Democracy cannot long survive with low political truth literacy

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Abstract

The institution of liberal democracy is in crisis. After a long steady transition to more and stronger democracies, a precipitous backward slide to authoritarianism/autocracy has begun, as seen in major powers like Russia, the United States, and even China, a non-democracy, as well as scores of lesser powers. Why is this? What can be done to reverse this ominous trend? Applying root cause analysis and system dynamics, the paper identifies the main root cause as low political truth literacy. As long as this is low democracy cannot long survive, because citizens are too easily deceived into voting against their own best interests. A sample solution element for resolving the root cause, Truth Literacy Training, has been empirically tested and is presented. Based on study results, we conclude that individual political truth literacy can be raised from low to high with a surprisingly small amount of carefully designed training, though we expect a collection of solution elements will be required for optimal root cause resolution.

Introduction

Liberal democracy has descended into crisis. Instead of the permanent ascendancy of Western liberal democracy as the final form of government famously predicted by Fukuyama (1992) in The End of History and the Last Man, democratic backsliding toward authoritarianism/autocracy is strongly underway (Bermeo, 2016; Lueders and Lust, 2018; Waldner and Lust, 2018).

The European Union, once a showcase of the benefits of democracy, finds itself in an “existential crisis” and has “reached a point where liberal democracy relapses throughout the continent” (Onis and Kutlay, 2019). After an early turn toward democracy after the collapse of the USSR in 1991, Russia has veered toward dictatorship under Vladimir Putin and is now an autocratic regime (V-Dem-Institute, 2021). China, a one-party state which formerly elected new leaders periodically, in 2018 become a dictatorship with the constitutional removal of president term limits, allowing Xi Jinping to remain in power for life. The United States, after four years under Donald Trump’s embrace of authoritarian ideals and attack of democratic institutions using a new style of authoritarian populism (Chacko and Jayasuriya, 2016), only narrowly returned to democratic ideals under Joe
Biden, by 43,000 out of a total of 74 million votes in the 2020 election due to use of an electoral college system (Wikipedians, 2020). India, Turkey, and Israel, “all previously hailed as exceptional democracies,” have all turned to antidemocratic populism (Rogenjofer and Panievsky, 2020).

Using their Liberal Democracy Index, the latest V-Dem Democracy Report (V-Dem-Institute, 2021), found:

**ANOTHER YEAR OF DECLINE FOR LIBERAL DEMOCRACY:**

- The global decline during the past 10 years is steep and continues in 2020, especially in the Asia-Pacific region, Central Asia, Eastern Europe, and Latin America.
- The level of democracy enjoyed by the average global citizen in 2020 is down to levels last found around 1990.

This decline has critical implications for problems like the climate change crisis because “The connections between the widespread rise of authoritarian and populist leaders …and destructive trends in environmental politics and governance on the other are legion” (McCarthy, 2019). The rise of authoritarian regimes also increases geopolitical tensions and the likelihood of armed conflict (Brands, 2018).

This raises two research questions: (1) *Why exactly has the backslide from democracy to authoritarianism occurred?* (2) *What can be done to reverse this trend?*

The remainder of this paper addresses these questions using root cause analysis, system dynamics, and an empirical study. After review of contemporary research and root cause analysis, research results are presented, followed by discussion and conclusions.

**Contemporary research**

The topic of “why democracies break down” has drawn “huge amounts of attention” from scholars (Bermeo, 2016). Reviewing the literature, Waldner and Lust (2018) examined six theory families developed to explain why democratic backsliding occurs. The theories centered on political agency, political culture, political institutions, political economy, social structure and political coalitions, and international actors. Each offers a different set of loosely organized factors that could logically cause backsliding. However, none offer a rigorous cohesive theory. Waldner and Lust conclude that “despite the existence of six well-populated theory families, we do not have an obvious theoretical framework for explaining backsliding.”

Fukuyama (2020) himself acknowledges a “democratic recession” is underway and assigns three underlying causes: (1) One is the switch from a left-right ideological divide based largely on economic factors, to *a divide based on identity politics* and political deception. Leftist parties now represent oppressed minorities instead of the working class. The new right, instead of catering to defense of free markets, individual rights, and business interests, now “emphasizes a traditional kind of ethnically based national identity and worries that ‘our country’ is being taken over by a cabal of immigrants, foreign competitors, and elites who are complicit in the theft.” (2) A second cause is *appearance of the global internet*, controlled by large independent monopolies, whose “self-interest has
allowed them to be used by antidemocratic actors who have discovered that conspiracy stories and fabricated information often are rewarded with more clicks than the truth receives.”  (3) A third cause is “the decline in authority of traditional social institutions [such as] political parties, business corporations, labor unions, churches, families, media outlets,” etc.

The three causes combine: “The tendency of the new identity politics, in both its leftist and rightist varieties, has been to fragment societies into ever smaller identity groups” which then self-reinforce their narrow beliefs instead of being heavily influenced by traditional and more reliable social institutions.

How can backsliding be prevented or reversed? Fukuyama offers little here, other than to say further investigation is needed in the relationship between democracy, corruption, and state capacity, and that somehow the authority of liberal democracy must be rebuilt.

That Fukuyama and Waldner and Lust’s literature review failed to find a satisfactory answer for how to prevent or reverse democratic backsliding indicates an enormous knowledge gap. We propose that gap can be filled by thoughtful application of root cause analysis and system dynamics. The paper demonstrates how these tools can be jointly applied.

The powerful tool of root cause analysis

Root cause analysis is the systematic practice of finding, resolving, and preventing recurrence of the root causes of causal problems. The practice rests on several core concepts. Drawing from a diversity of sources, e. g. (Andersen and Fagerhaug, 2006; George et al., 2005; Ishikawa, 1986; Okes, 2019; Pyzdek, 2003; Tague, 2005), a root cause is the deepest cause in a causal chain (or the most basic cause in a feedback loop structure for more complex problems) that can be resolved. A causal problem occurs when problem symptoms have causes, such as illness or a car that won’t start. Examples of non-causal problems are math problems, scientific discovery problems, information search/organization problems like criminal investigation and system optimization, and puzzle solving.

Root cause analysis serves as the foundational paradigm of widely used, highly refined business processes with high process maturity like the ISO 9000 family of international quality standards (Tummala and Tang, 1996), lean production (Womack et al., 1990), and Six Sigma (Pande et al., 2000). The leader is Six Sigma, used by 100% of aerospace, motor vehicle, electronics, and pharmaceutical companies in the Fortune 500 and 82% of all companies in the Fortune 100 (Marx, 2007). Root cause analysis employs hundreds of supporting tools and techniques, such as the 136 tools described by Tague (2005).

Root cause analysis centers on the Five Whys. Starting at problem symptoms, one asks “Why does this occur?” until the root cause(s) is found (Imai, 1986, p. 50; Ohno, 1988, p. 77). This reveals the causal chains leading from symptoms to intermediate causes to root causes. The problem is then solved by resolving the root causes.
Consider the sample problem in Figure 1. Problem symptoms are “My car won’t start.” If the intermediate cause is a dead battery and the root cause is a bad alternator, then recharging the battery is a superficial solution pushing on a low leverage point. It will only solve the problem partially and temporarily. To fully and permanently solve the problem, one must go deeper and find the root cause so that fundamental solutions can be applied. Here replacing the alternator solves the problem relatively permanently by pushing on a high leverage point.

Figure 1. Standard terminology of root cause analysis using a problem example. Only one intermediate cause is shown. More intermediate causes and additional subproblems are needed for more complex problems. The diagram shows the “essential causal structure” of the problem. Diagrams like this can summarize the much more complex simulation model containing the full analysis.

If analysis shows no \( F > R \) exists, the problem is insolvable. When this occurs, the problem should be redefined such that at least one \( F > R \) exists. Or solution should not be attempted and the problem declared insolvable.

**Essential causal structure** is the simplest possible cause-and-effect diagram and/or simulation model that describes why a problem occurs and how it will respond to resolving its root causes.

**All causal problems arise from their root causes.** Democratic backsliding is a causal problem. Its solution therefore requires finding and resolving its root causes, whether root cause terminology is used or not. Doing this explicitly is far more efficient and reliable than implicitly.
Highly complex problems require root cause analysis to reliably solve. Once a causal problem reaches a high level of complexity, it can only be reliably solved by explicit root cause analysis, because the problem’s essential causal structure is too well hidden, complex, and counterintuitive to be analyzed correctly. Other tools, such as comparative analysis, trial and error, and modeling, can sometimes eventually solve highly complex problems. But they cannot do so efficiently and reliably.

Highly complex dynamic problems require simulation modeling to solve, so that the problem’s dynamic causal structure can be correctly identified. The most suitable tool for doing this for difficult large-scale social problems is, in our opinion, system dynamics.

Root cause analysis results

Iteratively applying root cause analysis and system dynamics modeling, we arrived at Figure 2. Starting at Problem Symptoms, let’s walk the diagram to explain how it was built.

Figure 2. Essential causal structure of the democratic backsliding problem.

The first WHY question

The Five Whys were used to ask a series of questions. The first was WHY is backsliding from democracy to authoritarianism occurring? The first intermediate cause is election of politicians not working for the democratic common good. Too many citizens are voting instead for politicians working for the uncommon good of powerful special interests. These may be a single person (a dictator/autocracy) or a ruling elite (a party, aristocracy, theocracy, oligarchy, ruling family, etc.).
This intermediate cause is well known. The solution used now is the same solution used before to hasten the spread of democracy before the backslide began. The solution attempts to promote and prove the superiority of democracy over authoritarianism. This is a form of more of the truth. The more people who see the superiority of democracy over all other forms of government, the more they will tend to elect politicians who seek to strengthen democracy.

The chief reason the solution is no longer working is that since 2000, authoritarian state capacity (government effectiveness, regulatory quality, rule of law, and control of corruption) has improved so much worldwide, especially in China, that there is no longer proof democracy is superior (Foa, 2018).

The second WHY question

The problem is not insolvable, however. Our next root cause analysis question was why does election of politicians not working for the common good occur? The answer is because of successful political deception.

Examination of authoritarian regimes shows all rely on state-managed propaganda and deceptive strategies to maintain public support. Walker (2016) explains why:

Above all, authoritarian rulers are preoccupied with regime survival, and they study and learn from other authoritarian regimes, both past and present, in order to maintain power. … Through experimentation and learning, authoritarian regimes have refined their techniques of manipulation at the domestic level. By constructing fake political parties, phony social movements, and state-controlled media enterprises that appear in many ways to be like those of their democratic counterparts, autocrats simulate democratic institutions as a way of preventing authentic democracy from taking root. …authoritarians can deploy a potent combination of censorship and propaganda, allowing them to dominate the media space and create an unchallenged alternate reality for their audiences.

Populist authoritarians seeking to gain office, as well as those in office, depend heavily on deceptively provoking all sorts of false beliefs and emotions, especially fear. McCarthy (2019) describes how:

They use bellicose rhetoric and gestures in theatrical efforts to project strength. They promise to take quick and decisive action on highlighted issues, in contrast to liberal democratic administrations portrayed as weak, passive, and indecisive. They make the central populist move of claiming to speak and act in the name of and with the support of “the people,” who are typically identified in nativist, xenophobic, and often explicitly racialized terms. Following closely from that, they often identify internal enemies—ethnic or religious minorities, immigrants, refugees, drug users—as scapegoats and targets for public anger. They use populist rhetorical tropes of resentful anti-elitism, suspicion of experts and complexity, and celebration of direct action to promise simple, immediate solutions to complex, long-term problems.
Solutions used to solve the problem of *successful political deception* employ a strategy of *misinformation correction*. If people believe statements that are not true, then that can be corrected by providing citizens with corrected versions of deceptive statements pointing out the truth. Solutions to do this in democracies are *fact-checks, articles, social media posts, news, etc. pointing out the truth*.

However, these superficial solutions have worked so poorly that we are now living in the age of post-truth politics, where: “The post-truth politician does not simply pick-and-choose among relevant facts, offer questionable interpretations or avoid inconvenient questions. The post-truth politician manufactures his or her own facts. The post-truth politician asserts whatever they believe to be in their own interest and they continue to press those same claims, regardless of the evidence amassed against them” (Lockie, 2017). Outstanding recent examples are the “policy deception” behind the disastrous Brexit vote (Baines et al., 2020) and Donald Trump’s 30,573 false or misleading claims (Kessler et al., 2021).

### The third WHY question and the simulation model

**WHY** does *successful political deception* occur? This was so difficult to answer we began construction of a system dynamics model. The final result, after much iteration, is shown in Figure 3.

The reason the question was difficult was we had completed our work on the superficial layer of the problem and were now attempting to penetrate to the fundamental layer, where causal structure was so hard to see correctly that further analysis required simulation modeling.

The model uses Dawkins’ (1976) concept of memes. A *meme* is copied information capable of affecting behavior. All memes are learned from others, either directly from other people or indirectly through a transmission medium such as books, television, or social media. In the model a meme is a statement that is true or false. When a meme enters a person’s mind, they are said to be “infected” with the meme.

The Race to the Bottom among Politicians works like this: *Supporters Due to Degeneration* use their *degenerates influence* to transmit *false memes*. Some are detected. Others become *undetected false memes*. These cause the *degenerates infectivity rate*, which after a delay causes the *degenerates maturation rate*. This causes some *Not Infected Neutralists* to move to the stock of *Supporters Due to Degeneration*, and the loop starts over again.

Opposed to the Race to the Bottom is the Race to the Top. Here, instead of attracting supporters with falsehoods in an attempt to support the desires of powerful special interests, politicians attract them with the truth about what’s best for the common good of all. The two loops are mirror opposites with one critical difference. The Race to the Top lacks an *undetected true memes* node, because there is no deception to detect.
The two loops are locked in a perpetual struggle to attract supporters and are thus called The Dueling Loops of the Political Powerplace. This structure captures the essence of the left-right political spectrum, consequential because “global politics is first and foremost a debate between the left and the right. ... The left-right dichotomy occupies a special place, as the most enduring, universal, and encompassing of all political strategies” (Noel and Therien, 2008, p. 3).

The Dueling Loops capture this dichotomy. The two loops each embody an enduring political strategy. The Race to the Top houses the progressive left, who lean towards equality, justice, and quality of life because that optimizes the common good. The Race to the Bottom houses the conservative/authoritarian right, who promote anything that maximizes what powerful special interests want. In reality there are many loops along the political spectrum, such as the far right, right, center, etc. We have modeled only two.
Examples of powerful special interests are managers of large for-profit corporations, the rich, and elite ruling groups of many kinds, e.g., the ruling class. All are minorities. In a democracy, the only way a minority can persuade the majority of voters to support them is by use of deception, favoritism, or force. Force is illegal. Favoritism, such as bribery or patronage, is mostly illegal. Furthermore, in a large population, favoritism can only attract a small percentage of supporters. It’s too expensive to bribe millions of voters. There are not enough perks and jobs to dole out to millions of people.

This explains why deception is the main strategy for Race to the Bottom politicians and why political deception is so prevalent. Jeremy Bentham, the father of utilitarianism, in his handbook of political fallacies published in 1824 reached the same conclusion: “...it is impossible by fair reasoning ...to justify the sacrifice of the interests of the many to the interests of the few.... It follows that for effecting this purpose they must have recourse to every kind of fallacy, and address themselves, when occasion requires it, to the passions, the prejudices, and the ignorance of mankind” (Larrabee, 1925, p. xxi). Referring to Western democracies, “The central problem facing conservatives, once their country’s [voting] franchise had been extended to include most adult men, was that it was unclear why most voters would want to vote for them” (Ware, 1996, p. 32).

The key insight in the model is that the size of a lie, and hence its supporter attractive power, can be inflated, but the size of the truth cannot. The bigger the lie, the bigger and stronger the false belief a deceptive politician can plant in a supporter’s mind. The Race to the Bottom contains an inherent advantage that the Race to the Top lacks.

For example, a virtuous politician may gain supporters by stating, “I know we can’t balance the budget any time soon, but I will form a panel of experts to determine what the best we can do is.” Meanwhile, a deceptive politician is garnering supporters by saying, “Economics is easy. You just put a firm hand on the tiller and go where you want to go. I can balance the budget in four years, despite what the experts are saying. They are just pundits. Don’t listen to them. A vote for me is a vote for a better future.” The deceptive politician is also telling numerous different groups, “Yes, I can do that for you. No problem.” Guess who will usually win?

From a mathematical perspective, the size (and hence the appeal) of a falsehood can be inflated by saying that $2 + 2 = 5$, or 7, or even 27, but the size of the truth can never be inflated by saying anything more than $2 + 2 = 4$. Inflation is used to create fear when there is nothing to fear, doubt when there is nothing to doubt, the false promise of I can do so-and-so for you when I really cannot, a large flaw in one’s opponent when there is only a small flaw or no flaw, and so on. “In the end, the Party would announce that two and two made five, and you would have to believe it” (Orwell, 1949).

We can now answer our third question: WHY does successful political deception occur? The answer is because of the inherent advantage of the Race to the Bottom. Because this can be resolved it’s the main root cause. It can be resolved by pushing on the high leverage point of raise political truth literacy from low to high.

The model contains two high leverage points for doing this. One is logical truth literacy. Raising it increases detected false memes, which decreases undetected false memes, which weakens the Race to the Bottom because fewer neutralists will be infected
with false memes. Raising it also increases repulsion memes. The second high leverage point is repulsion to political deception. Raising it increases two nodes, which have the effect of weakening the Race to the Bottom and strengthening the Race to the Top.

Race to the Bottom manipulators know that pushing on the high leverage point cannot be allowed to work. This is the purpose of disorientation, the practice of making “it impossible for people in the society subject to the propagandist’s intervention to tell truth from non-truth” (Benkler et al., 2018, p. 36). For example, the purpose of Russia TV news programs is “not so much to convince viewers of any one version of events, but rather to leave them confused, paranoid, and passive—living in a Kremlin-controlled virtual reality that can no longer be mediated or debated by any appeal to ‘truth.’” [In the US] disorientation has become a central strategy of right-wing media since the early days of Rush Limbaugh’s emergence as a popular conservative radio talk show host….”

Dynamic behavior of the model

Next, we illustrate how the high leverage points work with a series of simulation runs (Figure 4). Percent rationalists = Supporters Due to Rationality / (Supporters Due to Rationality + Supporters Due to Degeneration). All runs begin with 1 degenerate supporter, 1 rationalist, and 98 neutralists. All parameters are estimated since this is an exploratory model. The model was tuned to give qualitatively realistic behavior over the full range of the high leverage points, false meme size, and influence per degenerate or rationalist. The two influence variables are equal and are not changed in the runs.

Run 1. This shows how when neither side (rationalists and degenerates) has an advantage, percent rationalists stays unchanged at 50%. The number of rationalists and degenerates rise evenly. Neither side has an advantage since false meme size = 1 and logical truth literacy = 0. Repulsion to political deception doesn’t matter because detected false memes = 0.

Run 2. Logical truth literacy is raised to 20%, giving rationalists a large advantage. By the end of the simulation run percent rationalists reaches 98%.

Run 3. Social agents are adaptive. Degenerate politicians are clever enough to adjust the size of lies to the optimum size: not too big and not too small. The effect of size of lie on detection is a lookup table with a curve to reflect how once a lie becomes too big, it’s more easily detected and diminishing returns begin. Experimentation shows the optimum false meme size is 4.8. Now it’s the degenerates who have the advantage. Percent rationalists quickly falls to 0%.

Run 4. Here we raise the other high leverage point, repulsion to political deception, from 0% to 20%. This reduces the degenerates’ advantage, causing percent rationalists to fall to only 32%.
Figure 4. Simulation runs 1 to 12. Shaded cells indicate changes between runs.

<table>
<thead>
<tr>
<th>Model Settings</th>
<th>Simulation Runs</th>
</tr>
</thead>
<tbody>
<tr>
<td>False meme size</td>
<td>1 1 4.8 4.8 2.6 3.6 2.3 3.6 3.6 3.8 4.2 4.2</td>
</tr>
<tr>
<td>Logical truth literacy</td>
<td>0% 20% 20% 20% 20% 20% 20% 20% 50% 50% 50% 50%</td>
</tr>
<tr>
<td>Repulsion to political deception</td>
<td>NA 0% 0% 20% 20% 20% 20% 20% 50% 50% 60% 50%</td>
</tr>
<tr>
<td>Results</td>
<td></td>
</tr>
<tr>
<td>Percent rationalists at end of run</td>
<td>50% 98% 0% 32% 14% 58% 38% 81% 84% 89% 96% 100%</td>
</tr>
</tbody>
</table>
Run 5. Reference mode. The smarter the social agent, the faster and better it adapts to changing circumstances. We can only assume that degenerate politicians will adapt their strategy to the new circumstances of run 4 by changing false meme size to its optimum of 2.6 in run 5. This doubles their advantage, causing percent rationalists to fall to 14% instead of 32%.

We hypothesize that in most political systems both high leverage points are low, at about 20%. This run thus reflects approximate real-world behavior and is the reference mode. It is the problem to solve, as later runs attempt to do.

Because political truth literacy is low, the Race to the Bottom is the dominant loop most of the time. “Special interests now take precedence over the common good. …we now live in a diminished democracy …with ordinary citizens squeezed out of the public sphere by partisan ideologues and professional propagandists” (Dillard and Shen, 2013, p. 16). The Race to the Bottom is not dominant all the time, because loop dominance changes back and forth due to a variety of reasons beyond the scope of this paper.

Run 6. Let’s test which leverage point offers the highest leverage. In this run logical truth literacy is raised to 50%. False meme size is set to its optimum of 3.6. The result is percent rationalists stabilizes at 58%.

Run 7. This run moves logical truth literacy back to 20%, raises repulsion to political deception to 50%, and sets false meme size to its optimum of 2.3. This time percent rationalists stabilizes at 38% rather than at the 58% of run 6, indicating that logical truth literacy is the highest leverage point. This makes sense, since raising logical truth literacy increases detected false memes and repulsion memes. It also more directly weakens the Race to the Bottom.

Run 8. Finally, we push on both high leverage points at the same time. Both are set to a medium level of 50%. Optimum false meme size is set to 3.6. As a result, percent rationalists soars to 81%. The Race to the Top is now dominant. Virtuous politicians will tend to be elected and deceptive ones will not.

However, 81% percent rationalists is not high enough. In a democracy the rights and desires of minorities must be respected and addressed. If 19% of voters prefer Race to the Bottom politicians, nations will be too distracted to focus efficiently on highly demanding problems, as seen in the disproportionate influence far right groups can have, such as the authoritarian populist wave in Europe of Le Pen in France, the Austrian Freedom Party in Austria, and the mis-named Center Party in the Netherlands. In Germany, Denny (2021) found that the far-right Alternative for Germany (AfD), even though national polls show only 10% support, “poses a significant and complex threat to the German constitutional order. Highly organized and openly hostile to the rules binding other political actors, the German far right has outperformed its electoral support in shaping German society. In 2020, [one of Germany’s intelligence agencies] reported that the number of right-wing extremists in Germany has increased to 33,300, of whom 13,300 are thought to be willing to commit violence.” Historically, the far right is where support for authoritarianism begins. We must do better.
**Run 9.** Let’s first test the effect of raising *repulsion to political deception* from 50% to 60%. Optimal *false meme size* remains the same. *Percent rationalists* rises slightly from 81% to 84%. There’s not much leverage here.

**Run 10.** Now let’s test what we already know to be the highest leverage point. This run sets *repulsion to political deception* back to 50% raises *logical truth literacy* to 60%, and sets optimal *false meme size* to 3.8. *Percent rationalists* now rises much higher, to 89%. But this is not enough, as demonstrated above by the destructive effect of Germany’s AfD party, which has only 10% support. We must therefore do even better.

**Run 11.** This raises *logical truth literacy* from 60% to 70%, and sets optimal *false meme size* to 4.2. *Percent rationalists* rises dramatically to 96%. We don’t have any evidence to say if this is good enough, so let’s raise it still higher.

**Run 12.** *Logical truth literacy* is raised to 80%. Optimal *false meme size* remains unchanged. *Percent rationalists* now quickly reaches 100%. There is no question this is good enough.

Note how the 100% *percent rationalists* was achieved by not raising *logical truth literacy* to an unrealistically high level of 90% or 100%. 80% appears achievable, as it is less than the adult 2019 global literacy rate of 86% and is considerably less than the literacy rates of Central Europe and the Baltics (99%), East Asia and the Pacific (96%), and Latin America and the Caribbean (94%) (UNESCO, 2019).

**Comparison of the analysis to contemporary research**

We cannot emphasize enough that without using system dynamics to answer the question of WHY does *successful political deception* occur, we would have never found the full causal structure of the problem. That structure was simply too elusive, too well-hidden in problem complexity. As simple as the Dueling Loops of the Political Powerplace model is, its construction took several years.

Compare the two intermediate causes and the main root cause found in our analysis (Figure 2) to the “causes” found in the literature. The backsliding literature as described earlier in Waldner and Lust’s work involves six families of backsliding theory and dozens of causes/factors. For example, for agency-based theories these are contingent decisions, constraints, temperament, intellect, strategic decision making, strategic interaction of groups and opposition, normative commitment to democracy, etc. Fukuyama’s three underlying causes for the “democratic recession,” as described earlier, were:

1. A divide based on identity politics.
2. Appearance of the global internet.
3. The decline in authority of traditional social institutions.

Fukuyama’s theory and the six families of backsliding theory contain no essential causal structure (as defined in Figure 1) and hence no concept of root cause. They are collections of loosely related plausible intermediate causes connected by verbal problem stories. Yet this is a causal problem. All causal problems arise from their root causes. For difficult problems like backsliding, if a problem theory lacks the problem’s full causal
structure and some proof the root cause can be resolved, how can that theory be used to reliably solve the problem? We politely suggest it cannot.

Examining the US in an effort to understand the effect of propaganda on politics, Benkler et al. (2018) analyzed four million messages using their Media Cloud platform. America’s political spectrum has evolved into two opposing feedback loops, a right-wing “propaganda feedback loop” where politicians “compete on identity confirmation” regardless of the truth (p79), versus a centrist/left-wing “reality-check” loop that follows “institutionalized truth-seeking norms” where politicians “compete on truth quality and the scoop” (p77):

The American media ecosystem consists of two distinct, structurally different media ecosystems. One part is the right-wing, dominated by partisan media outlets that are densely interconnected and insular and anchored by Fox News and Breitbart. The other part spans the rest of the spectrum. It includes outlets from the left to historically center-right publications like the Wall Street Journal and is anchored by media organizations on the center and center-left that adhere to [truth seeking] professional standards of journalism. (p75)

The differences between the two media ecosystems are palpable. Despite extensive efforts, we were unable to find an example of disinformation or commercial clickbait started on the left, or aimed from abroad at the left, that took hold and became widely reported and believed…. By contrast, we found such instances repeatedly succeeding in the right-wing media ecosystem, with pervasive exposure and lasting effects on the [false] beliefs reported by listeners, readers, and viewers within that network. (p383)

The propaganda and reality-check loops correspond to the Race to the Bottom and Top loops, and confirm the Dueling Loops are firmly established in the most influential democracy in the world. Ample evidence exists, e.g. (Cosentino, 2020; Heft et al., 2019; Pascale, 2019), that similar dynamics occur in many other democracies, particularly those with authoritarian tendencies.

The Truth Literacy Training study

Good root cause analysis and “scientific modeling,” as Homer (2012, p. 120) reminds us, require measurement or testing of all key assumptions. How much confidence can we have in the hypothesis that political truth literacy is low and can be raised to high in a practical manner, which forms the bedrock of the Dueling Loops model?

The research reported in this paper is part of a larger body of work which designed nine sample solution elements for pushing on the high leverage point of raise political truth literacy from low to high. These fundamental solutions are Freedom from Falsehood, Truth Ratings, Truth Literacy Training, etc. The most promising one to develop first appears to be Truth Literacy Training, since it requires the least amount of work to develop, test, and implement and can have high impact.
Solution element construction and study design

Using our own software and database, a form of online Truth Literacy Training was developed using a long questionnaire supplemented by training materials (Figure 5). A long series of pretests (first on collaborators and friends, then on Prolific online panels) was used to refine training and testing design. At one point we found many subjects were not taking the training seriously, resulting in widely varying and mostly low scores.

The problem was solved by discovery of an elegant set of experiments (Sagarin et al., 2002) on “dispelling the illusions of invulnerability” to deceptive persuasion. The authors found it was not enough to inoculate subjects by exposure to deceptive statements and explanation of why they were deceptive. This failed to work because “our participants’ sense of unique invulnerability to deceptive ads left them unmotivated to use defenses against such ads.” This illusion of invulnerability caused subjects to believe they were not susceptible to deception, with the result that “they did not resist the ads containing illegitimate authorities [a form of deception] more effectively than did controls.” This was corrected by “demonstrating in an undeniable fashion that participants can be fooled by ads containing counterfeit authorities.”
To dramatically demonstrate to people that they are not invulnerable to deception, we changed the initial part of the training. After subjects answer questions for the first three statements (in the Review Section of Figure 5) and before any training has occurred, they read the item on: The concept of truth literacy. There are only two choices here. If we design the treaty right, we are all going to benefit. But if we design it wrong, too many nations will suffer. Therefore, we must take every precaution to design it right instead of wrong.

42. The politician said “Therefore, we must take every precaution to design it right instead of wrong.” How true do you feel that claim is?

43. What is the main reason for your decision in the above question?

44. If the election was held today and this was all the information you had, how much impact would what the politician claimed have on your decision to vote for or against the politician?

Figure 5. Truth Literacy Training web page, group 3, claim and vote training. The subject has completed the training, done in the Getting Started and Review Section. They are now answering three questions for a statement about a Trade Agreement Treaty. All three answers are correct. The Personal Truth Test is shown on the right panel. Below it are the two vote training rules. Above it (the subject can scroll up to refer to them) are summaries of the fallacies groups 2 and 3 were trained on. Using the left panel, subjects can navigate anywhere in the questionnaire. Checks indicate an item has been completed.

To dramatically demonstrate to people that they are not invulnerable to deception, we changed the initial part of the training. After subjects answer questions for the first three statements (in the Review Section of Figure 5) and before any training has occurred, they read the item on: The concept of truth literacy. There they are shown their own answers (the first two are usually wrong) versus the correct answers. The item then says:

If you got all the answers right, congratulations. However, here’s how other people did. In a past survey with 34 participants, none got the answer to the first question right. Three got the answer to the second question right. On the third question 19 people got the answer right.
Why are the first two questions so hard? It’s because they use clever forms of deception, which makes it terribly difficult to determine how true the claims are.

The reason so many people got the third question right is it’s not deceptive. Generally, it’s much easier to spot the truth as opposed to deception, because we are so used to processing true statements from people we talk to, books we read, and so on.

This shocks people into realizing they are vulnerable to deception. From this point on, almost all take the questionnaire seriously.

Using a Prolific online panel, the study was run on 93 US subjects (age range 22 to 51, average age 31, 49% male) randomly assigned to three groups. All were told this is a decision-making study for the purpose of improving the health of democracy.

Group 1 received training on the neutral topic of how democracy works. Group 2 received training on how to tell if a political claim (embedded in a political statement, such as the one in Figure 5) was true or false, by spotting the pattern of fallacy or non-fallacy used and using the Personal Truth Test, which includes the Strong Evidence Rule (Figure 6).

Group 3 received the same training as group 2 plus training on how to vote correctly (given the perceived level of truth of a claim) by applying two rules: Reward the Truth Teller and Penalize the Deceiver. Total time for group 3 averaged 87 minutes, of which about one hour was training. Group 3 training involves 37 questions.

There is a 5-minute break after training for all groups, which we found necessary to avoid fatigue and loss of interest on such a long questionnaire. A follow up study was run 26 days later using different statements.

In the test section of the questionnaire (called Decision Making Section in Figure 5), non-hot statements were presented in random order. Figure 5 shows how each statement is followed by three questions: (1) the truth question, (2) an open-ended question designed to maintain cognitive motivation and give us feedback, and (3) the vote question. The fictitious country of “Rutania” was used in statements to create interest and political realism without the bias a real country would have provoked.

The study was designed to test six hypotheses as discussed later.
Definitions

The study uses these definitions:

**Truth literacy** is the ability to tell truth from deception, to be able to “read” the truth.

**Truth quotient** (TQ) is a measure of a person’s truth literacy in terms of their average ability to correctly process deceptive arguments in terms of how true an argument’s claim is, on a scale of zero to 100%. 100% is perfect truth literacy, which is not realistically possible due to the complexity and continual evolution of real-world deception. Like IQ or EQ, TQ measures an important aspect of intelligence. There are two components of TQ:

**Logical truth quotient** (LTQ) is the ability to logically tell if a deceptive claim is true or false. LTQ was measured by the percent correct for the truth questions for deceptive statements. LTQ corresponds to *logical truth literacy* on the Dueling Loops model (Figure 3).

**Democratic truth quotient** (DTQ) is the ability to vote correctly given a deceptive statement made by a politician. DTQ was measured by percent correct for vote questions for deceptive statements. This corresponds to *repulsion to political deception* on the Dueling Loops model.

Individual DTQ can theoretically never be higher than LTQ, since DTQ uses the results of LTQ as input. Study results support this prediction, as seen in Figure 7.

Deceptive statements contained six fallacies we found common in political appeals: cherry picking, ad hominem attack, appeal to emotion, strawman, false dilemma, and false fact lie, plus flawed application of the Strong Evidence Rule.
Study results

Figure 7 summarizes study results. LTQ is naturally low, at 8% for group 1. Voters not trained in logical truth literacy can spot a fallacy in a deceptive political statement an average of only 8% of the time. DTQ is also naturally low, at 2% for group 1. Both are crucial findings and appear to explain why nations are so susceptible to a dominant Race to the Bottom and democratic backsliding. While the study cannot say 8% and 2% are highly accurate measures due to the large confidence interval and low alpha, as well as the fact this was not a real-world test, we feel the results indicate political truth literacy is low instead of medium or high in most political states.

DTQ for group 2 was 6%, a deeply counterintuitive discovery. We expected it to be low, but not that low. The 6% means that even if voters have been trained on how to tell if a deceptive claim made by a politician is true or false, they are unable to correctly translate that knowledge into how to vote correctly. Group 2, which received claim training but not vote training, averaged spotting deception 77% of the time, but could translate that knowledge into voting correctly only 6% of the time. The claim training made almost no difference on voting correctly. This is why the vote training of group 3 is required.

The key data is LTQ and DTQ for groups 1 and 3. The large increases, from 8% to 76% and from 2% to 67%, 68-point and 65-point rises, suggest that Truth Literacy Training and other solution elements will be capable of pushing on the high leverage point of raise political truth literacy from low to high successfully. Group 3 training took only about one hour, indicating that Truth Literacy Training, such as in education systems and online training, will not require that much of a person’s time.
The follow up study found LTQ and DTQ for group 3 had declined from 76% to 66% and 67% to 60%, 10-point and 7-point falls. After an average of 30 minutes of refresh training, LTQ and DTQ for group 3 rose to 75% and 70%, indicating regular refresh training of some type can work and will be required. Or it may be that like reading and writing literacy, once truth literacy matures and becomes the reasoning default and is exercised often enough, little decline will occur.

However, LTQ for group 1 was 22% and 20% for the pre-refresh and post-refresh training statements, versus 8% for the first questionnaire. This indicates spotting deception was substantially easier in the second questionnaire statements, and suggests there was more than the 10-point and 7-point declines noted above and that the refresh training may not have worked as well as the 75% and 70% indicated. The second questionnaire statements were developed after the first questionnaire was run. Without realizing it, we structured them slightly differently and frequently omitted stating how strongly supported the premises were. This caused the second set to be substantially easier than the first set, as it made fallacies easier to spot.

This problem is easily corrected. A more accurate measure of training persistence would require further statement testing/development and rerunning the study using balanced statements of equal difficulty in the first and second questionnaires. During this work the first and second questionnaires could be improved as needed.
Study hypotheses results

The study was designed to test six hypotheses. We reached these conclusions:

**H1. LTQ and DTQ can be accurately measured.**

H1 was weakly supported for those not receiving Truth Literacy Training. Cronbach’s alpha was .38 and .44 for group 1, the neutral training topic group. We theorize this is low because since these participants are untrained, they are forced to guess a lot. Guesses have low internal consistency.

H1 was almost supported for those receiving only claim training, with alphas of .67 and .68 for group 2. These alphas were much lower than those for group 3. We attribute this to the confusion induced by not being training on the vote question, but being asked that question and forced to guess. This causes confusion on the truth question and reduces internal consistency.

H1 was well supported for those receiving full Truth Literacy Training, with alphas of .82 and .92 for T3.

**H2. LTQ and DTQ are currently low in the average voter.** This was well supported. The average voter has never received the equivalent of Truth Literacy Training. Their LTQ and DTQ were very low, 8% and 2% for group 1.

**H3. LTQ and DTQ can be raised to high via Truth Literacy Training.** This was well supported.

**H4. Truth Literacy Training on LTQ alone is insufficient to raise DTQ to above the minimum DTQ for a healthy sustainable democracy.** This was well supported. The average vote score for those receiving claim training alone was 4%. This shot up to 67% for the group receiving claim and vote training.

We found this astonishing. Even if a person has been trained on how to tell whether a political claim is true or false, they are unable to translate the truth or falsity of a claim into correct action. Instead, they choose all sorts of answers for the vote question. From our point of view this doesn’t make sense. In a time when political deception is so rampant and the truth is so rare, why would anyone NOT want to strongly penalize deceivers? Why would anyone NOT want to strongly reward truth tellers? Isn't that what's required is we want democratic governments to work for the best interests of voters? We suspect the reason for this behavior is hardly anyone has received the equivalent of Truth Literacy Training and in particular vote training, which is amazing simple. Vote training consists of following the two simple rules described in Figure 5.

**H5. Training on LTQ and DTQ persists but falls over time.** This was partially supported by second questionnaire results.

**H6. The fall in Hypothesis 5 may be eliminated with sufficient refresh training.** This was weakly supported by second questionnaire results. However, we expect the problems described in the second set of statements can be eliminated, as discussed earlier.

In all cases, further research is required to more fully confirm, reject, or modify these hypotheses.
Interpretation of the distribution of vote question answers

Let’s examine the answers for the three treatment groups in Figure 8:

**Group 1. Trained on neutral topic** – While the effect surely varies across political units and study samples, we hypothesize that the first row approximates how voters in most democracies behave today.

In chart A there’s more support than opposition in response to a deceptive political claim. This has not gone unnoticed by politicians willing to engage in deception. Also notice how close the data comes to a normal distribution centered on the midpoint. This indicates a person’s level of truth literacy is largely due to random factors (environmental and genetic chance) rather than the formal education seen in charts C and E.

Chart B shows people lean toward supporting truth telling politician, but seem shy about supporting them strongly. We offer no theory why this is so.
Group 2. Trained on claims – This contains what to us is astounding counterintuitive data. Citizens trained on how to determine the truth of claims but not trained in how to vote correctly, intuitively lean in the correct direction on vote answers. But very few choose the correct answers of 9 in chart C and 1 in chart D. A surprising percentage (22% and 29%) chose answer 5, “It would make no difference.” That’s like saying “It doesn’t matter to me at all if a politician tells the truth or not.” But yet it must, if democracy is to thrive.

Similar observations apply to other incorrect answers. Choosing 4 and 6 is like saying “It barely matters to me whether a politician tells the truth or not.” Deviations from correct answers are why the vote training in group 3 is required.

Amazingly, correct answer preference is worse in chart D versus chart B. Claim training reduced ability to vote correctly. This too is puzzling behavior we cannot explain.

Group 3. Trained on claims and vote – The third row, if we could get enough voters there, would resolve the root cause by raising political truth literacy from low to high. For the solution element to work, we estimate only 5% to 15% of an electorate needs effective training since most elections are close. The biggest training impact would be on uncommitted young and swing voters. Voters already strongly committed to a false ideology will tend to resist change due to the deceptive power of motivated reasoning, as discussed later. Training is not urgently needed for voters already supporting truth-telling politicians. This suggests that initially, training should target those who would benefit the most. In the long-term, all citizens should be trained.

The training needs improvement to reduce confusion of some kind, indicated by the answer 1 spike in chart E and the answer 2, 5, and 9 spikes in chart F. These should all be near zero.

Why are the correct answers 9 and 1? Because political deception has become so destructive in today’s world that nothing less than answer 9 for deceptive statements and answer 1 for non-deceptive statements is required if democracy is to thrive. Electing truth-telling leaders must be the top priority of voters.

For deceptive statements, even small deviation from the correct answer matters, since that indicates a person has been partially deceived and that adds up. Koch and Arendt (2017) surveyed the research on cumulative media effects and found consensus that “When media coverage of a certain aspect of reality is biased (i.e., differs systematically from reality), cumulative exposure to this coverage can bias recipients’ perceptions.”

Deception involves three components: (1) Response shaping, the initial formation of a new response to a stimulus, such as a slight amount of doubt climate change is real, or a small dislike of immigrants, or some doubt a politician not a liar, (2) Response reinforcement, where each repetition of a falsehood (often using different false evidence) strengthens the false belief response, and (3) Response change, how a person responds to a stimulus based on the amount of false belief acquired (Dillard and Shen, 2013, p. 37).

The cumulative exposure effect occurs because of component 2. Each additional exposure reinforces the conditioned response. Consider deceptive statements. What begins as a small error in reasoning, such as a small deviation from the correct answer, with
many repetitions grows into a large error, such as reasoning that “Well, Politician A didn’t tell that big a lie. I’ll vote for him anyway.” Or they might reason “Just because Politician B denies climate change is real is not that strong a reason to oppose him. Other things matter more.”

For non-deceptive statements, small deviation from the correct answer also matters, since that indicates a person does not understand how to best support truth-telling politicians. These errors accumulate and can lead to large errors, such as: “I like the fact Politician C told the truth on such an important subject. But telling the truth is not that big a deal. Other factors like experience are just as important.”

**The Truth Literacy Training cognitive mechanism**

The analysis found the high leverage point for resolving the main root cause of democratic backsliding to be raise political truth literacy from low to high. The study offers empirical evidence political truth literacy is presently low and can be fairly easily raised to high. What is the cognitive mechanism that allows that?

The main training strategy is *high-speed pattern recognition*, by spotting patterns of non-fallacies (truth) or fallacies (deception). Subjects were trained on how to spot one pattern of the truth, correct application of the Strong Evidence Rule. This inductive rule of logic appears to be the most common rule in true political statements. Subjects were also trained to spot flawed application of the Strong Evidence Rule, plus six fallacies common in political falsehoods: cherry picking, ad hominem attack, appeal to emotion, strawman, false dilemma, and false fact lie.

This approach can nullify the deceptive power of motivated reasoning, a well-established theory explaining how political decision-making works. “In short, citizens are often partisan in their political information processing, motivated more by their desire to maintain prior beliefs and feelings than by their desire to make ‘accurate’ or otherwise optimal decisions.” (Lodge and Taber, 2013, p. 149) When a prior belief is false (such as non-whites are inferior or climate change denial), deception has occurred and partisan reasoning will be erroneous.

The premise of motivated reasoning theory is that all reasoning is motivated to achieve either accuracy goals (slow thinking) or partisan goals (directional, fast thinking). With enough training and experience in how to “read” the truth by pattern recognition (claim training), and how to use that knowledge to act correctly (vote training), sufficiently correct accuracy reasoning can approach the speed of partisan reasoning and replace it, thereby becoming the reasoning default when important new political arguments or facts are encountered, or old ones need review.

This allows Truth Literacy Training to create a reliable high-speed pattern recognition heuristic. With proper training, accuracy reasoning is now automatically used instead of partisan reasoning when confronted with new potentially false inputs, because accuracy reasoning is now fast instead of slow, and usually correct instead of so easily deceived. A person’s important political beliefs will now tend to be true instead of false, depending on their level of truth literacy.
Heuristics work by substituting fast and frugal reasoning for slower logical reasoning. “A heuristic is a strategy that ignores part of the information, with the goal of making decisions more quickly, frugally, and/or accurately than more complex methods” (Gigerenzer and Gaissmaier, 2011, p. 454). Pattern recognition allows irrelevant information to be ignored and not processed, which can speed reasoning so much it becomes instantaneous.

For example, the statement in Figure 5 contains 85 words about a Trade Agreement Treaty. As soon as a truth literate person spots the false dilemma pattern in the 6 words saying “There are only two choices here” and confirms there really are more than two choices (there almost always are in politics), they know the statement is fallacious and nothing else matters. Step 3 of the Personal Truth Test applies.

Truth Literacy Training employs the preemptive aspect of inoculation theory. Innovating by training on logic pattern recognition instead of misinformation correction (such as fact-checks and news pointing out the truth), as we have done, Cook et al. (2017) found that inoculating subjects by training on spotting false balance and fake expert strategies “neutralized” the negative influence of misinformation on perceived scientific consensus on climate change.

Our approach necessarily goes one step further by introducing vote training and greatly improves training effectiveness by adding a catalog of common fallacies and The Personal Truth Test. Drilling subjects on the catalog of common fallacies (and correct and flawed application of the Strong Evidence Rule) teaches high-speed pattern recognition in the same manner that students are drilled on letters of the alphabet, words, numbers, object names, simple sentences, etc. With sufficient practice citizens can now “read” the truth. Common fallacies can be spotted in seconds and false meme infection prevented most of the time.

Peering into the future, what might a society that has achieved universal truth literacy look like? The key cultural trait might be something like: (Boush et al., 2009, pp. 123–124)

Marketplace Deception Protection Skills…. A person who is skilled in deception protection will have well-learned mental procedures designed to detect, neutralize, resist, correct for, and penalize deception attempts…. More broadly, consumers adept at deception self-protection will learn to warn and protect friends, kin, and loved ones…. Most broadly, consumers must learn to adopt a deception protection goal as their default….

**Discussion and conclusions**

“Truth is the first casualty in the establishment of the authoritarian state.”


We offer several practical conclusions concerning truth:
Fact-checks

Fact-checks, the most popular tool for reducing the damaging effect of political deception, are largely ineffective (Margolin et al., 2018; Oeldorf-Hirsch et al., 2020; Walter and Murphy, 2018) because they push on the low leverage point of misinformation correction, as diagrammed in Figure 2. “Once inaccurate beliefs are formed, they are remarkably difficult to eradicate. Even after people receive clear and credible corrections, misinformation continues to influence their reasoning: in cognitive psychology this is known as the continued influence effect of misinformation” (Swire and Ecker, 2018, italics in the original). The effect is so strong that “even if people do shift their opinion and acknowledge that information they previously believed to be true is incorrect, they are unlikely to change their voting preferences or feelings towards political candidates.” Other experimental research found the same result. “…journalistic fact-checks can reduce misperceptions but often have minimal effects on candidate evaluations or vote choice. … These findings suggest motivated reasoning can coexist with belief updating” (Nyhan et al., 2019).

A second reason fact-checks are ineffective is fact-checkers have never solved the problem of how to get people to read a fact-check corresponding to a particular falsehood. “We almost never observe respondents reading a fact-check of a specific claim in a fake news article that they read” (Guess et al., 2018). Misinformation cannot be corrected if people never read the correction.

As of October 2020 there were 304 fact-checking organizations in 84 countries (Stencel and Luther, 2020). Given the continued influence effect of misinformation, the unsolved problem of how to get people to read relevant fact-checks, and the striking results of the Truth Literacy Training study, it would behoove the fact-check industry and journalism/news to shift from misinformation correction to misinformation prevention, by switching to the high leverage point of raise political truth literacy from low to high. “An ounce of prevention is worth a pound of cure” (Franklin, 1734, referring to the need to protect towns from fires by various prevention practices).

Media literacy

Truth literacy is not the same as media literacy, a much broader concept. In the US, “At its most basic, media literacy is the active inquiry and critical thinking about the messages we receive and create [as well as] the ability to access, analyze, evaluate, create, and act using all forms of communication” (Bulger and Davison, 2018). In the European Union, media literacy consists of five similar competencies: access, analysis and evaluation, creation, reflection, and action/agency (McDougall et al., 2018, p. 7). By contrast, truth literacy consists of one specific skill: the ability to tell truth from deception. We suggest that media literacy shift from a broad skill set with no emphasis on any single skill, to one with a sharp focus on the high leverage point, using the measurement and training concepts demonstrated in the study as a starting point for training tools and curriculum development. Truth literacy training provides the foundation for the all-important analysis component of media literacy.
An opportunity for the system dynamics community

We are under no illusion that the static and dynamic causal structures presented (Figures 2 and 3) are sufficiently complete to support implementation of a specific set of solution elements that will work effectively on real political units. Much further research is required, especially real-world testing. But we do see the structures as a productive first step in a new direction.

That new direction also depends on driving construction of system dynamics models with formal root cause analysis, when confronted with problems so difficult they defy standard modeling processes. System dynamics experts may object and counter that they are already performing the equivalent of root cause analysis. If a model endogenously generates the “right behavior for the right reasons” (Barlas, 1996), then it must contain the equivalent of root causes. The right reasons occur “if the model has an internal structure that adequately represents those aspects of the system which are relevant to the problem behavior at hand.”

However, “judging the validity of the internal structure of a model is very problematic.” We argue this is because the model lacks explicit root causes and may not even contain the root causes. Lack of explicit root causes results in model validation being of the entire model structure (a “very problematic” diffuse task), instead of just the causal chains from high leverage points to root causes to intermediate causes to symptoms (a much easier precise task and one that can be specified by essential causal diagrams as in Figures 1 and 2). Here we are speaking of causal problems with a small number of discrete root causes rather than system optimization problems, where the entire model structure requires validation to confirm that reference mode behavior arises for the right reasons, because any node or feedback loop may require change to support optimization. Optimization problems are information search problems rather than causal problems.

Some proof that a system dynamics model generating the “right behavior for the right reasons” does not necessarily contain the root causes may be found in World3 and similar integrated system models. The reference mode scenario of World3 shows unsolved problem behavior. The “solved” mode scenarios for the three editions of The Limits to Growth show how collapse is avoided. Yet when governments attempt to change real-world policies corresponding to model policies that induced the solved mode, little happens. The problem is not solved, indicating the model exhibits unrealistic behavior. Why? Because the model only contains intermediate causes and low leverage points, and omits the fundamental layer of the problem. Solutions pushing on low leverage points cannot solve a problem because S < R. If the model contained the root causes and their high leverage points, and those assumptions were well tested, solutions pushing on the high leverage points would tend to work because F > R.

What these root causes might be was explored in an earlier work (Harich, 2010), which found two main root causes of the environmental sustainability problem. The main root cause of systemic change resistance to solving the problem was found to be high deception effectiveness. “Selfish special interests rely on deception to combat the truth” that the problem must be solved. This corresponds to the root cause in Figure 2, the inherent advantage of the Race to the Bottom. The earlier paper’s high leverage point was
general ability to detect manipulative deception, which corresponds to what this paper calls raise political truth literacy from low to high. This reveals that if problem symptoms in Figure 2 was changed to Successful opposition to passing proposed laws for solving the environmental sustainability problem, then the problem name could be changed to How to Overcome Change Resistance to Solving the Environmental Sustainability Problem. Indeed, this is the very subproblem the Dueling Loops model was originally developed for. We changed problem symptoms and modified the superficial layer of Figure 2 so that the original root cause analysis and model could be reused for the Democratic Backsliding Problem. A single root cause can sit at the bottom of many different causal chains and problems. All are solved by resolving the single root cause.

The bible of system dynamics, Business Dynamics: Systems Thinking and Modeling for a Complex World (Sterman, 2000), addresses the issue of finding causes by providing process step 2: “Formulating a dynamic hypothesis or theory about the causes of the problem” (p87). No method for doing this is provided, other than what works for client consulting, the most common use of system dynamics: “In practice, discussion of the problem and theories about the causes of the problem are jumbled together in conversation with client teams. Each member of a team likely has a different theory about the source of the problem; you need to acknowledge and capture them all” and from that “help the client develop an endogenous explanation for the problematic dynamics” (p95).

While this process for creating the dynamic hypothesis can work well for problems of a client consulting nature, it is not applicable to large-scale social problems as historically intractable as democratic backsliding or the many aspects of environmental sustainability, including climate change. In this class of problems there are no client teams. There is only a vast system of billions of selfish social agents (people, families, corporations, governments, politicians, etc.) engaged in an endless struggle for survival of the fittest. Sterman’s claim (p85) that “the process, however, is similar for other contexts as well,” including when the client is “the public at large,” does not in our opinion hold for this class of problems.

This gap can be filled by explicitly employing root cause analysis, such as by driving model construction with tight methodical application of the Five Whys and the terminology and concepts of Figure 1. Root cause analysis is not perfect, but it is highly productive once a process for a particular class of problems becomes mature. Such processes have worked extraordinarily well for difficult business problems, as demonstrated by the global popularity of root cause analysis based mega-tools like the ISO 9000 family of quality standards, lean production, and Six Sigma as discussed earlier. We see no reason why the same cannot soon be the norm for root cause analysis based application of system dynamics to difficult large-scale social problems.

Effective integrated system models (ISMs) are desperately needed to formulate the integrated policy solutions explicitly called for in the UN’s 2030 Agenda (Pedercini et al., 2020). “A central role is being created for further development of ISMs.” However, present policies are not working. How will policies that can work be identified, in a different manner from what past ISMs have used? This is the gap root cause analysis can fill. As this paper has demonstrated, once analysis penetrates to the fundamental layer of
the problem, entirely new insights can appear. Policies for resolving the root causes will probably not revolve around traditional strategies, but long overlooked high leverage points like the one covered in this paper.

We could not agree more with Pedercini, Arquitt, and Chan’s closing remarks: (italics added)

Only 10 years remain to attain the SDGs, and indications are that the majority of countries are far from meeting their goals. There is great need for ISMs to help find cost-effective paths to reach the SGDs. This presents the system dynamics community with the opportunity, and responsibility, to join in the global efforts to build a sustainable world.

A hypothesis

We close with our most leverageable insight. The analysis behind the Truth Literacy Training study implies a hypothesis the study itself cannot measure or test. Given the indispensable role of the voter feedback loop in modern democracy, we propose what can be called the Minimum Truth Literacy Requirement of Democracy: A certain minimum LTQ and DTQ is required for a sustainable healthy democracy, defined as one that can consistently achieve its top common good governance goals sustainably. The further a democracy falls below this minimum, the more suspectable it is to backsliding and the lower the benefits it will tend to deliver to the majority of its citizens, since the more it backslides, the greater the share of benefits delivered to the minority (powerful special interests, aka the ruling elite) and the less priority given to common good problems. Testing this hypothesis and finding the minimums will require real-world application.

It thus appears that political truth literacy is just as vital to the health of democratic nations as reading, writing, and math literacy.

The post-truth age of politics will end when the universal truth literacy age begins.

Acknowledgements

(To be completed later.)

Supporting information

(Links to the model and study data spreadsheet will go here.)

References


Stencel, M., Luther, J., 2020. Fact-checking count tops 300 for the first time [WWW...


