate claimed responsibility for bombing a branch of the Egyptian security agency.
- 59. Egypt police shooting
  - o 8/26/15
  - o The Sinai Province of the Islamic State group claimed responsibility for three gunmen who shot and killed two police officers.
- 60. Yemen mosque bombings 01
  - o 9/2/15
  - o Yemen's ISIS affiliate claimed responsibility for two bombings at a mosque that killed at least 20 people.
- 61. Tripoli, Libya prison attack
  - o 9/18/15
  - o Militants loyal to the Islamic State attacked a prison inside a Tripoli air base.
- 62. Yemen mosque bombings 02
  - o 9/24/15
  - o At least 25 people were killed when two bombs went off outside a mosque during prayers to commemorate Eid al-Adha, a major Muslim holiday.
- 63. Bangladesh aid worker shooting
  - o 9/28/15
  - o ISIS claimed responsiblity for the shooting death of an Italian aid worker.
- 64. Bangladesh rickshaw shooting
  - o 10/3/15
  - o ISIS claimed responsibilty for the shooting death of a Japanese man riding a rickshaw.
- 65. Yemen bombings
  - o 10/6/15
  - o A series of bombings in Yemen's two largest cities killed at least 25 people.
- 66. Ankara bombings
  - o 10/10/15
  - o Two explosions killed more than 100 people who had gathered for a peace rally in Turkey's capital. Turkish officials believe ISIS is responsible.
- 67. Bangladesh shiite bombing
  - o 10/24/15

- o ISIS claimed responsiblity for bombings that killed one person and wounded dozens more during a procession commemorating a Shiite Muslim holiday.
- 68. Russian jet in Egypt
  - o 10/31/15
  - o An ISIS affiliate in Sinai claimed responsiblity for the downing of a Russian passenger jet that killed all 224 people on board.
- 69. Egypt suicide bombing
  - o 11/4/15
  - o ISIS's Sinai affiliate claimed responsiblity for a suicide bombing that killed at least four police officers.
- 70. Bangladesh police stabbing
  - o 11/4/15
  - o ISIS claimed responsibility for a stabbing and shooting that left one police officer dead and another wounded.
- 71. Lebanon suicide bombings
  - o 11/12/15
  - o ISIS claimed responsiblity for a double suicide bombing that ripped through a busy shopping district at rush hour, killing at least 43 people.
- 72. Multiple Paris attacks
  - o 11/13/15
  - o President François Hollande blamed the Islamic State for terrorist attacks across Paris that killed more than 100 people. The Islamic State claimed responsiblity.
- 73. Sinai hotel, Egypt attack
  - o 11/24/15
  - o ISIS militants attacked a hotel in the northern Sinai Peninsula, killing at least seven people.
- 74. Bangladesh shiite mosque
  - o 11/26/15
  - o ISIS claimed responsiblity for an attack on a Shiite mosque during evening prayer in which gunmen opened fire on worshipers with machine guns, killing one man and injuring three others.
- 75. San Bernadino mass shooting
  - o 12/2/15
  - o A married couple shot and killed 14 people in San Bernardino, Calif. The FBI is investigating the shooting as an act of terrorism inspired by ISIS.
- 76. SB defined as terrorist attack
  - o 12/6/15
  - o It wasn't until four days later that the San Bernadino shootings were officially classified as a terrorist attack.
- 77. Yemen car bombing
  - o 12/7/15
  - o The Islamic State claimed responsibility for a car bomb that killed a provincial governor and eight of his body guards.