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Review of *Painting by Numbers: How to Sharpen Your BS Detector and Smoke Out the "Experts"* by Jason Makansi

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Abstract

Makansi, Jason. 2016. *Painting By Numbers: How to Sharpen Your BS Detector and Smoke Out the "Experts"*. Tucson, AZ: Layla Dog Press. 196 pp. ISBN 978-0-9984259-0-0.

Jason Makansi's book, *Painting By Numbers: How to Sharpen Your BS Detector and Smoke out the "experts,"* aims to get people to start thinking more about the errors in models and data presented to them on a daily basis. The book is written in a friendly and accessible way without excessive jargon. Throughout the book, Makansi provides the reader with twelve commandments to follow to be able to evaluate questionable claims along with real-world examples of how those commandments were violated. Furthermore, *Painting By Numbers* presents information that would be highly beneficial to readers that do not work with data or are not familiar with quantitative literacy, making it a good addition to a late high school or early college curriculum.

Keywords

Quantitative Literacy

Cover Page Footnote

Denis Voytenko is a data scientist with a background in the geosciences.

Paying attention to errors and uncertainties should be a tenet of modern civilization. On a day-to-day basis we are bombarded with information. The bits of that information relevant to our lives should be carefully analyzed before making any conclusions. Unfortunately, in today's society, this practice seems to be rarely followed.

One way to get people to consider more introspection about presented data and models is to provide them with concise and relevant information about where and how they could be misled by actions that may appear to be objective and data-driven. The book, *Painting By Numbers: How to Sharpen Your BS Detector and Smoke Out the "Experts,"* is a good guide on this issue and a great reference for anyone interested in quantitative literacy. The author is Jason Makansi, a chemical engineer by training who became an energy consultant. One of his goals in life is to get people to think more about errors and uncertainties. At only 147 pages, and without technical jargon, *Painting by Numbers* is written in a fun way making it accessible to everyone.

This book can be summarized by two relatively well-known quotations, the first, "trust but verify," a Russian proverb that was popularized by Ronald Reagan, and the second, "all models are wrong but some are useful," stated by the statistician George Box.

Apart from the preface, closing, and appendices, the book is divided into two sections. In the first section of the book, Makansi produces twelve commandments for readers to follow to be able to pick out dubious claims. The second section of the book is composed of many brief, but concise, examples of where people can go wrong when dealing with the ways of data and models. Each is connected to one of Makansi's twelve commandments which has been violated. In one of the appendices, Makansi provides an annotated bibliography of books that may be worthwhile to read for those with further interest in the subject.

Below, I go through Makansi's twelve commandments and provide my one sentence interpretations of their intent.

1. Acknowledge Error: All numerical information is prone to error originating from concepts like "inaccuracy, imprecision, bias, ignorance, carelessness, and uncertainty," the influence of which should be disclosed with every model and attempt at numerical analysis.
2. Identify Assumptions: Models simplify reality to gain insights and are based on assumptions and approximations requiring knowledge of their potential limitations.
3. Find the Weakest Link: The fact that errors propagate cannot be avoided, and models are as strong as their weakest parts.
4. Separate Past Performance from Future Results: Since models are typically based on historical data, they can be effective at explaining

something that has already happened, yet ineffective at predicting something that is yet to occur.

5. Question the Picture: Most presentations today involve words or pictures which are likely to have been reinterpreted many times over from their original state; they are based on the needs of the business rather than the objective truth, and they may have been designed to get people to think a certain way.
6. Understand the Business Model: Analytic models may show what the business needs to be shown and do not have to be right as long as they support the goals of the business.
7. Don't Confuse Feelings with Measurements: Modeling physical systems is difficult but doable due to variations which are typically small and behavior which tends to be consistent; modeling emotions, on the other hand, is almost impossible, especially when considering that different people have different values.
8. Suspect the Co(mpany) They Keep: The meaning of the terms "co-location, coincidence, correlation, causation, convergence, and consensus" can sometimes cause us to mistakenly have stronger beliefs than we should.
9. Hold Credentials at Arm's Length: Credentials of the individuals working on or presenting the information play an important role in how numerical information is perceived and propagate just like error.
10. Respect the Human Condition: Humans are fallible and models are made by humans.
11. Don't Start with the Answer: Many numerical exercises today start by assuming the answer and finding data and models that fit it; this practice is completely opposite to the nature of modeling where data are used to come up with explanations.
12. Don't Confuse Human Systems with Physical Systems: Methods for modeling physical systems don't necessarily work well for analyzing human behavior.

Although this book does not aim to teach any hard mathematical skills, the introspective soft skills that it gets people to consider seem like they may be more applicable on a day-to-day basis to the general population. For example, the book contains many insightful references to elections, medicine, and advertising.

Furthermore, the point of this book is not to instill fear of everything related to models and interpreted data, but instead to inform the reader that errors and

uncertainties may lurk in the background and be intentionally (or not) left out. Therefore, this book teaches the reader to have a healthy dose of skepticism that will hopefully get them to think about what is disseminated via the press and experts instead of blindly believing the numbers and figures as presented.

Although most of the material presented in this book will not be new to those who work with data on a daily basis, those who don't will likely gain a better appreciation of what should be the rigorous train of thought behind data analysis, interpretation, and modeling.

One potential concern that I have about this book is the problem of self-selection. It seems that those who will end up reading *Painting by Numbers* are likely to already be interested in the subject and therefore be tangentially aware of what is being presented. However, the people that would truly be impacted by this book likely won't be exposed to it. Therefore, in order to realize its full potential, this book requires a broad and general audience. For this reason, I think that *Painting by Numbers* would be a valuable addition to any high-level high school or introductory college-level course. Reading this book will help to instill in students a spirit of curiosity regarding what they are being presented and help them to hone their critical thinking skills before entering university or the labor force.

I really hope that more people outside of academic circles read this book and start to consider the potential pitfalls behind the data, models, and results that they are exposed to on a daily basis.