Online Appendix

June 16, 2025

Appendix I - Cosine Similarity Threshold Test

To establish a reasonable cosine similarity threshold for a super PAC ad to be coded as "orchestrated" via redboxing, I first took a sample of 41 redbox texts – one per candidate – from 25% of all candidates that employed redboxing (or had this strategy employed on their behalf by the corresponding party campaign committee) during the 2020 cycle. These redbox texts were paired with the transcript of a single super PAC aired during that race and categorized from 0 to 1 by increments of 0.1. Since I had previously determined that the appropriate cosine similarity threshold should fall in the 0.4-0.6 range, I oversampled pairs of texts that fell in that range. Of the 41 pairs of texts provided for coding, 24 fell in the 0.4-0.6 range, with the remaining 17 falling either above or below that range.

The resulting dataset was comprised of 82 texts – 41 redbox texts ("reference texts") and 41 super PAC ad transcripts ("comparison texts"). The three undergraduate Research Assistants were first provided with a brief, non-specific description of the project. In this description, I refrained from outlining my theory or any specific hypotheses as not to potentially bias coding decisions. I also did not employ the term "redboxing" or imply that such a phenomenon exists in order to keep the task as generic as possible. RAs were simply told that the project examined whether campaign ads produced by outside spending groups (e.g., super PACs) tend to copy or replicate candidate messaging during congressional elections. They were further told that the intention of the exercise was to test the efficacy of a computational tool of textual similarity analysis. To do this, they were provided with 41 pairs of texts that were each given a "similarity score" using this tool, but the texts were presented in random order – that is, not arranged in ascending or descending order by similarity score.

The RAs' task was to code each pair of texts according to similarities in content and wording; specifically, whether they believed the comparison text was inspired by, drew from, or was plagiarized from the reference text. The coding scheme employed by the RAs is outlined below:

1 = Highly similar – the comparison text addresses the same topic(s) using similar or identical language to the reference text. The comparison text effectively summarizes or rephrases the reference text, suggesting the author drew heavily from the reference text, or was directly inspired

by it.

2 = Somewhat similar – the comparison text broadly addresses the same topic(s) using similar language as the reference text, but there is considerable doubt over whether one text was directly inspired by or drew upon the other.

3 = Not similar – the comparison text addresses completely different topics and uses different language to the reference text. It is obvious that the comparison text was not plagiarized from or inspired by the reference text.

The subsequent coding was characterized by a high degree of agreement between the coders. Each of three coders accurately identified increases in textual similarity corresponding to higher cosine similarity values, and all three identified the 0.5-0.599 threshold as the point at which pairs of texts became consistently "highly similar" – as outlined in the coding scheme. As shown below, for the eight texts in the 0.4-0.499 range, a little less than a quarter of coding responses identified the pairs of texts as highly similar. For the eight texts in the 0.5-0.599 range, however, almost 80% of coding responses identified the texts as highly similar, implying that the author of the comparison text drew from or was inspired by the reference text. To verify the reliability of this process, I employed Krippendorff's Alpha - a common means of calculating intercoder reliability for ordinal data coded by two or more independent coders. Krippendorff's Alpha was equal to 0.84, with values greater than or equal to 0.8 generally accepted as providing excellent reliability.

Based on this process, I determined that a cosine similarity value of 0.5 would provide a suitable threshold at or above which a super PAC ad could confidently be assumed functionally coordinated on the basis of a candidate or party redbox. Below, I also provide a sample of the texts provided to the RAs for coding.

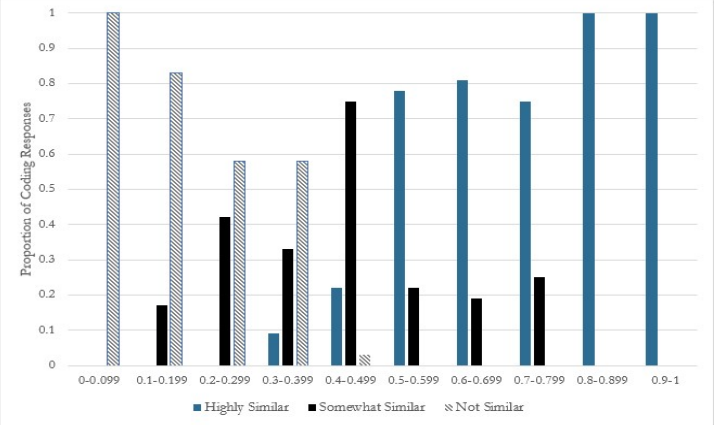

Figure 1: Research Assistant Coding: Cosine Similarity Threshold Test

Sample of Texts - Cosine Similarity Threshold Test

0-0.099

Reference Text – Candidate Redbox, Gary Peters (MI-SEN), 2020 Cycle[1]

Oil and gas companies and the Koch brothers threaten Michigan's Great Lakes and have spent over $670,000 to help John James' campaigns. No surprise from the Republican politician who said he would have voted against fully funding protections for the Great Lakes and sides with the special interests donating to his campaign when it comes to cutting EPA regulations that protect the Great Lakes.

Comparison Text – Outside Group Advertisement, Duty Honor, 2020 Cycle[2]

Never thought this would be part of my treatment for diabetes, but I need insulin every day and the cost just keeps going up. That's why I drive 200 miles per round trip to Canada where it costs thousands less a year. But Senator Gary Peters is doing something about it. He's working with Democrats and Republicans to get cheaper insulin to market, and he's holding drug companies accountable for pricing. With all the mess in Washington, I'm glad Michigan has Gary Peters working for us.

0.1-0.199

Reference Text – Candidate Redbox, Theresa Greenfield (IA-SEN), 2020 Cycle[3]

Theresa Greenfield believes that every Iowan has the right to quality, affordable health care coverage, even if they have a pre-existing condition. But she knows that too many Washington politicians are putting drug companies and insurance companies ahead of patients, and you can't stand up to the special interests in Washington if you accept their money. That is why she won't accept a dime in corporate PAC money, and as Senator, Greenfield will work to make health care affordable for all Iowans.

Comparison Text – Outside Group Advertisement, End Citizens United, 2020 Cycle[4]

[1] "What Michiganders Need to Know", Gary Peters for Michigan, https://web.archive.org/web/20201022151347/https://petersformich
michiganders-need-to-know/

[2] "Jack Feuerstein", Duty Honor, available at: https://www.youtube.com/watch?v=4Ixa1AS9Bj4

[3] "Important Update", Theresa Greenfield for Iowa, https://web.archive.org/web/20200518141656/https://greenfieldforiowa.com/imp
update/

[4] "Dark Money", End Citizens United, available at: https://www.youtube.com/watch?v=Gw0X1fZlGyo

New documents are showing dark money ties to Iowa Senator Joni Ernst. First, Joni Ernst's campaign was found to have knowingly accepted thousands of dollars in illegal contributions, including from corporations, and had to pay the largest penalty ever for an Iowa politician. Now, new accusations of breaking anti-corruption laws for her dark money ties. Washington's broken, and Joni Ernst has become part of the problem.

0.2-0.299

Reference Text – Candidate Redbox, Sara Gideon (ME-SEN), 2020 Cycle[5]

Instead of working for Maine people, Susan Collins has become part of Washington, taking millions of dollars from special interests like drug companies, insurance companies and Wall Street and then working for them in the Senate. Drug and insurance companies have given Susan Collins more than $1.4 million dollars. And Susan Collins twice voted to allow secret deals for drug companies that delay access to cheaper generic drugs - these schemes have forced Mainers to pay 10 times more for brand name drugs than they would for their generic equivalents and have resulted in billions in additional profits for the drug companies. Susan Collins. She's not for you anymore.

Comparison Text – Outside Group Advertisement, ChangeNow, 2020 Cycle[6]

When the pandemic forced us to close, we went from being open seven days a week to literally one day making nothing. We really needed the PPP loan just to keep our business, but Susan Collins brought a loophole to let corporate chains take the small business loan, and Mitch McConnell included it in the law. Big corporate chains scarfed up the money before most small businesses like ours had a chance. We feel totally abandoned by her. Susan Collins and Mitch McConnell were just looking out for their big corporate donors.

0.3-0.399

Reference Text – Candidate Redbox, Marilyn Strickland (WA-10), 2020 Cycle[7]

Marilyn Strickland has a record of getting progressive results. As Mayor, she rebuilt Tacoma while tackling climate change, raising the minimum wage, and increasing graduation rates. Strickland

[5] "Update", Sara Gideon for Senate, https://web.archive.org/web/20200115194645/https://saragideon.com/update/

[6] "Andrew and Briana Volk", ChangeNow, available at: https://www.youtube.com/watch?v=Ctmcxw5Iius

[7] "Media Kit", Marilyn Strickland for Washington, https://web.archive.org/web/20200714113428/https://stricklandforwashington.co
kit/

is endorsed by former Governors Christine Gregoire and Gary Locke because they know Strickland is a progressive leader who will work with others to get things done. Strickland will be the first African American ever elected to Congress from Washington State and the first Korean-American woman elected nationwide. Strickland will fight for universal health care, lower health care and prescription drug costs, and a clean energy future. Now more than ever, we need progressive leaders like Strickland who fight for justice and progressive change for everyone.

Comparison Text – Outside Group Advertisement, Collective Super PAC, 2020 Cycle[8]
When your father is a black veteran and your mother a Korean immigrant, you know what's possible in America. But you also know you have to fight for it. So as Mayor of Tacoma, Marilyn Strickland did. She fought to increase the minimum wage, and for all she helped rebuild downtown, bringing jobs and businesses. As we recover from COVID-19, we need a Congresswoman who'll fight to rebuild us.

0.4-0.499

Reference Text – Party Redbox, Gina Ortiz Jones (TX-23), 2020 Cycle[9]
Tony Gonzales' plan would remove protections for Texans with pre-existing conditions including the 300,000 right here in South and West Texas. In the middle of a pandemic and economic crisis, Gonzales would kick Texans off their health insurance including young mothers, those with asthma, diabetes, cancer or even those recovering from the coronavirus and force more rural hospitals to close.

Comparison Text – Outside Group Advertisement, House Majority PAC, 2020 Cycle[10]
Abuelas are the best. La familia es todo. Family is everything. But under Tony Gonzales' plan, our families could lose healthcare [caption: Texas families could lose healthcare]. Tony Gonzales would take away protections for people with pre-existing conditions: children with asthma, grandparents with cancer, young mothers, even coronavirus patients could be kicked off insurance if Tony Gonzales gets his way.

[8] "Father and Mother", Collective Super PAC, available at: https://www.youtube.com/watch?v=eRhY5jaSdqk

[9] "Texas' 23rd (TX-23), DCCC, https://web.archive.org/web/20200920203125/https://dccc.org/races/tx-23/

[10] "Family is Everything", House Majority PAC, available at: https://www.youtube.com/watch?v=nR09JpjnMSo

0.5-0.599

Reference Text – Candidate Redbox, Hiral Tipirneni (AZ-6), 2020 Cycle[11]

David Schweikert betrayed their trust by putting his own personal enrichment ahead of their interests. Congress found him guilty of 11 ethics violations, fined him $50,000 dollars and unanimously reprimanded him after he (1) used his Congressional staff to pay for his personal expenses like first class flight upgrades, dry cleaning and expensive dinners and to babysit his children and (2) lied on his official campaign finance reports about loans, donations and expenses.

Comparison Text – Outside Group Advertisement, House Majority PAC (HMP), 2020 Cycle[12]

They call it the people's house. But David Schweikert acts like it's his house, breaking the rules and our trust. Schweikert was caught for 11 ethics violations and fined $50,000 for flouting campaign finance laws. By failing to disclose $305,000 in loans, abusing taxpayer money, and having staff pay for first class upgrades, dry cleaning, and expensive meals. Mr Schweikert goes to Washington – for himself.

0.6-0.699

Reference Text – Party Redbox, Elaine Luria (VA-2), 2020 Cycle[13]

The character of who represents coastal Virginia matters. Scott Taylor is a scandal plagued politician who puts himself and his special interest donors first. Scott Taylor's campaign committed "out and out fraud" with "intent to defraud the Commonwealth" to try and win an election. So far one of his staffers has already pleaded guilty, another one goes to court in September and Taylor himself has not been exonerated as the investigation remains open.

Comparison Text – Outside Group Advertisement, VoteVets, 2020 Cycle[14]

One of the principles we lived by in the military was service over self. Not a bad idea for politicians too. Scott Taylor only serves himself. He's running for Congress again [caption: Circuit Court Judge: "out and out fraud"] even though people are still being convicted from his last one [caption:

[11] "Important Update", Hiral Tipirneni for Congress, https://web.archive.org/web/20201001063520/https://hiralforcongress.com/impo update/

[12] "His House", House Majority PAC, available at: https://www.youtube.com/watch?v=vUx2URLvll4

[13] "Virginia's 2nd (VA-2)", DCCC, https://web.archive.org/web/20200808021954/https://dccc.org/races/va-02/

[14] "Principles", VoteVets, available at: https://www.youtube.com/watch?v=GIJRJTlMn3U

former Scott Taylor campaign staffer pleads guilty in petition scandal]. The investigation isn't even over – Taylor still hasn't been cleared. I know people have low expectations for politicians these days, but Scott Taylor, he's just as crooked as a dog's hind leg.

0.7-0.799

Reference Text – Party Redbox, Dan Feehan (MN-1), 2020 Cycle[15]

Jim Hagedorn has shown disrespect to our troops and veterans who risked their lives for our country, even though Hagedorn himself never served in the military, instead working as a bureaucrat in Washington. That's why it's outrageous that he called a disabled combat veteran a half-soldier, he voted against pay raises for our servicemembers during the COVID-19 pandemic, and he refused to condemn Russia for offering bounties to terrorists who kill American soldiers in Afghanistan.

Comparison Text – Outside Group Advertisement, VoteVets, 2020 Cycle[16]

Jim Hagedorn is as slick a Washington politician as they come. But he refused to condemn Russia for offering bounties to terrorists who kill our troops in Afghanistan. And he voted against the military pay raise in the middle of this pandemic. [Caption: disrespect our troops]. Congressman, don't disrespect those who put their lives on the line for their country and think you're slick enough to get my vote.

0.8-0.899

Reference Text – Party Redbox, Anthony Brindisi (NY-22), 2020 Cycle[17]

While Spectrum Cable was jacking up rates on New York customers, Claudia Tenney was protecting their profits in Congress. After taking thousands in campaign contributions from Spectrum, Claudia Tenney voted to give them a $9 billion tax break. Claudia Tenney even voted to allow Spectrum and other internet companies to sell customer's personal data and browsing history without their consent.

Comparison Text – Outside Group Advertisement, Center Forward, 2020 Cycle[18]

[15] "Minnesota's 1st (MN-1)", DCCC, https://web.archive.org/web/20200808040314/https://dccc.org/races/mn-01/

[16] "Disrespect", VoteVets, available at: https://www.facebook.com/votevets/videos/386454319034975/

[17] "New York's 22nd (NY-22)", DCCC, https://web.archive.org/web/20200920215241/https://dccc.org/races/ny-22/

[18] "They've Gone Washington", Center Forward, available at: https://www.youtube.com/watch?v=qglGC0uXOGI

Tonight on "They've Gone Washington", featuring Claudia Tenney and Spectrum Cable. While Spectrum was jacking up New Yorkers' rates, Claudia Tenney protected their profits in Washington. She took thousands in campaign cash from them, then voted to give them a $9 billion tax break. She even voted to allow them to sell your data and browsing history without your consent.

0.9-1.0

Reference Text – Candidate Redbox, Tim Ryan (OH-SEN), 2022 Cycle[19]
Tim Ryan will stand up to China and fight for manufacturing in Ohio: Tim Ryan believes that we cannot be appeasers to the Chinese, we need to take them on and drive that investment back in the United States and reclaim the mantle of manufacturing around the world. Voters need to hear Tim Ryan passionately ask the House of Representatives when are we going to wake up? When are we going to have the guts to level the playing field? The guts to take on China? The guts to do what is right so our kids and grandkids can thrive in the United States? Check out Tim's impassioned speeches on the House floor focused on China on November 2nd, 2021 and October 25th 2011.

Comparison Text – DSCC Redbox, Tim Ryan (OH-SEN), 2022 Cycle[20]
Tim Ryan will stand up to China and fight for manufacturing in Ohio: Check out Tim's impassioned speeches on the House floor focused on China on November 2nd, 2021 and October 25th 2011. Tim Ryan believes that we cannot appease the communist government of China, we need to take them on and drive that investment back in the United States and reclaim the mantle of manufacturing around the world. Voters need to see Tim Ryan passionately ask the House of Representatives when are we going to wake up? When are we going to have the guts to level the playing field? The guts to take on China? The guts to do what is right so our kids and grandkids can thrive in the United States?

Appendix II - Redbox Division Process

To separate out the distinct messages contained in a single instance of redboxing for analysis purposes, it was often necessary to divide the redbox texts into separate chunks.

To illustrate this process, Figure 2 shows the DCCC redbox[21] posted on behalf of Democratic

[19] "Media", Tim for Ohio, https://web.archive.org/web/20220713185834/https://timforoh.com/media/

[20] "Ohio – Latest Update", DSCC, https://web.archive.org/web/20220808064320/https://defendthesenate.org/states/ohioupdates

[21] "California's 21st (CA-21)", DCCC, https://web.archive.org/web/20200920212829/https://dccc.org/races/ca-21/

Rep. T.J. Cox during the race for California's 21st congressional district, which was broken into two chunks – the first focusing on Republican opponent David Valadao's prior votes with Trump on healthcare and insurance premiums, and the second on Valadao's personal business failings. While converting each redbox into an appropriate form for textual similarity analysis, it was also important to remove any language not intended to be delivered in political advertising. This irrelevant information included directions to super PACs on targeted groups of voters ("Voters in Fresno and Bakerfield", "Hispanic voters…under 50"), requests for advertising on specific media channels ("need to see", "on the go") and links to backup documents that substantiated each message.

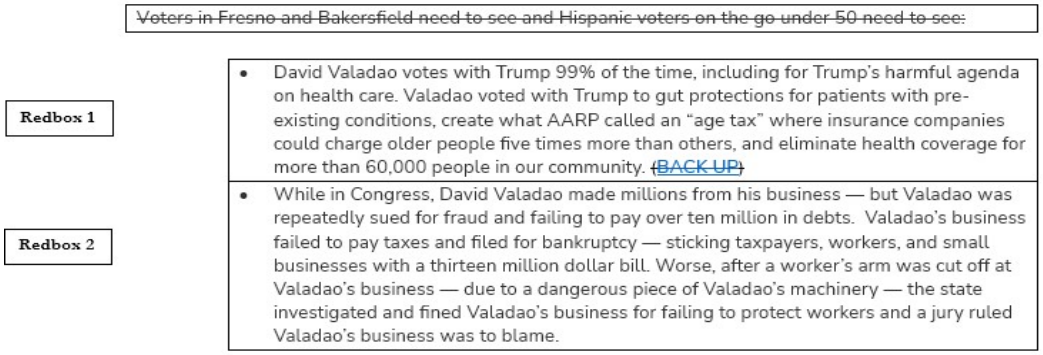

Figure 2: Cleaning Procedure for DCCC Redbox on behalf of T.J. Cox (CA-21), September 17th, 2020

Appendix III - Redbox Efficacy Coding

Each instance of redboxing by a candidate or party was coded according to four possible outcomes:

Successful amplification: At least one sponsored advertisement by both the party/candidate and one or more outside spending groups met the 0.5 cosine similarity threshold. When these conditions are met, the candidate/party and allied outside groups sing from the same hymn sheet, delivering political messaging to voters that is highly similar in content and wording. Outside group advertising thereby amplifies the campaign's chosen message.

Successful delegation: At least one sponsored advertisement by one or more outside spending groups met the 0.5 cosine similarity threshold, but no advertisements by the party/candidate met the threshold. When these conditions are met, the candidate and outside groups deliver politi-

cal messaging to voters that is distinct and dissimilar in content and wording. Candidates can thereby delegate certain messaging responsibilities to outside groups, including attacks on opponents with the potential for backlash if delivered by the formal campaign.

Failed amplification: At least one advertisement by the party/candidate met the 0.5 cosine similarity threshold, but no advertisements by outside spending groups met the threshold. When these conditions are met, candidates encourage outside groups to deliver similar political messaging, but are unsuccessful in securing this support. The message is ultimately delivered to voters, but not amplified by outside groups.

Failed delegation: No advertisements by either the party/candidate or outside spending groups met the 0.5 cosine similarity threshold. When these conditions are met, candidates encourage outside groups to deliver distinct and dissimilar political messaging but are unsuccessful in securing this support. Since the delegation is unsuccessful, the message is not delivered to voters either by the candidate or by outside groups.