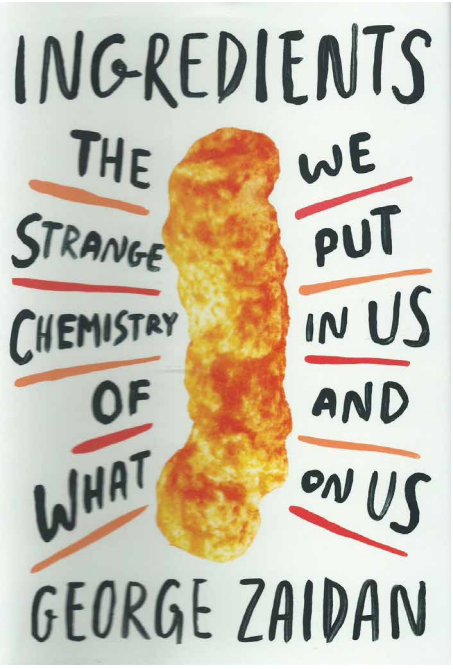

George Zaidan
2020 DUTTON: Penguin Random House
Hardcover $16.27
ISBN 978 - 1 - 524 – 74427 – 4

Part 1: Why does this stuff even exist
1 Processed food is bad for you, right?
2 Plants are trying to kill you
3 Microbes are trying to eat your food
Part 2: How bad is bad?
4 The smoking gun, or what certainty looks like
5 Sunburnt to as crisp, or what less certainty looks like
Part 3: Should you eat that Cheeto or not?
6 Is coffee the elixir of life or the blood of the devil?
7 Associations, or the grapes of math
8 What's that public pool smell made of?
9 You're late for a very important date
10 So what do I do?
Epilogue

Ingredients: The Strange Chemistry of What We Put In Us and On Us

Dr Tony Curtis

One of the most important things in life is good friends. This book was a present and had been on my shelf for some time before I found time to read it. By page two I was hooked! I do keep an eye out for new publications but this is where good friends come in. They spot things you might have missed and get them for you. Do share your reading discoveries with others.

In the last edition of the ICATS Newsletter I reviewed *The Art of Statistics: Learning from Data* by David Spiegelhalter. If you have not read this book, get a copy, but before you read it do first read *Ingredients!* David makes no bones about part of *The Art of Statistics* being a difficult read in places. Reading *Ingredients* will motivate you to persist in working through the more challenging sections of *The Art of Statistics*.

George's book is entertaining, thought-provoking but accessible. This is a book you can read and enjoy rather study and work through. The simple direct language is however well-founded on extensive research: this is no tabloid cut and paste anthology of excerpts by other authors. One of the thought-provoking issues he brings to prominence is the current focus on content and labelling. The regulatory focus (e.g. FDA) is on **what** the product contains and not what is the **reason** for the incorporation of a given material in the product. He also makes the very relevant point as to what is in a name; his example is enriched flour with:

> 7,8 – dimethyl – 10 [(2S,3S,4R) – 2,3,4,5, -tetrahydroxypentyl] benzo [g] pteridine – 2,4 dione as opposed to the more familiar alternative names such as riboflavin and vitamin B2. Long names can be scary!

He then goes on to discuss an alternative approach NOVA, which is based on the 'nature, extent and purpose' of food processing. This brings us nicely back to *The Art of Statistics: Learning from Data*. Different definitions give us different numbers and we have not even started to get to the interpretation of what the figures mean. A friend teaches History and complains bitterly that it is not the static subject some people think. It is not only that additional facts come to light but that we bring our current values and judgements to the topic. A parallel issue is illustrated by the attitude and regulatory compliance to products containing PGIs (potentially genotoxic impurities) debated in a recent Chemistry World article[1].

The limit set for some of the impurities is in the range of parts per billion for pharmaceutical products. However, the exposure to people from these materials in foods, such as cured products (e.g. bacon) and smoked fish, are much higher. Same issue, different industries, different standpoints and different answers. In my university lectures I would illustrate with a few examples and then set up a group discussion. The learning insight is that in the evaluation of evidence (numbers, data etc.) we bring in our own experience and [subjective?] values. We must not only consider the evidence but our approach to it.

David Spiegelhalter in his book gave these rules for considering data:

- Why am I hearing this number? Be sceptical of the motivation of the person giving the number.
- Are they trying to make it big or small?
- Are they trying to persuade me rather than inform me? (Too often it is the former!)

The subsidiary questions are: -

- Can I believe this number?
- Where does it come from?
- Does it actually represent what I think it represents?

George considers these same issues in his idiosyncratic colloquial style. He is ruthless in exploring the problem of diet, lifestyle and health outcomes. He provides a colourful exposition of how correlation does not definitely imply causation. I particularly appreciate his example of 'Coffee drinking may cause lung cancer.' The generic problem is that the supposed causal effect (coffee drinking) may not be associated with the 'real' cause (smoking). As always correlation does not necessarily imply causation.

He again has a direct approach in pointing out that the data collection methods may give different results. If you ask people what their height and weight is you not only get a more variation (from the true weight) than if you put the person on the scales in the Doctor's surgery. You may also may get biased results. In surveys on drinking habits how many people confess they over drink? How many people will willingly confess they are obese?

George then discusses the seductive trap of big data. If we use modern data collection methods, we can collect masses of information. This can be considered equivalent to thousands of experiments. If we set up an experimental design, we tend to set the level of 'Significant result' at the 10% level. That is to say there is a one-in-ten chance that the result was obtained by chance rather than a real effect. If our mass observation was equivalent to 1,000 experiments, we would expect 100 spurious 'positive' conclusions by pure chance. Digging out the 'truth' from data is far from easy. We must always remember David Spiegelhalter's rules for data!

Do not be deceived by the open accessible and non-jargoned approach of this book. It is deeply challenging and should make you think more profoundly about how we collect, interpret and extract information from data. Do get and read this book and if you have not already done so, then read *The Art of Statistics: Learning from Data* to get a more rigorous statistical take on the subject. David's book is not always an easy red but George Zaidan's book gives you the motivation to persist. Kotler's monumental book on Marketing explores marketing information for decision making. He discusses it in terms of collection, analysis, interpretation and dissemination of information. Collection of numbers without three last three aspects is valueless. Numbers do not solve problems, we need insight.

[1] *Food for Thought: Why do the pharmaceutical and food industries have different rules on genotoxic impurities,* Page 5, Chemistry World, April 2021