

Epstein. R. (2018). Manipulating minds: The power of search engines to influence votes and opinions. In M. Moore & D. Tambini (Eds.), *Digital dominance: The power of Google, Amazon, Facebook, and Apple* (pp. 294-319). Oxford, UK: Oxford University Press.

http://aibr.org/downloads/EPSTEIN_2018-Manipulating_minds-The-power_of_search_engines_to_influence_votes_and_opinions-UNCORRECTED_PROOFS.pdf

CHAPTER 12

Manipulating Minds

The Power of Search Engines to Influence

Votes and Opinions

ROBERT EPSTEIN

“A world of unseen dictatorship is conceivable, still using the forms of democratic government.”

—Kenneth E. Boulding

On January 17, 1961, three days before John F. Kennedy became president of the United States, outgoing president Dwight D. Eisenhower gave a remarkably surprising and prescient farewell speech. Eisenhower spoke boldly about what he saw as “the potential for the disastrous rise of misplaced power” through an emerging alliance between the various branches of the US military and the vast new industries of war that World War II had brought into being (Eisenhower 1961). Eisenhower dubbed this alliance “the military-industrial complex,” and he saw it as a serious threat to security and liberty in the years to come, preventable only by the efforts of “an alert and knowledgeable citizenry.”

These weren’t the ramblings of some left-wing outsider. Eisenhower was a highly decorated Army general who had led Allied forces to victory over Nazi Germany in World War II. He was the ultimate *insider*, baring his soul about what he perceived to be serious dangers facing his country and the world. One of his warnings is especially pertinent to the world

we face today: that our increasing dependence on technology could lead to the emergence of a “technological elite” so powerful it could come to control public policy without people’s awareness of the role it was playing in their lives.

Research directed by the author since 2013 suggests that such an elite now exists: that a small group of corporate executives now has the power to shift opinions, purchases, and even the outcomes of elections on a massive scale around the world without anyone being the wiser. That this power exists is now beyond question; perhaps more troubling is the growing number of indications such power is actually being wielded. This chapter reviews some of this research and also proposes how society can, following Eisenhower’s entreaties, do a better job in the years to come of becoming an alert and knowledgeable citizenry that protects itself from potentially dangerous sources of manipulation made possible by emerging technologies.

OLD AND NEW SOURCES OF MANIPULATION AND CONTROL

As the behavioral psychologist B. F. Skinner (1971) noted in his best-selling book *Beyond Freedom and Dignity*, in some sense all human behavior is controlled—always has been, always will be. Control per se is not bad. How could society exist without socialization practices or without police to maintain order? Imagine the chaos if we removed the lines that demark the lanes on multiple-lane highways. Control itself is not bad; it is certain *kinds* of control to which people object—especially aversive forms—that is, the kinds that make us feel bad: whips, chains, paddles, penalties, threats, punishments, and so on. We are not nearly as distressed about the positive means that governments, corporations, and the people around us use to control us: advertisements, salaries, rewards, bonuses, and praise, for example. In open societies like the United States and the UK—societies with a free press and relatively benign governments—we are also subjected to *diverse and competing forms* of control: a wide variety of leaders, newspapers, websites, vendors, and pundits that are pulling or pushing us in different directions. This makes us feel like *we* ourselves are actually in control—like we are making up our own minds. Company A says, “Buy our widget,” and Company B says “No, buy *our* widget,” and then we decide. Billboard A says, “Vote for Mary,” and billboard B says, “No, vote for James,” and, again, we decide.

Even in open societies, however, things are not always so simple. Sometimes we feel like we are making choices when in fact we are not. In the late 1800s, for example, a single corporation—Western Union—controlled

virtually all long-distance communications in the United States through its nationwide system of telephone poles, wire, and telegraph operators. In the presidential election of 1876, Western Union not only chose the Republican candidate—a relatively unknown politician from Ohio named Rutherford B. Hayes—but also used its communication monopoly to shift votes. Among other things, it made sure that news stories that traveled over its wires favored Hayes, and it also shared the messages sent and received by the campaign staff of Hayes’s opponent with Hayes’s own staff. Even with all the underhanded corporate help, Hayes did not win easily, but he did win, and the electorate was unaware of Western Union’s meddling (Blondheim 1994).

In this case, the key to controlling votes was to control the *information* to which people had access—information contained in correspondence and news stories. George Orwell reminded us in 1984 that if you can control the information people have, you can control how they think. Also fictional: In a 1992 movie about computer hacking—*Sneakers*, with Ben Kingsley, Robert Redford, and Dan Aykroyd—at the end of the film Kingsley’s character, defending the art of hacking, says,

The world isn’t run by weapons anymore, or energy or money. It’s run by ones and zeroes, little bits of data. It’s all just electrons. . . . There’s a war out there, old friend, a world war. And it’s not about who’s got the most bullets. It’s about who controls the information: . . . what we see and hear, how we work, what we think. It’s all about the information. (*Sneakers* Script 2017)

Fast-forward to a real study published in 2012 in which the Facebook company demonstrated the enormous power it has to control votes in an election. In the report, Facebook revealed that it had sent “go out and vote!” reminders to 60 million of its members on Election Day in the United States in 2010, causing an additional 340,000 people to vote that day who otherwise would have stayed home (Bond et al. 2012). Fast-forward again to Donald Trump’s surprising victory in the US presidential election of November 2016. What if Facebook had chosen that day to send “go out and vote!” reminders only to supporters of Trump’s opponent, Hillary Clinton? Extrapolating from the 2012 study, that might have caused 450,000 more people to vote for Mrs. Clinton (given that 200 million people were registered to vote, that 100 million might have favored Clinton, and that Facebook’s reminders might have reached 80% of those people)—more than enough, most likely, to give her the win, with no one but a handful of people at the company knowing about Facebook’s interference. This is not just fantasy on my part; at times, Facebook has *advertised* the power it has

to flip elections through targeted messaging (Pasick 2017), and a *New York Times* investigation concluded that Facebook boosted pro-Clinton voter registration through targeted messaging in the months prior to the election (Chokshi 2016).

As far as the author can tell, Facebook did *not* interfere on election day itself, perhaps because executives there were being cautious or were overly confident that Mrs. Clinton would triumph without the company's help. But imagine having that much power—the power to flip a close national election invisibly with a few keystrokes that will determine what kind of messages hundreds of millions of people will see on their computers and mobile devices.

Facebook probably held back on sending out targeted reminders on Mrs. Clinton's behalf on election day, and the company might even have unwittingly sent hundreds of thousands of votes to Mr. Trump in the final days before the election by drastically boosting the exposure of dozens of fake news stories that were damaging to Mrs. Clinton, rapidly spreading the contents of these bizarre stories to tens of millions of its members (Silverman 2016). Facebook's CEO, Mark Zuckerberg, at first denied this had occurred (Isaac 2016) but ultimately demurred, announcing that Facebook would soon launch new algorithms to protect users from fake news (Morris 2016).

Fast-forward again to November 10, 2016—two days after the presidential election—when Eric Schmidt, CEO of the holding company that owns Google, Inc., gave a speech at a meeting in New York organized by the *New York Times*. Said Schmidt: “How people get their information, *what they believe, what they don't*, is, I think, the project for the next decade” (Scola 2016; italics added).

Think about how new and bizarre these events are. The leaders of two massive tech companies are not just talking about what their businesses were originally created to do; they are reaching far beyond. On its surface, Facebook is a social networking site that allows us to keep in touch with friends and family members. On its surface, the Google search engine is a benign and simple tool that helps us find information on the Internet. Both Zuckerberg and Schmidt know full well, however, that these platforms have morphed over the years into very different kinds of tools. Among other things, they have become supremely intrusive tracking devices (Moore 2016; Taplin 2017a), and they have also become tools for manipulating the opinions, beliefs, purchases, and voting preferences of billions of people, often without their knowledge (Epstein 2016a). Day by day, Schmidt, Zuckerberg, and their fellow executives are making decisions about how to use the new powers they have, with the public and authorities completely

in the dark about the full range of techniques that can be deployed, the discussions that are taking place, and the decisions that are being made.

How some of the Big Tech companies have rapidly gone from being helpful gadgeteers to what some might view as Machiavellian monsters is a big topic—too big to handle in this brief chapter. For present purposes, suffice it to say that both experts and authorities are gradually waking up to the magnitude of the problem. Three antitrust actions are currently underway against Google by the EU, and similar actions in Russia and India have already resulted in fines against the company. Google has already faced fines as large as \$500 million in the United States for its online shenanigans, and under the Trump administration, new investigations of the company by the US Department of Justice are likely to be launched soon.

This chapter does not discuss the legal and regulatory issues surrounding the growth of Big Tech—issues that are beyond the expertise of the author. Instead, it focuses on two lines of scientific research that have been conducted in recent years that demonstrate the extraordinary power Google has to manipulate people without their knowledge. Two methods have already been mentioned that Facebook can use to shift opinions—by determining which news items to feature in its newsfeeds and by messaging targeted demographic groups (for a look at five such ways, see Epstein 2016c)—but Facebook’s power to manipulate is trivial compared with Google’s. How can a simple search engine shift people’s views?

WHAT A SEARCH ENGINE DOES—AND FOR WHOM

To understand how a search engine can shift opinions, you first have to know how it works. Before you ever use a search engine, a company like Google is constantly combing the Internet using programs called “crawlers,” which look, among other things, for new web pages, changes in existing web pages, and links among web pages. Crawlers build an *index* of the information they find—just like the index you find in the back of a book—so that eventually people like you and me will be able to find that information quickly. Because Google runs at least twice as many computer servers—probably more than two million at the moment—as its closest competitor (Microsoft), it also crawls more of the Internet than anyone else. By 2015, Google was likely maintaining an index of 45 billion web pages, easily more than three times as many as Microsoft (van den Bosch, Bogers, and de Kunder 2016). Note that most search engines these days do not run crawlers at all; doing so is just too expensive. Yahoo, a search engine that predated Google, stopped crawling the Internet long ago; when

its search engine gives you search results, it is taking them from other companies, including Google (Sullivan 2014). Even Bing, Microsoft’s search engine, might now be cutting costs by drawing search results from Google (Epstein 2016b).

When you type a search term into the query box on Google.com (more about search terms later), Google’s software mainly does four things: it *parses*, then *selects*, then *orders*, then *displays*. *Parsing* means that it analyzes what you typed, breaking down your words into terms it can use for search purposes. So if you type “best dog food,” the software looks for terms or phrases (such as “dog food”) it has in its index and then looks for modifiers (like “best”) it can use to narrow down the search. If you are like the vast majority of people in the world who allow Google to track everything they do, Google then adds what it knows about *you* to the parsed search term: where you live, what kind of dog you have, how much you spend on dog food, what websites and news sources you trust, and so on.

Next, the software uses this information to select a relevant group of web pages from its index. That gray message you get—say, “About 38,300,000 results”—shows you how many relevant pages it found. Next—and this step is especially critical for manipulation purposes—it *orders* those results from best to worst using criteria that Google keeps secret. Finally, it displays those results in numbered groups, 10 results per page, with the top 10 on the first page you see, the next 10 on the second page, and so on.

The selecting and ordering can be done in an infinite number of different ways; how does Google choose to do it? If we are searching for a simple fact (“What is the capital of Nigeria?”), we don’t care much about how Google proceeds as long as we end up with the correct answer. But what happens when there is no correct answer? What happens when we search for “best dog food”? We want the very best food we can get for our dog, do we not? How, exactly, is Google doing the selecting and ordering? Is Google interpreting the word “best” the same way we are? Are the results they give us somehow “unbiased” and “objective,” or do the results somehow favor Google, Inc.? Does Google make more money when we click on certain search results? If Google has a business relationship with the Purina pet food company, will Purina results turn up higher than other results?

For that matter, what if we are searching for more sensitive information? What if we type “Is Hillary Clinton a liar?” or “Are Jews evil?” or “Should the UK remain in the EU?” How does Google do the selecting and ordering in such cases, and whose interests are served by what they show us?

Although Google has done a superlative job of convincing us that it is nothing more than a cool, benign source of endless free services that exist entirely for our benefit, that is far from the truth. Google is one of the most

profitable corporations in the world, currently bringing in about over \$100 billion a year in revenues, most of which comes from targeted advertising (Alphabet 2017). The basic business model is highly deceptive: Google provides free services—the search engine, Gmail, YouTube, the Android operating system, the Chrome browser, Google maps, and a hundred other services—which it uses to collect information about us, and then it leverages that information to help vendors reach us with advertisements showing us products and services we want (Epstein 2013a, 2013b). In other words, even though we feel like the search engine and Gmail are products we are somehow getting free of charge, to Google, *we are the product*. As Google Android head Andy Rubin put it, “We don’t monetize the things we create. We monetize *users*” (Gruber 2013; italics added).

To put this another way, Google, Inc., thrives as a business by selling us to vendors. The search engine and Gmail are not products at all; they are actually just ingenious surveillance tools (Epstein 2013a, 2013b).

Over time, Google has been able to build an elaborate and ever-expanding profile for each of us that not only identifies all of our preferences and inclinations, no matter how base or carnal, but that allows the company to *predict* what we want and need. “Maybe,” said Larry Page, cofounder of Google, in an interview in 2014, “you don’t want to ask a question. Maybe you want to just have it answered for you before you ask it. That would be better” (Khosla 2014). Over time, the value of the trickle of free information the company gives us every day is greatly outweighed by the value of the vast amount of information it has collected about us (Epstein 2016e)—information that not only affects what we purchase but that also can be used to determine how we vote (Epstein 2015; Epstein and Edelman 2016; Epstein and Robertson 2015) and even how we think (Epstein 2016a).

SEME: THE SEARCH ENGINE MANIPULATION EFFECT

Through the end of 2011, the author viewed Google the way most people still do: as a super cool corporate anomaly that miraculously did amazing things for us every day completely free of charge. By that time, however, a number of people had already expressed grave concerns about the company. In 2007, the legal scholars Oren Bracha and Frank Pasquale called for the regulation of Google in an essay in the *Cornell Law Review* (Bracha and Pasquale 2008). In 2011, Scott Cleland, a US State Department official under President George H. W. Bush, published a scathing book called *Search & Destroy: Why You Can’t Trust Google Inc.* (cf. Auletta 2009; Taplin 2017a;

Vaidhyanathan 2011). Also in 2011, Google executive James Whitaker left the company, later noting:

The Google I was passionate about was a technology company that empowered its employees to innovate. The Google I left was *an advertising company with a single corporate-mandated focus*. (Whitaker 2012; italics added)

The author began to turn a critical eye toward Google in January 2012, after receiving multiple notices from the company saying his website had been hacked (Epstein 2012). He wondered why he was not being notified by some government agency or nonprofit organization. When had Google become the Internet's sheriff, prowling cyberspace for shady properties? Having been a programmer most of his life, he also wondered how Google was now blocking access to his website not only through its search engine but also, somehow, through both Safari (a browser owned by Apple) and Firefox (a browser owned by Mozilla, a nonprofit organization). He eventually explained how and why Google blocks access to millions of websites in an investigative article he wrote for *U.S. News & World Report* called "The New Censorship" (Epstein 2016d).

Late in 2012, he was looking at a growing scientific literature that examined how search results impacted consumer behavior. Apparently, people trusted search rankings so much that 50% of all clicks went to the top two results, with more than 90% of clicks going to that precious first page of 10 results, and eye-tracking and other studies suggested that people focused on high-ranked results even when lower-ranked results were superior (Agichtein et al. 2006; Chitika 2013; Granka, Joachims, and Gay 2004; Guan and Cutrell 2007; Jansen, Spink, and Saracevic 2000; Joachims et al. 2007; Lorigo et al. 2008; Optify 2011; Pan et al. 2007; Purcell, Brenner, and Rainie 2012; Silverstein et al. 1999; Spink et al. 2001). Such findings led him to ask: *Do people trust high-ranking results so much that results that are biased toward one particular perspective could shift the opinions or beliefs of people who were undecided on an issue?*

Early in 2013, he and Ronald E. Robertson, currently a doctoral candidate in network science at Northeastern University in Boston, put this idea to a test. Using real search results and real web pages from the 2010 election for the prime minister of Australia, they randomly assigned a diverse group of 102 eligible US voters to one of three groups: (1) people who were exposed to search results that favored Candidate A (Julia Gillard)—that is, whose high-ranking search results linked to web pages that made Gillard look better than her opponent, (2) people who were exposed to search results

that favored Candidate B (Tony Abbott), or (3) people who were exposed to search results that favored neither candidate (the control group).

They used the Australia election to make sure their American participants would all be “undecided.” Before letting them conduct their online search, the researchers gave them basic information about each candidate and then asked them in five different ways which candidate they preferred; the researchers asked how the participants trusted each candidate, liked each candidate, and so on. Prior to search, the three groups did not differ significantly in their preferences on any of the five measures.

Then participants were let loose on a custom search engine—“Kadoodle”—where they could research the candidates for up to 15 minutes using 30 search results, organized in five pages of six results each. Participants could freely shift from page to page and click on any of the results to look at full web pages, just as people do on Google and other search engines. After their search, the researchers again asked them for their preferences using those same five measures.

The author had speculated that the two bias groups would shift their preferences by 2 or 3 percentage points after their searches, with people seeing pro-Gillard search results shifting a bit in her direction and people seeing pro-Abbott results shifting a bit in his.

But that is not what happened.

Instead, dramatic shifts occurred in all five preference measures, with the proportion of people favoring one candidate or the other shifting by 48.4%, and this was after just one search. (Note how the math works here: If the preference is initially 50/50, and you can get 48% of the people in one group—in other words, 24 people out of 50—to shift toward the candidate you are supporting, you now have the ability to create a win margin of 48% for that candidate—in other words, to get 74% of undecided voters to vote for the favored candidate with only 26% voting for his or her opponent. So the shift mentioned above—what the researchers call their “VMP” or vote manipulation power—can be considered an estimate of the win margin one might be able to create among undecided voters in a tight race. Needless to say, a margin of 48.4% is gigantic, especially if many voters are undecided.)

The effect the researchers found was so large that they were skeptical about it. Also disturbing was the fact that only 25% of the participants showed any awareness that they were seeing biased search rankings, even though the rankings were, from the perspective of the researchers, blatantly biased. In two subsequent experiments, they intermingled the search results supporting the two candidates slightly to mask the bias. They still got dramatic shifts in voting preferences—63.3% and 36.7%, respectively,

in the two experiments—while reducing the number of people who spotted the bias in the search results to *zero*, thus showing that biased search rankings can shift voting preferences *invisibly*—that is, with no awareness at all that people are being manipulated.

The initial experiments were small and performed in a laboratory environment in San Diego, California, but the fourth experiment was conducted online with 2,100 eligible voters from all 50 US states. This experiment produced a 33.5% shift overall, and there were now enough people so that demographic effects could be examined. The researchers found that different demographic groups varied substantially in their susceptibility to this kind of manipulation, with one demographic group—moderate Republicans—shifting by an astonishing 80%. The researchers were also able to look separately at the small group of people (a total of 120 of the people in the two bias groups) who noticed that the search results were biased, and here another disturbing discovery was made: The people who noticed the bias shifted even farther in the direction of the bias—by 45%. In other words, simply being aware of a bias in search rankings does not protect people from being affected by that bias—quite the contrary, in fact.

The final experiment in this initial series took the researchers to India for the 2014 Lok Sabha national election there—the largest democratic election in the world. They recruited 2,150 undecided, eligible voters throughout India who had not yet voted and randomly assigned them to one of three groups: Each participant had access to search results favoring one of the three major candidates running for prime minister. The previous experiments had all employed American participants who viewed materials from that 2010 Australian election, but now current search results and web pages were being used with real voters, right in the middle of an intense election campaign. The author's thinking here was that biased search results could still shift voting preferences but by only 1% or 2%. Again, his prediction proved to be wrong.

At first, an overall shift of 10.6% was found, but when procedures were optimized based on what the researchers were learning about Indian culture, the shift increased to 24.5%—over 65% in two of the demographic groups they looked at—with 99.5% of the participants showing no awareness that they were seeing biased search results. Again, this shift in voting preferences occurred after only a single search; presumably, if search results were biased in favor of one candidate over a period of months before an election, people would, over time, conduct multiple searches that might impact their voting preferences. In other words, it is possible that the large numbers we were getting were actually on the low side.

The results of these initial experiments were published in the *Proceedings of the National Academy of Sciences USA* in 2015 (Epstein and Robertson 2015), and the effect that search rankings had to shift votes and opinions was dubbed the search engine manipulation effect (SEME). The report included mathematics that would allow one to predict which elections could be flipped using biased search rankings given information about Internet penetration and other factors in a given population. Because the win margins in many elections are small (Mr. Abbott defeated Ms. Gillard by only 0.24% in that election in Australia), and because normal search activity often boosts one candidate over another in search results, the report estimated that SEME was currently determining the outcomes of upward of 25% of the world's national elections. It included a mathematical model showing that even very small biases in search results could have a dramatic impact on elections because of a possible synergy between two phenomena: High search rankings increase interest in a candidate (SEME), and strong interest in a candidate boosts search results related to that candidate.

Subsequent research the researchers have conducted on SEME has increased their understanding of it substantially. Among the major findings:

- SEME is powerful because of operant conditioning. The simple factual searches we conduct day in and day out (“What is the capital of Nigeria?”) invariably show us the correct answer in the top search position, teaching us, over and over again, that what is higher in the list is better and truer. People also mistakenly believe that computer algorithms are inherently more objective than people are, even though algorithms are written by people and virtually no one knows how computer algorithms actually work (Gerhart 2004).
- SEME can dramatically shift the opinions of people who are undecided about almost anything at all—global warming, homosexuality, fracking—not just voting preferences.
- When multiple searches on the same topic lead repeatedly to similarly biased search results, additional searches do indeed increase the impact of SEME.
- SEME can be suppressed to some extent with warnings that alert people to the bias they are seeing in search results. (Note that when people see a warning, that is very different from when they notice on their own that search results are biased. Warnings suppress SEME, whereas *noticing* bias *increases* SEME's impact.) Unfortunately, the only way we have found to suppress SEME completely is with a kind of equal-time rule: that is, by alternating biased search results—first toward one

candidate, then toward the other, then toward the first again, and so on (Epstein, Robertson, Lazer, and Wilson 2017).

SSE: THE SEARCH SUGGESTION EFFECT

In June 2016, a media company called SourceFed released a 7-minute video on YouTube which claimed that Google, Inc., was suppressing negative search suggestions for Hillary Clinton. In other words, when you started to type a search term such as “Hillary’s he,” whereas Bing and Yahoo would show you suggestions such as “Hillary’s health” or “Hillary’s health problems,” Google would only show you positive suggestions, such as “Hillary’s health plan.” This was true, SourceFed said, even though Google’s own Trends¹ data revealed that far more people were searching for “Hillary’s health problems” than for “Hillary’s health plan.” The SourceFed video also showed that Google regularly showed negative suggestions for other people, such as Donald Trump; it just would not show negatives for Mrs. Clinton. The video soon attracted more than a million views, and a 3-minute version posted on Facebook soon had more than 25 million views.²

During the summer of 2016, the author and eight members of his staff investigated SourceFed’s claims systematically, and they found that those claims were generally valid (Epstein 2016f). Note, for example, the dramatic differences in what Google suggested when people typed the word “crooked” on August 8, 2016, versus what Bing and Yahoo showed for the same search term (Figure 12.1). Donald Trump’s insulting moniker for Mrs. Clinton—“crooked Hillary”—was conspicuously absent from Google’s suggestions, even though it was a frequently used search term:

Or consider the differences that turned up when typing “Hillary Clinton is” on August 3, 2016 (Figure 12.2):

There was little question that Google was suppressing negative terms for Mrs. Clinton, but what was the point? Why suppress negative suggestions for one candidate?

As the author has reported at recent scientific conferences, as of this writing he has completed a series of four experiments that shed light on

1. You can access Google Trends at <https://trends.google.com/trends/>.

2. The 7-minute version of the video was posted by SourceFed on June 9, 2016, at <http://youtube.com/watch?v=PFxFRqNmXKg>. Unfortunately, not long after it had been viewed more than a million times, the video on YouTube (which is owned by Google) was made “private,” and it appears to be inaccessible by any means at this writing. The 3-minute version is still accessible at <http://facebook.com/SourceFedNews/videos/vb.32274157776002/1199514293432055/?type=2&theater>.

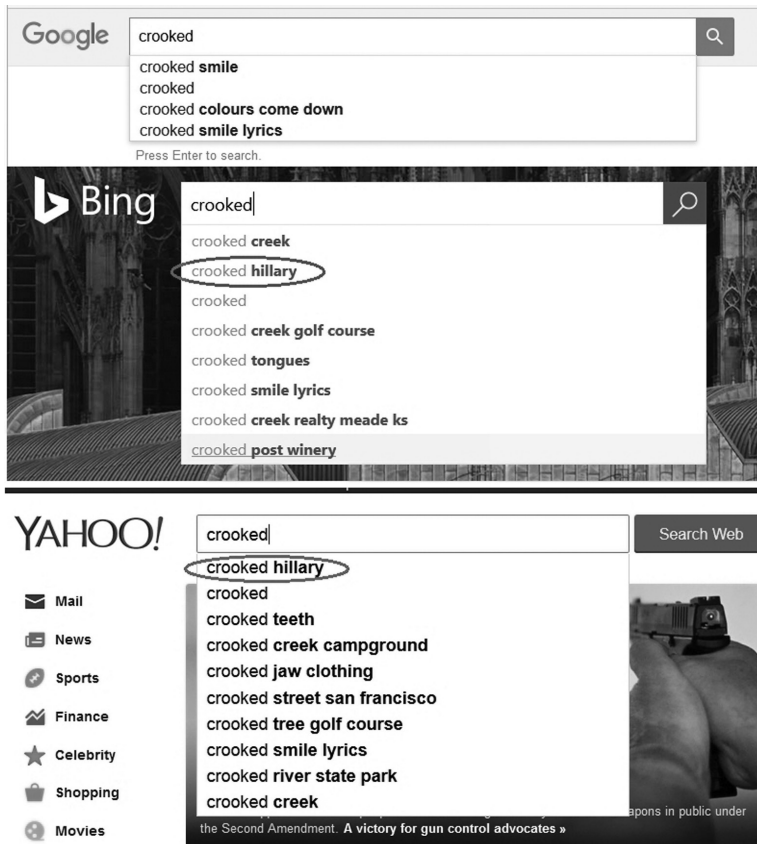


Figure 12.1: The search term “crooked” produced dramatically different results on Google than it did on Bing and Yahoo on August 8, 2016. Bing and Yahoo showed related search phrases that were popular at that time, including “crooked Hillary,” the unflattering nickname Donald Trump gave Mrs. Clinton during the 2016 US presidential campaign. Google showed four innocuous items; “crooked Hillary” was not among them.

what Google was doing—on, specifically, the *differential suppression of negative search suggestions* (Epstein 2017a). Each experiment was conducted online with a diverse group of 300 participants from multiple US states, and each had the same general format. People were shown examples of search terms typed into Google’s search bar, and search suggestions were also shown for each example. In some examples, the suggestions included a negative term (that is, a “low-valence” term). Two of the experiments controlled for both the word frequency and the arousal levels of the search suggestions, so that only negativity was varied.

Participants were asked to pick the search suggestion they would click if they had conducted this search; if they preferred, they could ignore the

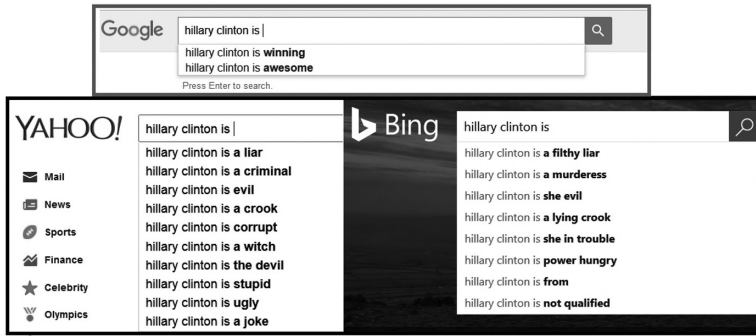


Figure 12.2: The search term “Hillary Clinton is” produced dramatically different results on Google than it did on Bing and Yahoo on August 3, 2016. Bing and Yahoo each showed a number of highly negative search phrases, all of which, according to Google Trends, were popular at the time. Remarkably, Google showed only “Hillary Clinton is winning” and “Hillary Clinton is awesome,” even though neither phrase showed any degree of popularity on Google Trends.

search suggestions and type their own search term. The experiments were designed to shed light on several mysterious aspects of Google’s search suggestions, among them:

- Why does Google systematically suppress negative search suggestions for some people and some topics—including for the company itself? Google, Bing, and Yahoo all show negative search suggestions for Bing and Yahoo, but only Bing and Yahoo show negative search suggestions for Google.
- Why do Google’s search suggestions not correspond to the frequency with which search terms are used in the general population, as indicated by Google’s own data in Google Trends?
- Why does Google generally show people only four suggestions? When the company first introduced autocomplete in 2004, it showed 10 suggestions, and these seemed to be indicative of how frequently these search terms were being used in the population at large. Bing and Yahoo still do this, although Bing generally shows eight suggestions rather than 10. What is so special about the number four?

These are issues the author and his associates are still studying, but so far what they have learned is both clear and disturbing. The bottom line is that although Google introduced autocomplete as a way of making people’s searches faster and more efficient—at least that is what the company said—over time, the purpose of Google’s autocomplete system has changed. Its main purpose now appears to be to manipulate people’s searches—that is,

to nudge searches one way or another so that people will see search results and web pages the company wants them to see.

Differentially suppressing negative suggestions for a preferred candidate (or, for that matter, a company or a political position) turns out to be an incredibly powerful way of manipulating search because of a phenomenon called “negativity bias”: the tendency for negative stimuli to draw far more attention than neutral or positive stimuli do (Baumeister et al. 2001; Estes and Adelman 2008; Kuperman et al. 2014; Nasrallah, Carmel, and Lavie 2009; Rozin and Royzman 2001). It is the old cockroach-in-the-salad effect: A single, small cockroach in a salad draws an inordinate amount of attention, ruining the entire salad. There is no corresponding phenomenon for positive stimuli; adding an attractive piece of chocolate to the center of a plate of sewage does not make the sewage more appetizing. Negative stimuli, however, are incredibly powerful.

Controlling for the arousal levels and word frequencies of our search suggestions, the new experiments show that a single negative item in a list of search suggestions generally draws far more clicks than neutral or positive suggestions do—10 to 15 times as many clicks under some circumstances. So, over time, differentially suppressing negatives for one candidate—the one the search company favors—has the potential to drive millions of people to view positive information about that candidate while also driving millions of people to view negative information about the opposing candidate. This brings us back to SEME, of course. Biased search results have a dramatic impact on the opinions and votes of undecided people; rigging search suggestions to nudge people toward positive or negative web pages is a simple yet powerful way to shift opinions without anyone being the wiser.

This new form of manipulation is called the search suggestion effect (SSE). Research that the author is currently conducting is showing how SSE and SEME can work synergistically, as well as how to quantify the SSE’s potential impact on an election.

Regarding the number of search suggestions Google shows us, the new SSE research suggests that four is the magical value that allows one to maximize the impact of a negative search suggestion (the more search suggestions you show, the lower the impact of the negative suggestion) while also minimizing the likelihood that people will ignore the search suggestions and type their own search term (Figure 12.3). Having people type their own term is the last thing Google wants; the company maximizes control over people’s searches by making sure they click on one of the suggestions the company provides. More and more, these suggestions have nothing to do with the popularity of search and much more to do with the algorithm’s

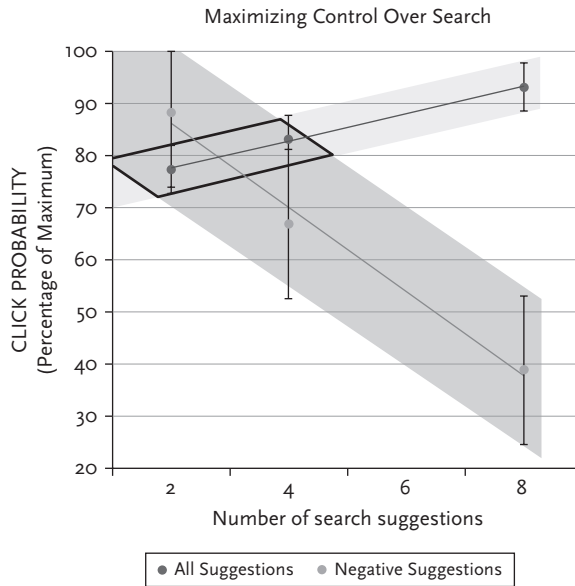


Figure 12.3: This graph shows partial results from one of the author’s recent experiments on the search suggestion effect (SSE). The positively sloped red line shows that the probability that the user will click on an offered search suggestion (rather than completing his or her own search term) increases as more search suggestions are offered. The negatively sloped blue line shows that the probability that the user will click on a negative search term (that is, one with a low “valence”) *decreases* as more search terms are offered. Offering four search suggestions (upper corner of the outlined parallelogram) maximizes the probability that the user will click on one of the offered search suggestions *and* that he or she will click on a negative search suggestion if one is available. In other words, offering four search suggestions maximizes control over a user’s search.

attempt to anticipate an individual’s responses based on the vast amount of information the company has collected about him or her.

It is not yet clear what the combined effects of SEME and SSE are, but their effects are not, in any case, the whole story. The author and his associates have recently begun a series of “Answer Bot” experiments, which are looking at yet another subtle aspect of how Google is systematically manipulating “what [people] believe, what they don’t,” as Eric Schmidt put it (Scola 2016). Although it may not be obvious to people, Google has rapidly been moving away from the search engine as a tool for answering queries and toward an Answer Bot model: that is, simply giving people the answer to their question, just as Captain Kirk’s computer always did in the old Star Trek shows and movies. People do not really want to be given a list of 38 million web pages; they just want *the answer*. Google is increasingly providing just that with tools like their “featured snippets”—those boxes that are appearing with increasing frequency at the top of the first page of search results—along with the Siri-like Google

Assistant that is now embedded in many new Android devices, and, more recently, the Google Home device that the company is urging people to install in every room.

With Home or Assistant, you simply ask your question (“What is the best dog food?”), and Google gives you the answer. This gives the company a high degree of control over what people purchase and how they think, and, as a bonus, it gives the company the ability to monitor, record, and analyze much of what people say 24 hours a day (Edwards 2017; Moynihan 2016). If this sounds shocking to you, you have not been paying attention. Google has been monitoring, analyzing, and storing all of people’s Gmails since 2007—even the drafts people decided to delete after realizing they were too outrageous to send (Epstein 2013b, 2014)—and many Android phones have been able to see and hear people since perhaps 2008. As far as anyone knows, Google stores all of this information permanently. As one top Google executive was quoted as saying in an article in the *New York Times*, “Never delete anything, always use data—it’s what Google does” (Hardy 2015).

A METHOD FOR MONITORING SEARCH ENGINES

It is one thing to demonstrate in controlled experiments that a company like Google has the power to shift opinions and votes by showing people biased search rankings—quite another to show that Google is *actually* showing people biased rankings.

Early in 2016, Epstein and Robertson, working in secret with two teams of programmers, devised a system to monitor the bias in Google’s search rankings (Epstein and Robertson 2017). Specially, they recruited a Nielsen-type network of confidential field agents scattered throughout the United States, and they developed browser add-ons for both the Chrome and Firefox browsers that allowed them to track election-rated searches conducted by the field agents for nearly six months before election day on November 8, 2016.

Overall, they were able to preserve 13,207 election-related searches (in other words, 132,070 search results), along with the 98,044 web pages to which the search results linked. After the election, they used crowdsourcing techniques to determine whether the search rankings people saw were biased toward Hillary Clinton or Donald Trump.

The researchers are still analyzing this wealth of data, but, overall, they found a clear and consistent bias in Google’s search rankings for Hillary Clinton in all 10 search positions on the first page of search results over

most of this 6-month period—enough, perhaps, to have shifted more than two million votes toward Mrs. Clinton.

Was this bias deliberately created by Google executives, or was it algorithmically driven by everyday “organic” search processes? In the opinion of this author, *it doesn't matter*. Bias in search results shifts opinions and votes dramatically without people’s knowledge. If Google executives are deliberately altering parameters to favor one candidate, that practice should be made illegal. If Google executives are simply standing aside and allowing their *algorithms* to show people biased search rankings, *that practice too should be stopped*. One can easily adjust an algorithm so that it suppresses all bias; the author’s data show unequivocally that Google has such power (Epstein et al. 2017).

Researchers have lately been developing ways of teasing apart sources of bias in online search (e.g., see Kulshrestha et al. 2017). Although such efforts are laudable, this author believes that any and all bias that turns up in important online source material such as search results—material people believe to be inherently unbiased and objective—needs to be strictly monitored and regulated. No matter what the source of the bias, it has too much of an impact on people’s opinions and behavior—almost always without any awareness on their part that they are being influenced—to be ignored.³

3. The monitoring system that Epstein and Robertson deployed in 2016 can be considered a successful proof of concept. It demonstrated that ephemeral events on the Internet—events that have never been tracked and that disappear in an instant—can be systematically monitored on a large scale. The system they developed could be used, in theory, to preserve any sort of ephemeral events on the Internet—search suggestions, search results, news feeds, advertisements—even events that have not been invented yet. To put this another way, the system they developed can be expanded into a worldwide ecosystem of passive monitoring software. Monitoring software can be installed on the computers of a large number of Nielsen-type confidants with known demographic characteristics, and this network can be scaled up as needed. Recruiting such confidants, developing and updating the necessary software, maintaining the security of such a system, analyzing the wealth of data that will be collected—all of this will be difficult and expensive, but it can be done. The author is now working with colleagues from Stanford University, Princeton University, MIT, the University of Maryland, the University of Virginia, King’s College London, and elsewhere to create a new organization—The Sunlight Society (<http://TheSunlightSociety.org>)—that will create such a system and coordinate similar systems, and, in so doing, protect the public from the machinations and manipulations of the Big Tech companies. The Society is dedicated to “detecting, studying and exposing new technologies that pose a threat to democracy and human freedom,” following the famous dictum of Justice Louis Brandeis that “sunlight is said to be the best of disinfectants” (Brandeis 1913). As needed and on an ongoing basis, Sunlight will share its findings with the general public, the media, regulators, antitrust investigators, legislators, and law enforcement agencies.

FINAL THOUGHTS

Since Google, Inc., was incorporated on September 7, 1998, it has become the gateway to virtually all knowledge for most people on earth outside China and Russia (the company's operations have so far been constrained by the governments of those countries). Throughout the European Union and in most other countries around the world, more than 90% of search is conducted on Google's search engine—"trillions" of searches per year, says the company (Sullivan 2016), with that number increasing rapidly as Internet penetration continues to increase. In major English dictionaries, to "google" now means to conduct an online search, and this verb is creeping into non-English dictionaries too (Greenfield 2012).

Google dominates the Internet not only in online search but also in mobile device software (Android), browsers (Chrome), language translation (Translate), e-mail (Gmail), online videos (YouTube), physical tracking (Maps), DNS routing, online storage, and dozens of other important domains, which means, among other things, that Google controls five out of the world's six billion-user online platforms: browsers, video, mobile, search, and maps (Cleland 2015). It has twice tried to dethrone Facebook from its dominance in the sixth billion-user platform—social media—but has so far failed to do so. In the critical world of online analytics, Google is unmatched: about 98% of the top 15 million websites in the world use Google Analytics to track the traffic to those sites, which means *Google* is also tracking that traffic. Meanwhile, social media platforms—Facebook in particular—are rapidly becoming the main sources through which people get their news (Gottfried and Shearer 2016).

Sometimes, at least momentarily, we get the impression that the online world is filled with many closely competing corporate giants, but this is largely an illusion. The popular social media companies Instagram and WhatsApp are both owned by Facebook, which has acquired more than 65 companies since it was founded in 2005 (Toth 2016). Since 2010, Google has been acquiring an average of a company a week (CB Insights 2017)—most recently, a gaggle of companies developing artificial intelligence systems; it owns YouTube, as I mentioned, and it recently purchased Waze, the ubiquitous GPS navigation app. Twitter is still independent, but it might soon end up in either Facebook's or Google's hands (Bilton 2016).

This is not what the Internet's creators had in mind. Sir Tim Berners-Lee, who invented the World Wide Web in 1989, is one of several prominent people who have recently expressed concern about what has become of the Internet. It was conceived of as the great leveler—a playing field that would give equal voice to every individual, organization, and small business.

Instead, as Berners-Lee lamented at a 2016 conference focused on reinventing the Internet, we have “the dominance of one search engine, one big social network, one Twitter for microblogging” (Hardy 2016). In a recent book and an essay in the *New York Times*, Robert Reich (2015a, 2015b), a professor of public policy at the University of California Berkeley and secretary of labor under President Bill Clinton, expressed his own concerns about the rising online monopolies, and so have Jonathan Taplin (2017a, 2017b) of the University of Southern California, Steven Strauss (2017) of Princeton University, Thomas Edsall (2017) of Columbia University, Nathaniel Persily (2017) of Stanford University, consumer advocate Ralph Nader (Ballasay 2017), and others (see Moore 2016; Epstein 2017b).

The author’s concern, driven by years of controlled scientific studies, along with the election-related search data he and his associates preserved in 2016 (Epstein and Robertson 2017), is that our online environment is not only dominated by a very small number of players but also that these players have at their disposal new means of manipulation and control that are unprecedented in human history. It is reasonable to assume that other such means exist that we have not yet discovered and that advances in technology will make possible other methods for controlling thinking and behavior that we cannot now envision. The failure of legislators and regulators to tackle such issues suggests that technology will remain well ahead of the legal and regulatory systems for the foreseeable future—perhaps indefinitely. The creation of monitoring systems of the sort described in this essay might prove to be critical in future years for protecting humanity from high-tech hijacking.

AUTHOR’S NOTE

The author is grateful to Roger L. Mohr, Jr. and Patrick D. Pham for help in the preparation of this manuscript. He can be contacted at re@aibr.org.

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