YOU ARE NOT A FRAUD

A Scientist's Guide to the Imposter ~~Syndrome~~ PHENOMENON

Marc Reid

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This book is for sale at http://leanpub.com/notafraud

This version was published on 2022-10-22

ISBN 978-1-7398243-8-9

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For Amanda, Adaline & Lachlan.

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Preface

My one promise to you in this book is to show you the hidden stories, dark data, and actionable tools that will help you manage your imposter experiences. Allow me first to take you on the scenic route through my own reasons for writing this book.

On a map of the world, Italy is the infamous geographical version of a long-legged boot. Just above the knee of the boot, in the north of the country, the city of Bologna represents an architectural haven for lovers of the Middle Ages and the Renaissance. Among the sea of ragu-red rooftops reminiscent of the region's famous pasta dish (this is where Bolognese sauce comes from), Bologna hosts its most enlightened claim to fame, the Università di Bologna: the oldest university in the Western world. For almost a thousand years, since 1088, the university's crest has boasted a proud motto reminding the world of what a university should be:

"Alma mater studiorum" or *"Nourishing Mother of the Studies"*[1]

If you leave Italy and head northwest on the world map, you eventually reach the University of Cambridge in the UK, home of the 500-year-old Cambridge University Press. On its crest, this publishing house displays an image that conveys another message of the university ideal. The alma mater – or 'nourishing mother' – stands tall, proud, angelic. Her maternally curvaceous body is the centre of the Press's crest. From a wreathed crown on her head rises a castle. Waist-length locks of hair meet a pedestal that the mother stands behind. She holds a chalice in her left hand to represent spiritual fulfilment. Her right hand cradles the sun, shining bright for intellectual enlightenment. And surrounding the crest, the motto:

"Hinc lucem et pocula sacra" meaning *"from here, light and sacred draughts."*[2]

Go still further north to Scotland, and you see the coat of arms for the University of Glasgow. The crest bears a Book of Learning sitting in the highest position as a font of knowledge atop the crest. This book is placed at the peak of a hierarchy of symbols depicting the story of Scotland's largest city.

Since their beginnings, universities have been designed and perceived to be places where knowledge and progress could move with untainted ease. Regardless of whether you're in Bologna, Cambridge, Glasgow, or another university town, universities have been modelled as places of discovery for those seeking to understand Nature and all that she possesses. Places free from political strife, free from apathy, free from mundanity, universities were born to be fertile grounds from where knowledge could grow without restriction. But fast-forward to modern universities in the 21st century and there is a parasitic weed growing on the crisp green grounds of utopian university life. There's a discussion topic that has been somewhat swept aside, out of sight but not out of mind. And it's no longer taboo.

Rather than universities providing nourishment for the mind, an ever-growing literature is showing that university culture is in serious danger of becoming the insidious centre of a tragic mental health crisis.

That darkening stain on academic life is manifest in higher-than-average reports of poor wellbeing, troublesome work-life balance, and debilitating stress. Sometimes it has even gone so far as to have life-threatening impacts on mental health.[3] Students[4] and staff[5] alike have used suicide as the only means of escape. The utopian perception of the university haven is being recast as a survivalist gauntlet. Moreover, social media is driving new behaviours and university cultures that misguidedly protect students from difficult and debatable ideas that might cause offence.[6]

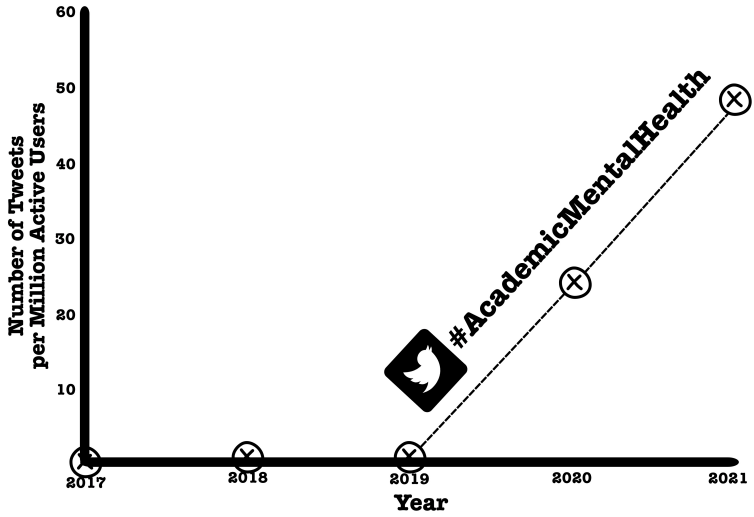
There is a worrying string of reports on both student and staff[7] mental health problems in the higher education sector. These reports are

scattered but nonetheless convergent, and they all crystallised in 2017.[8] A mental health review commissioned by the Royal Society and the Wellcome Trust – two of the most respected and trusted bodies in the UK's scientific community – was released for all to see. Although these specific numbers focus on the situation in the UK, the literature gathered for the 2017 Royal Society and Wellcome Trust review considers a broad data source, including North America, Asia, and Australasia as well as the UK. The review set out to find what (if any) "specific mental health needs" there were among researchers.

It's worth taking a moment to understand why the 2017 mental health review was commissioned at all. If you look at the statistics for the population of England alone, there are reportedly six million people suffering from a mental health condition at any one time. Six million! That's enough people to fill a premier league soccer stadium a hundred times over. Six million is about one-tenth of England's population, and 2% of the total number of Twitter users back in 2017. More people in England suffer a mental health issue than there are people in all of Denmark. Six million is a huge number and it's horrifying.

In monetary terms, the reported levels of mental health illness are enough to cost £26 billion to the UK, and over £1,000 per employee across the working nation. If you can't quite wrap your head around how much £26 billion actually is, imagine each pound was a second in time. Twenty-six billion seconds is close to fifty thousand *years*.

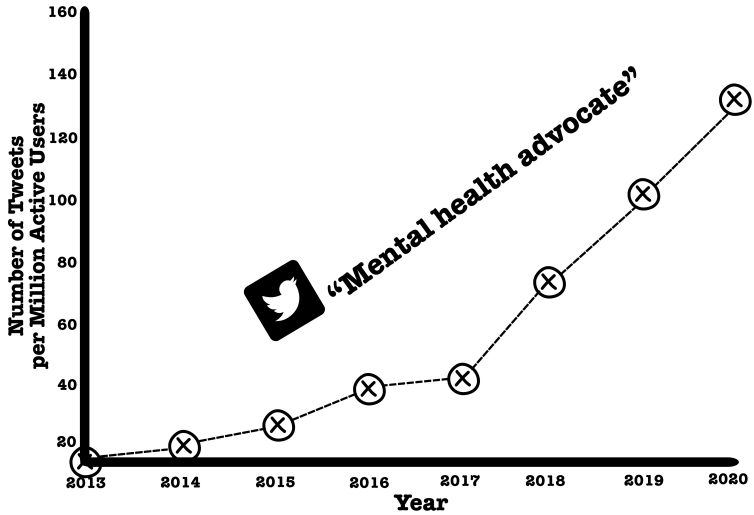
In 2020, a related report from Wellcome painted no prettier picture, sharing the dire statistic that over half of researchers in the UK and globally have sought support for anxiety or depression.[9] On Twitter, I personally scraped 15,000 tweets on the subject of academic mental health posted between 2017 and 2021. 99% of those tweets fell within the last two years.



Increasing instances of tweets containing "#AcademicMentalHealth", corrected for the number of active Twitter subscribers per year.

Even when correcting for the growing Twitter user base over time, it is still the case that the use of the term 'mental health advocate' has increased more than 700% since 2013.

The academic mental health crisis is extensive.



Increasing instances of the phrase "mental health advocate" appearing on Twitter, corrected for the number of active Twitter subscribers per year.

So, what makes the higher education environment so damn stressful? Why is this sector the seat of such potent concern? Remember, the growing number of reports on mental health problems relates to both students and staff. For students, one reason for the increase is that the number of graduating students – undergraduate and postgraduate – is increasing annually. For instance, the number of PhD graduates has doubled in the last twenty years up to the time of me writing this book.[10] Despite there being more graduates, the jobs available in the sector have not increased by the same amount.[11]

For staff in academia, limited funding sources have plateaued in some research areas and decreased in others, but the competition for grants remains as fierce as it ever was. It's tougher for young academics starting out now than a generation ago.

Work-life balance, pressure to publish, competition for jobs, short-term contracts, inconsistent managerial support, and increasing competition in the education sector all contribute to a community

on the edge. Higher education is approaching a collective mental breakdown.[12] The anxiety-inducing hell of uncertain employment has even led to sociologist Vik Loveday coining the term the *neurotic academic*.[13] The social media phenomenon exaggerates the temptation to perpetually compare oneself to others with exhaustingly little context.

At the time of writing, it has been over a decade since I came through the UK higher education system and started my scientific career. So it's been a while since I first walked through the university doors, hopeful, inspired, and with a lot more hair on my head than I have now. Over those ten plus years in higher education, and for my whole life, I have genuinely loved science. But in the last few years, I started to notice a worrying change in my behaviour that was in no way a reflection of my best self.

The reflections and realisations you will read in this book started at a fork in the road of my academic career. For me, a series of career-progressing shifts revealed to me a particular kind of stress…a stress I never thought possible. So, don't read my story in isolation. Rather, take it as a nudge to more deeply analyse your own points of professional pressure.
Having trained as a scientist, the fork on the road that gave me cold sweats took the form of a career question:

Industry or academia?

Where should my career go? What jobs should I apply for? What sort of scientist will this choice make of me? Is there a correct decision? Will I love the choice? Will I regret it forever?

And after speaking with many others, I realised I was not alone. Many of us feel this way. Regardless, more and more questions filled my mind with unnecessary worry and dread. It was like a crashing ring of dominos falling one after the other in regimented chaos. On and on, questions would tumble around in my mind, gathering into a shapeless grey mass of anxiety; swirling, darkening, growing, and groaning. These dark thoughts had a hunger that

could not be satisfied. Monstrous career stress was taking hold, and it would do so in a very particular way.

Modesty hat off, I have accomplished a lot in my academic life to date. I managed to complete high school with nothing lower than an A grade. I graduated at the top of my university Chemistry class, completed an award-winning PhD, and earned a decorated postdoctoral research post. When I started writing this book, I was beginning my independent academic research career: running my own lab, mentoring my own team, building collaborations, and working with companies.

Along the way, I've earned various prizes, awards, scholarships, grants, and honours. I've written and published peer-reviewed articles in prestigious journals and lectured in more countries around the world than I've got fingers and toes. If you can excuse my cringeworthy big headedness here, understand that I am a classic overachiever.

I probably sound like that one insufferable guy at the party who talks only about himself, but please trust me, there's a good reason for telling you all of this stuff about my own career.

Towards the later stages of what could safely be classed as a successful career in science so far, I noticed that I was becoming increasingly tired. Shattered, even. My thoughts started telling me a new story, telling me that I was not at all successful. In that decade-plus career progression leading to my first academic job, my mind was slowly but surely turning against me.

As I learned more and more about life in academia, a new monster emerged from the career questions swirling around in my head:

Am I good enough?

Was I ready for this path? Did I really qualify? Did I know enough? Should I even bother? Could I ever be as good as all the other people walking the same path?

I was doubting my abilities and habitually making damned comparisons between myself and my peers. The excitement for creatively carving out my own academic career after a life-long love of science was in danger. My career was being overshadowed by one of the many monsters behind mental health issues in higher education:

The so-called* *Imposter Syndrome*: the feeling that you are a fraud, that you are not good enough for your job, and that you are always in danger of being 'found out'.

As you progress through this book, you will learn about the journaling exercise I used to help me record my own thoughts about feeling like an imposter. Together, we will look at what imposter experiences mean to the 800+ participants from the survey research that grew out of my journaling and now underpins this book. We look closer at the unfounded thoughts and feelings of inferiority that many students and staff in higher education face. Feeling like an imposter almost drowned me. I share the discoveries that stopped me from digging a mental hole from which I might never have recovered.

Feeling like an imposter is not a syndrome.

Journaling and studying the problem has helped me to no end. It still helps me. By treating my neurotic thoughts like any other scientific problem, I felt an incredible ease come over me when I began to understand this so-called Imposter Syndrome in more detail. I have learned from other people who have waded through self-doubt and emerged enlightened out the other side.

In the process, I discovered masterful works of literature that were almost lost in a fireplace. I've come to appreciate the power of persistence for writers, actors, researchers, and politicians in enduring what we might call the Imposter Syndrome. Through my story and the stories of others, I wanted to dissect and anatomise the experience of feeling like a fraud in order to make it easier to manage.

*We will be having a whole discussion on why *Imposter Syndrome* is not a syndrome.

I thought very deeply about whether or not to release any of this to anyone other than myself. It began, after all, as an exercise to help me cope with the thoughts that were threatening to crush my career before it began. But there was a moment I knew I had to share it.

When I spoke at a chemistry careers conference for young students and researchers, I took the opportunity to road test some of this book's emerging content. I spoke about the ubiquitous term 'Imposter Syndrome' and found myself quivering close to tears as I shared my experiences for students who might be suffering in similar ways. Rather than being ridiculed, I was embraced. And when one student, timid and curious, approached me after my talk and said, "It really helped", I was overwhelmed. From that moment on, I took the view that, if my story helps one other person, it'll all have been worth it.

Before you read on, allow me to be clear. I am not a trained psychologist. Nor, in fact, am I a sociologist, psychiatrist, counsellor, or social scientist. I am simply someone – as a student and mentor – who has felt, and still feels the serrated dagger of imposter experiences! (My draft book was originally titled *Pull Out the Dagger* before it was finalised.) I have been in the eye of the mental storm and whirled round its violent perimeter. I have studied this particular mental struggle in intimate detail. I know it well. Although I am not a clinician or psychologist, I am a scientist. And, as an academic who has worked in a university, my life has been spent in one of the most notoriously neurotic and competitive environments we know of. It is a breeding ground for all dimensions of the imposter experience and more. I have seen, heard, experienced, and taught students in many scenarios in which the feeling of being a phoney has reared its ugly head.

You Are (Not) a Fraud is all about how I learned to manage my imposter experiences and keep moving on. I wanted to share the low points and the stories and the data that have helped me to recognise imposter experiences and to best understand how to deal with them.

Notice, I did not say "to cure" Imposter Syndrome. I did not say "crush", or "solve", or "quash" Imposter Syndrome.

It is not something to cure but something for you to recognise and manage.

It sounds easy, doesn't it? I've rhymed off the self-help rattle as if I am some sort of millennial messiah. The truth is that my own struggles to move forever forward in my career have taken a genuine mental toll. This book shares that story, and offers the liberating knowledge I have picked up along the way. You'll learn about the history of the Imposter Phenomenon, who it affects, and why. You'll think about real imposters, and what we really mean when we define success as just being 'lucky'. Going further, you'll dance with failure, rejections, and social comparisons in new ways. Productive ways! And you, the would-be imposter, will learn a little about what these thoughts in your head really are (and are not).

If you have made it this far, I'm willing to bet that you're dancing with ambition. You have something you want to achieve and you're here trying to find at least some of the answers to the hurdles that you've raised against yourself. Whether it's the book, a chapter, or a sentence, I genuinely hope something here makes you look at your own story in a different light.

Alas, for whatever ambition you carry, and the questions you have for yourself, only you can answer the specifics. That's not the scariest part. There is something more than this self-reliance that is just as important to keep in mind. Whether it is now, soon, or inconceivably far off in your future, you will have someone else in your care other than yourself.

We can all understand what true imposters are.

We can all understand how to be mindful of useless comparisons we make between ourselves and other people.

We can all understand how the Imposter Phenomenon might always be there…but it should never stop you from achieving the

goals you set out in your life and career.

Marc Reid (June 8, 2022)

Read and Journal

For each of the **Your Chapter Challenges** closing chapter sections, consider completing the accompanying *Your Are Not a Fraud: Journal Resources* as you go.

The resource contains ready-made templates for each of the 18 challenges presented to you throughout the book.

Available from wherever you purchased your copy of the book.

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Part 3 - Rejection Therapy

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Part 4 – Your CV of Failures

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Example 3: Sara Rywe

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Example 4: Bradley Voytek

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Example 6: Anonymous (by request)

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Example 7: Veronika Cheplygina

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Example 8: Alice Soragni

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The Final Example: Johannes Haushofer

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Part 5 - My CV of Failures

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Notes

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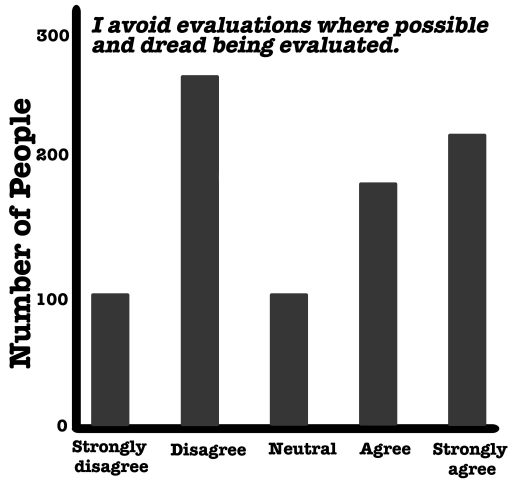
Chapter 7: Social Comparisons

When comparing yourself to others, are you aware of all the assumptions you are making? These assumptions, whether you're aware of them or not, help lead you down the dark path towards thoughts of being an imposter. Consider, for example, the following curious result from my own research. When participants were asked about their feelings on performance evaluations, there was a split in the room. About as many people wanted to avoid performance reviews as attend them. It's one of the few questions in the Imposter Phenomenon study whose collective answer did not yield a strong agreement in one particular direction. Why?

It's here, in this chapter, that I share with you the Imposter Phenomenon's most notorious double-edged sword. Whenever I've had the privilege to talk about this subject with an audience, one question consistently comes back time and time again:

Is there anything about the Imposter Phenomenon that is good?

Social comparison is the case in point. As you'll soon learn, comparisons you make between yourself and others can be the fuel that lights the fire of your ambition. If taken too far, the same comparisons can reduce your ambitions to ash.



Imposter Phenomenon score question focusing on the role of evaluation in triggering imposter experiences. A rare example of a question producing a divide among participants.

A full 730 days of my academic career passed before I faced my greatest embarrassment. And it's here that we meet the very heart of the Imposter Phenomenon – this insatiable drive to compare ourselves to others around us. In my study, relative terms of comparison ("than me", "compared to me", and so on) appeared in around 29% of all imposter experience stories. Stories citing parents only appeared in 23% of cases. Comparisons, therefore, are also core to feelings of being a fraud, concerns about perfectionism, and the fear of failure. So, whilst I figure out how to tell you my side of the story, I ask you to think about the world of high-end gourmet cuisine.

Part 1 – The Chef Who Cared Too Much About His Reputation

In 17th century high-society France, François Vatel was an impressive guy. He worked for the country's Superintendent of Finances, and later became maître d'hôtel (manager of the château) for a prince. Vatel was a well-known figure in the lofty world he inhabited. He was respected and valued; the prototypical event planner of his day. Vatel was held in such high esteem that he carried his own ceremonial sword and had his own bed-chamber in the castle where he worked (both blade and bed being clear status symbols for the time).

Alas, Vatel's earned position and regal responsibilities ended when he threw himself on his sword. The story of François Vatel is one of someone who was petrified of dishonour and the imaginary judgement of those to whom he compared himself. Working hard only to be attacked by the perennial panic of upholding a reputation resonates with me more than I dare admit to you. You, like me, might not be a chef of any description. Nonetheless, as we continue this story, try to keep track of how Vatel's interpretation of events in his life failed to match the reality.

Where might the comparisons you make serve to exaggerate your imposter experience?

Vatel was born Fritz Karl Watel to a working-class Swiss family living in Belgium.[14] Following his cooking apprenticeship in a pastry kitchen, he shot to the upper echelons of French cooking. He wasn't so much a cook or a chef but rather a leader for the grand kitchen teams he commanded. He had eccentric royals to please. Extravagance was the name of the game, and Vatel excelled at it.*

*The Superintendent of Finance, by whom Vatel was once employed, was one Nicolas Fouquet. After Fouquet's displays of opulence, which Vatel helped with on the culinary front, Fouquet was thrown in jail by King Louis XIV, for whom Fouquet's actions were both threatening, ambitious, and ultimately must be tantamount to embezzlement from the government.

His signature events included stage illusions, plentiful banquets, and dazzling fireworks displays. This was event planning – 17th century style.

In April of 1671, Vatel's then employer, the Prince of Condé, announced a dubious honour. Louis XIV, then King of France, would soon be visiting the Château de Chantilly. Two weeks before the visit from the overbearing king (who built the Palace of Versailles, the largest royal residence ever built, just to keep his minions all under one roof), Vatel was asked to plan a three-day banquet…for an entourage of five *thousand* people. This almost impossible banquet was placed solely on Vatel's shoulders. He didn't sleep for twelve straight nights.

Renaissance banquets could be ridiculously opulent. These shows of self-importance were believed to turn the humble requirement of eating into a transcendent experience. It was recognised that good cooking wasn't enough to make such feasts a success; genuine masters of ceremony were an essential part of the workforce for the upper classes who commissioned such events. So utterly exacting were the demands of a Renaissance gathering that, two hundred years before Vatel's time, the guidebook *Du fait de cuisine* was written by a medieval master chef to help event planners calculate what they would need for a good party.[15]

Imagine you have to prepare food for several hundred guests, with no fridge, no freezer, no electricity, and poor lighting. Your guests must be well-fed, and might even stay for a few days longer than expected. There's no internet and you don't have the luxury of a car or *Click and Collect*. What do you think you'd need? According to the event planning guide from 1420, you'd be looking to source around 200 lambs, 100 calves, and 2,000 chickens. Per day. And, just to make it a little more interesting, on the Christian fast days, Friday and Saturday, fish was essential. No meat allowed on those days.

For the visit of King Louis XIV to Château de Chantilly, François Vatel was organising a three-day event, Thursday to Saturday, not

for several hundreds of people, as was delineated in the *Du fait de cuisine* planning guide, but for five *thousand* people. Oh, and I've not even hinted at the quantity of dairy products, spices, kitchen staff, wine, and musicians that would be needed to pull off this behemoth celebration, but you get the idea. These banquets didn't need menus, they demanded blueprints.

During preparations for the king's visit, things went from bad to worse for Vatel. He was a perfectionist; a working-class man forever in the company of regal superiors. Comparison between himself and others was likely never far from his mind. He was eager to please, and compelled, by a trick of his own mind, to work non-stop.* Just before the start of the event, it was announced that an additional *seventy-five* guests would be joining King Louis XIV for the banquet. That didn't fit his plan.

As a result, he was forced to leave two of the banquet tables without any roast meat. He hadn't allowed for shortages or last-minute changes to his precise execution of the proceedings. More strangely, Vatel remained haunted by the roast beef mistake even though his direct employer, the Prince of Condé, tried to console him, asserting that the food shortage was *not* Vatel's fault. Remember, all the while, that one of the core tenets of the imposter experience is to feel that way even when the evidence and others around you see it differently.

After Thursday evening's apparent failures, Vatel stayed up into the small hours of Friday morning. Remember, he hadn't slept for twelve nights, agonising over the thought of preparing this festival for his perceived superiors. For the main banquet on Friday, fish had to be the centrepiece (in 17th century Catholic France, no meat could be eaten on a Friday). Around 4am that same Friday morning, Vatel met with a merchant delivering fish to the castle. But here, Vatel faced another terrible problem. The fish delivery was tiny,

*In the letters of Madame de Sévigné, Vatel was described as having *"too nice a sense of honor"*. See the English translation of the original French letters at: Retrieved 30 March 2020, from https://bit.ly/3BSySgb.

nowhere close to being enough to feed all the guests. When Vatel asked the merchant if this was all the fish that was coming, the merchant nodded.

Several hours passed as Vatel waited, in hope and terror, for more fish to arrive on site. That fish never materialised before Vatel's eyes. Three apparent failures – the extra guests, the tables without a roast, and the fish shortage – in the service of those he held above himself was too much for Vatel. He went to his bedchamber and shut the door. Mounting his ceremonial sword at an angle on the ground, he stepped back and then ran into the point of the blade. Like the three festival planning failures that depressed him, Vatel fell into his sword three times before the steel connected with his weary heart. Under the pressure of perfectionism and the will to please the highborn royals to whom he compared himself, Vatel's release was to let his blood run cold on stone.[16]

What Vatel hadn't understood from the fish merchant he spoke with was that the particular delivery in question was not all the fish that was going to be delivered that Friday morning. The first delivery at 4am was just all the fish that the first merchant had. Others were to follow. No more than a few hours after Vatel's suicide, the remaining fish deliveries arrived for the banquet. Left without the master of ceremonies who would oversee its preparation, that fish was never eaten.

Vatel's story survives through a prolific letter-writer of his time. For the failure of the first evening, Vatel is reported to have repeatedly said:

"I have lost my honor! I cannot bear this disgrace."

So focused was Vatel on his failures that he simply couldn't believe the Prince, his employer, who tried to reassure Vatel with the words:

"Everything is extremely well conducted, Vatel; nothing could be more admirable than his majesty's supper."

The prince continued to offer support but it just did not land with

Vatel, who replied:

"Your highness's goodness overwhelms me; I am sensible that there was a deficiency of roast meat at two tables."

For crying out loud! Vatel was told directly by the person he worked for that everything was fine. More than that, the meal wasn't just fine, but rather *"nothing could be more admirable"*. And yet, what stuck with Vatel? The *"deficiency of roast meat"*. When Vatel learned of the apparent fish shortage, some of the last words he ever uttered for outside ears were:

"I can not outlive this disgrace."

François Vatel compared himself to those around him and cared deeply about what they thought of him. Him, a working man from humble Swiss beginnings who worked hard to get to the top of his profession, versus the royals of France. Perfectionism clouded reason, and he paid the ultimate price. François Vatel died on a Friday. His banquet continued on the Saturday.[17]

Alas, these dark days in April 1671 did not mark the last time that France and Switzerland would be connected by the mental struggles of culinary superstars. There is a more modern story to tell of chefs bound by comparison and perfectionism.

Part 2 – The Poison of Comparative Perfectionism

Southeast of Paris, about a three-hour drive from the site of Vatel's demise, lies the small town of Saulieu. Sun-bleached terrace houses and cobbled brick walls fill its narrow streets. The singular steeple of the village chapel overlooks unassuming cars whose factory colour has long since faded. A quiet graveyard rests the town's ancestors. On one of those graves rests the blackened sculpture of

neatly folded chef whites, emblazoned with the interwoven letters "B. L.".

Drive approximately 270 kilometres (168 miles) due east of Saulieu and you arrive at the Swiss lakeside town of Crissier. It is a town with a cosmopolitan palette of buildings: square, three-storey abodes with wood slats, crisp paint finishes, and rows of perfectly aligned windows. Per square mile in Saulieu, you'd find seventy-five people speaking French; in Crissier, you'd find fourteen hundred, conversing in French, Italian, Portuguese, German, and Romansh.

Should you ever wish to escape the terabyte terrors of modern city life, Saulieu and Crissier would each offer tranquillity by their own characteristic ladleful. What ties these towns together, however, is not the bright blue lines of directions on a Google map, but something far darker. Both Saulieu and Crissier are home to renowned hotel restaurants thought to be worth a special trip just for the pleasure of eating there. Both superstar head chefs of both restaurants in both towns have died by suicide.

The letters "B.L." on the tombstone chef whites in Saulieu commemorated the late Chef Bernard Loiseau. He was the 3rd generation owner of La Côte d'Or, an infamous old building which now bears Loiseau's name. He worked tirelessly to obtain the rare and coveted Michelin three-star status. Since his teenage apprenticeship days in the 1970s, watching his mentors rise to the godly three-star status, three Michelin stars was all Bernard Loiseau wanted. In 1991, that dream came true.

But the time came, at the turn of the new millennium, when Loiseau's culinary status seemed to be reaching its sell-by date. In 2002, a meeting with Michelin officials suggested that Loiseau's three Michelin-star restaurant might slip to just two stars.[18] What's more, a competing restaurant guide had recently downgraded Loiseau's main restaurant from 19/20 to a still highly respectable 17/20.[19]

Let's be clear: in the world of cuisine, the almost divinely-inspired third Michelin star is what raises your restaurant in the guidebooks from a worthy detour to a life-affirming pilgrimage.[20] It has the power to add (or subtract) zeros to the bottom line of any restaurant's revenue. In the pursuit of a boyhood dream, Michelin stars had brought Bernard Loiseau fame, fortune, endorsements, and stability for his family. His chaotic charisma fuelled an empire. If one star had to fall from his restaurant's name in Michelin's annual guide, everything Loiseau had built would be compromised.

In his prime, he had helped pioneer *Nouvelle Cuisine*: a clean and elegant style of cooking that avoided lashings of butter and heavy sauces to instead draw out the natural flavours of each ingredient.

On 24th February 2003, Chef Bernard Loiseau was running his normal lunchtime service at *La Côte d'Or*. Guided by empty eyes, he went to his home office for a break, and never came back to the restaurant. Later that same afternoon, Bernard's wife, Dominique, found him in their bedroom. He lay lifeless next to a hunting rifle that she had once gifted him.

Fast forward from 2003 to 2016, and three Michelin-star Chef Benoît Violier of Restaurant de l'Hôtel de Ville in Crissier, Switzerland is found dead in his home, lifeless from shotgun wounds sustained in a presumed suicide.* At the time of his death, Violier was the chef of the best restaurant in the world.[21]

So, what do we have? Two superstar chefs, separated by thirteen years and 300 kilometres, connected by a profession that drowned them in so much stress that they each fired a gun at their own head.

In a drive towards the three Michelin-star status, they each burned fumes to achieve perennial prestige in comparison to their peers.

In the end, the ultimate connection between Loiseau and Violier, and to poor François Vatel three centuries before them, remains

*Benoît Violier, like Bernard Loiseau, was a keen hunter. The irony of their similar deaths is not lost in this fact.

their untimely, avoidable deaths in the service of perfectionism. But it's more than that.

What's particularly revealing about Loiseau and Violier, in a way that wasn't possible in Vatel's time, is their tie to a restaurant rating system. Vatel obsessed about the number of roasts and fish. Loiseau and Violier counted stars. But to understand just how bizarre it is that a restaurant rating system would drive these men (and other chefs besides) to constantly compare themselves to others, you have to understand where the Michelin Star system came from in the first place.

Part 3 – Michelin and the Birth of Maddening Metrics

You may have heard of the old saying, *"What gets measured, gets managed"*.[22] It was originally uttered with positive sentiment: if you find the appropriate way to keep track of a task, you will be able to observe progress in an objective fashion. On the more cynical side, *"What gets measured, gets managed"* can also take on a more totalitarian purpose. If a boss wants to control their employees, they'll hold those employees to particular metrics of performance.

In your own work life, you might have come across some metric that strikes eye-rolling indifference into those – including you – who may be bound by it. You sigh in the name of annual 'accountability'. But let me more directly ask you this.

For any metric that you have ever been measured against, or that's ever caused you to compare yourself to someone else's score on that metric, do you have any idea where that metric came from?

Do you ever ask who came up with it, why it exists, or what happened before everyone around you took the metric for granted?

Until I started looking deep into sources of imposter experiences, I had never asked myself these questions about metrics. And yet, as the data in the opening of this chapter shows, there are about as many people who dread evaluation as those who are perhaps driven by it. I thought even more about the real influence of metrics when I started reading about the world's greatest chefs killing themselves. So, what about the endowed Michelin stars? From where in the night sky did they fall upon the world?

Michelin's main logo is of a ghostly white, cartoon figure, rotund on account of the concentric tyres that make up its torso. This is, in fact, the same Michelin company that produces the now-infamous red-covered restaurant guide and three-star rating system. The three-starred metric that can make and break the careers of the chefs who pander to it. That is to say, the Michelin company of tyre fame and the Michelin company producing the little red book that rules the world of high-end cooking are *one and the same.*

If this connection of tyres and restaurants sounds strange, ridiculous, or odd to you – good! Trust your instincts. This connection was an eye-opener for me, and it blew a hole in how much I cared about the academic metrics that I, as a scientist, otherwise unconsciously lived by. Some of these metrics have exaggerated how often and how closely I compare myself to others and how often I have felt under-qualified in my workplace. Before we get to academia, I want to share with you the deeper story of how Michelin stars came to be, and how understandably tragic it is that any chef lives (and dies) by that little red book.

Nowadays, cars are on all roads, everywhere. But in the early 1900s, cars were still pretty rare and, for a time, shared the roads with horse-drawn carts. So, here's a question for you: how would you feel if you owned a company selling what car owners needed but knew that cars themselves were rare? Put another way, if you had a great product to sell at volume but only a tiny customer base, do you think your company would be likely to succeed? Such questions were at the heart of a problem faced by French brothers Édouard

and André Michelin. Building their business at the turn of the 20th century, their vital question was:

How do we get people to buy more tyres?

In a more cunning guise, the ultimate goal of the brothers Michelin revolved around the question:

How do we convince more people to buy cars that then lead them to buy the tyres we are selling?

In the Michelin brothers' time, there were fewer than 3,000 cars on the roads of France (compared to about 32 million cars at the time of writing this sentence over a hundred years later). Back then, most people couldn't yet imagine the world of possibilities that a car could open to them. This problem of how to sell one product to improve sales of another is the sort of challenge that a marketer's dreams are made of, and the Michelin brothers were more than up to the task. Their solution? If your potential customers don't yet know what a car can do for them, you *educate* them. You give them a *guide*.

In 1900, Édouard and André published their book of maps, tyre maintenance instructions, tourist locations, and restaurant recommendations for the very first time. It was the *Guide Michelin*, a compact collection of inspirations for aspiring motorists, Édouard and André's answer to making their tyre business boom. They were the pioneering content marketers of their day.

The first 35,000 copies of the Michelin guide were published free-of-charge; a gift to the people of France, inspiring them to seek out life-affirming experiences in their cars. The marketing gamble paid off. The guide's success was such that, by 1904, it was expanded from France to Belgium, and then to several more countries around Europe.

By 1920, the Michelin brothers stopped paying for the guide with advertising pages and started charging $2.15 per copy, removing any perception that the little red book was merely a door stop.

Six years later, in 1926, the *Guide Michelin* changed the restaurant business forever. Having noticed that the restaurant section of the guide was the most popular, the Michelin company hired their first *mystery diners* to covertly rate the restaurants and hotels of France.

The reward for impressing a mystery diner was to have a single star stamped next to your listing in the guide. In the eyes of the guide and those reading it, you (as the restaurant owner) were now deemed especially worthy of a motorist's time. For logistical reasons, the rating system was later focused on fine dining establishments only, and, in 1936, the one-star stamp became the three-star Michelin rating system known the world over today. Here's how you are supposed to count those stars listed against restaurants in the guide:

- **1 star** = *high quality cooking, worth a stop.*
- **2 stars** = *excellent cooking, worth a detour.*
- **3 stars** = *exceptional cooking, worth a special visit.*

Other restaurant rating systems exist but, in the immortal words of late great chef, Paul Bocuse (a household name in France):

"The Michelin guide is the only guide that matters."

Nowadays, when the *Guide Michelin* is published in January each year, the media buzz rivals that of the Oscars or the Nobel Prize. Newspapers announce the stars earned, retained, and lost from the previous year. The ingenious marketing trick that urged more people to buy tyres now commands the respect of restaurateurs in twenty-four territories across three continents. Those earning a new star rejoice for their lucrative badge of honour and advertising exposure that the star brings to their business. The losers, on the other hand, those shunned or stripped of their star(s), hang their heads. In some cases, the losers even take the Michelin company to court.* But you now know that the fear of losing a Michelin star

*French chef Marc Veyrat's Alpine restaurant, La Maison des Bois, was awarded its third Michelin star - the highest possible rating - in 2018, and downgraded back to 2 stars the following year. Veyrat tried to sue the Michelin company and lost. Michelin called him a "narcissistic diva".

can mean something far worse than bad press. Bernard Loiseau and Benoît Violier found this out the hard way.

So, why does a rating system, born as a marketing gimmick, command the respect and, alas, the lives of so many chefs? I think it's for some of the same reasons that François Vatel threw himself down on his sword.

For good or bad, secretive and subjective metrics like Michelin stars nonetheless supercharge our temptation to compare ourselves to other people.

The definition of 1, 2, and 3 Michelin stars seems completely clear and boastfully transparent. When you have these ratings, you know what it means. It's printed in glorious red and white on the Michelin website and printed guide. What it does *not* tell you is *how* to earn a star. All the chefs know is that some ethereal level of performance consistency is expected. The methods of the Michelin institution itself are shrouded in deep secrecy. How exactly Michelin's mystery diners watch and judge these chefs is unknown.

In 2003, Pascal Rémy, a former Michelin inspector (a mystery diner), published his exposé on the institution.[23] It sent palpable shockwaves through the industry. Rémy contested the ability of Michelin to annually inspect all restaurants in their guide. There are just too many high-quality restaurants and not enough inspectors. By the same stab of the knife, Rémy accused Michelin of treating some superstar chefs as untouchable. By heightening the demi-god status of some chefs, it helped maintain the legitimacy of the Michelin brand.

The curious and unclear notions in Michelin's mystery inspections run deeper still. In 2002, a year before his death, Bernard Loiseau had a secret meeting with representatives at Michelin, who were concerned about the consistency and quality of Loiseau's cooking. Later, Michelin would try denying this meeting ever happened, but documented meeting minutes made the effect clear. Loiseau was noted as being *"visiblement shocke"* (visibly shocked).[24] Alas,

while Bernard and his wife exclaimed that Bernard would dedicate himself to maintaining the restaurant's three stars, Michelin said nothing about how this maintenance of quality should be achieved. The rating system remained opaque to Loiseau right up until he pulled the trigger on his hunting rifle.

Gaining or losing a Michelin star can seriously impact restaurant income.* When chefs are caught in the bright headlights of the Michelin metrics, they don't see the freight train that is hurtling toward them.

Earning status with a metric is one thing, but the pressure to maintain that quantified status can be crushing.

As well as pandering to a mysterious set of standards, judged anonymously by people with less culinary skill than those they judge, some chefs live with the constant fear of going out of fashion. What is innovative and revolutionary one year might be judged boring and chased out by younger chefs the next. Yet, there is one innovation from a particular chef that helps turn these dark tales into a tool for managing the sorts of comparisons we so intrinsically connect to the Imposter Phenomenon.

Part 4 – The Street Urchin

Over the course of his career, chef Marco Pierre White ascended from dish cleaner to dining royalty. He battled all the way to winning the coveted three Michelin stars. In 1995, at age just thirty-three, he was the youngest ever British chef to be deemed worthy of Michelin's highest rating. He is *Grit* personified. Hard work and measured risk have earned him coveted and lucrative roles as a TV chef and brand ambassador.

*Two-star Michelin Chef, Raymond Blanc once launched a scathing attack on Michelin for the power they have over the amount of money a chef's business can earn. Similarly, in his book *Wine Snobbery*, wine writer Andrew Barr exposed the truth behind some apparently prestigious vintages, more inflated brands than delicious blends. Amidst it all, there are some sage chefs who have seen the *Guide Michelin* for the metricised gimmick it has (to some) become.

After a sixteen-year journey to earn his stars, he held them for five years, proving that what he could earn, he could retain. Consistently. Then, seemingly against all sense, he retired and handed the stars back to Michelin. A chef with three Michelin stars, a man on top of the world with the highest rating from what was the most revered metric in fine dining, handed back the chef's equivalent of a Nobel Prize. To those still reaching for their own stars (including White's arguably most famous protégé, Gordon Ramsay), this was madness. A cheap publicity stunt. Michelin itself rushed to claim that handing back stars was not in even in White's authority to do so. But why did Marco Pierre White do it at all?

The 2012 documentary *The Madness of Perfection* explored the highs and lows of Michelin-starred kitchens and what it takes to earn and retain the Michelin stars.[25] When chef White was asked about his experience, he said winning three stars was like *"the end of the race"*. More importantly, when he was asked about why Michelin puts such pressure on chefs, he corrected the documentarian by saying that chefs put this pressure on *"themselves"*.

There is a very thin line between the external pressures imposed by a system of metrics and the internal pressure induced by adherence to such metrics.

White could see that earning and maintaining his Michelin stars were not the same thing. At that level, maintaining three stars is all about doing the same thing, over and over, consistently to the undefined levels that Michelin expects, charging three-figure bills to diners for the pleasure. White even went so far as to call the process of three-star maintenance "boring", and he's not the only one to have smelled the Michelin rat.

Skye Gyngell, Alain Senderens, Joël Robuchon, Marc Veyrat, and Olivier Roellinger are just some of the Michelin-adorned chefs who have since said thanks…but no thanks.[26] They are all doing their own thing, by their own rules, no longer marching to the judgemental beat of the mystery diners who have far less technical

skill than they do.[27]

Vatel, Loiseau, Violier, and others besides* something deeply striking hit me when I looked into these chefs. They were all high-achieving, all at the top of their game. François Vatel was an innovator in his time, a master of ceremonies for royalty. Bernard Loiseau brought a failing hotel back from the brink of collapse and became a household name in France. And Benoît Violier, author of a triumphant 1,000-page opus on cooking game meat, was running a restaurant recently celebrated as number 1 in *La Liste*, a curation of the thousand best restaurants in the world. Number 1.†

There was a spine-chilling familiarity borne from these stories of chefs. High-achievers in a competitive landscape were aiming for unattainable perfection. Innovators were being judged by ill-defined metrics that drove them to over-value external opinions. They were reaching for stars that left nothing but mental scars. This is a problem that runs much deeper than the world of high-end cuisine.

Part 5 – The Grandfather of Google

The Sticky Paper Metric

Like the life-weary chefs chasing stars, academics have their own version of the Michelin metrics trap. Again, whether you are in academia like me or not, I'm willing to bet that you're able to draw your own parallels between the Michelin story and the metrics that exist in your workplace. More on that later, in your Chapter

*In 1966, chef Alain Zick completed suicide by gunshot after Michelin stripped his 2-star status. And in 2003, the same year as Bernard Loiseau's death, chef Gérard Besson suffered a non-fatal heart attack on hearing the news that he was to lose his third Michelin star.

†La Liste is France's answer to another restaurant ranking list that the French feel is biased against French restaurants, perhaps because the converse feeling exists for bias for French restaurants in the Michelin Guide. In La Liste, the algorithm used is named Ciacco, after a gluttonous soul damned to eternal punishment from a three-headed hound in the third circle of Hell.

Challenges. As to how this relates to Imposter Phenomenon, 30% of participants in my study cited journals, publications, and their metricised ranking as a source of their own imposter experience (versus 23% for parents). Here's what a mere handful of them reported:

"When I see colleagues publishing in top high impact journals and I can't get one, I feel it's my fault I'm not as good as them."

"In my PhD, some of my peers were publishing high-impact papers, graduating early, and getting impressive grants to continue their stellar trajectories…It was easy to focus on these people rather than the vast majority who were like me…"

"Any time anything remotely related to publications comes up I feel like an imposter."

"I believe I feel so overwhelmed with information and people bragging about publications and how well they are doing, that I just feel like a loser."

Once more, you might be one of these people, you might not. But one of these people could be your son, your daughter, your sibling, or among those who you'd look to recruit into your business.

The old saying in academia is that you *"publish or perish"*.[28] As an academic, you develop your research like a fine dining meal, then serve it up in a journal paper. The better your papers are perceived, the better shot you have at attracting ambitious students to your lab, and winning lucrative grants. Are you seeing the parallels between chefs and academics yet?

Here's the contradiction. Just as many great restaurants exist without necessarily being decorated in Michelin stars, there have been prize-winning discoveries reported in apparently 'lower tier' journals.* Where the Michelin story helps us see how easily a gimmick

*The 2016 Nobel Prize in Chemistry was jointly awarded to Fraser Stoddart, Ben Feringa, and Jean-Pierre Sauvage. Sauvage's award-winning work was originally published in what is now considered a low impact journal (*Tetrahedron Letters*). What's more, the article was published in French!

becomes gospel for chefs, so too is there an eye-opening history behind how academics in universities became part-governed by an immortal journal metric called 'impact factor'.

At a similar time to when Zora Raeburn was trying to get published, no one had a computer at home. It would be several more decades before the number-crunching power of laptops and smartphones got into the hands of, among the rest of us, librarians. Far from being a sedate, silent, and unassuming profession, librarians are tasked with cementing the retrievable archives of our combined human knowledge. They are the original information scientists.

To find books, articles, letters, theses, and tomes from over the world and across the ages, it has been the job of librarians to come up with the methods of classification that make knowledge of documented history retrievable. Using limited budgets, librarians need to figure out which literary materials to stock, subscribe to, and to ignore.

Before the Google search bar was even a twinkle in Larry Page's eye, the work of sorting was still in the realms of paper databases, punch cards, and periodicals. Far from the page-ranked platforms of the Internet age, information scientists of the time knew there were serious problems for academics looking to find sources of ideas in the literature. The origins of a particular idea might rest in that academic's own field or well outside their perceived realm of interest. This 'sticky' problem of connecting ideas to information turned out to have a rather sticky solution.

In 1875, salesman Frank Shepard needed a way to help lawyers understand when and why one legal case would refer to another. Using sticky gum paper, he stuck notes inside hardbound case files, acknowledging other sources citing the particular case to which the notes were stuck. The ideas and content of a case could thus be linked to ideas and content from *other* cases, without either case having to occur within the same published source. A higher number of sticky notes on the case file, the more cited it was, and the

more perceived value it had. The legal profession has used Shepard Citations for over one hundred years. The original business has since been acquired and modernised through a lucrative business merger.[29] Yet, making use of Shepard's sticky note innovation in libraries as opposed to law firms required an ideological leap in its own right. Enter, Eugene Garfield.

Our natural desire to categorise everything is muddied by the fact that the axioms of one subject often cross-fertilise with those of another subject. There are bridges between physics and chemistry, chemistry and biology, poetry and history, and so on. When Garfield, an information scientist, started tackling this library problem in the pre-computer era, he brought one crucial intellectual insight:

Researchers looking in the literature aren't primarily motivated by a well-defined subject; they are driven by *ideas*.[30]

Garfield developed his insight into a sorting index that offered the best compromise for collecting the largest number of connected ideas in high-quality articles, and minimising the citation of poor-quality data. It helped librarians choose which journals to stock on the shelves! Garfield formulated what could easily be called an *association of ideas* index. Today, he is remembered as the *Grandfather of Google*.[31] He, in turn, introduced the *Journal Impact Factor* (JIF), the academic equivalent of placing sticky notes onto legal files.[32] Despite the eminently legitimate reasons for which it was created, JIF, like Michelin Stars, can easily be contorted into a comparison-inducing nightmare.[33]

Interpreting Impact

The nut that Eugene Garfield cracked with his journal ranking metric was to base it on the number of citations earned by papers in a particular journal. More sticky notes on the case file was all that mattered, not so much where those sticky notes came from. The Journal Impact Factor (JIF from here on out) doesn't care if the

citations came from within your field or far outside it. The bigger the JIF number, the better quality the collected research papers in a journal are likely to be. It's simple. Quantified. Elegant. Right?

Well, you now know that the viciously prestigious Michelin stars were originally invented to sell cars rather than fancy meals. Do you think the JIF metric was ever going to be *that* easy to work with? Just as stargazing chefs have embattled themselves with the pressure of Michelin fame, and like so many of the Imposter Phenomenon study participants desperate to avoid evaluation, so too has academia taken JIF far beyond the innocence of sorting library shelf space. The first problem with the JIF lies in its interpretation.

The main problem with the JIF metric is that it is reported as a type of average called the *mean*. But (here's where it gets statistical) this assumes that the graph showing how many articles have a particular number of citations is bell-shaped. By contrast, the real article citation data are not at all bell-shaped and are instead squished to the left, shaped more like a bell that's been melted on one side. And when you have such skewed data, it's not the *mean* that is the most valuable statistic for making sense of the 'middle value' in the spread, but rather the *median*, a more robust cousin of the *mean*.[34]

While the more robust *median* metric is just as available as the *mean*, the *mean* of the data is what is used and marketed on journal web pages. Why? Well, if you had the choice of reporting your own journal's impact factor as 26 (the mean) or 16 (the median),[35] which would you choose as a way to market your journal?[36]

In one wonderfully ridiculous case, a niche chemistry journal's impact factor once jumped from 2 to 42 in a year because of a single very highly cited article that appeared in that journal. That same journal's impact factor has, at the time of writing, now settled back

down to around 2.*

What ties all of this to the Imposter Phenomenon is how the innocently invented journal impact factor has led to offspring that, rather than trying to measure the quality of a journal, tries to objectify the professional worth of an individual.[37]

The Contortion of Academic Metrics

In 2005, around fifty years after the introduction of Garfield's Journal Impact Factor, physicist Jorge Hirsch invented what is now eponymously known as the *h-index*. Whereas Garfield's metric was aimed at sorting a *journal*, Hirsch's metric aimed to assess the individual contributions of a *person*.[38]

An individual academic author's *h-index* tells you that they have at least *h* papers with *h* or more citations each. To Hirsch, this was a way to fill the loophole left by using raw citation count as the traditionally preferred way of measuring a researcher's productivity. The problem with raw citation counts is that if one person had a single paper with a huge number of citations, a scientific *one-hit-wonder*,[39] that would be enough for them to be deemed a success. Such outliers are unpalatable to the scientific community who, in the main, value steady, consistent contributions over singular stratospheric hits. Hirsch designed the h-index to help the theoretical physics community better understand productivity, but the influence of the h-index has spread far beyond its roots. This one individualistic metric is now used to assess academic job applications, and it's one of only a few sticky labels made plainly visible on an author's Google Scholar profile.

In several review articles explaining the history and meaning of Journal Impact Factor, Eugene Garfield acknowledged that JIF had

*In balance, within chemistry, there does seem to be some validity to impact factor versus the proportion of articles in a journal achieving a certain number of citations. But the trend remains that most single articles in a journal achieve less citations than the glorified impact factor would suggest. See, for example: Cantrill, S. (2014, December 5). Nature Chemistry's 2014 impact factor citation distribution. Nature Chemistry. https://go.nature.com/3vA8rYo.

evolved to determine author as well as journal impact. He did not shy away from the fact that it is dangerous to conflate a journal's impact factor with the impact of a single researcher. In his own words:

"The term 'impact factor' has gradually evolved, especially in Europe, to describe both journal and author impact. This ambiguity often causes problems. It is one thing to use impact factors to compare journals and quite another to use them to compare authors."

In academia, it's this shift towards individual metrics that plays a big part in driving the wrong types of comparisons between ourselves and others.
[40]

Metrics and Money

When I read Garfield's personal accounts of Journal Impact Factor, I found something fascinating beyond the core content. On the opening page, tucked neatly into the bottom-left corner in a tiny font, you find Garfield's correspondence address. In these articles, Eugene Garfield is not listed at some university, as a scholar might normally be, but as *"Chairman Emeritus of Thomson Scientific"*. If you search online for *"Thomson Scientific"* now, you won't find their website.

The company merged with Reuters Group in 2008. The Science & IP division of Thomson Reuters was then later sold to a private equity firm that, in turn, established the journal analytics company Clarivate. One of the products under the Clarivate umbrella is Web of Science (basically Google for scientists). The original company that Garfield had been chairman of had, through his insight, created means of storing, curating, and indexing the world's scientific knowledge. So valuable were these data that Thomson Scientific was able to amass that, through the iterations of acquisitions and mergers, the company sold, on 3rd October 2016, for $3.55

billion (US).* Cash. While metrics madden many, they make others millionaires.

I'd always thought that a career in academia was the pinnacle of achievement. Harking back to being a first-generation university student as a root cause for my imposter experiences, I've always placed the possibility of being an academic on a pedestal.

Understanding the business model behind the science of Eugene Garfield's work was an eye-opener for me. Before reading his last correspondence address, I had naively assumed such bibliometric work would have remained academic. It instead gave me a crystal-clear perspective on just how tragically silly it is to get wrapped up in the metrics that would have us compare ourselves to one another even more so than we otherwise might. Why compare myself to others through a metric that has been distorted beyond its original purpose? Why waste my thoughts and breath on a hyper-individualised branding iron that says nothing of the teams I've worked with, the area I work in, or use of my work beyond the pages of my journal articles?

It needs to be stressed. Prestigious journals publicly acknowledge the limitations of these metrics. At the same time, however, they recognise the attraction of the rejection-fuelled scarcity the metrics have enabled in the name of marketing. It's like chef Marco Pierre White said. The Michelin company doesn't put pressure on chefs to work to their metric, chefs do it to *themselves*.

And so it is in academia. Journals don't force scientists to stress themselves out over perceived high-impact factors and rocket-fuelled h-indices. Scientists do it to *themselves*. And it has alas resulted in similarly dark days to those that shook the world of the chefs. In 2014, toxicology professor Stefan Grimm ended his own life when his employers at Imperial College London warned that his

*Part of the intellectual property in the company that was once Thomson is the more complex calculation behind Journal Impact Factor, linking an article to its unique citations by other researchers in other papers.

grant income (indirectly tied to the apparent metrics-determined quality of Grimm's papers) wasn't high enough.

The modern dangers of JIF and the individual metrics that have been born from it have driven several organisations to construct manifestos on how to make research assessment fair. *The San Francisco Declaration on Research Assessment* (DORA),[41] for example, directly calls out the deficiencies of JIF in its text, urging researchers and assessors to take this infamous metric with a firm pinch of salt.

More recently, the Leiden Manifesto offers ten principles on the responsible use of metrics, and encourages assessors to adopt a flexible approach to assessment, based on the field of research, and the tangible assets of impact developed as a result of the papers under scrutiny.[42]

Vatel, the Michelin brothers, Loiseau, Violier, Garfield, Shepard, and Grimm – all of it brings me to the story I have avoided telling. Until now.

Part 6 – The Story I Didn't Want to Share

It was a rare sunny morning, rays pouring into my university office. I opened my emails and read that a promising young scientist was coming to my department to present their recent work. The email advert revealed that this particular early-career scientist* had been so successful that they had published a series of more than ten papers in just over a year. I had published one. This person was a year ahead of me, in a similar academic position, and on what seemed, at first glance, like a similar career path.

Immediately and without warning, I grew desperately short of breath. All my familiar thoughts of academic worthlessness came

*"Early career" in academia is commonly conflated with raw age. However, the term is more broadly defined as including anyone who is within the first 3 - 5 years of their first academic appointment.

flooding back. Before I could draw any air, I automatically rushed to compare my career, pound for pound, paper for paper, metric for metric, against this emerging star…who was visiting my department! *My office*! As I dusted my table and repositioned the chairs just so, I reached the conclusion, neglecting logic or consideration, that I was a fraud. Somehow, it felt that nothing I had done in my own career could possibly stand up to anything this other budding academic had already achieved.

My focus was on the fallible metrics that I had allowed to be judge, jury, and executioner of all my efforts. I scrolled through this imminent visitor's website. I cross-compared our publication impact factors and h-indices, never once questioning what these metrics meant or where the hell they had come from. I wondered if I should quit while I was ahead. In this blindingly stupid panic, I stared at the email announcing the visitor's schedule, and silently dissolved.

That compulsion to compare myself unconsciously and unjustly to one of my peers was the first and only time I have ever come close to thinking that things might be better if I weren't here at all…

I really do not think the darkness that consumed François Vatel, or Bernard Loiseau, or Benoît Violier, or Stefan Grimm, or anyone else is within my constitution. Nonetheless, that experience of metric fixation unearthed a side of myself that scared me. I'm not sure that I could ever be driven to fall on my own sword, but that doesn't really matter. The way I felt when I compared myself to that visiting academic left me staring down a dark road with only unanswered questions for company.

What might I have been convinced to do? What if I felt there had only been one way to end my worries? What I share with you here, now, is my ultimate embarrassment. This most desperate instance of my imposter experiences was triggered by comparison through academic metrics. The metrics, however, are not entirely to blame.

These tempting comparisons are far more foundational than

the metrics we construct.

Early 20th Century physicist Paul Ehrenfest shot himself after years of tormented self-criticism. Working at the time of giants like Niels Bohr and Paul Dirac and Albert Einstein, and despite being a celebrated communicator, Ehrenfest saw his own contributions to physics as petty by comparison.[43] Writing to his doctoral students, he once confessed:

"Every new issue of the Physical Review immerses me in blind panic. My boys, I know absolutely nothing."[44]

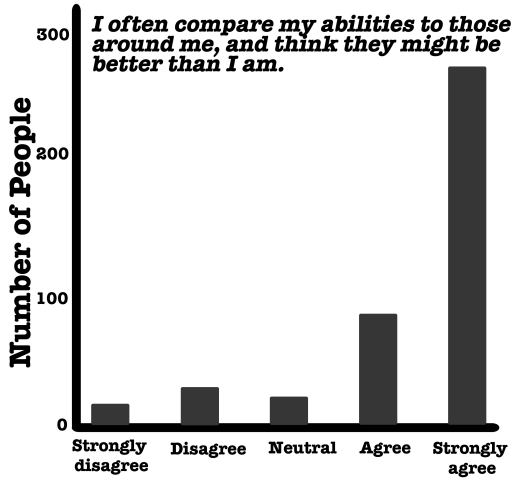
Ehrenfest died in 1933 and, like François Vatel before him, did so long before modern metrics gripped his profession. He didn't have Eugene Garfield's journal metrics feeding these depressive imposter experiences. The social comparisons he made to his peers happened anyway. Indeed, whilst wrestling with how to manage the comparisons that led to the very worst of all my own imposter experiences, I learned that comparisons aren't simply at the heart of the Imposter Phenomenon. No, no. Comparisons are at the very heart of who we are.

Part 7 – The Psychology of Comparison

François Vatel became depressed for the apparent dishonour of failing the royals to whom he compared himself. Bernard Loiseau fuelled his Michelin-starred rise and untimely demise through maddening comparison to his fellow three-star chefs and an unattainable perfectionism. Paul Ehrenfest couldn't reconcile his wonderful teaching ability with research giants like Einstein.

Terry Crews, whose story inspired the opening to this book, almost never became an actor because he panicked whilst working with established superstar Arnold Schwarzenegger. And stressed-out academics, myself included, compare their intellectual worth against their peers through the contorted frame of journal metrics.

This entire chapter boils down to what is arguably the main feature of all imposter experiences: our natural desire to compare ourselves to our peers. In my own study, no question was answered with more emphatic agreement than that attending the toll of comparison between ourselves and our peers.



Imposter Phenomenon score question focusing on the role of comparison in triggering imposter experiences.

Notice that I said 'peers' and not simply 'people'. Because, what you have to realise, as I now have, is that this drive for comparison runs much deeper than the Imposter Phenomenon. Because the Imposter Phenomenon itself, I would argue, is the birth child of a sociological phenomenon that was first coined during the study of US soldiers and airmen in World War II.

Imagine, for a moment, that you're out for a drink to catch up with two old friends. Conversation turns to how things are going at work. Both friends (let's call them Alex and Andy) work in the same large company but in different departments. Their departments are in separate buildings and they never see each other at work.

Over drinks, Alex explains to you that his rather swanky and well-resourced department is one with rapid promotions, whereas Andy's department has very few promotions up the ladder.

As you sip your drink and listen to what Alex and Andy have to say, you know they're both hard-working, both high school graduates, and both worthy of the jobs they hold, but who do you think is most satisfied in their job? Alex or Andy? If, understandably, you assumed Alex, being the one in the best-funded department with reportedly highest chances of promotion, you would be wrong. Why is it that the person we expect to be more satisfied in work is not? And why have I made no mention of Andy, in the less illustrious department, being at all jealous of Alex?

When sociology professor Samuel A. Stouffer studied the morale and motivations of over half a million soldiers in wartime, he and his team observed a curious difference between servicemen in the Military Police and those in the Air Corps.[45] Stouffer surveyed over 2,000 men across these two divisions of the Army, and asked the following question:

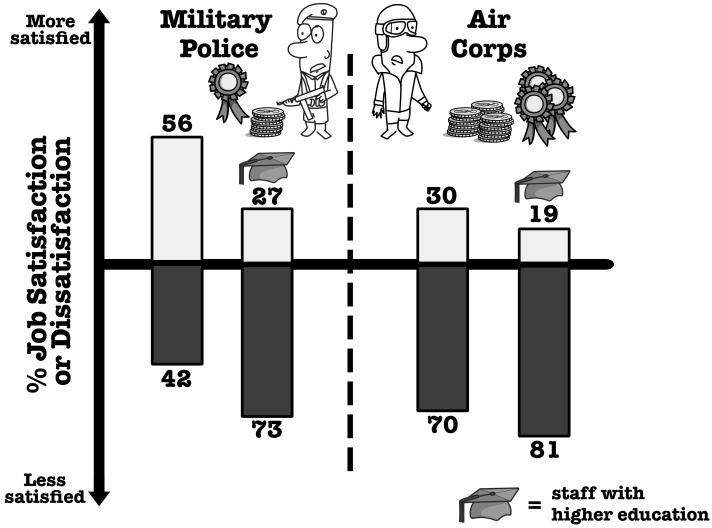
"Do you think a soldier with good ability has a good chance for promotion in the army?"

The results, published in a two-volume tome called *The American Soldier*, unearthed a pervasive concept that now ripples through psychology, sociology, economics, and beyond.[46] Stouffer found that the Military Police answered the promotion question more positively than did the Air Corps. The Air Corps (like Alex's department) was better paid, with better conditions, and more frequent promotions than in the Military Police (Andy's department). Why was it that the assumedly worse-off Military Police group felt more satisfied than their loftier Air Corps colleagues?

Like your friends Alex and Andy, working in the same company but in distant departments, the two different sections of the Army rarely encountered one another. We expect that, because the Air Corps had the better set-up, that the Military Police might see their

chances of promotion more negatively than their esteemed airborne colleagues. But that's not what happens at all.

Military Policemen worked closely with other Military Policemen who shared the rarity of ever being promoted. Air Corps members compared their position versus all their other colleagues in the same rapid promotion environment. How would you feel to work in a place where lots of promotions are happening but you don't get yours? When two related groups of people are distant, people in one group compare their situation only to others within the *same* group. Andy in the poorer department is more satisfied at work than Alex in the wealthier department because Alex and Andy never have the chance to compare themselves to one another. They each have more immediate comparisons to make.



Left of the vertical dashed line: job satisfaction data for Military Police. Right of the same line: comparable data for the Air Corps. Whether you compare the whole or the more educated subset of each group, in all cases, the Air Corps reported less satisfaction than the Military Police, despite having better conditions and more chances for promotion.

Stouffer realised that comparisons are relative, not absolute. The

unexpected result led him to formulate a concept now known as *Relative Deprivation*.[47] And it's a concept that pervades many fields because, when applied in a specific context, *Relative Deprivation* overlaps with several other psychological phenomena that go by different names.

In 1954, Leon Festinger published an influential paper on *Social Comparison Theory*: a fundamental psychological mechanism influencing our experiences, behaviours, and judgements.[48] When you want to understand where your abilities or opinions stand, you look to those around you. But you don't look to just anyone to learn about yourself. When you make these comparisons, you behave like the Military Police studied by Samuel Stouffer. You make comparisons locally, to those closest to you, those within reach. You don't make comparisons that are intangibly distant. If you're in the Military Police, you don't care about the Air Corps.

Festinger's *Social Comparison Theory* was built on nine principles. Among them, most importantly for our concerns on the Imposter Phenomenon, one of the nine principles recognises that, when you assess your abilities, you will naturally compare yourself to someone whom you perceive as being ahead of you. That is to say, there is a natural upward drive when comparisons are made to establish ability level. You compare yourself to other people as part of your attempts to figure out how to raise your game. And the further someone else's level is from your own, the less you compare yourself to them. Comparisons are most fierce, most potent, when they are close.

It's often impossible for us to determine our skill level or the validity of our opinions by reference to the physical world. For all those times when you're left searching, *social comparison* becomes the next best thing. It is often the only thing. You will seek out others similar to yourself, and slightly further ahead in ability. You will compare yourself to other people, even if a hypothetical database of all possible comparisons to the physical world existed. Alas, nearby social comparisons are simply much easier than investing the

extra mental resources needed to assess the objective list of every possible comparison. Social comparison helps us fulfil our goals by providing an energy-efficient mechanism for self-evaluation and self-improvement. On why we compare ourselves to others, Festinger himself said:

"The holding of incorrect options and/or inaccurate appraisals of one's abilities by reference to the physical world can be punishing or even fatal…".

But more than that, the language of comparison helps us communicate effectively. The distance from here to the sun is about ninety-two million miles, but that doesn't make much intuitive sense on its own. Saying instead that the distance from here to the sun is the same as walking from the North Pole to the South Pole over seven thousand times starts to give you a deeper sense of the scale of the journey, right?

From Stouffer's *Relative Deprivation* to Festinger's *Social Comparison Theory*, the reason why imposter experiences always seem to be linked to comparisons was becoming clearer to me. Yet, the most important of these comparison theories – to me, to my working life, to the Imposter Phenomenon – uses a metaphor of fish in ponds.

In the 1960s, James Davis investigated the academic confidence and achievements of college graduates.[49] He found that the calibre of graduating students' career choice correlated more strongly with grade-point average (GPA) than with the ranked quality of the school itself. Davis' core argument was that students attending higher-ranked colleges felt worse about their individual ability, and thus achieved a lower GPA at the point of graduation than students in a lower-tier college. Davis even likened his proposal to Sam Stouffer's *Relative Deprivation* work on Military Police and the Air Corps:

"The theory of relative deprivation suggests a plausible explanation, that students' career decisions are affected by their self-judgments regarding their academic abilities, and that, like soldiers, students

tend to judge themselves by comparison with others in their unit, that is, in terms of GPA."

Davis' paper was titled *"The campus as a Frog Pond"*. It leads us to a profound question about comparisons, and something I think is at the heart of the Imposter Phenomenon:

Is it better to be a big frog in a small pond, or a small frog in a big pond?

Some twenty years after James Davis first proposed this question, it evolved into one about fish rather than frogs. In 1984, Australian psychologist Herbert Marsh ran a study to look at the relationships between socioeconomic upbringing, academic achievement, and *academic self-concept*.[50] Academic self-concept (or ASC), simply put, is how you assess your own ability. The value of ASC cannot be overstated. How high or low you score on such a scale can have a profound influence on what you choose to do with your professional life. You can think of the academic self-concept as being a pie cut into four slices:

Absolute ASC: performance unrelated to any internal or external reference.

Critical ASC: performance evaluated against an objective measure.

Individual ASC: performance compared to past performance.

Social ASC: individual performance compared to peers.

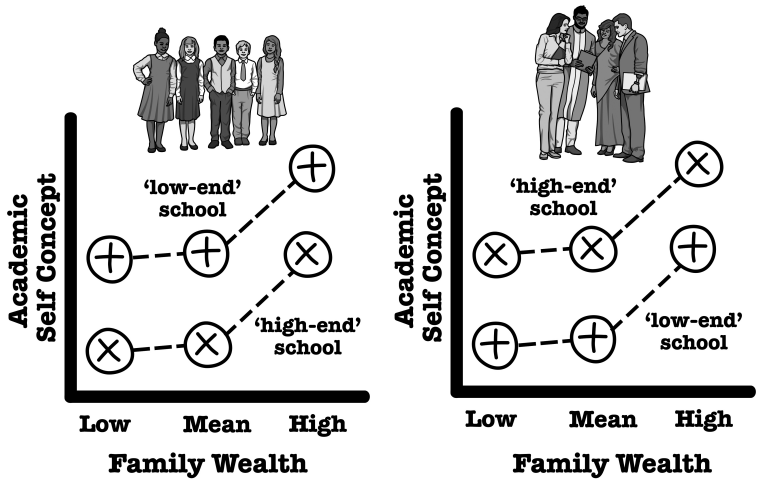
Of all the slices of pie that make up the ASC, the social ASC is the biggest. Marsh found that for every 1 unit increase in average class grade, there was a near equal unit decrease in social ASC.* For the same 1 standard deviation increase in average class grade, the absolute ASC decreased by only 0.2 standard deviations. In other words, a student's propensity to compare their performance to those around them is the surest way to decrease their academic

*I've deliberately avoided talking about this point in the more academically rigorous term of *standard deviation*.

self-concept. The better your class is, the worse you feel, regardless of how well you actually perform.

Marsh's findings get weirder still. You might think that a student from a wealthier background would feel better about their academic ability than a student from a poorer background. The wealthier child would presumably have stable family circumstances, more opportunities for extracurricular academic support, and more opportunity to feel confident in their academic ability than a child of a lower-income household.

But according to Marsh's study, this intuition is false. Kids from the wealthiest households had the *lowest* academic self-concept of all. And whilst the students in the higher-ranked schools felt worse about their ability than students in lower-ranked schools, the *teachers' assessment* of these students gave the opposite trend. When the teachers had to assess the students' academic self-concept, they scored the students from higher status schools as having a higher opinion of their academic ability than students in the lower tier schools. The students and the teachers were assessing academic self-concept through very different lenses. This overall negative correlation between class average performance and a student's own academic self-concept is what is now known as the *Big-Fish–Little-Pond Effect.*



Left: when students report how well they see themselves doing academically, it's worse in seemingly higher ranked schools, regardless of socioeconomic status. Right: when the teachers estimate the same students' academic self-concept, the trend switches, wherein the teachers rank the kids in high-end schools more able than those in low-end schools, again regardless of socioeconomic factors.

A major follow-up study by Marsh in 2003 found evidence for the *Big-Fish–Little-Pond Effect* across 26 countries, with 24 being highly significant.[51] In 2018, a Stanford University study reported the most compelling evidence to date, showing a clear negative causal link between class average grade and an individual's academic self-concept. From the study crossing 33 countries, the *Big Fish Little Pond Effect* was found regardless of social class, subject of study, and gender.[52] The study presents the most definitive evidence to date that, as individuals, competitive academic environments provide a strong driver for self-comparison. And in terms of how you feel about that, it's much better to be a big fish in a little pond than a little fish in a big pond.

It has to leave us wondering:

Do the 'best' schools help us to reach for our highest ambitions,

or do they encourage the type of comparisons that make us pick only the lowest-hanging fruit? Personally, I'm just grateful to have learned about the dark side of social comparison before it was too late…

Part 9 – Summary

In many ways, the story of the Imposter Phenomenon is the story of social comparison. If you've ever felt like an imposter, I'd be willing to bet it is, at least in part, because you have endlessly compared yourself to the best in your business, the big shot a few ranks above you who is famous and showered with fandom. Their success seems so close and yet so far.

When I think back now to that sombre and sunny day before the young superstar academic visited my office, I look again at the comparisons I made on autopilot. I think, now, about what I didn't know then. I think about François Vatel and the perils of overwork in the service of a perfect banquet. I think about Bernard Loiseau and Benoît Violier, haunted by their attainment of a star-branded metric originally designed to sell car tyres; a metric that made them compare often, and stress always. I think about academics like Paul Ehrenfest and Stefan Grimm, haunted by the trappings of academic competition. I think of all the students whose academic self-concept is blighted by the school and college rankings that society perceives to be the cradle of career success. And I think about you, because if you're still with me, you've recognised experiences of comparison in yourself. So hear this.

There are myriad pressures, systems, metrics, and games that would have you – consciously or not – compare yourself to other people. The incentives of the game can make you lose sight of what matters most. You take on the game's definition of success and forget all about your own. You try to tick **their** boxes, not your own.

Feeling like an imposter often arises from people trying desperately to find their unique place in the crowd. You feel like such a rip-off because you have so many opportunities to think of yourself as the small fish swimming into a shark-infested ocean. Stave off imposter experiences by finding your niche. Face uncharted waters.

Don't be the big fish. **Be the only fish**.

Comparisons between ourselves and our peers is unavoidable. From war, from sociology, from psychology, comparison is part of the human condition. Metrics of our classrooms and workplaces can drive these comparisons beyond a means of improving ourselves towards a deranged means of concluding that we are always underqualified. Understanding where a metric comes from, where it was born, can help us take it off the pedestal on which we hopelessly placed it. Whether it's Michelin Stars or paper citations or grade point averages, appreciating the origin stories of why these numbers exist can help take your mind away from the madness of metrics and onto the only game of comparison you can ever win…

Making you *now*…better than you *then*.

Your Chapter Challenges

1. Not everything that can be counted counts. The origins of a metric can reveal their limitations. We've covered Journal Impact Factor and Michelin stars here. Now it's your turn.

What is your version of attaining three Michelin stars or publishing in a journal with a high impact factor? Consider the metrics in play in your own workplace.

If the metric involves a numerical scale, write it out.
Note what 'good' is supposed to look like according to that metric.

Dig into the origins of your chosen metric. Finalise your challenge template by documenting any historical facts about the metric that differ from how it is now used or interpreted.

2. Beware of your environment. You will always compare yourself to those around you. Moving from one stage or place in your career to another is a strong trigger for imposter experiences.

Write down a notable study year or employment transition you've experienced in your career. To be clear, as discussed in regard to the Big-Fish–Little Pond-Effect, the career move in question could be anything from a move from school to university, to moving company, team, or rank.

On an arbitrary scale of 1–5, rate your confidence in your own abilities before and after said study year or career move. A template is available in the accompanying journal resource.

How did the move affect how often you were tempted to compare yourself to others in your work?

Chapter 8: Questioning Your Brain

This content is not available in the sample book. The book can be purchased on Leanpub at http://leanpub.com/notafraud.

Part 1 – The Diary Days

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Part 6 – The Only Person in Your Head

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Part 7 – The Theory of Constructed Emotion

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Part 8 – Summary

This content is not available in the sample book. The book can be purchased on Leanpub at http://leanpub.com/notafraud.

Your Chapter Challenges

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Principle 4 – Don't Let Them Forget the Unlikeliness of Being

Principle 5 – Save Their Work from the Fires of Perfection

Principle 6 – Turn Awful Comparisons into Awe-inspired Action

Principle 7 – Look Out of Other Windows

A Well-timed Phone Call

Acknowledgements

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About the Author

Marc was born and raised in Glasgow, Scotland.

He completed his Masters in Chemistry at the University of Strathclyde in 2011. In 2015, he completed his Carnegie Trust-sponsored PhD in Chemistry at Strathclyde. From 2015-16, Marc was a postdoctoral research associate at the University of Edinburgh. During that time, he was inducted into the SciFinder Future Leaders in Chemistry programme.

In 2016, Marc won the prestigious Leverhulme Trust Early Career Fellowship and rejoined the Department of Pure & Applied Chemistry at Strathclyde from 2017-20. This position was supported by GlaxoSmithKline, and he was thus the first Strathclyde-GSK Early Career Academic. In 2018, Marc was selected to participate in the Scottish Crucible leadership program, the Merck Innovation Cup, and was part of the Converge Challenge Entrepreneurship Competition Top 30. In 2020, Marc became a Lecturer for Innovation in Education at the University of Bristol.

Most recently, Marc was awarded a UKRI Future Leaders Fellowship, joining the Department of Pure & Applied Chemistry at Strathclyde in 2021.

He has held visiting lectureships at the University of Bristol and the Hunter Centre for Entrepreneurship at the University of Strathclyde. In 2021, Marc completed Seth Godin's altMBA.

His research interests include physical organic chemistry, computer vision, virtual reality, process safety, and the psychology of the imposter phenomenon.

He lives with his wife, two kids, and border terrier in 'sunny' Glasgow.

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Marc's main social and correspondance channels are as follows:

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