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#COMMONCORE PROJECT

HOW SOCIAL MEDIA IS CHANGING THE POLITICS OF EDUCATION

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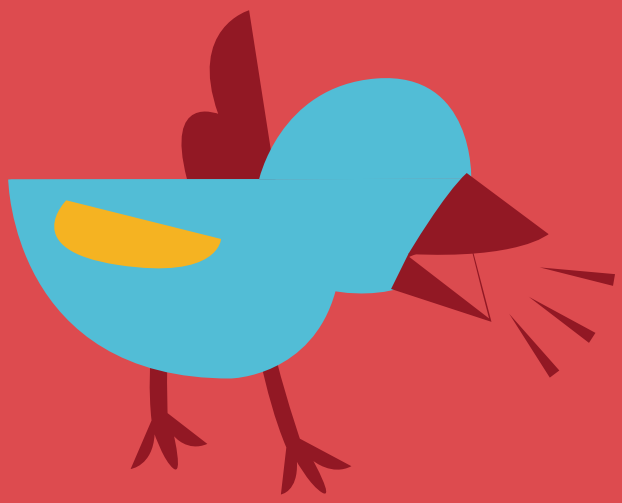

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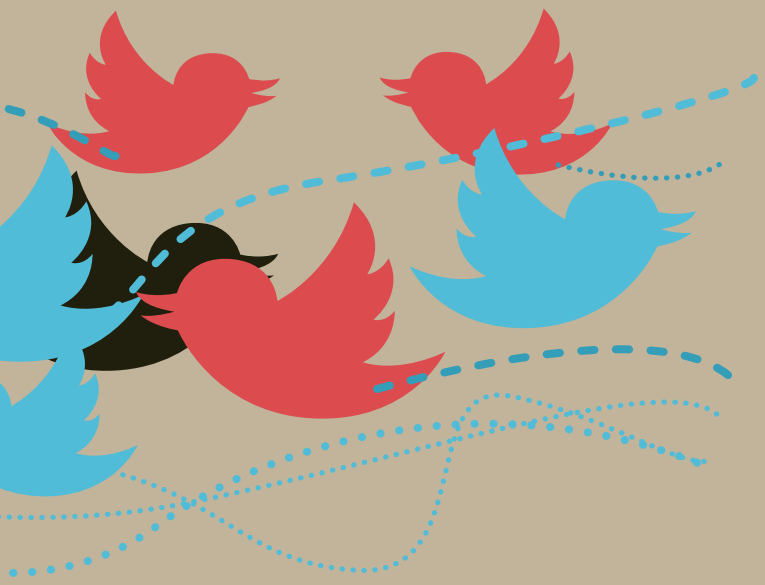
PROLOGUE



PROLOGUE

Fueled by impassioned social media activists, the Common Core State Standards have been a persistent flashpoint in the debate over the direction of American education. In this innovative and interactive website we explore the Common Core debate on Twitter. Using a distinctive combination of social network analyses and psychological investigations we reveal both the underlying social structure of the conversation and the motivations of the participants. The central question guiding our investigation is: How are social media-enabled social networks changing the discourse in American politics that produces and sustains social policy?

ABOUT #COMMONCORE PROJECT

In the #commoncore Project, authors Jonathan Supovitz, Alan Daly, Miguel del Fresno and Christian Kolouch examine the intense debate surrounding the Common Core State Standards education reform as it played out on Twitter. The Common Core, one of the major education policy initiatives of the early 21st century, sought to strengthen education systems across the United States through a set of specific and challenging education standards. Once enjoying bipartisan support, the controversial standards have become the epicenter of a heated national debate about this approach to educational improvement. By studying the Twitter conversation surrounding the Common Core, we shed light on the ways that social media social networks are influencing the political discourse that, in turn, produces public policy.

THE RISE OF SOCIAL MEDIA-ENABLED SOCIAL NETWORKS

We live amidst an increasingly dense, technology-fueled network of social interactions that connects us to people, information, ideas, and events, which inform and shape our understanding of the world around us. In the last decade, technology has enabled an

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exponential growth in these social networks. Social media tools like Facebook and Twitter are engines of a massive communication system in which a single idea can be shared with thousands of people in an instant.

In this project, we use data from Twitter to analyze the intense debate surrounding the Common Core. The standards have consistently generated a high volume of activity on Twitter. Hashtags (#) are used on Twitter to mark keywords or topics of interest to users, and hashtags related to the Common Core – in particular, #commoncore, #ccss, and #stopcommoncore (the three from which we drew our analyses) – have consistently generated 30,000-50,000 tweets a month. While topics tend to trend and fall on Twitter, debate using these three hashtags has consistently maintained this volume of activity over the 32 months from September 2013 through April 2016.

SOCIAL NETWORK ANALYSIS MAKES THE INVISIBLE VISIBLE

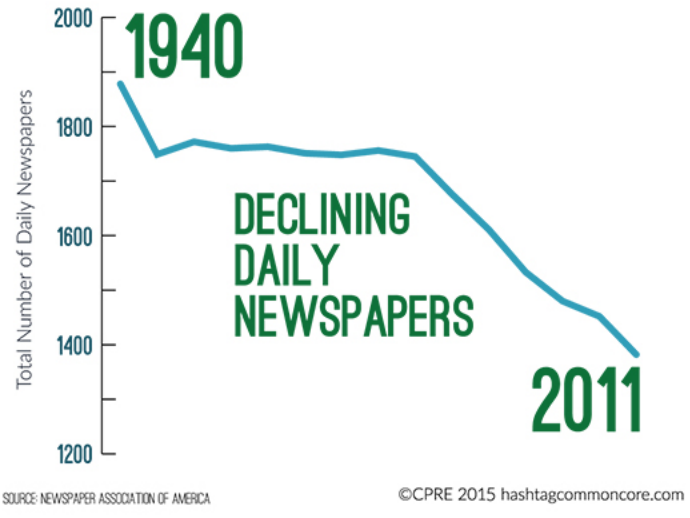
To understand the Common Core network and the discussion coursing through it, our research combines social network analysis and linguistic analysis to produce a distinctive combination of lenses that allow us to examine the debate both from the outside in and from the inside out. Pairing social network analysis and linguistic analysis gives us a unique vantage point to gain insight into the ways in which social media-enabled social networks are producing and disseminating the political discourse that influence public policy.

The powerful thing about social network analysis is that it makes visible the patterns of communication in social networks that are otherwise invisible to either those interacting within the networks or to those observing them from the outside. Regardless of whether they are networks of neighbors talking across backyard fences, friend networks on Facebook, or professional networks in business, social networks are mostly invisible to the naked eye. Despite being unseen, the ideas, opinions, and information streaming through these networks can be very consequential, both in terms of the content and with whom it is being shared. These sources help form our beliefs and opinions, which form the basis for our convictions and subsequent actions.

Looking closely at the Common Core tweets using linguistic analysis is similarly revealing. By examining how participants articulate and frame the Common Core reform and related issues, how they craft metaphors to represent their views, and what lexical choices they make, we gain insight into their psychology which motivated their participation in the conversation. Linguistic analyses can provide a deeper understanding of participants' underlying motivations, their levels of conviction, and even their state of mind. We can conduct linguistic analyses on individual tweets, the body of activity of particular actors, and even social groups, in order to better understand how interest groups build coalitions in the social media era.

THE EVOLUTION OF MEDIA IN POLITICS

As network television became more dominant in the 1960s and 70s, the three major networks—CBS, NBC, and ABC—molded public perceptions to an unprecedented degree in what became known as agenda setting. In one famous study that was replicated many times, McCombs and Shaw demonstrated the overwhelming alignment between what residents in Chapel Hill, North Carolina, thought were the most important election issues of the day and what the news media reported were the most important issues. 2 The public depended heavily on the three dominant networks to stay abreast of national and international news, and because of this, the media had tremendous influence in molding public opinion.



PROLIFERATION OF MEDIA OUTLETS

With the advent of cable television in the 1980s, the proliferation of channels led to a fragmentation of audiences. Cable news, talk radio, and 24-hour all-news outlets competed for attention with increasingly brazen and partisan reporting. The wide array of available media choices increasingly caused audiences to fracture as people tended to avoid information that diverged from their worldview, instead seeking out information that was consistent with their preexisting attitudes and beliefs.3 In this context, it is not hard to see why many political scientists have argued that the expansion of available news sources has increased political polarization.4

In today's media landscape, the Internet and social media sites such as Twitter and Facebook provide even more opportunities for audiences to splinter as members with similar views have increasing access to each other. And there are some distinct differences between the media landscape at the end of the last century and the social media era we are in today. The growth of cable television in the 1980s and 1990s was still essentially unidirectional from "elites" to general audiences because of the content control of mass media and passive forms of viewing. Social media, however, allows members to actively voice their opinions and engage directly with each other.

Some researchers, including Valenzuela, Park, and Kee, view social media as a new opportunity for political participation, free flow of information, and broader democratic mobilization.5 Others, like Roodhouse, view social media sites as nothing more than discursive information flows and echo chambers where the fervent can shout with each other.6

Thus, Twitter is in many ways the perfect platform for examining the ways in which social media are influencing the Common Core conversation in the United States. Twitter is a free, online, and global communication network that combines elements of blogging, text messaging, and broadcasting. One of the most valuable aspects of Twitter is its evolving nature to be, "a media of intersection of every media and medium."7

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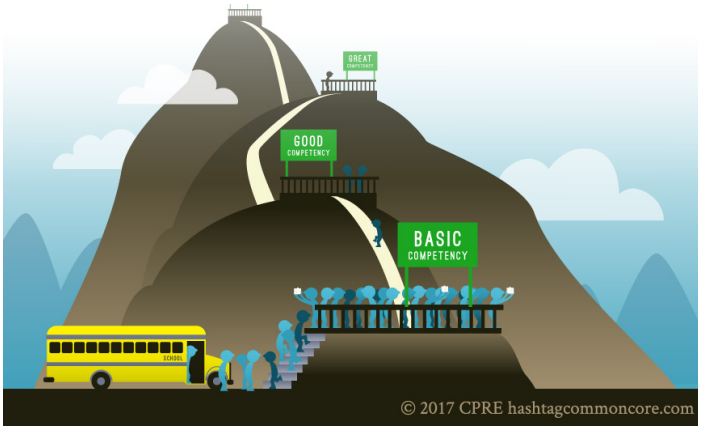
THE RECENT HISTORY OF STANDARDS REFORM IN AMERICA

The Common Core State Standards set forth what students should know and be able to do in mathematics and English language arts at each grade level. The standards were developed at the behest of a group of organizations led by the National Governors Association (NGA) and the Council Chief State School Officers (CCSSO). The development of the Common Core began in 2009, but they are part of a history of several decades of education reform.

1980S: FOCUS ON MINIMUM COMPETENCY TESTING



In the 1980s, policymakers created a set of minimum competency tests, which they intended schools to use as a foundation for performance. The expectations codified in the tests focused on a set of basic skills that schools were expected to have all students meet. However, the basic expectations assessed through the minimum competency tests often became the aspirations for instruction. The important lesson from this era was that low expectations produced low performance.

1990S: STATEWIDE SYSTEMIC REFORM

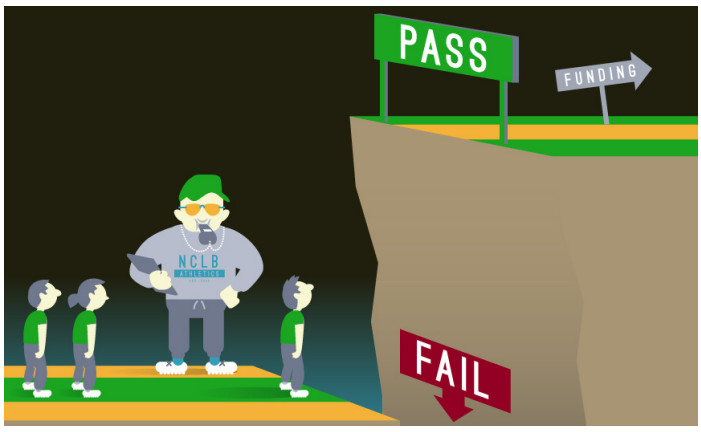
The apparent "race to the bottom" phenomenon spurred by minimum competency testing led to an emphasis on high expectations. The systemic reform effort of the 1990s was built around three general principles. First, ambitious standards developed by each state would provide a set of targets of what students ought to know and be able to do at key grade junctures. Second, states measured progress toward standards by developing aligned assessments that combined rewards and sanctions for holding educators accountable to the standards. The third component was local flexibility in organizing capacity to determine how best to meet the academic expectations.1 This structure of

clear goals (standards), measures (assessments), and incentives (accountability) at the state level, combined with implementation autonomy, fit with our historical conceptions of education as a local effort. This led each state to develop its own standards and assessment systems, which produced lots of variation in the quality and rigor of state educational systems across the country.

2000S: TEST-BASED ACCOUNTABILITY

Research on schools pressed by test-based accountability showed both productive and unproductive responses. There was an increase in attention to tested subjects, a rise in test preparation behavior, more attention to students just at the cusp of passing the test, and greater attention to heretofore marginalized students.2

Some states also gamed the system by creating tests that most students could easily pass. There were also several cases of systematic cheating by educators in school districts and schools that made national headlines. The accountability emphasis of No Child Left Behind left many policymakers convinced that although pressure was important, we couldn't just squeeze higher performance out of the system—we had to build a structure to support it.

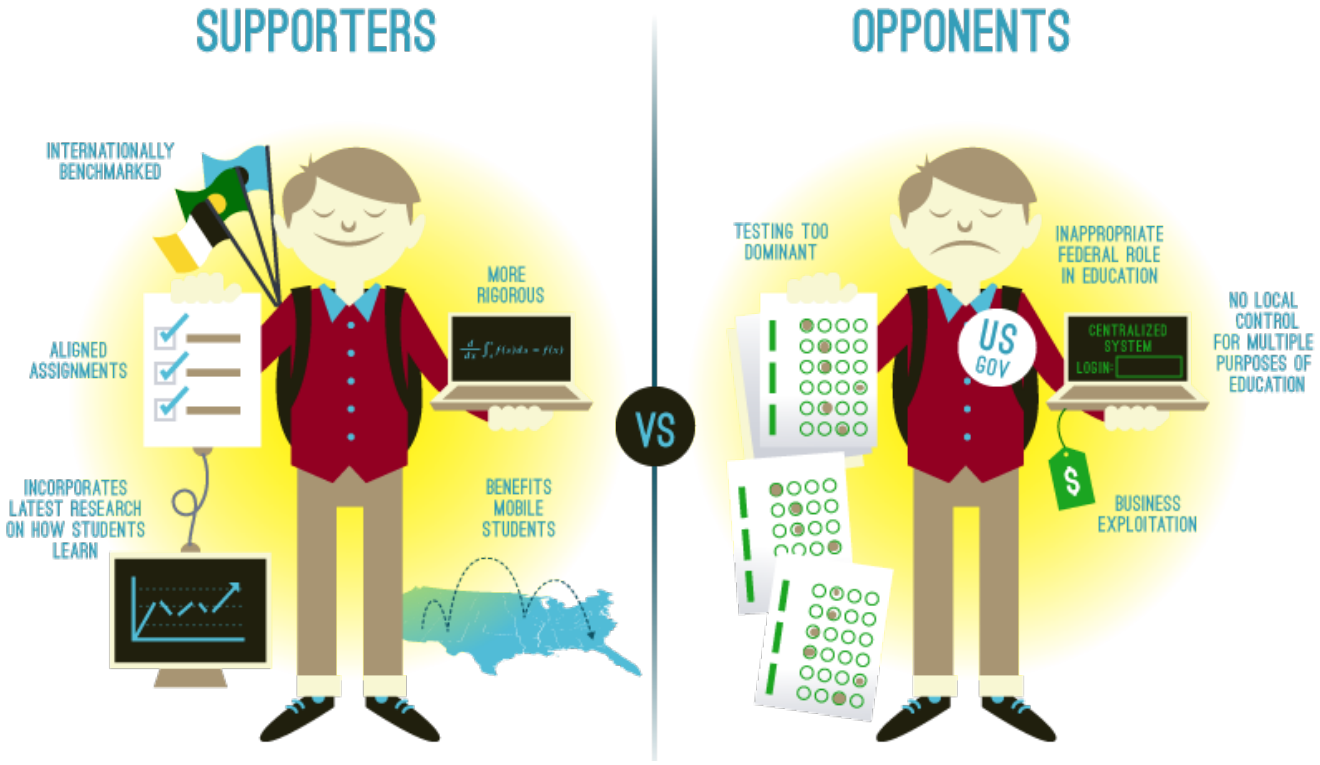


2010S: "COMMON CORE STATE STANDARDS"

This brings us to the present major reform initiative in the United States - the Common Core State Standards (CCSS). The CCSS set forth what students should know and be able to do in mathematics and English language arts at each grade level from Kindergarten to 12th grade. In a remarkable moment of bi-partisanship, the CCSS were adopted by the legislatures in 46 states and the District of Columbia in 2010. Alaska, Texas, Virginia and Nebraska did not adopt the Common Core, preferring their own state standards. Minnesota adopted the Common Core ELA standards, but not those in mathematics. Since then, the CCSS have become remarkably political and several states have either backed away from the CCSS and/or the associated tests or are in the midst of heated discussions about their involvement with the CCSS.

In sum, many factors led to the development of the Common Core State Standards. Ever since the Nation at Risk Report of 1983, which famously stated "the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people," we have felt our education system besieged.3 Flat longitudinal performance on the National Assessment of Educational Progress (NAEP) and middling performance on international comparative assessments like TIMSS and PISA has further perpetuated the belief that America needs a more rigorous education system to compete with other nations in the increasingly global economy. This middling performance is often partly attributed to the spiraling nature of what is taught in America's schools, a student experience that has been called "a mile wide and an inch deep."4

Thus, the Common Core represents the latest response to the challenge of educational improvement by incorporating the lessons learned from prior experiences with education reform. The minimum competency era taught us that we needed high expectations for all students. The state-wide systemic reform movement of the 1990s taught us that state-led standards and testing systems would produce too much variability in quality and alignment. The decade of experimentation with test-based accountability drove home the lesson that,



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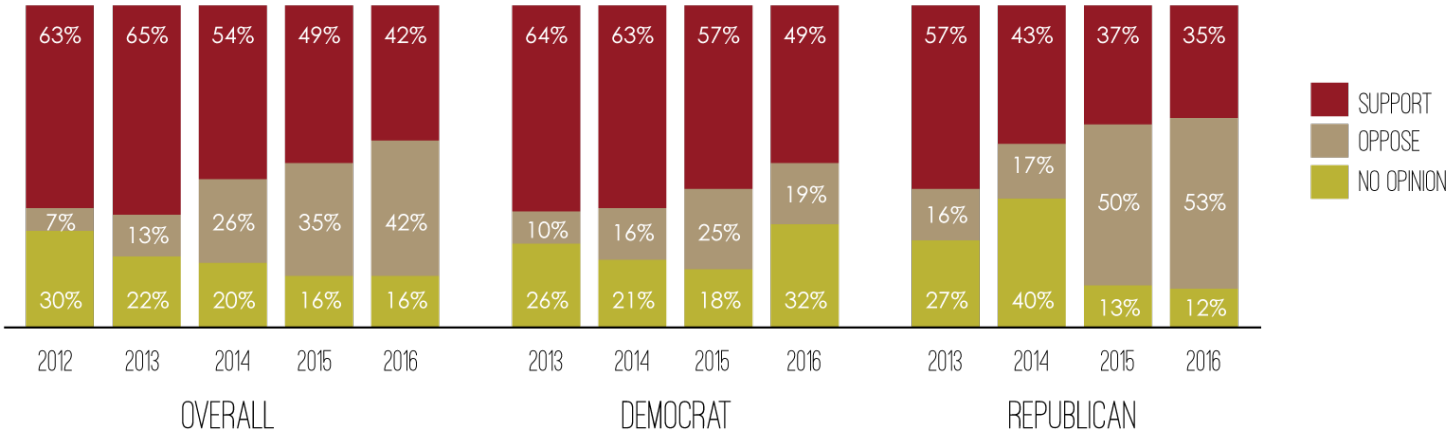

while accountability pressure was important, we couldn't just squeeze higher performance out of the system without a coherent infrastructure to support it. All these factors have led to the push for a more comprehensive system with a uniform set of standards and aligned assessments that would allow for consistency in an increasingly mobile society.

ONGOING CONTROVERSY SURROUNDING THE COMMON CORE

Since their bipartisan adoption in 2010, the CCSS have become increasingly controversial. A series of important events contributed to both the pace of implementation and policymaker and public perceptions of the CCSS. First, the severe economic recession of 2008 spurred the economic stimulus of the American Recovery and Reinvestment Act in 2009, which included funding for the Race to the Top (RTTT) competition in education. Forty-six of the 50 states submitted applications for RTTT (Alaska, North Dakota, Texas, and Vermont did not submit applications), which included a provision that states adopt rigorous standards, and eventually awarded over $4.1 billion to 19 states. This financial carrot heavily incented states to adopt the CCSS, but created an impression of Federal coercion.5

Second, by 2013, more than half the governors who were in office when their states adopted the standards (and who were members of the National Governors Association, a sponsor of the CCSS) were no longer in the governorship, loosening states' commitment to the standards. There was also growing partisan resistance in several states about continuing to use the CCSS. In 2013, Republican legislators in 11 states introduced legislation to repeal adoption of the Common Core.6 In 2014, Indiana, Oklahoma, and South Carolina backed out of the CCSS and several other states (including Missouri, New Jersey, Pennsylvania, Tennessee, and West Virginia) have modified their standards to replace the Common Core. Additionally, about half of the states have withdrawn from the associated Common Core aligned test consortia.

Third, as shown in the Education Next survey results, the CCSS have become increasingly unpopular and partisan. In 2012, 63% of respondents supported the CCSS. From 2013 to 2015, support declined from 65% to 49%. At the same time, while Democratic support remained in the low 60% range, Republican support declined 20 percentage points, from 57% to 37%. The ongoing controversy surrounding the CCSS provides both a backdrop and consequence of the activity on Twitter.

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THEORY OF SOCIAL CAPITAL

A RELATIONAL PERSPECTIVE

This project is based on the fundamental idea that connections and ties between individuals create a larger network, and that this network is important to outcomes at both the individual and collective level. Ideas, opinions, and information that flow through these ties can be influential and impact behavior.

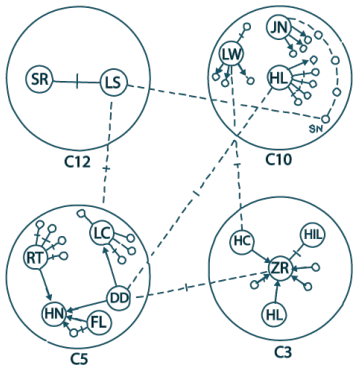
This is idea is grounded in social capital theory, which posits that individuals exist in a social structure of relationships. This structure of relationships facilitates or inhibits an individual's access to both physical and intellectual resources such as knowledge, ideas, and opinions. Social capital theorists consider the richness of a social network to be a key component of a group's social capital, which refers to the kinship, trust, and goodwill that provides a collective advantage to the community.1

Sociologist Robert Putnam has chronicled the social benefits of memberships in organizations such as churches, clubs, and more.2 He hypothesized that the benefits he observed were due to the connections that these groups offer to their members. In another famous example of the importance of social capital, Mark Granovetter found that extended ties even beyond one's tight-knit circle of friends helped people gain access to job opportunities.3

HISTORICAL GROUNDING

The most explicit and earliest network approach to society dates back to German sociologist Georg Simmel (1858-1915) who wrote, "Society exists where a number of individuals enter into interaction," and the object of study "was no more and no less than the study of the patterning of interaction."4

> "A collection of human beings…becomes a society only… **when one individual has an effect, immediate or mediate, upon another**…. If there is to be a science whose subject matter is society and nothing else, it must exclusively **investigate these interactions.**"
>
> GEORG SIMMEL



Contemporary social network analysis was formalized in the 1930s with the work of Jacob Moreno, who studied runaway girls and argued that their behavior was influenced by the social links among them.5 Moreover, the girls themselves may not have been consciously aware of how their actions were socially influenced and how, ultimately, it was their position in a social network that may have affected the runaway behavior. This idea is still prominent today and has expanded to the idea that social influence can impact a host of behaviors—both consciously and unconsciously—from happiness to weight gain to access to career opportunities.

Thus, a core idea of the work running from Simmel to Moreno to Coleman to Putnam is the importance of social networks, which reflect the overall structure of small and large societal relationships. This idea comes with some basic assumptions.

ASSUMPTIONS UNDERLYING THE SOCIAL NETWORK PERSPECTIVE

There are a few core theoretical underpinnings to a social network perspective including:

- Actors in a network are assumed to be interdependent rather than independent.
- Relationships are regarded as conduits for the exchange or flow of resources and influence.
- The robustness and structure of a network has influence on the resources that flow to and from an actor and across a network.
- Patterns of relationships present dynamic tensions as these patterns can act as both opportunities and constraints for individual and collective action.

This approach privileges the structure of relationships to hold more sway than the attributes of individual actors. For our work, we start with a structural perspective and then add individual attributes and perspectives. Let's look a bit more into what a network can illuminate.

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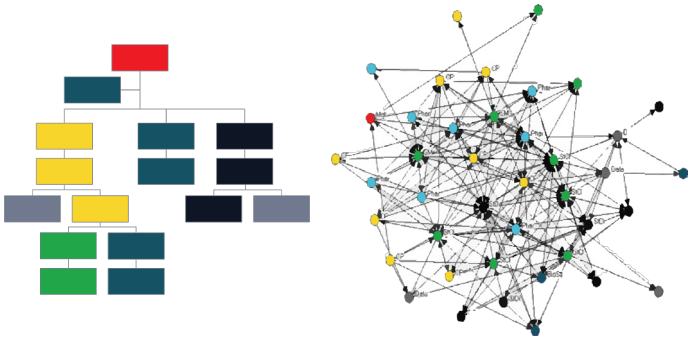
COMPARING FORMAL AND INFORMAL NETWORKS



One of the most interesting aspects of social networks is the ability to compare and contrast the formal structure of relationships—meaning how things are formally structured versus how people actually interact. Sometimes, formal professionals are less important in social networks while unofficial individuals are central. In this example, a central player (large red box) in the formal system (left) is at the top of the hierarchy, yet in the informal social structure (right) this actor is marginalized (average-size red dot). Social network analysis can sometimes make the invisible visible.

NETWORKS ARE EVERYWHERE

Networks are intuitive and show up in many aspects of our lives. They may be structural, like subway systems or computer connections, or social, like relationships with our friends, church members, sports teams, parent groups, or colleagues.

From a social network perspective, individuals or organizations can have relationships that are depicted by lines connecting them, called ties. These ties can be uni-directional (going in one direction or the other) or bi-directional. Ties that go out (i.e. are sent) from one actor to another are called out-ties and ties that come in (i.e. are received) are referred to as in-ties. Ties can sometimes be reciprocated. These can be seen in the informal social structure graphic above.

The size of the circle that represents each individual, called a node, reflects the magnitude of the resource of that individual or group. Some actors have more "importance" in the network, meaning they have more incoming or outgoing ties in comparison to others. Other actors are more peripheral and others are even entirely disconnected from the network (called isolates).

CENTRAL ACTORS

The major actors in a network are considered central because they have more connections than others. These individuals therefore amass disproportionately more resources through unique social links and, therefore, may have undue influence over a network.

Research suggests that these actors also have access to novel and diverse resources, allowing them the possibility to guide, control, and determine the flow of resources to others in a group.6 In this sense, they often disproportionately dominate what information and opinions get moved across a network.

In this project we are most interested in those individuals who occupy a central location in a network, as central actors have been shown to influence other actors and interactions in a social sphere. We are specifically interested in actors who transmit a high number of messages to central actors in the network. We call these individuals transmitters. We are also interested in those actors who both receive and relay a large number of messages to others in the network. We call these individuals transceivers. Both of these types of central actors are important in understanding how resources flow in a network.

OTHER ACTORS IN THE NETWORK

Although our project focuses on central actors, it is also important to consider how those central actors may influence others in the network who are considered more peripheral. More peripheral actors are typically engaged in fewer interactions and, as such, may have limited access to resources and tend to have less influence over the larger network. The perspectives of peripheral or isolated actors may not be as readily spread across a network and information may take longer to make it their way.

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HOW TWITTER WORKS

Founded in 2006, Twitter is one of the top 10 most-visited websites on the Internet, with over 313 million monthly active users worldwide.1 Twitter is often called a micro-blogging social network site, where users can sign up for free, display recognizable user profiles, share messages with those who chose to follow them, and receive the messages of those they follow. Twitter users are a special breed of communicators—they represent only 18% of Internet users and 14% of the overall adult population. According to Pew Research from 2014, they are more affluent, younger, and more ethnically diverse than the general population.2

Each Twitter message can contain not more than 140 characters, including spaces, which is exactly the number of characters in this sentence. While some view the brevity of tweets as a shortcoming of the medium, others view the minimal effort as an advantage.3 Additionally, given the concise nature of the medium, Twitter users get quite creative with the construction of their tweets, and often link people to other Internet locations, including articles, blogs, and other websites.

COMMUNICATING WITH TWITTER

An important feature of Twitter is the way that the medium is designed for people to communicate. Twitter users can follow others on the medium, be followed, or have a reciprocal relationship.

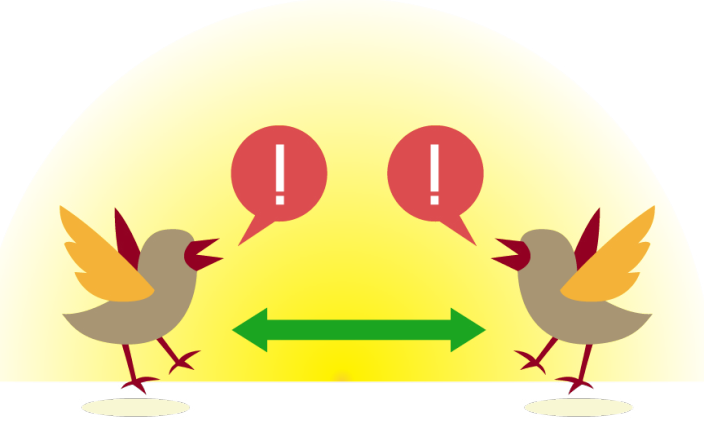
Twitter users can send their messages in three ways. First, they can initiate messages, called tweets. Second, tweets can be further disseminated when recipients repost them through their account. This technique, called retweeting, refers to the verbatim forwarding of another user's tweet. A third type of messaging is a variant of tweeting and retweeting, called mentioning. Mentions include a reference to another Twitter user's username, also called a handle, denoted by the use of the "@" symbol. Mentions can occur anywhere within a tweet, signaling attention to that particular Twitter user. All three of these approaches are powerful because they can introduce information to new audiences.4

Conversations are facilitated by preceding a tweet with the '@' sign and a user's name (i.e. @BenFranklin). Such messages are not private, but can only be seen by those who have reciprocal relationships (i.e. are following and followed) by both the sender and receiver of the targeted tweet.

HASHTAGS

Twitter users employ the hash or pound sign (#) to identify, or tag, messages about a specific topic. Streams of tweets are searchable by hashtag, which is the basis for our research on the #commoncore.

FOLLOWERS AND FOLLOWING



An important distinction on Twitter is the directionality of messaging. Some users are primarily senders, or transmitters, of messages. These transmitters are influential if they have many followers who receive their messages. Some people, like celebrities and politicians, are transmitters who are followed by many people, but follow relatively few others.

Other Twitter users are primarily followers, or receivers, of messages. These followers are recipients of tweets, but do not post many tweets themselves.

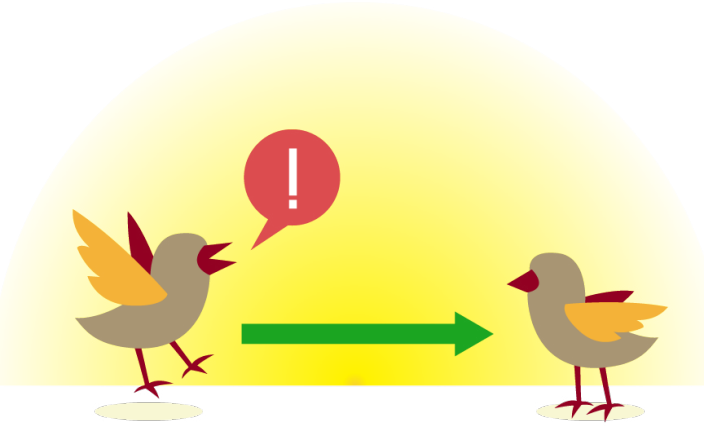
Still other Twitter users are transceivers, both senders and receivers of messages. These individuals are the audience to some and the main attraction to others. These individuals gain their influence as conduits in the flow of information.

In our analyses, we are primarily interested in transmitters and transceivers.

PRIVACY

Twitter allows users to make their profiles private, meaning that only approved followers of a given account are able to read a person's tweets. If not private, all tweets are open to public consumption, but when made private, only approved followers can view a person's tweets.

RECIPROCITY



Twitter can be used in ways that are both uni-directional and bi-directional.

If two individuals follow each other, they both receive each other's tweets. This creates a reciprocal relationship.

Information contained in Tweets

Tweets can be used to:

- Share information or news
- Express opinions
- Provide links to other web sources
- Carry on a conversation

Another dimension to consider when studying the Twitterverse is the accuracy of the information that is disseminated. Because posts are self-policed, there is no external check on the veracity of data one receives on Twitter. A study of news headlines by Schmierback and Oeldorf-Hirsch found that headlines presented on Twitter were significantly less credible than the same headline on the news sites themselves.5 Other studies have shown that most Twitter messages regarding news events are accurate, but the medium is also used to spread misinformation and false rumors, often unintentionally.6 In such an environment, the reputation of the sender of the message is a crucial component of its perceived credibility.

AS TWITTER EVOLVES

Twitter has become increasingly sophisticated as it adapts to its users and incorporates improvements. Among the many small tweaks made by Twitter and third-party developers, are an application called TweetDeck that helps people manage their Twitter accounts, a mute function to silence certain mentions, and a block button to prevent unwanted outsiders from seeing a person's tweets. A third party application called Twitlonger lets people exceed the 140-character limit. Users can also now purchase "followers" in bulk, essentially phantom accounts reserved to the profile page, serving no other purpose than to cosmetically embellish a tweeter's prowess.

In other ways, Twitter has been manipulated by the creation of Twitterbots– automated programs designed to disseminate information at regulated intervals. Essentially, Twitterbots are unmanned computer programs used to advertise products, articles, companies, and sometimes even ideas. Despite how this might aid in marketing, Twitterbots (masquerading as individuals) create an environment susceptible to manipulation, inflated statistics, and disinformation. In this, and many other important respects, Twitter is an unregulated virtual world and the identity and authenticity of some participants is suspect. This is to say that users – and researchers – must approach the Twitterverse with healthy skepticism. While the evolution of Twitter complicates our analyses, we have taken care to accommodate for their potential effects on our research.

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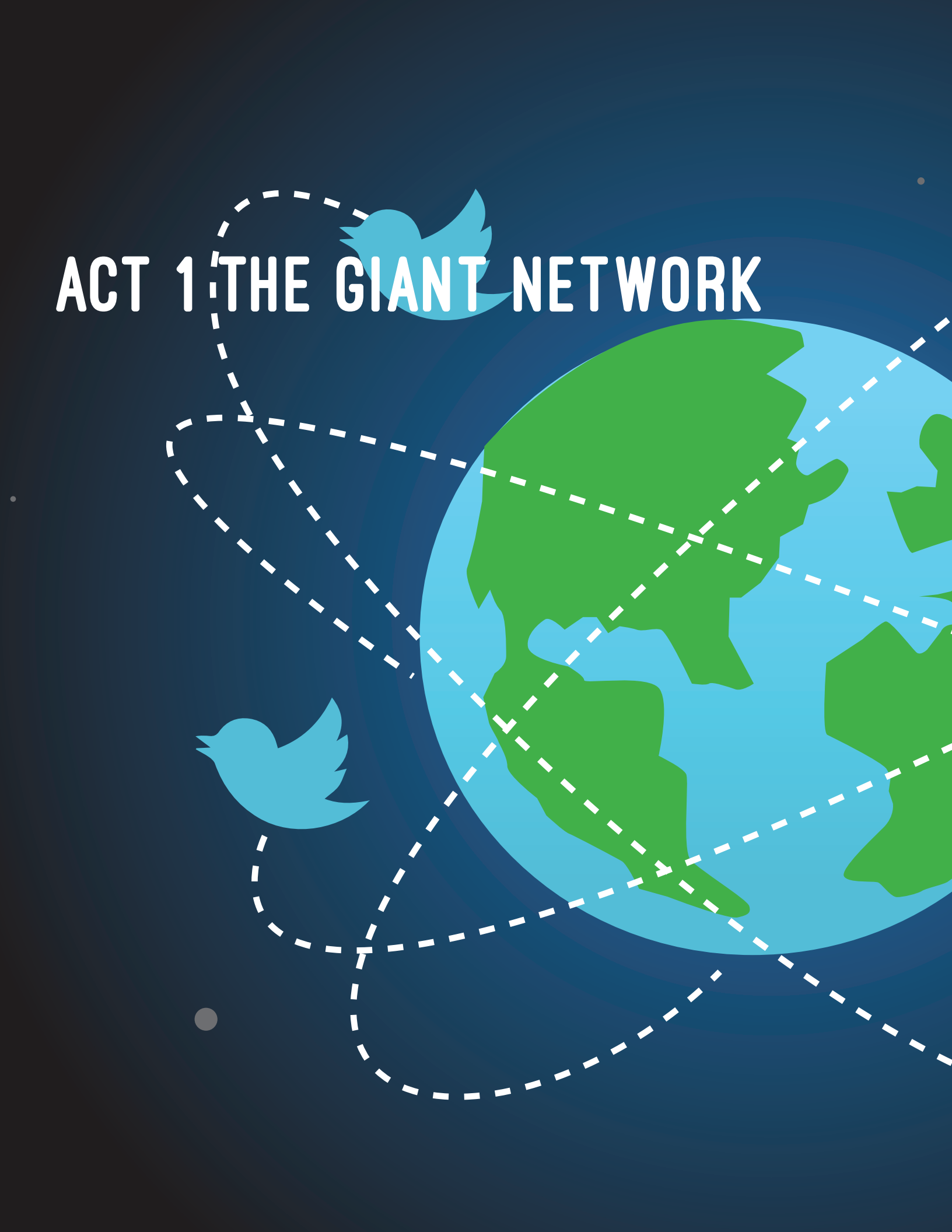
ACT 1: THE GIANT NETWORK



ACT 1 THE GIANT NETWORK

The network of people debating the Common Core State Standards on Twitter was both robust and sustained. In this act we map the social network of the entire Common Core conversation, which consisted of over 190,000 actors who wrote almost one million tweets over the 24 months that we examined. Herein we describe the contours of the networks and participants, including the increasing volume of activity over time and the levels of participation of different groups of actors. We also examine the structure of the network, which was driven by the relational behaviors of the participants. We identify five distinct groups who were active in the conversation, several of which will surprise you.

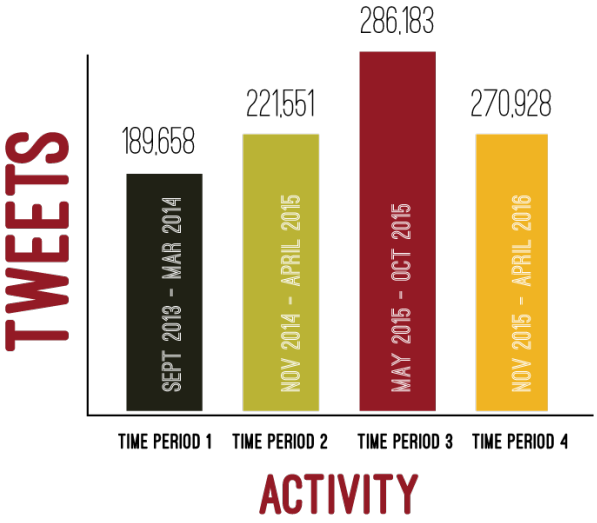
THE DATASET

In this section, we provide an overview of the large dataset of tweets that we explored in the #commoncore project. This analysis presents a reprise and extension of our original study of the Common Core debate on Twitter, which covered the six-month time period from September 2013 to February 2014. This updated website examines three subsequent six-month periods, stretching from November 2014 through April 2016. We chose six-month time periods because we sought to make comparisons from period to period. The first and second thru fourth time periods were interrupted by an eight-month period in which we did not collect data.

One difference between our first analysis and those in periods 2-4 was the hashtags that we use to collect our data. In Time Period 1, we focused solely on #commoncore while in Time Periods 2-4, we added #ccss and #stopcommoncore.

The overall number of tweets in each time period can also be broken down into tweets, retweets, and mentions. As explained in the section on How Twitter Works, tweets are messages sent by a Twitter user, retweets are the forwarding of a received messages to one's own followers, and mentions are a variant of

#COMMONCORE PROJECT



retweets that include a reference to one or multiple other Twitter users (using the @ symbol).

Finally, the overall volume of activity masks the fact that some participants are fair-weather tweeters, who only sent a few tweets, while others are dedicated activists who were assiduously working the computers and mobile devices to send out torrent of information. In fact, about 95% of the twitter activity over the 24 months examined came from people who sent less than 10 tweets. Another 4-5% came from people who sent between 10 and 39 tweets. The bulk of the Common Core Twitter activity came from the 1% of users who sent 40 or more individual tweets. While the whole network is important, an investigation that we will take up in the next section on the Giant Network, the most active #commoncore twitter participants also merit focused attention, which we will give.

THE GIANT NETWORK

Each dot, or node, in the data represents a user on Twitter who tweeted something related to the Common Core with at least one of the three hashtags that we followed. The lines, or ties, between actors reflect the following behavior amongst the actors.

A number of single nodes float around the core. These are isolated actors who did not engage in much activity regarding the Common Core over the 18 month time period. In contrast, very dark spots represent actors that were highly active in the Common Core space. These central actors were often very dominant in Common Core exchanges and held sway over what was exchanged in the network.

All of the data create a giant social network that you can see changing in the image below. We start with 100% of the actors, and rotate through until only .01% of the individuals are displayed. This illustrates the size of this network, the vast number of connections therein, and the core participants who are the most active members of the #commoncore network.

If we look across the entire data set we see almost 190,000 individuals sending almost a million tweets, averaging about 40,000 tweets per month. Is this a lot of activity, average, or not so much? This very reasonable question is quite complicated to assess.

Twitter volume averages 6,000 tweets sent per second, meaning 350,000 tweets per minute, 500 million tweets per day, and around 200 billion tweets per year.1 That is a whole lot of data.

During a typical month, while the #commoncore network is generating about 40,000 tweets, there are about 1 million tweets about Canadian singer Justin Bieber. Reality star Kim Kardashian appears in well over 1.4 million tweets in an average month, with big swings depending on events. And in the presidential debate of 2016, over a one-day period there were close to 2.3 million tweets. So when compared against pop culture and presidential debates, the Common Core Twitter activity looks downright paltry.

For a subject-specific comparison, our colleague Chris Curran at University of Maryland, Baltimore County school of Public Policy did a Twitter analysis of the Every Student Succeeds Act (ESSA).2 He tracked users and tweets related to ESSA in December 2015, when the ESSA was introduced, and found about 40,000 tweets in that month, which similar to what we found in our Common Core work. It should be noted that the timing of Curran's tracking was just after the introduction of ESSA—he is not continuing to gather the data any more – so we don't know if the bulk of the activity was related to the announcement of ESSA.

For another comparison, Martin Rehm a researcher at the Learning Lab at Essen University in Germany has been collecting data on Ed Chats, which are online communities where teachers share ideas, tools, etc. On an average month, the Ed Chats he tracks include about 15,000 tweets per month with 5,000 users, placing it somewhat less than our capture.

We think the amount of activity from our capture seems robust for an education policy initiative. What we find notable is the numbers of users and tweets stays so consistent oer the time periods we analyzed, suggesting a robust network with staying power which, while not quite Kardashian in scope, does hold its own in the comparable Twitter space.

REFERENCES

1 See http://www.internetlivestats.com/twitter-statistics for more specifics.

2 See http://www.hashtagessa.com/

STRUCTURAL COMMUNITIES

As we described in The Dataset, we collected almost 1 million tweets from about 190,000 authors over four six-month periods. The first period, which ran from September 2013-February 2014, was documented in our previous work. The next three periods reflect our most recent work and document activity on Twitter related to the Common Core from November 2014-April 2016. These three new periods span from November 2014-April 2015, May 2015-October 2015, and November 2015-April 2016. Below you can see each of the
In social network analysis, a giant component is a graph that is completely connected—meaning there are no isolates displayed. Each graph below shows the activity in each six-month period.

You may also note that there are some very large nodes, like sunspots, inside the networks. These represent individuals who have either received or sent a large number of tweets or retweets. These prolific actors are important in the network because they have disproportionate influence over what flows across the system.

Each network is color-coded. Blue, green, yellow, and, in the three most recent time periods, red. The actors fall into distinct groups, representing subcommunities within the Common Core network.

Across the Common Core network, distinct subcommunities arose. We refer to these sub-groups as structural communities. Structural communities are those subgroups that affiliate more with some people than others, or have more within-group than across-group ties. We did not pre-define these groups ahead of time; rather, we analyzed tweet patterns of actors to discover interaction patterns.

These communities are distinguished strictly by the structural patterns of participants' interactions, not any grouping we did a priori. Thus, these communities are based specifically upon the observed behaviors of authors.

Our analyses suggested that people tended to fall into three fairly distinct structural communities regarding their conversations on Twitter about the Common Core (with one outlier, which is addressed below). These communities differed by size and each had their own central actors. We observed that subgroups of people choose to affiliate with some people more than others, and that the size of the community's change over time.

ACTIVE, SUSTAINED, AND A COUPLE SURPRISES

What is clear is that the activity in the Common Core network is active, and this activity sustained, which forms a robust network both within and across time periods. What is even more interesting is that the patterns hold steady over the course of the study. The size of the core groups changes over time, revealing new patterns as certain sub-communities become more active.

The algorithm we used identified an outlier community, denoted in red on the graph, during the three most recent time periods. When we ran the community analysis, we were puzzled by the appearance of this new group. After looking at bios of members of the red group and systematically looking at their tweets, which were in Spanish, it turned out that in Costa Rica an active group of Twitter users were discussing the Costa Rican Social Security system. We then discovered that the social security system in Costa Rica is called the Caja Costarricense Segoro Social, which uses the hashtag – you guessed it – #ccss. We include the Costa Rican sub-community in this overview to illustrate the importance of carefully checking the groups, but take the Costa Ricans out of the mix for subsequent analyses. Much later in our study we also encountered the presence of a less apparent group, one whose character was particularly difficult to discern…

ACT 2 CENTRAL ACTORS

ACT 2 CENTRAL ACTORS

Every group discussion has both central and peripheral actors. Who were the most active members of the conversation about the Common Core on Twitter and how were they bonded together into subgroups? In this act we examine three particular types of influencers who are found in Twitter social networks, who we call transmitters, transceivers, and transcenders. Each of these types of actor plays a distinct and powerful role in the social network about the Common Core and we examine their affiliations, their professional positions, and their persistence in the Common Core network over time.

EXPLORE THE NETWORKS

These networks are comprised of the elite actors in each time period. Transmitters are those who gain influence through sending a high volume of tweets. Transceivers accrue importance because they are frequently either retweeted or mentioned. Transcenders are the elite of the elite in that they are present in both the transmitter and transceiver networks.

When you click on the interactive links below, you will see the network and information about some of the key actors in the network. In each network, the size of the circle (node) for each actor represents the volume of tweets sent by that participant over the six months (which is also depicted in the font size of their name). The bigger the name, the more frequently they tweeted. The thickness of the line between two actors provides a sense of the frequency of interactions between them.

CHANGE IN FACTIONS OVER TIME IN THE MOST HIGHLY ACTIVE COMMON CORE NETWORKS

Transmitters are those who are influential in the social network because they send a large number of Tweets. By continually trumpeting their perspective, transmitters are more likely to be heard and acknowledged, and influence perspectives of others. As we established in the Giant Network (LINK TO GIANT NETWORK-> DATASET),

only 1 percent of the participants in the #commoncore network sent more than 40 tweets over each six-month time period. The transmitters represented here are the top .25 percent of the entire network, or those that send at least an average of a tweet a day over the six-month period (i.e. 180 tweets or more). The faction each transmitter is associated with (blue/yellow/green) is determined by their connections in the Common Core social network. That is, their behavior on Twitter – who they choose to follow and retweet/mention – determines their social affiliation.

THE GROWING DOMINANCE OF OPPONENTS OF THE COMMON CORE IN THE TRANSMITTER NETWORK

The four pie charts below show the changes in distribution of the transmitters by faction over time. In the first time period, the transmitters were fairly equally distributed amongst Common Core supporters (green), opponents of the Common Core from within education (blue) and opponents of the Common Core from outside of education (yellow). As time progressed, transmitters from the faction from outside of education (yellow) became increasingly dominant in the transmitter network, growing in both proportion and number over time, ultimately comprising about 80 percent of the total network by the third and fourth time period.

Conversely, the transmitters who supported the Common Core (green) playing a diminishing role in the transmitter network over time. From time period one to two, the number of Common Core supporters in the transmitter network were almost cut in half, from 43 to 24. By the fourth time period, their representation in the transmitter network had dwindled to just 12 individuals, representing justa six percent of this elite network of high volume tweeters.

COMMON CORE CRITICS FROM OUTSIDE EDUCATION CAME TO RULE THE TRANSCEIVER NETWORK

Transceivers hold a distinctive source of influence in the social networks on Twitter. Rather than asserting themselves through a high volume of tweets, their sway comes from the ways in which they are able to mobilize their networks and capitalize on their reputations. Transceivers gain their influence by the extent to which their messages are retweeted and/or they are mentioned in the tweets of others. Like transmitters, transceivers are the elite of the #commoncore social network, representing the top .25 percent of the network who are retweeted and mentioned.

The figures below show the transceivers by faction over time. Similar to the transmitters, those affiliating with yellow faction, the opponents of the Common Core from outside of education, grew increasingly dominant over time. From the first to fourth of the time periods that we tracked, the transceivers from the yellow faction more than doubled from 63 to 146, and came to comprise three quarters of the transceiver network. The transceivers who affiliated with the blue network, the opponents of the Common Core from inside of education, remained fairly stable in number, but represented a smaller percentage of the transceiver network over time. Supporters of the Common Core, the green faction, had a stable but declining percentage of representation in the transceiver network over the four six-month periods that we tracked.

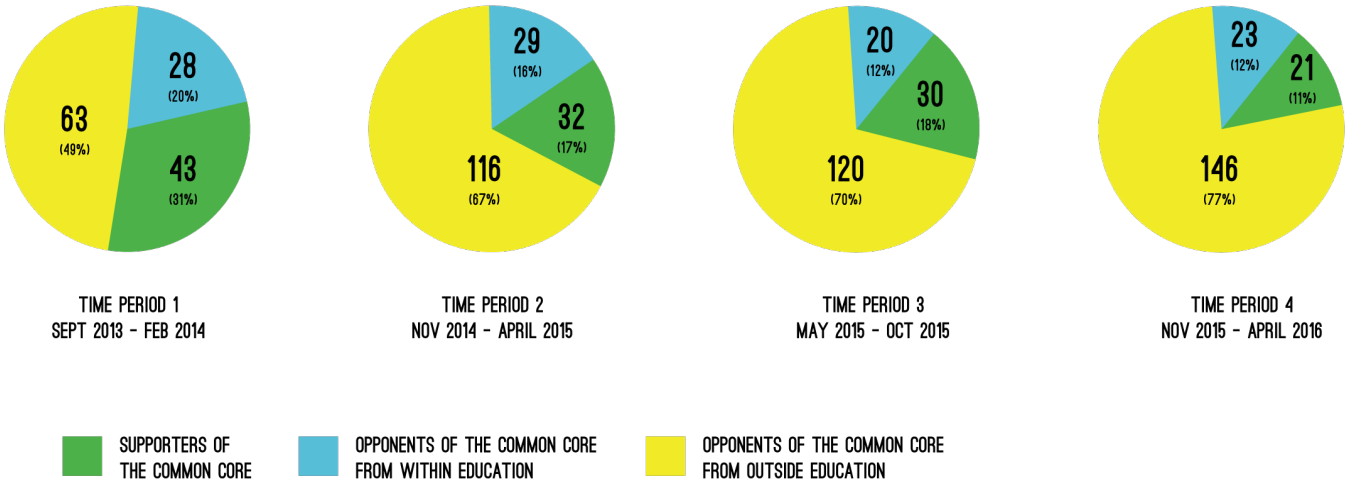
TRANSCENDERS FOLLOW A SIMILAR PATTERN

The transmitters and transceivers are distinctive networks and only a small proportion of people exert both of these forms of influence. Transcenders are the the individuals who are both transmitters and transcievers at any given time period; thus they are the elite of the elite. As shown in the figures below, only about 40-50 people were transcenders in any give time period. In time period one, the three factions were fairly well represented. By time period two, the opponents of the Common Core from outside of education (yellow) represented about half of the transcenders. By time period three, and continuing through time period four, the members of the yellow faction made up about three quarters of the transcenders. While both the supporters of the Common Core (green) and the opponents of the standards from inside of education (blue) continued to be have transcenders, their size dwindled over time to the point that they were only represented by a few people.

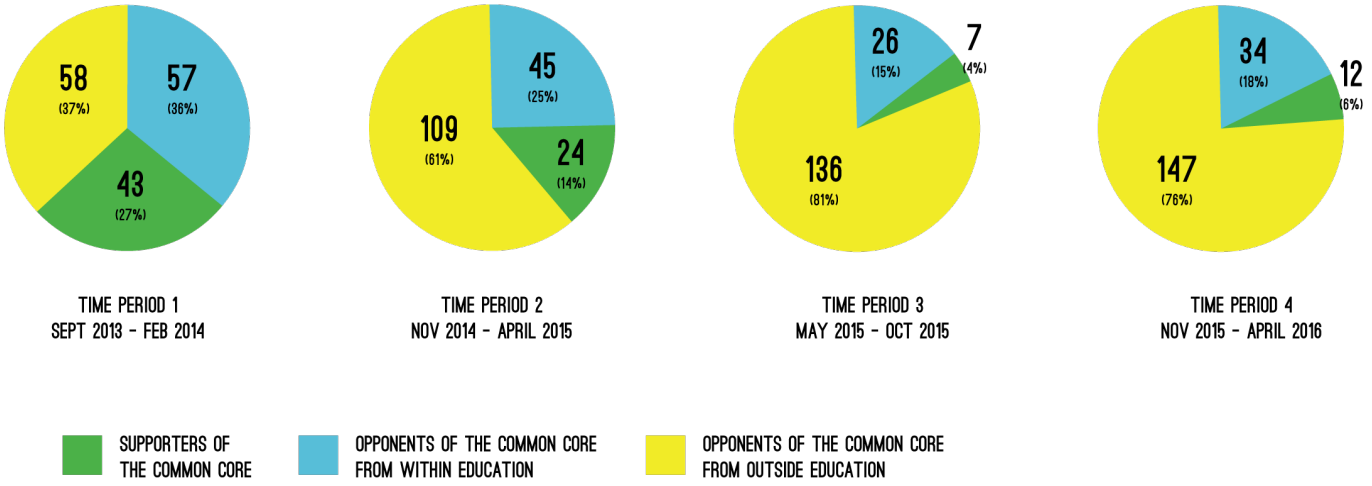
THE PROFESSIONAL POSITIONS OF THE ELITE ACTORS IN THE COMMON CORE TWITTER NETWORK OVER TIME

What kinds of people made up the networks of the most prolific Common Core participants on Twitter – those who tweeted on average of once a day or more in a given six-month period? In this section we investigate changes in the composition of the elite networks based upon the professional position of the actors. Using the social network distinctions of transmitters (high volume tweeters), transceivers (those most retweeted

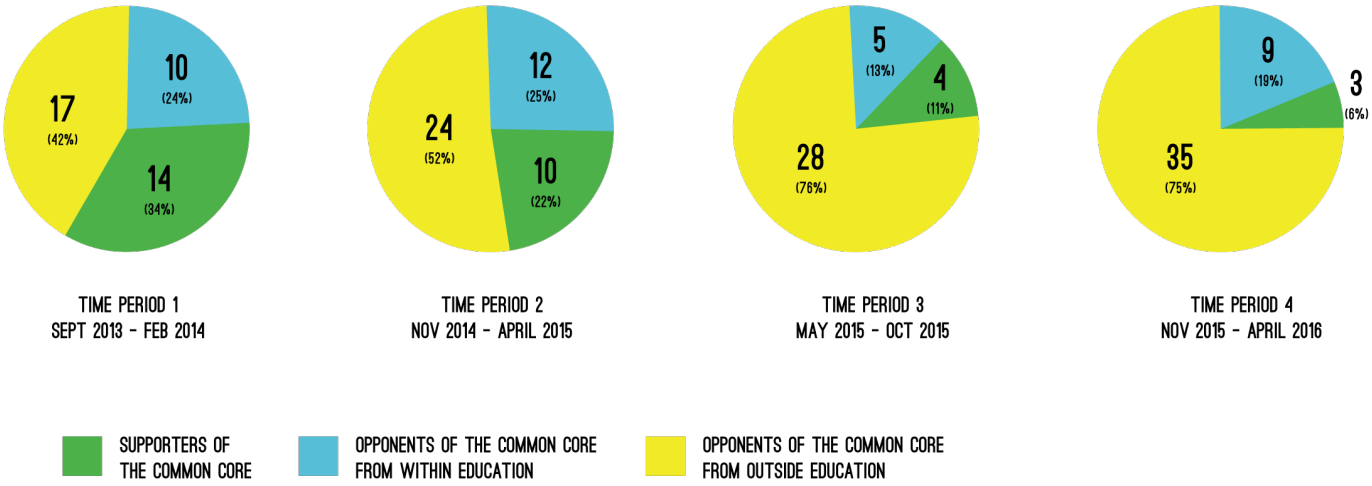
TRANSCEIVERS BY FACTION OVER TIME



TRANSMITTERS BY FACTION OVER TIME



TRANSCENDERS BY FACTION OVER TIME



and mentioned) and transcenders (those in both the transmitter and transceiver networks), we examine the network membership based upon their stated professional positions. To classify #commoncore network participants by their positions, we categorized the members of the three elite networks into six position types, based in information in their Twitter profiles. The six position types were:

- Individuals from outside of education were individual activists who participated in the Common Core debate as just one of many social issues that they were active in on Twitter. These individuals were predominantly opponents of the Common Core (the yellow faction in our social network diagrams).
- Institutions/groups from inside of education were tweeters who represented education institutions or groups. These individuals could be either supporters of the standards (the green faction) or opponents of the Common Core (the blue faction).
- School and district practitioners were individuals who were professional educators, including teachers, principals, and district administrators. These individuals could be either supporters of the Common Core (the green faction) or opponents of the standards(the blue faction).
- Education professionals were individuals who worked in, commentated on, or were otherwise part of the education profession. They most like were in either the blue or green factions in our social networks.
- Journalists or media organizations were either people who identified themselves as journalists or tweeted using the Twitter handles of professional media organizations. Although some journalists were affiliated with positions on the Common Core, many were not associated with any particular faction.
- Institutions or groups from outside of education were those that represented a range of organizations that may have become involved in education issues, but had broader missions outside of the education industry. These groups were usually associated with the yellow faction in our social networks.

SHIFTING MEMBERSHIP COMPOSITION IN THE TRANSMITTER NETWORK

Across the four time periods that we examined, the group of individuals from outside of education became increasingly dominant as high-volume transmitters of messages about the Common Core. These individuals represented about 40% of the transmitter network in time period one, and climbed to almost 70% of the transmitter network by time periods three and four. By contrast, the representation of education groups declined over the course of the 24 months that we tracked the network – from 20% of the total network to only about 5%. Importantly, the representation of school and district practitioners also dramatically declined in the transmitter network, going from 27 active members to 17 to 9 to 11 members in each successive six-month period. Journalists and media representatives, like @StateEdWatch and @ShannonJoyRadio continued to be present in the elite transmitter network, although their presence dwindled over time as well.

GROWING INFLUENCE OF EDUCATION OUTSIDERS IN THE TRANSCEIVER NETWORK

Transceivers are distinct from transmitters. They gain their influence in social networks through the efforts of others. They are prominent because their messages are retweeted or they are mentioned in the tweets of others. This could be become of their reputations outside of Twitter or because of their prestige inside the virtual social world. Individuals from outside of education increasing came to dominate the network. Although mostly a different group of people from those who were predominant in the transmitter network, individuals from outside of education also increasingly came to monopolize the transceiver network. Individuals from outside of education went from 29% of the overall transceiver network to 66% in time period three and 53% in time period four. These individuals, which included many people who used the PJNET hashtag (see PJNET to learn more), included some people who were active in the #commoncore network (@michaelpetrelli, @angeldwein, @anthonycody) as well as those who were never or rarely participants but who were sometimes retweeted and frequently mentioned (@arneduncan, @senTedCruz, @RealDonaldTrump). In addition, although representing a smaller proportion, institutions and groups from outside of education contributed an additional 10% of the transceiver network in each of the four time periods. If we combine the groups from outside of education with the individuals from outside of education, we can get a stronger sense of how much education outsiders dictated the tenor of the Common Core conversation on Twitter.

Institutions and groups from inside of education, like @StudentSuccess, @StopCCSSinNYS, and @TruthinAmEd, continued to be a presence inside the transceiver network over the four six-month time periods that we examined. Although their presence declined over time, from 35 in time period one to 17 in time period four, they continued to play a substantial role in the high-volume transceiver network.

Interestingly, journalists and media organizations were a consistent presence in the transceiver network in each of the four time periods. Journalists and media outlets such as @educationweek, @megynkelly, @glennbeck, @politico, and @FoxNews, continued to be present in the elite transceiver network, indicating that they were frequently mentioned by others. The reason, we hypothesize, is that mentioning journalists and media outlets in tweets is one way to send potential stories from the niche conversation into the mainstream, where they might get picked up and disseminated more broadly.

Increase in Transcenders from Outside of Education and Stability of Transcenders Within Education

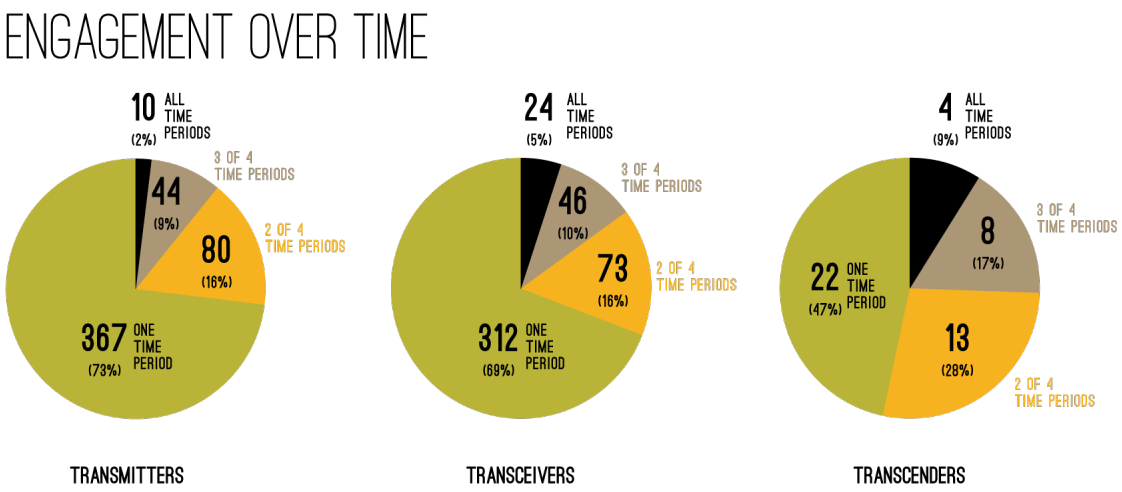
The final analysis of the position types of the elite participants in the #commoncore network examined the roles of the transcenders over time. Transcenders were those who were present in both the transmitter and transceiver networks in a given time period. Thus, transcenders are the elite of the elite in that they are both high volume tweeters and are also frequently retweeted or mentioned. Only about 40-50 people/ organizations were transcenders in any given time period.

The overall pattern from the data shows that the number of transcenders from outside of education increased, while the number from inside of education were stable. Transcenders who were individuals from outside of education more than doubled, from 11 in time period one to 29 in time two. They then increased again, to 25 in time period three and to 28 in time period four. These individuals, including @commoncorediva, @chelearle, and @ceasecommoncore were the dominant actors in the #commoncore network.

Education insiders – including education groups, practitioners, and education professionals – were fairly stable in their representation in the transcender network over time. Although the particular groups may have changed, the groups from inside of education, including @ StopCCSSinNYS, @StudentSuccess, and @ badassteachersa continued to be a presence in the elite group of both high volume transmitters and transceivers. Education professionals were also steadily represented in the transcender networks in each of the four time periods. Although small in number, usually only 6-8 in any given time period, people like @michaelpetrelli, @ jaredbigham, @anthonycody, @nealmccluskey, and @rweingarten frequently represented their views as professionals in the education field and their messages reverberated throughout the network. Similarly, although they were only a small and hearty band, there were a few school and district practitioners that were represented in the transcender networks across the four time periods. These included such educators @ tfarley1969, @dgburris, and @ MelissaStugart, who were transcenders in at least one of the four time periods.

ENGAGEMENT IN THE ELITE NETWORKS OVER TIME

People tended to enter and exit the elite transmitter and transceiver networks over time. The vast majority of people in these elite networks became highly engaged with the Common Core debate on Twitter during one particular six-month period, but then migrated away from the issue as time went by. Similarly, people entered into the conversation in the middle of the two years that we examined and then floated out again. A few hardy few individuals were, however, persistently active over the four time periods that we followed. In this section we examine the extent to which people persisted in the transmitter, transceiver and transcender networks. As shown in the figure below, only 10 individuals or groups were in the elite transmitter network for all four



time periods. An additional 44 individuals/groups were transmitters in three of the four time periods; while 80 people were transmitters in two of the four time periods. The overwhelming majority, 73%, were transmitters in just a single time period. At the end of this section, we provide a list of the 10 transmitters who were present in all four time periods, as well as their position and the faction to which they belonged. Interestingly, the 10 represented education professionals, groups inside of education, individuals from outside of education, and school & district practitioners. They also represented all three factions that we examined (blue/green/yellow).

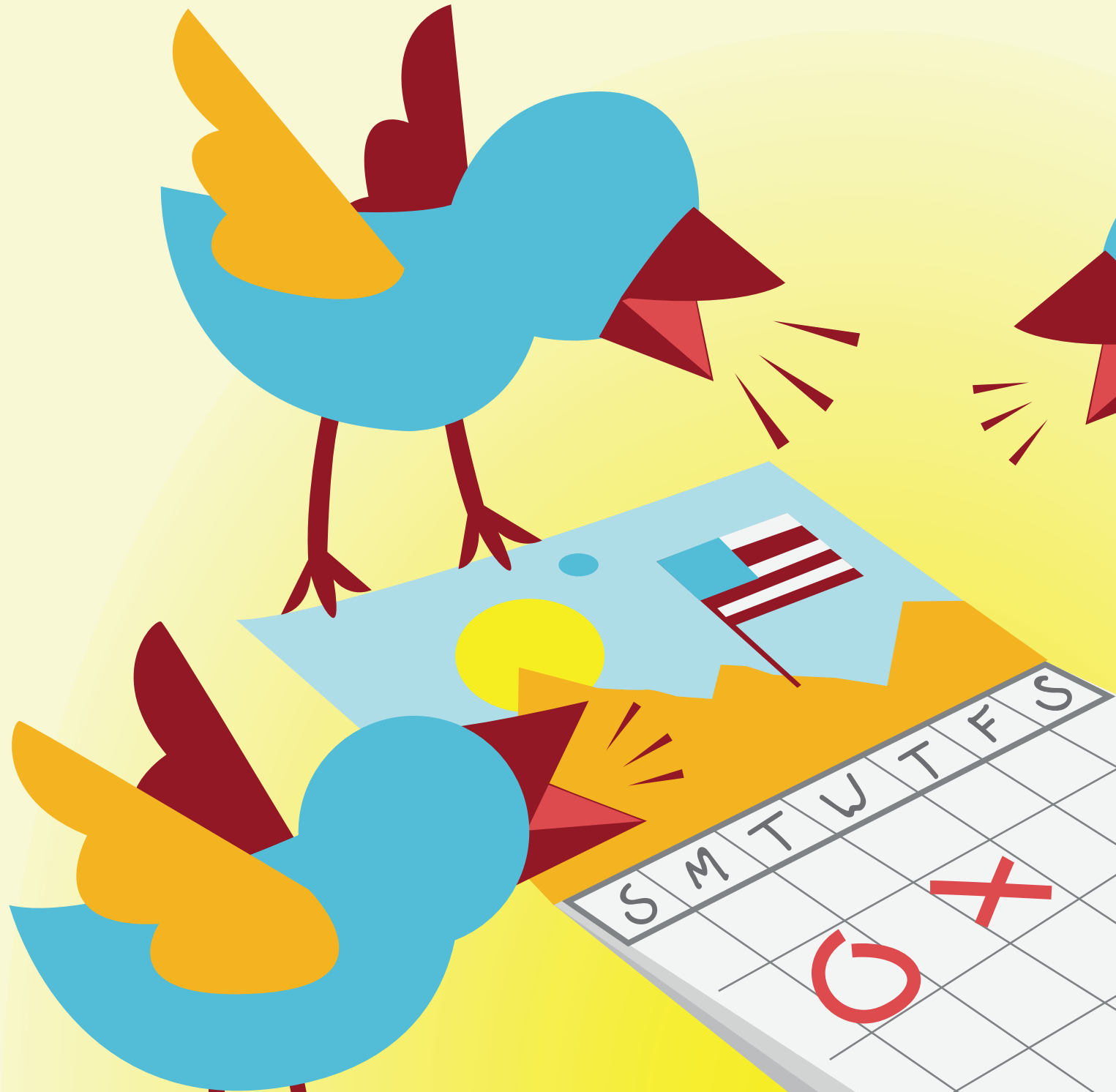
Similar to the transmitter network, the overwhelming majority of the transceivers (312 or 69%) were in this elite network in just one of the four time periods that we tracked. An additional 73 (16% of the transceivers) were present in two of the four time periods; while 46 individuals/groups were in three of the four time periods. There was no pattern about which of the time periods these people were in, although they tended to be sequential. Only 5% of the transceivers, 24 individuals or groups, were in all four time periods. At the end of this section, we provide a list of the 24 transmitters who were present in all four time periods, as well as their position and the faction to which they belonged. These transceivers represented all the position types, except institutions/groups outside of education, and came from all three factions (blue/green/yellow).

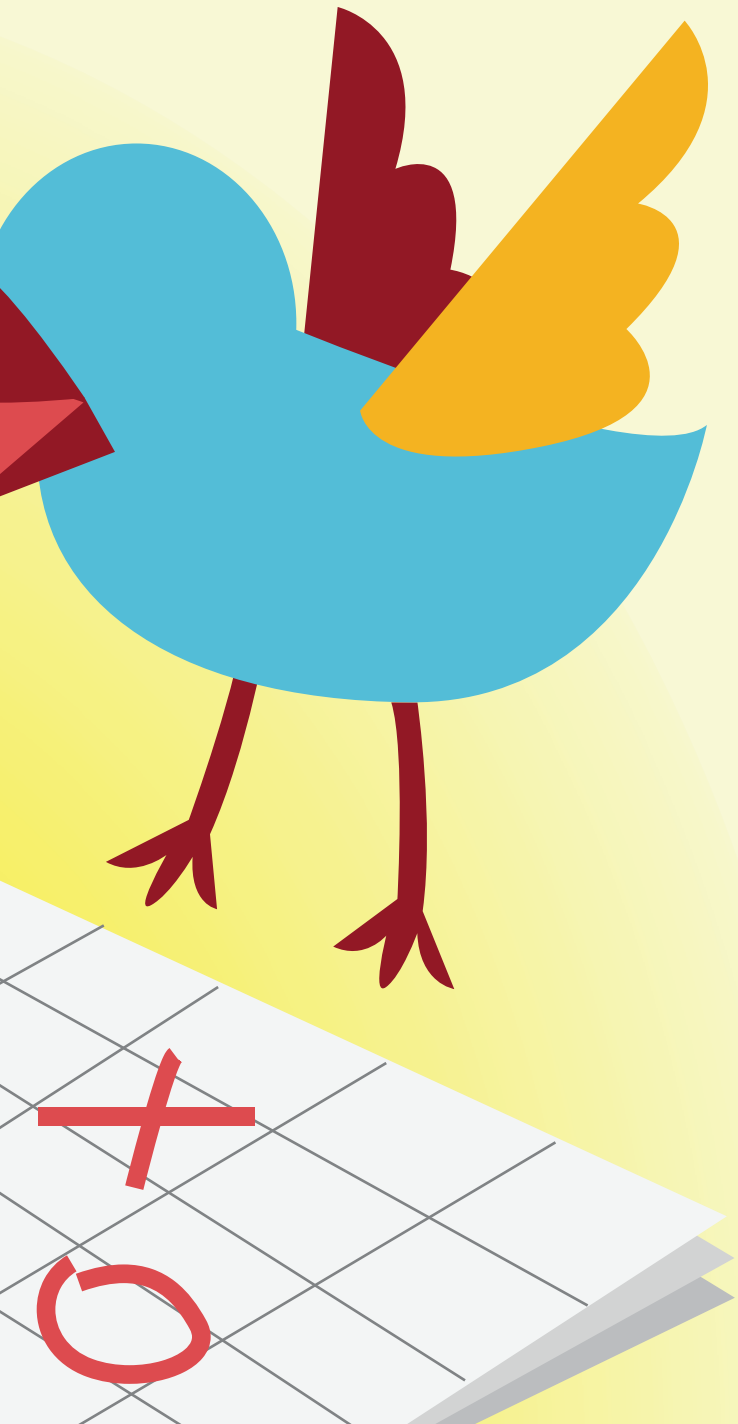
PEOPLE PRESENT IN THE TRANSMITTER NETWORK IN ALL FOUR TIME PERIODS

TWITTER NAME	POSITION TYPE	FACTION
@leoniehaimson*	education professional	blue
@michaelpetrilli*	education professional	green
@assesswell	group inside education	blue
@educationfreedo	group inside education	yellow
@chelearle	individual outside education	yellow
@ladyliberty1885*	individual outside education	yellow
@manateespirit	individual outside education	yellow
@cheryl_smith1	school & district practitioners	blue
@getupstandup2*	school & district practitioners	blue
@posroff	school & district practitioners	blue
*Also present in the transceiver network in all four time periods		

PEOPLE PRESENT IN THE TRANSCEIVER NETWORK IN ALL FOUR TIME PERIODS		
TWITTER NAME	**POSITION TYPE**	**FACTION**
@anthonycody	education professional	blue
@DianeRavitch	education professional	Blue
@leoniehaimson*	education professional	Blue
@michaelpetrilli*	education professional	green
@nealmccluskey	education professional	blue
@rweingarten	education professional	blue
@achievethecore	group inside education	Green
@badassteachersa	group inside education	Blue
@nysut	group inside education	blue
@TruthinAmEd	group inside education	yellow
@FreedomWorks	group outside education	yellow
@RedNationRising	group outside education	yellow
@drscott_atlanta	individual outside education	yellow
@gerfingerpoken	individual outside education	yellow
@ladyliberty1885*	individual outside education	yellow
@michellemalkin	individual outside education	yellow
@NYGovCuomo	individual outside education	
@PJStrikeForce	individual outside education	yellow
@BreitbartNews	Journalist/Media	yellow
@educationweek	Journalist/Media	
@mericanrefugee	Journalist/Media	yellow
@ClassTechTips	school & district practitioners	green
@getupstandup2*	school & district practitioners	blue
@tfarley1969	school & district practitioners	blue
*Also present in the transmitter network in all four time periods		

ACT 3 KEY EVENTS





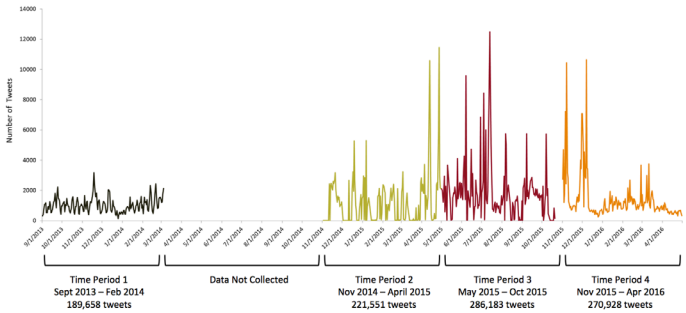
KEY EVENTS

Social networks are living, pulsing hives of communication. When outside events stir the passions of participants the network buzzes with activity and the volume of tweets spike. In this Act, we examine the key events that spurred activity within the Common Core network across the 24 months of our analyses to understand what issues caused activity to surge.

OVERVIEW

This section explores the ebb and flow of twitter activity that used one of the three hashtags that we examined (#commoncore, #ccss, and #stopcommoncore). While overall activity across the 24 months was brisk and fairly steady, ranging from about 30,000-40,000 tweets per month, this masked a series of jagged peaks and lulls in Common Core activity on Twitter.

The figure below shows Twitter activity about the Common Core from September 2013 to April 2016. Our first analyses, released in 2015, covered the six-month time period from September 2013 to February 2014.



We broke our analyses into four comparable six-month periods, which is interrupted by an eight-month period, from March to October 2014, when we did not collect data. Overall, you can see that tweet volume increases substantially from time period 1 to time period 4, reaching its height in period 3, with a 50 percent increase from the first time period. Some of the increase in tweet volume can be attributed to the fact that we cast a wider net in the latter three time periods (adding #ccss and #stopcommoncore to our original focus on just #commoncore). But, as we will show in the final section of this act, we think a larger source of tweet volume was due to the rise of robo-tweeting.

Even so, the tweet volume per time period masks a great deal of volatility within each six-month period. In this Act we will identify the key events that drove spikes in Common Core activity on twitter, explaining the backstory and meaning of each event.

WHAT DROVE THE RAPID EXPANSION OF THE COMMON CORE CONVERSATION?

As we noted in the description of the Dataset, there was a rapid expansion in the volume of Common Core-related Twitter activity during the course of our investigation. From the six months in time period one to the six months in time period three, the volume of activity increased by more than 50%.

The influx of Common Core-related Twitter activity was surprising, leaving us to ask what drove this surge of tweets. Was it external events, new legislative activity in the states, or could the presidential primary season be directing interest toward the Common Core? While all of these things undoubtedly stimulated Twitter activity, none of them explained the general swell in Common Core-related volume. Only upon close investigation were we able to locate the source: a faintly visible presence in the first six months, steadily rising in each successive time period. A new and increasingly dominant actor had joined the Common Core conversation, spurred on by innovative technology and crowd-sourcing strategies. At its peak, this actor accounted for roughly a quarter of all Common Core-related activity on Twitter.

THE PATRIOT JOURNALIST NETWORK

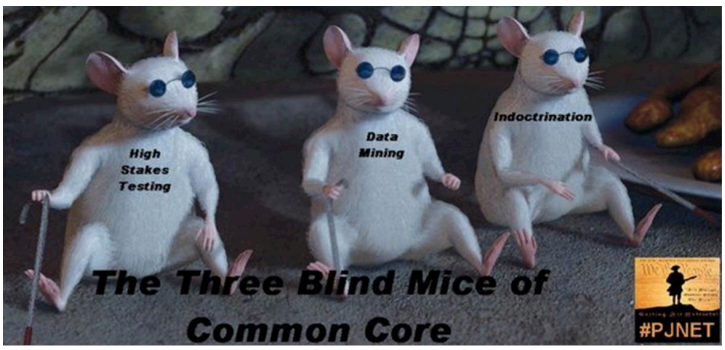
The major source of the increase in Common Core tweets was due to the work of the Patriot Journalist Network. Founded by Mark Prasek (@datagenesis), a self-avowed Christian Technologist, the Patriot Journalist Network (PJNET) is a group affiliated with a for-profit church located in Tallahassee, Florida. Through PJNET, Prasek coordinates a loosely affiliated group of committed grassroots Twitter activists, dedicated to advocating conservative causes and supporting legislation aligned with their views. In Prasek's telling, he is the "coach" and the group is the "team."

At the core of PJNET's efforts is a robo-tweeting mechanism of Prasek's design. Whereas traditional Twitterbots run from individual domains, tweeting out pre-fabricated messages or mechanically following other accounts, Prasek's robo-tweeter is an apparatus that can be granted unlimited access to a Twitter user's account by its owner. By signing up as a member of #PJNET "Team," Twitter users allow the Patriot Journalist Network to tweet from their accounts at regulated or random intervals even when they are not online. This creates a network of bots, or what we call a "BotNet," singularly focused on a particular group's message, but emanating from all corners of the Twittersphere.

As Prasek explained:

> We have developed technology whereby our members have granted permission for our Twitter application to act (either tweet or retweet) on their behalf. This is NOT just another hashtag used by a group on Twitter who vaguely agree with an intent to support one another. The difference is that our platform does not rely on good intentions, remembering, or members taking future volitional action. Our application is able to robotically post (re)tweets on behalf of our members - even if they are not online.
>
> - Mark Prasek1

Prasek's technology also differs from traditional bots in that it intentionally masks its operation, generating a false sense of authenticity for every disseminated tweet. Both by removing the preceding RT (retweet) or MT (mention) before a tweet is sent, and also by sending it from an individual's account, the machine makes the tweeter appear as the true author of its messages. This means that the same tweet can be sent by thousands,



yet look as if each occurrence was independently authored. This multidirectional onslaught of verbiage, sent throughout the network, engenders the illusion of a vociferous Twitter conversation waged by a spontaneous mass of disconnected peers, whereas in actuality the peers are the unified proxy voice of a single viewpoint. Outside of the robo-tweeter, there really is no team. The PJNET Team is therefore effectively built by the technology, linking thousands of independent users to a common message that is methodically established and distributed through a steady stream of mechanized tweets. The tweets are often attached to memes of unknown origin, pointing to particular tweets from other users, or accompanied by links to news stories. Many of these news stories are actually links to political blogs, but sometimes, if fitting the pre-determined ideology, the group links to genuine news items. Whether or not these "news" or news sources are knowingly in cahoots with the Patriot Journalist Network remains unclear; however, the team frequently tweets links to Investor's Business Daily, Daily Caller, and American Thinker. Because thousands of people send the exact same tweets, it is difficult to determine authorship. But the group can usually be identified by its ubiquitous PJNET hashtag.

Importantly, PJNET is a broad network not solely devoted to the Common Core issue. They claim 4,631 participating team members that reach approximately 21 million Twitter accounts (as of this writing). As a group, they employ their technology and strategies on a range of hot button social topics, or what they call "crusades," including: #UnbornLivesMatter, #RenewUS (Evangelical focus), #BlueLivesMatter, #SOT (Support our troops), #2A (2nd amendment), #CruzCrew, #TeaParty, and #TermLimits.

THE INCREASING PRESENCE OF #PJNET IN THE COMMON CORE NETWORK

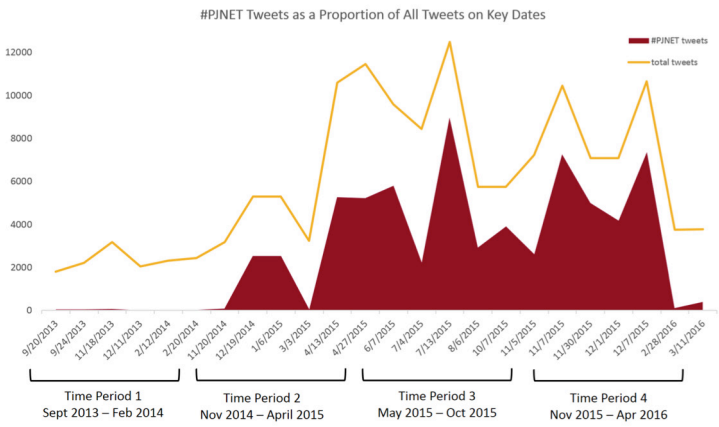
Revisiting the original social networks introduced in Act 1's Structural Communities section, you can see a variant of the yellow faction depicted in gold. When we looked at this very small cluster closely, we realized that these are the actors connected to the PJNET sub-community.

The Presence of PJNET in Time Periods 2-4
Blowups of Network Periods 2,3,4

Gold being close to yellow, PJNET is a splinter group of the opponents of the Common Core from outside of education. Similar in their stance, but different in their structure, they are depicted in a slightly different shade. Invisible in Time Period 1, they arrived in Time Period 2, concentrated in a set of small bundles in the top left of the large network image. In the Time Period 3 network image, they are less discernable as a cohesive sub-community, but rather shown as interspersed nodes throughout the larger yellow cloud. By Time Period 4 however, the gold members of PJNET again intermingled with the yellow faction, but they also formed a distinguishable sub-community at the top of the graphic, standing out from their larger group, yet still apparently connected.

As our data analysis progressed over time, the PJNET hashtag was found in an increasing number of Common Core related tweets, as shown in the adjacent figure. In the first time period, there were about 5,600 tweets containing #PJNET, accounting for only 3% of the total data. But in Time Period 2, the number of tweets incorporating #PJNET rose to over 27,000, and accounted for about 12% of the 220,000 total tweets sent during that six-month window. By the third time period, #PJNET volume accounted for fully one quarter of the 286,000 tweets. This proportion persisted into the fourth time period, where #PJNET was present in 24% of the 270,000 tweets.

HASHTAG RALLIES



The Patriot Journalist Network furthered their influence by also organizing hashtag rallies. A hashtag rally is an online "meeting" where participants "gather" at particular times on particular days to tweet out prefabricated messages en masse. To facilitate these hashtag rallies, the PJNET website includes a landing page where tweeters have open access to nearly 100 pre-produced tweets that any user can click and immediately send from their personal accounts to their social networks. These "Action Pages" are often used to host and conduct the rallies. On the surface, a rally appears to be an organically inspired, independent democratic conversation; when in fact, it is a highly coordinated promotional effort. Assumedly, a rally is

hosted to get a topic trending, thereby drawing outside interest to the espoused views, issues, and news stories.

Numerous #PJNET hashtag rallies occurred throughout the 24 months examined, rising on seemingly random days, unattached to exterior events. Though #PJNET was found in nearly 25% of the Common Core-related tweets in time periods three and four, on rally days, the hashtag appeared in up to 70% of the tweets. Determining the date of every rally throughout our study was beyond our scope, however we did locate a pattern occurring on the 7th of every month. On this day, reoccurring on a monthly basis, #PJNET was found in no less than 50% of the daily data, sometimes reaching almost 70 percent. For example, on October 7, 2015, we gathered 5,735 tweets related to the Common Core, of which 68% contained #PJNET. On November 7, 2015, there were 10,448 tweets and 69% of those came from the PJNET Team. On December 7, 2015 there were 10,647 tweets, with 69% connected to #PJNET. You get the picture. The figure below shows the number of tweets on the 24 key event dates noted in this section along with the mirrored volume of tweets containing #PJNET.

#PJNET TWEETS AS A PROPORTION OF ALL TWEETS ON KEY DATES

PJNET also circuitously utilized the retweet function available on Twitter. Per the structure of Twitter's programming, an individual user is only allowed to retweet a message once. However, PJNET cleverly circumvented this structural prohibition by creating a page on their website where team members can automatically retweet a single tweet multiple times because the same tweet was attributed to a multitude of authors. Though an exact duplicate, this singularly repeated tweet appears to Twitter as having come from different sources due to the fact that it was consistently sent via new profiles. Essentially, this massive retweet campaign is a strategic reverberation of a single message, sending repeated ripples into the Twittersphere. The reason this strategy is so effective is that if a person has 1,000 followers, and they tweet something, that tweet only reaches those 1,000 people. But if a message is retweeted by a myriad of other Twitter users, that message reaches those people's followers as well.

This repetitious broadcast effort thus serves two important functions: one, it helps further spread the team's general message, hammering home certain ideological points, and two, it also helps team members spread the words of other members, ideally helping to make digital connections between followers and PJNET "friends." Connecting each other to one another's follower base, and thereby, assumedly, helping to build each other's follower bases, appears to be one of the inherent appeals in joining the Patriot Journalist Network. By simply signing up as a member, the individual tweeter is guaranteed immediate exposure to a network of people devoted to spreading each other's rhetoric, all with the hope that they can help the larger entity continue to grow.

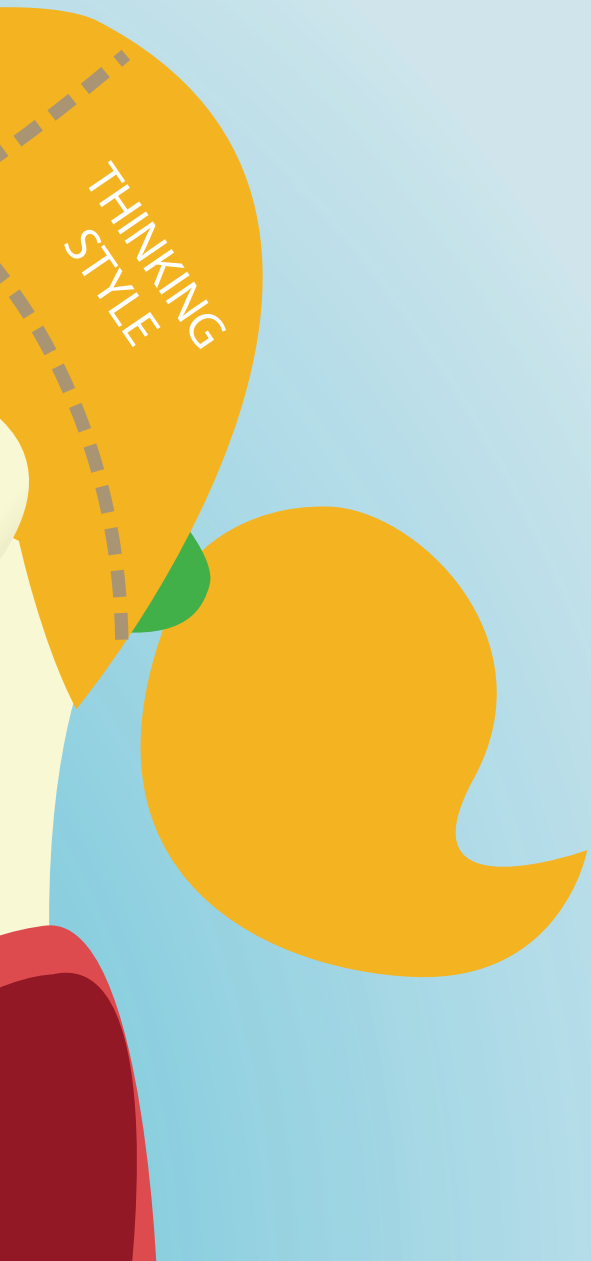
ACCOMPLISHED GOALS

As the data show, in many ways, Prasek and the PJNET Team accomplished what they set out to do. Not only did they dominate the Common Core conversation on Twitter, but they also achieved their stated goal of promoting a set of "conservative topics, causes, and legislation." What is even more intriguing is that the group is apparently unaffiliated with any registered political action committee. They are instead a homegrown grassroots social media movement intent on promoting their social and political agendas, cleverly aided by BotNets and hashtag rallies.

The strategies employed by PJNET exist below the radar and would have remained invisible to us had we not noted the unusual pattern in their activity and pursued it further. By shining a light on the PJNET Team and their work, we are attempting to heighten awareness around social media message crafting, movement, and distribution, while also illuminating the reality that available information may originate from corners unknown.

1 Downloaded October 27, 2016 from http://irregulartimes.com/2013/02/11/patriot-journalist-network-pushes-dozens-of-members-of-congress-to-bomb-twitter/
2 M. Prasek, personal communication, January 4, 2017

ACT 4 LEXICAL TENDENCIES



LEXICAL TENDENCIES

Stretching back to the 1950s, a long lineage of psychological studies show that the words we use provide tremendous insight into the workings of our mind. In this act we examine over 500,000 tweets from more than 100,000 actors to discover the lexical tendencies of members of the three major factions of the Common Core debate. Using an innovative large scale text mining strategy, we analyze the linguistic choices in the tweets of members of the three factions. Our analysis assesses four distinct psychological dimensions: mood, thinking style, level of conviction, and drive orientation. We find that the different groups had distinctly different psychological makeups which provides insights into their emotions, motivations, and strategies.

OVERVIEW

TACOS

Our focus on the how was inspired by Dr. James Pennebaker's illuminating work at the University of Texas at Austin. Over the course of his career,

#COMMONCORE PROJECT

Pennebaker, along with myriad esteemed colleagues, has found that certain words, beyond their meanings, reveal dimensions of our psychology. "Tacos" tells us little, but the "I", if habitual, is profound: Alice's "I", if used throughout a text, indicates that she is prone to depression.1 Conversely, sipping a julep on a Faulkneresque, wisteria-shaded afternoon, Beauregard's use of "best" reveals that he is driven by Achievement.2 These words, in this case, "I" and "best" are what Pennebaker calls function words.3 They are small and there are thousands of them; we often overlook them, but like stars in a light-polluted city night, though tough to see, they are there, twinkling as they always have. As simple as "an" and as complex as "calumnious," specific words are applicable to certain psychological dimensions, and some are applicable to more than one. "Extraordinary," for example, contributes both to the measurement of a person's drive for achievement and also to their style of thinking.

OUR METHOD

After customizing Pennebaker's word libraries, we then employed the help of the Department of Computer and Information Science at the University of Pennsylvania. Using a programing language called Python, we were able to sift through the 500,000 tweets in Time Periods Two and Three, extract the function words used by each individual tweeter, and finally create a proportion to the total words they used. The results arrived as proportional percentages that we then standardized. The reason for standardization is that each library is comprised of a different number of terms, so a proportional reading of one is not necessarily equal to another. Remember, some libraries have as little as 23 while others have over a thousand. So to address the disparity, we standardized each library, which then gave us equally weighted proportions, thus equal measurements across the various dimensions. Pennebaker did a similar thing in his work

when examining the speeches of various presidential candidates during the 2016 election season.5 The difference between our work and his, however, is that not only did we measure individuals on the various psychological scales, but we used our social network data to create average scores in each domain for each of the factions as identified by their Twitter behavior. Generating the average group scores allows us to compare the psychological profiles of each faction, determining differences in their moods, drives, levels of conviction, and thinking styles.

CONSIDERATIONS

Another thing to consider is that word counting is a psychological analysis meant to determine things about individuals. The individual has habits and those habits reveal aspects of who that person is. Here, however, we have taken a psychological tool and used it to assess things at the group level, using individual aggregated habits as measures for the groups to which our social network analysis determined the individuals belonged. Certainly, by moving up a level from the individual to the group, aspects of those people are lost and nuances are sloughed to the floor. Group measures may not represent any particular individual in that group, but rather represent the group average. Thus, for example, if the blue faction uses significantly more sad words than either the yellow or the green factions, this does not mean every blue faction member is sad. It just means

that, on average, the members of the blue faction used more sad words.

The final consideration is the relatively loose nature of Twitter-based conversations, and whether or not this fact has any bearing on the type of words people use. And the answer to that question is no. In repeated studies, without great variance, people use similar function words when writing essays, letters, emails, Twitter messages, and even diary entries.6 In the same way that I walk with a similar gait regardless of street or circumstance, I use a similar set of words whenever writing, typing, or speaking. Though at times, I may walk faster or slower, with a greater sense of caution or urgency, the rhythm or placement of my feet does not necessarily change. We talk like we walk then despite the clichéd disparity noticed by the frustrated observer; talking the talk is in fact walking the walk; both are habits, that if examined, reveal who we are.

In the following sections you will find links to detailed explanations of the various dimensions, more nuanced discussion of the words and processes involved, and visual comparisons of each group's placement on the psychological dimensions.

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2. Winter, D. G. (1987). Leader appeal, leader performance, and the motive profiles of leaders and followers: A study of American presidents and elections. Journal of Personality and Social Psychology, 52(1), 196-202.

3. Chung, C., & Pennebaker, J. W. (2007). The psychological functions of function words. Social communication, 343-359.

4. Tausczik, Y. R., & Pennebaker, J. W. (2010). The psychological meaning of words: LIWC and computerized text analysis methods. Journal of language and social psychology, 29(1), 24-54.

5 Wordwatchers. (n.d.). Retrieved November 21, 2016, from https://wordwatchers.wordpress.com/

6. Pennebaker, J. W. (2011). The secret life of pronouns: What our words say about us. New York: Bloomsbury Press.

THE MOOD OF THE COMMON CORE FACTIONS

Our moods change how we think and how we think changes the words we use. When we are sad, we see the world through an invisible veil of sadness, and our word choices reveal our mask. When we are happy, our happiness lifts what we think and our buoyancy is shown in everything we say or write. Though we may never come out and tell the world how angry we are, if wanting to know, one simply needs to monitor our word choices.

The connection between linguistic choices and mood have been established through extensive studies analyzing the language of a range of public figures. Using this lineage of empirical research as guide, we examine how word choices reflect three specific mood states: sadness, anger and happiness. Our purpose in doing this is to assess the emotional tenor of each faction involved in the Twitter-based Common Core debate. Doing so provides a deeper, more nuanced understanding of the issue, the people involved, and the emotions fueling participation. Thus, in the same way a doctor determines the relative health of a patient by using every tool at their disposal, we utilize a linguistic stethoscope, to listen into the hearts of Common Core tweeters.

THE USE OF SAD WORDS IN COMMON CORE TWEETS

Our analysis of sadness focused on three word libraries associated with a somber or depressed mood state: "I" words (e.g. (I, me, my), future tense verbs, and negative emotion words (e.g. empty, lonely, sorrow). The results of our word choice analysis showed a clear distinction between each group's respective use, indicating differences in their level of sadness. The blue faction (opponents of the CCSS inside of education) used the most sad words, averaging 25 per 1000 words, followed by the yellow faction (opponents of the CCSS outside of education), averaging 20 sad words per 1000. The members of the green group (supporters of the CCSS) used the fewest sad words, averaging only 15 per 1000. The differences in sad word usage were statistically significant amongst all three factions.

Conversely, the green group's low score on the sadness scale is also likely multifaceted. In a linear interpretation, we might relate the green faction's relatively low use of sad words to the adoption of their desired reform (the CCSS). But if we probe deeper, their reduced use

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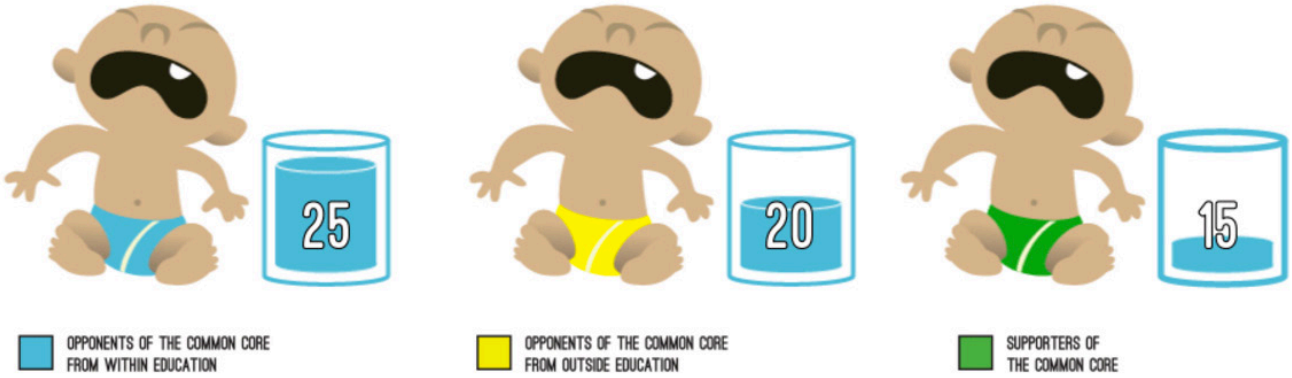
USE OF SAD WORDS BY COMMON CORE FACTION (WORDS PER 1000)



USE OF ANGRY WORDS BY COMMON CORE FACTION (WORDS PER 1000)

USE OF HAPPY WORDS BY COMMON CORE FACTION (WORDS PER 1000)

of future tense verbs speaks to the immediacy of their argument and position. Their position relies on the current implementation of the standards, something occurring in the moment, the description of which would not necessitate future tense language. Unlike the blue group, in this regard they are not prognosticating the future effects of reform (which would necessitate future tense verbs). They are instead discussing the immediate effects of the system put in place. Finally, in their general advocacy of the CCSS, there would be no sense for supporters of the CCSS to promote their desired reform using negative emotional language. Why attempt to advocate something one wants using negative descriptive terms? The answer of course, is that this wouldn't happen, thus we find the green faction's low measure on the sadness scale.

THE USE OF ANGRY WORDS IN COMMON CORE TWEETS

The anger scale consists of five word libraries that included anger words, (e.g. aggressive, hostile, offensive, violate) you words (e.g. you, your, u, ur) and focus future words (e.g. now, presently, today). Our anger analysis showed that the two groups opposing the Common Core, blue and yellow, used higher proportions of angry words (50 and 38 per 1000 words respectively), while the supporters of the Common Core, the green group, used anger words with a significantly lower frequency, averaging only 29 angry words per 1000.

With the marked differences in support, interpreting these results seems relatively straightforward. Those against the Common Core were obviously more frustrated, or angered, by their implementation than were those in support. However, if we look a little deeper, the underlying nature of this frustration is open to interpretation, and we can find reason to associate the anger with feelings of loss. Effectively, through the adoption of the Common Core, opponents "lost" both in terms of their position in the debate and also their sense of comfort born from the previous system. The new system of standards, and all that came with it might have upset opponents' sense of stasis, resulting in circuitous feelings of loss, giving rise to fear or anger. The reason we say fear, stems from Daniel Kahneman's loss aversion theory , which states that the potential for loss generates feelings of fear in people. 3 Essentially, he insists that the fear of loss outweighs the potential for gain, causing Double tweet from sharisedixon and java_ penguin about here

THE USE OF HAPPY WORDS IN COMMON CORE TWEETS

There are four word libraries associated with happiness, including positive emotion (happy) words (e.g. admire, delight, pleasing, thrilled), past tense verbs, nouns, and we words (e.g. we, our, us). In order to determine their relative level of happiness, we measured all three words types, finding that both the yellow and green factions used similar proportions of happy words, averaging 66 and 65 per 1000 words respectively, a significantly higher average of happy words than the blue group, who averaged only 58 per 1000.

Possibly more intriguing than the green faction's understandable positivity is the yellow group's high use of happy words, particularly so when one considers the fact that the yellow faction was comprised of people opposed to the Common Core. Why would opponents of the standards be happy when discussing the issue? One possible explanation is that the members of the yellow faction viewed the standards as a proxy issue to rouse their base of support on other political topics (LINK TO POLITICS IN THE TWEETS FROM FIRST STUDY). By being so widely discussed, there was a host of new attention generated around the CCSS opposition and other related issues (e.g. federal role in education, proliferation of testing, business role in education). Another possible interpretation can be found by combining the yellow faction's high measure on all three mood indicators. The yellow group's relatively high levels of happy, sad, and angry words suggest an overall tendency toward emotional language, therefore a debate processed through an emotional mind. If our language is emotional this implies that we were thinking emotionally, so whether happy, sad, or angry, the members of the yellow faction, in general, seem to have processed this conversation in an emotional way.

RESEARCH RATIONALE: THE LANGUAGE OF OUR MOODS

"I shut my eyes and all the world drops dead; I lift my lids and all is born again. (I think I made you up inside my head.)
The stars go waltzing out in blue and red, And arbitrary blackness gallops in: I shut my eyes and all the world drops dead."
- an excerpt from "Mad Girl's Love Song" by Sylvia Plath

Oh, poor Plath, destined to despondency. A lonely pen, a magical scribe, from darkness sprung genius—profundity and pensiveness in poem. The entire subject of the above excerpt is defined by the use of a single

vowel; the focus of her rhythm, Plath, speaking of I, of she, of me or my, personally addressed in every line, her feeling placed on view. Feeling, feelings, consistently feeling, feeling is the hallmark of almost every poem. Good, bad, or Whitmanesque ecstatic, poetry is typically written to articulate and understand a poet's feelings. Like no other breed of scribe, poets' words reveal what they feel, so whose words are better to examine for mood, not specifically in what they say, but instead how things are said?4

"I" is Sad

To investigate mood state in word choice, Dr. James Pennebaker, a psychologist at the University of Texas at Austin, used his groundbreaking word-counting computer program to compare the poems of suicidal poets and their non-suicidal peers.5 And just as he had in his other studies, he found that the two groups made far different word choices, even when they wrote poems about similar subjects – a similarly lovelorn heart described in opposite ways, the opposition a reflection of the writer's general mood. Shifting like our lips, whether we smile, scream, or frown, our moods change how we think and how we think changes the words we use—our lexical tendencies are predicated on our feelings.

In Pennebaker's study, poets who committed suicide – those it is safe to assume struggled with sadness or depression – used far more I words (I, me, my, etc.), increased numbers of causal words (based, effects, intend, provoke, etc.), and more past and future tense verbs. Happy poets on the other hand, not necessarily just those who didn't commit suicide, but a group exemplified by the buoyant poetry of Edna St. Vincent Millay,6 used far more we words (we, us, our, etc), fewer causal words, and more of what are considered concrete nouns (dog, sister, house, etc.).7 So, while Plath spoke of isolation, employing "I" or "my", the happy poet articulates their sadness using "us" or "we". The reason being is that when writing poems, even those discussing tragedy or pain, the "happy" poet shares their experience with others and understands that they are not alone with their feelings. They are instead participating contributors to the social whole, accompanied in their struggles by those like them, as prescribed by the common cliché – misery loves company. Indeed it does, for as Pennebaker sees it, those who use I words feel psychologically closer to their feelings, almost isolated with their emotions; their lives are viscerally felt at near tangible levels, whereas the happy poet, using we, finds distance between themselves and their feelings and they share their experiences with others.8

A similar dichotomy between happiness and sadness exists when discussing the groups' use of causal words, or those words directly associated to active thought. By various definitions, sadness (depression) is an active cognitive process, something strongly linked to introspection, self-reflection, or the consideration of past tragic events.9 Basically, we think when we are sad, so, when thinking, we use words associated to thought—causal and insight. Plath's poem is a perfect example of this phenomenon. Her day is described in a somber tone, each line revealing thoughts about herself. Her introspection permeates the work with a pronounced air of sadness. Happy poets on the other hand, therefore happy people, do not actively think about their happiness: happiness is not something to be pondered, but instead a sentiment to be simply felt and enjoyed. Therefore, happy people do not use words associated to thinking; they instead show an empirically reduced use of causal and insight words.

WE GET ANGRY TOO

But as any person knows, we are not bound to these emotional poles; we also experience feelings between the limits of happiness and sadness. Often destructive if not properly aimed, anger can also be measured through an analysis of word choice. In a separate study looking at the changes in word choice and mood of then New York City Mayor Rudy Giuliani, before and after 9/11, he was "variously referred to in the media as an insensitive bully, a man seething with anger and self-righteousness."10 James Pennebaker found that pronoun use in particular, just as it does for the happy and sad, sheds light on one's reddened cheeks, ears, and eyes. While sad people use I and happy people use we, angry folks use a lot of you (yours, you're, y'all, etc.) mixed with he, she, or they. Anger is measured by 2nd and 3rd person pronoun use, the number of angry words used (abuse, damn, enrage, idiot, etc.), as well as with the number of present tense verbs found in a specific text. Present tense prevalence is due to the fact that anger is another active emotion, one that is directed outward, inspired by an issue at hand and turned toward the offending party: "they" or "you."11

NOTES AND REFERENCES

1. A full description of the measurement of mood is provided in the project methodology. Furthermore, we advise readers not to compare the number of words used across sentiments. Due to disparities in library size, a measure for mood is not the same as a measure for conviction, drive, or thinking style.

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THE DRIVES THAT MOTIVATE THE DIFFERENT COMMON CORE FACTIONS

David McClelland's Needs Theory1 states that people are driven in three distinct ways, interpreting the world and its functions through the lens of their motivating drive. We are either driven by a need for power, a need for affiliation, or an underlying desire for achievement. These motives move our minds to think and speak or write in particular ways, revealing to the observer what steers us. Here we use David Winter's (a contemporary of McClelland's) lexical analysis process2 to diagnose the drives of the various factions involved in the Common Core debate, intent on unveiling previously unseen layers in the conversation. A faction's general opposition or advocacy tells us only so much, but when determining the motivations underlying a group's stance we gain a deeper understanding of the debate as a whole. Finding nuance in opinion is a difficult task, but at the very least, these profiles shed light on the fact that opposing factions are often motivated in a similar manner, yet driven toward different goals, while unified factions often agree but for much different reasons. Following our analysis of the drive motivations, we provide an essay that describes the empirical research establishing the connection between lexical tendencies and drive motivation.

THE POWER DRIVE

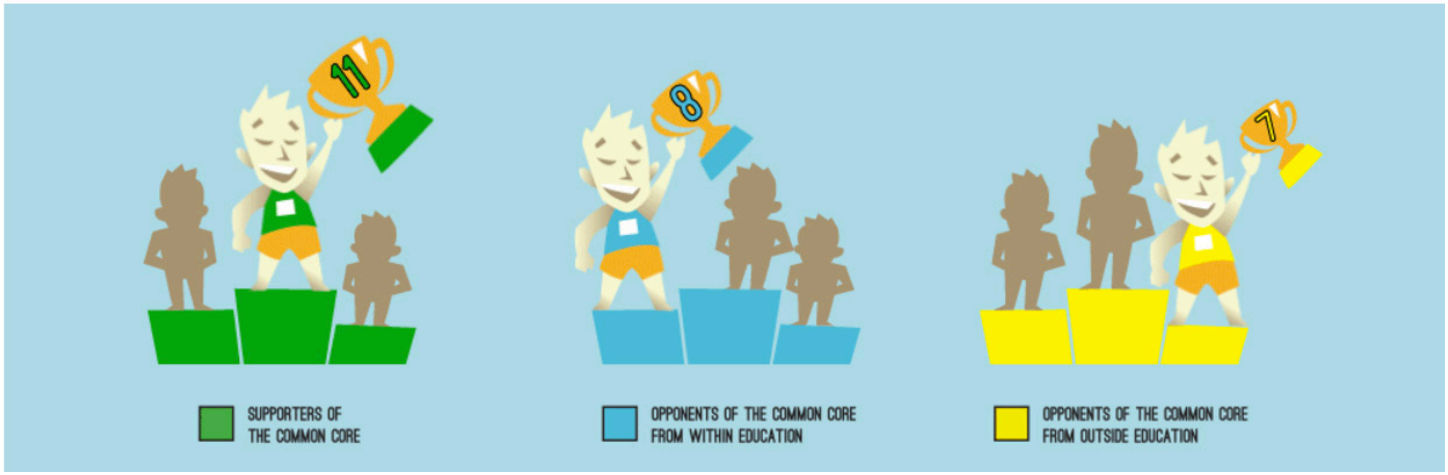
The power drive analysis examines the use of words from one large library containing 918 terms associated with power (e.g. leader, weak, biggest, force, strong, lose, least)3 Our analysis indicated that there were distinct and statistically significant differences in the use of power words amongst the three Common Core factions. The blue faction, those inside education who opposed the standards, had the highest use of power words, averaging 29 per 1000. The yellow group, those outside education who opposed the Common Core, had the next highest, averaging 27 per 1000. The green group, supporters of the Common Core, used power words with the least frequency, averaging 25 power words for every 1000 words tweeted.

An added layer of interpretation is that the green faction's low measurement on the power scale combats the notion that proponents of the Common Core were driven by a desire to leverage power. Many of the Common Core's most ardent detractors argued that the CCSS were an effort to centralize education, thereby consolidating control of the education of American

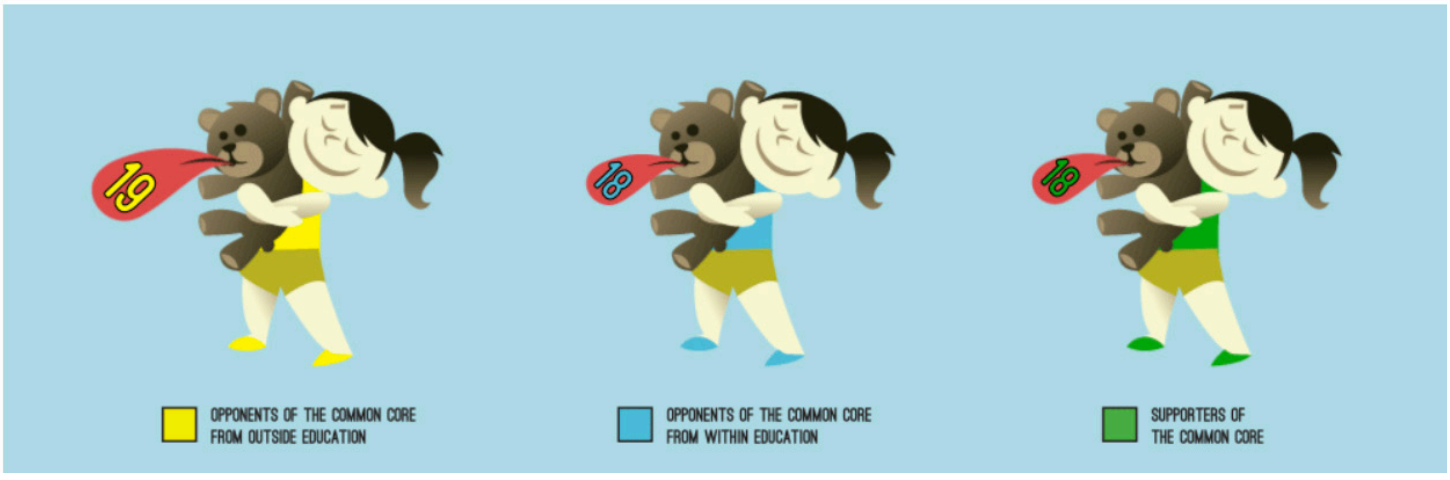
#COMMONCORE PROJECT

USE OF POWER WORDS BY COMMON CORE FACTION (WORDS PER 1000)

USE OF ACHIEVEMENT WORDS BY COMMON CORE FACTION (WORDS PER 1000)



USE OF AFFILIATION WORDS BY COMMON CORE FACTION (WORDS PER 1000)



children. However, the low power measure suggests that the members of the green faction's advocacy was not a desire for control, but instead, they pushed the CCSS as a reform movement designed to solve various issues within the American education system.

THE DRIVE FOR ACHIEVEMENT

The drive for achievement was measured by a single library consisting of 364 words. Words like ability, improvement, perseverance, striving, and winning are associated with an achievement orientation. The green faction (proponents of the CCSS) used an average of 11 achievement words per 1000. The blue faction (opponents of the CCSS within education) used an average of 8 achievement word per 1000, while the yellow faction (opponents of the CCSS outside of education) utilized achievement with the lowest frequency, averaging only 7 achievement words per 1000. The differences amongst all three of these groups were statistically significant.

At root, the Common Core is an achievement-oriented initiative, designed to create a clear set of expectations to help educators develop students' knowledge and skills in order to achieve higher levels of academic success. On the surface it would seem that the green faction's relatively high use of achievement words could be linked to the successful adoption of the Common Core. However, we do not believe this is an accurate interpretation, for that would mean that one's drive for achievement is based upon external conditions rather than internal motivations. Achievement drive is really a latent motive that exists regardless of external circumstances. In fact, the standards' relative "success" was quickly met by the rise of the opt-out testing movement and in various state's' efforts to either repeal or amend the standards themselves. From our perspective then, the high measure of achievement words is rooted in the language used to argue for the Common Core as well as the language within the Common Core state standards.

As reform focused on achievement, the standards naturally used many of the terms found in the achievement library, therefore their promotion would also utilize language from the achievement library. From this perspective, the green faction's high use of achievement-oriented language begins to make a different kind of sense. By simply promoting the CCSS, or even by discussing the merits of the standards, the green faction is more prone to use terms like achieve, success, performance, test, assessment, standard, level, higher, or lower at higher rates. These words and their many synonyms are terms found in the achievement library. So, simply by discussing the issue in a positive light, and by promoting the standards ability to improve student performance, the green group stimulated their achievement orientation. This does not necessarily mean that this is an artificial reading of the group's drive, but instead, it might shed light on how the green group, as constructors and promoters of an achievement measure, perceive the process of education. As advocates for a system, promising achievement, using language found in our achievement library, it is reasonable to assume that the green group sees education as a process of achievement, something to promote or encourage success as measured by higher or lower performance on assessments and standards. Importantly, this reveals the fact that the standards were created (and advocated for) by a group of people who perceive education in a particular manner that does not necessarily coincide with the views of others, for not all people consider education to be a means for societal "success". In fact, many people view education as a process dedicated to the "enabling" (a power word) of a student's ability to critically think, or alternately, as a means to the creation of a responsible, conscientious public citizenry (an affiliation word).

THE DRIVE FOR AFFILIATION

Affiliation consisted of one library of 348 words, including terms like buddy, collaborate, fellowship, and sharing. The differences between the three factions' use of affiliation-oriented words were relatively small. The three groups are separated by the presence of a single averaged word: the opponents of the Common Core from outside of education (yellow) used 19 affiliation words per 1000, while the two groups of educators (green and blue) averaged slightly fewer with 18 words per 1000. This one word difference between yellow and the two groups of educators however, was statistically significant, indicating that there are in fact differences in our measurement of this drive.

RESEARCH RATIONALE: THE LEXICAL ROOTS OF DRIVE ORIENTATION

Three words define the primary interrelational motives of people: power, achievement, and affiliation. Each to its own degree, most of us home to all three, typically one of which is our primary drive in life: we are either power people wanting to organize or order others,4 achievement people seeking to excel or attain status,5 or affiliation centric individuals driven by the creation

and maintenance of harmonious relationships with those in and around our lives.6 The three driving concepts come from David McClelland's seminal research in needs theory—a motivational model of human behavior created in conjunction with the Thematic Apperception Test.7

A BRIEF HISTORY OF NEEDS THEORY

The Thematic Apperception Test (TAT), is a psychological projection tool developed in the 1930's, designed to unearth the underlying thoughts, motives, fantasies, and urges of people.8 Like the Rorschach, the TAT consists of ambiguous pictures presented to individuals, who are then asked to create narratives based on what they think or see. Different from inkblots however, the images presented involve artistic renditions of people interacting in various ways, images that, like post-modernist paintings, lend themselves to personal interpretation. After administering a test, researchers, therapists, or other psychological practitioners analyze patient responses, attempting to glean insight into the person's mind.

In its initial incarnation, scoring the TAT—or understanding the results of its application—was a complex process of manual phrase analysis prone to administrative subjectivity. But as technology progressed, models like McClelland's needs theory minimized this underlying problem. With both his motivational model and a novel computer based scoring system, needs theory provided a more thoroughly objective analysis of TAT results. Much like James Pennebaker's variety of word-counting work,9 McClelland's program was based on the idea that lexical choices used during a TAT examination revealed the degree to which a test taker was driven by power, achievement, or affiliation. The problem, however, was that needs theory was originally wedded to the administration of a TAT, making it very difficult to profile those who were not physically tested.

PROFILES FROM A DISTANCE

Recognizing this dilemma, David Winter, aided by McClelland, created a method to analyze motivational drives removed from the taking of a test.10 His computerized scoring program was built to scour any written or spoken texts from a single author, where it would then look for specific words or phrases linked to the three specific drives. Once done, an analysis culminated in a needs theory profile, one that could be performed on anyone from anywhere, regardless of physical presence. Effectively, this later model relied on the idea that those driven by power used power words (e.g. ambition, manage, master, obey), that those driven by achievement used achievement words (e.g. accomplish, challenge, overcome, strive), and that people pushed by the construction of relationships used words associated to affiliation (e.g. ally, collaborate, communicate, interact).

As one can see from the example words listed, many of these terms exist in the majority of our daily vocabularies. As individuals, however, we rely on sets of words to express our ideas because only specific sets of words convey certain concepts. For example, if we interpret a situation as a power struggle, it is difficult to properly express the nuances involved by using words like friend or collaboration. Similarly, if we view an interpersonal interaction as an episode of egalitarian affiliation, words like overcome or obey fail to convey our perception of the event.

Among the many studies that have utilized his technique, Winter himself successfully profiled the drives of Naval officers,11 South African leaders,12 and every American president from 1789-1981.13 Importantly, when doing this work and considering the results of an analysis, it is integral to detach any connotations connected to the guiding terms. Power, for example, is not a negative drive, nor is affiliation necessarily friendly. In his various studies of American presidents, Winter and his colleagues determined that Richard Nixon was one of the most affiliation-driven presidents in American history,14 whereas Franklin Roosevelt, Jimmy Carter, and Grover Cleveland were all uniquely driven by power.15 Our personal opinions of these figures not withstanding, the point remains that attaching connotations to the three primary drives deters us from grasping their multifaceted meaning.

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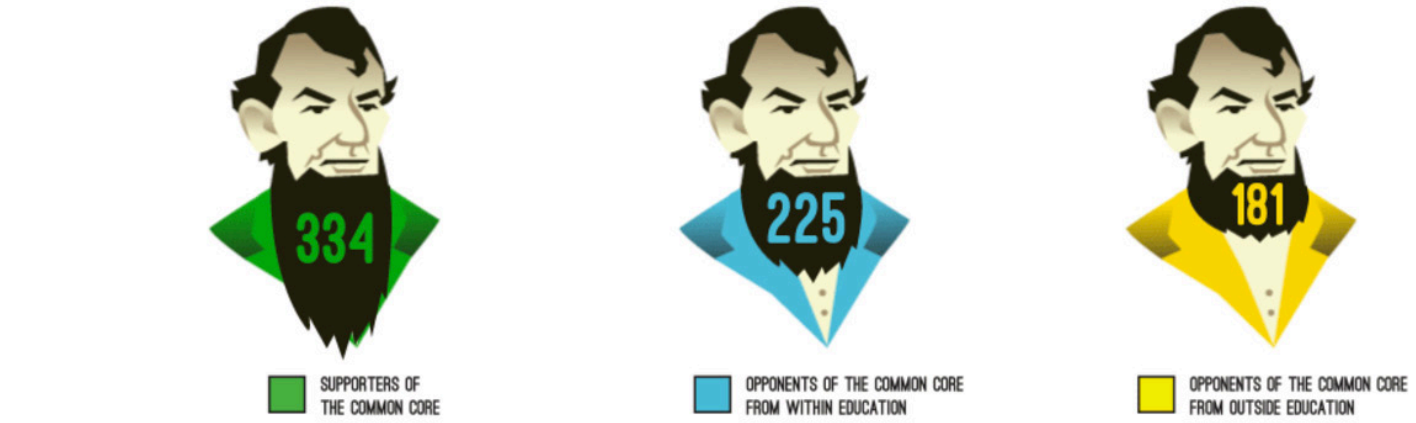
CONVICTION IN THE TWITTER DEBATE ABOUT THE COMMON CORE

The conviction scale measures the degree to which people are convinced about what they say. There is a strong empirical lineage connecting the level of our beliefs in what we say and the words that we use. Studies have shown that linguistic analysis is more accurate than a polygraph test. People with more conviction use more concrete details in their language, while those with less conviction are vaguer and more evasive in their language. In this analysis, we examine the level of conviction for each group involved in the Common Core debate in order to assess their genuine investment in their position.

ASSESSING CONVICTION

Conviction was the most complex phenomenon we measured. The scale of conviction is based upon 13 different word libraries, including: discrepancy words (eg. would, could, and should), negative emotion words (e.g. destroy, kill, and terrify), and time and number words (eg. one, quantity, and hundred). The results of the conviction analysis were distinct.1 The group with the highest use of conviction words was the Common Core supporters, the green faction, using an average of 334 conviction words for every 1000 words tweeted. The second highest group on the conviction measure was the opponents of the Common Core within education, the blue faction, using an average of 225 conviction terms per 1000. The opponents of the Common Core from outside of education, the yellow faction, used the least number of conviction words, averaging only 181 per 1000. The differences between all groups were statistically significant.

The conviction scale assesses the extent to which people are convinced about what they are saying. Based on the words they used, the green group had the highest level of belief in their position and arguments. When writing their tweets they used high numbers of concrete nouns, number words, and time words. All three of these word types highlight green's use of concrete, analytical arguments often culled from empirical studies or grounded in research.



RESEARCH RATIONALE: THE BASIS FOR CONNECTING CONVICTION TO LEXICAL TENDENCIES

Liars sweat. Liars blink. Liars look up and to the right and their pulse quickens when they prepare to lie. At least, so says conventional wisdom, the Internet, inadmissible evidence, and angry couples accusing each other of various adulterous crimes. Well, the forlorn lover isn't alone in their want for truth; researchers too have long waded into the bogs of lie prediction. A difficult proposition, for how do we differentiate between truth and lies when liars insist they tell the truth? Where is the proof to prove that a lie is in fact a fiction? It is in the person of course, lies like a spider's silk, woven into their words.2

Urged on by these questions, Dr. James Pennebaker, a psychology professor at the University of Texas at Austin, and Denise Huddle, a private investigator determined to improve lie detection methods, set out on a fact-finding mission. Aided by Huddle's experience in the legal system, and assuming criminals use different words when lying or telling the truth during testimony, the two decided to examine word choices in courtroom transcripts.3 However, they quickly encountered an unforeseen problem: people under prosecution often insist that they are telling the truth, and additionally, many people are falsely convicted of crimes they did not commit. In each situation, the truth is either unavailable or difficult to discern, making it risky to diagnose when someone has lied. So, simply looking at courtroom testimony as if the eventual verdict could determine whether a defendant had lied, was not an adequate measure of honesty. Take, for example, a situation where a defendant tells the truth about their innocence, yet is falsely convicted of a crime. In such a scenario, the defendant's honest testimony, if compared to the guilty verdict, would appear as if it were false, when in fact they had told the truth. The incorrect verdict then creates a false dynamic, one where the truth looks like a lie and a lie looks like the truth.

Fortunately for Pennebaker and Huddle, in many states, after a successful criminal conviction, defendants can be subsequently prosecuted for perjury if they are believed to have lied during their original criminal trial. An ensuing perjury conviction is typically successful if either eyewitness accounts or DNA evidence contradict the defendant's original testimony. For example, if a defendant was successfully tried for murder and testified that they were not present at a crime scene, yet DNA evidence proved that they were, the DNA evidence could be reintroduced during a perjury trial to prove they had in fact lied while on the stand. The two sets of testimonies then, one from the original murder case and one from the subsequent perjury trial, if differing from one another, could be compared, allowing the research team to determine if there were any differences in word choice.

Using cases like the aforementioned, where felons were successfully convicted of perjury following original criminal convictions, Pennebaker and Huddle determined that defendants did in fact make different word choices when lying and telling the truth on the stand. The differences in word choice did not surprise them, however the starkness in contrast surprised them both. It was clear that liars used certain sets of words while honest folks used others.4 This finding has been replicated by additional investigations, using a variety of methods, that validated the claim that our words reveal our level of conviction.5

FACT VS. FACTION

Buoyed by their findings and those gathered from another compelling study,6 Pennebaker next piggybacked on the research of Melanie Greenberg at SUNY Stony Brook, who wondered if writing about imagined traumas had a therapeutic effect on trauma victims. On the surface, her study appears inapplicable. However, to discover if describing false traumas had a therapeutic effect, Greenberg asked a group of participants in her study to lie. She separated her test subjects (all of whom self-reported experiencing trauma) into two distinct groups and asked them all to write about traumatic scenarios. Some of them were asked to write about scenarios they imagined, while the others were asked to write about their true traumatic experiences. The imagined traumas, though neither malicious nor comparable to the aforementioned crimes, were, at root, essentially lies—stories concocted in the mind of their teller, done so with a particular intent.

Hearing about her study, Pennebaker wondered if there would be lexical differences in the different types of responses. Using the writing samples of both groups, he compared the words they used and found the same linguistic tendencies he found in courtroom transcripts. Essentially, those writing about imagined traumas tended to use words associated with dishonesty, and those writing about genuine experiences used the words he had previously associated with truth.

MORE ACCURATE THAN A POLYGRAPH

In a final effort to affirm his work, Pennebaker partook in a more challenging test of his theory: trying to predict lies based on word choice. To do this, he borrowed transcripts from the Ekman Project, a study that took place in 1999.7 At the University of California San Francisco, Paul Ekman, Maureen O'Sullivan, and Mark Frank, also tested their lie detection skills by asking participants to express a personal opinion about a particular topic, then go to a second interview with another person to express their opinion about the same topic. In the second interview, some of the participants were asked to express the opposite view of their own. With their positions reversed, the participants were urged to convince the second party that they in fact held the opposite viewpoint. This second party (a researcher) would then attempt to guess who had lied or told the truth about their opinions. To mimic the incentive that often motivates lies, participants were given financial reward if they successfully convinced the researcher about a falsely held belief.

Pennebaker read what the Ekman team had done and asked for access to the transcripts. His idea was to run both sets of beliefs—those true and those false—through his burgeoning computer program to see if it could locate the same lexical tendencies noted in his earlier studies. Ekman and his team agreed to release the transcripts, but only on one condition. They asked that they withhold their findings until Pennebaker, after doing his analysis, could come back with predictions regarding who had lied or told the truth. Thrilled by the challenge, Pennebaker agreed to their terms, analyzed the transcripts, and returned with a list of liars. After receiving his results, O'Sullivan called Pennebaker to express amazement at his accuracy.8 Determining liars with up to 76 percent accuracy is quite remarkable, particularly because a polygraph test performs at a 60-65 percent rate.9

WORD TYPES

In these studies, as well as others, researchers have consistently found that liars use certain types of words in their explanations, words that differ from those used when telling the truth.10 Specifically, dishonest people employ fewer I words, more 3rd person pronouns, fewer number words (one, two, hundred, thousand, etc), far fewer details like concrete nouns, and most commonly, what are called discrepancy words (would, should, could, etc). People telling the truth, on the other hand, use far fewer emotional words—both positive and negative—more words related to time (yesterday, today, hour), increased number words, and fewer of both causal (made, make, intention, enact) and insight words (know, reasons, remember, think).

Now, some of these pertinent word types make a lot of inferential sense. The fact that liars use fewer number and time words correlates directly to the lack of detail in many lies. On the other hand, a truth teller's lack of causal and insight terms, might necessitate further explanation. According to Pennebaker, the decreased use of causal and insight words in the written or spoken texts of people telling the truth is due to the fact that our honest experiences are our own, so that when we retell them, we do not need to think, whereas constructing a lie is a much more arduous cognitive task. For similar reasons, we use more I words when telling the truth, because they are our personal experiences; we are closer to them, and when talking about them, we reference ourselves.11

OUR DEPARTURE

Building upon James Pennebaker's lexical tendencies work with honesty, we decided to measure certain word choices for the subgroups identified by our Social Network analysis (Yellow, Green, and Blue). However, as you can see, we have departed from his depiction of honesty by titling our similar analysis Conviction. During the course of researching his work, we noticed something that caused us concern - a general misalignment between well-established falsehood and high scores on honesty scales. People were registering as honest who were clearly misleading and there was no way to rectify the results. Basically, in a recent examination of the 2016 presidential primary season, Donald Trump measured as the most honest of any candidate from either party, more so than Marco Rubio, Ted Cruz, Bernie Sanders, and Hillary Clinton.12 Not only is this surprising, but when comparing these results to a bevy of fact-checking websites, there is legitimate cause for intellectual pause.13 How could Mr. Trump measure so highly on the honesty scale when in fact, there was no doubt he routinely eschewed established fact?

Our belief is that Pennebaker's honesty scale is not a measurement of genuine truth telling, but instead a measurement of how much a person believes the things they say—how convicted one is when they speak. Much like a polygraph, we believe that word choice fluctuates when a speaker or writer hesitates, overthinks, hedges, or experiences nervousness during a speech or while writing. In Donald Trump's case, he doesn't hedge or hesitate in the same way a typically dishonest person does, meaning he uses the same word groups people do when they tell the truth. This lack of hesitation therefore results in high measurements on scales of honesty, or in this case, conviction – he believes what he says. Ultimately, this means that we are measuring how fervently the subgroups in our study believe the things they wrote during the #commoncore Twitter debate, where a lack of conviction would register on our scale similarly to its register on a polygraph test: the needle would flit and jump.

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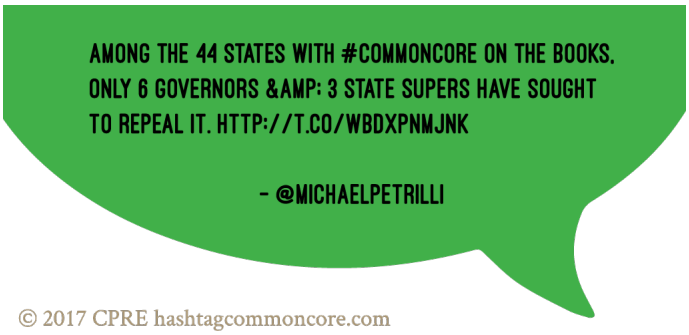


THE THINKING STYLE OF THE COMMON CORE FACTIONS

People think in distinctly different ways and their thought processes are reflected in the words that they use. In his myriad word choice studies, James Pennebaker found that there were three distinct word bundles that people used regardless of context and he named the three patterns Thinking Styles. Analytic thinkers, by using certain word groups, understand the world through division and distinctions; they find ways to group and order people, places, and events into distinct categories of their design. Narrative thinkers interpret information through stories and focus their thoughts on individual experiences. They understand the world and express themselves through narratives and anecdotes. Formal thinkers are stodgy and emotionally distant. They can be conceived as arrogant and they communicate in structured, dry clips, using hifalutin language. Different from each other, the three thinking styles transcend contexts and remain consistent across boundaries, unchanged regardless of the type of communication or conversation. In the following section, we analyze the thinking styles of the three Common Core factions. Our intent is to determine if there are differences among the thinking styles of each group: the ways in which they received, interpreted, and articulated information surrounding the Common Core. Following our analysis, we provide an overview of the research base establishing the definition of the three thinking styles.

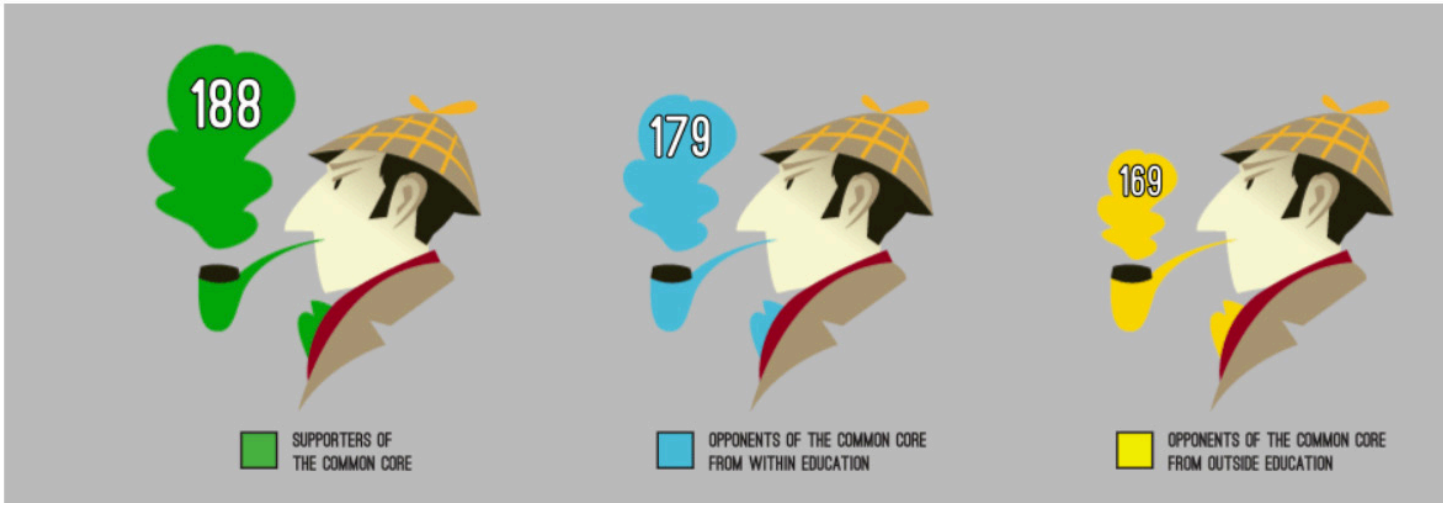
ANALYTIC THINKING STYLE

Words associated with an analytic thinking style are contained in seven distinct word libraries, including causal words (e.g. effect, trigger, infer), insight words (e.g explains, decides, solves, proves), negations, prepositions, conjunctions, and quantitative terms (e.g. average, group, most, sample, tons).1 Comparing the frequency of these word groups, we found that supporters of the Common Core (the green faction) used significantly more analytic words (averaging 188 of every 1000 words) than did either group of Common Core opponents (blue or yellow). Blue, CCSS opponents within education, averaged 179 analytic words for every 1000 total words used, while yellow (opponents from outside education) averaged 169. The differences in the use of analytic thinking words were statistically significant amongst all three groups.

The green faction measured the highest in analytic thinking style, which we believe was likely due to the

#COMMONCORE PROJECT

USE OF ANALYTIC WORDS BY COMMON CORE FACTION (WORDS PER 1000)



USE OF NARRATIVE WORDS BY COMMON CORE FACTION (WORDS PER 1000)

USE OF FORMAL WORDS BY COMMON CORE FACTION (WORDS PER 1000)

Common Core supporters' greater use of analytic arguments. An analytic argument is one based in making distinctions, distinguishing one thing from others, and such arguments are predicated on analytic thinking. Analytic thinking is defined by a person's habitual use of conjunctions, numbers, negations, and distinctions, - parts of speech that would help concretely differentiate the Common Core from previous standards efforts. Interestingly, these results are also consistent with findings from our first #commoncore study, showing that supporters of the standards used policyspeak while opponents of the standards Tweet from michaelpetrilli about here

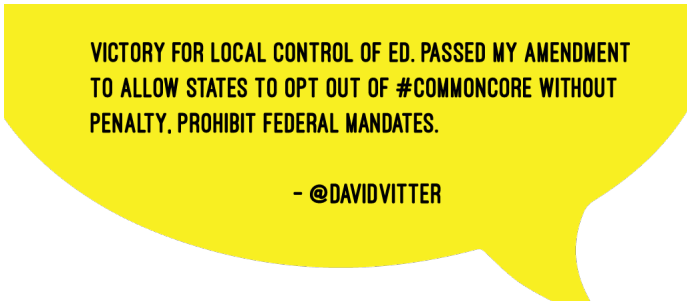
NARRATIVE THINKING STYLE

A narrative thinking style is identified through five word libraries, including social words (e.g. advice, consult, express, talk) third person POV (e.g. he, she, them, they), conjunctions, pronouns, social words (e.g. friend, sister, brother, teacher) and common adverbs (e.g. generally, mostly, typically). Our analysis of narrative thinking found that both groups of Common Core opponents (yellow and blue) used significantly more narrative thinking words than did the group supporting the Common Core (green). Although the yellow faction used the most narrative thinking words (averaging 263 per 1000), their frequency was not statistically different from the blue group (averaging 253 per 1000). Essentially, the high overlap of the distribution of narrative thinking words used by members of these two groups meant that we could not be confident that the group averages represented a substantial difference in narrative word use. The faction made up of supporters of the Common Core (green) however, used significantly fewer narrative thinking style words (averaging 207 per 1000).

By contrast, the green faction's relatively low narrative thinking word use may reflect their overall view that the standards were a strategy for systemic improvement, one that would build up the system in order to elevate overall performance. Their linguistic choices suggest that they engaged less with the personal implications of the CCSS, while emphasizing the overall benefits. The two sides of the debate, as their narrative thinking measure shows, saw the same issue through different lenses, mirroring the distinct differences in their positions on the Common Core.

FORMAL THINKING STYLE

As they did in our analytic thinking style analysis, supporters of the Common Core (green) measured the highest on our formal thinking scale, averaging 179 formal words per every 1000 used. But in a reversal of the previous order, opponents of the Common Core from outside education (yellow) had the second highest use of formal words (167 out of 1000) while the blue faction, opponents of the CCSS from within education, used the least formal thinking words, averaging 164.



RESEARCH RATIONALE: THINKING STYLE EXPLANATION

"Please, sit down and start writing."
Nervous eyes.
Sprinkler necks.
Curious whispers to equally flummoxed neighbors.
The brave student asks, "About what?"
The smirking professor responds, "Anything."
"Huh?"
"What?"
"I'm confused."
"I can see that."
"Well, what's the assignment?"
"I told you. To write."
"About what though?"
"Anything."
"Anything?"
"Anything. Whatever comes to mind.
Stay in the moment and write down your every thought, observation, and feeling. "

STREAM OF CONSCIOUSNESS

For years, as an Introductory Psychology professor, Dr. James Pennebaker taught William James' stream of consciousness theory: a theory popularized in post-modernist literature, stating that the mind is not a linear track, and our thoughts, on the surface, do not appear to connect. Though seemingly disconnected, the theory states that if properly examined by the educated eye, our unadulterated thoughts provide unique insight into our cognitive function. To teach this concept, Pennebaker assigned his students stream of consciousness diaries, asking them to spend specific amounts of time writing down anything that moved through their heads. His hope was to give them an unfettered glimpse into their own thinking, allowing them to see stream of consciousness at work. Always a successful assignment, Pennebaker accumulated thousands of these diaries over the years, but it wasn't until he and Laura King teamed up to examine them that he realized what he had.2

Wanting to see if they could find genres of people using types of function words—inspired by the literary genre word counting work of Douglas Biber—the two needed thousands of writing samples wherein different authors wrote on the same general topic.3 And just like that, Pennebaker remembered the trove of diaries he had serendipitously kept over the years. So, using his burgeoning word counting computer program, he and King analyzed each stream of consciousness diary, categorized every pertinent word into its function word group (prepositions, pronouns, conjunctions, etc.) and then, using a process called factor analysis, compared and contrasted the word groups in search of potential patterns, basically bundles of word types used together within single texts and across an individual's written or spoken work. Though their findings were illuminating, worried that the relative casual nature of diary entries might have influenced student word choice, the pair decided to perform a follow up study. The second was different from the first in that instead of stream of consciousness diaries, they analyzed analytic essays written by the same group of students. Their thinking was that a different academic goal might stimulate changes in word choice. But contrary to their suspicion, after completing the analysis, their findings mirrored their initial work. According to Pennebaker, "no matter which texts we analyze, we generally find the same dimensions within almost any genre of writing, including similar types of literature, song lyrics, college admission essays, or suicide notes."4

Effectively, Pennebaker's work shows that we use the same word types no matter what we write; our love letters are linguistically similar to our academic essays, meaning that individually, our brains work in specific ways regardless of task. It doesn't matter what we are saying or writing; we rely on certain word groups to articulate our ideas because our ideas originate from the same general place. And being that our brains form ideas in three distinct ways best expressed by certain bundles of word groups, Pennebaker labeled the three overriding linguistic patterns: Thinking Styles.

THE THREE STYLES: FORMAL, ANALYTIC, AND NARRATIVE

Formal thinkers are rigid, stodgy, unemotional, structured, and lacking humor in their speech. They also tend to be arrogant and psychologically distant. Pennebaker explains the style like this:

Formality often appears stiff, sometimes humorless, with a touch of arrogance…High formal thinking and writing typically includes big words [words greater than six letters], high rates of articles [a, an, the, etc…] nouns, numbers, and prepositions. At the same time, formal writing has very few I words, verbs (especially present tense), discrepancy words (e.g. would, should, could) and common adverbs (really, very, so).5

Formal thinkers, generally speaking, are more intellectual, emotionally distant, concerned with status and power, and less introspective than their peers. There is also an air of performance in their manner of speech and writing. If wanting an example of formal work, think of academic essays or dense non-fiction. Interestingly, people become more formal over time and this is thought to be a growth pattern particular to those moving through the academic track. The more schooling one has, the more one tends to think and speak or write in a formal way.6

Analytic thinkers are people who understand the world by distinguishing one object or subject from another. They break things up and parse them down: what we do versus what we don't, what exists versus what does not, the truth versus falsehood with little room between. Dividing the world so as to comprehend it, this practice of distinction is directly reflected in their words: analytic thinkers use more exclusives (but, without, except) negations (no, nor, nothing), tentative words (maybe, perhaps) and quantifiers (some, many, more, less). They also show a higher degree of cognitive complexity, an intellectual habit reflected by their reliance on causal (because, reason, effect) and insight language (realize, think, mean). Other characteristics of analytic thinkers include success in academic settings (analytic

institutions), high degrees of honesty/conviction, and a general openness to new experiences or potential learning.7

Whereas analytic thinkers parse people down, assign them roles, and determine where they fit within a greater system; narrative thinkers are more focused on the character of people or things, the origins of people or things, and the experiential nature of life. Narrative thinkers interpret information in story form and relay their thoughts in a similar fashion. For example, when asked by Pennebaker to keep a stream of consciousness diary, the narrative thinkers in his class often told stories about the things they observed or thought.

"Okay, so my friend Chris came to visit town for the football game this weekend. She decided that she wanted to have a GOOOOD time so we went out on Friday night, and she got wasted off her ass…She was throwing up at parties and in bathrooms of EVERY place we went! We got kicked out of Waffle House…..KICKED OUT! I mean seriously, who gets kicked out of Waffle House[?]….It was crazy."8

As Pennebaker notes in his book, even though the writing assignment asked students to track their thoughts and feelings, nearly 20 percent of the students couldn't help but tell a story.9 They followed this pattern because that's how they think. They think in stories, and they interpret the world in narrative form. The types of function words narrative thinkers use are personal pronouns (their focus on people), past-tense verbs, and conjunctions (particularly words like with and together). They are also said to have better social skills, more friends, and rate themselves as more outgoing.10

NOTES AND REFERENCES

1. A full description of the measurement of thinking style is provided in the project methodology. Furthermore, we advise readers not to compare the number of words used across sentiments. Due to disparities in library size, a measure for thinking style is not the same as a measure for conviction, drive, or mood.

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4. Pennebaker, J. W. (2011). The secret life of pronouns: What our words say about us. New York: Bloomsbury Press.

5. Ibid.

6. Ibid

7. Pennebaker, J. W., Chung, C. K., Frazee, J., Lavergne, G. M., & Beaver, D. I. (2014). When Small Words Foretell Academic Success: The Case of College Admissions Essays. PLoS ONE, 9(12).

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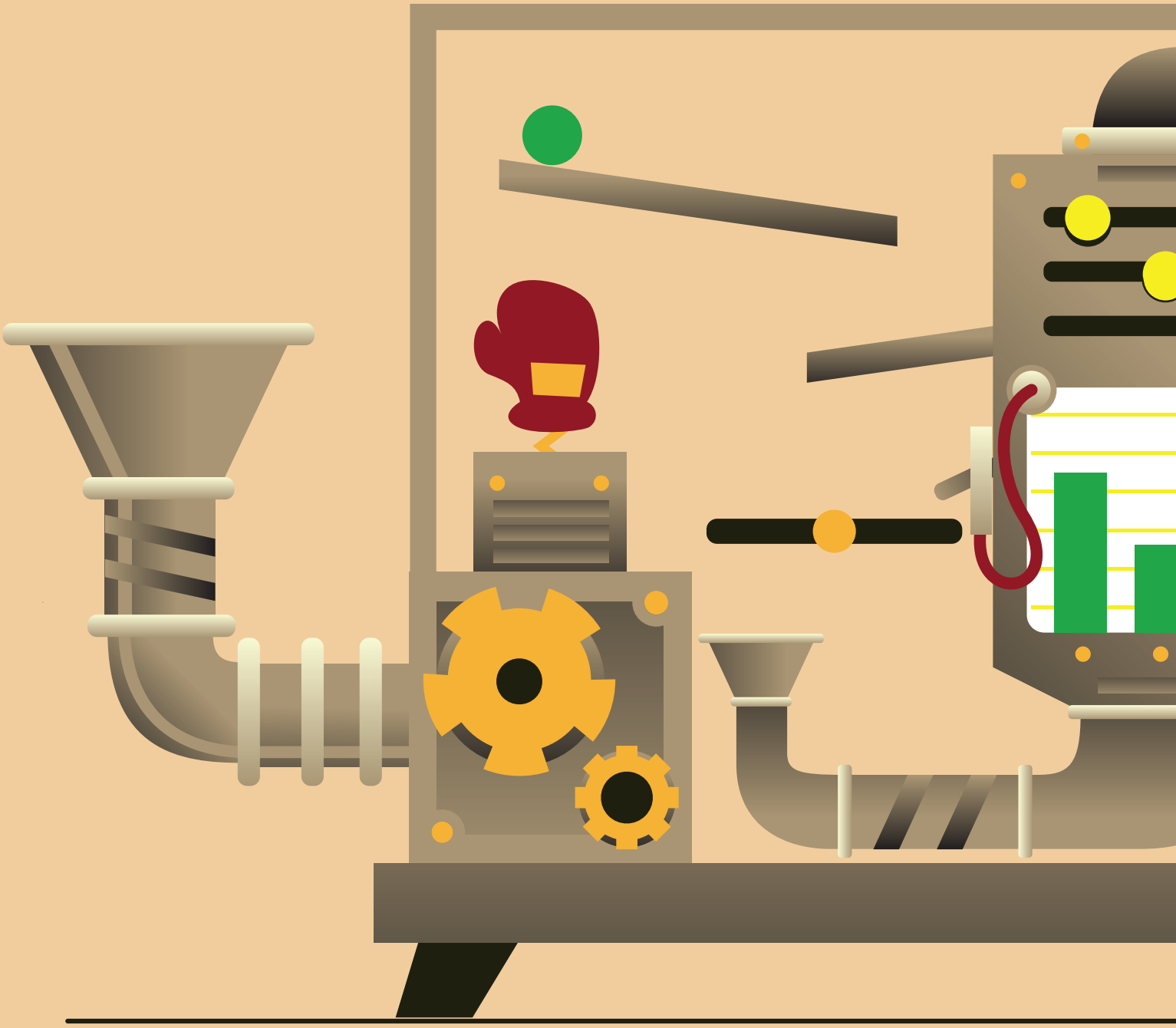
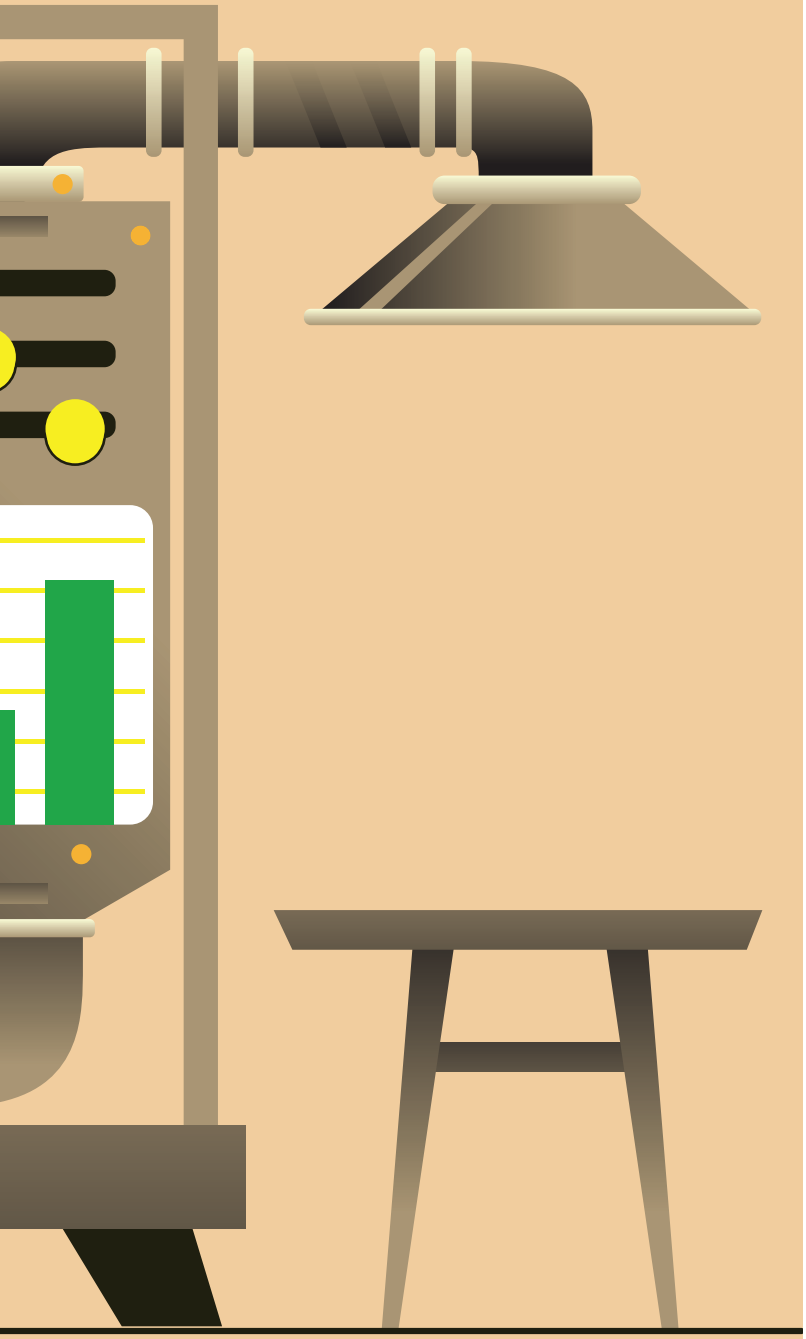
ACT 5 TWEET MACHINE





ACT 5 TWEET MACHINE

Issue framing is a powerful means of mobilizing supporters and shaping public opinion. In this act we identify the frames used by interest groups who sought to influence the debate about the Common Core on Twitter. We identify five central frames that supported the overall message of the standards as a threat to children. Through this analysis we argue that each frame and its activating metaphor appealed to the underlying value system of a different constituency. Connecting the frames together helps us understand the extraordinary transpartisan coalition that came together in opposition to the standards.

THE POWER OF ISSUE FRAMING

Issue framing is a powerful means of shaping public attitudes and perceptions about political issues. Political actors who seek to win an audience's backing strategically choose to emphasize particular aspects of an issue in order to give their side an advantage and mobilize their constituencies.1 For example, proponents of affirmative action frame the issue as compensation for the past effects of discrimination, while opponents frame affirmative action as reverse discrimination when we should be seeking equity for all.2 Similarly, supporters of welfare describe the issue as a "helping hand" for those in poverty, while opponents depict it as a "government handout" that encourages dependency.3 The hand swats both ways.

Cognitive linguists note that framing strategies are activated by the particular words advocates choose to convey their perspective. Eminent linguist Norman Fairclough views frames as choices within discourse that are indicated through a variety of markers including grammar, vocabulary, sentence connectors, and textual references. It is the careful choice of words that come with a frame's introduction that reinforce the message and trigger the emotional connections we make to a message.

Metaphors are one of the most powerful ways to activate frames. Metaphors are used to convey new ideas in familiar contexts. For example, if I tell you to use your moral compass, it mentally connects the complex and challenging concept of moral decision making to the straightforward notion of geographic direction. According to cognitive linguist George Lakoff, metaphors are the fundamental mechanism by which people understand the world. "Metaphors play a central role in the construction of social and political reality," Lakoff argues.4 He believes that our overriding views of public policy come through the metaphor of government as the parent and citizens as children.5 According to Lakoff, conservatives tend to view government through a "strict father" metaphor, which projects the value that the parent is the one who is the most developed and therefore knows how children should behave, what is best for them, and what they need to develop and mature. The strict father value does not mean that the government (father) intrudes into the lives of the governed (children), but that its role is that of moral guide and protector. By contrast, liberals view policy through the "nurturing parent" metaphor, which conveys a government that protects citizens (children), fosters life fulfillment, promotes fairness, and values open communication and trust.

Others argue that frames are powerful because they subconsciously appeal to deeply held social values and beliefs. Moral psychologist Jonathan Haidt's research has shown that human morality has five foundational values: care, fairness, loyalty, authority, and sanctity, and that these moral values are activated every time we see images or read descriptions of suffering (care), cheating (fairness), betrayal (loyalty), disrespect (authority), or degradation (sanctity).6 Moreover, Haidt's research indicates that peoples' political affiliations are associated with different moral matrices. That is, people who self-identify as liberals most heavily emphasize care, and also value liberty and fairness; but give relatively less emphasis to loyalty, authority and sanctity in their moral matrices. Conversely, social conservatives highly value the preservation of the institutions and traditions that sustain a moral community and therefore equally value loyalty, authority, and sanctity, along with care, liberty, and fairness. This is how people with diverse values can interpret the same event differently and how carefully crafted messages can be framed to arouse our underlying core values to garner a visceral response.

Through an examination of the frames, metaphors, and activating language of #commoncore tweets, in The Tweet Machine we examine the ways in which influential actors sought to influence the Twitter-based Common Core debate. We focus on a subset of tweets related to the standards' impact on children. By examining the metaphors, and the language that activates them, we identified five central frames that support the overall frame of the standards as a threat to children. These are:

1. The Government Frame: Government controlling children's lives through the CCSS.
2. The Business Frame: The use of the CCSS for corporate profit.
3. The War Frame: The CCSS as an enemy to be fought, and as a weapon in a culture war.
4. The Experiment Frame: The CCSS as an experiment on children.
5. The Propaganda Frame: The CCSS as a way to brainwash children.
6. While there were many examples in the tweets that supported the Common Core, they did not group together within coherent frames as did the tweets that opposed the standards. Therefore, our analyses focus on the frames of those who were opposing the Common Core.

As we show in The Tweet Machine analyses, each of these five frames enacts a metaphor and uses particular language to reinforce the overriding frame of the Common Core as a threat to children. The point of these frames is not only to raise alarms about the CCSS as a threat to children, but to position the target audience as the defenders against this existential threat. Further, we argue that each frame appealed to the value system of a different constituency that coalesced to bring together a unique transpartisan coalition around this issue, and contributed to the overall perception of the Common Core.

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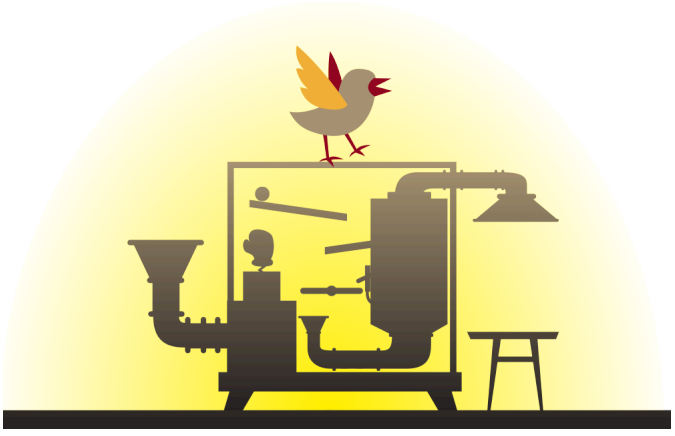
TWEET MACHINE

CHOOSE A TWEET AND DRAG AND DROP IT INTO THE TWEET MACHINE. THE MACHINE WILL IDENTIFY THE FRAME THAT THE TWEET ACTIVATES AND DESCRIBE WAYS IN WHICH THE LANGUAGE TRIGGERS A METAPHOR THAT APPEALS TO THE VALUES OF A PARTICULAR AUDIENCE TO MOTIVATE THEIR RATIONALE FOR OPPOSING THE COMMON CORE.

I'm pretty sure #CommonCore was designed purposely 2 make parents insane, in addition 2 making kids need therapy. http://t.co/91yGKe1Bep	(Experiment Frame)
Dirty mouths come from dirty minds. Don't American kids need a good #Brainwashing? http://t.co/VvHIZzKi8F via @Heritage #CommonCore	(Propaganda Frame)
@TsLetters2Gates @HuffPostEdu #CommonCore Stdized guidelns,stdized tests,stdized gov ctrl = stdized children, oops, I mean stdized consumers	(Business Frame)
Cookie Cutter #CommonCore Crony Curriculum. Corruptocrats crushing children. #BillWhittle @FoxNews @ Drudge https://t.co/5Zbj3bDBuN	(Government Frame)
US Ed Sec Arne Duncan's war on women and children http://t.co/ dYucuSNM9s via @michellemalkin #FedEd #commoncore	(War Frame)



RESULTS FROM THE TWEET MACHINE

BUSINESS FRAME

This tweet is an example of The Business Frame, where the CCSS are depicted as a means for corporate interests to make money from the education market at the expense of childrens' education. This frame directs our attention to schools and children as a marketplace for extracting profits; as a source of private profit rather than public good. The actors in this frame, shown in bold/italic, are often representatives of business and the language of the tweets that activate the metaphor are commonly expressed in the language of business.

Pearson+Gates= #Education Monopoly=Not good for Kids or Teachers. http://t.co/QHRz8gUVe0. #stopcommoncore #CommonCore #edreform

@TsLetters2Gates @HuffPostEdu #CommonCore Stdized guidelns,stdized tests,stdized gov ctrl = stdized children, oops, I mean stdized consumers

.@GovernorCorbett Please do not sell our kids down the #CommonCore river. @crafty1woman @dcepa http://t.co/ma5xDlZR0o

How Publishers Take Advantage of the #CommonCore Educational Standards, ie, how to make $ on the backs of our kids. http://t.co/yexT454iaa

@USChamber You have to be stupid to Believe the Crap in this Tweet #CommonCore Will Destroy our kids and turn them in to robots slaves!

The particular language chosen by the tweeters (shown in reverse highlight) enacts powerful images that provoke readers' aversion to harmful business practices, including phrases like "monopoly," "standardized consumers," and "make $ off the backs of our kids." In the last tweet we see an explicit call-out of the US Chamber of Commerce, an early and ardent supporter of the Common Core and representative of business interests writ large. In this tweet one is left to wonder just what is meant by the unidentified tweet that the Common Core will turn children into "robots slaves."

Importantly, while the tweets stimulate an anti-business frame, they could just as easily have been crafted to produce a pro-business frame, by evoking themes of private enterprise, innovation, and national and international competition. This is a good example of how frames can focus people in one direction rather than another. So who are these tweets intended for? It is unlikely that this framing of business would appeal to libertarians, fiscal conservatives, or other free market advocates who tend to see business as a positive means of unleashing dynamism into the system. Rather, these messages are more likely to appeal to the values of more liberal opponents of the Common Core who are suspicious of the misalignments between business interests and educational goals.

RESULTS FROM THE TWEET MACHINE

GOVERNMENT FRAME

This tweet is an example of The Government Frame. In this frame the government—or a stand in for the government—takes on the role of the central perpetrator of acts 'on' children. In the tweets we can see that sometimes the government (shown in bold/italic) is represented as the institution (Feds), while other times a tweeter uses a metonymy to represent the government, such as Jeb Bush, Obama, or Pres O. The government frame is activated by language that shows inappropriate government actions. These tweets tend to frame the government as a parent.

The use of alliteration and the invented word "corruptocrats" draws the reader's attention to the idea that the Common Core is "cookie cutter," an accusation of the tendency of government programs to apply the same strategy to all without regard to individual needs. Further, the use of "crony" mixes in business interests in the metaphor of the oppressive government "crushing" children. In the context of the government-as-family metaphor, this subtly reinforces the ideological opposition to the government-as-parent, implying the country is too big, has too many children with different needs to parent them all effectively.

#CommonCore fails children. Keep Feds out of our schools. #stopcommoncore http://t.co/sBrYrnFrVC
Cookie Cutter #CommonCore Crony Curriculum. Corruptocrats crushing children. #BillWhittle @FoxNews @Drudge https://t.co/5Zbj3bDBuN
Hey @JebBush ! This is what u are shoving down OUR CHILDRENS throats! You should be ashamed of yourself. #CommonCore http://t.co/bNSwSeyfO1
Read w fear and trembling Pres O's Ed Proclamation. NOTE terms 'Cradle to Career'- all of child's life! http://t.co/fOhzDG0VWd #CommonCore
Stop trying to teach OUR children your urban, socialist values, #obama. #CommonCore #falseflag #publicmiseducation right @JimDeMint?
#CommonCore: Marxists Seem to Have Infiltrated our Educational System and are now Proceeding to Brainwash/Indoctrinate our Children. #tcot

In the third tweet we see a twist on the parent metaphor, as the author effectively scolds Jeb Bush as one would a child for committing the physical harm done to children by "shoving [the Common Core] down OUR CHILDRENS throats." The verbs in the tweets, such as "shoving" and "crushing," are carefully chosen to represent the actions taken by the government. They serve to activate the metaphor in the tweets and also, at a deeper level, stimulate a response in opposition to government intrusion into local education control. The "fear and trembling" reaction to the idea of an oppressive, all-encompassing government is spelled out in the fourth tweet in referring to Obama's education proclamation using the phrase "cradle to career." It is a phrasing progressives who see government as a nurturing parent might view positively, but for conservatives, the same phrase takes on a menacing tone in this tweet, implying control, not support.

RESULTS FROM THE TWEET MACHINE

PROPAGANDA FRAME

This tweet is an example of The Propaganda Frame, where the CCSS are depicted as a way to brainwash children. These tweets often obscure the propagandist, or make the actor (shown in bold/italic) the Common Core itself or even Obama, as a stand-in for government. The propaganda frame is activated with the multiple mentions of the Common Core being aligned with Un-American ideologies (shown in reverse highlight), raising the specter of the Cold War. The word "brainwashing" appears several times, and arguably harkens to the government, standing in for parent, who is teaching values to children. The tweets, with the use of hashtags #AGENDA21, #NWO, and #falseflag are replete with subtle references to conspiracy theories.

#CommonCore: Sounds like Totalitarianism/Marxism is being taught to our Children: http://t.co/1dEdfSfejA Dem Strategy: Brainwash Kids early?
@FoxNews where's your epic exposure of Marxist Control-takeover of Our Children through #CommonCore. Marxist program squashes free thought!
5* #COMMONCORE & #AGENDA21 ENTWINED! EDUCATION UNDER #NWO FOR KIDS! TO PROGRAM THEM YOUNG! SSTOP! #CommonCore programming! @ TavernKeepers
Dirty mouths come from dirty minds. Don't American kids need a good #Brainwashing? http://t.co/VvHIZzKi8F via @Heritage #CommonCore
Stop trying to teach OUR children your urban, socialist values, #obama. #CommonCore #falseflag #publicmiseducation right @JimDeMint?
#CommonCore: Marxists Seem to Have Infiltrated our Educational System and are now Proceeding to Brainwash/Indoctrinate our Children. #tcot

The propaganda frame is used to rouse those who hold a particular view about what are America's distinctive social and cultural values. These tweets speak to social conservatives who view America's social system holding a preferred cultural set of values that convey a sense of moral hierarchy in the world, where western values are superior to other social systems, and education needs to be protected from the infiltration of foreign value systems.

RESULTS FROM THE TWEET MACHINE

EXPERIMENT FRAME

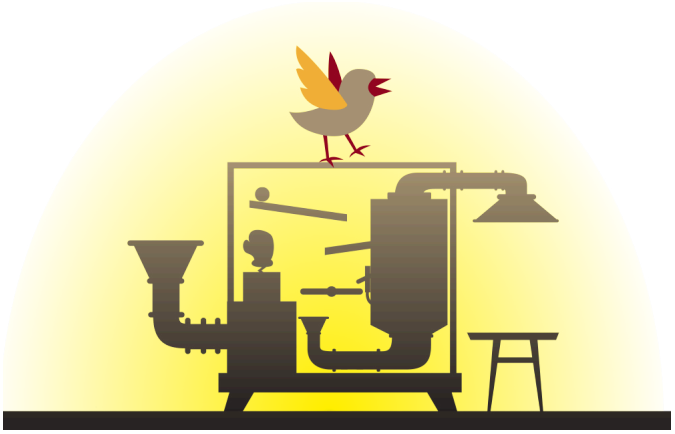
This tweet is an example of The Experiment Frame, where the CCSS are depicted as an experiment on children. These tweets typically personify the standards (shown in bold/italic) as the enactor of the experiment. The experiment frame portrays education leaders or government as an illegitimate scientific authority by comparing children to experimental subjects, with physical and psychological effects attributed to the Common Core. The frame is activated by using language (shown in reverse highlight) associated with laboratory experiments and serves to undermine the legitimacy of rational and empirical policy.

I'm pretty sure #CommonCore was designed purposely 2 make parents insane, in addition 2 making kids need therapy. http://t.co/91yGKe1Bep

@donttreadonfarm @michellemalkin The Parents' Manifesto on #CommonCore "our children will not be guinea pigs 4this education experiment"

#CommonCore makes kids pee, poop, puke with anxiety, say principals: http://t.co/qIeH46eNSW #edreform #childabuse #PostTraumaticStress

Use of the Experiment Frame reifies the overall conception of the Common Core as a threat to children, and frames the issue as an appeal to those who highly value care as a social value. In Haidt's moral matrix, care is the highest value of political liberals.



RESULTS FROM THE TWEET MACHINE

WAR FRAME

This tweet is an example of The War Frame, which positions the Common Core as an enemy to be defeated, or as a weapon in a culture war. War metaphors are very common in political discourse (war on poverty, war on terror, etc.), so it is no surprise that the Twitter debate about the Common Core uses this metaphor. The war metaphor is useful for opponents of a reform because it raises the specter of unwanted intrusion, positioning opponents as defenders and victims of aggression, while casting the aggressors as less civilized and morally in the wrong. In this series of tweets, the actor or initiator of the frame (shown in bold/italic) most frequently mentioned is the Common Core itself. One tweet identifies former education secretary Arne Duncan as the stand-in for the government, thereby framing the government as the aggressor. Carefully chosen words in the tweets activate the war metaphor, positioning the Common Core or its supporters as an enemy to be fought. The use of words such as "violates and invades," "destroying," and "warriors fighting ... in the battle," vividly raise war images in the reader's mind. The third tweet is notable because it flips the script of the war metaphor and has @ twitchyteam (a conservative news outlet) and @michellemalkin (a pundit known for her virulent opposition to the standards) as the "warriors" in the "battle against #commoncore."

The last tweet applies the oft-used construction "war on..." and harkens back to Johnson's War on Poverty and Nixon's War on Drugs, but is repurposed to refer not to a war on a scourge, but on women and children, led by Secretary of Education Arne Duncan. Of course, in none of these cases is an actual war happening, but the metaphor is strong: we see the debate as two sides opposed to one another, leaving no room for compromise.

oped: #CommonCore violates & invades our private lives thru data mining... children are not common. They are unique. http://t.co/4QUKoqbscI

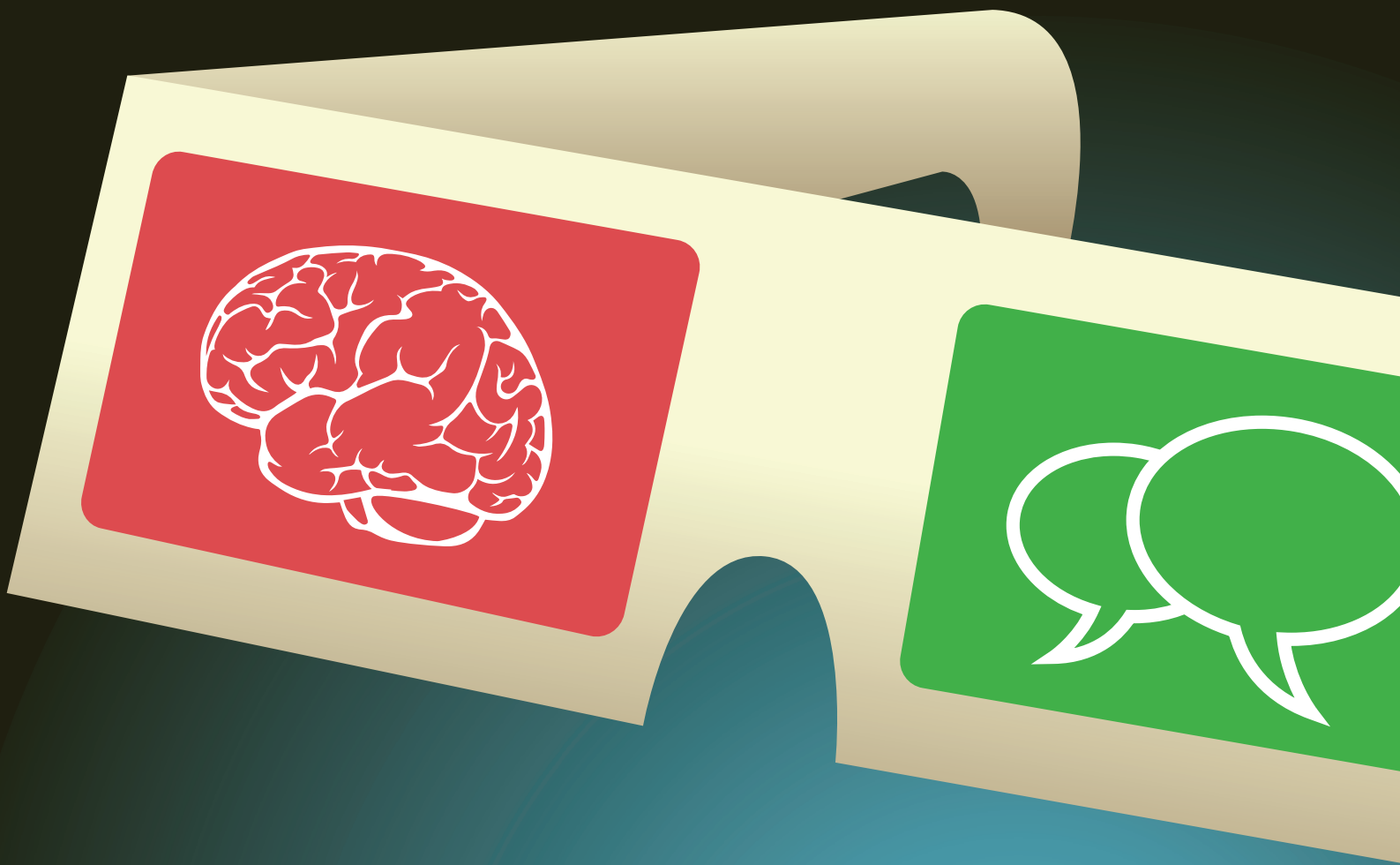
Parents need to know! #CommonCore destroying education & our children's love of learning. Get the truth from teachers http://t.co/6btB9bqmA9

A huge THANK YOU to @TwitchyTeam @michellemalkin and so many warriors fighting for our children in the battle against #CommonCore Press on!

MT US Ed Sec Arne Duncan's war on women and children http://t.co/dYucuSNM9s via @michellemalkin #FedEd #commoncore

The images awakened in the war frame call to mind the struggles over who should dictate what is taught in America's schools. While standards might seem like a non-controversial set of statements of what children should know or be able to do at particular educational junctures, they cannot be separated from questions about what content should be used to teach the standards and who should make these decisions. The centralization of 50 sets of state standards into one 'common' set of standards effectively merged local battles for hegemony over curricular influence into one national battle. From this perspective, it is not hard to see the standards as a battleground for influence over the nation's cultural values. Framing the Common Core debate as a battle for influence over social values appeals to social and religious conservatives who seek to protect traditional cultural values.

EPILOGUE
THE BIG TAKEAWAYS



EPILOGUE

This website presents an in-depth examination of the different ways in which social media-enabled political interest groups are influencing the discourse that shapes the political and policy-making environments. By combining social and psychological perspectives we reveal important insights into the structures, mindsets, and strategies that help shape the prevailing system of beliefs and actions. In the epilogue, we synthesize the big takeways from the project and each of the authors uses their distinct perspective to interpret the trends in the data and convey the important lessons for social media participants, educators, and policymakers.

#COMMONCORE PROJECT SUMMARY

In the #commoncore Project, authors Jonathan Supovitz, Alan Daly, Miguel del Fresno and Christian Kolouch examined the intense debate surrounding the Common Core State Standards education reform as it played out on Twitter over the 32 months from September 2013 through April 2016. Our analyses are based on almost 1 million tweets sent by about 190,000 distinct actors.

By investigating the Common Core debate through the lenses of both a social perspective and a psychological analysis, we reveal the story beneath the story.

In Act 1, The Giant Network, we examined the Common Core social network on Twitter and learn that it is both growing and shaking out over time. We found that there was an increase in the volume of activity each year from 2014 to 2016. Using social network analytical techniques, which connect people based on their behavioral choices, we identified five major sub-communities, or factions, in the Twitter debate surrounding the Common Core. Three of the groups were present when we started following the conversation in 2013: (1) supporters of the Common Core, (2) opponents of the standards from inside education, and (3) opponents from outside of

education. The fourth distinctive sub-community turned out to be a group of Costa Ricans who were tweeting about the Costa Rican Department of Social Securityor Caja Costarricense de Seguro Social (i.e. #ccss) which is in charge of the Costa Rican public health system. Their use of #ccss captured them in our social dragnet. We also detected a small group of the opponents of the Common Core that were sometimes integrated with the larger group of opponents from outside of education and sometimes were a distinguishable sub-community. It later became apparent that this was the Patriot Journalist Network (PJNET) which was an increasingly dominant force in the Common Core Twitter conversation.

In Act 2, Central Actors, we dug deeper into the social networks of the elite actors in the #commoncore debate. As we began to disentangle the giant network, we noted that most of these participants were casual contributors – almost 95% of them made fewer than 10 tweets in any given six-month period. We focused our attention on the actors with the highest influence in the social networks. We distinguished between two types of influence on Twitter: Transmitters who tweeted a lot, regardless of the extent of their followership; and Transceivers, those who gained their influence by being frequently retweeted and mentioned. As we examined the transmitters and transceivers over time, we found the same factional sub-groups as in Act 1, and that the faction from outside of education was increasingly dominant in both the transmitter and transceiver networks. Our initial analyses, for the six-month period from September 2013 thru February 2014, revealed three factions who equally participated in the debate: common core supporters, opponents from within education, opponents from outside of education. By the last six months of our examination, November 2015 thru April 2016, the opponents from outside of education accounted for more than 75% of the participants in the elite transmitter and transceiver networks, while common core supporters had dwindled to less than 10% and Common Core opponents from within education made up the remaining 15%.

When we looked at the tenor of the conversation in Act 3, Key Events, we identified what issues were driving the major spikes in the conversation. Some of the activity was based on very real events, like the day in November 2013 when Secretary of Education Duncan spoke about white suburban moms' opposition to the Common Core, or the debate over the authorization of the Every Student Succeeds Act in November 2015. But we also saw evidence of manufactured controversies spurred by sensationalizing minor issues and outright fake news stories. We also identified the growing presence of PJNET, which used a customized Tweeting robot that allowed them to send messages from the Twitter accounts of assenting users, creating the impression that disconnected users were spontaneously tweeting about the same topic. PJNET also made savvy use of both hashtag rallies and a circuitous usage of the retweet function to mobilize followers and get topics trending. In Act 4, Lexical Tendencies, we examined the linguistic tendencies of the three major factions that were identified by our social network analysis. By customizing word libraries based upon the work of psychologists James Pennebaker of University of Texas at Austin and David G. Winter of the University of Michigan, we examined four psychological characteristics of the different Common Core factions: mood, drive, conviction, and thinking style. These characteristics reflect important elements of the mindset of each of the factions. By comparing the particular word choices of the three factions, we found that Common Core supporters used the highest number of conviction words, tended to use more achievement-oriented language, and used more words associated with a formal and analytic thinking style. By contrast, opponents of the Common Core from within education tended to use more words associated with sadness, and used more narrative thinking style language. Opponents of the Common Core from outside of education made the highest use of words associated with peer affiliation, used the largest number of angry words, and exhibited the lowest level of conviction in their word choices. While these conclusions are specific to the case of the Common Core, they also represent insights into the more general mindsets of each groups' membership.

In contrast to the psychological perspective underlying the choice of specific words, frames are conscious effort by individuals or groups to portray an issue in a way that appeals to the underlying values of their target audience. Through the tweet machine introduced in Act 5, The Tweet Machine, we examined five frames that opponents of the Common Core used to appeal to values of particular subgroups. The government frame, which portrayed the government as controlling children's lives through the CCSS, is an argument that appeals to libertarians and conservatives who oppose government encroachment into citizens' lives. The business frame, which portrayed the use of the CCSS for corporate profit, is an argument that appeals to more liberal opponents of the Common Core who are suspicious of the misalignment between business interests and educational goals. The war frame to depict the CCSS as an enemy to be fought, and as a weapon in a culture war. Framing the Common Core debate as a battle for influence over social values appeals to social and religious conservatives who seek to protect traditional cultural values. By framing the CCSS as an experiment on children, opponents appeal

to the social value of care, which is of particularly high interest to liberals. Finally, the CCSS were also framed as propaganda, or a way to brainwash children. Framing the issue in this way speaks to social conservatives who believe that America's social system holds a preferred cultural set of values that convey a sense of moral superiority in the world, and education needs to be protected from the infiltration of foreign value systems. By combining these constituencies, we can see how the Common Core developed a strong transpartisan coalition of opposition.

CITATION

Supovitz, J., Daly, A.J., del Fresno, M., & Kolouch, C. (2017). #commoncore Project. Retrieved from http://www.hashtagcommoncore.com

THE BIG TAKEAWAYS

The Common Core was the first major education policy reform to come to life in the social media age. The previous large education reform, No Child Left Behind, was signed into law in 2002, before the first Like on Facebook (2004), before the first video upload on YouTube (2005), and before the first tweet on Twitter (2006). Thus, the Common Core faced a distinctly different political environment.

Our cutting-edge research examined almost one million tweets about the Common Core from about 190,000 distinct actors across the 32 months between September 2013 and April 2016. Our findings show how political debate in the age of social media is being transformed in substance, sophistication, and strategy. By examining contemporary political debate through a combination of social and psychological perspectives, we reveal insights into the way the world works that are often hidden in plain sight.
Amongst the important takeaways that our work illuminates are:

THE COMMON CORE DEBATE ON TWITTER REVEALS HOW SOCIAL MEDIA IS TRANSFORMING POLITICAL DISCOURSE IN AMERICA.

The rise of social media has changed the political landscape in several profound ways. Most directly, stories that become 'news' are increasingly introduced into the public's consciousness via alternative sources on social media. Using this avenue, individuals and organizations can disseminate information unvetted by formal sources. This loosening of the hold of the 'professional' media has led to broader reporting of activity and events, but also has the effect of increasing unsubstantiated, exaggerated, and even outright fake news stories. In our investigations of the Common Core on Twitter, we saw multiple examples of these phenomena at work and identified a number of alternative online 'news' organizations that used the legitimacy of news to overtly push a particular ideological slant. For better and worse, the spigot has opened wider, but what comes out is often wholly unfiltered.

•A SOCIAL NETWORK PERSPECTIVE SHOWS A VIBRANT WORLD OF EXPANDED SOCIAL INTERACTIONS THAT ARE HIDING IN PLAIN SIGHT.

Social networks permeate the world and connect people with invisible bonds that form complex and subtle inter-relationships. Becoming more aware of the relational connections of these social networks opens up a rich set of interrelationships that include entire networks, naturally occurring sub-groups, and highly influential individuals who are prominent due to their social resources and strategic connections. In our investigations of the Common Core discussion on Twitter, we found that the pattern of social ties connecting these layers in the Common Core network were both active and sustained. The networks have both a specific content and structure, and it is in the interplay between these two that we gained many of the insights about how advocates in the space were operating and using the network principles to amplify and move their messages in order to draw maximum attention to their viewpoints. These invisible online and offline networks surround and influence us every day in ways we are seldom fully unaware. Absent a way to make these networks, their actors, and the activity visible, we would not fully grasp the breadth, depth, and growing influence of social networks on public opinion and social policy.

THE COMBINATION OF SOCIAL AND TECHNOLOGICAL ADVOCACY STRATEGIES HAVE RATCHETED UP THE POWER OF EXTERNAL POLITICAL PRESSURE GROUPS.

Motivated Twitter users have begun to employ savvy strategies to further the influence and reach of their messages. Our investigations unearthed creative uses of BotNets (automated tweeting robots that exploit networked systems), the Twitter retweet function, and

hashtag rallies (bringing people together online to flood the system with advocacy messages). These strategies show that invested parties are making a concerted effort to disseminate information in intentional ways with specific goals. These strategic technological methods are rocket-fueled by the power of network techniques, which take advantage of how social networks operate. Actors who capitalize on network concepts leverage sets of relationships, hubs of influence, and flows of opinion to move messages effectively through a system. The actors in this space who can fluently speak the language of networks are more able to position their ideas and spread their messages.

THE CONSUMERS OF POLITICAL CONTENT ARE BECOMING INCREASINGLY SEGMENTED, REDUCING VITAL OPPORTUNITIES FOR ENGAGEMENT WITH IDEAS

The internet and social media provide people with a plethora of customized news and information sources. One consequence of this disparate range is that they provide people with all too comfortable spaces where they can consume only the information that reinforces their prior beliefs and protects them from alternative perspectives. While it is not surprising that people want the validation of information that confirms their prevailing views, the splintering of the professional and social media has accelerated the fragmentation of society into separate sub-groups, which live in increasingly disparate worlds. This fragmentation continually reinforces members' belief, in a form of voluntary social segregation. In our research, we saw this phenomenon at work in the sub-communities that formed during the Common Core debate on Twitter. The behavioral choices of Twitter participants, in terms of who to follow and what to retweet and mention, revealed that people tended to interact far more with those who held similar views rather than with those from different factions.

One implication of the balkanization of peoples' personal, political, and cultural experiences is that they are provided with fewer opportunities to be exposed to common stimuli – the experiences that unite us – and the ideas and views of others – the perspectives that makes us more understanding of different vantage points. Individuals who only interact with those with whom they share similar views become more polarized in their opinions, regardless of whether they are liberal or conservative, in contrast to those who have opportunities to hear multiple and alternative perspectives. And it is these continuous opportunities for discussion that form the bedrock of American democracy.

FAKE NEWS IS NOT NEWS, BUT RATHER A LONGSTANDING PROBLEM, AND THE EDUCATION SECTOR IS NOT IMMUNE.

The issue of fake news has received much attention since the presidential election of 2016. Our investigation, which spanned the 32 months from September 2013 to April 2016, showed that this is not a new issue. In one section of our website, we tracked the heartbeat of the Common Core on Twitter by examining which days produced surges in chatter related to the Common Core. When examining the peak days, we found several spikes in activity driven by the spread of fabricated news stories coming from pseudo-news outlets on the internet, such as Investors Business Daily and WorldNetDaily, which is on the Southern Policy Law Center's HateWatch list. Overt fake news stories and their peddlers have a destabilizing impact on our ability to make informed decisions, and by shining a light these types of organizations, we seek to heighten awareness that seemingly reliable information may originate from corners unknown.

ISSUE FRAMING IS A POWERFUL WAY FOR ADVOCATES TO APPEAL TO THE VALUE SYSTEMS OF CONSTITUENCY GROUPS TO EVOKE THEIR SUPPORT.

Political groups who seek to win an audience's backing strategically choose to emphasize particular aspects of an issue in order to give their side an advantage and mobilize their constituencies. In our analyses, we observed a number of ways in which Common Core opponents framed the standards as a threat to children and used a range of metaphors to appeal to the value systems of a diverse set of constituencies. In our research, we identified five different frames: the Government Frame, which presented the Common Core as an oppressive government intrusion into the lives of citizens, which appealed to limited-government conservatives; the Propaganda Frame, which depicted the standards as a means of brainwashing children, and in doing so hearkened back to the cold war era when social conservatives positioned themselves as defenders of the national ethic; the War Frame, which portrayed the standards as a front in the nation's culture wars, and in doing so appealed to social and religious conservatives to protect traditional cultural values; the Business Frame, which rendered the standards as an opportunity for corporations to profit from public

education, a frame that appealed to liberal opponents of business interests exploiting a social good; and the Experiment Frame, which used the metaphor of the standards as an experiment on children, and in doing so appealed to the principle of care that is highly valued amongst social liberals. Collectively, these frames and the metaphors, and language that triggered them, appealed to the value systems of both conservatives and liberals, and contributed to the broad coalition, from both within and outside of education, which was aligned in opposition to the standards.

DIFFERENCES IN THE WAYS WE PROCESS INFORMATION MAY LEAD TO MISUNDERSTANDING RATHER THAN GENUINE DISAGREEMENT.

The words we use reveal much about the ways we think and act, including our motivations, emotions, and thinking styles. By using sophisticated large-scale text mining techniques to analyze the Common Core-related tweets, we were able to measure the sentiments of the individuals that made up the different factions of the Common Core conversation on Twitter. When we looked across the factions, we found that each had distinct cognitive and emotional profiles. Furthermore, by examining these profiles across groups, we found that some of the frictions in the Common Core debate were not necessarily about disagreements over substance, but rather were due to misalignments in communication and understanding. Due to the varied ways in which people process information, participants in the conversation often struggled to communicate with those from different factions, not because of differences in their core beliefs, but because their modes of delivery were misaligned with the methods of reception of some audiences.

INFLUENCE COMES AS MUCH FROM WHO YOU KNOW AS FROM WHAT YOU KNOW. AND INCREASINGLY, WHO YOU KNOW DETERMINES WHAT YOU KNOW.

The simple number of followers for social media profiles is the standard metric to assess an individual's influence. The greater the number of followers, the more influence one is thought to wield. The follower metric now has both monetary and prestige value as resources flow disproportionately to those individuals based solely on the count of followers. Although many of these 'opinion leaders' "earn" their followers, there are a sizable number that engage in a host of behaviors to "game" the system. The internet is replete with ways to increase the number of followers, including the outright "purchase" of individuals or through other techniques such as creating social debt. The rounding up of followers and advertising on social media is a major industry estimated at $24 billion a year flowing into the pockets of highly followed individuals. However, our work suggests that while number of followers is just one metric of influence, and that there are a host of actors we who we identify in our work (including transmitters, transceivers, and transcenders), which do not necessarily have Kardashian-level followers, but never-the-less wield tremendous influence due to their set of relationships and interactions in social space that remain invisible unless illuminated by analysis.

Our work suggests that social influence spreads through connections, and these sets of ties are a powerful shaper of opinion. The idea that one's opinion is shaped and honed through the ecosystem of relationships that surrounds us provides an additional perspective beyond the common notion that our opinions, and perhaps how we come to know the world, are properties solely of the individual. Our work offers a supplementary explanation as to how opinion is shaped and understanding is gained, expanding on the idea that it is less about what you know, but more about who you know and how those relationships influence, or even determine, what you know. The interplay between the individual and the network is a powerful and influential one, and examining just one or the other may limit our understanding.

TWITTER IS A UNIQUELY POWERFUL TOOL FOR DISSEMINATING INFORMATION, BUT ITS STRUCTURE LENDS TO MANIPULATION.

Twitter is essentially a two-dimensional dissemination engine uniquely capable of instantaneously spreading information across the world as well as creating the structure for members to interact. Whether originating in Connecticut or Costa Rica, a tweet can be written, sent, read, and retweeted thousands of times in mere moments, essentially without barrier. With enough followers or social connections, or through the act of sending a resounding enough tweet, there are virtually no limits to how far, fast, and ferociously a message can travel.

However, for all its power, Twitter comes with a definite hitch. Due to its structure, individuals or groups can easily manipulate the environment, particularly when intent on furthering a specific message. Unlike a Facebook account, one or many Twitter profiles can easily be manufactured. Individuals frequently use pseudonymous

accounts, and Bot programs to spread their message and amplify their voice. In this project, we found that there are groups who have discovered ways to co-opt genuine accounts to produce mechanized hubs that disseminate messages at regulated or random intervals. More than that, these groups are doing so in ways that keep their strategies hidden from view, making their participation seem random and coordination non-existent. The structure of Twitter is a powerful conveyor of information, but has weak safeguards against misappropriation and the spread of misinformation. NetCitizens beware.

PARADOXICALLY, EVEN AS WE HAVE MORE INFORMATION AVAILABLE TO US, WE ARE LESS INFORMED.

We are awash in data, information, ideas, and opinions in a way that is unlike any other time in history. Estimates are that the amount of data created in the last few years alone is more than during the entire course of recorded human history. Given the sheer volume of information that we receive, one would surmise that we would be more informed and, as a consequence, able to make better decisions. However, the opposite appears to be true. In this project, we saw how the sheer volume of data and opinion that floods over us each day leads to a hardening of opinion and a narrowing of perspective, as a host of conflicting information and diametric arguments muddy the waters. The volume of data thrusts the ordinary citizen into the role of arbiter, forced to distinguish between fact, fiction, and falsehood without clear guidelines as to how to delineate these categories. This results in idiosyncratic rules for assessing the veracity of information and the notable rise of individuals and groups leveraging this new reality to move an agenda often beyond the scope of awareness. The findings from the #commoncore Project remind us of the growing reality that we spend more time in echo chambers, and the sounds that reverberate make us no more informed than when we entered. Ironically, the increase of information is not providing us with better insights, but rather fogs our lenses and distorts our focus.

REWRITING THE RULES OF ENGAGEMENT

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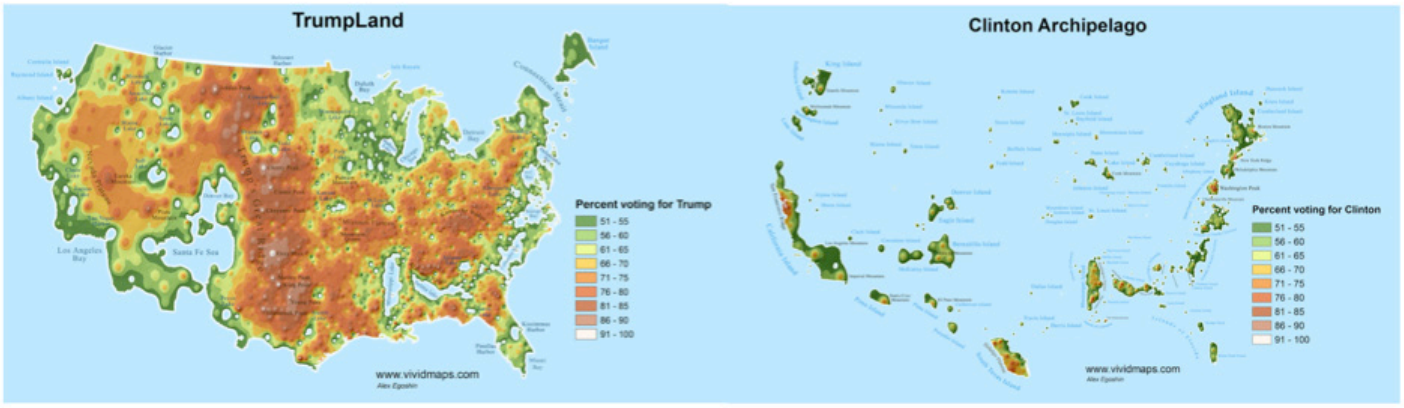
The smoke has cleared. The Common Core advocates badly lost the political battle on Twitter, but won the policy war. And the rules of engagement will never be the same again.

When we started following the Common Core debate on Twitter in 2013, there were a multitude of varied opinions represented. By the middle of 2016, the diversity of perspectives had largely boiled down to different shades of opposition. Based upon our analyses, opponents of the Common Core increasingly dominated the Twitter activity over time. Led by the concerted efforts of "Coach" Prasek and the Patriot Journalist Network (PJNET) "team", who viewed the standards as a threat to social conservative values, opponents of the Common Core from outside of education came to represent about 75% of the most influential participants in the #commoncore network. While it is impossible to estimate the exact influence of the cacophony on Twitter to the sentiment of the nation at large, correlation of the trends on Twitter with declining popular views about the Common Core in national polls are too strongly related to ignore.

However, there is a difference between politics and policy, and it is in this distinction that the Common Core won the policy war. While public sentiment and political pressure caused many states to rethink their support of the standards, there was no concerted effort to develop a plausible alternative. To alleviate the political pressure, many of the states that initially adopted the Common Core just replaced them with their own state standards by essentially rescinding, renaming, repackaging, and reinstituting them. As case studies of Indiana and Oklahoma showed, replacements contained largely superficial changes to details of the sequence of topics and emphases within the Common Core.1 Other states like New Jersey, California, and Florida simply rebranded the Common Core with their own state monikers to sidestep the controversy.2 The bottom line was that few, if any, states had the capacity to fundamentally re-engineer defensibly different ways of organizing the sequence of topics that children should receive to develop their mathematical and literacy skills.
While the policy decisions are worth plenty of attention and analysis in their own right, the controversy over Common Core was never really about standards themselves. As we demonstrated in our 2015 analysis of the Common Core debate on Twitter, the dispute about the standards was largely a proxy war over other politically-charged issues, including opposition to a federal role in education, which many believe should be the domain of state and local education policy; a fear that the Common Core could become a gateway for access to data on children that might be used for exploitive purposes rather than to inform educational improvement; a source for the proliferation of testing which has come to oppressively dominate education; a way for business interests to exploit public education for private gain; or a belief that an emphasis on standards reform distracts from the deeper underlying causes of low educational performance, which include poverty and social inequity. Thus, while polls continue to show that the standards are drawing less public support and views are increasingly divided along partisan lines, the substance of the Common Core are well entrenched in American education.

What the Common Core opposition has accomplished is to push back against the forces that have sought to centralize and cohere America's education system. Progressive reformers' arguments, based upon evidence from international comparisons, are that common standards and national assessments that overarch state and local systems would produce a more effective and equitable education system. The very design of the Common Core movement, framed as a state-led effort to adopt common standards and common assessments, was an effort to thread the needle of a centrally orchestrated system in a nation fundamentally committed to educational decentralization. If anything, this experience shows that the deep-seated belief in state-led education systems, which draw their strength from America's profound historical distrust of centralized power, are entrenched in our national ethos. The principle of local autonomy drowned out any discussion about the quality of the standards themselves.
Beyond the specific issue of the Common Core, the experience of watching the dispute about the standards play out in a variety of public forums and state capitals, and particularly through the prism of Twitter, reveals several insights into the changing dynamics of how political debates occur in this country. Here I focus on three ways in which the rules of engagement have fundamentally changed.



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1. THE WAY IN WHICH INFORMATION IS PRODUCED AND PUBLICIZED IN OUR SOCIETY IS UNDERGOING A DRAMATIC TRANSFORMATION

The Common Core was the first major education policy reform to come to life in the social media age. The previous major education reform, No Child Left Behind, was signed into law in 2002, before the first Like on Facebook (2004), before the first video upload on YouTube (2005), and before the first tweet on Twitter (2006).

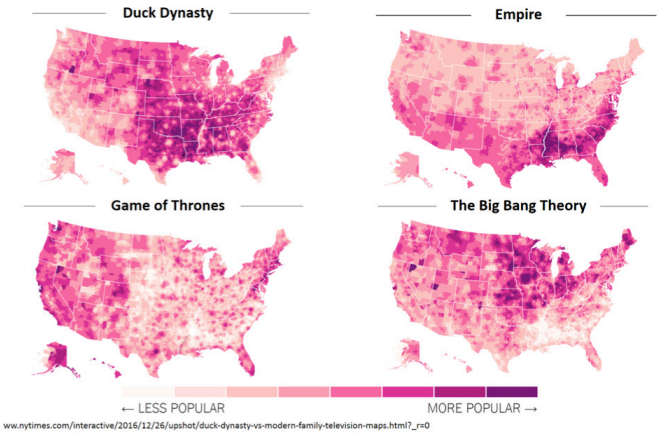
Comparing the media environment of the NCLB decade and the Common Core era is illustrative. During the implementation of NCLB, the professional media was increasingly splintered. Cable TV gave rise to news channels with both conservative (i.e. Fox News) and liberal (i.e. MSNBC) slants that courted different audiences. Reporting of events increasingly blended with the opinions of pundits and surrogates. In this raucous environment, it became more and more difficult to discern which were the mainstream media outlets; and where once unquestioned and authoritative news sources like the New York Times, Washington Post, and CNN stood along an increasingly disparate continuum of news sources. Yet, even as this splintering of the media speaking to different ideological factions occurred, there remained a professional media which were the 'official' sources of information disseminated to Americans.

The rise of social media has changed the landscape in at least two profound ways. First, stories that become 'news' are increasingly introduced into the public's consciousness through unfettered and unverified alternative sources via the internet and social media. Organizations and individuals can directly and widely disseminate information unvetted by formal sources. This loosening of the hold of the 'professional' media on information has led to broader reporting of activity and events, but also has the effect of increasing unsubstantiated, exaggerated, and even outright fake news stories. In our investigations of the Common Core on Twitter, for example, we identified a number of shady online 'news' organizations like the Investors Business Daily and WorldNetDaily, which used the legitimacy of appearing as news sites to overtly push a particular ideological slant. For better and worse, the spigot has opened wider, and what comes out is wholly unfiltered. Second, newsmakers no longer need to rely solely on the professional media to communicate broadly to people. Twitter, Facebook, and other social media platforms are ways for public figures to speak directly to citizens without going through the media middleman. This diminishes the power of the professional media because they no longer have a monopoly on access to the public, but it also has the consequence reducing their ability to hold public figures accountable for the messages that they transmit.

2. FUELED BY TECHNOLOGY, THE STRATEGIES OF ADVOCACY GROUPS ARE BECOMING INCREASINGLY POWERFUL

Our analyses uncovered a number of ingenious strategies in the Common Core kerfuffle on Twitter. Canny and tech savvy, these partisan strategies demonstrate the growing sophistication of issue advocates as they learn how to capitalize on the social and technological power of networking mediums. These strategies help to explain how the opponents of the standards came to dominate the political conversation and contributed towards turning the tide of public opinion.

We discovered the first set of approaches as we began to disassemble the data and became increasingly aware of the concerted efforts of the Patriot Journalist



Network (PJNET), which we discuss in-depth at the end of Act 2. PJNET used a range of effective tactics that helped them to increasingly dominate the output about the Common Core on Twitter. Most inventive was PJNET's use of a robo-tweeting technology that allowed them to send messages from the accounts of a range of consenting Twitter users'– essentially creating a BotNet that integrates robo-tweeting and social networks.
What makes this approach so powerful is that it both dramatically increases the volume of the same message and makes it appear that the message is independently sent, when it is really a concerted effort of amplification. PJNET also used clever forms of retweeting and hashtag rallies to bring advocates together to amplify their message. By using these strategies to harness the people power of social networks on Twitter into concerted issue campaigns, both targeting and supported by elected officials, provides a glimpse into how powerful these efforts can be and how they can create enough synergy to bust out of Twitter and into the broader consciousness.
A second noteworthy strategy, which we illuminated through the Tweet Machine in Act 5, was the way in which Common Core opponents framed the standards as a threat to children and used a range of metaphors to appeal to the value systems of a diverse set of constituencies. We identified five different frames: the Government Frame, which represented the standards as an oppressive government intrusion into the lives of citizens, which appealed to limited-government conservatives; the Propaganda Frame, which depicted the Common Core as brainwashing children, and in doing so hearkened back to the Cold War era when social conservatives positioned themselves as defenders of the national ethic; the War Frame, which portrayed the standards as a front in the nation's culture wars, and in doing so appealed to social and religious conservatives to protect traditional cultural values; the Business Frame, which rendered the standards as an opportunity for business interests to profit from public education, a frame that appeals to liberal opponents of a business exploitation of a social good; and the Experiment Frame, which used the metaphor of the standards as an experiment on our children, and in doing so appealed to the principle of care that is highly valued amongst social liberals. Collectively, these frames, and the metaphors and language that triggered them, appealed to the value systems of both conservatives and liberals, and contributed to the broad coalition, from both within and outside of education, that were aligned in opposition to the standards.
The combination of the internet and social networks are powerful tools in interest groups' toolkits to influence public opinion. We see evidence that both the messages and the messaging system are becoming more sophisticated. These strategies show how Twitter can be used as an organizing force to bring people together into a grass-roots multi-issue influence engine.
The enduring grassroots nature of the activity on Twitter is also surprising. When we completed the analysis for the first phase of the #commoncore project in 2015, my bet was that Twitter was going to be the temporary terrain of a guerilla war of sorts, and that the more formal, professional advocacy groups would hegemonize Twitter over time and that the grassroots activists would move on to another platform to stay one step removed from the professional machines. I was wrong. Twitter has remained an open-source grassroots battleground for public opinion. And the fascinating thing is that the individuals and groups that have surfaced have tended to be really motivated and concerned citizens who are consistently active in Twitter and who feel that this medium is the best means for them to express themselves and be heard amidst the national clamor.

3. THE AUDIENCES THAT CONSUME "CONTENT" ARE BECOMING INCREASINGLY SEGMENTED

One consequence of the technology-enhanced customization of information sources and the increased sophistication of advocacy strategists is that they offer people both comfortable enclaves and easily consumable materials that reinforce their prior beliefs and protects them from discordant views. It is not surprising that people want the validation of information that corroborates their prevailing perspective.
Sociologists use the word homophily to describe the natural phenomenon that individuals prefer to associate with those who hold similar preferences and worldviews to their own. In other words, people naturally gravitate towards those who hold similar views to their own and, in a world of choice, we are attracted to information sources that are popular with the people with whom we are most comfortable interacting.
While the splintering of the professional media and talk radio accelerated the fragmentation of society into increasingly homophilous sub-groups, the internet and social media have exacerbated this phenomenon to

the point that we may now be living in a world where members of different sub-communities get most of their information and share their own ideas only with people who share similar belief systems. This fragmentation into homogeneous subgroups, which continually reinforces members' belief systems, is a sort of voluntary social segregation that reifies prevailing beliefs.

While politics may be a source of our division, it is not the only indicator of our segmentation. We can also see homophily at work in many other venues, including our popular culture preferences, as shown in the fascinating chart that reveals our national television watching patterns:

And of course, we saw this same phenomenon at work in the sub-communities that formed during the Common Core debate on Twitter. As you can see in the network image of about 55,000 participants from November 2014 to April 2015, the behavioral activity of Twitter participants in terms of who to follow, retweet, and mention revealed that people tended to interact far more with those who held similar views than with those from different factions.

Third, and perhaps the most important implication of all, is that the fragmentation of people's personal, political, and cultural experiences provides us with fewer opportunities to be exposed to either common stimuli – the things that unite us – and the ideas and views of others – the thing that makes us more understanding of different perspectives. In fact, there is abundant research to show that people who only interact with those who share similar views become more polarized in their perspectives, regardless of whether they are liberal or conservative, than those who have opportunities to hear alternative perspectives.6 So the fragmentation of our worlds into cliques of ideologically familiar others is a problem without a sufficient counterforce of opportunities to hear from others who hold different views than our own, which holds the greatest promise for learning, change, and growth.

So let's take these three observations and string them together. First, the ways in which information is produced and made public is undergoing a dramatic transformation; the volume and diversity of information sources are expanding, and consequently the quality and veracity of information is suffering in the process. Second, the missives and dissemination tools of the messengers are becoming more sophisticated as they capitalize on psychological influence techniques better utilize social networks to ripple messages outward. And third, the audiences that consume the content are becoming increasingly segmented. This seems like a recipe for further rending of the fabric of society.

In this environment, we must ask what are the institutions that create the shared experiences that hold us together as a collective nation. Politics might be one, but as we increasingly see, the information we get about politics, which shapes our views about candidates and issues, is not shared. We might think of popular culture. But, as shown in the maps of our viewing habits, we do not have the same cultural experiences. We might think of major sporting events as cultural unifiers. Superbowl viewership is certainly large, and people feel a sense of national pride when the American Olympic team takes the field. Jury duty is one of the few remaining civic duties where one is put in a position to engage with a cross section of different people from society for a common purpose. And there is only one other area that I can think of where Americans have a shared experience: public school. Nine out of every 10 students in the country attend a public school.7 Education may be one of the last bulwarks against to disintegration of the body politic. No wonder the Common Core was such a contentious issue across the land.

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THE SOCIAL SIDE OF SOCIAL MEDIA

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Data data everywhere and too many drops to drink IBM estimates that we create 2,500,000,000,000,000,000 bytes of information EACH day (BTW the number is read as 2.5 quintillion if you want to impress your friends). A number that size is hard to get your head around, so let's try to imagine it in a different way. The data created every day, that 2.5 quintillion bytes, would fill 10 million Blu Ray Discs, which if stacked on top of one another would be as tall as 4 Eiffel Towers. The volume of that amount of data is epic, but not only is the volume impressive, the velocity of which it is created is equally staggering.

Data velocity estimates suggest that for every minute of every day there are 204,000,000 emails sent, 72 hours of YouTube video uploaded, 216,000 Instagram photos posted, and most importantly for our project, around 300,000 tweets tweeted. The volume and velocity of the data is incredible, but the variety of the data is equally mind blowing.

Within any 24 hour period the data generated can include: text, audio, video, click streams, sensors, and a host of other forms that get entered by human, machine or bot. Out of all that production, IBM estimates that 90% of the data is "unstructured" meaning it is a seemingly random collection of photos, cat videos, tweets and logs that are not ordered in any particular manner, nor organized for easy analysis—which makes the job of working in this space challenging. The volume, velocity, and variety of data generated on the web everyday may have led Mitchell Kapor to famously note that, "Getting information off of the internet is like taking a drink from a fire hydrant," and we have the wet clothes to prove it.

Kapor's description may feel very familiar to those of us who attempt to make sense of the daily stream of data that is available and continues to grow every second. Lest you think that a few kids in their Mom's basement are generating all of this data, the We Are Social digital report may give you pause. Consider the following, 2.13 billion people across the globe are on social media and in the US 87% of the total population regularly uses the internet with another 193 million being active on some form of social media (Facebook, LinkedIn, Twitter, etc.). We live in an increasingly connected and interconnected world, and given this reality, we need new and unique ways to start to make sense of it all and search for important signals in the noise. In finding our signal we have drawn on network science to guide the work and extend this current project—as the ideas from network science are so critical to the work, a bit more understanding about networks may be helpful.

THE "SOCIAL" IN SOCIAL MEDIA

Our first question is how do we parse out and make sense of the information flow and meaning-making that takes place within the growing social media space. Our collaborator on this project, Miguel DelFresno, has argued that given the ubiquity of online activity and its incorporation into our "real world" lives it makes increasingly less sense to think about "offline and online" worlds. This has led us to argue that in reality, the offline and online experiences just reflect a larger social continuum in which individuals interact, access resources, and make sense of their world (DelFresno, Daly & Supovitz, 2016). The important idea from our vantage point is the need to better understand the "social" aspect of "social" media.

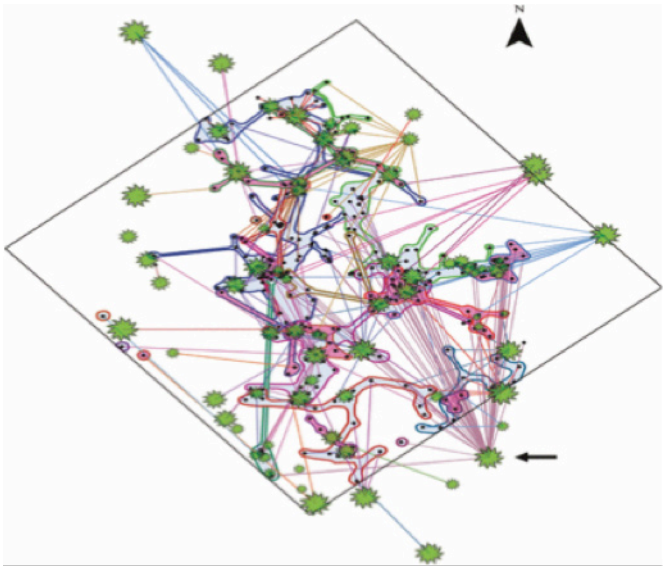
We are social, meaning making creatures and have been since the dawn of time. In fact, our survival and evolution was based squarely on the idea that we looked out for one another and worked together to shelter ourselves, hunt for food, and raise families. While we did so in a decidedly offline world back in the day, our lives today are just as social even though in many ways we have traded bricks for bytes and face to face for screen to screen. In this current reality is about the both the pen and the phone and the degree to which either is mightier than the sword is not always clear.

Today, when we seek to shelter, we turn to members of the Tripadvisor tribe to support our efforts. When hunting for food, we may take advice and insight from the highly valued clan on Yelp. Consider how much of our daily lives and decisions take place and are influenced by others in a social space. This is not to say we don't reach

out to tribe members in the "real world", of course we do, but now we have access to a larger set of actors who are connected and offer us resources. In this iteration of the project we have taken this social idea to the next level by portraying the set of social ties and the tone of messages exchanged to seek insights. We have intentionally chosen to privilege the social side of social media and use a sophisticated set of network methods to reveal the often hidden world of relations and make sense of what is being transacted.

On this website we have described the social network approach to making sense of the world (for a refresher click here). From a social network perspective we are interested in the structure and pattern of relationships that form as individuals interact in a given space. Like Noah, our work is grounded in pairs, or dyads. The interactions between two individuals form the building blocks of networks, which can grow to include thousands and even millions. Examining the structure that results from these interacting dyads can lead to insights about socially influential actors, subgroups of people, and even individuals that are on the periphery of the network. Our starting point for this work is the relationship, and that jumping off spot differentiates our work from other equally important endeavors that may start from the individual—more on that later. However, in making sense of the idea of networks, lets make a stop in an unexpected place: the forest.

GROWING SOCIAL ROOTS



Many reading this piece will have heard of the World Wide Web, but likely fewer have heard of the Wood Wide Web (AKA by its less fun name, Mycorrhizal Network). You read it right, there is no Elmer Fudd issue here, I am writing about the Wood Wide Web. Over the years our team has invested in understanding as much as we could about networks and in doing so our learning has taken us far and wide. One of the most interesting finds came from an excellent article written by Kevin Beiler and colleagues (2010) who showed that there was a network of connections among and between trees in every section of a wood (and you thought things were unusual in Pooh's Hundred Acre Wood). Roots in a wood crisscross and overlap and this line of research indicates that the roots of trees are connected by fungi, which act as links between the root systems of different types of tress. In essence, these fungi act as brokers connecting otherwise disconnected trees and ultimately creating an interdependent system (see graphic below).

This graphic represents an interconnected and interdependent network between trees at the root level. The fungi, in their brokerage capacity, support trees to essentially share resources such as sugar, nitrogen, and phosphorus between and among themselves. Interestingly, this network of connections also provides for a type of early warning system. If one tree is under attack from a beetle or pest that tree can actually "warn" other trees (both of the same species and other species of trees) to raise a defensive response to ward off the upcoming siege. Even more remarkable, a dying tree may send its resources out to the larger community of trees for the collective benefit of the wood wide web. For example, seedlings that may be in a shady location in the wood and require a supplement of energy resources may receive those resources from other healthier trees (in the diagram above larger green nodes are trees that are exchanging more resources). The notion that trees themselves are surviving and thriving based on a network of connections is a powerful and potentially instructive perspective for our work and the larger effort of understanding people systems. The Wood Wide Web is important and it grows and continues to thrive based on a set of resource exchanges, but without the individual trees themselves adding to the larger network there can be no exchange and as such we must look at both the network and the individual to understand the flow or resources within a system. It is this powerful idea of the interplay between the collective and the individual that was instructive to the way we approached this next iteration of project and added a unique perspective.

THE REESE'S ADVANTAGE

In the previous iteration of this project we focused almost exclusively on the network aspect of the work and in this

version, like the wood wide web, we look at both the forest (collective) and specific trees (individual). In this sense we are weaving together both sociological and psychological approaches to give us a different level of insights than we may get from privileging just one perspective. Lets make this idea a bit more explicit and arguably more delicious.

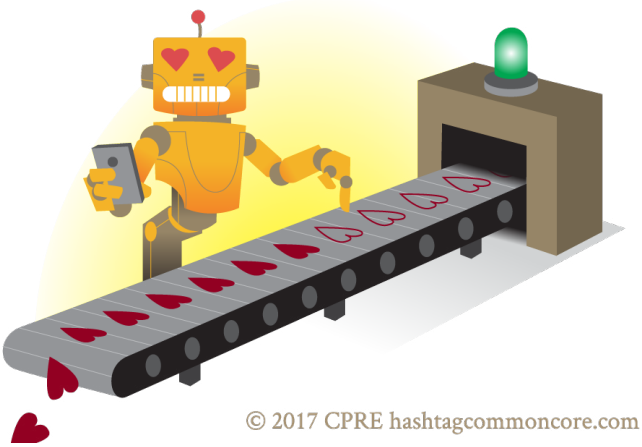
From an American perspective, fewer things are better than peanut butter. Those misspent blissful days of our youth when we would eat Peanut Butter by the spoonful or mix it in with its cosmic partner jelly to form close to the perfect sandwich are distant memories for many of us to the glee of cardiologists the world over. Moving beyond the good ol' USA, the world's love of chocolate is undeniable—the smack down between Switzerland and Belgium about whose chocolate is best is epic and competes with classic battles akin to the Montagues and Capulets or for a more contemporary audience any Kardashian dinner. 90 years ago this very year a man named Reese mixed together the creamy awesomeness of peanut butter with the sweet crunch of chocolate and together those two taste sensations are arguably better than they were apart. From our standpoint this sweet idea of togetherness is one of the main contributions of the current iteration of this project—bringing together both sociological and psychological traditions to make, well, a lower calorie mash up that offers unique insight into this complex world. So what is the Reese's aspirational advantage from our perspective?

A more integrated (sociological and psychological) perspective as to how an important educational policy plays out in social media space may provide us with additional analytic purchase. There is a great deal of work that attends to the psychological/individual aspects of actors, which has been critical in our understanding of a host of phenomena. This important research focuses on beliefs, perceptions, expertise, education, pathology, etc. all rooted within the individual. Although the context may be considered, generally speaking, it is not necessarily a core focus of a more psychological approach. We may consider elements such as beliefs and emotions as properties of the individual and we can examine these properties in an attempt to understand behavior, outcomes, and those instances when things go horribly wrong or right—thank you Positive Psychology! Efforts from this scholarship and practice have produced critical insights and helped to construct a predominant view of the world in which most events are explained through properties of the individuals.

There is another perspective or several hundred more, but who is counting. Although the more psychological approach is grounded in the individual, a sociological perspective suggests that it is something about the interaction of individuals with others in groups or beyond. At its core, in an overly simplified version, the idea of the social connections starts with a pair or dyad of individuals and then branches out to a larger system (more on this later). The important bit here is that we recognize that the ecosystem of connections that surrounds all us trees and creates a much larger forest system may influence us in ways we are unaware. This notion is what drove our previous work and still serves as the foundation of this effort, the difference is that we are now adding in concepts and work from the psychological tradition and mixing these two perspectives. Our aim is to unlock what we hope to be important and unique insights that go beyond what each field could bring us on its own—hence the Reese Advantage!

In the previous incarnation of this work we privileged the social network view of what was happening around the Common Core State Standards. This work enabled us to present our research in a unique light and focus on the insights that could be drawn upon when one considers the world a large interdependent forest. In this work we still focus on our social roots of policy interaction, but we now add a more "psychological" dimension in which we rigorously examine the individual use of language within the space and connect that use to more psychological factors such as emotion, drive, and thinking styles (LINK). From our admittedly biased viewpoint, we think seeing both the forest and the trees pushes our work and the field of policy a bit further or at least toward some potentially exciting new geography.

So, now having a better insight into how we approached the next iteration of this project let's dig a bit deeper into some meta-ideas from a network perspective that revealed themselves.



Robust and consistent nature of the network
One of the most striking findings from this iteration of the project is the consistent amount of activity around the Common Core over the entirety of the project. When we started, we were not sure that the tweet activity would be as active, but to our surprise and glee (yes, we were gleeful) the activity was high. In fact, the activity remains high even to just before Thanksgiving 2016 when we stopped collecting data (this project only reports up April 2016). See the activity below—the spikes reflect the run up to the election.

As we describe on the website here, there was a solid amount of activity in terms of a policy debate and it does not seem to be abating. One of the integral elements of our work is that we were not forming networks based on our opinion of how actors may or may not or should or should not be connecting, we were "observing" their behaviors in social media space. Focusing on the behaviors of the actors and the subgroups of actors they formed also revealed a few interesting patterns of "behaviors" that from our vantage point were worth noting.

One of those patterns was the fact the sub-communities we identified were strong and consistent. The Green, Yellow, and Blue factions (meaning more in group ties than cross group) we observed in our first cut at the data remained, and we noted the rise of a couple of groups we had not seen before—the "Red and Gold" (not to be confused with the school colors of USC). It turned out our Red group was actually a group of Costa Ricans—we left them in the Giant Network analysis to illustrate that the subgroup analysis was behaving as expected. These groups were identified not based on our a priori descriptions, but on their observed social behavior of tweeting, retweeting, and mentioning. The Gold sub community turned out to be primarily comprised of PJNetters, whose "botnet" became of interest as PJNet clearly used ideas from network science (whether the group knew it or not is unclear) and the wood wide web to amplify message and perhaps create some social indebtedness.

NETWORK INTENTIONALITY

It is a fair to say that PJNet's activity and set of behaviors was an unanticipated discovery based in patterns we noted in the data. Thoughtful analysis by Christian revealed PJNet and how a BotNet strategy was employed to maximize perspective. As you have already read, some actors played very central roles in the network and others, using what we called a "bot-net" strategy, extended their influence through a network of bots that repeated and accelerated messages and perspectives. The idea here is an interesting one from our perspective as it suggests that network science concepts can be used to move, leverage, and amplify message—this implies a type of intentional action, which we will refer to as "network intentionality".

As you have likely deciphered at this point, we have drawn on social capital to ground our work as described in another part of the website. Two dimensions of social capital have been suggested— structural social capital and cognitive social capital (Nahapiet & Ghoshal, 1998). The structural aspect of social capital addresses the network of social relationships that surrounds an individual and offers opportunities for the exchange of resources, which we have drawn upon to examine key influencers and structural communities. The cognitive aspect of social capital encompasses the norms, values, attitudes, beliefs, and narratives of an actor, which influences meaning-making and the ultimate actions of that particular individual (Krishna & Uphoff, 2002). We have also included ideas from psychology to enable us to think more deeply about cognitive social capital and round out our analysis.

The cognitive aspects of social capital are believed to affect the formation of social relationships (Obstfeld, 2005). For example, in a school undergoing major reform, one may imagine that educators' interpretations of, and beliefs about, the change process may differ, firstly about the specific reform effort itself, and secondly about the people they need to approach for understanding the new expectations and exchanging the necessary information about the reform. This in turn may affect the way in which educators collaborate, and with whom, in terms of making sense of the reform effort.

This idea about the role of social influence on beliefs, and ultimately behavior, is well demonstrated by my UCSD colleague, James Fowler, in his outstanding book Connected as well as in numerous articles. He and his colleagues, in a number of excellent pieces, argue that many aspects of our lives are socially influenced including such diverse areas as happiness, weight gain, and smoking. So, it also follows that our connections in social space may also influence our beliefs on such topics as the Common Core or the role of government in our lives as we have demonstrated in this work. The way in which individuals think about certain shared topics (e.g., their values, norms, beliefs, relationships, etc.) may shape and reflect their social behaviors and the behaviors of others with whom they are connected. We are influenced not just by those with whom we have a direct connection, but from those individuals who are one or more steps away from us, like the support a

seedling receives from other trees in the wood. This is what it means to be a part of an interdependent system and again, like the wood described earlier, it is the interplay between the forest and the trees that yields nuanced insights.

One could argue that PJNet and others engage in a form of "Network Intentionality" (Moolenaar et al 2014). Meaning that individuals have a varying degrees of intentionality for actively seeking relationships, serving as a source of advice, actively brokering relationships between disconnected others, and using social connections to move messages—some act on their networks more or less than others. This idea suggests that an individual has agency in terms of forming, brokering, and dissolving social relationships given their own perceptions and understandings of what makes for a "good" network to reach goals. We are not merely reacting to the set of relationships that surround us, we actually can choose to act on the pattern of relationships should we choose. Success in that action is based in part due to understanding the larger network in which one resides, but regardless one can be intentional or not about forming and dissolving ties. Actors in social media space may have certain beliefs when it comes to forming and amplifying relationships or exchanging resources with others. Those individuals who can capitalize on, or be intentional about, forming networks (such as PJNet) may be better able to position their ideas to reach others in ways that provide a broader forum for their resources—just consider the presence and activity of PJNet over the course of this entire project. In a sense PJNet was highly successful at creating branches and sprouting enough leaves to begin to cover the canopy of the conversation.

An orientation towards strategically connecting others (e.g., the tertius iungens orientation in which the "third connects", see Obstfeld, 2005) and being intentionally involved in leveraging social relationships may in fact allow some ideas to gain greater traction than others or so that appears to be the explicit strategy used by PJNet. Research outside the social media space suggests that individuals with greater ability to actively make and sustain relations are perhaps in a better position to access unique information, make meaningful connections, and disproportionally influence idea flows (Felicio, Couto, & Caiado, 2009). The combined idea of structure, social influence on beliefs, and network intentionality seem to be a unique thread in this work. As we move further into the social continuum of offline and online worlds with attention being the new currency, those who are more fluent in the language of networks may be able to create more social capital. There is another network strategy we also saw at work.

MUTUAL TIES AND SOCIAL DEBT

Another interesting network science concept that is being leveraged in the social media world is an idea around reciprocity. Reciprocal ties are those that are mutual—meaning for example if I indicate that I have a trusting or friendly relationship or share a resource of some sort with someone and they also do the same back to me, we have a "reciprocated" relationship in the same way the roots of the tree and the fungi "support" one another. The development of reciprocal ties between actors has been shown to increase trust and lead to the continuation and deepening of relationships (Daly, 2010). For example in studies of network change over time one of the most consistent findings is that if someone initiates a tie at time point 1 and that time is reciprocated at time point 2 the relationship is likely to be present over time. Part of that has to do with idea that individuals do not like to feel "obligated" to others or in a type of debt and therefore when someone makes a gesture the other is likely to return in kind. So while reciprocity provides an opportunity to deepen relationships, it does come with a social "cost" or "debt". If someone creates a connection with you there may be an implied social expectation that you act in kind and return the connection. We have all experienced this idea when someone gives you a holiday gift and you did not provide the person a gift in return—the scene is often experienced as awkward as we want to avoid the social debt introduced by gift or lack thereof.

We see this the network science idea of reciprocity playing itself out in social media space, with some actors leveraging this network concept to great success. Consider the case of Instagram. Instagram, like Twitter, is a popular social media site in which you can have followers. If one wants to increase the number of followers one strategy is to create a type of social debt. In other words, you "like" or compliment another person's picture and they will be more likely to "like" you back or make a comment. So responsive is this strategy is that there are Bots on Instagram (e.g. Instagress) that you pay to act on your behalf. These Bots will randomly like other people's posts and make supportive comments even if you have no idea to whom the Bot is connecting. This in turn results in those with whom the Bot randomly, and unknown to you, connected liking your posts or even following your Instagram all thanks to social indebtedness. Individuals who among other reasons want to up their number of followers will pay companies such as Instagress to create a social debt—such is the exploitive beauty of the Internet. The role of reciprocity and social debt is grounded in both network science and the roots beneath our feet and reflects yet another strategy users employ in creating networks.

READIN', RITIN', RITHMETIC, AND RELATIONSHIPS

Networks exist in almost all aspects of life from subways, to communication systems, to ecology, to our brains, and even out to the forest. Network science enables us to understand and describe how different elements interact creating larger patterned structures that are often hidden in plain sight, like the roots of a tree in a wood. In our work we are pushing on the idea that it might not always be the number of followers that matter, and in fact the real influencers maybe those with the set of ties and constellation of connections necessary to move and access resources. In this project we have been studying larger social patterns of how individuals connect and how those connections both inhibit and support access to resources and the movement of ideas and it is this core idea that forms the basis of our project.

As we have argued, we live in an increasingly socially connected world in which people generate data with a breathtaking amount of volume, velocity, and variety. Likely at some point during your day you have connected to a social network to share or find information—maybe you checked in on friends on Facebook or tweeted out something of interest, maybe even about the Common Core, if so, THANKS! Technology provides for almost immediate communication and movement of information through interconnected and interdependent communication networks. In a real sense we live in a networked society and success in this new space will require a host of new skills and proficiency in social network literacy.

Understanding how to connect to and leverage this larger social infrastructure is critical in moving messages, accessing information, determining veracity, supporting decision-making, and connecting with others for discovery, community, and sharing of viewpoints. Despite the fact that we live in a hyper connected social world we do not systematically and explicitly teach social network literacy skills either in the classroom or in the forest. Those who are able to learn and speak this new tongue or see with this new perspective have an added advantage. Developing fluency and vision in this new language and arboreal sensibility is often left to chance or assumed to be self evident, but based on our years of work in this project we are convinced that given the ubiquity of networks the next literacy emphasis must be intentional and mindful instruction around Social Network Literacy.

FINAL THOUGHTS

The last couple of years around this project have been some of my most enjoyable work. As I reflect on what made them so special to me I have to say that it has been the collaboration with my team partners. Jon, Miguel, and Christian have been amazing and we have formed our own densely connected network with all the trappings of the role of the forest and the trees, with me often being referred to as the Asspen (or so my friends tell me this is the correct spelling). From my vantage point, research is a team sport and I could not have asked for a better group with whom to make this work come alive. I am also gratified that we were able to bring the passion for social network theory and analysis to life in a beautiful, engaging and what we hope is highly interesting way. We "flipped the script" on the research endeavor by leading with the public facing work and engaging the wider community first with the project. That has not been easy, as we did not realize what it meant to fully jump into the public pool without our floaties. However, no matter the near drowning, bumps, and bruises along the way we learned, grew, strengthened our own roots, and I think our work as scholars is better for it. We can no longer hide behind rigor, we also need relevancy in our work and it is to that lofty goal we have dedicated this project.

Our institutions should not fear, well maybe a little, we do of course have scholarly papers underway and in this project we just provide a flyover of the terrain occasionally landing to look at an interesting part of forest—there is more to come. I have to say what struck me about this process is that if I added up our collective citations to our work (and likely of a few of our friends as well) we would not come close to the direct impact and exposure this work has generated. We are attempting to make the invisible visible, we are in our small way attempting to take a drink out of the hydrant in the forest while eating Reeses in hopes we can quench some of our own thirst for understanding. This project represents a small step toward the larger idea of engaging the public in discourse around important issues that go well beyond the Common Core. We live in a connected work and so when the tweet tweets it tweets for thee—thanks John Donne and I am sorry.

COMMON GROUND ON UNCOMMON GROUND.

CHRISTIAN KOLOUCH
University of Pennsylvania

Candidate one: "Our nation's infrastructure is collapsing, and the American people know it. Every day, they drive on roads with unforgiving potholes and over bridges that are in disrepair. They wait in traffic jams and ride in railroads and subways that are overcrowded. They see airports bursting at the seams…"

Candidate two: "We have a country that needs new roads, new tunnels, new bridges, new airports, new schools…" "Our airports are like from a third world country…You land at LaGuardia, you land at Kennedy, you land at LAX, you land at Newark, and [then] you [go into] Dubai and Qatar and you see these incredible you [go into] China, you see these incredible airports…"

A THREAD OF SHARED CONCERN

In essence, the two statements above convey a shared belief delivered by assumedly opposed candidates: here, they both insist that due to neglect, our country's infrastructure has eroded and that there is a resounding need to address the issue via various renovation projects. In their own terms, they identified the same problem, discussed it in a similar situation, and assured whoever was listening that they were each uniquely qualified to address the issue. Importantly, at the time of these statements neither candidate had fully articulated their plan to solve the problem, meaning that the public was being asked to base their particular allegiance on mutual recognition of the expressed concern and also on an individual belief in the person expressing this concern.

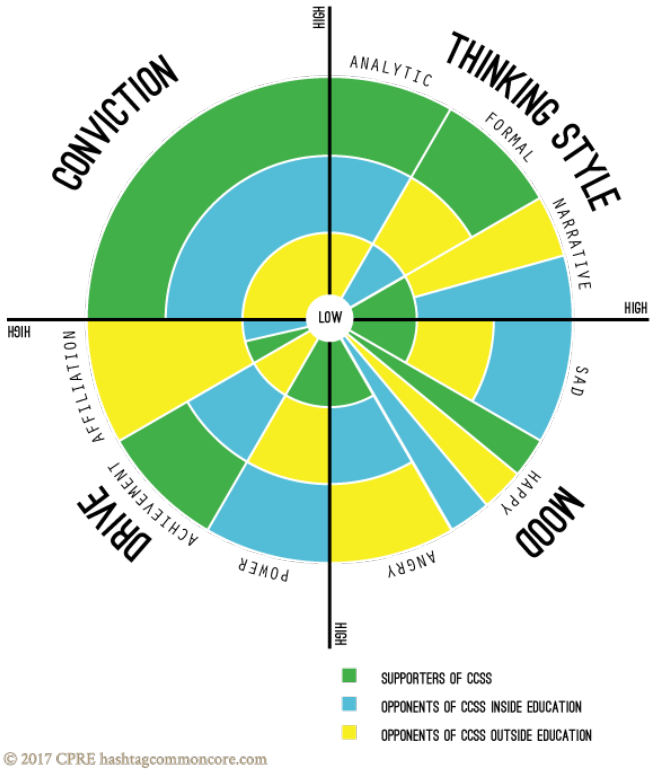
Furthermore, as the election season wore on, at various turns, both candidates successfully, similarly spoke about the growing sense of disenfranchisement in the United States, a national need for jobs, a desire to bolster and regenerate the middle and working class, and a certain need to curtail the perceived corruption in Washington. They said similar things and espoused certain, somewhat similar views, yet their messages resonated with purportedly opposed portions of the voting public. Now, if the resonance of the candidates' views is an indicator, many of us, even across party lines, while transgressing other assumed cultural divisions, saw similar problems and sought similar solutions, identifying with one another's view point whether we knew it or not.

However, more than ever, we are told, or we may have even come to believe so on our own, that divided we stand, never further apart, shattered into homogenous enclaves of similar thought pejoratively labeled as echo chambers, in which we, in a multitude of voices, effectively speak to ourselves.1 Yet, when looking at the above example - albeit a bit of a simplification - we can see, if we are willing to admit, that despite the apparent chasm between our own and others' beliefs, somewhere through the muck and mire there still stretches threads of shared concern.

BOILED TO A BINARY

Muddying the existence of these common concerns however, just as it occurred during the recent election, every two to four years, the American public is tasked with the difficult prospect of choosing sides in order to cast their votes, basing their decisions on apparently opposed platforms. This means that the entirety of the drawn out electoral season (debates, campaigns, plans, promises, ads, platforms, scandals, lapel pins, and catchy barbs) is forced into a single box – two boxes really – one which the voter checks and the other, which the voter leaves blank. Effectively then, the voter (their entire history, ideology, and psychology) and the electoral season itself, are confined to a Yes or No. Though helpful in lubricating the electoral machine, most of us, as individuals, are lost to the reductive event; our nuance and complexion sacrificed, ideally, to the ordered flow of the greater good, but definitely to the binary nature of our choice. Of course, there does exist third party options to choose from, but as it stands, those options seem to be little more than outlets for fringe dissatisfaction. Therefore essentially reduced to a check or not - advocacy or opposition – the subtleties residing in our political beliefs, like the areas of shared concern, often go unnoticed.

This dichotomous process also governed the debate surrounding the Common Core State Standards, a debate that basically forced interested parties to either support or oppose the issue, regardless of positional nuance. Boiled to a binary, interested parties had to either be for or against, advocating or opposing, the dualistic prospect once again implicating the existence of stark divide. Yet, if thought about in a particular manner, there was, much like there was in the debate between Presidential candidates, an assumedly shared concern fueling the majority of involvement in the overall debate: the desire to adequately educate American



children in ways that help them live happy, fruitful lives. With the same possible end goal in mind then, opposing sides came to conflict, a conflict exacerbated by the dichotomous demands of the argumentative process. This of course resulted in a tense conversation, subjugating any common desire to the reign of opposing sides, forcing all involved to reduce their position, even person, into one of two categories. And once these categories were created (breaking it all down to either for or against), if left unexamined, they edified the appearance of division. However as mentioned above, if the two positions are probed, this division becomes more difficult to discern, possibly revealing that there was no division at all, but simply differences in the ways participants' minds received, processed, and articulated information – differences that in my opinion, lead to misunderstanding or misinterpretation rather than genuine dispute.

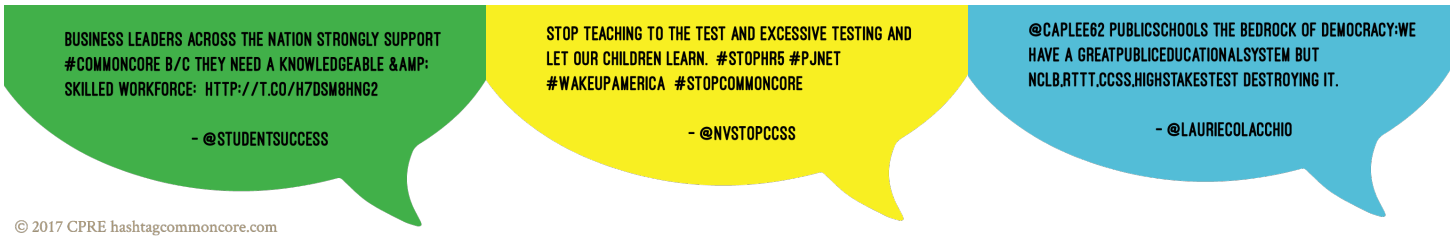
SEEING EYE TO EAR

Our Lexical Tendencies analysis was an effort to probe the depths of this binary. By examining the different word types people habitually used while conversing about the Common Core on Twitter, we were able to measure certain aspects of their psychology. Stethoscopic in a sense, word counting allowed us to efficiently plumb a large amount of data in a relatively short period of time, which in turn provided us measures for the author's moods, drives, thinking styles, and finally, their levels of conviction. With over 100,000 participants and over half a million tweets to sift through, this was a very effective and empirically grounded means to quickly identify various aspects of the psychology working through the CCSS debate.

Specifically, our Thinking Style analysis measured the ways in which participants received, interpreted, and articulated information (their position in the debate). Based on the habitual use of certain word groups, we found that each faction had a distinct style of thought and when recalling the definitions of the three measured types, certain insights come to light: Analytic thinkers (in order of their analytic word use from highest to lowest – Green, Blue, and Yellow) understand the world through division and distinction, finding ways to group and order people, places, and events into separate categories of their own design or selection. Narrative thinkers on the other hand (in order of their narrative word use from highest to lowest - Yellow, Blue, then Green) interpret information through stories and focus their thoughts on the individual experience. They understand the world and express themselves through anecdote, seeing life occur at the personal level. Finally, Formal thinkers (in order of their formal word use from highest to lowest - Green, Yellow, then Blue) are stodgy and emotionally distant; often believed to be arrogant, they communicate in structured, dry clips, using hifalutin language and rigid argumentation.2

Much like the differences in audio vs. visual or visual vs. tactile learners, the different thinking styles are prone to absorbing and sharing information in distinct manners, inferring that information interpreted and presented in different ways has the potential to be dismissed, lost, or misunderstood. For example, if a formal thinker, in their slightly pretentious, almost dismissive manner, only understands or legitimizes the arguments of those who communicate and think like them (not necessarily ratifying or arguing against the actual content of the arguments put forth) is in a debate with a narrative thinker, the arguments and concerns of the opposing party risk going unaddressed. In this example, the dismissal would not be a result of the content, but instead due to the mode of presentation and possibly earlier interpretation. Expressed in another way, if a narrative thinker communicates and thinks in stories, the narrative thinker might dismiss or stand against the necessarily analytic aspects of the CCSS debate, interpreting the parsed categorical or numerical analysis as a dehumanization of the parties involved. Again, perhaps it is not the actual information that the narrative thinker opposes - the gathering of added context - but more the manner in which this process has been described and advocated for, something that if restructured to better fit the thinking style of the recipient, might be more readily received.

#COMMONCORE PROJECT



Tweet Example 1We saw reflections of this misunderstanding throughout the conversation, but specifically so in one of the primary contentions to the CCSS: the data mining tied to the Common Core. Many people on the opposing side frequently expressed a clear concern that data mining would dehumanize education and turn children into troves of information to eventually be scoured for profit or other nefarious purposes. This interpretation was particularly common amongst the narrative-minded yellow faction, people who saw the issue as a personal one, their common contention to the data mining not about a specific standard, but instead about their understanding of this secondary point. On the other side of the problem stood green: the faction scoring highest on our analytic measure, a group of people who generally interpreted the data mining in a much different manner. As advocates for the process, they believed it to be an integral way to further understand education, the resulting information providing insight that the individual student experience could not. Interpreting this point in different ways, they communicated about this point in different ways, possibly revealing that interpretation and communication rather than specific CCSS content was the issue. Furthermore, being that their view points aligned with their thinking styles, we can begin to ask about the true roots of the conflict, asking if it might have been a cognitive issue rather than a substantive one? And if this is the case, taking this idea one step further, are we, generally speaking, neurologically built to misunderstand certain types of people?

WHAT FUELS OUR PERCEPTIONS AND MISPERCEPTIONS ALIKE

In another Lexical Tendencies analysis, we measured the Drive Orientation of the participating factions and found that each group was distinctly driven in one of three ways – by Power, Achievement, or Affiliation. To quickly refresh your memory, or if you have yet to read the analysis, power people have an innate drive to create order by organizing people and situations into coherent groups or events. Achievement oriented people on the other hand are focused on goal-oriented success, ideally receiving stature or recognition in return for their efforts. The final drive orientation is affiliation wherein folks are driven by the development and maintenance of harmonious relationships, seeing situations as means to affiliate with others or as interactions between affiliated groups.3 Importantly, there is no hierarchy of merit to any of the three drives. They are each of equal value and all can be used for both good and bad. To further understand the meaning of each drive, it is also integral that we remove any personal connotations we've attached to the attending terms. Being driven by power for example does not necessarily produce negative results, nor infer a tyrannical want for control; in fact, power people are often very generous, considerate, participating members of society who generate net positive effects on those around them.

With these ideas understood, like our Thinking Style analysis discussed in the previous section, this measure was also based on linguistic tendencies extrapolated over a faction's cumulative participation in the CCSS Twitter conversation, revealing habits of writing that in turn revealed habits of mind. For example, our drive analysis revealed that the group's comprising the Common Core opposition - separated into the blue and yellow factions - (blue – opponents within education and yellow – opponents outside education) were multifaceted in their shared position, each position motivated by a different drive. Though they agreed in their stand against the CCSS, they apparently did so for very different reasons, showing that division existed on the same side of the debate.

The blue group was measured as being motivated by power while the yellow group measured highest on the affiliation drive. As we mentioned, in our results, these measures revealed a very important nuance in the oppositional stance. There, we postulated that Tweet Example 2 blue's measure on the power drive opened the possibility that their faction may have perceived the CCSS as a power issue. As a group comprised of people inside education, their concerns over power could be inferentially connected to their fears regarding the Common Core's effect on educator agency. Simply put, it is possible that they used power words because their power drive was threatened, thus activated, by a potential threat to their power in classrooms and schools – remember power here means to order and

organize, ordering and organizing a classroom or school, something that could have been uniquely disrupted by the standards. There is strong evidence to suggest that because they were oriented in a certain way, educators perceived the situation in a certain way, and therefore specific concerns arose due to their effect on the driving orientation.

On the same side of the debate, but driven by a much different cause, the yellow group measured highest on the affiliation measure. Our postulation in this case was that, as shown by their lexical tendencies, the yellow group's opposition to the CCSS was focused on how the reform might affect the relationships they knew, the relationships Tweet Example 3 they had formed, and the relationships they hoped to maintain in, around, or through their schools, including their relationships with their own kids. In this case, members of the yellow group used affiliation words because they were concerned about their affiliations; their participation in this debate, motivated by a desire to maintain or protect academic relationships they had formed. A potential example of this concern was the oft-voiced fear that the CCSS would impede local control of education - the local nature of the education process, providing the possibility for maintained relationships within given locales. If the CCSS, as commonly interpreted, was a national intrusion on local power, it could be perceived that the centralized environment would create relational barriers in a given school or district. Rationally speaking, it is difficult to form or maintain a relationship with someone working in an office in Washington D.C. when that person lives in Idaho or Ohio; while conversely, having an impactful relationship, with people in your local district or school, Tweet Example 4unmitigated by national standards, is assumedly easier to maintain.

All told, on the same side of the argument, the members of the blue and yellow factions shared a common concern, yet they were propelled by different drives, coming together to achieve a common goal while not letting their personal interpretations or motivations impede the success of their shared desire. They were divided, yet solid, inferring that division does not, paradoxically, inhibit cohesion; in fact, that divisions of any kind can be overcome when efforts are directed toward identifying and focusing on shared concerns. In this case, there was a situational division between the blue and yellow group – one faction outside education and the other inside education - yet, the two were able to overcome this difference with the same end goal in mind. I don't believe they did this knowingly, however it does reveal the possibility that our cultural divisions do not prevent us from addressing common concerns. So, if we are really living in a fractured country, as has become round belief, there still remains plenty of common ground on which we can meet and arrive at mutual goals.

A DEFINED MOMENT IN MISPERCEPTION

On the other side of harmony however, within the same Drive Orientation analysis, we located further evidence of misperception and miscommunication. As the highest measuring faction on the achievement drive, the Green group, used the language found in the Common Core itself - language also found in our achievement word library – to advocate for a system that promoted achievement. Fundamentally, the Common Core was an achievement or performance-based reform, requiring teachers to turn the education process into a defined series of steps, the landings of which, were various Tweet Example 5 standards that need be met by students and teachers alike, in order to continually climb or achieve. Because it made sense to them (the reform a reflection of their dominant drive) the green group used arguments and language which expressed an achievement view of education: education as a means for ascension, something meant to promote or encourage success. Such a fact illuminates the reality that the standards were created (and advocated for) by a group of people who perceived education in a very particular manner that did not necessarily coincide with the educational philosophies of others.

As we mentioned in our results, not all people consider the primary purpose of education to be about academic or social achievement. In fact, many people view education as a process dedicated to the enriching of a student's ability to critically think, or alternately, as a means to the creation of a responsible, conscientious public citizenry. The problem with promoting a specific educational view (seeing education as specifically for achievement) is that the use of achievement oriented language may not have necessarily connected with those who have different ideas regarding education's purposes.

For example, if I see something as a power scenario and I try to convince someone of its merit based on its ability to promote a person's power, yet that person is not driven by power, my promotion might fail to register or engage my interlocutor's needs. Affiliation people are not concerned with how a reform affects their ability to order or organize; they are more worried about how a reform inhibits or promotes their capacity to harmonize relationships with others. Such a schism then between rhetoric, position, and reception makes me wonder if the various arguments put forth during this debate had been fervently recast, using different language more

focused on alternate views, without actually changing the standards themselves, would the Common Core, and Green's advocacy, have been met with increased social support? Had they not generally positioned the CCSS as a means to increase achievement, but rather as a conduit for critical thinking or a method to promote teacher autonomy, or even how it could engender harmonious relationships in schools, would the debate have been less contentious? To green's credit, they did just this in the adjacent example, but I wonder if this was too little too late, or maybe just a Tweet Example 8 reactionary, even, singular example of Green attempting to calm the power fears of Blue?

FINAL THOUGHTS

All this combined leads me to wonder, what was the real nature of the Common Core conversation on Twitter? Was it in fact a conversation at all, or was the issue merely a template on which people worked out their individual psychologies under the guise of an education reform debate waged over social media? As my colleagues noted in the first #commoncore project, this appears to have been something of a proxy war, a substitute topic co-opted by a multitude of minds, in my opinion, though it wasn't the means to discuss other political issues, but instead a conduit through which individuals exercised their desires, drives, moods, and angst. The yeses and no's then, at least in my eyes, eventually were of no matter; removed from the dichotomy of advocacy or opposition, this conversation became something else.

What exactly it was, I do not know, but I can say for certain that it was not a simple matter of for or against, nor a proposition understood by simply counting yeses and no's. It is so far removed from the binary, that to think of it in these terms further oversimplifies an already oversimplified subject. As shown by the size of this project, and the multitude of ways in which we examined the conversation, this was something much greater than a dichotomous clash - the issue itself, the standards, a mere fragment of the conversation, a focus upon which prevents genuine understanding of what took place. In the same sense, focusing on the sensational aspects of the last election, or the apparently cavernous division between political tribes, derails a person from truly understanding the contemporary political climate - what took place and why things are the way they are – and also possibly causes us to miss the threads of shared concern with which we might mend our national bond.

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MISINFORMATION AND NETWORKS

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Language is never neutral; it determines the way we understand reality and our way of thinking ultimately drives our individual and collective behavior. Language is the mediation technology par excellence between the mind and the larger world in which we interact. The metaphors or linguistic frameworks that mass media, social media, think tanks, lobbies, and activist organizations use create specific perceptions of reality and as such influence our thoughts. These various perspectives can be moved through social systems that have been enhanced and accelerated by technology. The subsequent understandings and misunderstandings then have the potential to multiply and diffuse through relations, communities, and over large-scale networks. This new reality creates an interesting intersection between language, social dynamics, and technology.

The ubiquitous nature of technology continues to play an increasing mediating role in the way that individuals and societies access and perceive reality. The advent of social media created a new ecosystem of communication that has begun to threaten or even destroy traditional media communications, which for a long time held a monopoly on information and its flow. In the current climate both mass and social media cohabitate, creating a new information ecosystem that reflect the emergence of a single social and communication continuum. Within this ecosystem co-exists both information and misinformation, each holding similar status; news stories as much as fake news hold equal sway. This co-existence affects how individuals, communities and societies perceive and understand reality and how people ultimately behave based on their understanding. In this new social continuum, data information, knowledge, and even falsehoods move in a "networked" way.

We all now live in a world where the enormous amount of (mis)information available creates the unprecedented paradox of not being more or better informed, but in fact, actually less. Though this violates the common conception that knowledge is dependent upon the availability of information; it is coming clearer that an abundance of access to information may have the reverse effect. The explosion of information seems to have generated an increased need to make better and more efficient decisions, thrusting the individual into the editorial role. More access to "information" may actually generate the potential for ambiguity, misinformation, and uninformed risk taking. Taken together this creates the conditions for poor decision making, or more arduous decision making, putting the consumer in a position to determine their own truth based on an ever expanding library of sources. This is not occurring just for the average citizen, but also for high level decisions makers tasked with making political, economic, or even for health care.

Often the approaches to making sense of data and (mis)information is idiosyncratic or biased, further exacerbating the potential problem. The interplay of bias and (mis)information gives way to a new level of risk both at the individual and collective level. Within this new communication ecosystem, there exists concurrent streams of incongruous information and misinformation, noises and signals both false and real, news and rumor, the original and the duplicate—all contained within the same bold universe. In this unprecedented time of (mis) information in a global, highly interdependent society, one is left to ask where decision makers should place their focus? Whom to trust when attempting to manage this explosive growth accelerated by the complexity of everyday life reflected and buoyed by technology.

It seems that the oft quoted phrase - "information is power" – is no longer applicable, that the idea must be changed to fit our post-Internet reality. Unfortunately, in a sense, "misinformation is now power" as we seem to be losing our grip on traditional conceptions of "truth". What was once fact, now seems to carry far less weight, even coming into conflict with what is certainly false. In a slightly unnerving way we now live in a "post-truth era, particularly so after the US presidential election and the Brexit referendum in 2016. Both situations were created and furthered by the confluence of fact and fiction, information rampant on both sides of every debate, utilized to further individual ideologies.

To accept misinformation, or worse ignore its existence, will have serious consequences. The increasing complexity of everyday life, due to technological disruptions, is already chaotic and stressful, but that does excuse us from attending to, or even questioning what is put before us. Though it is difficult, it is now necessary more than ever to be more vigilant in questioning sources. Unfortunately however, all too often we do not possess a powerful enough light to illuminate the shadows. Our previous ability to truth-seek no longer seems adequate. As technology and the dissemination of information have evolved, our tools must evolve as well. In some small way our project attempts to do this, bringing light to some of these forces at play. It seems that only a misunderstood relativism, or an explicit strategy of disinformation, can explain the spread of

intellectual perversions that we are experiencing on a near daily basis.

When misinformation expands through mass and social media there are no filters, no border or countries, only flows through a global network. Everything circulates with similar speed and it is all equally accessible with only a cursory knowledge of computers, but the consequences are dramatic for individuals, groups, communities, etc. The inevitability of information flow is part of communication progress, but it is also potentially socially destructive. The (mis)information onslaught has begun and show no signs of abating and will have severe consequences for us all. As it stands, there are no indications that the drip of misinformation is dwindling, for it seems that more and more people, events, and groups join in the fraying networked world.

So in moving beyond despair, what is one to do? From our work, having and sharing accurate information is what allows us, as advanced societies, to place limits on uncertainty. Our social, scientific, political, and moral progress, as well as our idea of freedom is grounded in minimizing uncertainty through rationality, evidence and fact. We must remain aware and vigilant that there remains great capacity in networks to produce misinformation and corrode our democratic social contract.

#COMMONCORE PROJECT METHODOLOGY

INTRODUCTION

This section provides a detailed discussion of the methods used to arrive at the conclusions in #commoncore: How social media is changing the politics of education. After describing how we retrieved the Twitter data, which was used in all sections of the website, we then detail the analyses for each of the five acts in the website.

TWITTER DATA

Twitter (http://www.twitter.com) is a free online global social network that combines elements of blogging, text messaging and broadcasting. Users write short messages limited to 140 characters, known as 'tweets', which are delivered to everyone who has chosen to follow the sender and receive their tweets. Within each tweet is possible to link to other media and to embed video, images and use searchable metadata named as hashtags (a word or a phrase prefixed with the symbol # as metadata).

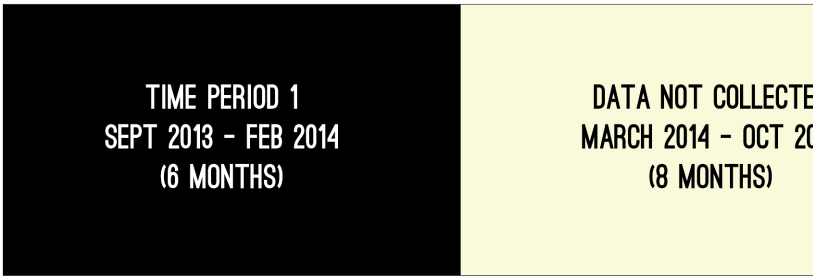
Twitter users can interact and communicate in different ways and users are finding new and creative ways to get the most out of each tweet. First, they can write simple messages called tweets adding images, videos, hashtags, etc. Second, tweets can be further disseminated when recipients repost them through their timeline. This technique, called retweeting, refers to the verbatim forwarding of another user's tweet. A third type of messaging is a variant of tweeting and retweeting, called mentioning. Mentions include a reference to another Twitter user's username, also called a handle, denoted by the use of the "@" symbol. Mentions can occur anywhere within a tweet, signaling attention or referring to that particular Twitter user.

To collect data on keywords related to the Common Core we utilized a customized data collection tool developed by two of our co-authors, Miguel del Fresno and Alan J. Daly, called Social Runner LabTM. Social Runner LabTM allowed us to download data in real time directly from Twitter's Application Programming Interface (API) based on tweets using specified

keywords, keyphrases, or hashtags. We bounded the data collection to a set of keywords and captured Twitter profile names as well as the tweets, retweets, and mentions posted. Our data include messages that are public on twitter, but not private messages between individuals, nor from accounts which users have made private or direct messages.

In the data collection for the first six months of our study, we collected only tweets that used commoncore. In the last 18 months of our data collection we added ccss and stopcommoncore to our collection dataset. Thus, as can be seen in Figure 1, we collected data for 24 months over the period from September 2014 to April 2016. For the sake of comparability, we broke our data into six-month periods. For more details about the data, see The Dataset in Act 1.

The analysis that produced the conclusions of each Act in the website used different segments of the Twitter dataset and employed distinct methods. Table 1 shows a summary of the data used for the analysis conducted for each Act, as well as the samples of actors and tweets, the keywords, and the methods that were utilized.



TIMELINE

The analysis that produced the conclusions of each Act in the website used different segments of the Twitter dataset and employed distinct methods. **Table 1** shows a summary of the data used for the analysis conducted for each Act, as well as the samples of actors and tweets, the keywords, and the methods that were utilized.

TABLE 1. DATA AND METHOD FOR EACH ACT OF THE #COMMONCORE WEBSITE

ACT	DATA USED	SAMPLE SIZE	KEYWORDS/HASHTAGS	METHOD
Act 1 – The Giant Network	Time Periods 1-4	968,320 tweets from 188,585 distinct actors	(#)commoncore (Periods 1-4), (#)ccss, (#)stopcommoncore (Periods 2-4)	Social network analysis
Act 2 – Central Actors	Time Periods 1-4	825 distinct actors	(#)commoncore (Periods 1-4), (#)ccss, (#)stopcommoncore (Periods 2-4)	Social network analysis, descriptive statistics
Act 3 – Key Events	Time Periods 1-4	968,320 tweets from 188,585 distinct actors	(#)commoncore (Periods 1-4), (#)ccss, (#)stopcommoncore (Periods 2-4)	Quantitative aggregation by dates; qualitative scanning to identify key events
Act 4 – Lexical Tendencies	Time Periods 2-3	507,734 tweets from 100,247 distinct actors	(#)commoncore, (#)ccss, (#) stopcommoncore	Social network analysis Automated text mining based on customized word libraries; analysis of variance to test for group differences.
Act 5 – Tweet Machine	Time Period 1	Random sample of 5,700 tweets from Time Period 1	(#)commoncore	Qualitative coding and interpretation
What follows is a detailed description of the analyses conducted for each act.				

D 014	TIME PERIOD 2 NOV 2014 - APRIL 2015 (6 MONTHS)	TIME PERIOD 3 MAY 2015 - OCT 2015 (6 MONTHS)	TIME PERIOD 4 NOV 2015 - APRIL 2016 (6 MONTHS)

ACT 1 - THE GIANT NETWORK

The Giant Network is a visual depiction of the social network of actors engaged in Twitter interactions using the three Common Core keywords and hashtags commoncore, ccss, and stopcommoncore. Because our data for Time Periods 2-4 were not contiguous with Time Period 1, the Giant Network graphics consist only of the participants in the latter three time periods. To produce the social networks for both the Giant Network and Central Actors, we used an open-source software program called Gephi,1 which depicts the relations as networks and we set metrics for a specified magnitude.

The social network analyses are grounded in the larger idea of social network theory and draws on a set of metrics to examine the pattern of connections, or ties, between individuals that create a larger "social network." This network forms a social structure of relationships, which research suggests can facilitate or inhibit an individual's access to resources such as opinions, beliefs, and perspectives.2 This structure allows for analysis at the individual, pair, small group, and overall network level and as such provides insights into not readily visible patterns of interactions and who may be influential in a social structural sense. We also bounded the analysis within the universe of keywords and hashtags of interest—meaning that we were not examining the structure of the entire Twitterverse, but rather a bounded network to enable us to report findings on a particular and specified network. Although our work captured a vast amount of activity in the Common Core space it is likely additional interactions took place outside of our bounded sample. We will often use the term "relative" in our work as one's activity in this space is only comparable to others within the bounded network, meaning the actors are only more or less active in comparison to other individuals within the bounded network. In the #commoncore Project each node is an individual user (person, group, institution, etc.) and the connection between each node is the tweet, retweet, or mention/reply.

After retrieving the data from the Twitter API, we created a file that could be analyzed in Gephi. We then visualized the entire network including all individual actors in Time Periods 2-4, consisting of approximately 780,000 tweets from about 150,000 distinct actors.

DETERMINING THE STRUCTURAL COMMUNITIES/FACTIONS

As we wanted to understand the inner structure and clustering of the interactions within this large connected network, we ran a community detection algorithm to identify and represent structural sub-communities, or factions (a "faction" in this sense is a group with more ties within than across group even those group boundaries are somewhat porous). When we ran the algorithm we found 4-5 main factions (depending on the time period) within the Common Core network.

These factions were based on the Twitter activity of the actors around Common Core, which resulted in the distinct and overlapping groups. It is important to note, we did not "pre-assign" these factions a priori based on attributes of the individuals, rather we let their interactive activity on Twitter determine the structural group (faction) to which they belonged. It is also important to note that the factions are porous, meaning that an actors' membership to one group is based on their interactive activity (tweets, retweets, and mentions) with others and that if their Twitter "behavior/activity" changed they could be appear in a different community. As such, the boundaries and membership are not hard and fast, but rather reflect a general indicator of faction membership.

We then used that data as the starting point to first identify specific actors and then second examine the opinions of actors within each factions (see section on coding of tweets).

ACT 2 - CENTRAL ACTORS

DETERMINING WHO WERE THE KEY ACTORS IN THE NETWORK

In order to better understand the relative degree of activity of each member in the network, we ran measures on each actor in order to assess which individuals had relatively more incoming and outgoing ties. It is important to note that we did not constrain ourselves to the 'number of followers' metric to determine influence as is often done, but we focused on a wider constellation of ties surrounding an actor and the larger patterns that formed over the network to identify social influencers. Our results suggested socially influential actors of three different types. We call these three types transmitters, transceivers, and transcenders.

Transmitters are individuals who send out a large number of tweets using the keywords of interest. Social network researchers call the activity of transmitters outdegree, which is a measure of the number of tweets an individual sends over the period of time under study. Outdegree is not related to the number of followers a transmitter has, but is strictly a measure of how many tweets an individual posts to the specified keywords.

Transceivers are a different kind of elite influencer. Transceivers are those actors who have what social network researchers call high indegree. In our analyses, indegree is the combination of the number of times an actor's messages were retweeted, coupled with the number of times in which they are mentioned in others' tweets within the specified keywords. Mentions are signifiers of a different kind of influence in the #commoncore conversation.

Transcenders who have both high outdegree, defined as sending the largest number of common core-related tweets to keywords of interest, as well as having high indegree, defined as a combination of being retweeted and mentioned in the highest number of tweets. These individuals reflect those elite actors who possess the highest relative levels of activity within the network and wield a significant amount of social influence.

Once we identified the factions and key actors in the network we wanted to examine the structure of the bounded network more deeply. In order to do this, we used Gephi to filter out all other actors to focus on the top .25% of social elite with the greatest relative outdegree and indegree activity. In terms of outdegree, these represent the participants who tweeted, on average, 180 times or more over a given six-month period. This was the equivalent of the top .25% of the network which we used as a cutoff for indegree. As the data are publically available we were then able to specifically identify the core actors and factions and conduct further analysis described in the coding section below.

ACT 3 - KEY EVENTS

DETERMINING THE KEY EVENTS

To create the line graphs for each six-month period, we collapsed each of the four tweet datasets into the number of tweets per day and produced line graphs with date on the x-axis and number of tweets on the y-axis. We then chose dates with relatively high volumes of tweets and scoured the tweets for that day until themes began to emerge. The themes often contained key words or phrases, which allowed us to search through the data for the specified day to quantify the prevalence of the theme amidst the other tweets for that day.

ACT 4 - LEXICAL TENDENCIES

Measuring lexical tendencies involved a number of steps. First, we adapted versions of James Pennebaker's Linguistic Inquiry and Word Count (LIWC) libraries by running our entire dataset through his LIWC program. By running our data through his program, we were able to locate every word that was used in the CCSS Twitter debate that matched those in his libraries and create libraries specific to each sentiment we examined. Each of his libraries, thereby our libraries, was composed of words, which were carefully selected to measure a specific psychological dimension. The word libraries ranged in size from 23 to just over 900 words. The range in the number of words across the libraries was determined by Pennebaker and his team through their own background research.3 In their work they selected words for inclusion in a library by combing through entire dictionaries to determine the potential applicability of every word to reflect a psychological domain, and then conducting empirical analyses to support the measure. Overall, we included measures of 10 psychological dimensions in our analyses: anger, happiness, sadness, power, affiliation, achievement, conviction, analytical thinking, formal thinking, and narrative thinking. Table 2 shows information about the libraries for each psychological dimension, the number of words in the library, and examples of the words contained in each library.

SENTIMENT	DIMENSION	# OF LIBRARIES	# OF WORDS IN LIBRARY		EXAMPLE WORDS FROM LIBRARY
Mood	Anger	4	Anger Words	417	dumb, fight, frustrated
			Focus Present Words	400	ask, die, go, infer, meet
			I Words	19	I, my, me, I'm
			You Words	23	you, your, u, you're
	Happy	4	Focus Past Words	279	came, did, gave, felt, got, saw
			Noun Words	373	children, education, amendment
			Positive Emotion Words	602	free, helping, please
			We Words	10	we, our, us
	Sad	3	Focus Future Words	113	wants, will, going, tonight
			I Words	19	I, my, me, I'm
			Sad Words	192	suffer, failing, lost, reject
Drive	Power	1	Power Words	918	big, control, demand
	Affiliation	1	Affiliation Words	348	love, parents, help, we, alliance
	Achievement	1	Achievement Words	364	creating, overcome, proud, tried
Conviction		12	Auxiliary Verbs*	122	is, will, have, are
			Conjunctions	36	how, so, and, as
			Discrepancy Words*	43	must, need, if
			I Words	19	I, my, me, I'm
			Negative Emotions	614	rotten, wrong, problem, defend
			Numbers	78	one, five, sixth, year, grade
			Positive Emotions*	602	easy, free, please, ready
			Pronouns*	79	his, you, your, we, our
			Social Words*	1019	human, kids, public, talking, love
			Time Words	206	now, stop, new, end
			Word Length > 6 chars		
			You Words*	23	you, your, u, you're
			3rd Person POV*	27	his, he, they, their
Thinking Style	Analytical	7	Causal Words	300	reasonable, how, using, because
			Conjunctions	36	how, so, and, as
			Insight Words	229	know, learn, think, explain
			Negations	58	don't, no, not, can't
			Prepositions	348	parents, help, our, we
			Quantifiers	109	more, all, every, much, another
			Tentative Words	243	if, or, try, may
	Formal	5	Article Word	3	a, an, the
			Common Adverbs*	128	how, why, just, so, about
			Discrepancy Words*	43	must, need, if
			I Words*	19	I, my, me, I'm
			Prepositions	348	parents, help, our, we
			Word Length > 6 chars		
	Narrative	5	3rd Person POV	27	his, he, they, their
			Common Adverbs	128	how, why, just, so, about
			Conjunctions	36	how, so, and, as
			Pronouns	79	his, you, your, we, our
			Social Words	1019	human, kids, public, talking, parents, love, fight

* Reverse coded during analysis

Once the libraries were built, we created customized search routines using Python,4 an open-source object-oriented programming language, to comb through each of the 507,734 tweets from 100,247 distinct actors and match the words to those in the word libraries. This procedure produced a count of the total words in each tweet and the words that matched those in each library. We then aggregated these up from the tweet level to the actor level, which generated the total number of words used by each actor and the words used by that actor which were contained in the word library. This gave us a stable reading of the proportion of words in a library as a proportion of total words for each individual for each library. Because we wanted remove anomalies in the data where someone could have tweeted five words, of which three matched those in the library, we decided to remove any individual who tweeted less than 15 words over the one-year period. This reduced our sample by 20% from 100,247 to 80,671.

Next, for those sentiments which contained more than a single word library (i.e. all except the three drive dimensions), we first standardized and then averaged across the multiple libraries. Since seven of the 10 psychological characteristics (except for the three drive motivations) were measured by more than one library (ranging between 3 and 13 libraries), we standardized the proportions across libraries within dimension using z scores ($\mu=0$; s.d.=1). This served to essentially equalize the differences in proportions across the different libraries within a dimension. This was necessary because of the imbalance of the number of words within libraries that represented a particular sentiment dimension. For example, the sadness dimension of mood contains three libraries (focus future words, I words, and sad words). Since there are fewer I words than there are focus future or sad words in their respective libraries, the unstandardized effects of focus future and sad words would swamp the effects of I words. By standardizing the libraries of a dimension before averaging across them, we essentially equalized across the three libraries, therefore producing and unbiased average for each individual.

In two cases, we recoded several of the libraries after standardization, but before averaging the libraries within a dimension. In both Conviction and the Formal Thinking dimension of thinking style, we reverse coded a subset of the libraries (noted with an asterisk in Table 2) so that the greater use of the words in the library was always aligned with higher levels of both Conviction and Formal Thinking. We did this by multiplying the standardized results for the specified libraries by -1 before averaging across them.

The next step was to connect every individual tweeter to one of the three Common Core-relevant factions (excluding the Costa Rican group) that were previously identified in our social network analysis (see Giant Network). The community detection algorithm that we used to create the structural sub-communities was used to determine the faction to which each individual belonged, based upon their behavioral activity on Twitter. That is, people were connected to groups because of their activity in following, retweeting, or mentioning others within the specified hashtags or keywords. Using these data, we categorized the individual tweeters by the three color we chose to represent the factions: green (supporters of the Common Core), blue (opponents of the Common Core from within education), or yellow (opponents of the Common Core from outside of education).

Using these groups, and the standardized results scores for each sentiment dimension, we then performed a series of analyses of variance (ANOVA) to test for differences between factions for each psychological characteristic. In the results sections in lexical tendencies, we report significance using the standard .05 level.

For our final step, we decided to report actual word use in number of words used per 100 rather than in standardized scores, because we believed this would be more meaningful to our readers. Thus, we chose one of the libraries in each dimension as an anchor and, using a linear transformation, converted the standardized scores into the metric for the anchor library and reported the results as the number of words per 1000. A consequence of this approach is that those characteristics with more libraries resulted in a larger number of words per 1000, because there are more words that can be identified within each dimension. Therefore, we caution readers not to compare the frequency of words used across the psychological characteristics, but focus instead on comparing the numbers for each faction within each dimension not across.

ACT 5 - TWEET MACHINE FRAMING ANALYSES

The Tweet Machine results are distilled from a peer reviewed paper in Education Policy Analysis Archives.5 The data for this part of the study come from the publicly available tweets downloaded from Twitter for Time Period 1, between September 1, 2013, thru March 4, 2014. The 189,658 tweets using commoncore during this time period came from 52,994 distinct authors.

To arrive at the sample of tweets for the qualitative analysis, we first took a random sample of 3% of the tweets, or 5,700 tweets. These included tweets, retweets, and mentions. We then conducted a word search through this random sample of tweets to identify the tweets that contained the words 'child' (therefore including the word 'children'), 'youth', 'kid' (including the word 'kids') or 'teen.' The words 'child' and 'kid' were frequently mentioned, while 'teen' and 'youth' were rare occurrences. This produced a dataset of 821 tweets, which represented 14.4% of the random sample. Extrapolating back to the population, we infer that about 15% of the tweets sent over the six-month period we examined included references to children.

The development of our coding framework was an iterative and emergent process, informed by a conceptual framework that looked for frames, metaphors, and the particular language used by the tweet authors. We first did an initial reading of the random sample of tweets to identify emerging meaning and a set of categories began to arise. These included the main actor of the tweet, the purpose of the actor, the action of the actor, the scope of the action, the target of the action, and the consequence or effect of the action. Using a visual mapping process advocated by Miles and Huberman (1994),6 we sketched out these relationships and began to recode the tweets based on these emerging groupings. As we began the recoding process, we noticed that the actors and purposes could be organized into a set of topical themes, which formed the five frames (government, business, war, experiment, propaganda) that we ultimately used to organize the analyses. As the five frames began to emerge, we subsumed the initial categories (actor, purpose, action, scope, target, and consequence) within each of the frames. We then restarted our coding process, methodically coding the tweets by the five frames, and reaffirming our assessment of the initial categories. We then combed through the resulting coded tweets as a series of themes and points emerged to illustrate the metaphors, including metonymies, linguistic enablers of the metaphors, and the value systems these sets seemed to best target. As we engaged in this process, we carefully attended to the metaphors, metonymies, pronouns and other linguistic markers that substantiated or refuted our emergent themes. We then picked about five to 10 exemplars from each of the five radial categories that provided strong and diverse examples of the radial frame, which we used as exemplars in the results presented in the website.

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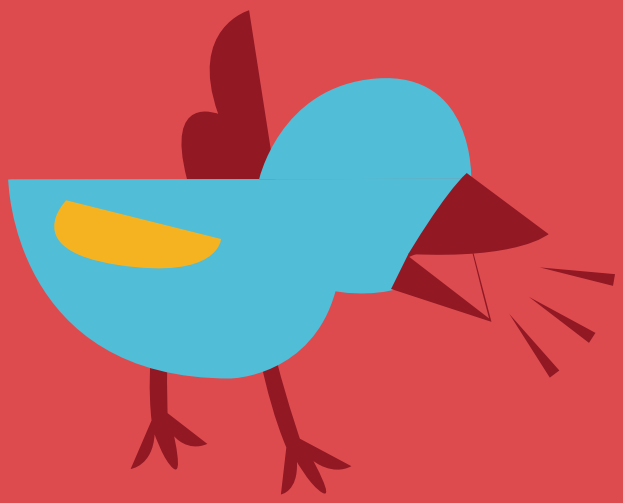
#COMMONCORE PROJECT



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