

# Just what is our problem with numbers?

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Statistics. Credit: John Cairns

Most people are aware of arachnophobia, but have you heard of arithmophobia? Even if you haven't, you've likely come across it.

Arithmophobia is the term for an irrational fear of numbers or mathematics – and it's very common. So much so, that while people are usually too embarrassed to admit to finding reading or writing difficult, they feel more comfortable to laugh off their difficulty with numbers.

Dr Jennifer Rogers, Director of Oxford University Statistical Consulting

of the Department of Statistics, has decided that it's time all this changed, and is asking: 'just what is our problem with numbers?' As a leading statistician, she is confident that, not only is everyone capable of understanding how numbers work, but that we would be lost without them. Statistics can do so many things for you, influencing your choices without you even realising. Dr Rogers talks to Scienceblog about being a leader in her field, using [statistics](#) to improve people's lives and why everyone is a secret statistician.

What is the one thing that you would like people to know about statistics?

I know some people find numbers scary, but they are hugely important and there for a reason. Statistics illuminate, educate and inform our decisions. They shape our everyday decisions, from choosing shampoo, to where to live, and what airline to fly with—even though we may not realise it.

## **How do you think public understanding of maths and statistics can be improved?**

We've all heard the phrase 'Lies, damned lies, and statistics'. I think many people regard statisticians as liars, manipulating data in support of whatever story or agenda suits their purpose. But, any responsible statistician just wants to discover and tell the truth and statistics allow us to do that.

Statistics help government to make important decisions, For example, they can show which area has the best crime rate or hospital response time, and where it is decreasing or increasing in others. I always maintain that everybody is a secret statistician. If you were looking to buy a house you would compare one against others in the area; how close

is it to a good school? Will it improve my commute to work? That's statistical analysis—gathering data and using it to make decisions in our everyday lives.

## **Why do you think maths has such a troubling reputation socially?**

I think it is a real shame that it is not a social taboo to say 'I can't do maths.' A lot of people in the public eye openly admit it now, almost to the point that it's considered cool by some. That's really disappointing. I understand that numbers are not always intuitive. Things like percentage increases and percentage point increases can be quite complex issues for people to get their head around. Everybody's life can be protected and illuminated through numeracy. I think everyone should be able to walk into a shop and possess the skills to not be ripped off. Or, to be able to count change when they are getting into a taxi.

It's also important to be able to evaluate and question what you see and read in the media. Knowing how to ask the right questions and recognise any flaws in what you're being told is essential if you are to get the best out of life. For example, when you see an article that says eating bacon is going to increase your risk of cancer by 18%, that sounds really shocking—and like you should stop eating bacon now. But as a statistician, I can see that when you get into absolute numbers, actually, eating bacon isn't as bad for you as that headline makes it sound.

## **What inspired the launch of the Oxford Statistical Consultancy?**

There is such a wealth of expertise within the University, but it can go unnoticed and unused by the outside world, which is such a waste. To me, it's absolutely essential that there are accurate, properly applied

statistics out there, helping us to understand more and to do things better. I'm determined that this unit will be a highly-tuned engine, powering businesses to new heights of creativity and success.

It is early days, and we have already worked with numerous and greatly diverse clients from healthcare providers to lawyers. We've even worked on BBC1's Watchdog for whom we evaluated the statistical probability of getting a middle seat at random, on a Ryanair flight.

## **Describe a typical working day in your life?**

Because statistics are involved in just about everything, as Director of the Consultancy Unit, I get to be involved in a huge range of projects. I can be working on long-range forecasting, helping a supermarket to understand the best time to stock barbeques for hot weather. I also help healthcare providers to better understand how and why a disease occurs, mapping a patient's pathway from diagnosis through to appropriate treatments, which is especially rewarding.

I do a lot of work developing clinical trials for new treatments. I'm involved in designing the trial and deciding the best way to assess the effectiveness of treatment and I'll also advise my clients on the most suitable method of analysis.

## **What do you like most about your role?**

The mathematician John Tooki said it best: 'statisticians get to play in everybody's backyards'. I think that sums up my job perfectly. I'm involved in so many different, fascinating and useful things—and I love it.

## **What is the biggest challenge in your work?**

Well, I do get frustrated when there's a bug in some computer programming code that takes half the morning to straighten out. But, seriously, communicating statistics is both the most rewarding and challenging thing about the job.

I often work with people who are not mathematically trained. So, I may have to translate quite complex statistical ideas for those who perhaps do not understand what I'm talking about at first, and it's wonderful to watch their faces light up as the brilliance and, in my opinion, the beauty of the numbers becomes clear to them. Being able to communicate your findings so that decisions can be made is the most important part of the job, otherwise we are just analysing data for the sake of it. For example, I may have to explain to clinicians why a new treatment is a better choice for a particular disease than other options.

## **What came first, your love of maths or statistics?**

My maths teacher always said I was a natural mathematician, but, actually, I hated the subject at school. I thought I was rubbish at it. The standard [number](#) crunching exercises just bored me witless, but it seems to be all that's learned about maths at school. It was only when I got to A-level maths that I really fell in love with the subject. I really began to see how statistics mattered, and the more I engaged with the figures, the more it all made sense. Plotting and playing with raw data was when the subject cast its spell on me. Ever since then I have loved applying mathematics to real world problems – and finding solutions.

## **What has your experience been as a woman in statistics?**

Historically the field has been male dominated. People are always shocked when they meet me. They tell me 'you don't look like a

statistician.' But times are changing, membership of the Royal Statistical Society used to be predominantly male, but less so recently. However, I think academia is more challenging for a woman. Fixed term contracts affect decisions about starting a family. You can find yourself unemployed while on maternity leave. Job security for young researchers needs to be addressed for it to be a viable long-term career option for women. Those are just some of the issues – I could go on, but this is a great place to start.

## **What are you most proud of?**

I am really proud that my work can help enrich people's lives. Sometimes as a statistician you can just sit in your office and plug in the numbers, never really seeing the outcome. Having the opportunity to go and see your work in action, and understand how it is influencing change, is profoundly rewarding. I remember going to a cardiology conference where my research was used to explain an alteration to a standard medical procedure. Knowing that my work impacts real people at such critical junctures in their lives makes me feel inexpressibly proud.

Provided by University of Oxford

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