

Public Discourse in the Age of Personalization: Psychological Explanations and Political Implications of Search Engine Bias and the Filter Bubble

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EXECUTIVE SUMMARY: This policy proposal recommends that Google engineer and implement a new web application, to be embedded directly into the company's trademark search engine, that will allow users to manually toggle between results returned through Google's new personalization algorithms and results returned through Google's original PageRank algorithms. The intent of this policy is to provide users with an interactive visualization of Google's various content filters that will increase their awareness, understanding, and control of these same filters and thus impact how users appreciate and act upon the information delivered to them by Google's search engine.¹ This policy proposal is motivated by recent research on the effects of online personalization algorithms, especially their tendency to trap users in "filter bubbles" – information streams uniquely tailored to the interests and biases of individual users – without their knowledge or consent.² Drawing upon relevant literature in rational choice theory and social psychology, this policy proposal examines how filter bubbles threaten meaningful public discourse and effective democratic governance, and presents the aforementioned policy as a solution. Concerns regarding the policy's feasibility and functionality are also addressed.

This policy proposal is targeted for Google's Public Policy and Governmental Affairs team. This team's primary responsibility is to convene with government and elected officials to clarify Google products and promote the growth of the web. The team also works to ensure that Google's Code of Conduct – guided by the mantra, *don't be evil* – is upheld. The Public Policy and Governmental Affairs team identifies "...following the law, acting honorably, and treating each other with respect" as important ways in which Google prioritizes "doing the right thing."³

¹ Sayooran Nagulendra and Julita Vassileva, "Understanding and Controlling the Filter Bubble through Interactive Visualization: A User Study," *Hypertext and Social Media: Proceedings of the 25th ACM Conference* (Santiago, Chile: The Association for Computing Machinery Digital Library, 2014).

² Eli Pariser, *The Filter Bubble: What the Internet Is Hiding from You* (New York: Penguin, 2011), 9.

³ "Transparency," *Google U.S. Public Policy*, <http://www.google.com/publicpolicy/transparency.html>.

I. PUBLIC DISCOURSE AND ONLINE MEDIA

The roots of democratic theory on the necessity of a free press and public discourse can be traced back to Thomas Jefferson, who believed that an educated citizenry was requisite for the proper functioning of a free and enlightened nation. Because a free press is “the best instrument for enlightening the mind of man and improving him as a rational, moral, and social being,” Jefferson explained, the freedom and quality of the press are important indicators of the health of the nation as a whole.⁴

Jefferson’s argument continues to influence how political scientists understand the democratic function of the news media in modern America. While the most basic purpose of the media is to inform the public, it is also responsible for establishing the “foundation of shared experience and shared knowledge upon which democracy is built.”⁵ The news puts people on the same page – literally and figuratively – by providing a shared vocabulary and set of facts with which to debate and reach a consensus on how to work together to solve common problems. By writing, reading, and discussing the news, citizens engage in a dialogue that allows them to “democratically create their culture and to calibrate their ideas in the world.”⁶ Indeed, as reporter Walter Lippmann intoned, it might even be that “all that the sharpest critics of democracy have alleged is true, if there is no steady supply of trustworthy and relevant news.”⁷ Given the indispensability and responsibility of a free press to democracy, the media is a fundamentally political and ethical enterprise.

In recent decades, distributive and curatorial power over the news has shifted

from print journalism to online content suppliers. Cyberphiles in the early days of the Information Age – like John Perry Barlow, author of the 1996 treatise “A Declaration of the Independence of Cyberspace” – regarded this shift with optimism.⁸ In large part, they believed the nation’s well-established newspapers had failed their democratic mission, using their exclusive ownership of expensive printing presses to guard the gates of public opinion, protect elite interests, and decide what “the people” should think. The Internet, these “techno-optimists” argued, would disintermediate and redemocratize public discourse by allowing individuals to autonomously plug into a public sphere that directly supplied more and “better information, and the power to act on it.”⁹

While the Internet has not brought about a digital democratic utopia, recent technological innovations have dramatically reduced the cost to produce, distribute, and access diverse information and perspectives.¹⁰ As Internet activist Eli Pariser so powerfully puts it, “whereas once only those who could buy ink by the barrel could reach an audience of millions, now anyone with a laptop and a fresh idea can.”¹¹ As the cost of producing media plummeted at the end of the 20th century, the number of blogs and online news websites grew exponentially; the chore of filtering through vast swaths of cluttered, obscure information on the Internet for relevant content became unmanageable.¹² Google – which now holds nearly 70% of U.S. search engine market share – emerged at the turn of the 21st century to fill the pressing demand for a tool that would allow users to effectively search

⁴ Thomas Jefferson, and Henry Augustine Washington. *The Writings of Thomas Jefferson: Being His Autobiography, Correspondence, Reports, Messages, Addresses, and Other Writings, Official and Private. Published by the Order of the Joint Committee of Congress on the Library, from the Original Manuscripts, Deposited in the Department of State* (Washington, D.C.: Taylor & Maury, 1854).

⁵ Pariser, *The Filter Bubble*, 50.

⁶ *Ibid.*, 163.

⁷ *Ibid.*, 50.

⁸ Jack L. Goldsmith and Tim Wu, *Who Controls the Internet?: Illusions of a Borderless World* (New York: Oxford UP, 2006), 18.

⁹ *Ibid.*, 3.

¹⁰ Seth R. Flaxman, Sharad Goel, and Justin M. Rao, “Ideological Segregation and the Effects of Social Media on News Consumption,” *Social Science Research Network*. (2014): 2.

¹¹ Pariser, *The Filter Bubble*, 51.

¹² Siva Vaidhyanathan, *The Googlization of Everything: (and Why We Should Worry)* (Berkeley: U of California, 2011), 1.

and organize the web.¹³ Since then, the company has become a lens through which millions of people view the world and process knowledge, and one of the single most important arbiters of “what is important, relevant, and true on the web and in the world.”¹⁴

It is key to note that Internet search engines and traditional media broadcasters – like newspapers and television – draw upon two very different paradigms of content distribution. Newspapers and television are “push technologies” that specialize in “pushing” generic content at a passive general audience. Search engines, on the other hand, are “pull technologies” that specialize in “pulling” information from various online servers to answer the specific queries of their users.¹⁵ Google’s original search algorithm, PageRank, “pulled” information in a relatively objective and democratic manner. PageRank assumed that “if one site was referred to more than another, it was... more relevant to users.”¹⁶ As a young company, Google listed websites linked to by many other websites higher up on the pages of results it returned to users. Google founder Larry Page believed this process “utilized the uniquely democratic structure of the web,” in that it essentially rewarded those websites with the greatest number of “votes.”¹⁷ With PageRank, identical searches returned identical results ranked according to popularity, regardless of who made the search or from where the search originated.

It would be fair to say that Google did not resemble a traditional news source in 1998 when the company’s founders, Larry Page and Sergey Brin, operated their startup out of a garage near the Stanford University campus before moving to a small office on

University Avenue in Palo Alto.¹⁸ Unlike traditional news sources, Google did not carefully curate a single “front page” that featured important – and potentially unpopular – stories to be distributed indiscriminately to all of its users. It did not put all of its users on the “same page.” But the fledgling company did do what may have been the only feasible option in an information ecosystem overflowing with new content: it routed its users to many pages that were all the same. Every unique Google search returned a corresponding and consistent “front page” on the topic implied by the search’s keywords. A user employing Google’s search engine to learn more about the Iraq War, for instance, would see the same results, in the same order, as other users who searched the topic. Thus, while Google did not generate “shared experience and shared knowledge” in the same way that traditional news sources had done, the company did generate and organize a body of common information that was equally visible and accessible to all Internet users.¹⁹ Because Google’s search results reflected a democratic consensus about which news topics were most important, the public had the potential to develop a shared vocabulary and engage in a common conversation about current events. A few years after its founding, Google adopted the slogan, “Democracy on the Web works” as a guiding principle.²⁰ By that time, the company was well on its way to becoming one of the world’s most important sources of news.

On December 4, 2009, Google announced that it had replaced PageRank with algorithms that “personalized search[es] for everyone.”²¹ Google executives publically explained that the change was an attempt to

¹³ Ashley Zeckman, “Google Search Engine Market Share Nears 68%,” *Search Engine Watch*, <http://searchenginewatch.com/sew/study/2345837/google-search-engine-market-share-nears-68>.

¹⁴ Vaidhyanathan, *The Googlization of Everything*, xi.

¹⁵ Pariser, *The Filter Bubble*, 67.

¹⁶ Vaidhyanathan, *The Googlization of Everything*, 2.

¹⁷ Pariser, *The Filter Bubble*, 31.

¹⁸ “Our History in Depth,” Google, <http://www.google.com/about/company/history/>.

¹⁹ Pariser, *The Filter Bubble*, 50.

²⁰ Pamela Jones Harbour, “The Emperor of All Identities,” *The New York Times*, 20 May 2015,

http://www.nytimes.com/2012/12/19/opinion/why-google-has-too-much-power-over-your-private-life.html?_r=0.

²¹ Pariser, *The Filter Bubble*, 1.

improve the user experience. By installing “cookies” that recorded online “click signals,” the search engine could learn users’ specific needs, goals, interests, and preferences, thus adapting to provide more personally relevant content.²² It was a small step towards perfecting “the ultimate search engine,” Google founder Larry Page proclaimed – a machine that “would understand exactly what you mean and give back exactly what you want.”²³

But personalization was also motivated by profit. Google monetized its operations by selling advertising space on its search engine. Google could sell more advertisements at higher prices if its personalization algorithms ensured that increasingly targeted audiences would see – and ultimately click on – increasingly relevant advertisements.²⁴ Moreover, the growth of personal data-aggregation companies willing to pay to accumulate “click signals” in vast commercial databases on users’ interests and identities provided Google with another incentive to personalize. Such personalization algorithms increased the likelihood that a given Google search would return relevant results and trigger sellable clicks. While Google does not publish confidential company reports on the statistical characteristics of its search results, academic and industry researchers believe that at least 11.7% of searches conducted with Google’s personalized search engine – and frequently, a far larger proportion of such searches – return individual users with significantly different results as a result of algorithmically programmed personalization.²⁵ Google’s publicly available annual investor relations

reports do shed some light on the effects of personalization on the company’s bottom line. Since 2008 – the year before announced it would be personalizing search – Google’s advertising revenues have nearly tripled, jumping from \$21 billion in 2008 to just shy of \$60 billion in 2014.²⁶

The realization that Google’s users are in fact its products, rather than its customers, is indeed troubling. This paper, however, addresses what may be an even more worrying and pervasive outcome of personalization algorithms: their tendency to trap users in filter bubbles – information streams uniquely tailored to the interests and biases of individual users, often without their knowledge or consent. Unlike PageRank, Google’s new algorithms return personalized results to individual users by noting their geographic location and documenting their “click signals.” These filters screen which results its user sees and dictate in what order the user sees them, effectively straining out content deemed inconsistent with interests and perspectives that the user has encountered and endorsed in the past. As citizens become increasingly dependent on Google for their view of the world, writer Paul Boutin notes that the “would-be information superhighway risks becoming a land of cul-de-sacs, with each user living in an individualized bubble created by automated filters.”²⁷ Thus, Google’s personalization algorithms are concerning precisely because

they tend to erode the shared public sphere that the news media once built and occupied and instead provide users with “their own custom versions of the Internet.”²⁸

The damage done to democratic processes by personalization, Pariser asserts,

²² Engin Bozdogan and Job Timmermans, “Values in the Filter Bubble Ethics of Personalization Algorithms in Cloud Computing,” *1st International Workshop on Values in Design – Building Bridges between RE, HCI and Ethics* (Lisbon, Portugal: Delft University of Technology, 6 September 2011).

²³ Pariser, *The Filter Bubble*, 33.

²⁵ Aniko Hannak, Balachander Krishnamurthy, Piotr Sapiezynski, David Lazer, Christo Wilson, Arash Molavi Kakhki, and Alan Mislove, “Measuring Personalization of Web Search,” *World Wide Web Conference*, 13 May 2013.

²⁶ “Google’s Annual Advertising Revenue 2001-2014,” *Statista*, 24 June 2015, <http://www.statista.com/statistics/266249/advertising-revenue-of-google/>.

²⁷ Paul Boutin, “Your Results May Vary,” *Wall Street Journal* [New York] 20 May 2011, Eastern ed.: A13, ProQuest Business Collection.

²⁸ *Ibid.*

could be severe. After all, democracy requires that citizens see the world from one another's point of view – a task made easier by a common collection of shared facts – but users are now more and more “enclosed in their own bubbles,” living in “parallel but separate universes.”²⁹ In the pages that follow, this paper draws upon two interpretations of human attention, judgment, and decision-making to explain why the filter bubbles created by personalization algorithms are socially and politically harmful, and proposes a possible solution.

II. BIAS AND RATIONALITY: TWO COMPETING THEORIES OF HUMAN INFORMATION-PROCESSING AND DECISION-MAKING

Modern social science theories that have their basis in the ways in how human beings process information and make decisions have generally demonstrated a preference for one of two competing interpretations: information-processing and decision-making as a manifestation either of economic rationality or of psychological bias. These approaches are introduced below and discussed in relation to the filter bubble in the following section.

The economic principle of rational choice theory posits that all individuals seek complete information in order to make well-reasoned decisions that will maximize their total utility according to their own stable, predetermined preferences.³⁰ Adam Smith, commonly referred to as the “father of modern economics,” held that individuals contribute to society's general opulence by pursuing their own self-interest through markets of trade and exchange.³¹ Applying this same logic to the political realm,

economist Anthony Downs argued that individuals promote the health of the polity when they amass complete information about their voting options and cast their votes for the party whose platform promises them the greatest personal utility. In order to evaluate the optimal course of action, a citizen “depends ultimately on the information he has about policies.”³²

To political scientist Joseph Schumpeter, rational decision-making similarly entailed “sift[ing] critically” through information in order to gather “the ultimate data of the democratic process.”³³ Exclusive exposure to “adulterated or selective” information, he argued, impinges upon a citizen's ability to rationally “make up his mind” and leads him to “exalt certain propositions into axioms and put others out of court.”³⁴ Schumpeter believed that this type of “associative and affective” thinking would ultimately detriment the political community as a whole by allowing “the people to be ‘fooled’ step by step into something they do not really want.”³⁵ Rational choice theory thus posits that individuals pursue their own self-interest through well-informed and well-reasoned decision-making that, in the end, tends to benefit the larger polity.

A more recent iteration of rational choice theory, “bounded rationality,” asserts that while individuals are not perfectly rational, they do act rationally given certain restrictions.³⁶ Proponents of bounded rationality, like Herbert A. Simon and Gary Becker, criticized Smith and Downs' models of rationality because these models assumed the existence of an impossibly perfect “economic man,” blessed with access to

²⁹ Pariser, *The Filter Bubble*, 5.

³⁰ Jonathan Levin and Paul Milgrom, *Introduction to Choice Theory*, Stanford University, 2004, <http://web.stanford.edu/~jtlevin/Econ%20202/Choice%20Theory.pdf>, 1.

³¹ Adam. Smith, *The Wealth of Nations* [1776] (New York: Penguin Books, 1982), <http://nrs.harvard.edu/urn-3:HUL.FIG.003625441>, 13.

³² Anthony Downs, *An Economic Theory of Democracy* (New York: Harper, 1957), 46.

³³ Joseph Schumpeter, *Capitalism, Socialism, and Democracy* (New York: Harper Perennial, 1976), “The Classical Doctrine of Democracy,” 254.

³⁴ *Ibid.*, 264.

³⁵ *Ibid.*

³⁶ Herbert A. Simon, “A Behavioral Model of Rational Choice,” *The Quarterly Journal of Economics* 69, no. 1 (1959).

complete information and limitless “computational capacity.”³⁷ While Simon and Becker believe that rational decision-making occurs when individuals “weigh the advantages and disadvantages of alternative actions,” they also believed that rational decision-making is often constrained by logistical and cognitive limitations.³⁸ Because “the information-gathering process is not costless” and because people suffer from deficiencies in “income, time, memory and calculating capacities,” they explained, perfectly rational decision-making is at times neither practical nor attainable.³⁹ To Simon and Becker, the fact that individuals frequently choose to satisfy rather than maximize their utility preferences does not prove that humans are irrational. Rather, decisions of this type indicate the functioning of rational decision-making under certain logistical and cognitive constraints.

While academics and researchers who believe that human information-processing and decision-making are primarily governed by certain psychological biases do not deny the existence of rational thought and action, they do claim that conscious, intentional, and systematic cognitive processing plays a far more limited role in the day-to-day workings of human behavior than the rational approach would suggest. In the 1970s, psychologist Daniel Kahneman proposed that the human cognition occurs through the collaboration two different psychological systems. The operations of System 1, Kahneman wrote, are “fast, automatic, effortless, associative, implicit... and often emotionally charged; they are also governed by habit.”⁴⁰ The operations of System 2, on the other hand, “are slower, serial, effortful,

more likely to be consciously monitored or deliberately controlled.”⁴¹ Because the processing capacity of System 2 is easily expended – in other words, because the cognitive resources necessary for rational decision-making are in short supply – the intuitive and automatic functions of System 1 manage “most of moment-to-moment psychological life.”⁴² Indeed, “much of a person’s everyday life,” Bargh and Chartrand explained, is determined “by mental processes that are put into motion by features of the environment and that operate outside of conscious awareness and guidance.”⁴³ Rather than endangering free will and self-determination, automatic mental processes silently carry much of the brain’s cognitive load so that resources remain for rational decision-making during the most deserving and deliberative of circumstances.⁴⁴ Unfortunately, precisely because System 1’s operations are effortless, they also frequently remain unexamined.⁴⁵ Thus, while System 1’s mental shortcuts effectively simplify and sublimate the complex task of gathering and processing information, they can also lead to severe and systematic errors that would not occur if individuals were fully aware of what they were doing.⁴⁶ In 2002, Daniel Kahneman was awarded a Nobel Prize in Economic Sciences for challenging the prevailing assumption of human rationality with his empirical and theoretical findings on psychological biases and heuristics. His best-selling book, *Thinking, Fast and Slow*, was published in 2011 and summarizes a body of work that has revolutionized our understanding of the ways in which human

³⁷ Ibid, 99.

³⁸ Gary Becker, “The Economic Way of Looking at Life” *Nobel Lecture*, 9 December 1992, http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1992/becker-lecture.pdf, 51.

³⁹ Simon, *Rational Choice*, 106.

⁴⁰ Daniel Kahneman, “A Perspective on Judgment and Choice: Mapping Bounded Rationality,” *The American Psychologist* 58, no. 9 (September 2003): 697–720, <http://www.ncbi.nlm.nih.gov/pubmed/14584987>, 698.

⁴¹ Ibid.

⁴² J. A. Bargh and T L Chartrand, “The Unbearable Automaticity of Being,” *American Psychologist* 54, no. 7 (1999): 462.

⁴³ Ibid.

⁴⁴ Ibid, 464.

⁴⁵ Kahneman, *Judgment and Choice*, 699.

⁴⁶ Robert Jervis, “The Drunkard’s Search,” *Political Psychology*, edited by John T Jost and Jim Sidanius (New York: Psychology Press, 2004), 259.

begins process information and make decisions.

III. APPLICATION: THE FILTER BUBBLE

Before any thorough investigation of the detriments of personalized filter bubbles, it is important to note that some filtering, both online and in person, is necessary for effective functioning. As discussed above, the human brain cannot constantly engage in purposeful, systematic reasoning – the type of rational decision-making venerated by Adam Smith and Anthony Downs – because the mind’s effortful resources are limited. The human brain lacks the capacity to consciously and deliberately process all of the physical and social information presented by the surrounding environment. Thus, most moment-to-moment cognition occurs automatically, with conscious awareness only roused when “there are real options and choices of which path to take.”⁴⁷

Importantly, the basic psychological theory that humans have limited information processing capacity may explain a large part of Google’s success. As the Internet expanded, it became clear to many cybertheorists that the anarchic cyber utopia extolled by “techno-optimists” at the dawn of the Information Age was becomingly mind-numbingly vast; in this “interlinked yet unindexed” web of networks in which “clutter and confusion reigned,” the sheer amount of data thrust in the faces of intrepid Internet users threatened to render the system un navigable.⁴⁸ The human brain was not up to the task of consciously and deliberately filtering through hundreds of thousands of websites to find a single piece of useful information. A direct, disintermediated web guaranteed an attention crash.

The invaluable insight of Google’s founders was that in order to be useful, the Internet required a sorting mechanism that would reduce the amount of energy and time required to extract useful information from

the web. In many ways, Google’s search engine can be thought of as a virtual extension of the System 1 processing operations of the human brain. Because there was far too much data on the Internet for users to consciously sift through in search of a few pieces of truly important information – and because Google initially offered to sift through and prioritize this data using seemingly “neutral and democratic” methods – users came to trust Google’s search engine to quickly filter through the Web for them and alert them of any key findings.⁴⁹ While users lack the cognitive resources to deliberately assess every page on the web, they do have sufficient cognitive capacity to evaluate the limited number of results returned to them by a Google search, especially when these results are ranked in a meaningful and fair way. This is why “when personalized filters offer a hand,” Pariser explains, users “are inclined to take it. Personalized filters can help users find the information they need to know and see and hear, the stuff that really matters.”⁵⁰ Given the indispensability of some means of filtering through the vast amount of information on the web, this paper does not criticize online personalization outright. Rather, it suggests that Google’s information filtering algorithms may have become “too good.”⁵¹

One of the primary functions of System 2 is to reconcile uncertainty and consciously decide how to settle the doubt that arises when one is confronted by incompatible thoughts or perceptions.⁵² System 1 recognizes that uncertainty and doubt are strategically important to human-decision making and accordingly draws the attention of System 2 to their existence so that deliberative reasoning can occur. In his book, *The Sentimental Citizen*, George Marcus argues that emotional anxiety provoked by perceptions of conflict is the only means of

⁴⁹ Ibid, 2.

⁵⁰ Pariser, *The Filter Bubble*, 11.

⁵¹ Nagulendra and Vassileva, *Interactive Visualization*, 107.

⁵² Kahneman, *Judgment and Choice*, 702.

⁴⁷ Bargh and Chartrand, *Automaticity of Being*, 473.

⁴⁸ Vaidhyanathan, *The Googlization of Everything*, 1.

forcing a rational reevaluation of one's current beliefs and habits. Anxiety is unpleasant, Marcus acknowledges, but "it frees us from being just stimulus-response creatures" by recruiting "reason and the attentive state of mind."⁵³ While Google's personalization algorithms are extraordinarily good at filtering through the billions of gigabytes of data stored on the web and bringing items relevant to users' search queries to their attention, it is less clear whether the items they bring to users' attention actually foster the doubt, uncertainty, and anxiety required to trigger deliberate and conscious evaluation. Because personalized filters are programmed to predict users' interests, habits, and desires by learning from past online behavior, these filters become increasingly biased to share users' own views.⁵⁴ Rather than returning results that might throw a user's current beliefs into question and prompt him or her to reevaluate his or her perceptions and rationally decide on a new course of action, personalized algorithms return results that "encapsulate users in a bubble of their comfort" – a friendly world – where they see "only content related to their interests" and are "spared of anything else."⁵⁵ While Google's filtering algorithms excel at returning relevant results to users, they omit those that are in fact most strategically important: results that threaten a user's unexamined assumptions and habits. Thus, Google's current search engine approximates the psychological operations of System 1 while neglecting one of its most vital functions. By metaphorically "severing the synapses in the brain," Pariser warns, Google's personalized filters are effectively performing a "global lobotomy."⁵⁶

Google's original PageRank algorithms, on the other hand, did expose

users to online media that had the potential to jeopardize their current worldviews and thus instigate critical assessment of previously unexamined beliefs. A staunch social conservative who Googled "homosexual" in 2006, for instance, might have received as his or her top search result a popular article advocating for civil unions; in 2011, this same person would have much more likely been directed to sources consistent with his or her ideological opposition to homosexuality. Because PageRank ranked its results according to relevant websites' popularity, the algorithm plunged users into a common media stream of "shared knowledge and shared experience." There, users were forced to confront social and political positions that either commanded general democratic consensus or demanded attention due to the discussion and debate they instigated. To the extent these results challenged rather than affirmed a user's preexisting beliefs, PageRank prompted the same uncertainty, anxiety, and doubt necessary for rational reevaluation and eventual working consensus. In other words, PageRank carried out the democratic mission of a free press. While PageRank filtered out much of the web, it continued to point users' attention to strategically important information that, by threatening users' automatic and unexamined points of view, would eventually allow users to end on the same page.

Conversely, Google's new personalization algorithms presage far less promising political outcomes. Personalized search results turn computer monitors into one-way mirrors that reflect and exaggerate users' own biases and interests. Rather than pushing users towards some sort of shared dialogue and common consensus on social and political issues, personalization algorithms tend to exacerbate individual users' particular predilections by showing them content and perspectives that echo and amplify their own beliefs. Because Google's personalized filters fail to activate System 2-

⁵³ George E. Marcus, *The Sentimental Citizen* (Pennsylvania State University Press, 2002), http://nrs.harvard.edu/urn-3:hul.ebookbatch.PMUSE_batch:muse9780271052731

⁵⁴ Pariser, *The Filter Bubble*, 3.

⁵⁵ Nagulendra and Vassileva, *Interactive Visualization*, 107.

⁵⁶ Pariser, *The Filter Bubble*, 19.

type judgments among users, they increase the likelihood that users will suffer from some of the same severe and systematic biases that an unquestioned reliance on System 1's automatic assumptions tends to generate. In 2014, an interdisciplinary team of computer and social scientists from the University of Minnesota empirically affirmed that "recommender systems" like Google's personalized search engine have an outsized effect on user's choices – larger even than that of peers and experts – and that over time, these systems "strongly push users towards narrow consumption" of online content.⁵⁷ The researchers suggested that recommender systems display diversity metrics or summary statistics to alert users of the declining variety of their returned results, a recommendation very much aligned with the one proposed in this paper. A second study, commissioned by Microsoft Research, produced similar findings and found that individuals exhibit "substantially higher" ideological segregation when they rely on personalized search engines to deliver their news.⁵⁸ Cumulatively, personalization tends to nurture biases that fracture of the public sphere into narrow and inflexible interests that struggle to participate effectively in the rational, deliberative decision-making of collective public discourse.

IV. POLICY PROPOSAL AND EVALUATION

Currently, a Google search will return users with only one set of search results. These results are determined by Google's personalization algorithms, which rely on users' "click signals" and other personal data to refine their predictions and provide individual users with personally relevant results. Prior to December 4, 2009, PageRank – Google's original search algorithm – indexed

search results for all of Google's users using a rough approximation of relative website popularity. This approach to search was democratic because it rewarded websites for receiving "votes" of confidence from other websites. Because personalized filters prioritize relevance and PageRank filters prioritize popularity, a side-by-side search conducted by the two algorithms using identical keywords would return different results.

This policy proposal recommends a simple solution to the filter bubble problem: Google should engineer and implement a new web application that will allow users to easily toggle between results returned through Google's new personalization algorithms and results returned through Google's original PageRank algorithms. At a functional level, the toggle feature should be an easy-to-use interactive tool. It should be easily accessed through an icon embedded in Google's search bar, directly adjacent to the microphone ("Search by voice") and magnifying glass ("Search") icons. A light switch icon may be a helpful illustration of the toggle feature's main function. When flipped to "Personal," the toggle feature should prompt the Google search engine to display and arrange highly relevant results that reflect Google's perceptions of the individual user. When flipped to "Popular," the toggle feature should prompt the Google search engine to display and arrange highly popular results ranked using Google's original PageRank algorithms. As the name suggests, a single click of the mouse on the toggle icon should allow the user to flip back and forth between results returned using the "Personal" and "Popular" filters. While the launch of the toggle feature should prompt the creation and distribution of some explanatory user materials – including an informative text bubble that should instruct a user on how to use the feature when he or she hovers his or her mouse over the toggle icon – because Google developed its PageRank algorithm a decade ago, the implementation of the toggle feature

⁵⁷ Tien T. Nguyen, Pik-Mai Hui, F. Maxwell Harper, Loren Terveen, and Joseph A. Constan, "Exploring the Filter Bubble: The Effect of Using Recommender Systems on Content Diversity," *International World Wide Web Conference*, 7 April 2014, 685

⁵⁸ Seth R. Flaxman, Shared Goel, and Justin M. Rao, *Ideological Segregation*.

should not require the costly and time-consuming development of an entirely new search algorithm. Rather, it simply demands the reintroduction of the PageRank algorithm alongside the personalized algorithms already in place, and the creation of a simple and intuitive toggle mechanism that will direct the search engine which algorithm to use in which situation.

The toggle feature will help users visualize and understand how their search results change depending on what type of filter Google applies, and give users the opportunity to explore content they would not have discovered if they only had access to personalized search results. Thus, the toggle feature will both educate and empower users. By allowing users to engage in a side-by-side comparison of PageRank search results and personalized search results, the toggle feature will educate users on how Google's filters function and expose them to informative content they would not have seen had they only referenced their personalized search results. The toggle feature will give users the opportunity to choose which filter – popular or personalized – they wish to apply when they use Google search, and thus will empower them to decide for themselves what type of results they would like to receive. Because the toggle feature increases the likelihood that users will be exposed to results deemed important by Google's PageRank algorithms, it increases also the likelihood that users will confront challenging information that is highly relevant to the democratic community as a whole and thus instrumental to generating democratic consensus. Additionally, by drawing users' attention to the disparity between the results returned by the "Personal" and "Popular" filters, the toggle feature will alert users of their own biases, as they are reflected by their search engine's learned biases. As a result, this policy will reduce the negative effects of filter bubbles while providing users with continued access to the highly relevant

search terms returned by Google's personalization algorithms.

V. RESPONSE TO POSSIBLE CRITICISMS

The policy proposed is vulnerable to two major criticisms. First, why would Google, a company beholden to its stockholders and motivated by profit, expend precious resources to implement a web application that, in the end, may harm its bottom line? Some users may never explore or utilize the toggle feature. Many will likely use the feature occasionally to assess how the results returned differ depending on the filter they use. Still, others may use the toggle feature to opt out of Google's personalization algorithms altogether, metaphorically leaving the switch "off" whenever they use Google's search engine. Less personalization theoretically means less relevance, which ultimately translates into fewer clicks, fewer data points to sell to data-aggregation companies, and fewer advertisers willing to pay for prime real estate in Google's search results. So what reason does Google have to engineer and implement this policy?

It should be noted that the policy proposed does not completely eliminate personalization. Rather, the toggle feature allows users to switch between results returned using Google's new personalization algorithms and results returned using Google's original PageRank algorithms. Google will therefore still continue to profit from personalization, though it is true that – in the short term – profits may fall due to user defection from Google "Personal" to Google "Popular," where advertisements command lower prices and fewer click signals are generated for sale to data-aggregation companies.

In the long run, however, implementing this policy may actually increase Google's profits in three different ways. First, by increasing the transparency of its personalization algorithms, Google will foster trust from its users. Google currently refrains from explaining or demonstrating

exactly how its personalization algorithms function, and the company offers users little to no control over these settings. By providing users with knowledge about these filters and granting them some control over their functioning, Google will strengthen the loyalty of its existing users and attract new users, thus increasing the quantity of personal data it can collect and the value of the advertisements it can sell. Second, this policy will placate political interests that are currently calling for legislation to more strictly regulate the personal data market.⁵⁹ If legal limitations are placed on what kind of personal data Google can collect and how it can be collected, Google's future inventory of "click signals" will plummet, and a potential source of profit will be eliminated. Thus, this policy functions as a proactive concession to politicians who seek to regulate the personal data market; by increasing the transparency of its personalization algorithms, Google may be able to convince these interests that further regulation is not required. Finally, as a corporation headquartered in the United States of America, Google will benefit from this policy because it indirectly enhances the quality of public debate and democratic decision-making. By reducing the deleterious effects of filter bubbles, this policy will contribute to effective democratic governance in the United States, which in will improve the laws passed by federal and state governments contribute to favorable business conditions.

The second criticism of this proposal logically follows the first: even if Google did choose to implement this policy, would Internet users actually use toggle feature? After all, personalization increases relevance, and relevance is akin to convenience. In the short term, users benefit from personalized search results because they route users websites tailored to their location, interests, and values. As such, this policy may overestimate the extent to which users will actually assess the differences between their

"Personal" and "Popular" search results. If confronting opinions that disagree with our own is inherently anxiety provoking, as George Marcus claimed, is it reasonable to assume that Internet users will willfully seek out opinions that challenge their own?

First, it must be acknowledged that not all Google users will explore and utilize the toggle feature proposed in this policy recommendation. The criticism advanced above is valid: personalization is a useful tool, and many users appreciate the relevancy of the search results it returns. This policy does not propose eliminating personalization, but rather tempering it. It recommends that users be given the option to explore how search personalization works and opt out if they so choose.

Two powerful psychological tendencies grounded in Daniel Kahneman's empirical work on psychological biases and heuristics predict that users will indeed experiment with the toggle feature. The first is that "information gaps" tend to spur curiosity.⁶⁰ If users are notified that they are operating in a filtered environment, they may feel a sense of deprivation and seek to learn what is being hidden from them. This same tendency explains why individuals pursue additional information even if this information is noninstrumental to their decision-making.⁶¹ Thus, if a clearly visible icon reminds users their results are being filtered, they will be tempted to explore how personalization changes their search results. A second explanation for why a user may take advantage of the toggle feature is that, once he or she has tried it, his or her attentional capacity is altered and amplified from a feeling of empowerment. The tool proposed here is indeed a powerful one; it gives users have the ability to manipulate the algorithms of the world's largest Internet company and control their own view of the world.

⁶⁰ Pariser, *The Filter Bubble*, 90.

⁶¹ A. Bastardi and E. Shafir, "On the Pursuit and Misuse of Useless Information," *Journal of Personality and Social Psychology* 75, no. 1 (July 1998).

⁵⁹ Harbour, *The Emperor of All Identities*.

Psychological research shows that the sensation of power allows individuals to attend to information more selectively and to exhibit greater attentional flexibility.⁶² These findings suggest that individuals who feel empowered by the toggle feature will want to continue using it, thus enhancing its greater impact.

VI. SUMMARY

This policy proposal began by examining the roots of democratic theory on the necessity of free speech and public discourse. It traces the development of the news media to the present day, with particular attention paid to the birth and expansion of online content distributors, especially Google. It describes Google's gradual transition from PageRank algorithms to personalized algorithms, noting how personalization increases the company's profits. After briefly outlining the rational and psychological approaches to human behavior, it applies these approaches to the filter bubble problem. This policy proposal recommends that Google implement a toggle feature to combat the deleterious effects of filter bubbles. This feature, to be embedded directly into Google's central search bar, will allow users to switch back and forth between results returned using Google's personalization algorithms and results returned using Google's PageRank algorithms. Although this policy will not completely solve the filter bubble problem and may, in the short run, diminish Google's profits, it is still defended as a necessary step to ensure the longevity of effective public discourse in America.

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⁶² Ana Guinote, "Power Affects Basic Cognition: Increased Attentional Inhibition and Flexibility," *Journal of Experimental Social Psychology* 43, no. 5 (September 2007): 685.

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