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TENACITY OF NONSENSICAL OPINIONS: RESISTING THE ALLURE OF CERTAINTY

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Abstract
We live in the age of post-truth and arrogance, where lying has become so acceptable that we have numerous euphemisms for deceit. A major threat to the success of a society or organization is the feeling of certainty. People overestimate how much they actually know. This problem is compounded by the fact that what passes for truth is often a distortion of reality. Institutions such as our court system have demonstrated that truth is not the main priority, further exacerbating the problem. This paper examines the dangers of certainty. People with too much confidence in their opinions may have mental flaws that can be dangerous. Moreover, much of the research in areas such as medicine and management cannot be replicated and turns out to be untrue.

Keywords: Post-truth era; Dangers of moral certainty; Overconfidence; Intellectual humility; Expert predictions; Replication crisis; Cognitive flexibility; Evidence-based management; Evidence in the courtroom

Introduction

> "The Ministry of Peace concerns itself with war, the Ministry of Truth with lies, the Ministry of Love with torture, and the Ministry of Plenty with starvation. These contradictions are not accidental, nor do they result from ordinary hypocrisy: they are deliberate exercises in doublethink" (Orwell, 1992 [1949], p. 192).

According to an old Icelandic proverb, there are more than a hundred words for snow in Icelandic. While the precise amount of that claim has been disputed, 46 terms have been accounted for, and that list is not considered comprehensive. Philologists have studied other countries where snow is a central concern for those societies. They have documented the number of terms describing snow, with up to 70 in Alaska and about 180 among the Saami people in northern Scandinavia and Russia (Robson, 2013).

The point of this abundance of terminology is that it reflects cultural mores, values, and concerns. (Hitchcock, 1992). By contrast, while American English has few words for snow, it is fascinating – and disturbing - to observe how many words we have for "lie." A perusal of an online Thesaurus reveals 43 synonyms for "lie" (https://www.thesaurus.com/browse/lie) – and that list does not include recent terms such as "fake news" or "misinformation." Merriam-Webster reports over 30 synonyms for the verb "lie" and over 40 for "lie" as a noun. This profusion of words would seem to reflect a societal concern with those who do not speak the truth.

About 2,000 years ago, the Sages of the Talmud stated (Babylonian Talmud, Berachos 4a): "Teach your tongue to say, 'I do not know.'" In the Talmud, the expression of *Teiku*, meaning the question stands, is used quite frequently. According to Pessin (2005), the phrase is used 317 times in the Babylonian Talmud. Unfortunately, we live in an era where people rarely say, "I do not know."

Lynch (2017) highlights the fact that the "defining trait of the age seems to be arrogance…the arrogance of thinking that you know it all and that you don't need to improve because you are just so great already" (para. 1). Lynch avows that we all need intellectual humility. This means that we have to accept that we do not know as much as we think to do given our various biases and limitations, and appreciate the importance of learning from the experience of others. This, of course, means that we have to be receptive to what others have to say, even those who have very different opinions from our own. Contrary to what many executives believe, "the humble leader is precisely the person who is best qualified to transform his firm into a profitable, successful, and respected organization." (Argandoña, 2015, p. 70).

Many scholars feel that we live in the " post-truth age." The term "post-truth" became the Oxford Dictionaries Word of the Year in 2016 (Wang, 2016). Another term that is being used is "alternative facts." Keyes (2004, p. 5) asserts that "deception has become commonplace at all levels of contemporary life… It is now as acceptable to lie as to exceed the speed limit when driving." Jon Lovett, a former speechwriter for Hillary Clinton and Barack Obama, as well as a stand-up comic and television writer had the following to say about deception (the term he used was bullsh--):

> We are drowning in it. We are drowning in partisan rhetoric that is just true enough not to be a lie; in industry-sponsored research; in social media's imitation of human connection; in legalese and corporate double speak. It infects every facet of public life, corrupting our discourse, wrecking our trust in major institutions, lowering our standards for the truth, making it harder to achieve anything (Davis, 2017, para 2).

It is becoming effortless to deceive people because information today increases exponentially, mainly because of the internet and globalization. It took 1,800 years, from 100 BCE to 1700 CE, for the world's knowledge to double; currently, knowledge doubles every 12 months (Lewis, 2016). Online information doubles every six months; technical knowledge doubles every 18 months (Lewis, 2016). With such rapid growth in knowledge, one would think that people would recognize the dangers of absolute certainty. Unfortunately, this has not been the case. We observe arrogant people ranging from academics to doctors to politicians who are proudly sure of their facts. Unfortunately, not all the information available to the public is reliable. There is a great deal of bad science, junk science, fake news, and erroneous research available to the public. Researchers speak of evidence-based medicine, evidence-based management, and evidence-based practice; we shall see that the "evidence" is often unreliable.

With so much nonsense on the internet, knowing the difference between fiction and fact has become crucial. Many scholars believe that the presidential election won by Donald Trump in 2016 was influenced by false "news" (Najmabadi, 2007). Because they spend so much time on the internet, one might think that students should have no trouble separating fact from fiction. Unfortunately, a report by Stanford University researchers found that the critical thinking of high school students left a great deal to be desired. Based on a sample of 3,446 students, the report found that subjects could not assess the accuracy and trustworthiness of digital information. Two-thirds of respondents were not able to make a distinction between sponsored content and news stories (Walker, 2020).

One example of misinformation that spread all over the internet is that the COVID-19 vaccine is 4.8 times deadlier than the virus. A chart was cited that showed that England had 3,430 deaths from COVID-19 during a three-week period: 2,882 had at least one vaccine, and 587 were not vaccinated at all. The bloggers did not mention that 90% of the adult population was vaccinated, so the base is very different for the two groups. The correct comparison for these three weeks is 54.9 Covid-19 deaths per 100,000 vaccinated people vs. 125.4 deaths per 100,000 unvaccinated people (Curet, 2021).

Carl T. Bergstrom and Jevin West teach a course with the provocative title of "Calling Bullshit: Data Reasoning in a Digital World" at the University of Washington. The syllabus is available on the internet at https://www.callingbullshit.org/syllabus.html. Their definition of bullshit is: "language, statistical figures, graphics, and other forms of presentation intended to persuade by impressing and overwhelming a reader or listener with a blatant disregard for truth and logical coherence" (Kolowich, 2017, para. 7). The University of Michigan — as well as many other institutions — offers a similar course, "Fake News," Lies and Propaganda: How to Sort Fact from Fiction. A recent article published in *Science Advances* involved a joint study conducted by scholars at the University of Cambridge (UK), the University of Bristol (UK), and Google. These researchers have developed a method that they call "prebunking" to "inoculate" students against lies and conspiracy theories by showing them videos about the tactics behind misinformation on the internet. Unfortunately, while they have had some success with this system, it has proved ineffective vis-à-vis those with extreme views and hardened beliefs. Further, the impact of this training, even when effective, is temporary, lasting from only a few days to a few months (Roozenbeek et al., 2022).

Confronted with increasing scrutiny and criticism, several internet-based social media platforms have attempted to prevent the flow of misinformation disseminated via their websites. For example, Meta, Facebook's parent corporation, has been struggling for years with how to stem the flood of misinformation and fake news on its site. Meta announced in 2020 that they would be using AI (Artificial Intelligence) on Facebook to minimize the spread of misinformation, hate speech, and deep fakes, i.e., "videos, which use AI to show people doing and saying things they didn't actually do or say" (Facebook, https://ai.facebook.com/blog/heres-how-were-using-ai-to-help-detect-misinformation/).
However, the tools that they employed have not proved sufficient. In July 2022, Meta introduced a new tool called Sphere that it claims will effectively ferret out misinformation. (Huddleston Jr., 2022) As of this writing, assessing this new AI tool's effectiveness is premature.

Facebook is not the only major site that has been struggling with the question of how to preserve the value of maintaining an open arena for the exchange of ideas and views but, at the same time, to police falsehoods, toxicity, and lies. Google announced in August 2022 that it was introducing a new tool called MUM, among other efforts to help users identify misinformation.

Twitter has also been battling its demons. A dispiriting article in *Science* reported that tweets containing falsehoods are 70% more likely to be retweeted than truthful tweets, and they reached users six times faster. (Langkin, 2018) Twitter has been waging a largely unsuccessful war against misinformation in the past few years, announcing once again in September 2022 its latest attempt to stymie its growth (Wagner, 2022). It is important to note that whatever policies Twitter has adopted to date are subject to rejection and revision due to the acquisition of the company by Elon Musk at the end of October 2022.

Musk has described himself as a 'free-speech absolutist" who intends to make Twitter "a more freewheeling place for all types of commentary" (Conger & Hirsch, 2022, para. 3). While Musk has expressed his intention to reopen the site to all sorts of speech, thereby undermining previous efforts to curtail the transmission of misinformation, he has also stated

that he wants to target spam and eliminate fake accounts. However, some of his announced policies may undermine his intended plans. For example, Musk announced that he wants to eliminate the notations at the bottom of tweets that indicate where these messages originate. Experts are concerned that eliminating this information may encourage phishing or spambots (Metz, 2022). Musk has also restored access to Twitter by former President Trump, who has been under a lifetime ban. Former Twitter employees have reportedly voiced concern over this reinstatement, worrying that the former president attracts extreme content, conspiracy theories, and misinformation. (Stokel-Walker, 2022)

The ongoing struggles that internet-based platforms experience trying to balance the free and welcoming exchange of ideas and points of view, on the one hand, with language that promotes hate, toxicity, and misinformation, on the other, highlights the difficulty in identifying falsities and immunizing its users from its poison. Even the most sophisticated and skeptical users can become convinced of a lie if the canard is repeated often enough and with sufficient confidence.

Bertrand Russell once said: "The whole problem with the world is that fools and fanatics are always so certain of themselves, but wiser people so full of doubts" (Chastain, 2017). People trying to persuade the public often speak with such certainty and confidence, which is why individuals must understand the dangers of absolute certainty combined with overconfidence.

The Danger of Certainty Combined with Overconfidence

With certain kinds of questions, answers that people feel that their response is "99% certain to be correct" turn out to be incorrect 40% of the time (Kasanoff, 2017).
Kolbert (2017) highlights that people believe they know considerably more than they really do. This overestimation of the knowledge we possess is known as the overconfidence effect. Sloman and Fernbach (2017) speak of the "knowledge illusion"; we simply do not understand how little we know.

> Over the last few decades, the ideal of the rational individual has been attacked from all sides. Postcolonial and feminist thinkers challenged it as a chauvinistic Western fantasy, glorifying the autonomy and power of white men. Behavioral economists and evolutionary psychologists have demonstrated that most human decisions are based on emotional reactions and heuristic shortcuts rather than rational analysis, and that while our emotions and heuristics were perhaps suitable for dealing with the African savanna in the Stone Age, they are woefully inadequate for dealing with the urban jungle of the silicon age.
>
> Sloman and Fernbach take this argument further, positing that not just rationality but the very idea of individual thinking is a myth. Humans rarely think for themselves. Rather, we think in groups. Just as it takes a tribe to raise a child, it also takes a tribe to invent a tool, solve a conflict or cure a disease. No individual knows everything it takes to build a cathedral, an atom bomb or an aircraft. What gave Homo sapiens an edge over all other animals and turned us into the masters of the planet was not our individual rationality, but our unparalleled ability to think together in large groups (Harari, 2017, paras. 2-3).

In the discipline of economics, rational choice theory has been challenged by so many researchers – especially after the Great Recession of 2008 – that it has become evident to many scholars, including Daniel Kahneman, Nobel laureate, that the theory is incorrect (Ariely, 2009; Friedman, Fireworker, & Nagel, 2017).

Robert A. Burton, a neurologist, examined the neuroscience behind being certain and came to the following conclusion:

> Despite how certainty feels, it is neither a conscious choice nor even a thought process. Certainty and similar states of "knowing what we know" arise out of involuntary brain mechanisms that, like love or anger, function independently of reason (Burton, 2008a: xi).

Burton believes that humans cannot avoid certainty bias but can moderate its effect by an awareness that feelings of certainty are not based on logic and reasoning. These feelings result from "involuntary brain mechanisms" that have little to do with the correctness of a belief. This is why intuitions, hunches, premonitions, and gut feelings must be empirically tested. Burton sees certainty bias as a possibly severe mental flaw. Burton (2008b) explicitly points out that people should not believe in politicians that sound very sure of themselves. A simple way of reducing certainty bias is training oneself to listen when another person, even one with a different viewpoint, is talking. It is essential to hear what others say in order to see things from a different perspective.

Critchley (2014) relates the concept of uncertainty to the tolerance of others, and he attributes the existence of Auschwitz to certainty bias.

> The play of tolerance opposes the principle of monstrous certainty that is endemic to fascism and, sadly, not just fascism but all the various faces of fundamentalism. When we think we have certainty, when we aspire to the knowledge of the gods, then Auschwitz can happen and repeat itself. Arguably, it has repeated itself in the genocidal certainties of past decades (Critchley, 2014, para. 18).

Lloyd (2017, paras. 4-5) also feels that moral certainty is dangerous. He posits, "History overflows with misery inflicted by well-intentioned people who were convinced that they had seen the only true moral values, and who sought to convert or destroy those who would not agree." His examples include the Inquisition, which was based on the moral certainty of the Roman Church. The Church did not doubt that its interpretation of Christian scriptures was correct. Similarly, Stalin's Russia, Mao's China, and Hitler's Germany were totalitarian societies built on the belief that they knew the truth and anyone who disagreed had to be exterminated.

Mao's "Cultural Revolution" resulted in the death of millions – one estimate is 30 million -- and was a Chinese holocaust (Lewis, 2014: xviii). Communism is one social experiment that has failed miserably. White (2012, pp. 453-457) lists 17 countries that became Communist; the total number of people that died in these countries from "execution, labor camps, famine, ethnic cleansing, and desperate flight in leaky boats." is about 70 million. White (2012, p. 453) underscores that "when death and destruction have followed every single Communist regime ever established, there would seem to be a flaw in the system." It should be impossible for anyone to believe that this economic system works.

On the other hand, White (2012, p. 309-315) describes the effects of Adam Smith's opinion that "Famine has never arisen from any other cause but the violence of government attempting, by improper means, to remedy the inconvenience of death." This notion that governments should not interfere with famine resulted in the deaths of 26.6 million people in British-ruled India. Amartya Sen challenged this view and noted that famines do not occur in democracies; the government's action can prevent deaths from famines in poor and rich countries (White, 2012: 309).

Leaders – even of democratic countries – who are sure of their beliefs will resort to lying if that is what it takes to accomplish what they want. The war in Vietnam, which cost more than 58,000 American lives, resulted from fabrications made by President Johnson (Lewis, 2014, pp. 8-12). According to Lewis (2014: xiii), the war in Iraq came about because

of 935 lies made by President George W. Bush and top officials of his administration regarding the Iraqi threat. President Obama told untruths about the Affordable Care Act when he repeatedly assured Americans, "If you like your health plan, you can keep it" (Lewis, 2014: xviii).

Overconfidence and Expert Predictions

Numerous websites discuss expert predictions, which turned out to be wrong. Some of the worst predictions about technology include: "There is no reason anyone would want a computer in their home" — Ken Olson, founder of Digital Equipment Corp.; "Remote shopping, while entirely feasible, will flop." — Time Magazine; "There's no chance that the iPhone is going to get any significant market share." — Steve Ballmer, Microsoft CEO; "Fooling around with alternating current (AC) is just a waste of time. Nobody will use it, ever." — Thomas Edison,
"The idea of a personal communicator in every pocket is a pipe dream driven by greed."— Andy Grove, then CEO of Intel; "No one will need more than 637KB of memory for a personal computer. 640KB ought to be enough for anybody."—Bill Gates (Dhiraj, 2017).

Kahneman (2011, pp. 261-265) believes one must be very careful with overconfident and assertive people. They certainly think they have the expertise but may not perform better than chance. He concludes that "an unbiased appreciation of uncertainty is the cornerstone of rationality — but it is not what people and organizations want…Acting on pretended knowledge is often the preferred solution" (Kahneman, 2011, p. 263).

Several books have been written about expert predictions that usually turn out wrong. According to Dobelli (2013):

> Experts suffer even more from the overconfidence effect than laypeople do. If asked to forecast oil prices in five years' time, an economics professor will be as wide of the mark as a zookeeper will. However, the professor will offer his forecast with certitude (Dobelli, 2013, para. 3).

Kahneman (2011, pp. 218-219) cites research conducted by Tetlock (2005) that demonstrates how poorly experts who make a living "commenting or offering advice on political and economic trends" actually perform. They do not do better than monkeys throwing darts on a board displaying the various possible outcomes (Kahneman 2011, p. 219). Virtually all economic models failed to predict the Great Recession of 2008 (Krugman, 2012; Smith, 2015). The best economic models are not judged on forecasting something new but on "how well the model fits the data on the phenomenon the model was created to describe." This, of course, is almost worthless since you might end up with hundreds of contradictory models to describe hundreds of different phenomena (Smith, 2015).

Smith (2015) further states:

> Economists didn't just fail to see that monster recession; they routinely fail to see economic events coming. The best models we have -- the ones central banks use, which take graduate-level training in order to handle -- have about as much forecasting power as simple, naïve mathematical techniques that any undergraduate statistics major could whip up in a few minutes (Smith, 2015, para. 5).

Kahneman (2011, p. 241) says this about expert intuition: "Claims for correct intuitions in an unpredictable situation are self-delusional at best, sometimes worse ... intuition cannot be trusted in the absence of stable regularities in the environment." If an environment is stable and regular, an expert can understand the regularities by observing the

right cues. In areas where there are no regularities and consistencies (e.g., the stock market or political environment), people will not be able to develop any real expertise.

Predictions made by academics are especially suspect. Kahneman (2011), citing Tetlock (2005), has the following to say about these kinds of predictions:

> In the age of academic hypersegmentation, there is no reason for supposing that contributors to top journals — distinguished political scientists, area study specialists, economists, and so on — are any better than journalists or attentive readers of *The New York Times* in 'reading' emergency situations (Kahneman, 2011, p. 219).

Kahneman (2011: 222-233) believes that algorithms often do a better job of predicting than experts. He describes several situations in which one should rely on a simple checklist consisting of six relevant characteristics rather than relying on an expert. Kahneman discusses a simple algorithm developed by Dr. Virginia Apgar in 1953 to determine whether a newborn infant was in distress. Her method is superior to the expert judgment of obstetricians since it focuses on several cues. Kahneman does point out the hostility towards using algorithms. Incidentally, Apgar's algorithm, still in use, has saved thousands of lives.

Kahneman (201, p. 226) cites the work of Dawes (1979) and claims that a simple formula that uses predictors (i.e., independent variables) with equal weights is often superior to multiple regression models that use complex statistics to assign different weights to each of the predictor variables. This is because multiple regression models are often affected by "accidents of sampling." Of course, some common sense is needed to select the independent variables most likely to predict the dependent variable accurately. Dawes (1979) claims that the simple metric of "frequency of lovemaking minus frequency of quarrels" does an excellent job of predicting marital stability (Kahneman, 2011, p. 226). The bottom line is that we should not be overly impressed with the judgment of experts.

This is what Menand (2005) says in his review of Tetlock's book *Expert Political Judgment: How Good is it? How Can We Know*?:

> [P]eople who make prediction their business—people who appear as experts on television, get quoted in newspaper articles, advise governments and businesses, and participate in punditry roundtables—are no better than the rest of us. When they're wrong, they're rarely held accountable, and they rarely admit it, either. They insist that they were just off on timing, or blindsided by an improbable event, or almost right, or wrong for the right reasons. They have the same repertoire of self-justifications that everyone has, and are no more inclined than anyone else to revise their beliefs about the way the world works, or ought to work, just because they made a mistake. No one is paying you for your gratuitous opinions about other people, but the experts are being paid, and Tetlock claims that the better known and more frequently quoted they are, the less reliable their guesses about the future are likely to be. The accuracy of an expert's predictions actually has an inverse relationship to his or her self-confidence, renown, and, beyond a certain point, depth of knowledge. People who follow current events by reading the papers and newsmagazines regularly can guess what is likely to happen about as accurately as the specialists whom the papers quote. Our system of expertise is completely inside out: it rewards bad judgments over good ones (Review by Menand, 2005, para. 2).

According to Menand, the best lesson one learns from the book is to think for yourself.

Does it pay to be overconfident? There is evidence that individuals who are overconfident and sure of their abilities are overrated by others; underconfident individuals are underrated by others as being worse than they happen to be (Lamba & Nityananda, 2014). Thus, it pays to be overconfident. This may explain why politicians act sure of themselves and overpromise (Hutson, 2014). The importance of overconfidence is used to describe why there is a gender gap in the corporate world. Men are more egotistical than women, making them appear more capable (Hutson, 2014).

The Difficulty of Changing People's Minds with Facts: Confirmation Bias

Psychologists describe confirmation bias as a significant cognitive bias (Lockton, 2012). A cognitive bias is defined as:

> A cognitive bias is a systematic error in thinking that occurs when people are processing and interpreting information in the world around them and affects the decisions and judgments that they make (Chery, 2020, para. 1).

This systematic bias is often due to people's use of heuristics or rules of thumb to simplify decision-making. These shortcuts can often lead to poor decision-making (Lockton, 2012). A thorough list of biases may be found in Wikipedia (List of Cognitive Biases, 2021). Heick (2021) places the 180+ biases into a graphic consisting of four categories: Too Much Information; Not Enough Meaning; Need to Act Fast; and What Should We Remember?

Once people form an opinion, they "embrace information that confirms that view while ignoring, or rejecting, information that casts doubt on it … Thus, we may become prisoners of our assumptions" (Heshmat, 2015, para. 3). People tend to only listen to information that supports their preconceptions, thus strengthening their beliefs and making them even more confident of their assertions.

There is a great deal of evidence that not only do facts not correct misinformation, but they make it more persistent and potent (Gorman & Gorman, 2017; Kolbert, 2017; Mercier & Sperber, 2017; Wadley, 2012). People get a rush from finding information that confirms that they are right; they would rather win an argument than discover the truth. People may have the ability to see flaws in their opponent's arguments. However, when it comes to their own opinions, that is when they are blind.

Certainty and misinformation are extremely powerful, and it is difficult for facts to change people's minds. Colleen Seifert, a researcher at the University of Michigan, says the following about misinformation.

> Misinformation stays in memory and continues to influence our thinking, even if we correctly recall that it is mistaken," said U-M's Colleen Seifert, the Arthur F. Thurnau Professor of Psychology. "Managing misinformation requires extra cognitive effort from the individual. If the topic is not very important to you, or you have other things on your mind, you are more likely to make use of misinformation. Most importantly, if the information fits with your prior beliefs, and makes a coherent story, you are more likely to use it even though you are aware that it's incorrect." (Wadley, 2012, paras.3-4).

Back in the 1950s, Leon Festinger, best known for cognitive dissonance theory, made the point that it is quite challenging to change the mind of a person who is sure about something. "Tell him you disagree and he turns away. Show him facts or figures and he questions your sources. Appeal to logic and he fails to see your point" (Mooney, 2011, para. 1). It is not easy to use the truth to enlighten people, but it can be done. One trick is to keep

repeating the facts without repeating the misinformation. This is because the more often people hear untruths, the higher the likelihood they will believe them. There is considerable evidence that if you wish to get someone to accept new evidence and change their mind, you must present the information in a way that does not cause a protective, defensive, and emotional response.

> Conservatives are more likely to embrace climate science if it comes to them via a business or religious leader, who can set the issue in the context of different values than those from which environmentalists or scientists often argue. Doing so is, effectively, to signal a détente in what Kahan has called a "culture war of fact." In other words, paradoxically, you don't lead with the facts in order to convince. You lead with the values—so as to give the facts a fighting chance. (Mooney, 2011, para. 46).

There is no question that it is considerably more challenging to change people's opinions who are misinformed rather than simply uninformed. This is why teaching people to be critical thinkers is so essential. Critical thinking aims to solve a problem honestly and not be unreceptive to new approaches and different opinions. Knowing how to resolve conflicts has become a valuable skill, and it often requires the ability to help people see the truth. The following are some rules for changing opinions:

> Provide people with a narrative that replaces the gap left by false information; Focus on the facts you want to highlight, rather than the myths; Make sure that the information you want people to take away is simple and brief; Consider your audience and the beliefs they are likely to hold; and strengthen your message through repetition (Wadley, 2012, para. 12).

Kahneman puts forth "adversarial collaboration" as an effective way to avoid confirmation bias which arises when a researcher consciously or unconsciously designs an experiment in such a way as to provide support for a particular position (Matzke et al., 2013). Bringing together two researchers who disagree and having them conduct an experiment jointly often results in better research (Matzke et al., 2013). The goal of adversarial collaboration is to discover the truth, not win arguments (Kahneman, 2012).

Kahneman talks about "willful ignorance," which is a problem that results when people refuse to consider other opinions or viewpoints. Willful ignorance produces individuals who become so hardened in their positions that they even demonize people with differing views. No evidence will get people suffering from "willful ignorance" to change their minds. Eventually, this refusal to listen to other points of view becomes denialism (McIntyre, 2016). For example, this seems to have happened to many intelligent people who maintain that the MMR vaccine causes autism. The hope is that individuals with critical thinking abilities will not fall into the trap of willful ignorance and will be capable of listening to other points of view.

Cognitive flexibility protects against several biases, including confirmation bias (Sahakian, Langley, & Leong, 2021). Cognitive flexibility has been defined as:

> [A] skill that enables us to switch between different concepts, or to adapt behaviour to achieve goals in a novel or changing environment. It is essentially about learning to learn and being able to be flexible about the way you learn. This includes changing strategies for optimal decision-making (para. 2).

People with cognitive flexibility find it easier to adjust their thinking when situations change or when unplanned events occur and do not become frozen in how they respond or think. Its

opposite is cognitive rigidity. Obsessive-compulsive disorder is an extreme manifestation of this type of rigidity.

Evidence-Based …

Researchers speak of evidence-based medicine, evidence-based management, and evidence-based practice. How reliable is the evidence researchers use to prove their points? Munafo and Flint (2010, para. 1) indicate that a "substantial proportion of scientific research may in fact be false." They attribute this to several factors, including publication bias, low statistical power, "trend for effect sizes to decrease with year of publication," overestimate of true effect size, and source of funding. They conclude:

> In the meantime, readers of scientific journals should perhaps only believe large studies which report on findings in a mature literature (as opposed to early findings in a new field), place less emphasis on nominal statistical significance and focus instead on effect sizes and confidence intervals, and are published in journals with a low impact factor (Munafo & Flint, 2010, para. 11).

Researchers have been talking about a replication crisis. There is a severe problem in reproducing the results of numerous major studies, which is why many scientists are skeptical of a significant percentage of published findings.

> More than 70% of researchers have tried and failed to reproduce another scientist's experiments, and more than half have failed to reproduce their own experiments. Those are some of the telling figures that emerged from *Nature*'s survey of 1,576 researchers who took a brief online questionnaire on reproducibility in research (Baker, 2016, para. 1).

Approximately 60% of 100 experimental studies in psychology could not be replicated. The percentage of failed replications in experimental economics was also surprising, 40% (Bohannon, 2016). This has become a significant problem in the social sciences as well as medicine. One reason for the problem is that researchers often make the mistake of believing that demonstrating statistical significance means that it is not necessary to replicate the study (Bower, 2018). This is especially true when an alpha of .05 is used. One economist noted that it is unlikely that findings will be reproducible if only a 5% significance level is used (Bohannon, 2016).

Ioannidis (2005) demonstrated that many medical research studies have been shown to be false. This is especially true for non-randomized studies, where 80% are later found to be incorrect (Gutting, 2013). This is because it is difficult and costly to conduct randomized controlled experiments. Therefore, most research is based on correlational data. Furthermore, data mining software enables one to dredge the data and perform hundreds of statistical tests until something shows up as significant at the $p<.05$ level (Ioannidis, 2005).

Pfeffer and Sutton (2006) noted that medicine and management are not evidence-based. Evidence-based medicine is defined as: "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients" (para. 1). Doctors only make about 15% of decisions using scientifically valid studies.

> Recent studies show that only about 15% of their decisions are evidence-based. For the most part, here's what doctors rely on instead: obsolete knowledge gained in school, long-standing but never proven traditions, patterns gleaned from experience, the methods they believe in and are most skilled in applying, and information from hordes of vendors with products and services to sell (para. 2).

The same is true when it comes to management decisions. Many management beliefs are not based on hard evidence but on opinions. Some examples of management myths cited by Pfeffer and Sutton (2006) include the following: (1) That the use of stock options to compensate corporate leaders will result in better financial performance for the organization; (2) Forced performance ranking of employees (this often means that the bottom 10% to 20% will be terminated) will ensure higher productivity and profits; and (3) the belief that the first company to enter an industry will have a considerable advantage over competitors.

We may believe that medicine is evidence-based, but it is common for patients to receive ineffective or dangerous treatments.

> Sometimes doctors simply haven't kept up with the science. Other times doctors know the state of play perfectly well but continue to deliver these treatments because it's profitable—or even because they're popular and patients demand them. Some procedures are implemented based on studies that did not prove whether they really worked in the first place. Others were initially supported by evidence but then were contradicted by better evidence, and yet these procedures have remained the standards of care for years, or decades (Epstein, 2017, para. 13).

RightCare Alliance is an organization that consists of a partnership between community groups and healthcare professionals. It is committed to "bringing medicine back into balance, where everybody gets the treatment they need, and nobody gets the treatment they don't need." Unfortunately, the current trend is "increasing medical costs without increasing patient benefits" (Epstein, 2017). Epstein cites a study published in *Mayo Clinic Proceedings* that examined 363 articles published in *The New England Journal of Medicine* that found that

> 146 studies that proved or strongly suggested that a current standard practice either had no benefit at all or was inferior to the practice it replaced; 138 articles supported the efficacy of an existing practice, and the remaining 79 were deemed inconclusive (Epstein, 2017, para. 15).

Epstein (2017) cites other studies that concluded that many current procedures and drugs are ineffective or dangerous. Some unnecessary and potentially harmful treatments described in the paper include placing stents in stable patients, using beta-blockers for those with high blood pressure, and surgery for a torn meniscus. One study found that the cognitive bias known as the "availability heuristic" was why some cardiologists would recommend a stent, although it is well-known that they do not help stable patients. The availability bias is the tendency of people to overestimate the importance of information that is easily recalled – even if relatively rare -- and thus readily available to them. Therefore, this bias makes us believe that the probability of being killed in a terrorist attack or airplane crash is much higher than in a car accident. Cardiologists remembered well-known cases of people who died suddenly —one example is Jim Fixx, the jogging expert—from a heart attack. This caused them to be afraid that they would look bad if a patient did not receive a stent and then died suddenly.

Karl Popper made scientists realize how science is supposed to work. He said: "No number of sightings of white swans can prove the theory that all swans are white. The sighting of just one black one may disprove it" (James, 2002, para. 1; Popper, 1963). The way science works is that scientists should look for black swans to disprove the existing theory, not try to confirm their beliefs by looking for additional support (white swans).

With so many research issues, one would think that scholars would see the hazards of certainty. Unfortunately, this has not been the case. We observe arrogant people ranging from academics to doctors to politicians who are confident of their facts. Unfortunately, not all the information available to the public is reliable. There is a great deal of bad science, junk science, fake news, and erroneous research open to the public. As noted above, there have been attempts to remedy the situation and to educate users on how to identify fake news, but with minimal success, especially with those with extreme positions.

Distortion of Truth in the Courtroom

The trial process presents unique problems in trying to ascertain facts or truth. The stated purpose of a trial is to elucidate the facts through testimony, evidence, and rigorous questioning. In reality, the "facts" established during trial merely reflect an attorney's skill and a witness's credibility rather than a depiction of reality. Therein lies a disconnect between the perception versus the facts.

It is interesting to note that scholars do not seem to have written extensively about what truth means within the context of a trial. Klein (2016) explores the dichotomy between the ostensible stated purpose of a trial – the so-called search for truth – and the actual meaning of what truth is as refracted through the lens of knowledge, justification, and belief. Klein states that "the 'knowledge' courts seek is a systemically defined 'probability' on a spectrum of knowledge less than 'intuitive certainty' and more than impossibility…. (W)hat courts are doing when they seek the 'truth' is – and essentially must be -- seeking an adequately justified belief about what happened in a case" (Klein, 2016, pp. 8-9).

In the process of formulating the truth, courts apply rules of evidence. These rules lead judges to exclude certain types of information from their deliberation as inadmissible, thereby predetermining what is a "fact." These rules aim to cherry-pick the evidence laid before the court and exclude irrelevant evidence or hearsay, for example. Nonetheless, the net result of these exclusions is that the full story of what actually happened - in all its confusion and inconsistency - is massaged, managed, and manicured when presented to a jury for its consideration.

It is important to note that there are often valid reasons for excluding evidence. For example, suppose evidence that could lead to a criminal conviction was obtained in violation of the constitutional prohibition against an unwarranted search and seizure. In that case, that evidence cannot be considered by the court. A pure search for the truth would necessitate the inclusion of such evidence. However, constitutional liberties and protection against governmental abuses are given precedence over that search for truth. In other words, other considerations, concerns, policies, and values may take precedence in the finding of facts in the courtroom. "(T)he rules of evidence create their own absurdity, because the foundation is defined as incomplete (relevant evidence is excluded) and hence inaccurate – the rules define a path to "truth" that intentionally is not the whole truth." (Klein, 2016, p. 22).

Simon (2012) acknowledges that what is puzzling about our legal system is that the discovery of truth is not considered a priority or essential; winning a case is what matters. Chief Justice Warren Burger, U.S. Supreme Court (1969-1986) noted: "Doctors…still retain a high degree of public confidence because they are perceived as healers. Should lawyers not be healers? Healers, not warriors? Healers, not procurers? Healers, not hired guns?" (Andrews, 2017). That can only happen if lawyers care about facts and truth.

As viewed by a jury, conclusions about truth are also skewed by the statistical constructs of Type I (false-positive) vs. Type II (false-negative) errors and the law's preference for the latter, at least within the context of a criminal case. This predilection can be seen by the allocation of the burden of proof in a criminal contrasted to a civil (non-criminal, such as a malpractice case or a breach of contract case). The burden of proof on the

prosecution in a criminal case is beyond a reasonable doubt, thereby minimizing the possibility that the jury will convict an innocent defendant (a Type I false-positive error) and increasing the odds of setting free someone who did, in fact, commit a crime (a Type II false-negative error). The premise is that, as a society, we are willing to allow criminals to walk free rather than condemn innocent people to imprisonment or possibly death. (Kaplow, 2012)

Klein describes the difference between "colloquial" truth, as viewed by the general public, versus the legal system's equation of truth with justice. Klein argues that with every procedural step toward justice, with the elevation of public policy concerns over the unfettered search for facts, the further courts get from the probability that the actual judgment in a case corresponds to the reality of what occurred. Klein voices concern that the cost of the distortion of what transpires in the courts is the erosion of judicial legitimacy.

What should concern us, within the context of this paper, is that in one of the foremost institutions that we the public turn to for its elucidation of facts, for the ferreting out of truth, does not, in reality, hold truth to be its highest value. Would we accept such a distortion or reality from other institutions? For example, would we want Congress to enact laws without a solid grasp of the facts? Should we complain about the distortion of reality on the internet when reality is distorted wherever we look? And how do we as individuals assess for ourselves what truth is?

Leadership and Certainty

There is evidence that the best leaders have the ability to listen to others. Spears (2004) found ten characteristics in the servant leader. One was "listening," which means listening carefully and respectfully to what others say. Van Dierendonck (2011, p. 1246) affirms that "Leaders who show humility by acknowledging that they do not have all the answers, by being true to themselves, and by their interpersonal accepting attitude create a working environment where followers feel safe and trusted." Nielsen, Marrone and Slay (2010, pp. 34-35) also found that "people with humility are actively engaged in utilizing information gathered in interactions with others, not only to make sense of, but also, when necessary, to modify the self. That is, their self-views are focused on their interdependence with others rather than their independence from others."

Kahneman (2011, p. 205) states that the correlation between CEO quality and the success of their firm is probably about .30. Several studies demonstrate that chance plays a much more critical role in the performance of companies than CEOs (Fitza, 2013). Kahneman (2011, pp. 206-208) asserts that the halo effect, together with outcome bias, helps explain the popularity of various books dealing with leadership. These books focus on successful firms and then attribute it to leadership style. Actually, in most cases, it is simply luck. Chance quite often explains the success of specific firms and the failures of others, not the competence of leadership. Indeed, the situation often reverses over time, and the successful firms become unsuccessful and vice versa. This is what Kahneman writes about Built *to Last*, a leadership book by Collins and Porras (1994).

> The basic message of *Built to Last* and other similar books is that good managerial practices can be identified and that good practices will be rewarded by good results. Both messages are overstated. The comparison of firms that have been more or less successful is to a significant extent a comparison between firms that have been more or less lucky. Knowing the importance of luck, you should be particularly suspicious when highly consistent patterns emerge from the comparison of successful and less successful firms. In the presence of randomness, regular patterns can only be mirages (Kahneman, 2011, p. 207).

Interestingly, about 8 of the 18 companies extolled in *Built to Last* have stumbled (Reingold & Underwood, 2004).

Peters and Waterman (1982), authors of *In Search of Excellence*, studied 43 of America's best-run companies to determine what made them successful and came up with eight basic management principles. How did these firms end up doing in the longer term? Eckel (2013, para. 8) says that "two-thirds of them underperformed the S&P 500 over a decade. Some faltered badly, and some even went out of business." The stock performance of these companies did not stand the test of time (Baum & Smith, 2015).

Conclusion

The biggest threat to the success of a society or organization is not appreciating uncertainty. People with too much confidence in their opinions may actually have a mental flaw that can be dangerous. Lloyd (2017) avows:

> Two of the greatest achievements of Western Civilization are science and democracy. They have in common the admission of each person's own fallibility, which is psychologically a hard thing to do. In science, we must admit that our preconceived ideas about the external world might be mistaken, and that we must carry out scientific experiments to determine the truth. In democracy, we must admit that our cherished values and political convictions might be wrong, and that society should be governed by the majority, albeit with safeguards for the rights of minorities (Lloyd, 2017, para. 17).

If Sandel (2010) is correct in his assertion that Americans are so sure of themselves that they have lost the ability to have a "democratic argument," then we are in huge trouble. Indeed, a key reason for gridlock in Congress is the rise of hyperpartisanship and total certainty. Members of Congress have lost the ability to work with colleagues from another political party because they are so sure they are right; you cannot have bipartisanship in an atmosphere of absolute certainty. Jouet (2017) believes that America is having a "meltdown" and has become highly polarized. It is virtually impossible to compromise when one side suffers from overconfidence and arrogance and bases its arguments on myths and nonsense. All the more so if both sides suffer from these issues.

> … One of the main obstacles to bridging polarization is not only that there's a major divide among Americans about their values, but also there's a major factual divide about a lot of these issues. For example, if people believe that climate change is a hoax or a myth, it's not possible to genuinely discuss solutions to the problem.
>
> If people widely believe that undocumented immigrants are massively flowing into the country, that they are responsible for illegal voting in the millions — which is completely false — there can't be a more rational discussion about issues like immigration. Unless there is more of a common nucleus of facts over which to debate, it is going to be very difficult to bridge the divide. We see that's also a big factor in the current debate over health care reform, given the magnitude of falsehoods about the oppression of Obamacare and shaping ideas about the need for eviscerating the legislation entirely (Jouet, 2017, para. 26).

The best cure for the dangers of absolute certainty and overconfidence is humility and appreciating the value of doubt, constructive debate, and compromise. We should never forget that without compromise, there would not have been a United States (Leskes, 2013). In his 1820-1821 play, *Almansor*, Heinrich Heine wrote, "Where they burn books, they will ultimately also burn people." He was uncannily correct; university students burnt thousands

of "un-German" books on May 10, 1933. It was not only Jewish authors whose works were burnt (Heine's works were also burnt): books by Hellen Keller, Jack London, Ernest Hemingway, Erich Maria Remarque, various critics of the Nazi ideology, and many others were torched (United States Holocaust Memorial Museum, 2017).

What is the connection between book burning and murdering people? Both require absolute certainty that one's own ideology is correct and that another individual's opinions are so wrong that these ideas must be thoroughly eradicated. To utterly eliminate an idea (if that is even possible) may require burning books and the very authors of those books.

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