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Be Careful! That is Probably Bullshit! Review of *Calling Bullshit: The Art of Skepticism in a Data-Driven World* by Carl T. Bergstrom and Jevin D. West

Abstract

Bergstrom, C. T., & West, J. D. 2021. *Calling Bullshit: The Art of Skepticism in a Data-Driven World*. NY: Random House. 336 pp. ISBN 978-0525509189

The authors provide a journey through the numerical bullshit that surrounds our daily lives. Each chapter has multiple examples of specific types of bullshit that each of us experience on any given day. Most importantly, information on how to identify bullshit and refute it are provided so that reader finishes the book with a set of skills to be a more engaged and critical interpreter of information. The writing has a quick and lively pace that a wide audience will enjoy.

Keywords

quantitative literacy, data Interpretation, rhetoric

Cover Page Footnote

James B. Schreiber is a Professor in the School of Nursing at Duquesne University. Before academia he was an Advanced Placement Calculus teacher and department chair. His research has focused on motivation, reasoning, and behavior. He currently teaches courses related to human health and development, statistics, and data literacy. He is Editor Emeritus of the *Journal of Educational Research* and former Editor-Chair of the *Journal of Experimental Education*.

In this book, Bergstrom and West have created a lively print version of the online videos and other materials they developed for their similarly titled course at the University of Washington. The narrative allows for a deeper dive into the topics in their videos with the added bonus of the references. The book contains 11 chapters and begins with an overview of bullshit and ends with tactics for refuting bullshit. The book appeals to a wide audience, such as those interested in quantitative education, media and misinformation, and rhetoric, and thus is interdisciplinary its own way.

The book is part of the larger quantitative literacy domain where recent texts have tended to focus on problems with data quality, analysis and interpretation. Books in this domain are, for example, *Weapons of Math Destruction* (O'Neill 2016), *Artificial Unintelligence* (Broussard 2018)), *Atlas of AI* (Crawford 2021), *Inferior* (Saini, 2017). The authors of these books are calling bullshit on data analyses and the uses and interpretations of the data and data analyses. There are other related books, such as *White Logic, White Methods* (Zuberi and Bonilla-Silva 2008); *No BS (Bad Stats . . .)* (Toldson 2019); *Data Feminism* (D'Ignazio and Klein 2020); and *Tyranny of Metrics* (Muller 2018), which call out bullshit in their own way. *Calling Bullshit* and all of these books should be required reading for high school and college students.

I must note that I use this book in a course called Fake Data and will continue to use it in a new course called What Counts? The Fake Data course also uses some components of Bergstrom and West's course at the University of Washington and Dr. Carrie Diaz-Eaton's course at Bates College. In this review, I provide some highlights of each chapter along with places where I think it excels, creates arguments or contradictions, and falls a bit flat.

Chapter 1: Bullshit Everywhere. With the opening line, the narrative is set: "The world is awash with bullshit, and we're drowning in it." This is a book about the preponderance of bullshit in our daily lives. The strength of this chapter is the dive into related topics such as bluffing. Assisting the reader is their description of a sophisticated bullshitter. They verbally dance around a definition when the reader is expecting a bullshit definition at any moment. This dance, though, provides an experience with a wide range of bullshit from weasel words to Wakefield's hoax about vaccination and autism. They end the chapter with a key component of bullshit: it is easy to create and easy to spread, but very difficult to stop and clean up. I find, and so do my students, their decision to call bullshitters out by name refreshing.

Chapter 2: Medium, Message, and Misinformation. Now that the reader understands how bullshit is spread with ease, Bergstrom and West show how changes in technology send bullshit faster, farther, and wider than ever before. They begin with the "Brother of the Printing Press," Filippo De Strata's complaint concerning the type of material people would be able to read. A brief historical

journey is provided and then a quick turn to what we are experiencing today with an analysis of headlines, which grab our attention but do not match the actual narrative. A highlight of this section for me is the discussion on the effect of emotional experience with the headlines. Bergstrom and West discuss Steve Rayson's work (2017) and the change in the focus of headline writing, from facts to emotion. Most importantly, they discuss how this opens the door for bullshit because basic facts cannot compete in this emotional environment. The separation of misinformation (false but not designed to deceive) and disinformation (false and designed to deceive) adds to the richness of the bullshit you see every day. Separating these two allows for an easy entry into the most current form of bullshit: counterfeit people—BOTS. The section on bots is interesting and frightening.

Chapter 3: The Nature of Bullshit. By the end of Chapter 2, the reader might wonder, "is everything bullshit? What exactly counts as bullshit?" I did. The wait is over, and Bergstrom and West provide their definition and the specific parameters of what constitutes bullshit. For the reader, you might not agree. For my students, the definition has debatable components, intention and purposefulness and blatant disregard for truth. This raises questions, such as does it have to be intentional to be bullshit or is complete disregard for the truth needed? Is disregard just lying? Do we need to call it lying? Further, how does one separate or discuss the bullshit and the bullshitter? Students in the Fake Data class argued so much about the parameters, and whether one needs to separate the bullshit from the bullshitter and other aspects, that I was concerned they would enter a phase of calling bullshit on bullshit definitions. The chapter finishes with a brief discussion of blackboxes, AI, and algorithms.

Chapter 4: Causality. Causality and the discussion of causality is a central topic in bullshit discussions. The chapter guides the reader through cultural experiences with causality, such as "red sky at night, sailor's delight," athletes' height and weight, and personality inventories. Bergstrom and West write seriously about causality, thinking about causality, and intervening variables. The transition to the specific cases, such as the Zillow app, are rough and at points the flow is a bit disjointed. Even with the disjointedness, the discussion of NPR's MarketWatch story on the Zillow report is an excellent example of writers' caveats in reports being completely ignored by the time the story hits the media. The NPR report implies a causal relationship, a claim Zillow did not make. This example also opens the opportunity for the reader to wonder, "does this fit the definition of bullshit provided in the previous chapter, i.e., intentionality?" Was this intentional or sloppy? The highlight of the chapter, for me and the students, was the discussion of Tyler Vigen's spurious correlations. The examples are fun, and it makes the students inquisitive about looking for their own data to show spurious correlations. The end of the chapter focuses on Mike Pence's argument that smoking does not kill, but they missed an opportunity to highlight R.A. Fisher's argument that lung

cancer causes smoking while he was being funded by the tobacco industry. Fisher essentially claimed that the pain from the cancer made people smoke. Thus, not denying the relationship, but arguing for a different direction to it, and that there was a genetic determination to it (Stolley 1991).

Chapter 5: Numbers and Nonsense. An old joke, and a bad joke, opens the chapter and then quickly intensifies to the heart of the book—numbers—in particular, how numbers are ideal "vehicles for promulgating bullshit" (78). As they acknowledge, words are used to lie, bend, and blur the truth, but numbers are perceived as objective and precise. Percentages, and reference points in general, take center stage, which leads the reader to Goodhart's Law (and Marilyn Strahern's rephrasing of it): when the measure, such as achievement, becomes the focus, it will no longer be a good or useful measure. The authors then move into the number nonsense part of the chapter and discuss "mathiness"—those creative equations that are not based on math or logic, such as the Trust Equation. The chapter ends with a nice flourish of zombie statistics—numbers that are not right and won't go away. Every field has zombie topics; my main field has "learning styles," which is not a thing and never was, but won't die just like a zombie.

Chapter 6: Selection Bias. The central theme of the chapter is how sampling processes create bias in results with some hints of cultural differences in perception. The thought experiment using Jordan Ellenberg's (2015) Berkson's paradox is a good activity for understanding the difference between population correlation and sample correlation problems. In the thought experiment, a person is complaining about dating and stating that people who are hot are also not nice. Now, Ellenberg has you imagine potential partners on a two-dimensional grid with niceness on the x-axis and hotness on the y-axis. The relationship between the two is near zero for the population. As you cut out part of the partners, such as those you would not date in the bottom left of the grid, you start to see a moderate negative correlation. Then as you continue that process and cut out those in the top right, you will have a larger negative correlation, but now you only have a sample of the population. You have created a negative correlation. I have used this example in several classes. The example also has created arguments when used in class, as one student called bullshit, not on the paradox, but on how one measures hotness (attractiveness) because we had just discussed measurement, social constructions, and Goodhart's Law from Chapter 5. Thus, within the book there are these interdisciplinary topics that are not explored, but with careful noting can become rich areas for discussion.

I generally extend this topic in my course with discussions of our Student Evaluation Survey and the items that were selected and placed on it versus the "population of topics and items" that could have been on it. This activity is very concrete and personally relevant to the students because of their episodic memory of the survey, and their own curiosity about it.

Chapter 7: Data Visualization. This chapter provides strong examples and a brief discussion of problems in visualization that have been noted by many authors. The chapter needs more separation of true bullshit, that intentional component, from people's general poor design skills, which they discuss in one spot. This is the one chapter that could use a re-organization and clear delineation of design issues versus bullshit based on their definition. For example, is the ESPN shots on goal graphic really bullshit, or just badly done? Does something like this really rise to being bullshit? Additionally, arguments regarding proportional ink are not as clean cut as implied. Design decisions are not neutral. In the future, I will be using this chapter in conjunction with sections in *Data Feminism* (D'Ignazio and Klein 2020) to juxtapose a few of the design arguments, such as emotionally empty visualizations as a false choice between emotion and reason and embracing uncertainty in our graphics.

Chapter 8: Calling Bullshit on Big Data. This chapter has a strong conceptual overview of the problems with algorithms and the general architecture of current AI. The chapter has good concrete examples for those who might be new to the inner workings of this topic. Bergstrom and West provide a smooth narrative for how machines "learn" and "think." I supplement this chapter with other more detailed work from O'Neill (2016), Broussard (2018), and Crawford (2021). If you have read many articles or books on this topic, you won't find anything new, but you will enjoy how they discuss the topic.

Chapter 9: The Susceptibility of Science. This is simply my favorite chapter because it aligns with why I entered academe originally: to figure out why people do things. Bergstrom and West pull some of the band-aids off and discuss the mixture of scientists' curiosity with their desire to, sometimes, be better than everyone around them (e.g., big fish, small pond), or maybe even appear on the *The Daily Show* and be that rare public intellectual that university administrators want so badly to have on their campuses. The section on the market for bullshit science is fascinating and the topic stunned and shocked some of my students who had their beliefs "shattered."

Chapter 10: Spotting Bullshit. The chapter focuses on critical thinking related to believing what you see or read, e.g., faked pictures. An important aspect, briefly discussed at the beginning, is journalism 101: Who is telling me this? How does this person know it? What is this person trying to sell me? The placement of this chapter should be earlier, perhaps directly after the definition of bullshit in Chapter 3. The reader can then use this chapter as a cognitive schema for the other chapters. I recommend adding a bit of information from the *Investigative Reporters Handbook* (Houston et al. 2002) here if you are using the chapter in a class.

Chapter 11: Refuting Bullshit. The last chapter is about how to refute bullshit you see, hear, and read. The content and flow provide a smooth landing of the previous ideas, examples, graphics, and bad jokes. The reader is provided a set of

basic skills to refute bullshit when they realize they must. The small section entitled "Be Charitable," humble in essence, is important and applies to all of us and especially our scientific results. Being humble is also a focus of the American Statistical Society's argument in "Moving to a world beyond p <0.05" (Wasserstein et al. 2019). We might be wrong, and being charitable is important. Finally, in the last pages, Bergstrom and West circle back to the definition to discuss topics, such as relevance, speaker's intention, audience, power dynamics, and judiciousness when refuting bullshit.

This book is enjoyable to read even when you disagree and want to call bullshit, which is part of the subtext of the work. In the epilogue, equally important, the authors thank their children for showing them the ideas in the book are for everyone, not just those with a college degree. The book also acts as a guide for each of us to make sure we are not creating bullshit along the way. You can read the book in order, or after the third chapter, bounce around a bit. For courses, I think reading chapter 1–3, discussing the definition of bullshit, and then Chapter 10, "Spotting Bullshit," and then moving through the topics might be a smooth flow of material. Additionally, discussions in class can change the course or order, thus you have flexibility with the book.

For instructors who want to have more interdisciplinary courses and discussions, or already teach these types of courses, books such as this provide a framework for cross-disciplinary topics. The content easily starts conversations in the classroom and, well, arguments about what to call bullshit on and why. The variability in responses from students keeps everything "lively" yet respectful because there is a common framework for the discourse. Additionally, you inherently bring in critical literacy skills, such as reading graphs, tracking down a "fact," or identifying different types of rhetoric.

Finally, I believe the greatest strength of the book is the development of the skillset related to understanding bullshit. As I state to all my students, I am not trying to get you to think like me; I am trying to get you to think, be a good critic, and be engaged.

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