The Watertight Diet: Exposing the ignored secret to successful weight loss and health

PART II

Dr Harriet A. Carroll, BA, MSc, MRes, PhD

Twitter: @angryhacademic
Facebook: https://www.facebook.com/groups/dontbelievehype
Website: www.dontbelievehype.co.uk
Email: hc12591 [at] my.bristol.ac.uk

PART II: Delving into the details

Part I should have given you good grasp of the idea and science behind the diet and provided you with enough detail and evidence to help you decide whether it is at least worth trying for yourself. Hopefully you have processed the key messages that the health benefits of drinking excess water are unfounded, and that avoiding excess fluid has multiple health benefits. If so, that is great—that is **exactly** the purpose of Part I. However, I must now come clean. The diet laid out in Part I was presented in a way that is *supposed* to be convincing. If you were in any way convinced about any of the claims then I have done a good job. But, in all honesty, the diet outlined in Part I is completely made up. I would not recommend this as a diet, either for health or weight loss. But please let me explain, as continuing reading will hopefully help you avoid following diet and other conspiracy traps in the future. If you believed any of Part I, please do not despair. I used every trick I could think of to convince you that this is a legitimate diet with true health and appetite advantages. And this is the point of the book: I do not want to convince you to do one or another diet, but rather to show how easy it is to make any claim sound evidence-based, even something as outrageous as not drinking fluid.

In this section, I will go through each paragraph of Part I and highlight the tricks I used to sell you my bullshit. Believe it or not, bullshit is a “technical” term, in that this is the terminology sometimes used in scientific papers on people’s beliefs (e.g. Pennycook *et al.*, 2015). According to Frankfurt (2005), bullshit is distinct from lying, in that in order for a lie to be told, the truth must be known (or thought to be known) so that it can be hidden (in that sense, I did lie). Conversely, bullshitting is not predicated on any notion of truth; rather, bullshitters can say anything to suit their purpose. Unlike lying, there may be no intentional deceit in terms of the information given by a bullshitter (Frankfurt, 2005). Equally, I would argue that most perpetuators of bullshit are not bullshitters themselves: they are—to their best knowledge—being honest, in that they have believed the bullshit to be true (I call these people “victims of bullshit” going forward). To be clear: Part I of The Watertight Diet was lies, but I used the same techniques and bullshitters do to convince you it was truth. Do not try The Watertight Diet!

Part III will discuss why this book might make you feel uncomfortable, and why you will probably still believe at least some of the false or misleading claims I made in Part I. I will also provide some tips to help you debunk claims yourself and I will outline some advice about diets as I feel it is unfair to misleadingly get you to read all this with no (legitimate) diet advice. It would be irrational of me to think you will trust the diet advice I give in Part III, but along with some basic research skills, hopefully you will be able to determine if the advice I have given is logical and evidence-based (though I warn you now, it is not very exciting).

Before continuing, I would like to highlight a few important points. Most importantly, the aim here is not to make anyone feel silly for believing a bullshit diet. The aim is to help people understand how convincingly outrageous claims can be made to sound factual. To be honest, I even started to convince myself of some things whilst writing. I hope after reading you will be able to apply these skills to other things, such as diet books, contrarian videos on the internet, or other such information. It is worth noting that anyone can (and probably at some point everyone does) fall for bullshit. There is even a name for this in Nobel Prize winners who frequently seem to peddle bullshit after winning, called Nobel Disease. Even the smartest and most innovative people in the world can be fooled by a well curated narrative.

I am not claiming any superior intelligence but I have believed a lot of bullshit myself, and it took a lot of work and discomfort to undo the strong narratives ingrained in my head. Things I am embarrassed to admit that I have believed include that climate change is a hoax, MSG being incredibly unhealthy, sugar and carbohydrates cause obesity (independent of calories), BigPharma is evil (notwithstanding their many flaws, but that is part of the lure; there is some truth to many claims made), artificial sweeteners are dangerous, the moon landing was a hoax, I even went gluten-free for a bit in my teens, and to be honest I still do not really know what to believe about aliens. Luckily, it does not matter what I believe about aliens, and I have become quite content in knowing that I will never know for sure the absolute truth about many things—this is simply impossible! I am both comfortable with my knowledge, comfortable that I am aware I have some irrational thoughts (aliens!), and comfortable and open with what I am ignorant about (ask anyone who has done a pub quiz with me!).

For some things, believing bullshit claims are irrelevant to everyday life, but for health claims, believing bullshit can be very dangerous (for the record, whilst I do not endorse the Watertight Diet, if you are otherwise healthy, I do not anticipate that it will have caused any harm if you did try it). Lots of alternative therapists cite the number of medicine-related deaths as proof that the medical system is a scam. Yet they fail to provide figures for their own risks. We know how many people died or were injured through medicine. We use these data to improve our methods and to make accurate assessments so patients are fully informed of risks and benefits. I have never seen a homeopathist, acupuncturist, or unqualified nutritionist talk of the risks of their intervention, let alone provide data on how many people were unsuccessful or had side effects. Rather the opposite; I have seen ample cases of harm being portrayed as a "good" response. An example of this is meat consumption causing higher LDL cholesterol (a known risk factor for cardiovascular diseases) (e.g. Bergerson *et al.*, 2019). Yet many proponents of high-meat diets claim publicly that high LDL cholesterol is in fact healthy. Who is keeping track of these health outcomes? Why are these people not publishing their results anywhere reputable?

The entire health bullshit industry is based on something called **survivorship bias**. This is where we hear only of the success stories but not the failures. In the diet and nutrition world, let's face it, who is going to start shouting about all the diets they have tried and failed? Very few people, particularly as failing to lose weight carries immense stigma, sadly. Instead, if you look up *any* diet (fasting, vegan, low carb, keto, paleo, cabbage soup, Soylent, maple syrup…) you will come across an abundance of people who have had great success on this diet. Some of these people subsequently promote that particular diet as *the* diet that *will* help *everyone*. If all, or nearly all, the testimonies you read online about a diet are positive, you will come away thinking that diet is superior. In well controlled research though, we know *any* diet that reduces calorie intake relative to calorie burning is effective, but after around six to 12 months, many people start to regain weight again (for a multitude of reasons, including changes in physiology) (Montesi *et al.*, 2016). To my knowledge, this is consistent with every appropriately tested diet. But online, we only hear about the minority who had long-term success, not the majority who failed and/or had negative side effects.

Throughout Part II, I will be discussing "tricks" that are used to sell bullshit. By tricks, I mean logical fallacies, appealing to biases, and manipulative language. It is important to recognise that just because something is a trick, does not *necessarily* automatically make the content of the statement wrong. For example, I might use my own **survivorship bias** and **anecdote** (i.e. I have never gotten ill from UK tap water) to claim that drinking UK tap water is safe. The statement that "UK tap water is safe" is true, but how I came to that conclusion is not based on good logic or evidence. In saying that, if someone is speaking evidence-based truth, they should not need to use tricks to portray their argument. As such, the use of tricks can be a good indicator of a bullshitter (or someone who truly believes bullshit).

This is complex though, and sometimes wonderful ideas have come from what is technically some form of logical fallacy. For example, Ignaz Semmelweiss, cut infant mortality from about 18 % to less then 2.5 % after introducing a handwashing policy in hospital, before the concept of germs as we know them today was accepted (there is more to this story, but this is good enough for the purpose of an example!). The medical community were not impressed with these recommendations and largely rejected them. Part of their dismay was no doubt the medical profession's own biases, but another part was that there was no obvious reason for this intervention to have worked. In other words Semmelweiss did not create this intervention based on evidence, he just followed a "hunch" of sorts based on what might be considered a rather weak observation from his friend getting stabbed in the eye with a scalpel and dying similarly to the infants.

Equally, John Snow helped mitigate the cholera epidemic by disagreeing with the "bad air" theory of how it spreads (again, this was before modern germ theory was accepted). Snow noticed hotspots of cholera outbreaks were at water pumps and using these data managed to get the water pumps closed. The water from pumps in hotspot areas and clean areas looked the same under the microscope. Neither Semmelweis nor Snow had proper evidence to back up their thinking, and probably today this kind of science would struggle to get funding. On the flipside, many concluded using reasonable logic of the time that the sun orbited Earth, that our own vision showed us everything possible to see (we now know of the electromagnetic spectrum), and that objects are properly solid (we now know they are more than 99 % empty space).

These examples demonstrate, that logic can be fallacious yet the conclusion be correct, whilst equally, your logic can be excellent but the conclusion still be incorrect. It is important to appreciate this, but also important to understand the difference between scientific speculation and bullshit. Even Semmelweis and Snow, whilst lacking a (correct) theory to drive their research, did collect data and did not just make up their ideas on a whim. Perhaps (at least before they had collected their data) we would have thought they are bullshitters if they were around today! For the most part though, true claims (i.e. claims that according to our best current evidence are least likely to be wrong), are generally quite boring, and part of the allure of bullshit is the rather beautiful narrative that surrounds it. It is exciting. But usually in science, if something is exciting it is probably going to disappoint. Even big new theories do not just turn up and change paradigms overnight, we need extensive and rigorous evidence which takes years (rightfully).

So my key message here is that bullshitters do not care for truth; tricks may be used to sell the truth or to sell a lie; logic can be used to sell the truth or to sell a lie; and often scientific discovery is boring, so it is safest to follow the current consensus. It is a consensus for a reason: there is a lot of good evidence to back up the claim(s). More broadly, the key message is that every version of events can be told in many different ways, and often those who have the 'sexiest' narrative will be most successful at getting heard. An example of this is Dr Judy Mikovitz. One version of events is that Mikovitz *was* a legitimate scientist who ended up peddling a failed theory on the cause of chronic fatigue syndrome being a virus. Following that, she stopped publishing scientific papers, and continued promoting her theory along with making erroneous claims regarding the novel coronavirus (such as wearing masks "literally activates your own virus") (Enserink & Cohen, 2020). Alternatively, Mikovitz is portrayed as courageous, truthful, and a victim of the corrupt system (gleaned from online reviews of her book).

As an outsider, we simply cannot know what the truth of Mikovitz' story is (since she was likely bullshitting rather than lying), but both stories are essentially saying the opposite: the former states that Mikovitz is corrupt, the latter states Mikivitz is innocent. And if you dig into both sides of the story, both arguments (at least intuitively) can easily make sense. And it would not be unlikely that both storytellers wholeheartedly believed their version of events.

This leads me onto why I have done this book in the way I have. I am a legitimate nutrition scientist and one frustration pretty much everyone in nutrition has is the ongoing diet wars (and more broadly, most scientists get frustrated with pseudoscience bullshit). What tends to happen in nutrition is a diet book is written, using tricks like the ones I will show you below. The diet book gains a following. Others then critique the book. Cognitive biases then kick in for those who wrote/liked the book and they fail to accept any critique. Those who critique the book are called biased in some way or another. All hell breaks loose and we all hate each other (I am not kidding, nutrition social media gets brutally insulting). It is not productive. Plenty of people spend too much time trying to debunk things and offer nuance into some rather wild claims. But this just fuels the fire.

Debunking also takes a disproportionate amount of time compared to making the claim. This is known as **Brandolini's Law** (though this is not really a law, just a relatable observation). Remember, the bullshitter does not care for the truth. For example, if I say "LDL cholesterol is not unhealthy" (2 seconds to type), the debunker has to search for papers showing the relationship between LDL and health markers. I then say "no, you did not take into account particle size, or that I meant specifically when it increases from low carbohydrate diets" (3 seconds to type). Off the debunker goes looking for exactly that evidence and the cycle goes on. Whatever the debunker finds, the bullshitter (or victim of bullshit) denies or rejects. They may even provide their own evidence, often **anecdotal** like some blood markers they had measured, but occasionally, they do provide a legitimate paper. In my experience, the papers cited often are of low quality or do not actually show what the bullshitter thinks they are showing.

This gets difficult because most people know that randomised controlled trials are a high-quality study design, so they will throw them at the debunker. However, not so many people know that you can have rubbish randomised controlled trials (discussed later in this chapter). But if the debunker then says "well, the study you cited has these flaws", the bullshitter thinks the debunker is being biased and often get rather defensive. I can understand how this looks to the bullshitter since in their head they have provided gold standard evidence, but critiques are usually valid from what I have seen. Rather the problem is the bullshitter has a very superficial understanding of how to critically evaluate a study.

So to avoid having to spend far too long debunking what is already out there (kudos to the many who do this persistently) only to get internet-shouted at, called biased, accused of being overly picky, or a whole host of other slurs debunkers receive, I have created my own bullshit diet. Using this diet, I will show you what I personally did to manipulate you into believing what I wrote. What I write herein may or may not apply to other books, but hopefully you will have built some skills to work it out for yourself. And I think this entire logic can be applied to many things in life, particularly conspiracy or other "fringe" theories you might come across (note: I fully acknowledge many conspiracy theories have turned out to be true, but when assessing claims, it is more likely to be bullshit-peddling if they have used these tricks).

I will not use this section specifically to debunk the claims I made in Part I; after all, I have just sold you a diet based on deliberately misrepresenting evidence, so why would you trust me not to do it again? Rather, I hope the messages you can take from this section will help you decide whether I presented the evidence accurately about the Watertight Diet, as well as any claims you have already or do come across in the future. Sorry again for lying (not bullshitting though!), I hope the following will be interesting and useful, and helps in some way towards finding a diet based on good evidence that works personally for you.

Lastly, in the interest of transparency, and possibly a first in a diet book, I would like to acknowledge my own limitations in writing this section. I am not a language, logic, or bias expert. I am simply portraying what I have observed and researched in the hope to help you identify bullshit. The reasons why I have chosen particular words or phrases may not be exactly correct according to research, or there may not be any research at all on some of the points I make. I am okay with that because I am simply explaining what I was thinking when I wrote the diet, and how I thought my words would trigger people (on average).

I have used tricks I have noticed in nutrition, and pseudoscience/conspiracy theories in general, to sell you a diet, and now I want to un-sell you the diet using logic and reason. If you decide to not read on, please bare in mind that what you have read in Part I was a carefully curated narrative that deliberately skewed the evidence, played into biases, and used multiple logical fallacies to come to erroneous and wild conclusions. As such, I do not advocate, support, or promote anyone trying the Watertight Diet outlined in Part I.

The rest of this section will analyse each paragraph of Part I, explaining the tricks and I have used to lead you into believing a false narrative.

Contents

2.0(a) Title

The tricks start in the title: “The Watertight Diet: Exposing the ignored secret to successful weight loss and health”. So let’s break this down a bit. Some of this might seem rather picky, but small and subtle tricks all add up together to create a story; in isolation they may not matter, but added together, they are greater than the sum of their parts. Additionally, people respond more strongly to certain things, so maybe some of this is excessive *for you*, but to others, those same bits have quite an impact.

We will start with the first word: “The”. Using “the” implies this diet is unique, and therefore ultimate; it is not “a” diet, one of many, but *the* diet. “Watertight” obviously bears relation to the diet with the reference to water, so superficially it might seem like a reasonable name. But “watertight” has associations with being reliable and sturdy. You would probably not want to trust a diet book that sounded unreliable. “Exposing” feeds into **conspiratorial thinking**. I do not know if there is a proper name for this, so I will explain what I mean as this is a trick I use throughout the diet.

When I use the term **conspiratorial thinking**, I mean language that has been used to lure the reader away from convention, and towards ideas that there is a conspiracy. In this case a cover up of the science behind water restriction to encourage us to drink more water, which is of course funded by drinks companies. Using a term like “exposing” gives the impression that there is a cover-up going on, and more subtly makes me as the author appear to the brave hero risking their reputation to uncover this hidden truth (this theme will come out more strongly as the book goes on).

Following this, “the ignored” again utilises “the” which acts to give the impression of one truth. We saw above with Dr Judy Mikowitz that the truth can come in many versions; as such, ensuring people believe my version is *the* truth (rather than *a* truth) increases confidence and trust in my story. The use of “ignored” adds intrigue and piques the potential readers’ curiosity. No one wants to be ignorant, so people get lured into the book. “Ignored” also sets the book up for some **conspiracy** and going against the grain, making the reader really want this unique knowledge. “Hidden” is another word that is often used; in this case I chose “ignored” because it fitted better with the narrative I created in the book.

I then pull out the big gun: “secret”. Secrets are, by their very nature, tempting. But this is not just any secret, this is *The Ignored Secret* (come to think of it, that is kind of an **contradiction**, but in a way that is all the more tempting). You will see that contradictions come up a lot in this book, as that is generally the case for bullshit ideas; people who are prone to believing conspiracy can simultaneously hold two opposing views that cannot be simultaneously true (Wood *et al.*, 2012). Again, this adds to the controversial tone of the book and for some people, controversy is attractive. Having details of a secret is by proxy an **unfalsifiable** statement; there is no way to disprove me here. In science, claims have to be falsifiable. In other words, others should be able to test your claim and in theory be able to show it to be wrong. An unfalsifiable claim is one that cannot be disproven, for example Professor Richard Dawkins’ infamous flying spaghetti monster cannot be proven nor disproven. Unfalsifiable claims are often used in bullshit theories (coupled with science-y sounding **jargon** to sound legitimate).

Equally, I feel that some of this is an **ego** thing. There is nothing wrong with that, we all have an ego, and we all enjoy it getting stroked at times; luring book titles can really play into this desire to have unique or special knowledge. So much in our life is out of our control, so things that offer you hope of finding some control (with relative ease, why get a PhD when you can just read a book and know the secrets?) are tempting. This kind of thinking defers any blame from yourself too (Abalakina-Paap *et al*., 1999). For example, if you want to diet to improve your health, thinking the reason for your poor health is because of a cover-up may reduce your guilt or self-blame.

I want to qualify this with something though: there is ample evidence that our life is dictated by external forces. On a simple level, if only water is available to drink, then I cannot decide to drink a sugary drink. On a more complex level, we have genes that predispose us to liking certain flavours, nudges (like advertising) which tempt us towards products, busy jobs which might make cooking difficult, and economic factors like having to choose less healthy food in order to afford rent. All of these factors, and more, can also interact to amplify effects. I do not want people to blame themselves if they think they are unhealthy, nor do I want to pretend that health is a simple fix for everyone (which often diet books proclaim or at least infer). Rather, we can be aware of these factors and work out ways that work for ourselves to mitigate their influence as best as possible, whilst being realistic. Regardless of this though, many people will blame themselves, and offering a cover-up of any kind may help to reduce these feelings.

In the case of a diet book, the element of control is twofold. Firstly, you can take control of your health, and secondly you can take control by knowing *the* secret others do not know. This is very empowering, and thus in my view it potentially boosts the **ego**. I wish more people knew that following evidence can be equally as empowering.

In line with the above is the subsequent word in the title: “successful”. This part of the title **primes** you that this book *will* help you succeed in your weight loss journey. Again, this is very empowering language. This might in part also add to a placebo effect, i.e. that you will be successful in part just because you believe you will be successful. I end with “weight loss and health”—not just weight loss, and not just health, my diet is so good it will help both. This gives my book an edge over other books who might make a simpler claim. To give all this some perspective, if I was truly honest with this as a diet, my title might read something like “The No Drinking Fluid Diet: One of many ideas that might help you improve your health”. That sounds weak, uncertain, and probably not very tempting (who wants to not drink fluid?).

Now I am obviously analysing the title to people who did find it luring enough to read the content. For many, this will not be a tempting title and they will not get to read my rather extensive discourse analysis (yes, I really did systematically deliberate over each word!). But most book titles (good or bad, though I think it is less subtle in true bullshit books) will be playing on something to lure their reader in, usually some form of intrigue. For example:

- “Good Calories, Bad Calories: Fats, Carbs, and the Controversial Science of Diet and Health” by Gary Taubes might make you think “what have I missed, have I been eating bad calories?”, plus planting some **conspiracy** in there stating that this is “controversial”. If we were being honest, the title might be “Low Carbohydrate Dieting: A journalists’ perspective”
- “Big Fat Surprise: Why Butter, Meat and Cheese Belong in a Healthy Diet” by Nina Teicholz infers that Teicholz has a surprise (intriguing) about delicious foods you have been duped to believe are unhealthy (since you do not want to be ignorant, this plays into your **ego** to want to know what the surprise is and why you can eat butter guilt-free). If we were being honest, this could also be called “Low Carbohydrate Dieting: A journalists’ perspective” (this is very unexciting as you can see!)

- "The Obesity Code: Unlocking the secrets of weight loss" by Dr Jason Fung pretty much uses the formula I outlined above to a tee. The use of "code" additionally makes the book sound formulaic and scientific, whilst also making obesity easy to beat, using his "code". This book could more accurately be called "Don't eat for long periods of time and lose weight"
- "Fat Loss Forever: How to Lose Fat and Keep It Off" by Peter Baker and Dr Layne Norton is much more to the point, but the intrigue comes from the thing the other titles I have analysed have ignored: that this book has the secret to *maintaining* weight loss, and importantly, maintaining this weight loss *forever*. This book may more accurately be called "Evidence-based long-term weight loss". You can see with this example why a bit of sexing up is not necessarily a bad thing!

You might note that none of the book titles actually promise you personally anything. The book titles just state that they have information they want to share. Baker and Norton's title is the closest to promising anything; their title is a "how to" which infers some instructions you can follow. In a way, Norton's title is like flatpack furniture instructions: no frills, nothing exciting, no guarantees, just instructions outlined. I therefore think it is the most honest, but also the least intriguing of all the titles. Perhaps unsurprisingly, Baker and Norton's book is the least controversial (not at all controversial as far as I am aware).

But the tricks around the title of the diet do not stop there. I use this space to emphasise my credentials, by (a) using my "Dr" title, and (b) stating all my degrees. Grammatically, you should either state your degrees, *or* use your title; there is no need to put both (Bureau de la Traduction, 2020). But in this case, the "Dr" title adds trust, people trust doctors and often associated "Dr" with a medical doctor. Showing I have four degrees adds credibility that I am a scientist who knows their stuff. Therefore, I use both to simultaneously add trust and credibility. Stating degrees can in itself be misleading—my BA was in Martial Arts and Sports Psychology. In other words that bears little relation to my credentials on writing a diet book. Others have written diet books outwith their area of expertise, but still put their (irrelevant) qualifications to increase their credibility. The irony here is of course not lost. I have tapped into **conspiratorial thinking** to lure you in, but used my rather conventional credentials to make you trust me.

This is another common **contradiction** I have come across. Many bullshitters/victims of bullshit (and conspiracy theorists) will peddle anti-science and fuel mistrust in the scientific establishment. Simultaneously however, they will cite any scientific paper that supports their views, and will hold anyone with legitimate scientific credentials who supports the conspiracy on a pedestal. Tactically, I can see why this is done—if *legitimate* science/scientists are saying this, then [insert theory] has some credibility. This might seduce some people who would otherwise be sceptical. On the whole though, I do not think this is a thought-out tactic; rather my perception is that it provides **confirmation** of our belief. This relates to **confirmation bias** which is the tendency to find, interpret, and/or remember things that support our own view.

I will talk more about scientific evidence later in the section, but I do want to emphasise that finding the odd (few) study(ies) that support your view is not how evidence works. If your car broke down and you took it to 100 mechanics, and 97 of them said you need a new clutch, whilst 1 said a new gearbox, another said a new clutch pedal, and the last said a new airflow metre, who would you believe? When building evidence, we do not cling to the odd-ones-out. We see what is going on overall (that's a simplification but hopefully you get the gist). So it might seem silly to have used my credentials to make you trust a conspiracy, but this does legitimately happen quite frequently (see Mikowitz above for example).

Finally, research has shown that the more middle initials someone displays, the more knowledgeable they are perceived (van Tilburg & Igou, 2014). I have applied that finding here, just in case it helps my cause, and included my middle initial. Really, "Harriet Carroll, PhD" would have told you all you needed to know.

To finish this section, I want to add that I was writing a diet title to be deliberately tempting. I do not anticipate that most authors of similar books spend this much time analysing each word (maybe they do!). Rather such titles come naturally because authors are excellent communicators, and bullshitters are wonderful story tellers. This stuff comes naturally to them.

2.0(b) Introduction

The rest of this section will have the sentence/paragraph from Part I in *italics* followed by an analysis of the trick(s) used underneath. Please note that I spent a lot of time deliberating on how to refer to you, the reader. I initially did not want to make this personal, so opted for "the reader". However, on drafting, I decided that Part I has (possibly) deceived you and as such I need the messages in Part II and III to not be "third partied", i.e. you need to know they at least *could* apply to you. Of course, maybe Part I did not convince you or some of the tricks I raise below do not apply to you (remember you might be tricking yourself with biases to think you were not tricked—discussed in Part III).

I think we can all agree: nutrition science is a mess. It seems every day nutrition scientists, medical professionals, and dietitians have "discovered" the opposite of what they "discovered" the day before.

I have started the book by appealing to frustrations many people feel about nutrition science—its apparent inconsistencies (which, I should add, are primarily caused by the conflicting messages put to the public, not the science itself; Marton *et al.*, 2020). Thus I have appealed to two fallacies. Firstly, an **appeal to emotion**. This is where an argument taps into any emotion you may feel about a topic. Such emotion can supersede rational thought and therefore reduce your standard for evidence. Secondly, I have used an **inflation of conflict fallacy**. In this case, I have put forth the idea that because there is conflict in the field of nutrition science, conclusions cannot be made and the field itself is questionable. This is fallacious because if we knew everything about a topic, there would be no need to continue researching it. This may also fall under being a form of **Bulverism**; essentially planting the assumption that experts (except me) are wrong, and me explaining (later in the book) why they are wrong (according to me).

The framing of "I think we can all agree" also sets me apart from other nutrition scientists (and puts me on your "team") who I want to make out to be biased to increase your trust in me. The benefit of this is that if any of the other scientists refute my claims, your own cognitive biases (**primed** by the language I use throughout the book; discussed in Part III) will kick in and you will easily be able to ignore/deflect what they say because "they are biased" (more **Bulverism**). Stating "nutrition science is a mess" is a **false premise fallacy**. This means I am setting up my entire idea on something that is not really true (most of the true scientific debate in nutrition science is about nuance). Furthermore, I have provided no evidence for any of my statements, which is known as **ipse dixit** (or **assertion without proof**).

So in my first two sentences, I have used at least four tricks to help set the tone for the rest of the book. For clarity, nutrition science is complex so can appear to be messy, but really those ideas primarily stem from the media being poor at reporting our research well in my opinion.

Complex biological systems are broken down into snappy soundbites that lose all nuance. This is a **contradictory** statement since the book is then about how a single nutrient (snappy soundbite) can do wonders for your health and appetite (lacks nuance). However, by making this statement, it gives the impression that I am aware of this problem, and therefore I am immune to it. Ergo, my word is more trustworthy.

All good misleading narratives have a **hint of truth** in them somewhere, and diet books do indeed often mix evidenced claims with unsubstantiated claims; e.g. Goff *et al.*, 2006). Here, the hint of truth is that both the media and health professionals do indeed simplify complex biological systems, but for good reason: saying "your hypertonicity-induced elevation of AVP concentrations has increased aquaporin 2 transcription and insertion into renal apical membranes of the collecting tubule" seems rather unnecessarily complex, when we could just say "you are dehydrated which has caused you to wee less". Simplifying things is not necessarily a problem; simplifying things inaccurately is. This relates to a wider problem with science communication: scientists are incredibly specialised, but our research needs to get portrayed to the public. This inevitably means we have to simplify things, losing details and nuance along the way. Those who communicate science well make their work easy to understand for most people, but because it has been simplified, people come away thinking they understand it (potentially resulting in a **beginner's bubble of overconfidence** [Sanchez & Dunning, 2018], where people who know a little about a topic, say from reading a book, overestimate the reliability of their judgements; similarly, it may fuel an **illusory superiority**, where people overestimate their own abilities).

For example, often, as with Part I, you may frequently hear about blood sugar regulation. This sounds quite simple. But this can be measured in loads of ways, and depending on how it is measured and the circumstances in which it is measured, it can mean vastly different things. To give a taster, blood sugar regulation can be measured by overnight fasted blood sample, a random blood sample, a single or several post-eating blood sample(s), continuous glucose monitoring, or a hyperinsulinaemic-euglycaemic clamp. Within this, measures can mean different things if the samples were taken from a capillary (usually a finger prick), a vein, an arterialised vein, or interstitial tissue (which is what continuous glucose monitoring does), or back of hand *versus* the arm. Depending on what you measure, you may also get different values if you look at whole blood *versus* plasma/serum.

Once you have your blood sample/s, you can then look at various different markers, such as the amount of sugar in the sample, a marker of sugar in the blood such as glycated haemoglobin (HbA1c), and/or a hormone known to regulate blood sugar (usually insulin). Then you need to interpret these values. Some are much more simple than others: a simple fasted plasma glucose measure is easy for example, but measuring a post-meal response gets more complicated. If you want to compare your blood sugar response to a test meal *versus* a control meal over two hours, you end up with three comparisons: (i) do the two meals cause different blood sugar values at each time point; (ii) do the two meals cause a different response (trend) over time; (iii) are the time trends different according to which meal was eaten (known as a treatment x time interaction).

On top of that, sometimes lines on a graph can be tricky to interpret; maybe your intervention leads to higher blood sugar at some time points, but lower blood sugar at other time points, so how do you know if it is better than your control meal? To do that, you can calculate the area under the curve, or the incremental area under the curve; both suit different purposes. You might also want to know whether your blood sugar measures compare to your physiological response to the blood sugar. This is usually done by looking at your blood sugar relative to your insulin. So if your blood sugar is low, but your insulin is high, it might indicate that your cells are not particularly responsive to insulin. There are several different ways to measure this too (e.g. Matsuda Index, Insulin Sensitivity Index), all with pros and cons depending on your aim. I could go on, even this is a simplification of how we can measure blood sugar regulation.

That might have been interesting to read for some of you on this occasion, but imagine every time you read an article on a website and the authors described all of the different ways they analysed the data like that. I think most people would switch off or not follow, so saying "overall X had no effect/an effect on blood sugar" is much easier. But the impression this gives to readers is that it is a simple thing to measure and interpret. Of course, that level of detail is not necessary, nor is it accessible, so I am not advocating that scientists stop communicating their findings in a friendly way. Rather, I am advocating for non-scientists to appreciate that what they read in the media (including diet books), even if it is perfectly accurate, always gives an incomplete picture. And that simple finding that the scientist has made clear for you to understand is often a vastly reduced version of the work.

I am a nutrition scientist in the early stages of my career; I have published many nutrition papers using different methodologies to understand my specialty: the effects of hydration on appetite and metabolic health. I remember starting out on this journey being very confused about the state of nutrition science and what an optimal diet for health is. I also believed some very questionable dietary practices. Since you have started reading this diet, I imagine you might be confused too. I have spent my entire adult life sifting through thousands of research papers to understand my own personal interest. I did not anticipate nor plan for my research ideas to hold so many answers, and I am excited to share my insights with you. I cannot promise this book will have all the answers, but I hope I offer a unique perspective to help your weight loss and health journey.

I then introduce myself to you, and in doing so I set you up to make an **appeal to authority fallacy** if you ever discuss this diet with people. There is a fine line between **appeal to authority** and a legitimate deferral to experts (Fallacy Man [2015] over at the blog The Logic of Science explains this difference very nicely; see the reference list for the link). I am setting the reader up to make the fallacy because I am proposing something that goes against the current consensus, and my credentials are being used as a means to back up my claims. Generally speaking, if my claims were authoritative, the consensus would agree. Why would you trust me, a single scientist, over the majority of other scientists in the field?

I continue describing my journey. Indirectly, I was aiming to **appeal to emotion**, in that you can probably empathise with things like me being "very confused about…what an optimal diet for health is". This supports the initial **prime** I gave you right at the beginning. You will see key tricks be used repeatedly throughout the book; on their own they are pretty ineffective, but when they are used many times and woven into the story, they create the tone and spin that I (as the author) want. Along with the end of the paragraph where I am offering you hope (perhaps linked back to **conspiratorial thinking**) I am starting to create a narrative that we are on the same team (i.e. **in-group bias**). I am framing myself as helpful, honest, knowledgeable, trustworthy and one of the good-guys going against a system which is inherently bad. This discourse is reinforced throughout Part I.

The last sentence also gives the illusion of balance ("I cannot promise this book will have all the answers"). To be honest, I do not see this level of honesty in much bullshit; usually claims cure everything with zero side effects. But I included this as I wanted a "trust me" theme which I think this supports by making me sound genuine: I am not making guarantees, but I am doing everything I can to help you. If you want to delve deeper analytically, this sentence also gets me off the hook if the diet does not work out; after all, I did not actually make you any promises.

It is worth commenting on how I frame this paragraph too. I speak of a (fictional) journey of mine as somewhat of a surprise; this is almost a necessary function of bullshit. No one will admit that they are writing a book deliberately to con you. No doubt, many people actually believe their own bullshit, so maybe they are telling you the truth (according to them). Why does their story matter? I do not know if there is a name for this, but having some kind of story where you "switched" sides makes you ever more believable that you have now found truth. For example, if you have two friends, Bill and Ben. Bill has been vegan for as long as you have known him and always feels great "because of his diet". Ben is an avid meat eater, three meaty meals a day if he can. For a bet, Ben goes vegan for a month. He then says he feels great and plans to stay mostly animal-product free. Whose story is most convincing to make you think a vegan diet will make you feel good? I would guess Ben's story, despite both of them being equally valid. So I do not know what the name of this is, but telling a transformational journey for some reason makes my entire narrative seem that bit more believable. Stories like this though are superfluous, unnecessary, and distracting; thus can be a sign of bullshit.

Before starting, I think we need to discuss some honest truths about nutrition science. I say this as someone who has invested my entire adult life in the system; I have gotten into tens of thousands of pounds in debt to fund my four degrees, have won over £100,000 of research funding from government, industry, and philanthropists, have been invited to attend and speak at conferences, and have had the joy of discovering some physiology myself. So I understand how the system works, both the good and the bad.

This paragraph mimics quite a lot of bullshitters, with the key theme emphasising them as a **victim** of the system; in this case I have "invested my entire adults life in the system" and gotten into "tens of thousands of pounds of debt". Ultimately, this is another **appeal to emotion**. However, I have made this emotional appeal quite subtle as it is disguised in seeming like I am simply reiterating my credentials and dedication (**appeal to authority**). This further builds on the **conspiratorial** ideas I planted earlier. All of these small statements are adding up to build me up as a bastion of truth after falling victim to the evils of the system. If you think this is an exaggeration, I encourage you to trawl key controversial figures (especially those with legitimate credentials) in the nutrition world and read their narratives.

The biggest problem in nutrition science is conflicts of interest.

This is an unevidenced statement (**ipse dixit**). How do we know this is the *biggest* problem? What about lack of funding, or the skew towards white middle-class male participants in studies, or poor study design? What does “biggest problem” even mean?

This is where supposedly independent scientists have an agenda and/or are funded by those with an agenda, and unsurprisingly find whatever favours this agenda.

Here I have used a **circumstantial *argumentum ad hominem* fallacy**. This is where you attack others based specifically on their circumstance, in this case their positions as scientists who received grants to do research (the fallacy being that you avoid the actual issue at hand). More subtly, I have reiterated previous “trust me” statements, by framing others negatively (“supposedly independent”) and claiming their research to be untrue because of their circumstance (“unsurprisingly find whatever favours their agenda”). The term “agenda” reiterates a division between us and the system (**conspiratorial thinking**). This claim also lacks any evidence (**ipse dixit**) but is a claim many people believe because probably intuitively it seems right. It is also a **contradiction** since I have just declared that I have received industry funding; how do you know I am not being paid off to discredit others?

Just for clarity, the role of industry funding in nutrition research is not particularly clear: some evidence shows no effect (e.g. Chartres *et al.*, 2016, 2019; Mishali *et al.*, 2019), whilst others show industry funded research to be more likely to find favourable results (e.g. Lesser *et al.*, 2007). Equally, even this story is not that simple. For example, companies may be more selective with the ideas they test so will choose the ideas they think will most likely give them strong results. Alternatively, some evidence even suggests that industry-funded nutrition research has a higher quality of reporting their research which helps to reduce bias (Thomas *et al.*, 2008) (it is worth noting that more recently study reporting guidelines have been better enforced so now industry and non-industry funded research seem roughly on par; Kaiser *et al.*, 2012). The point is that even simple claims like “industry = biased” should not be taken at face value.

We then get left with lots of positive findings; this is called publication bias and I published a paper on this in 2017, showing overall scientists thought it was too much effort to change anything in the system to prevent such a bias (Carroll et al., 2017).

You might be reading so far thinking that I have highlighted story telling, and maybe it has been misleading but people are not going to read uninteresting diets and books, so maybe a bit of story-telling is ok. This sentence is where things start to get sordid. I cite a paper I wrote about publication bias; I do this to show that I am an authority to be trusted on this too (**appeal to (my) authority**). This was a fun paragraph to write because it is all **half-truths**.

Publication bias is a real thing, but there are many causes of it (you can actually read my paper on it which explains some sources of bias; Carroll *et al.*, 2017). My description of the findings is somewhat **hyperbolic** though, but more importantly is how I have presented the research itself. In the context of the rest of the paragraph, it sounds like I researched industry funding and publication bias. Actually, I just researched perceived barriers to changing the publication system to reduce publication bias, i.e. I have **misrepresented (my own!) evidence**. Misrepresenting evidence is ethically unacceptable, but many diet books and bullshit theories seem to do it a lot in my experience. One has to question the motive behind systematically/deliberately **misrepresenting evidence**. (Of course, as discussed above, people may do this as they are victims of bullshit too.) At this point, the book goes from misleading story telling, to manipulative and agenda-driven.

My own nutrition research has found results going against my funders' ideologies, and as such I have gained a contrarian reputation and struggle to get others to take my work seriously. I have lived and experienced these problems, and understand them better than most. That is why I am so motivated to help.

Once again, I paint myself as a **victim of the system** because I do not conform. This reiterates **conspiratorial thinking**, uses **appeal to emotion**, and reaffirms my **authority**. No doubt, you can see patterns here. This is deliberate, and links to **proof by assertion**. **Proof by assertion** is when a claim is repeated over and over again, even when it is countered with evidence, until it becomes "true". Each time I am adding to the story and building a picture to ensure you believe me and you see me as part of your **in-group** and other scientists in your **out-group**.

For the record, my studies usually show nothing (null results), including my industry funded studies. You will have to ask my colleagues but I think I have genuinely gained a bit of a contrarian reputation, but equally fully appreciate that my research is one piece of a complex puzzle; if we are going to flip our consensus understanding, we should not do that based on just my few studies alone. Hopefully that clarification will help put future claims you see from contrarian scientists into perspective.

Colleagues I have worked with generally seem oblivious to these problems or are adamant they are not biased.

I have again attacked and discredited my colleagues (***argumentum ad hominem***) based on no evidence (**ipse dixit**). Such language further cements **in-group out-group** ideas, including that others cannot be trusted (**conspiratorial thinking**).

The result of this (and much more) is that we end up towing a particular line, and anyone who goes against the grain is disparaged or labelled "quack". These same scientists will cry "ad hominem" attack towards anyone who highlights their own bias to them. We end up with an homogeneous groupthink, and this has caused many of our problems in nutrition science.

Hopefully you are starting to recognise some of the tricks now and you can see how this feeds **conspiratorial thinking**, emphasises me as a **victim of the system** though this time I am subtly introducing the idea that I am a brave hero for speaking out against the system, and I have of course provided no evidence for my assertions (**ipse dixit**).

Re-read the last few sentences copied from Part I: you will notice that I have not actually said anything of substance, yet they read so convincingly.

The particular line we tow, of course, is the dietary guidelines which are touted by public health authorities to offer a well-balanced diet, optimal for health. These guidelines however, have coincided with the rise in obesity and other related diseases such as type 2 diabetes.

This fallacy is known as **cum hoc ergo propter hoc**, or more commonly, that correlation does not necessarily equal causation. Additionally, I have not provided evidence for my statement (**ipse dixit**). Nearly every bullshit diet book I am aware of makes this or very similar claim, boiling down to blaming the dietary guidelines, so I followed suit. To give you something to consider in case you come across this claim, people are not very good at following the dietary guidelines. So that would suggest *not* following the guidelines causes obesity, or simply *having* guidelines available causes obesity (the latter seems less likely of course).

I have framed the guidelines as a “line we tow”, which has undertones that we as experts are being forced somehow to promote these. This also sets up a **false premise** for me to base the rest of my story on. For clarification, nutrition scientists are not attached to the guidelines, either by force or by emotion.

A relatively recent addition to the dietary guidelines in Europe and the US is an explicit recommendation to drink water. It is entirely unclear why this recommendation has been included. It is based on virtually no evidence of health or appetite benefit, and was a decision predicated on the vast industry support for the dietary guidelines. For example, Public Health England (n.d.) have partnerships with Britvic and Danone—both are large corporate drinks producers.

Is there any evidence that the guidelines were in fact <u>influenced</u> by industry (**ipse dixit**)? Additionally, does industry partnership equal industry influence (**cum hoc ergo propter hoc**)? This is spin fuelling **conspiratorial thinking**. Sure these companies want to sell their product, but does that necessarily mean that their products do NOT have health benefits? Even if the claim is true, the logic in which I have formed my conclusion is not sufficient to take notice of.

As we have seen over the last few decades with how wrong the dietary guidelines were about dietary fat, it seems we may be heading in the same direction with the inclusion of drinking water into the guidelines. In other words, including water intake recommendations in the guidelines does not just seem benign, but likely harmful. The following sections will highlight why this might be, and how you can utilise the power of water, or rather, the lack of water, to improve your health and reduce your appetite safely and effectively.

It is quite unfair to say we were “wrong” about the guidelines without defining what “wrong” means, or providing any evidence (**ipse dixit**). At the time, the guidelines were based on our best evidence; I personally am happy that they have evolved over the last 50 odd years as it means they are being updated with new evidence. I have then used **false equivalence** (this basically means comparing apples to oranges; comparing two incomparable things) to claim that whatever I think was wrong with the dietary fat guidelines when they came out, is now wrong with dietary water guidelines. That is a lot of speculation without any evidence (admittedly I do go into the water evidence below). I finish with strong words like “power” to emphasise that this diet is brilliant, and I am on your side (**in-group bias**). This final paragraph I think wraps up nicely the **conspiratorial thinking** I have been building helped with some **hyperbole** to end on.

To sum this section, throughout the Introduction, I framed myself as a victim of the system, I have framed others as part of this system and oblivious to their own bias, and described that this system is corrupt. Simultaneously, I have built up myself as a bastion of truth, honesty, and on your side. To do this, I set up false premises, misrepresented research, made many claims without evidence, claimed causal relations from correlations, and defamed my colleagues and other scientists. As **Brandolini’s Law** predicts, it took me a whole lot more time to write this section than it did the original section.

2.0(c) All things water

Water is undoubtedly one of, if not the, most fascinating molecule on the planet; it is truly an honour to research it as a career. This simple molecule seems to be the unifying nutrient for all life on Earth (yes, there is even life that does not require oxygen!).

I start this section enthusiastically but with two essentially meaningless sentences. The aim here is to pique your interest about water—something most of us rarely properly think about—and make you think "I had never thought about that before". This helps draw you into this chapter. The framing here also places water as the number one nutrient, trumping other nutrients which you may have heard about for health. Of course, this is another **contradiction** (potentially); framing water as so fascinating, essential for life, but downplaying its role in health. Admittedly, this analysis is potentially a **slippery slope fallacy** of sorts in that water does not need to be consumed in excess in order to be essential. Critiquing things is not always a clear-cut process, hence why things get confusing!

You might think that such an important nutrient would be extensively studied; this is not an unreasonable expectation, but is a far cry from reality. When I started researching water during my MSc in 2012-13, I was quite shocked at how little we really knew in terms of hydration and health in everyday life. At the lack of evidence, and because water is so essential, it has been assumed that consuming more than is needed to maintain life is necessary to optimise health. This assumption is based on both scarce and somewhat dubious evidence though.

As with any good conspiracy theory, there is a **hint of truth** to this paragraph; there is discussion in the hydration and health field as to whether consciously drinking a bit more each day could have health benefits (studies typically range from 0.5-1.5 litre extra water per day), and indeed, there is not as much hydration and health evidence as most people think (though interest in the last decade has skyrocketed to be fair). The **hint of truth** shrouded by misinformation adds credence to my arguments as you can look some things up and they will be confirmed; if they are not, then you do not want to seem silly so you will be able to justify why you could not find what I said. This fuels **conspiratorial thinking** as things then become a "cover-up" rather than me bullshitting.

I invite you now to think carefully about the paragraph within the wider context of the diet so far, as I have made a glaring **contradiction**: that there is not that much research, yet I have the answers. How can both these statements be true? <u>If there is not enough evidence for the health effects of drinking more than needed, then we cannot know how drinking more fairs against drinking less. If there are not enough data (or the data are being hidden, so we do not know what they say), the only honest response is that we do not know yet.</u> If you do not take anything else away from this book, please remember this paragraph, because pretty much every fad diet and many conspiracy theories use this trick.

Before delving into the science of all this, it is important to define some terms. Throughout this book, I will refer to water, but within that I mean any fluid (so, for example, milk) as these fluids are nearly entirely water. Even caffeinated and alcoholic beverages are mostly water, so unless otherwise specified, when I talk about "consuming water", I also mean things like coffee and beer. It is also probably worth mentioning the difference between dehydration and hypohydration: dehydration is a process of losing water, whereas hypohydration is a state of having less body water (broadly: hypo *meaning too little or under;* hydration *meaning water). So you could be well-hydrated at the moment, but just by existing, you will be losing body* *water (through sweating, breathing, and urine production) so you are dehydrating. Equally, you could be hypohydrated (e.g. after a hard gym session), but not dehydrating because you are now drinking more fluids than you are losing. However, dehydration is a more intuitive term than hypohydration so I will use dehydration throughout.*

This paragraph is not really designed to help you understand anything about the diet. Quite often, people who do not understand a topic will overcompensate by going into excessive details on the things they do properly understand; I have seen ample explanations from diet gurus and other bullshitters that are simply incorrect, but they write with absolute confidence using technical **jargon** so people believe it. At no point in this book is it "important" to know the difference between dehydration and hypohydration; emphasised by the fact I say that for ease I will use "dehydration" instead.

The added benefit here is that as a reader, you feel like you have learnt some science-y sounding terminology. This can be one of those definitions you store and can correct your friends on in the pub and therefore perhaps feed your **ego** a little bit, as discussed earlier. That gives you a false sense of confidence about your knowledge and could start to trigger **illusory superiority** and **overconfidence**. These link to the well-known **Dunning-Kruger effect** where people overestimate their ability. In other words, this means that no matter how much we objectively know about a topic, we all *perceive* ourselves as knowing about the same on a topic (though this effect may not be as robust as we thought). In the context of this diet, congrats, you now know some hydration words! In more sinister cases, we can see this pan out when people will adamantly argue with legitimate specialists. The person arguing with the specialist may think their competence in the topic are equivalent. You can see why this might cause problems. But do not get cocky, because we probably all fall for this at some point, and we simply do not know.

*The flipside of this is hyperhydration which is too much (*hyper*) water (*hydration*) (again, for ease, I will call this overhydration), often accompanied by hyponatraemia (too little,* natrium *meaning sodium, and* aemia *meaning blood; thus too little sodium in the blood). We will discuss this more later, but for now you might be asking "too much or too little water compared to what?" This is an excellent question which seems simple but as yet no one quite agrees. When someone is in perfect water balance, so they are losing the same amount of water as they are gaining, we call this euhydration. But defining euhydration is nigh on impossible as it lies on a wide spectrum. This, in part, is where some confusion in hydration and health becomes apparent.*

This paragraph uses the same tricks as the previous paragraph, but additionally includes an **inflation of conflict fallacy**, highlighting that there is a term that scientists in the field struggle to define perfectly. This leaves you as the reader thinking "these so-called experts cannot even define what is an obvious term, how can I trust anything else they say". Subtly this helps me build trust with you, since I am the one exposing this truth (**conspiratorial thinking**). Really though, euhydration is well defined in theory (i.e. perfect water balance), but this definition is not very practical so we cannot really apply it in the real world. I think a lot of people have a perception that science is always clean-cut, black-and-white, but most of it is grey areas and all of it is based on uncertainties and probabilities of being wrong. So if you come across something inferring that "scientists cannot agree", firstly ask whether that is in fact true; secondly ask whether they might be disagreeing for a valid reason; and thirdly ask whether you are actually suitably qualified to be asking/answering those questions.

To help explain the confusion, we need to delve into some hydration physiology. When you stop drinking, your blood osmolality increases. High osmolality is a fancy way of saying your blood is more concentrated (so I will call this "blood concentration" going forward). You can think of this like a drinking squash: if you add loads of water to your squash, it becomes very dilute; this is your well-hydrated blood. If you don't add very much water to your squash, it is very concentrated; this is your dehydrated blood. High osmolality (more concentrated blood) gets detected by special cells in the brain called magnocellular neurons leading to lots of physiological changes, such as causing a hormone called arginine vasopressin (AVP, also known as antidiuretic hormone or ADH) to increase. When AVP is high, it tells the kidneys to reabsorb water. That means it tells the kidneys to keep water in the body rather than letting it be excreted in urine. This is why when you are dehydrated, your urine gets darker—it is simply that AVP is telling your kidneys to not waste water through urination, so all the other things your kidneys excrete become more concentrated.

Once again, these are the same tricks as above. Some of these terms, like osmolality and kidney reabsorption will be useful to know, but magnocellular neurons—rather overly-detailed information to again help boost your own **ego** and perceived feeling of expertise.

I also use subtly **misleading language**: "telling your kidneys to not waste water through urination". My intention here, along with similar phrases throughout the diet, was to **prime** you to think of water in urine as wasteful; rather we need to *conserve* water and not *waste* it through urination. For the record, urination is essential and requires water.

As such, difficulties arise when trying to define proper hydration (euhydration) because in the early stages of dehydration (losing water), our body water will remain the same. It is does this because our physiology has changed and responded to the reduction in water intake by increasing AVP. Some have called this state 'underhydration' (Kavouras, 2019). Even this is not clear-cut though, as there are many examples of when people may have low blood concentration but high AVP or vice versa, with a range of body water states (Carroll, 2020a).

Further **priming** of **superiority/ego boosting** and **inflation of conflict fallacy**. If you want to follow a diet, it is of course good to understand some of the science behind it. But often diet books give a dangerous amount of (sometimes outright false or misleading) information—enough that you think you know it all, but not enough for you to properly critically assess your knowledge (**beginner's bubble of overconfidence**). So my analysis of this paragraph of the diet is not that I have given you information about hydration, but more so that I deliberately gave you this information to ensure I was feeding you the right mix of science and bullshit. This makes it difficult because the diet becomes full od **half-truths**; thus for every claim you can fact check, there will be another that is open to interpretation or outright false. Whether deliberately or not, many diet books and conspiracies do exactly the same. It makes it difficult for you to assess what is true; if you fact check half my claims and they are correct, then that instils trust in me to not be lying/bullshitting. For the remaining claims you cannot verify, you can brush off more easily as I have given you no reason to doubt my word.

Broadly speaking though, we know with quite some certainly the physiological impacts of dehydration and overhydration/hyponatraemia, but we do not know with much certainty this middle ground area we live most of our lives in: euhydration and underhydration (Perrier, 2017). Yet, dietary guidelines are once again rushing in with recommendation to consume more water without knowing the full health benefits or risks.

Further emphasising the current debates in the field (**inflation of conflict fallacy**) as well as again reiterating the **false premise** I have been setting up. This was written deliberately to **mislead** you. Claiming the guidelines are being rushed is the opposite of true; campaigns to get water into the dietary guidelines have been ongoing and my impression at conferences is that many (including myself) felt it took too long to get water in them. This **false premise** perpetuates **conspiratorial thinking** by placing the dietary guidelines and scientific status quo as the bad guys; thus by default, I am the good guy who once again can be trusted as I am the only one speaking the truth (**in-group bias**).

Moreover, the risks of not consuming fluid have been vastly overblown and the benefits of avoiding excess water are ignored. At the same time, the risks of drinking more than needed water are downplayed and the benefits based largely on speculation. The following sections will outline common, often hidden, misnomers regarding water intake and hydration status. My aim is not to bog you down with excessive scientific detail, but rather provide you with enough data and detail to help you have an informed opinion. How this information can be used to help you on your weight loss and health journey will also be explained.

Hopefully you can see how this summed up the key themes in this section, using **hyperbolic language** and **misleading claims**, to fuel **conspiratorial thinking**. I used the word "hidden" to emphasise the **conspiracy**. I have also given myself a get-out-of-jail free card by saying I will not give too much detail. This is because there is not that much more detail to give as the bulk of the evidence goes against the narrative of the book. But I have framed that in a way that I am doing you a favour. As described above, the idea of giving you "enough" information feeds into the **Dunning-Kruger (and similar) effect(s)**. I have ended with a message that this is all about you, giving the impression that I truly care, unlike the cold, hard, and impersonal guidelines.

Overall, I deliberately made this section a bit technical and somewhat unclear. This helps ensure you can broadly follow the section, but not understand it enough to challenge me. This simultaneously boosts your **ego** in terms of learning the scientific words, whilst trapping you in a **illusory superiority "**state" of not actually understanding, but thinking you do. This technique also gives the impression I am really up-to-date and knowledgeable about current issues and debates in the field. In my case this is probably true, but in many cases it is not. As you saw above, some things I just made up or put my own spin on to make them seem like problems when they are not (for example, it actually does not functionally matter too much that we cannot properly apply euhydration in the real world—we work out different comparisons that are applicable to the real world!). Remember, if you have picked up a diet book (or you are reading about a theory), you have most likely done that because you do not know too much about the topic (or you think you do, and you want more information to **confirm your bias**, as discussed in Part III). So you are not in a position to accurately assess whether the claims are true, false, or otherwise spun.

2.1 Water kills

The title of this section is deliberately **hyperbolic** and **appeals to emotion (fear)**. A title like this will stick in your mind, and the evidence I present will build on that thought to cement it as fact. It is worth noting here that that this is an unnecessary title: the dose makes the poison and anything can kill in the right doses; oxygen kills too, but that sounds ridiculous out of context (as should the title). I could argue that everyone who has ever died consumed water. This is true, but absurd. Hopefully you get my point.

I also want to refer you to a previous statement I made earlier in the book: "*Complex biological systems are broken down into snappy soundbites that lose all nuance*". As you can see, I have broken down a complex idea into a snappy soundbite designed to grab your attention. I additionally want to draw your attention to a **contradiction** earlier in this chapter: "*This simple molecule seems to be the unifying nutrient for all life on Earth*". Thus I have said that water is the unifying nutrient for life, but it kills. This is the problem with unnuanced snappy soundbites. I frequently come across these **contradictions** in the nutrition and conspiracy world; they are superficially very subtle so you may not notice the contradiction, but once they are pointed out, I think they become quite obvious (if you are receptive to the comment).

A commonly stated "fact" is that we cannot survive more than a few days without water (three to five days is most often cited). I am unable to find a source for this myth, and academic papers that cite this statistic often do not have a reference for their source, or their reference does not actually provide evidence of this claim. I know this is a lie because I tried it myself and survived comfortably (Carroll, 2020b); I will get back to that later though. Contrary to popular claims, there are ample documented cases of humans far exceeding a few days of fluid restriction, including in extreme circumstances. Two quite famous cases demonstrate this.

This may be surprising, but this paragraph is actually true to the best of my knowledge. As I said previously, bullshit often has a **hint of truth** to it which makes debunking claims all the more difficult. Calling the claim a "lie" though is somewhat hyperbolic; it is actually an example of an **illusory truth effect**. This occurs when claims are repeated enough that they just become "true" (similar to **proof by assertion**, but proof by assertion is more focused on claims that are consistently debunked; the idea of not surviving more than a few days without fluid was more-or-less just blindly accepted in my view).

Firstly, the case of Mauro Prosperi, an endurance runner who, midway through a marathon in the Sahara in 1994, became lost during a sandstorm and ended up running hundreds of miles away into Algeria. Within 24 hours he had run out of food and water. Prosperi survived nine days before finding civilisation, and lost a total of 18 kilograms. In an earlier case, albeit in much less severe conditions, Andreas Mihavecz in 1979 was mistakenly put into custody and forgotten about with no food or fluid for 18 days. He lost a total of 24 kilograms and was recognised by the Guinness World Records as achieving the longest complete fast. There is no doubt in my mind that there are countless other cases that have gone undocumented, for example refugee trips across gruelling conditions with limited food and water.

These are two true cases, however I did leave some parts out, particularly Prosperi's story (**misrepresenting evidence**). On his journey, Prosperi ended up drinking his own urine and also ate bats and drunk their blood. So this was not a complete dry fast. Perhaps that is a bit picky though, since even including urine and bat blood, the story is still rather incredible. However, when details like that are left out, it can be a sign that other details in other parts of the story are omitted, and it is difficult to discern whether they are omitted deliberately. For the record, I got this information off Wikipedia, so it is easy enough to access. I do not say that though because it makes me sound more knowledgeable to just "know" these things, rather than cite the source of my knowledge to be an openly edited website.

Perhaps a more important piece of Prosperi's story though is that he attempted to commit suicide because the experience was too overwhelming. He had a knife with him and cut his wrists, but his cut was relatively shallow and his blood was so thick he was unable to bleed out. I omitted this because it makes fluid abstention sound unpleasant, as well as unhealthy. Rather the picture I painted was that both cases got through the situation with relative ease. I then add speculation regarding refugee trips; this sounds perfectly plausible despite citing no evidence (**ipse dixit**), and therefore adds strength to my case that lots of people do intense things without fluid. The undertone here is that you *will* find this easy. I am now luring you into a **false sense of security** with how feasible this diet plan is. The **hidden agenda** here is that if you fail the diet, it is your fault, not mine. If someone can get lost in a sandstorm in the Sahara and be ok, but you struggle, you are a failure. It is, in my opinion, a rather hurtful agenda which leaves the author in a powerful no-failure position. This may also help perpetuate **survivorship bias**, as it discourages people from talking about their failures openly and risk being outed as a "failure".

In more controlled settings, several studies have been conducted whereby volunteers have been deliberately deprived of fluid for extended periods of time. Many of these studies were conducted in the 1930s to 1940s (e.g. Chesley, 1938; McCance & Young, 1944; Nadal et al., 1941) and included restricting fluid intake in participants for days at a time and measuring what happened (hint: no one died, or even came close to harm). A more recent study, subjected volunteers to five days of no food or fluid (Papagiannopoulos et al., 2013). No one died here either.

I think this is quite a reasonable paragraph introducing studies. The final sentence feeds into the aforementioned **ego** boost, by giving a "well, duh" tone to the text. The use of sarcasm here helps you build confidence in your (perceived) growing wealth of knowledge (building on **illusory superiority** and **overconfidence**).

To be honest, the idea that humans can only live three or so days without water was so ingrained that when it was initially suggested to me that this might be a myth, I almost could not believe it. Being a keen scientist (with some lockdown boredom), I decided to try it out myself. So for 72 hours, I consumed basically no fluid (less than 50 grams per day from food) (Carroll, 2020b). As you may have guessed, I also did not die, nor did I come close to even notable discomfort. I will talk about the findings of these studies in the relevant sections below.

The first sentence emphasises that it is ok if you were silly enough to believe the three-day myth, because I did too. This helps reduce your **cognitive dissonance** (we will talk about this cognitive bias more in the Part III, but in brief, this this the discomfort you feel when faced with information that goes against your beliefs), whilst increasing your perceived knowledge (**illusory superiority**). I frame myself as a "*keen scientist*" (**appeal to authority**) and describe a home experiment I ran (**anecdote**). Anecdotes are notoriously powerful in helping lure people in. The bonus in my anecdote is that I turned it into a piece of research, so it appeals personally and authoritatively. I did actually do this experiment, and honestly it was nowhere near as bad as I anticipated. However, I would not describe it as pleasant, and I did experience discomfort (thus, my claim was **exaggerated**)!

The reason I bring this experiment up is that firstly, it shows how confident I am in my knowledge; if I did not truly believe evidence, then I would not have risked my life by abstaining from fluid. As a reader, you therefore get the impression that I am very evidence-based, coupled with being "keen", and having ample relevant qualifications. All this reinforces your trust in me (ready for you to use an **appeal to authority** when you tell people about this diet in real life). Secondly, this shows that I, the creator of the diet, can relate to you, the future user of the diet. This further instils trust as I have been through anything I will ask you to do. At least, that is the impression. In reality, I will be suggesting that you abstain from drinking fluids for as long as you can; comparatively, I went three days with no fluids. This is a **false equivalence fallacy**, but in this instance I hoped for it to be an incredibly powerful tool to help you trust me. For the same reasons as above, I added sarcasm ("I also did not die").

Key message:

Our water needs for survival are vastly exaggerated

I then add key messages throughout the book. All of these key messages are **hyperbolic** and I wrote them with the intention that they would stick in your mind, even if you could not remember the other details. Personally, I have seen many victims of bullshit essentially repeat the same information over and over again, answering completely irrelevant questions with the few phrases that are firmly instilled in their heads (**proof by assertion**/**illusory truth**). So I thought I would use that trick in my book to help hook you. With this particular message, I was deliberately misleading considering the content of the previous subsection; dietary recommendations for water intake are not designed for our survival, but rather to maintain/optimise our health.

To put this in perspective, we can look back at our evolution. Less than two percent of the worlds water is drinkable, and we evolved on the plains of Africa which for the most part is not the most water-rich area on the planet. It would be poor design if we could not survive more than three days without fluid. Consider that additionally, we evolved in a hot climate and needed to hunt and gather for survival. Those who could not survive these harsh conditions would not be able to pass on their genes; thus we as a species have evolved to endure harsh conditions which undoubtedly included periods of relative drought.

First and foremost, I did not fact check claims (**ipse dixit**) on the amount of drinkable water on earth, nor the water sparsity or climate during our evolution. It sounded right-enough to be convincing though. I honestly made up this entire paragraph; it sounds intuitively convincing and often intuition is a greater motivator to believe than any amount of evidence. I also use a fallacy called **reification** (or **misplaced concreteness**). In this fallacy, abstract concepts are treated as real things. In this case, I describe our evolutionary development (which is a construct rather than a thing) using the term "design". As such, I am describing evolution in the same terms as a conscious entity. Additionally, even if this was all true, and nature "designed" us to survive without water for prolonged periods in harsh conditions, that does not mean mimicking that state would be optimal for health. This is an **appeal to nature fallacy**, which is where we wrongly assume that what happens in nature is best or healthiest. There is finally a small **contradiction**: despite previously stating how water is the unifying aspect of life, I now make (made up!) claims about how drinking it is unnatural and goes against our evolution.

On the other end of the spectrum, in terms of drinking, we can look at other animals. Animals drink according to two factors: thirst and availability. If an animal is thirsty but there is no water available they will not drink; equally if there is ample water available, but the animal is not thirsty, they will also not drink. Thus we need the two factors together to elicit drinking (Carroll, 2020a). What animals (with few exceptions for good evolutionary reasons) do not typically do is drink excessively, or "stock up" on fluid. Yet, this is essentially what the recently updated dietary guidelines are telling us to do, with no consideration for (a) how unnatural this is, and (b) the potential risks this may have.

This paragraph again is mostly made-up and not fact checked (**ipse dixit**); I have no idea whether other animals drink before they are thirsty, drink beyond thirst, stock up on water, or whether there are exceptions to any of these things. Even if we assume the original statement I made in Part I was true, it is a **false analogy**—every animal is different so it is not easy to compare humans to animals. When we do make these comparisons, such as in medical research, we select the animals who have very similar physiology to us with respect to the particular thing we are researching, and even these comparisons can fail to apply to humans. The statement regarding thirst and availability is really just waffle, known as **pseudo-profound bullshit**. This sounds clever, but read it again: did I really say anything of value? No. I end the paragraph by looping back round to the **false premise** I set up previously regarding the dietary guidelines. Keeping that theme going is a **proof by assertion fallacy** by repeating the same thing over and over until it sounds instinctively true. Further, the guidelines do not actually tell us to "stock up" on fluid since excess fluid will get urinated out (with the exception of a few particular conditions). Contrary to claims I have seen some people make/indirectly infer, the dietary guidelines do not risk causing overhydration (which is a serious problem caused by excessive intake of water in a very short time frame).

And this is the crux of the problem that no one likes to talk about: water kills. To my knowledge, no one has ever died straight up of dehydration. There have of course been cases where dehydration has been a comorbidity (in other words, other heath problems have caused death, and dehydration occurred at the same time as this perhaps even contributing to the primary health problem), but I have never come across a case whereby lack of body water has been the actual cause of death. On the other hand, there are ample examples of water causing death.

Here I repeat (feeding an **illusory truth**) the **false premise** that no one is interested in overhydration when this is not true. Additionally, I am posing the risk of too much water **hyperbolically** in that yes, excessive water does kill, but not in the context of everyday drinking to thirst, or even drinking more than that in an everyday context. I also have provided no evidence (**ipse dixit**) regarding deaths (as with previous paragraphs, I just made these "facts" up). I worded this in a way that covers my back though, and relies on you trusting my authority (**appeal to authority**), by saying "I have never come across". This is entirely true because I never bothered to even look up the "facts". The statement "there are ample examples of water causing death" deliberately omits essential information (**misleading claim**): that examples of water causing death are either from excessive intake consumed rapidly, or from non-drinking behaviours like drowning.

Firstly, we can look at exercise. I have already highlighted an extreme case of a lost marathon runner in the Sahara, but in less extreme events, it is not uncommon for endurance athletes to lose over 10 % of their body mass in water (Del Coso et al., 2013; Hoffman et al., 2013; Sharwood, 2004; Wharam et al., 2006). Moreover, these athletes are the ones who typically win the races (Hoffman et al., 2013; Sharwood, 2004; Wharam et al., 2006). Contrarily, many athletes finish marathons with hyponatraemia (too little sodium/salt from diluting their blood so much with excessive fluid intake) (Hoffman et al., 2013). Resultantly, there have been several cases of athletes dying of overhydration (too much water), yet none dying of dehydration (too little water). These observations have been noted enough that many marathons now do not offer free water along the race route. From an evolutionary perspective, it of course makes sense that we can perform well without the need for fluid. Hunting in arid conditions means regular fluid stops are infeasible, both on a *physical level (i.e. there is no water available) and practical level (i.e. stopping to drink increases our risk of being predated, as does stopping to urinate).*

Let me start by saying there is a lot wrong with this paragraph. Firstly, there are **misleading claims**. For example, "these athletes are the ones who typically win the races" is an overstatement; these studies found a (weak) correlation showing the more body mass was lost during the race, the faster the race time. They did not report on the weight loss of the winners *per se*. Additionally, there was no evidence that race times were quicker *because of* greater body water loss (**cum hoc ergo propter hoc**). There could be many explanations for this association such as those with more race experience can cope better with less fluid, so the reason they were faster is because they are better trained (not the lack of fluid). This might be perceived as quite nit-picky, but all these small **omissions** and **misleading** statements put together paint a particular picture which tells the story I want you to hear.

Despite citing four pieces of research, I made several unevidenced claims (**ipse dixit**). I provided no evidence that some marathons have stopped giving water or that overhydration in marathons has caused deaths (I do believe these are both true, but if I have not provided evidence, you should not take my word for it). Also without evidence, I relate marathon running to evolutionary hunting, these are very different contexts; so as well as **ipse dixit**, this statement is also an **appeal to nature fallacy** and a **false analogy**. Marathon running is also a very extreme thing to do, especially compared to the average person who would likely be reading this diet to improve health; in other words, I have provided a **false equivalence** between the purpose of the diet and the examples I use to make my point.

Again, this paragraph is comfortably mixing some legitimate research (which is odd because I kept saying earlier that no one is looking at overhydration, so that is another **contradiction**), with non-truths, adding legitimacy to my non-truths and making them all the more difficult to refute.

Secondly, we can look at drug use. One drug is particularly interesting: 3,4-methylenedioxymethamphetamine (MDMA), more commonly known as the party drug ecstasy. This drug is fascinating because it gives all the symptoms of dehydration (for example, increased thirst and body temperature), whilst simultaneously causing overhydration at a cellular level (Carroll & James, 2019). This effect is driven by ecstasy *causing AVP (the hormone described above) to raise considerably, therefore telling the kidneys to reabsorb water rather than urinate it out. Because* ecstasy *also causes an increase in thirst, users often drink more which exacerbates overhydration, causing cells to swell up with water, and diluting the blood leading to hyponatraemia (Baggott et al., 2016; Brvar et al., 2004; Wolff et al., 2006). From a physiological perspective, this is quite an incredible phenomenon, but on a personal level, this overhydration is the leading cause of death and injury in MDMA/ecstasy users. Most famously was the case of Leah Betts who thought her insatiable thirst was caused by dehydration, so drunk excessively, leading tragically to her death.*

Again, I am mixing some valid truths with **appeal to emotion**. The tragic case of Leah Betts was used as this caused a national outcry at the time of happening. Here I tap into those emotions and relate her death to excess drinking. Again, this is a **false equivalence** as most people will not be capable of drinking that much without the influence of drugs. Both marathons and ecstasy use bear little semblance to the dietary guideline recommendations for fluid intake, nor everyday drinking behaviours.

Thirdly, we can look at hydration-related pathologies. Diabetes insipidus is an illness whereby AVP production is disrupted in such as way that it is minimally, if at all, produced, or the kidneys are not responsive to AVP. This means water that is consumed is urinated out very rapidly rather than absorbed. People with this condition can be chronically underhydrated. When it is completely uncontrolled, the condition can lead to brain damage, but as yet, no one has actually died from the dehydration it causes. Conversely, another condition called syndrome of inappropriate antidiuretic hormone secretion (SIADH; remember that ADH is another name for AVP) causes too much AVP to be produced, so the kidney reabsorbs too much water and the body becomes overhydrated. If left uncontrolled, this can (and has) caused death. It goes without saying that neither of these conditions are healthy and complications in either one are incredibly unpleasant, but they do demonstrate that it is far more dangerous to have too much body water than not enough.

This is another **false equivalence**. It is irrelevant comparing people with pathological disorders to those without those disorders. The underlying physiology is vastly different. This frequently occurs in the nutrition world, so I want to provide a simple analogy. We all know that in order to maintain our bone health, we need to put pressure on our bones, in other words, exercise. But, if we break a bone, our limb is put in a cast and we are told to rest. As you can see here, when we are healthy, we need to do things differently compared to when we are ill (in this case exercise *versus* rest). This is the same for any condition; the underlying physiology is vastly different in a healthy *versus* unhealthy state, so if a diet helps *prevent* a disease, it does not necessarily help *manage* or *treat* that disease and *vice versa*. Of course, sometimes prevention and management/treatment will be the same; my point is that you should not *assume* they are the same. If a diet is aimed at generally healthy people who want or need to lose weight, that is a different population to those with type 2 diabetes who want or need to lose weight. Note how most diet books do not specify who their diet is targeted at (including The Watertight Diet).

Next thing to note about this paragraph is that I literally took the information for both diabetes insipidus and SIAHD from the first links on a Google search. I was quite relieved that diabetes insipidus did not have “death” as an extreme consequence, yet SIADH did, as this fitted my narrative perfectly. Note how I did not cite my source (**ipse dixit**), because again, it makes me seem much more knowledgeable if I appear to “just know” these things; therefore increasing your trust in me. Rather, not citing claims should raise alarm bells that the author might be making things up!

The conclusion of this paragraph is based on unverified information (**ipse dixit**), and used to justify an intervention in people without these disorders, under much different circumstances (as explained above). But the final sentence has an important role to play in that it makes me sound balanced and rational by highlighting myself that what I said was **hyperbolic**. Of course, if my purpose was to inform you accurately, I would not have included such **hyperbole** to begin with. But my purpose was to build a narrative, so I included it, even though I knew it was irrelevant. It is worth highlighting that in my experience, proponents of diets often downplay the risks of their diet; in this case I have somewhat downplayed very severe health impacts of diabetes insipidus of brain damage. That is not proof in any way that dehydration is safe or healthy!

Water is of course an essential nutrient, in that we do need to consume some water to live. We produce water ourselves through metabolising energy (Coller & Maddock, 1933), but the amount of water we produce internally is not enough to sustain our needs. In fact, the amount we produce (roughly 300 mL per day) is pretty much cancelled out by what is known *as "insensible loss". Insensible losses are water losses through things like sweating and breathing. So we do need to consume some water.*

Key message:

Our water needs are easily met and not getting enough fluid is not a legitimate health concern. Contrarily, there are health benefits to consuming far less fluid than is recommended

These ideas may feel very uncomfortable; it certainly did for me, but as a scientist I feel it is important that my views are guided by the evidence, and not long-held beliefs.

I end this section by affirming the balance I pretended to have at the end of the previous paragraph. In a section called "Water kills", I finish by saying "Water is of course an essential nutrient" (**contradiction**). As with earlier in the section, I provide some unnecessary technical details about water production in the body and insensible loss (fuelling **illusory superiority**), before making a rather bold statement based on no evidence presented thus far "not getting enough fluid is not a legitimate health concern". Remember, I showed you an example of a man driven to attempted suicide partly due to dehydration, but I did not disclose that part of the story. I end with **appealing to emotion (empathy)**, that I understand this is a lot of information to take in and it goes against long-held beliefs. I reinforce this with an **appeal to (my) authority**, and reminding you that I am a good honest scientist, getting a hidden evidence-based message out to help you (**conspiratorial thinking**).

Overall, this whole section is trying to prove the safety of not drinking water, but it is like proving the safety of oxygen deprivation by saying free-divers can go without breathing for over 10 minutes so chronic low-level oxygen deprivation is safe. It is an irrelevant comparison. The diet will tell you to avoid drinking any fluid, and to eat normally (according to your appetite); this bears little to no relevance to running a marathon in the Sahara, being locked in a cell and forgotten about, being in a research study and abstaining from fluid for days on end under expert supervision, conditions experienced during our evolution, endurance exercise, ecstasy use, or having an illness that dysregulates your body water. Such irrelevant comparisons are frequently made in the nutrition (and conspiracy) world. The point of the section though was to make you feel safe, break down any trepidations you might have, and fill your head with information so it feels like the diet has been extensively tested and researched. In reality though, so far, I have shown you zero data to say this diet is safe or effective.

2.2 Water myths

The above has hopefully demonstrated that a lack of water is not dangerous, the reverse of which is a myth that is so pervasive, even I, with a PhD focused on hydration, believed it until recently. But there are a few other myths that should be cleared up before we delve into the appetite and health benefits of a low water diet.

This first paragraph is designed to **reassure** you as a reader that it was ok if you believed drinking more water was healthy. *Even I* (**appeal to authority**) believed this so there is no need to feel silly. This is reiterating an earlier message I made in Part I.

Common dogma dictates that we need to drink eight glasses of water per day. The shocking truth about this myth is that it is not only hyperbole, but largely a made-up number completely unrelated to any health outcomes.

I start by stating common rhetoric about drinking water is **hyperbole**, ironically by using **hyperbolic** language ("shocking truth"). The aim of this language is to reinforce my narrative that the guidelines are untrustworthy (**illusory truth**). Portraying my message with language like "*made-up*" also builds further upon the idea that the scientists behind all this are stupid or part of an agenda (**conspiratorial thinking**).

Before continuing with the analysis of this paragraph, I want to highlight how difficult this section of Part I was for me (ironically, I am now painting myself as a **victim**). This section has many truths in it, but the language I use spins the truth to sound sordid. I honestly do not believe the situation with regards to the dietary guidelines including water to be sordid in any way. Though I equally appreciate that there is no reason at this stage for you to believe me either (here I am trying to build **trust** but of course I have misled you so much now it is hard to know what to believe; this is kind of the point of all this). I hope you read on.

So where did this number come from? Broadly speaking, the idea of eight glasses of water per day came from the average intake of water in an American cohort that have regular dietary assessments. Why do we need guidelines to tell us to drink what we are already drinking? Plus, as well as being American, this cohort is predominantly white, middle class, and well-educated—in other words, hardly representative of most people.

In this group, researchers looked at the participants' blood (well, technically plasma which is the watery faction of blood) concentration. What was found is that plasma concentration was roughly the same in those who drank a lot compared to those who did not drink very much. From this, the researchers concluded that hydration status is tightly regulated and therefore it does not really matter in the context of daily life how much someone drinks. Alas, the idea to drink eight glasses of water a day came to fruition by simply taking the average fluid intake of the cohort. This logic is full of half-truths and flaws.

To my best knowledge, this is all broadly true. Whilst I do also agree with the last sentence of the paragraph, my intention for writing it was to increase your mistrust of the guidelines (**conspiratorial thinking**), and further make you trust me (**appeal to authority**).

So why do we need to drink more if it is not affecting our blood (i.e. the transport system for all the nutrients required by the body)? I have never quite understood why their conclusion was to drink more, when drinking more demonstrably did nothing.

Superficially, this reasoning seem intuitively logical. As you may have now guessed, it is intentionally misleading. If you come across statements like this in the future, you should stop and ask whether you think that the entire thought process behind something has been properly portrayed. In this case, we had some early evidence that being at the low end of the water drinking spectrum would more likely confer some harm, compared to drinking more. Some early concerns were mostly about kidney health, potentially problems like urinary tract infections, and some ideas surrounding cardiovascular health.

Admittedly this evidence was not strong, some of it is actually quite weak. But imagine the uproar if a few decades later these ideas turned out to be true but scientists recommended that drinking very little water was healthy. Conspiracies that scientists were sitting on evidence would rapidly emerge. As scientists in a dynamic field, we can never win; someone will think we are hiding something at some point. So we often opt for the precautionary principle. In the case of the guidelines, we knew that body water (hydration status) was not particularly affected by how much water people consumed; as such recommending the average amount (8 glasses per day) prevented any as yet unknown but potential harms from under-drinking, whilst being achievable for most people. Within this, part of the guidelines emphasise replacing other drinks with water, so the benefit might not be with water *per se*, but rather in surrounding behaviours, like reducing sugary drink intake. In other words, the guidelines were the safest bet with sub-optimal data.

Beyond this being an irrational conclusion, the recommendation is also often presented without context; in this case, the contribution of food to our total fluid intake, and the fact that any fluid consumed counts towards your "eight glasses". My own research in a representative sample of UK adults showed that about 25-30 % of our total fluid intake is from food, equating to roughly 500-600 mL (roughly 1 pint) per day (Carroll et al., 2016). Since one cup is usually around 240 mL of water, food alone typically accounts for two to two and half of the eight glasses you supposedly need. Now, considering < 2 % of the worlds water supply is made up of drinkable water, the question is whether we do in fact need the other five to six glasses per day (of course, this ignores desires such as a morning coffee which serve a different purpose!).

I start by once again disparaging my fellow colleagues by accusing them of coming up with an "irrational conclusion" (***ad hominem***); once again this fuels **conspiratorial thinking**, and adds to my **illusory truth**. I then mix my **conspiracy** in with a truth (that foods are included in the 8 glasses a day recommendation); by stating this, it sounds like I *really* know things, but I think this is actually relatively common knowledge. To those who did not know this though, it sounds impressive that I "uncovered" that water from food counts as water.

Following this, I cite my own paper from 2016, but conveniently ignored that this paper showed that consuming less water was associated with worse blood sugar control in men. By citing my own work though, it adds to my **appeal to authority**, as it gives the impression that there is no way I could misinterpret my own work, *and* I truly am at the forefront of research in this field.

I end with a rather random and out-of-the-blue sentence linking back to our evolution (**appeal to nature**). Remember, I completely made up everything I wrote in terms of our evolutionary water requirements. I pose what seems like a reasonable sounding question, but this is actually a **leading question**. Considering the information I have bombarded you with throughout the rest of the book, there is likely only one answer you will have given to this question. And that answer has been carefully curated by my entire narrative thus far. To add trickery to trickery, I once again add some what seems to be balance: I acknowledge that we do indeed have desires for fluids that our beyond our desire for water. I have used this trick earlier too, and I do not know a name for it, so I will call it the **balance trick**. It is designed to distract you from how irrational I am being by saying something rational (sounding). It is similar to gaslighting in a way.

Another central tenet to the "drink more water" campaign is that not drinking enough is bad for the kidneys. Defining "good" and "bad" for the kidneys seems to be a challenge though, and as yet no one has ever given me a clear-cut answer. So at the lack of any particular clarity, I will fall back on some standard markers of kidney function, namely glomerular filtration rate (GFR). This measure represents the volume of fluid filtered by glomerular capillaries in the kidney into the Bowman's capsule (a cup-like sack that performs the first step in the filtration of blood to urine). One by-product the kidneys clear is called creatinine.

Describing the current recommendations to drink more water as a "campaign" makes them sound militant, adding to the **us-and-them division** and **in-group bias**; we obviously do not want to be on the side of a "campaign", especially one that I have made you believe is untrustworthy. It is worth noting that I still have not actually provided any evidence regarding any harm from drinking fluid as per the dietary guidelines.

I go on to state that "*no one has ever given me a clear-cut answer*"; this is incredibly powerful language in that it gives the impression kidney specialists are hiding something (**conspiratorial thinking**) or they do not know basic things (perhaps an **inflation of conflict fallacy**). The reality is that I have actually never asked anyone about this. So this statement is a bare-face **lie**. Note that I do not give any details on who I have spoken to or any nuance in their answer (because I did not speak to anyone); this is because any elaboration might oust my lie. Note the **contradiction** too. I say that no one is giving me an answer about kidney health, then say I will therefore fall back on standard markers of kidney function. Again, superficially, this can sound convincing. But if you think about it, how can we even measure kidney function without having some understanding of what is "good" or "bad" (note how I never defined those terms either).

Regardless of these points, the biggest problem with this paragraph is everything about the kidneys. My understanding of the kidneys is enough that my research makes sense, but in no way am I an authority on kidneys. The information I write here is nearly verbatim taken off of Wikipedia (https://en.wikipedia.org/wiki/Assessment_of_kidney_function; accessed August 2020). I of course did not cite this as a source as that would reduce my perceived authority and credibility. This in itself might seem rather outrageous and seem like I am exaggerating for the purposes of making a point. Unfortunately this does not appear to be the case.

One example is from Seth Yoder who has analysed Nina Teicholz's book Big Fat Surprise and found vast swathes of it appear to be verbatim, or near verbatim from Gary Taubes' Good Calories, Bad Calories (Yoder, 2014). Regardless of the relative truth of Taubes' book, one may question the understanding of an author who cannot cite other people's ideas and instead claims them as their own. Admittedly, this is a **slippery slope fallacy**, but realistically, if I had cited Wikipedia would your trust in me dip? There is often a reason when people systematically avoid citing their claims: the ideas are not theirs, the evidence does not support their claim, and/or they are making things up. Part of the difficulty is that it is difficult to know if or when something is plagiarised, and whether it was plagiarised from a reliable source or not. In the case of my excerpt, as much as I think most people would agree that Wikipedia is a fantastic resource, I think we can also all agree that it is not a particularly reliable source.

Creatinine is formed from normal metabolism of muscle and protein in the body. Creatinine clearance in the kidney therefore measures the volume of blood plasma (the watery part of blood) that is cleared of creatinine per unit of time, and is a useful measure to approximate GFR. It is commonly thought that GFR and creatinine clearance must add more strain to the kidneys if there is less water available to filter through the kidneys. However, this does not stand up to testing. For example, in the study by Papagiannopoulos et al. (2013) where participants abstained from any fluid for five days, creatinine clearance increased (!) by 167 %; in other words, the kidneys were working better!

I have presented the study by Papagionnopoulos *et al.* (2013) as if it is an accurate reflection of the literature, albeit rather subtly. I did not look up any other studies because this one said exactly what I wanted it to say, so have no idea if this was an anomaly, or whether the lack of food in this study might have affected creatinine clearance too (**misleading claim/evidence**). I honestly do not know.

Ok, you might be thinking, but these are healthy participants—what about those with reduced kidney function? This is an excellent question, and a good friend of mine Dr Bill Clark and his team have done, and continue to do, fantastic work in this area. In fact, they conducted the first randomised control trial (gold standard study) of increased water intake on kidney function in those with stage 3 chronic kidney disease (Clark et al., 2018). In this study, participants in the "drink more" group increased their fluid intake by nearly one litre (roughly 2 pints) per day. Their estimated GFR actually decreased *(which is not a good thing) compared to the group who kept their water intake the same. Taken together, these and many other studies (e.g. outlined in a review by Rouhani & Azadbakht, 2014) suggest that low fluid intake is at the very least not harmful to the kidneys, but also potentially beneficial.*

I now deflect any inadequacies in my argument with a **strawman**. A **strawman fallacy** is typically when someone sounds like they have refuted an argument, whilst actually avoiding the question at hand altogether. In this case, I have used a **strawman** tactic to distract you from any inadequacies in my previous paragraph, by implanting the idea that you might have been thinking about those with reduced kidney function (I bet pretty much no readers were). As previously discussed, comparing those with and without a disease is not appropriate; therefore I am supporting my own claims with data completely irrelevant to my original claims. This might also be perceived as **moving the goalposts**. This is often seen when someone provides adequate evidence against a claim, and instead of accepting the new evidence, the question gets changed ("what about…"). I often get round this by asking people explicitly what evidence they want (you would be surprised at how often people cannot answer this question).

I have called Dr Bill Clark "*a good friend*"; Clark and I meet usually once a year at a conference and we have a good laugh and a drink together. I would not describe us as "good friends", but rather jovial colleagues. His research, in my opinion is excellent though. The purpose of painting Clark as a good friend increases **trust** in what I am saying, as it shows I am well connected to current researchers; the inference here being that my ideas cannot be bullshit because am in with top scientists. This is somewhat a **contradiction** considering I painted my colleagues as biased earlier on in the book. It is a confusing message, but one I see quite frequently in bullshit circles.

My apologies to Clark and his team, because I then go on to **misrepresent** their work. Firstly, participants drank 0.6-0.7 litres per day more, not "nearly one litre", which is a somewhat **misleading** but completely deliberate rounding error. I also miss out the bit where the researchers state that they may not have found an effect because participants did not increase their fluid as much as the study team aimed for.

Above, I cited creatinine clearance from the Papagiannopoulos *et al.* (2013) study, so why would I not report a comparable measure in the study by Clark *et al.* (2018)? Of course, the answer is because Clark *et al.* (2018) did not find what supported my narrative in terms of creatinine clearance (**misrepresenting evidence**). Further, I presented GFR as decreasing, when there was actually no difference (statistically) according to whether participants consumed more water or not, nor did I mention that on average, participants were drinking adequate water already (roughly two litre a day). Therefore, regardless of the findings, none of this supports the premise of The Watertight Diet to stop drinking water. I end this paragraph citing a review to make it sound like these findings are representative of the entire evidence-base. What I failed to mention was that the review cited was in Ramadan fasting, so the applicability to the advice given in The Watertight Diet is (once again) basically zero (**misrepresenting evidence**).

The next big myth is about thirst; specifically the ongoing debates about whether we should drink before we are thirsty or not. I will start by highlighting that I wrote a rather long paper outlining why I think our commonly accepted notion of thirst is untrue (Carroll, 2020a). To give a brief outline, our dominating idea claims that the increase in plasma concentration we experience when we restrict fluid gets detected by special cells in the brain, and these trigger the sensation of thirst (Armstrong & Kavouras, 2019). This sensation of thirst starts to occur when your blood concentration increases by 1-2 % (Wolf, 1950), and is unignorable and overwhelming (Robertson, 1984).

However, before you feel thirsty, your body has already taken action to conserve body water. It does this by raising AVP—as discussed above, this will tell the kidneys to stop excreting as much water in urine. Because AVP (and other related physiological changes) occur before we feel thirsty, many have advocated that we need to beat thirst by drinking before we feel it. In theory, they say, this helps stop the physiological changes (like high AVP), and is therefore better for your health. As described above, both from an evolutionary point of view, and in comparison to other animals, this does not make logical sense. I will discuss the health point of view later in the book.

This section is true to my best knowledge, until the final sentence which uses **appeal to nature** and a **false analogy** to animals. It is worth highlighting a couple of subtle tricks I used though. Firstly, I stated that I wrote a paper refuting our current notions of thirst. This is true, I did do that. However, I deliberately framed this sentence to fuel the **conspiratorial thinking** I have been growing throughout the book, by using words like "untrue". In reality when I discuss this paper in the real world, I frame it (correctly) as a new idea that still needs to be tested and verified, rather than as something that has shown everything we know to be wrong (which is a **misrepresentation** of the paper).

Secondly, I used words like "theory" to describe our current understanding. Scientifically, my use of this is correct, but in everyday language, theory sounds uncertain. Again, this language fuels mistrust of our "conventional" knowledge and feeds into **conspiratorial thinking**. Finally, I go back to the **false equivalence** and **appeal to nature** by bringing back the idea of evolution. I reinforce (**illusory truth**) the trueness of this idea by claiming everyone else's ideas do not make "logical sense" (according to this idea I made up!) which **primes** you to perceive my argument as logical.

My recent theory suggests that we do not have just one type of thirst, rather we have several subtypes regulated by various psychological and physiological phenomenon (Carroll, 2020a). I dubbed the classical subtype, defined by plasma concentration (as above), "true-thirst", and when this gets strong (i.e. disrupting normal living), this is the signal we need to look out for that the body is struggling. Since previous research has not differentiated subtypes of thirst, it is difficult to know whether they actually measured true-thirst or milder forms of thirst. My own experimental data suggest studies with less than 2 % body mass loss (perhaps even more!) probably have not measured true-thirst (Carroll, 2020b). At lower levels of body mass loss, you will likely experience things like a dry mouth, dry lips, a mild desire to drink, and an unpleasant mouthfeel. None of these indicate true dehydration though; they indicate a reduction in fluid intake and will normalise after a few days when your thirst-related setpoint has been adjusted.

Key message:

When you truly need water, you will absolutely know about it

I use this paragraph to describe my thirst hypothesis—remember this is an idea with minimal testing and direct evidence behind it, but I am using deliberately strong language to demonstrate my credibility as a scientist *and* as a scientist who does not conform to the status quo/has an open-mind (**appeal to authority**, **illusory truth**), and to discredit by inference other researchers. Citing this paper in a book and using it as any proof is also **misleading**, due to the hypothetical nature of the paper.

Following this, I use **anecdote** as "evidence" about my theory, but cleverly disguise **anecdote** by calling it "my own experimental data". Whilst my self-experiment (Carroll, 2020b) was very interesting, I reported the findings incredibly inaccurately: the experiment was in no way designed to provide any meaningful data on a potential cut-off for true-thirst (**misrepresenting evidence**). Rather it provided hypothesis-generating data that have no current application until further testing in more people than just me! No matter how science-y sounding, anecdotes are anecdotes and should not be used as evidence (there may be a few exceptions to that rule). I end the paragraph discussing a completely fictional set-point regarding symptoms of thirst, backed by fiction regarding why these occur ("*they indicate a reduction in fluid intake*") (**ipse dixit**).

2.3 Important note

Before going further, I want to discuss some technical aspects of study design to help further explain why there is such a strong belief that drinking more water than necessary is healthy. Much of the work showing water intake or hydration status to be good for various health outcomes is based on what is known as observational data. In observational studies, we measure people's behaviour (e.g. what they are drinking) and we measure a health outcome (e.g. their blood sugar level). Sometimes we do this at one time point, known as cross-sectional, and other times we do this at multiple time points or measure a behaviour at timepoint one and a health outcome at timepoint two, known as longitudinal.

Before going into my evidence for the health and appetite benefits of not drinking water, I spend some time explaining science. Most of this is not relevant to the book, but the information serves many purposes in my attempt to help you believe my narrative. I have used this primarily to detract from the fact I have not even described the vast majority of the literature on hydration and health. But there are several other purposes too.

Firstly, it shows that I understand science (**appeal to authority**), and now you do to (or so you think—feeding your **illusory superiority** and **ego**). Secondly, despite my earlier gripe with making complex things into snappy soundbites, this entire section on study design is a vast oversimplification of how nutrition and health sciences work. This oversimplification **misleads** the reader towards following a particular narrative I am building. Thirdly, this acts to help me dismiss any data that might disagree with me; there is a simple comeback that the evidence is not "gold-standard".

Just to be clear, the actual information written is correct. The problem is that it entirely lacks nuance or in-depth understanding. There is a reason we have degrees and it is because you cannot read a few pages in a book and understand research methodology. I have framed randomised controlled trials as somewhat infallible, and observational data as basically useless. Neither of these premises are correct (i.e. another **false premise**), and such claims fuel **conspiratorial thinking** by inferring scientists base their guidelines on weak evidence.

In nutrition and heath sciences, we use a range of data to help understand a particular phenomenon, and this is a skill that unfortunately does take years of experience to understand well. The purpose of this diet is not to explain this nuance though as that would be a book in itself, but I will cover the basics. The point is to be aware that brief discussions of research methods are inadequate. As I stated at the beginning of Part II, such lack of proper understanding is often used to claim that people critiquing studies are biased, when in reality even theoretically gold standard studies can be conducted poorly or not actually provide causal evidence (for example, if they have an inappropriate comparison group).

Both cross-sectional and longitudinal observational data suffer with huge problems. For example:

- *Reverse causation: in cross-sectional studies in particularly, how do we know whether the behaviour caused the outcome, since we only actually measured one timepoint?*
- *Residual confounding: these are unmeasured variables that may affect our findings; since they are unmeasured we cannot understand how they relate to either the behaviour or the outcome*
- *Hypothesising After the Results are Known ("HARKing"): when researchers see the results, and then write a hypothesis, so it looks like their study deliberately was looking at what they report. This is a problem because of…*
- *…p-hacking: in science, we use a statistics called a p-value to help us decide whether there was a statistical difference in the outcome we are interested in or not. The more you analyse a dataset though, the more likely you are to come across a significant p-value by chance rather than because the difference is true ("false positive"). Some researchers will run lots of statistical tests and then pick the statistically significant findings to report*
- *Recall bias: this simply describes that people are bad at accurately remembering things. Yet, much of nutritional epidemiology is based on people remembering their diet. Try it for yourself: can you accurately tell me on average over the last year, how often did you eat bread each week? What about drink a sugary drink? Or eat chocolate? Crisps? Sausage? Or drink milk? Water? It is really hard! So the data we get are quite frankly crap and virtually useless. And I say this as someone who has published work using such data.*

But beyond all that (yes, there is more!), these studies cannot tell us if a relationship is causal or not. Type into a search engine "spurious correlations" and you will find tonnes of examples of how completely unrelated things have an incredibly convincing relationship with each other. For example, water intake has been associated with better blood sugar regulation (Carroll et al., 2015; Carroll et al., 2016; Roussel et al., 2011), but water intake is also associated with higher physical activity (Kant et al., 2009). We know that physical activity causes better blood sugar regulation, so maybe water intake is simply a marker of more exercise, and the exercise is the thing that causes the better blood sugar (known as a mediating variable). Unfortunately, whilst these study designs attempt to control for such issues, they cannot do this adequately enough to claim a causal relationship.

Briefly note the **contradiction** here: I have cited my 2016 paper here as a demonstration of a relationship between water and blood sugar control that does not agree with my narrative. But I also cited that paper earlier, basically justifying my recommendation to avoid drinking fluid. Either the data collection methods in the study are so crap they are unusable, or they have some utility, but they cannot be both simultaneously. Secondly, this is a tactic called **inoculation**. Inoculation occurs when you prepare people with counter-arguments to claims they might hear. Now if someone cites any of the papers I cited above as evidence that water might be good for blood sugar control, you have a comeback already prepared!

Making causal claims from observational data is a well-known problem in the nutrition science literature. Recently, we have seen this occur with breakfast and health outcomes. Observationally, breakfast has been undeniably associated with lower body mass (Brown et al., 2013). Yet, when we combine the studies that are designed to infer a causal relationship (known as randomised control trials), we see that not only does breakfast not cause a lower body mass, but actively increases it (Sievert et al., 2019).

Overall in these paragraphs, I have placed the problems of observational data in a context that infers that because they are not perfect methods, they are therefore useless (**inflation of conflict fallacy**). This is not the case. Beyond anything, we cannot have a causal relationship without a correlation between two variables. So understanding how variables interact is a vital step for understanding what we should test causally, how we should test it, and how we should interpret the findings.

To use the breakfast example, whilst there currently appears to be no *causal* benefit of eating breakfast, people who eat breakfast in the real world do have lower body mass indexes and are generally healthier. This is interesting because it tells us that behaviourally, breakfast eating clusters with a range of other healthful lifestyle factors. This can give us insight into other relationships, such as whether “morning people” who tend to eat breakfast more frequently are healthier because of the genes that determine their morning preference. So rather than dismissing the observational literature, it can refine our understanding and give us new insights and questions to test. It also helps us more clearly define guidelines; if people are naturally already eating breakfast, but they need to lose weight, skipping breakfast may be an option (note: the guidelines do not currently say this for two reasons: firstly, there is always a lag between evidence and real-world practice; secondly, we do need more causal studies before being confident in recommending breakfast skipping). Bringing up an analogy adds weight to my argument and makes what I am saying all the more credible. Once again, this increases your trust in me and decreases your trust of “the system” (**conspiratorial thinking**).

So what are randomised controlled trials? These are beautiful study designs (when done well) because they eliminate nearly all sources of bias. Two key aspects of this study design are important. Firstly, participants are assigned to either a treatment or non-treatment group. The non-treatment ideally would receive what is currently seen as best practice, but may also be a placebo, normal care, or another comparator treatment. The aim here is to try and match the non-treatment/comparator group to the treatment group as much as possible without giving them the thing you are interested in. That way, at the end, you can be confident that any differences you find are solely because of the treatment you were interested in.

I have now changed my tune and used **emotive** (“*beautiful*”) and oversimplified (“*eliminate nearly all sources of bias*”). This was designed to be a subtle **appeal to emotion** such that any time you read about randomised controlled trials, positive imagery would come to mind, whilst if you ever heard about observational studies, negative imagery would come to mind. This aids in fuelling your **illusory superiority**, and helps deflect any criticisms of The Watertight Diet, as I know my followers will easily be able to dismiss things that do not support my narrative.

Secondly, which group participants will go into is selected at random. This maximises the chance that if these participants were not in your study, they would have the same chance of getting the outcome you are interested in. That way, you increase the likelihood that any final differences are because of the intervention, and not because one group was more likely to end up with the outcome anyway. For example, if you were interested in blood sugar, and everyone in the treatment arm was age 20-25 years, and everyone in the non-treatment arm was 70-75 years, it would be no surprise that you found better outcomes in the treatment group because they were younger and naturally less likely to get ill. Despite observational studies showing positive effects of drinking more water, randomised controlled trials do not, and these are the studies I have come to my conclusions on.

Key message:

Much of our diet knowledge, including the dietary guidelines, is based on very weak evidence

Note how I have only presented the positive aspects of randomised control trials and only presented the negative aspects of observational studies. Some issues with randomised control trials include reduced validity, poor adherence, HARKing and *p*-hacking (which I mentioned for observational studies but it can happen in controlled trials too), inadequate power (i.e. small sample size), intervention concealment/blinding issues, and poor generalisability. For both observational and controlled studies, these critiques do not apply all the time, but they are all a potential limitation. The way I spun this in Part I though failed to account for any of this nuance though. Again, I see this lack of nuance and understanding frequently. As such, I would like to emphasise that even after reading this, you do not understand study design very well (unless you are trained in research, obviously!). If a legitimate researcher critiques a study you present, they most likely know more than you.

2.4 So how much fluid should you drink?

The simple answer to this is that, providing you eat a relatively varied diet (which can be achieved in many different ways depending on your preferences), you get enough fluid from your food. To clarify, as we saw above, we can get about half a litre of fluid a day from our food. This number is based on a representative UK sample (Carroll et al., 2016), which means participants were from all walks of life and so were unlikely to eat a particular kind of diet. High fat and snack foods typically contain low (less than 20 % of their weight) water (e.g. oil, hard cheese, crisps, chocolate), whereas plant foods typically contain high water (more than 90 % of their weight; e.g. fruit and vegetables). Just eating what you normally eat will likely achieve adequate fluid intake!

This section starts with a rather striking **contradiction**; previously I stated "*Complex biological systems are broken down into snappy soundbites that lose all nuance*", and once again, I am framing a complex biological system (health and appetite) as a simple system, lacking nuance. The phrasing "*The simple answer*" was also very deliberate. As with the title of the book, "*the*" infers a singular and therefore has authoritative connotations, whilst "*simple answer*" makes whatever I say next seem obvious. I would put money on at least some readers reading that sentence and thinking "ahh yeah that makes sense" (**illusory superiority**). Note again how I have cited my 2016 paper despite literally just a couple of paragraphs ago saying it was based on basically useless data (another **contradiction**). The rest of the paragraph is repeating spiel from earlier in the book; the more the same information gets repeated, the easier it becomes to accept if it is something you relate to (**illusory truth**).

The reason I emphasise to not drink fluid is that excess fluid gets urinated out, and the most obvious form of excess fluid is from drinks. This was clearly seen in my recent experiment when I rehydrated after three days of no fluid (Carroll, 2020b). The amount of fluid I drank equalled pretty much exactly the amount I urinated out. Even after no fluid for three whole days, my body did not want or need the extra fluid from drinks. So why risk adding strain to my kidneys with worse creatinine clearance and GFR by consuming extra fluid?

I have again based this assertion on my (very science-y sounding) **anecdote**. There were other factors in my self-experiment that could explain why I urinated out the same amount as a drank; most likely is that my salt intake had been very low for the last three days (between 0.5 and 1.1 grams per day), and it remained low whilst I was rehydrating (2.3 grams). Thus, I unsurprisingly **misrepresented the evidence**.

Note my phrasing too: "*excess fluid*". This will be a term I favour throughout the diet. In particular, you will notice I say "avoiding excess fluid" rather than "fluid restriction". This phrasing was deliberately chosen to make the Watertight Diet seem less unappealing. At the beginning of the diet I decry other diets for being restrictive, so I am careful to avoid language that infers in this diet is restrictive in any way. Excess fluid makes the diet sound legitimately like I am asking you to avoid the bit we do not need. Sometimes it is good to think of alternative ways diets could be described to see how more or less appealing they sound. If the description alone can change how you feel, you may want to consider if the diet is bullshit and perhaps a bit too extreme *for you*. Like "fasting" sounds quite modern, "meal skipping" sounds a bit silly or perhaps sinister (e.g. eating disorders), whilst "temporary starvation" sounds quite brutal…yet they all describe the same thing!

Other studies also support this. In Dr Clark's work discussed above, volunteers' urine output increased by pretty much exactly the same amount as they reported consuming extra in fluid. Moreover, you will notice in Table 1 of Dr Clark's paper that urine volume in both groups at baseline (1.9 litres per day) nearly equates to reported fluid intake (2.0-2.1 litres per day). The difference here, if we are being generous, is 200 mL per day. In other words, that 200 mL is the amount of fluid the body stored during the day, and as such, we might consider this "essential" fluid. As we saw earlier, this is easily achieved by eating normally. More likely though, fluid intake was measured by participants reporting what they drank. How accurate do you think that is? Do you think if you were in a study looking at water, you might (even subconsciously) exaggerate how much water consumed?

You may have noticed how I switch between calling my colleague "Dr Clark" and "Bill". I did this depending on how authoritative I wanted to sound compared to when I want to relate to you as the reader, so it is a subtle form of **manipulation**. Less subtly, I refer the reader to Table 1 in Clark's paper. This is to give the impression that I have thoroughly read the paper, so well in fact, that I can tell you exactly where I get the information. This adds to my **authority** and credibility. A good question to ask when you see authors do this is why have they chosen that particular table in that particular paper? Sometimes it is legitimately appropriate, but other times it is a way to **cherry pick** data whilst giving the impression of being well-read and thorough.

The rest of the paragraph uses genuine data from Clark's paper, but I added my own spin (i.e. the idea of demonstrating what is "*essential water*") which I made up on the spot whilst writing. As a non-expert, this sounds very convincing as I have used published data (at least, that was my intention!), but as soon as someone adds their interpretation to data, I would advise that you proceed with caution especially if they are not reputable scientists in that particular field. I also fail to remind you that Clark's work is in those with chronic kidney disease, so most likely does not apply to you.

In another study in healthy adults, another good friend and collaborator Prof Olle Melander and his team asked volunteers to consume three litres extra of water per day (Enhörning et al., 2019a). In doing this, participants appeared to only achieve a net increase of two litres per day, and guess how much extra urine they produced? You guessed it, about two litres (1.95 litres to be precise!). In a similar study by Olle's team, participants were asked to consume 1.5 extra litres per day of water for six weeks (Enhörning et al., 2019b). Participants again struggled to increase their fluid intake as much as the researchers would like (hmmm, I wonder why…maybe it is not natural to drink that much?), so they reported consuming about 0.9 litres extra per day. That may not be a surprise, but what is a surprise is that they urinated out an extra 1.2 litres per day; in other words, drinking more fluid made them actively lose about 300 mL of extra water (i.e. 0.9 litres extra consumed minus 1.2 litres extra urination). This is likely due to the excess water being consumed suppressing AVP so the kidneys do not have any instruction to keep fluid in the body. Drinking water actively dehydrated participants!

As with Clark, I have described Melander as "another good friend"—in this case it is quite true at least. With phrases like this though, you should ask "why does it matter that you are friends or collaborators?". Science should speak for itself; who you know is irrelevant in that respect. The reason I have used such descriptors repeatedly was to make you think I know a lot of respected researchers so my credibility improves (**appeal to authority**); I must be a credible scientist if I know and collaborate with all these people who are credible scientists, right? As discussed previously, this is a strange (but frequent) **contradiction**, whereby bullshitters decry science unless it can support their agenda. Remember, previously in the book I ranted about how my colleagues are biased and oblivious to their bias? Now it turns out there may be some exceptions to that rule, namely me, and the people I allege to be friends with (whose research I can twist for my own narrative).

I wrote "*1.95 litres to be precise!*" with the aim of giving the impression that I have thoroughly checked all the numbers (similar to when I mentioned "Table 1" above). My aim was to subtly make you think "wow she really checks details", which aids in maintaining your trust by giving the illusion that I am meticulous and reliable (**appeal to authority**; **proof by assertion**). As I did earlier in Part I, I added some cockiness to the paragraph ("you guessed it"; "hmmm, I wonder why…") which transfers to you as the reader to increase your confidence in my words (**ego boost**).

Additionally, I use an **appeal to nature fallacy** ("…maybe it is not natural to drink that much?"), despite so far not actually providing you with any evidence that drinking 1.5 litres per day extra is unnatural. Nonetheless, experientially you can probably relate to this as drinking *too much* is not pleasant. But just because something is difficult does not mean it is unnatural (I reckon hunting wild animals is difficult but still natural). For the record, I have no idea how much fluid our ancestors drunk. Furthermore, the underlying inference here is that the dietary guidelines are suggesting we drink 1.5 litres extra fluid per day, when this is not the case (**false equivalence**).

The final three sentences of this paragraph are most interesting though. Superficially and intuitively, the maths I did regarding drinking water dehydrating you may sound compelling. This might even be a "woah!" kind of moment when you read these sentences. And that draws you in further to really believe what I am saying. I am hoping you can now reflect on these sentences and know that something is missing. Actually, several things are missing. Firstly, in the previous section, I provided information on how dietary data are collected and said these methods were virtually useless. But I only mentioned that in the observational study design rant. These same methods are frequently used in randomised controlled trials too. So the biggest problem with me saying that the amount participants drunk was less than what they urinated is that we do not accurately know how much they drunk, but it is somewhere around 0.9 litres per day extra. It is reasonable that the error surrounding this measure could account for the 300 mL gap I described. Secondly, I did not check what they ate, so perhaps they ate more (watery) food, which would mean they consumed more water there too. Thirdly, a multitude of other factors might have caused such results such as changes in salt intake. Note, I am not saying that what I originally wrote is incorrect, just that it is only part of the story; it is intentionally **misleading**. For both Clark and Melander's work, I have only based my conclusions on the extra fluid consumed.

If you look up the study, you will also notice that before the intervention, participants urinated one litre per day. Their total fluid intake (including fluid from food) was 1.8 litres per day. Only 0.4 litres of fluid was from water and 0.3 litres on top of that was tea/coffee. If we do the maths, that means the water consumed from water, tea, and coffee was urinated out (0.7 litres), plus about another 0.3 litres of the fluid from food (or maybe other beverages unspecified in the paper). This provides evidence that the fluid we get from food is more than adequate to meet our water needs, allowing our kidneys to excrete enough fluid to safely remove waste and metabolic by-products, without the added strain of having to filter excess fluid.

The numbers from the paper are true, the inferences in the rest of this paragraph are entirely made up. When writing, I kept a separate document noting all the tricks I was using in each section. My notes for this paragraph read "Next para is some fudged maths, I don't even know if they make sense". I have no evidence that other diet books have made numbers up this brazenly, but the point is that in a book or blog, you can literally say anything and people will believe you.

A more well-known study aimed to quantify the hydrating properties of different drinks, dubbed the Beverage Hydration Index (Maughan et al., 2015). To start, participants consumed one litre of water; quite consistently, participants urinated out 1.3 litres over the next four hours. The index that was created demonstrated that nearly every drink tested led to a similar amount of urine produced when compared to spring water. This once again suggests that drinking itself may be preventing the body from holding onto its own water.

Key message:

Consuming excess fluid actually dehydrates you

These results no doubt sounded super convincing; they do to me (intuitively) anyway. But if you read the paper, you would see that before drinking the test drinks, participants fasted overnight, urinated, then consumed 500 mL (about 1 pint) of water before starting the study. This is likely where the "excess" urine came from! Thus, I deliberately omitted key study information (**misrepresented research**).

Of course, sometimes we drink for reasons other than need, with the most obvious example being caffeinated beverages. I would not object to anyone drinking these on this diet, but perhaps you may wish to consider reducing the amount of these drinks you consume, using a smaller cup so there is less fluid per drink, or substituting a drink for another source of caffeine such as a supplement. I think this is personal preference but ideally for this diet to be effective, reducing excess fluid intake from as many sources of possible will lead to *maximal effectiveness. If you do really enjoy your caffeinated drinks, avoid drinking these with food, for reasons that should become clear in the next section.*

After all that number crunching, I then round the section off by becoming your friend again. I do not want you to suffer without caffeine…so here are some tips on incorporating caffeine (**balance trick**).

To briefly sum up the key messages from this section, overall so far the evidence shows that:

- ✓ *Not drinking enough is far safer than drinking too much;*
- ✓ *Drinking less than is commonly "recommended" reduces strain on your kidneys*
- ✓ *Water that you drink just gets urinated out so has no benefit to being consumed*

If you are anything like me when I came to this realisation, you will be feeling much discomfort and perhaps even confusion. So before moving on to why drinking less will aid your weight loss and health journey, it is probably worth highlighting that such mistakes have previously been made in nutrition science; in other words, we have been here before, and I am worried we will be making the same mistake again

The summation aims to provide you with the key things I want you to remember; details may get lost, but these will stick in your head. It is worth noting how covertly **misleading** this summation is. Namely, that I have provided (albeit dubious) evidence for the things I describe, but as yet I have not provided evidence showing anything related to guidelines will cause health problems. The studies I have cited bear little or no relation to the guidelines or life in the real world in general.

I follow these points by once again relating to you and your **cognitive dissonance** which helps me lure you back into my **conspiratorial thinking** regarding how bad nutrition science is ("*similar mistakes have been made*"). Phrases like "*I am worried*" add empathy (**appeal to emotion**) and a human-feel to this and contribute to the **in-group bias** I have helped create; I care about YOU, the dietary guidelines do not.

One example is vitamins. We know vitamins are essential to life, just like water.

This entire example is a **false equivalence** and **false analogy**, but providing it offers reassurance. This is again a form of **inoculation**.

Because of this, some nutrition scientists proposed that more vitamins must be better; this led to the introduction of vitamin supplements

This is deliberately **misleading**; one scientist in particular started the idea of needing more vitamins, Dr Linus Pauling. Writing "*some nutrition scientists*" acts to cover my back as an some nutrition scientists do recommend supplements (I do not specify how many and under what circumstances though). In the context of the whole diet, "*some*" may not sound like a minority to readers. Nutrition scientists have a strong consensus that excess vitamins are unnecessary. Supplementation is only typically recommended in particular contexts such as pregnancy, in those with deficiency, or at a public health level when there is evidence of population deficiency (e.g. vitamin D).

(we can see this happening with water recommendations now, both in the dietary recommendations, and in that a lot of people seem to carry water bottles with them everywhere they go). However, excess intake of certain (water soluble) vitamins leads to

them being urinated out (hence you get brightly coloured urine after taking supplements)—in other words, they serve no physiological purpose.

This is true, though it is unclear to me (because I am not an expert in vitamin excretion) as to whether they serve no purpose and I did not provide any evidence for my assertion (**ipse dixit**).

I have just demonstrated above that the same is true for water when consumed beyond our needs. Even worse though, is that excess intake of some vitamins can actually be harmful; for example, too much vitamin E causes prostate cancer (Klein et al., 2011).

This is also true, and hence why the vast majority of nutrition scientists are in consensus that unnecessary supplementation is not recommended.

We can see with kidney function, the potential for harm certainly seems to be the case with water.

Remember, the study I showed on kidney function in healthy people did not compare to anyone drinking “excess” fluid, so this is quite an inferential leap (**misleading claim**).

Considering water is one of, if not the, least studied nutrients, I have additional concerns of what we are yet to find out. We also know with vitamins that, assuming we have a reasonable diet, we can adequately meet our needs with food; it seems reasonable therefore that the same is true for water.

Key message:

Dietary recommendations to drink more water may actually cause harm

I have used a **false equivalence** between vitamins and water. These are vastly different nutrients; comparing them in this context is basically a pointless task. This is mere speculation, and I have not provided you with enough causal human data to give this conclusion any weight (**ipse dixit**).

It is noteworthy that nearly everything in this paragraph about vitamins was correct. But I started the paragraph by framing it as “nutrition scientists are trying to hurt you”, and that spun the entire context (**conspiratorial thinking**). A **false premise** is incredibly powerful, but equally hard to detect unless you are competent in the specialism. Essentially, I said (with a bit of spin) what the consensus is, then framed it in such a way to make it sound like it is not the consensus whilst simultaneously saying “we made a similar mistake before” highlighting that what I have said is indeed the consensus. Conspiracies within conspiracies. I pat myself on the back for that one!

2.5 Excess water and health

I want to start this subsection by stating that overall our current best theory and evidence suggests dehydration to be at best equivalent in terms of blood sugar regulation, but potentially worse than being well hydrated or drinking “excess water”. Blood pressure is less well researched, but observational research does not seem to show a relationship with water intake. In the immediate time after drinking and absorbing water, blood pressure should rise; to claim this is bad for health I think is quite a leap though as chronically high blood pressure is the primary public health concern.

Now we have established the problems with drinking fluid, we can look at the benefits of avoiding it. My research focus is cardiometabolic health and appetite. Cardiometabolic health is a fancy phrase encompassing both cardiovascular (i.e. heart and circulatory system) and metabolic (i.e. systems related to how we use energy) health. Whilst the next section will discuss appetite, this section will focus on the two most prominent markers of cardiometabolic health: blood sugar control and blood pressure. Both of these are excellent predictors of diseases like type 2 diabetes, heart disease, and early death (mortality).

The first sentence of this section was designed to **remove any doubt** by using **affirmative language** (namely the word "*established*" gives the impression that there is no room for manoeuvre and I have objectively presented the truth). I of course did not mention the amount of research I omitted showing any even *potential* health benefits of consuming water. I once again confirm my position as an expert by discussing my own research (**appeal to authority**), and teach you another new word ("cardiometabolic") to pique your interest and boost your ego (**illusory superiority**).

I stated that blood sugar regulation and blood pressure are "*the two most prominent markers of cardiometabolic health*", but have provided no evidence for this claim (**ipse dixit**). Again, I use the infamous definitive article ("*the*"), to give the illusion of certainty. Whilst these are excellent markers of cardiometabolic health, the reason I chose them is because these were the outcomes I knew I could most easily spin to sound convincing. For the record, there are several markers of cardiometabolic health and each marker shows a particular piece of the puzzle and may more strongly represent risk of a particular outcome (though not definitively—humans are complex!). I would be confident in saying that no single marker is *the* most important; as such, claims like this should always be queried: the most important for what; how much does it affect risk; how does it interact with other markers? We see this a lot in the low carbohydrate/keto diet crowd who consistently label insulin as *the* marker of health.

Blood sugar regulation is the topic I have published academically most extensively on and where my passion truly lays. This is a really hot topic in the hydration field at the moment; sadly I feel that most people in the field have misdirected their focus. To start, we need to differentiate two aspects of hydration: actual body water (hydration status), and the act of consuming water (drinking), which we will look at sequentially.

More **appeal to (my) authority**, followed by more denigration of my colleagues (sorry everyone!), once again building distrust in the establishment (**conspiratorial thinking**) and by proxy confirming myself as a trustworthy source.

There has been huge debate as to whether hydration status affects our blood sugar regulation (Carroll & James, 2019). There is some theoretical, mechanistic, and animal work showing that elevated AVP (which, remember, is a hormone that increases when you stop drinking) might cause your blood sugar to increase (which is bad for metabolic health). This is because AVP is part of the stress response, formally called the hypothalamic-pituitary-adrenal axis. In this axis, AVP is part of a chain that leads to the stress hormone cortisol to be released. Cortisol tells the liver to increase sugar production, and as such is associated with worse blood sugar regulation. However, a recent meta-analysis (a study that looks at the combined effects of lots of studies) suggested that the increase in cortisol that is often seen in dehydration studies, is actually due to the studies using exercise (which is known to increase cortisol) to dehydrate participants (Zaplatosch & Adams, 2020). In fact, the one study that did not use exercise, and instead used a heat-tent and fluid restriction, found no *effect of dehydration on cortisol levels despite a huge (up to five-fold) increase in AVP (Carroll et al., 2019a).*

This paragraph is all true (albeit an oversimplification); as I said previously, conspiracies often have some truth in them which increases their credibility. As above, providing more "science-y" sounding information boosts the readers **ego** and confidence (**illusory superiority**). I did slightly **misrepresent** the meta-analysis by Zaplatosch & Adams (2020) with regards to cortisol only increasing with exercise-induced dehydration. This is true, but I feel like I worded this more as a finding of the meta-analysis, rather than a mechanistic comment from the authors in the paper. With only one study showing that cortisol does not increase with dehydration, we need to be cautious with making strong statements like I did in Part I. Additionally, I was not entirely truthful. In my study (Carroll *et al.*, 2019a), we did not measure AVP, rather we measured a marker of it called copeptin. Although this is a reliable marker of AVP, it is not technically correct to say AVP increased five-fold (because this is not what we measured). Admittedly this is a very technical point and I am not sure this would be fair to pick someone up on.

Importantly, several studies have shown that neither limiting water intake nor increasing water intake with a view to altering hydration status and hydration physiology affects blood sugar regulation or insulin (a key hormone that helps blood sugar leave the blood and go to cells) (Carroll et al., 2019a; Enhörning et al., 2019a; Zaplatosch & Adams, 2020). Equally, in uncontrolled settings (those 'observational studies' I told you about above), those who drink more water do not seem to have better or worse blood sugar regulation than those who do not drink very much naturally (Carroll et al., 2016; Pan et al., 2012).

I have **misrepresented** the literature in that I **cherry picked** *only* the studies that supported my claim. I did not explain any of the study methods or findings as this would leave me open to having to face some of my own **contradictions**. For example, Enhörning *et al.* (2019a) found a decrease in glucagon when participants who typically do not drink very much fluid drunk more water. Glucagon tells the liver to increase the amount of sugar in the blood so may have negative health effects if it remains elevated longer term (the study did not test long term effects though). I even **misrepresented** my own research from 2016, and ignored that this work found that men who consumed more water had better blood sugar regulation (which I actually mentioned earlier in the book!). This might seem rather outrageous to misrepresent *my own* research, but I have seen this ample times on places like Twitter, whereby proponents of a particular diet will focus on the findings they like, and ignore the findings they do not like, or disregard any critique of their own research.

Moreover, some of the research in this paragraph is observational—the type of research I said was basically useless earlier in the book (**contradiction**). I even point out the contradiction in the paragraph, but I framed that in a way to suggest that *even* the crap research cannot find an association. I have observed frequently that many diet proponents only have a problem with methodologies if the studies do not find what supports their own narrative. This is why it is important to critique methods, ideally before you know what the results are.

Those studies above are either under very controlled settings, or just look at total water intake, disregarding drinking patterns. But we know that most drinking occurs with meals. So does drinking with food make a difference? Rather embarrassingly, I was rather blissfully unaware of this literature until recently, and to be honest, the findings shocked me.

I again build **trust** and **reassure** you by stating that even I was unaware of all this until recently (**in-group bias**). The term "shocked" is **hyperbolic**, but was chosen to help maintain your interest, as well as perhaps boosting your **ego** that you will now be learning something "shocking" (within the context of the rest of the book, this has undertones of "cover-up", i.e. fuelling **conspiratorial thinking**).

I initially got interested in this due to my own self-experiment of no fluid for three days (Carroll, 2020b). Based on my previous work (Carroll et al., 2019a; Carroll & James, 2019), I did not expect my blood sugar to change across the three days, though if anything, I expected it to increase a bit. I looked at two measures of blood sugar: fasting (i.e. immediately after waking, and at 3pm where at most I would have eaten a couple of mints by this time), and postprandial (this is another way of saying "after-eating"). These measure slightly different things; fasting blood sugar is a good indicator of how well your liver responds to insulin, whereas post-meal blood sugar is a good indicator of how well your muscles respond to insulin (Nathan et al., 2007).

This is all true again. Hard to tell though. This confusion between truth and bullshit serves a purpose of protecting the bullshitter. It is protective because if anyone questions the bullshit, the bullshitter can swing back round to a truth and essentially gaslight the questioner. The victims of bullshit (and perhaps also the bullshitter) of course do not know what is true or not, but the elements of truth are designed to drive **confirmation bias** (that the bullshit is correct), whilst making anything that is not verifiable due to the **conspiracy** that has been developed.

Both measures were distinctly lower the more days I went without water, but most notable was the after-eating measure. After eating when I was not consuming fluids, my blood sugar barely increased, whereas after eating before starting the study when I had drunk an excessive amount of fluid, and the day after the study when I was rehydrating, my post-meal blood sugar was ~140 % the levels of my fluid-restricted levels. At first I thought this was an anomaly of my data as I used finger prick whole blood glucose. This comes with relatively high error, for example, the temperature of your finger can affect this measure, and it is not as accurate as taking from a vein in the arm.

Firstly, remember that whilst my experiment was well-controlled and I wrote it up as a scientific experiment, it is still **anecdote**. The reason I keep talking about it is so that you know I can **relate** and I am not recommending you do anything I have not done; i.e. more tricks to build **trust**. We know anecdotes are powerful otherwise no one would try any of the fad diets on the market.

I have then used some rather **dodgy statistics** here but technically covered by back by being very particular with my language. The two blood sugars I compared were 7.1 (well-hydrated) and 5.1 (dehydrated) mmol·L^{-1}, making it 40 % higher, or more sneakily phrased "*140 % the levels of…*". Of course, the aim of this was to sound more shocking, knowing that most, if not all, readers would not check these values (did you?). I reckon for many the takeaway would be "140 % higher blood sugar" even though that is not technically what I wrote. I was deliberately **misleading**. I follow this by showing my thought process that such a high difference might be an error; reigning in the **hyperbole** with the **balance trick** helps to make me sound rational and thorough. Ultimately, my purpose of this was to lead you towards thinking along the lines of "she clearly is not exaggerating because look how hard she tried to work out if there was a problem in her methods". Thus, more **reinforcement** that I am reliable, thorough, and trustworthy (**appeal to authority**).

Adding to the above, I include some more **misleading** trickery by talking about technical stuff; in this case, the temperature of your hand can also affect the blood sugar measures taken from a vein in your arms (albeit usually only a small amount). I bank on most of my readers to not be trained in phlebotomy nor have experience or understanding of arterialised venous blood sampling, but writing such unnecessary detail adds to my **credibility** as a meticulous scientist. For what it is worth too, I have been involved in ample conversations whereby people who clearly have no proper experience or understanding start throwing technical jargon at you. It is a sly trick, and I struggle if I do not know what the technique is (I usually ask incessant questions to get them to explain or note any fallacies in their arguments; legitimate experts do this usually pretty well, bullshitters do not…obviously this tactic is by no means bulletproof).

So, as any good scientists would do, I looked at other literature investigating the effect of drinking water with food. During five days of no food or fluid, Papagiannopoulos et al. (2013) found lower blood sugar levels in 10 participants as well. Similar results have been found in those with diabetes (Rouhani & Azadbakht, 2014). However, since these participants were also not eating, it might be reasonable to expect lower blood sugar levels naturally. My journey continued to try and understand what typically happens when participants drink water with their food…

To dampen any remaining doubts that maybe I was **hyperbolic** in the previous paragraph, I start this one by **reinforcing** that I am a "good scientist" (**illusory truth**). The more I say this, the more true it becomes to the reader. I now cite research and once again **cherry pick** the data I want to present. For example, in the Papagiannopoulos *et al.* (2013) study, participants blood sugar was only lower on day 3 (in a five-day study). And I fail to discuss that the study by Rouhani and Azadbakht (2014) was investigating Ramadan fasting which is vastly different to me telling you to stop drinking any fluid. As with the previous paragraph, I go back to using the **balance trick** to emphasise to the reader that "I am not being **hyperbolic** and I am really trying to find evidence to the contrary, but I cannot"!

Torsdottir and Andersson (1989) examined this directly by feeding volunteers a standardised meal (meat and potatoes) with or without 300 mL of water. When volunteers had water with their food, their post-meal blood sugar increased by 68 %. Their insulin also increased, suggesting it was harder for insulin to get sugar out of the blood and into cells; if this occurs chronically it is known as insulin resistance which is a precursor to type 2 diabetes. These results were later replicated by Young and Wolever (1998) who additionally showed a dose-response relationship—in other words, the more fluid consumed with food, the higher blood sugar rose after eating! Considering these findings, it is no wonder the hydration community had not been talking about these studies.

The crux of the studies cited here are correct, but my interpretation makes a lot of assumptions and leaps, some of which are just silly if you know what you are talking about. For example, I state that "*if this occurs chronically it is known as insulin resistance which is a precursor to type 2 diabetes*"—again this is broadly true but this can then become tricky because no one can refute that statement alone is incorrect. The placing of this statement, however, gives the impression that the findings of the study by Torsdottir and Anderson (1989) suggest that drinking water with foods increases your risk of diabetes. This quite a big inferential leap, and clever placing of technically correct statements in diet books makes it very difficult to debunk. An analogy to demonstrate how big of a leap this is (this is deliberately fallacious because so was the original text) might be that:

(a) High blood pressure causes heart attacks
(b) Exercise causes high blood pressure
(c) Exercise causes heart attacks
(d) [inference] Avoid exercise

If you think this logic is ridiculous, then you can apply that to the leaps I originally made:

(a) Too much insulin causes diabetes
(b) Drinking water with food increases insulin
(c) Drinking water with food causes diabetes
(d) [inferenece] Avoid drinking water with food

Note that in both examples (a) was unnuanced, and (b) was a normal physiological response to the stimulus. Yet (c) made these normal responses sound unhealthy.

I then discuss the Young and Wolever (1998) study, and to be honest, I did not check the details; I had a vague recollection of reading this for a paper I was writing a paper a few weeks before writing this book. Did you as a reader check the study? Finally, I missed the only other study that I am aware of investigating drinking water with food and blood sugar. Considering I am aware of just three studies, it is inexcusable to miss one; this is deliberate **cherry picking**. In this study, Yolanda *et al.* (2018) found a slight *reduction* in blood sugar levels two hours after eating when participants consumed water with their food compared to when they did not. It should be obvious that I did not include this study because it goes against the other two studies. This would have made my theory sound less certain and weak if I presented contrary evidence. I end again by dissing my colleagues in hydration science, furthering **conspiratorial thinking** that these studies are part of a cover up.

The reason for these findings is likely the rate at which food leaves your stomach, known as gastric emptying (Torsdottir & Andersson, 1989; Young & Wolever, 1998). When you drink water, the water leaves your stomach pretty rapidly and takes nutrients like carbohydrates and sugars with it. This means these nutrients enter your blood stream more rapidly, but also means your food does not get properly digested (ever notice how much more bloated you feel when you drink with meals?). It is for these reasons that I recommend only consuming water from food whilst avoiding water from drinking fluids, and equally why I recommend to avoid drinking fluids that you cannot resist (like coffee) with meals (wait at least one hour from eating, though maybe more if you have eaten a large meal).

This works because water in foods is trapped in a food matrix and will get digested at the same rate as the food, unlike fluid that we drink which as we have seen leaves the stomach rapidly and stresses our metabolism. Providing you eat a varied diet, you will get enough fluid from food to maintain your body water, whilst also not burdening your kidneys with excess fluid, nor strain your pancreas with lots of rapid blood sugar spikes.

Key message:

Dehydration does not affect cortisol or blood sugar (and may even lower blood sugar), but drinking water itself might increase blood sugar and insulin levels, particularly after eating

This paragraph provides a plausible mechanism that has been cited in the literature (gastric emptying), plus a completely made up (**ipse dixit**) and somewhat **contradictory** mechanism (undigested food). The reason that this latter idea might be contradictory is that if food is less digested, the food matrix is more intact, and nutrients may be harder to extract (one reason that fibre might reduce blood sugar is because it is not at all or only partially digestible). Thus nutrients would more like be harder to absorb if they remained undigested. To distract any critical thought on this, I **relate** to you as the reader with a (rather cockily phrased) question "*ever notice how much more bloated you feel when you drink with meals?*". Firstly, this is a

loaded question. It is designed to increase the chances that you remember any time this has been true in any capacity (e.g. even when you had that cup of water after eating a curry, rice, three onion bhajis and a samosa) and answer "yes!".

Secondly, and admittedly, this is my opinion here, this is just a daft question. Think about it: if you eat a 500 gram dinner of course you will feel more bloated if you then drink 300 mL of water. You would probably feel equally as bloated if you had just eaten 800 grams of food instead. If you have ever read a diet book/website/blog before, I am sure you will be able to come across these daft and loaded questions somewhere. The question in terms of building my narrative is important though, you can relate to feeling bloating, bloating is bad (you may associate the entire gluten free movement with bloating), therefore water with food is bad. It is the same misapplied logic as nearly every diet uses.

I use all this to justify my Watertight Diet of no drinking fluid. Remember, as yet, I have actually provided <u>zero</u> evidence of avoiding fluid *in the way I recommend* on any health outcome. But I end by reinforcing the key messages I want you to remember, regardless of their actual evidence-base or truth (**proof by assertion**).

In terms of heart health, avoiding excess water appears to have profound effects on blood pressure too. Before delving into this research, it is important to acknowledge that a reduction in blood pressure is not entirely unexpected when you reduce your fluid intake. This is because as your body loses excess water that it has been holding on to, eventually some of that water will come from your blood. The result of this is that your blood volume is lower, therefore taking up less room in your blood vessels and resultantly causing your blood pressure to be lower. In fact, the most common blood pressure medications work in exactly this way: these are drugs known as diuretics which cause the body to urinate out extra fluid. However, the effects I will show you next are beyond what would be expected through just simple reductions in blood volume. Rather, it is well established that it requires about 10 % of your blood volume to be lost to achieve any notable effect on your blood pressure, particularly if you do not already have high blood pressure (Henry et al., 1968).

I chose the deliberately **hyperbolic** phrase "*profound effects*" in order to **prime** you, ready to believe that whatever I present will be beyond expectations. My comparison to a medication fuels **conspiratorial thinking** as it makes it sound as though we already have a (natural) solution to high blood pressure, but BigPharma are pushing their less effective medications (note: I have not cited anything to back my claims at this point; **ipse dixit**). I also **reinforce** the term "*excess water*" which has undertones (based on the content of this diet) of being unnecessary and possibly straining the body.

Following this, I provide a legitimate mechanism as to why blood pressure will drop (lower blood volume), and then dismiss this mechanism without any evidence (**ipse dixit**). In fairness, I do not even cite evidence for this (legitimate) mechanism; again, truth is not always presented accurately, which increases the difficulty for a non-expert in terms of interpreting true claims. I also fail to mention that some of the blood pressure drop can be due to electrolyte (salt) imbalances; yet I give no information on this which could have serious implications for your health (**misleading claims**).

I then severely **misrepresent evidence**, or more accurately in this case, I **lie.** I cite Henry *et al.* (1968) as the source of this "10 % reduction in blood volume" claim. Did you check the reference? If you did, you might have been quite shocked. Firstly, this study did not provide evidence for the claim I made, but secondly, this study looked at the effect of blood volume on AVP (which does regulate blood pressure) by drawing blood from the femoral artery of live dogs.

The purpose of my including this (admittedly, this in itself was quite a **hyperbolic** and shocking example to use) is that if you checked the reference list, the paper is called "The role of afferents from the low-pressure system in the release of antidiuretic hormone during non-hypotensive hemorrhage". Do you understand that? I would guess probably not. Does it sound like it could be related to what I said? Quite possibly yes. Does it sound like draining blood from live dogs? Not at all. So the lesson I want to get across here is that it is not enough to check the titles of papers alone. Once you find a paper though, you may not fully understand it, so how will you know if the author is telling the truth?

The reason I chose such a hyperbolic example though, is because when I initially wrote the claim about losing 10 % of your blood volume, that was legitimately the study I thought of. I had simply misremembered what the study actually looked at. I have the impression this forgetfulness probably more so happens in conversation than writing—you know when you say "I saw a study once that showed…". Bringing it up in conversation lacks any accountability to provide evidence, and once an idea is out there it becomes fact regardless of any further evidence. This was a good reminder to myself to only cite studies I know inside out.

You may think this is unfair and that this level of **misrepresentation** does not occur in the real-world. Unfortunately it does, particularly in the media. There are ample examples of this; in fact Dr David Allison has a weekly nutrition and related research update called Obesity and Energetics. The update is split according to various common themes, and one of those these is called "Headline vs Study". It is shocking how often the media headlines bear absolutely no relation to the study they are allegedly describing.

Further, by using the term "*well-established*", and then citing a 1968 paper, I give the illusion that this has been researched for decades, yet beyond the paper being irrelevant, one paper from 50 years ago does not mean something is established. Again, as a non-expert reader, it is hard for you to know this.

I will start with my own data again. During my three days of no fluid both my systolic and diastolic blood pressure reduced by 17 and 7 mmHg, respectively (Carroll, 2020b). To put this in perspective, highly successful interventions that get people to reduce their salt intake have achieved less than this (13/6 mmHg reduction) after two years (He & MacGregor, 2007). More modestly, from a public health point of view, a salt reduction intervention that is deemed successful reduces blood pressure by 4/2 mmHg (He et al., 2013), yet I achieved three to four times this in just three days. Equally, after one day of rehydrating, my blood pressure increased by 12/21 mmHg. This increase is greater than a five day intervention actively giving participants salt (showing an elevation of 4 mmHg for systolic and no change in diastolic blood pressure; Tzemos et al., 2008).

I start with more **anecdote**. No matter how convincing and scientific, studies with just one person are not enough evidence to make any real conclusions. It is additionally worth noting that I ran that study in my flat with equipment I bought off the internet, for which I had no means to validate the readings. What I report are true values I measured during my three days of no fluid, but I deliberately picked the values from each day with the largest difference. Now the data are published and accessible by anyone. Did you check? Comparing my **anecdote** to other studies creates a rather convincing narrative, and may feed **conspiratorial thinking** by making it seem that there are no studies looking at fluid abstention; this makes me a pioneer of sorts (increases **appeal to authority** and **proof by assertion**). If there truly is no research though, how can I have all these answers? Either I am hiding or unaware of the legitimate research out there, or I am making very large leaps from very little data. Whichever is correct, neither are suitable to be basing a diet on. Lastly, I want to highlight that the two studies I cite regarding how much is a clinically meaningful change in blood pressure (He & MacGregor, 2007, and He *et al.*, 2013) were the first papers I came across that would help me exaggerate my point. I have no idea if they are representative, nor did I check the study details.

Such an effect on blood pressure has been well-established for decades. Hardy (1944) showed lower blood pressure in patients admitted to hospital (for a variety of reasons) who were dehydrated compared to those who were well-hydrated. Similarly, when patients were infused with fluid, their blood pressure increased notably. Another study taking measures from hospital patients had similar findings; approximately 10 mmHg reduction in blood pressure in those who were dehydrated compared to those who were well-hydrated (Vivanti et al., 2008).

Key message:

Dehydration profoundly reduces blood pressure

The study by Hardy (1944) sounds very simple in my account of it, however, the trends were not at all clear and blood pressure only increased in those who were dehydrated and then got infused with fluid (i.e. their body perhaps ‘wanted’ the extra fluid?) (**misrepresenting evidence**). The use of the term “*reduction*” when describing the study by Vivanti *et al*. (2008) is also **misleading**, as reduction is a causal word. Rather this was another observational study, so we have no idea if the lower blood pressure was *caused* by the dehydration or if it just co-occurred (**cum hoc ergo propter hoc fallacy**). I also, somehow, made hospital patients having low blood pressure and being dehydrated sound like a good thing—that is the power of spin!

Of course, I have only shown you the main benefits of avoiding excess fluid, and I will go into some more technical details later in the book. But there are multiple other benefits too, such as:

- *Improved bone health (Bahijri et al., 2015);*
- *Reduced total cholesterol, triacylglycerol (a type of fat in your blood associated with worth health), and low-density lipoprotein (“bad” cholesterol), and increased high-density lipoprotein (“good” cholesterol) levels (all of these are types of blood fats which predict your risk of things like heart attacks and strokes) (Adawi et al., 2017; Rouhani & Azadbakht, 2014);*
- *Improvements in several aspects of immune function and reduced inflammation (Adawi et al., 2017; Develioglu et al., 2013; Faris et al., 2012; Rouhani & Azadbakht, 2014)*

Key message:

Avoiding excess fluid has a range of health benefits, beyond what is discussed in detail in this book

This end paragraph might sound quite strong because it is packed with references, but this technique is called **gish gallop**. **Gish gallop** is where you bombard people with so much information it is basically impossible to refute it. This is a very powerful technique to bamboozle people. I have seen many claims on social media and in online diet book reviews by followers of diet fads along the lines of “[author] extensively goes over all the literature”; in other words, quantity appears to be more impressive than quality. As such, to impress a non-expert it can be easier to just cite lots of papers, rather than citing the most relevant papers.

If you are debating someone who uses this technique, it can make you give up due to **Brandolini's Law**. In the case of convincing someone who is already on side (as I hope was the case for my readers), this technique can be used to make you think there is *loads* of research for what I have said; as such, there is no reason to distrust me. Here is the risk though: I cited six papers in that paragraph; some I skimmed, whilst others I did not even fully read the abstract. All the papers relate to Ramadan fasting though, and as such bear no relation to the Watertight Diet.

2.6 Excess water and appetite

As with health, I want to start this subsection by stating that overall our current best theory and evidence suggests dehydration to be at best equivalent in terms of appetite, but potentially people eat more without "excess water".

The above described the unique properties of avoiding excess fluid on health, but there is another distinct property too: restricting water also reduces your appetite. With a lower appetite, you will eat less food and this will lead to weight loss. This is critically important on three levels. Firstly, we are amidst an obesity epidemic so anything to mitigate this should be taken seriously, yet water restriction is taboo to say the least. Secondly, weight loss does wonders for your cardiometabolic health; combine the benefits of weight loss with the health benefits of avoiding excess fluid described above and that causes an exponentially positive effect on your health. Thirdly, successful weight loss is incredibly difficult and part of the reason is that most diets require some form of restriction that is unsustainable; water restriction will likely be difficult for a day or two, but the diet is flexible and your body adjusts quickly making this a legitimate long-term strategy.

This paragraph reinforces the narrative that water restriction is good for your health (**proof by assertion**). Using words like "*unique*" is rather **misleading** considering the evidence I presented was **biased**, ignored counter evidence (**cherry-picked**), and attributed effects of water restriction when ample other factors could account for the findings (**misrepresented evidence**). The term "*distinct*" also feeds this line of thinking, and subtly gives the impression that there is something particularly special about water in terms of both the health *and* appetite effects. Whilst I do not disagree that appetite control is "*critically important*", the use of these words in the context of the previous sentences connects "*unique*", "*distinct*", and "*critically important*" specifically to water restriction: I am **leading** you towards the conclusion I want you to make.

The subsequent three points I presented are slightly **hyperbolic** in terms of the language used, but are correct. Presenting these in the context of the book sets the scene that water restriction is *the* answer to these three points though. This is reinforced by mentioning the supposed benefits of water restriction. I also framed the three true points in a way that fuels **conspiratorial thinking**; namely on the first point I state that "*water is taboo to say the least*". I provide no evidence for this (**ipse dixit**) but the rest of the book has primed you to believe (perhaps undoubtedly) that this statement is true.

The latter half of the final sentence frames water restriction as a non-restrictive diet, yet: (i) it is restrictive (**misleading**); (ii) I have provided no evidence of these claims (**ipse dixit**); (iii) I have provided no evidence of this being a sustainable diet (**ipse dixit**); (iv) I have provided no evidence of the long-term health effects of the diet (**ipse dixit**); and (v) I have made up that it takes a day or two for the body to “adjust” (**lies**!). Basically here, I prime you to believe the rest of this section by using **confident** language with no evidence (**ipse dixit**).

The fundamental key to weight loss is what is known as negative energy balance. Energy balance is when your energy expenditure and losses equal the same amount of calories as you consume and produce. This sounds very simple but has many different aspects to it. You expend or lose energy in four different ways (Hall et al., 2012; Kjølbæk et al., 2017; Livesey, 1991; Rigaud et al., 1987; Southgate & Durnin, 1970; Westerterp, 2004):

1. *Your basal metabolic rate: how many calories you burn just staying alive (breathing, heart beating, brain functioning, etc); in most people this makes up the large majority of calories burned*
2. *The thermic effect of food (also known as diet-induced thermogenesis): the extra calories you burn when you metabolise energy from food. Typically, you use about 0-3 % of the energy you consume from fat to get the energy from fat, about 5-10 % of the energy from carbohydrate, and about 20-30 % of the energy from protein (and 10-30 % of energy from alcohol!). So overall, on a standard diet, about 10-15 % of the calories you eat will be expended just getting the energy from your food*
3. *Physical activity: the amount of energy you use doing any activity above just living. This might be a tiny amount of energy (scratching your head whilst asleep) or a lot of energy (running a marathon)*
4. *Loss: you also lose some energy in your faecal matter and to a lesser degree urine; these losses are nutrients that essentially did not get absorbed during digestion or utilised during metabolism, and can be as high as 10 % of the calories you consume*

You consume or produce energy in two different ways (Bergman, 1990; Hall et al., 2012; Kasubuchi et al., 2015; LeBlanc et al., 2017):

1. *Food and drink: the amount of calories you directly consume from food and drink. Roughly, this can be broken down into four energy-available macronutrients which have different amounts of energy per gram: fat (9 calories per gram), carbohydrates and proteins (both 4 calories per gram), and alcohol (7 calories per gram). Water is of course another macronutrient but does not contain accessible energy*
2. *Gut bacteria: certain bacteria in your gut produce short chain fatty acids; some of these get absorbed and used as energy by the body. This can be as high as 10 % of the your total energy “intake”*

Figure 1 below shows these six energy balance factors: [Figure 1]

In these two paragraphs, I again present knowledge you may not have heard before, such as faecal energy loss and gut bacteria energy production. As before, this makes you feel like the book is a good and knowledgeable investment and increases your trust in my detail-oriented approach (**appeal to authority**, **proof by assertion**, **illusory superiority**). If I am willing to talk about faecal energy loss, there is no way I would be missing any studies on water restriction, right? These two paragraphs were quite good fun to write. This was mostly knowledge I confidently knew, but wanted to find references to back up my points. This is of course the wrong way to go about things: first you should find evidence, then you should form your claims based on the evidence. The things I was most confident about were easy to find evidence for (I was confident because I wrote about them in my PhD thesis, so at least I knew them based on evidence).

One of my previous postdoctoral position was a study on gut bacteria though, so I knew that we could lose energy in our faeces and equally gut bacteria could produce some energy. *However,* I had 10 % as a figure in my head, and I literally had no idea where I got that figure from. So I did what I think most diet gurus do when in doubt, and I scoured Google Scholar for *anything* that supported my 10 % figure. This was not as easy as I hoped, so I just cited every paper I came across that could be interpreted as saying "10 %". A hint to seeing whether people have really understood the references they cite or not is whether the citations are with the statement. Typically you would cite evidence after each claim, but here, I cited the evidence for all the points together (sort of a **gish gallop** approach).

If you read the references, you will see for the four components of energy expenditure, four of the six citations relate to faecal and urinary energy losses, and two citations cover the other three components. Citing in bulk like this gives the impression I have done a lot of reading and I am thorough, but in reality can mean I am trying to find anything to fit my idea.

For the record, the 10 % energy figure does seem to be true under certain circumstances. But why do I even need to mention this? Without getting your gut bacteria and poo assessed, you will not know how much energy these particular aspects produce/excrete. Since they could equate to roughly each other, it is a moot point, stated only to show my intellectual prowess and boost the readers **ego** with another pub night nugget (sorry, couldn't resist the pun!) (**appeal to authority**, **illusory superiority**).

As you can see this is very complex already. A successful diet aims to increase energy expenditure and/or reduce energy intake. The regulation of all this fundamentally comes down to your appetite; I say this because exercise increases how hungry you get by more than the calories you burn during exercise, making exercise alone a difficult method to use to lose weight (it is very helpful for weight maintenance though) (Hopkins et al., 2010). If getting people to address their appetite through food-related interventions worked, we would not have an obesity epidemic on our hands. Yet everyone seems to have been ignoring the part of our diet that contains no calories, is very easy to modify, and spontaneously makes you reduce your energy intake with no hunger pangs or cravings to worry about: water!

Key message:

Diets are difficult and energy balance is complex, but avoiding excess fluid reduces appetite effortlessly

What I wrote here about exercise is incredibly unnuanced; this was deliberate because I am not a specialist in exercise and appetite. Once again, I found a reference that agreed with my narrative, and I did read many that (at least partially) disagreed with my statement because it is a very complex area of appetite (e.g. King *et al.*, 2012; Martins *et al.*, 2007).

My intention for including extra details like gut bacteria and exercise was to produce a perfect balance in your head of "kind of makes sense" *versus* "kind of confused". In this situation in real life, I have often felt that my confusion is down to me not being smart enough to fully understand the message. I now believe that in situations like selling a diet book or other bullshit, this is done to disempower the reader (subtly **gaslighting** them to trust the author). Along with everything else, the reader has trust in the author (both their intellect and their integrity); thus the confusion cannot possible be that the author lacks understanding. This firstly abstains the author from any misinterpretations as they can always reply with "that is not what I meant", but secondly mitigates the reader from reading external sources any further. The reader trusts the author knows, so they will just mull the idea over (if at all) until they can make their own sense of it all.

I go on to reiterate my **false premise** from the start of the book by stating how the establishment has failed us all and "ignored" (what I have presented as) obvious evidence (**conspiratorial thinking**). Of course the hero in this is water which I have stated as the zero calorie modifiable option; this is true, but since I am promoting less water, the calorie content seems like a superfluous detail. The final statement "*no hunger pangs or cravings to worry about*" **primes** you that this is a successful and viable diet (feeding the **placebo effect**). I also state no cravings, though one might argue that thirst is a craving, and much more powerful than hunger.

How can (lack of) water have such effects though? Water restriction results in a phenomenon known as "dehydration-induced anorexia" (Boyle et al., 2012). Before you worry, anorexia here is simply a term to describe loss of appetite (literally: an meaning without, and orexis meaning appetite). Dehydration-induced anorexia occurs primarily from losing water from your cells ('cellular dehydration'); in other words, you cannot cheat this effect easily by using drugs like diuretics as these remove water from outside your cells (extracellular compartments, like your blood). When you stop drinking, you lose water roughly equally from both inside and outside of the cells, so you trigger this rather extraordinary appetite response.

None of what I have written here is untrue (to my knowledge), but it is **misleading**, and hopefully you will see why as I go through the claims in the rest of the section. The first thing to point out though is that dehydration-induced anorexia has not been tested, let alone proven, to be a reliable effect *in humans*. All the references relating to dehydration-induced anorexia are in rodents (**false attribution**). I do cite a review by Bankir *et al.* (2017) which states:

"If prandial thirst is not quenched by drinking, then further food consumption is reduced, a phenomenon known as dehydration-induced anorexia that could be observed in young patients with congenital nephrogenic diabetes insipidus (40)"

If you follow that reference, it is to a paper by Bockenhauer and Bichet (2017) who present a case study of a 20 month old baby with a condition called diabetes insipidus. Thus I do not believe this provides sufficient evidence of dehydration-induced anorexia to be a true effect in average adults (whom a diet book is targeted at). It could be a true effect, I think it is to be honest, but currently we do not have enough evidence for (or against) it.

Additionally, these rodents used in the dehydration-induced anorexia studies are typically given very salty water to drink (hypertonic saline) to dehydrate them; this bears no semblance to avoiding drinking fluids that the Watertight Diet promotes. Moreover, I discuss various appetite hormones, and again these studies are all in rodents, often tested by infusing the hormone directly into the brain. These studies are incredibly interesting, but ultimately **irrelevant** to the diet and the mechanisms behind the diet, particularly as we are not rodents. I should also add that in my notes, I commented that nearly everything I wrote was based on the paper by Boyle *et al.* (2012). This was an excellent paper on theoretical mechanisms. Most, if not all, the references I then included were papers that Boyle *et al.* cited; I did not even read the papers. All I have done is turned the speculations in Boyle *et al.*'s paper and presented them as fact. So for the rest of this section, please bear in mind the studies cited are **not relevant** and in many cases were not even read by me, and I will focus on my critique on other aspects of the story I have been building.

There are many reasons dehydration induces a loss of appetite, mostly relating to the regulation of appetite in the brain. Dehydration increases a hormone called oxytocin (Pretel & Piekut, 1989), and oxytocin decreases food intake (Olson et al., 1991). Oxytocin neurons have been shown to connect to cholecystokinin (CCK) neurons in the in an area of the brain that helps with appetite control, called the nucleus of the solitary tract (Olson et al., 1991). CCK in itself is an appetite hormone that makes you feel full.

What has oxytocin got to do with dehydration though? Oxytocin is more commonly known as the "love hormone" because it increases when parents hug their children (particularly strong immediately after childbirth), and is partly responsible for the feelings people get when they take the party drug ecstasy. The oxytocin molecule is nearly identical to the AVP molecule though, so has key roles in regulating our hydration status too (Conrad et al., 1993; Rhodes et al., 1981; Van Tol et al., 1987; Verbalis et al., 1991; Verty et al., 2004)!

As well as the above quite immediate appetite-reducing effects (within a day), after a few days of dehydration, other appetite-blocking mechanisms occur. The most fascinating change in my opinion is an increase in a hormone called glucagon-like peptide-1 (GLP-1); the increase is again is caused by oxytocin (Rinaman & Rothe, 2002). Admittedly, I am a bit biased as my PhD thesis included quite a lot of work on GLP-1. The reason I am so enthused by GLP-1 is that it has a three-fold effect on health: (i) it makes you feel full; (ii) it reduces the reward value of food, so you crave foods less; (iii) it is known as an incretin hormone because it works with your pancreas to produce insulin and keep your blood sugar in check and your pancreas healthy. So anything that increases GLP-1 has two thumbs up in my book!

As a brief reminder, all the above information is not in humans and bears no semblance to The Watertight Diet. Moving on though, I state here the effects are "within a day", having provided no (human) evidence for that statement (**ipse dixit**), and the subsequent statement regarding what happens after a few days has also not been demonstrated in humans (**ipse dixit**, **misleading claims**). I frame the change in GLP-1 as "fascinating", this gets you as the reader excited and intrigued about GLP-1 changes, but also **primes** you to recall any factual information about GLP-1 as more impressive than it actually is. I also fail to mention the multitude of other factors that can increase GLP-1, including sugar!

I go on to discuss my PhD including GLP-1, affirming my status as an expert in this hormone (**appeal to authority**). I am genuinely quite fascinated with GLP-1 as it does seem to have some potent properties, though I am sure we could say that of any hormone (I am quite happy to admit my love of GLP-1 is perhaps a bit irrational!). It was a hormone I measured in my PhD for a study looking the health and appetite effects of sugar at breakfast. It was a key mechanism I was interested in but to say my thesis "included quite a lot of work on GLP-1" is a bit misleading. I wrote about GLP-1 but actually failed to measure it due to me buying the wrong analysis kits. Is that the impression you got after reading Part I? Unsurprisingly, I rather badly **misled** you.

Whilst the three properties I outline about GLP-1 are evidence-based, I have not cited any evidence for the statements (**ipse dixit**); again, sometimes true claims are not properly narrated.

Moreover, in the brain, there are two key signalling molecules ('peptides') that tell you that you are hungry: neuropeptide Y (NPY), and agouti-related protein (AgRP). When you stop drinking, you will likely continue to eat meals when you normally would, but you will probably *find that you eat less at each occasion; this is from lower NPY activity! In other words, hunger signals in your brain become weaker (Boyle et al., 2012; Salter-Venzon & Watts, 2009). The final appetite hormone that is affected by avoiding excess fluid intake which I want to highlight is ghrelin. High ghrelin levels make you hungry, but it is most strongly suppressed by intestinal osmolality (remember, osmolality is how concentrated things are, but this time in your intestine rather than your blood) (Cummings, 2006; Overduin et al., 2005). Therefore, by not drinking, you allow your gut concentration to increase and this stops you feeling hungry.*

Key message:

Avoiding fluid increases hormones that make you feel full, and decreases those that make you feel hungry

This paragraph is full of **misleading** and **false claims**. For example, "you will likely continue to eat meals when you normally would…"—this statement is based off of one study in rats given salty water to drink to dehydrate them (Boyle *et al.*, 2012). I then turn your attention to ghrelin. I cover my back here and say "*might* also be affected by water restriction". This is because ghrelin concentrations in the blood have not consistently been shown to be altered by hydration status in humans (Zaplatosch & Adams, 2020). The increase in intestinal concentration from fluid restriction cited to cause the decrease in ghrelin is a mix of true and false statements. Intestinal concentration does impact ghrelin secretion, but there is no evidence that intestinal concentration is altered by dehydration. Absence of evidence does not equate to evidence of absence of course, but without evidence, I have sold you a diet based on my own guesswork. I am rather more confident you would want to follow a diet plan based on evidence though.

Many bullshitters use mechanisms and ideas to back up their claims. In this case, just because in theory dehydration might increase gut concentration and therefore reduce hunger, it does not mean it will happen like that in humans. Do not accept ideas as truth; quality human data should be presented to back up claims.

It makes sense for appetite to be lessened during times of fluid restriction (Bankir et al., 2017). If you remember earlier I mentioned that when you stop drinking, your blood concentration increases? Well, this also happens when you consume solutes, such as salt. When you eat salt, this gets absorbed into your blood stream, and water then follows because of osmosis. As water moves into your blood stream (and anywhere else the salt has been distributed), your blood concentration stays roughly the same. But if you are dehydrated already and you do not drink with your food, your blood concentration will end up taking water from other areas of the body. As I hopefully demonstrated above, this is not dangerous; the fact your appetite goes away helps prevent it being dangerous! It therefore creates a negative feedback loop (Figure 2) (negative feedback loops, despite sounding bad, are actually good as they stop things getting out of control): not drinking increases your blood concentration and this reduces your appetite and stops your concentration getting too high:

Of course, anything in excess will be dangerous including too much salt in your blood. So listen to your body and the appetite signals it is giving you—these will tell you when you should eat, and because this is so tightly regulated, your eating will occur at optimal times for your body to handle the salt you consume.

The physiology bits in this are broadly right (albeit oversimplified), but I have added my own **spin**. I have framed the negative feedback loop as good in the wrong kind of context and missed out some details. That particular loop also triggers thirst so you drink to balance out the high salt concentration. If you "listened to your body" (discussed further below), you would break the diet at this point and drink fluid. Another way to think about this feedback loop is that the salt concentration in your blood is so tightly regulated, that your body takes a really extreme measure to keep it in check—in this case, it makes you lose your appetite (well, at least if you are a rat)! Same information, but different spin provides a completely different perspective on the phenomenon!

More concerningly though is how I have deferred any danger onto you as the reader/follower of the diet: if your concentration gets too high, clearly you were not listening to your body enough (which probably told you to drink, but I told you not to drink)! Think about it: what does "listen to your body" actually mean? Things most people can "listen to their body" for accurate information: bladder fullness, excessively loud volumes/bright lights, rancid tastes, cuts and injuries, fatigue, temperature, etc. Things most people cannot "listen to their body" for: high blood pressure, high blood sugar, most (small) immune responses, cholesterol levels, early liver disease, and yes, slightly high blood concentration (until you get thirsty) (etc).

I also state that you should listen to your appetite signals; this is a **misrepresentation** of appetite, reducing it down to very specific signals and hormones. We know this is not the case and lots of things affect appetite (Government Office for Science, 2007). But in the context of this diet, once again, I **contradict** myself. At the beginning of the diet, I moan about oversimplifying complex systems, yet here I am doing just that (again). Further, if part of my instructions to make this diet successful include "listening to your appetite" then why do people not just do that to begin with?

It therefore makes sense that when we dramatically reduce our fluid intake, our appetite reduces as this prevents the salts in our blood getting too concentrated, and our body cleverly regulates this by altering our appetite hormones and how our brain responds to appetite signals. But all that is quite theoretical, and what happens in a lab does not always work outside the lab. So what does more 'real life' research show?

I am essentially **gaslighting** here. I am admitting I have given you inadequate evidence (though not really explained why the evidence is theoretical or why I chose to use it), and maybe you were starting to get sceptical, so I will mitigate that scepticism by presenting the evidence I want you to see (**balance trick**).

Let us go back to my three day study of no fluid (Carroll, 2020b). When I stopped drinking my hunger decreased, and had all but vanished by the third day. Similarly, my fullness was consistently high every day when I was not drinking. By the end of day 1, I also noticed something quite peculiar: my desire to eat was basically gone. I have participated in lots of nutrition studies over the years, and even when I have not been hungry, I have still in some way wanted to eat. I imagine this lack of wanting to eat might be related to my GLP-1 increasing (though I did not measure this, it just seems likely). Equally, before the study started (when I was pre-loading with lots of water) and when I was rehydrating after the three days of no fluid, my hunger was much higher, as was my want to eat. Part of this was probably an increase in ghrelin from diluting my gut with all this excess fluid, but regardless of reasons, this rapid reversal of the appetite loss when reintroducing fluids is well documented so not unexpected (Watts, 1998). I ran some correlations on the data too, and found strong relationships showing that the longer I went without fluid, the lower my hunger *was, the higher my fullness was, and the less I wanted to eat. I also desired fatty and savoury food much less too.*

I am sure you have understood by now that this is all **anecdote.** I go the extra mile though and add my own speculation of my experience with theories about hormones I had outlined above. This gives the **illusion of consistency** and helps you to relate to the previous paragraphs which might have been a bit jargon-heavy. The paper I cite stating this is well-documented (Watts, 1998) is based on rodents too, like the rest of the papers so far (**misleading use of evidence**).

It is all well and good that I felt this way, but how did any of that change my eating? Well the day before and the day after the fluid restriction when I was consuming ample fluid, my energy intake averaged 1731 calories per day. But during fluid restriction, my energy intake averaged just 1012 calories per day. That is a difference of over 700 calories per day, and honestly this was without any effort at all.

This is a **misrepresentation of the data**. What I wrote was *technically* true if you are happy with averages and ignoring trends and methodological quirks. The day before starting, I ate a final wet meal in my last hour of being able to drink. This means in that 24 hour period, I ate a meal I would not normally have eaten, thus inflating my average "hydrated" energy intake. This meal, along with copious amounts of fluid as pre-hydration, made me *very* full which may have contributed to my reduction in energy intake on day 1 of no fluid. Day 2 of no fluid, I ate a regular amount for my energy needs, and actually 50 kcal more than when I was rehydrating after the study. So the picture I painted is not as clear cut as it sounds. And again, even if it was very clear appetite suppression, it is still **anecdote**!

Now, admittedly, the food I ate was very low water content too, so each day my total fluid (water from foods and drinks) was less than 50 grams. It is perfectly safe for most (healthy) people to do this for a few days, but you do need a bit of extra fluid than that longer term. Hence why I recommend eating normally, and avoiding excess fluid intake by not drinking. Of course, you may want to eat low water content foods (e.g. toast, oil, nuts, flapjacks, dried fruit) so you can drink more fluid (e.g. coffee!), and I would leave that decision up to you. But aiming for a total fluid intake of less than 800 mL (about 1.5 pints) a day if you are a man and less than 600 mL (about 1 pint) a day if you are a women should provide you with the benefits I described above.

I just made 800 and 600 mL up. There is no logic, reason, or evidence for these numbers (**ipse dixit**). But numbers make things sound certain and scientific, hence why I felt the need to include *some* numbers *somewhere*. As a point of reference for this, if you have read anything about low carbohydrate or ketogenic diets, you will notice numbers vary: some say less than 20 grams a day of carbohydrate, others say less than 50 grams a day, and the more flexible approaches might even go as high as less than 80 grams a day. Have any of these books provided actual specific long-term causal human evidence for that exact amount? Or have they used any of the range of tricks I have outlined to make their conclusion sound evidence-based but actually it is not? I invite you to re-read their recommendations to see for yourself. Equally, the 5:2 fasting diet often states that on fasting days you can eat 500-600 kcal. These numbers are plucked from somewhere, but I see no evidence of that place being the scientific literature!

I will finish this section by highlighting that the above is not just my experience in terms of appetite; plenty of research has shown similar rather extraordinary effects. To give some *examples, above I described a study by Vivanti et al. (2008); within this study they looked at body mass index. Body mass index can be used as a proxy for appetite regulation as if you are eating the right amount relative to what you are burning through activity, you will have a healthy-range body mass index. Vivanti et al. (2008) found that those with dehydration had on average a body mass index that was seven points lower—their body mass index was 20.0 kg/m^2 (at the lower end of the healthy range) compared to those with normal hydration who had an index of 27.5 kg/m^2 (which is well within the overweight category).*

I set up these final paragraphs with a **prime** that "plenty of research" has shown similar to my anecdote. Plenty is, of course, left undefined. And admittedly, I did not say "plenty of relevant research", so more fool anyone who believes me! Following this is another **contradiction**; earlier in the book, I bemoan observational studies because they are riddled with problems that basically render them useless (apparently). Yet, I am now using an observational study (Vivanti *et al.*, 2008) to back up my argument. This study provides zero evidence that the dehydration caused the lower BMI (**misleading use of evidence**). Actually, I could not even quite work out how they defined dehydration either, so it is unclear if there was a distinct difference in hydration states on the patients at all.

The language use is quite subtle but was chosen to be **leading**. Note how softly I state BMI 20.0 kg/m^2 ("*lower end of the healthy range*") compared to how I frame BMI 27.5 kg/m^2 ("*well within the overweight category*"). One could argue that BMI 20.0 kg/m^2 is "nearing the unhealthy range" which is 18.5 kg/m^2 or lower (particularly in the context of hospital admissions). See how that framing makes a BMI category sound worse than it is? Whilst neither of my original statements were untrue, the language was used to emphasise that those with better hydration status had a higher BMI.

Similarly, Salari-Moghaddam et al. (2020) found those who drink less than two cups of water per day reduced their risk of having obesity by 78 % compared to those who drank more than eight cups per day. Thinking back to the above, two cups per day is roughly in line with my recommendations set out above. In a very early study, Nadal et al. (1941) experimented with different methods of dehydrating people, and also found dehydration-induced anorexia though they did not give details on how much calorie intake was reduced by. This is such an interesting but completely ignored topic, and I could go on and on but want to save some of the details for Part II. So for now, I just want to emphasise that this is a well-established phenomenon (Bruno & Hall, 1982; Callahan & Rinaman, 1998; de Gortari et al., 2009; García-Luna et al., 2010; Jaimes-Hoy et al., 2008; Reyes-Haro et al., 2015; Rinaman et al., 2005; Watts, 2000; Watts et al., 1999).

Key message:

Losing your appetite when avoiding excess fluid is an incredibly well-established phenomenon

I start this paragraph again by citing observational research (Salari-Moghaddam *et al*., 2020) (**contradiction**). Following this, I **misrepresent evidence**. The study by Nadal *et al.* (1941) was very interesting but only found dehydration-induced anorexia in humans when the dehydration was induced by severe salt restriction plus *excessive* water intake; in some ways that is the exact opposite of what the Watertight Diet tells you to do!

Phases like "*I could go on and on*" can typically be interpreted as "I have run out of superfluous details now". Admittedly, this seems more common in online conspiracy theories rather than diet books specifically. To cover my back and show that my statement is honest, rather than admitting I have ran out of things to say, I again use **gish gallop** to bombard you with references. These were all the studies I found on the first page of a Google Scholar search for “dehydration-induced anorexia”. I read none of the papers. The keen-eyed readers might notice I cited 9 papers here when scholar gives you 10. Well, one of the papers mentioned the rapid reversal of dehydration induced anorexia upon drinking, so I included that in the relevant paragraph previously (admittedly, I did skim the abstract of this one!).

This may seem harsh and perhaps unrealistic, but this does happen. A lot (sorry, **anecdote** coming up). I remember emailing the creator of a food brand who claims the medium chain triglycerides in their product were burnt instantly so you couldn’t gain weight if you ate them. I asked what evidence he had and he literally sent me pages of links which were clearly from an ill-thought-out search. I ordered them into categories where they were relevant, irrelevant and which ones supported his claims. It took ages. He never replied. Anyone frequently involved in nutrition “debates” online can probably also attest to this kind of behaviour. I do not know how prevalent this is, or other tricks. That is besides the point. They are used and now you can look out for them hopefully critically.

Finally, I have **cherry picked** studies. I have missed out any study that shows dehydration does not affect appetite, or where drinking water before or with food did not alter food intake, or actually reduced it (Carroll *et al.*, 2019b; Corney *et al.*, 2015a; Corney *et al.*, 2015b; Corney *et al.*, 2016; Kelly *et al.,* 2012; Parretti *et al.*, 2015; Van Walleghen *et al.*, 2012). After all the **deceit** I have fed you in this book, there is no reason for you to believe that the studies I have just cited are all the studies I am aware of. That is fine and no doubt I am not aware of many other relevant studies; my point is that my original claims did not even consider contrary evidence. I gave the illusion of evidence-based, objective, and well-read, but I was none of those things.

The keen eyed will noticed that I have just used **gish gallop** by citing seven studies to make one point. As previously noted, the use of logical fallacies and tricks is not necessarily black and white. My purpose above was to demonstrate that there are many studies I missed out in Part I that directly go against my narrative; I left them out and **cherry-picked** other studies to be deliberately misleading. Unfortunately, to demonstrate how biased I was being, I had to use a trick (**gish gallop**) myself for demonstrative purposes. Complicated isn’t it!

I also want to add a couple of extra points to this section. Firstly, I am sure you are aware of the success people have on the low carb diet. A lot of people attribute this to the metabolic switch from carbohydrates to ketones. But with the low carb (or ketogenic) diet, comes body water loss. This is because to store carbohydrates, you need three times as much water as there are carbohydrate, so when you consume carbohydrates, you also encourage your body to store excess fluid (Carroll et al., 2019a). When carbohydrates are dropped from the diet, there is an initial rapid weight loss from losing this excess fluid. There also appears to be a rather rapid reduction in appetite. I cannot help but feel that this is exactly what I have described above, particularly considering the water loss is directly from cells which is the driver of dehydration-induced anorexia. Low carbohydrate diets also reduce how much water can be absorbed, so often people experience mild dehydration and more urination than usual. This suggests the dehydration is prolonged during such a diet, but due to its controversial nature has not even been considered as a reason for the success of the diet.

I have not provided any evidence for all bar one statement (**ipse dixit**). I was kind of impressed with myself for this paragraph because I feed into claims about the ketogenic diet, which whilst it has utility and is very interesting for many reasons, the culture surrounding this diet is shrouded in fallacies, bias, and conspiratorial thinking. I have now one-upped the low carbohydrate diet by saying all the effects are because of hydration status not ketone production and utilisation! (Apologies to most readers, that will probably be more interesting to read if you are in the field of nutrition science!)

Further, in terms of how your metabolic response might aid your weight loss, my research showed that even at low levels of dehydration, such as those you will likely experience after one or two days of avoiding excess fluid; the amount of fat you burn increases after eating, compared to when you are well hydrated (Carroll et al., 2019a). This means that behaviourally, you will eat less, whilst metabolically you will also be burning more fat! To add to that, if you remember back to when we discussed blood sugar, you will recall that when we drink with food, we get a higher blood sugar response. This was attributed to water drawing nutrients out of the stomach prematurely. But this lower blood sugar level when we stop drinking might also represent that we are actually absorbing fewer calories too. This means that gram for gram, you absorb less energy when you stop drinking excess fluid, which of course is another helping hand to your weight loss success.

Here I correctly claim that my previous research showed that fat burning is higher after eating when people are dehydrated. However, fat and carbohydrate burning are on a spectrum, so if you burn more fat, by proxy, you burn fewer carbohydrates and *vice versa*. My study showed that metabolic rate (how many calories you burn per minute) did not change according to hydration status. So in this case both groups burned the same amount of calories, but when people were dehydrated, a greater proportion of this energy was from fat. As such, the claim I make is intentionally **misleading** and **misrepresenting the evidence**.

This claim of burning more fat is often cited in both the low carbohydrate and fasting communities. In terms of weight, it is calories that matter, not whether you are burning fats or carbohydrates (these differences are nuances rather than determining factors of your weight loss success/failure). Additionally, I mention that fat burning increases after eating. In that study, we gave people what is known as an oral glucose tolerance test, which involves participants drinking 75 grams of pure liquid glucose after an overnight fast. When you consume glucose, you should switch towards burning more carbohydrates for energy. This is known as metabolic flexibility. So when participants were dehydrated, they remained “stuck” towards fat burning mode and did not switch to carbohydrate burning. More importantly though, this was a one day intervention study and looking at fat burning was a secondary outcome so I am not in a position to be able to say whether what we found for metabolic flexibility was “good” or “bad” for overall health (or even a reliable finding). The point is that I did not give the full story in Part I. I also completely made up that we absorb fewer calories when we are dehydrated (**ipse dixit**)…it kind of sounded reasonable though!

Finally, I want to clarify that I am not advising that anyone does anything as extreme as permanently living in a state of extreme thirst. If you want to experience that, it is perfectly safe to do for a few days (assuming you are generally healthy), then you can move onto the diet I am suggesting. I am actually not suggesting anything extreme; just avoid excess fluid. By that I mean you can get more than enough fluid from your foods (perhaps be a bit selective, a diet of soup would be somewhat counterproductive!). I also recommend that you listen to your body through this. You will feel things like a dry mouth but these are just whilst you adjust and will get better over time. You may want every week or so to have a “cheat” day to enjoy fluids that you miss. I think it is important to make this work for you, safely and comfortably. You know the science now, so you can make it happen! Hopefully the next *sections will help with some of the finer details of this diet and empower you to make evidence-based, science-backed decisions on your health.*

Key message:

Avoiding excess fluid is a flexible diet, reduces your appetite, and helps you burn fat

Hopefully now, you can see just how **spun** this conclusion is…

2.7 Summary

To sum, the key messages you should have picked up from Part I of this book are as follows:

1. *Our water needs for survival are vastly exaggerated*
2. *Our water needs are easily met and not getting enough fluid is not a legitimate health concern. Contrarily, there are health benefits to consuming far less fluid than is recommended*
3. *When you truly need water, you will absolutely know about it*
4. *Much of our diet knowledge, including the dietary guidelines, is based on very weak evidence*
5. *Consuming excess fluid actually dehydrates you*
6. *Dietary recommendations to drink more water may actually cause harm*
7. *Dehydration does not affect cortisol or blood sugar (and may even lower blood sugar), but drinking water itself might increase blood sugar and insulin levels, particularly after eating*
8. *Dehydration profoundly reduces blood pressure*
9. *Avoiding excess fluid has a range of health benefits, beyond what is discussed in detail in this book*
10. *Diets are difficult and energy balance is complex, but water restriction reduces appetite effortlessly*
11. *Avoiding fluid increases hormones that make you feel full, and decrease those that make you feel hungry*
12. *Losing your appetite when restricting fluid is an incredibly well-established phenomenon*
13. *Avoiding excess fluid is a flexible diet, reduces your appetite, and helps you burn fat*

Once you have digested (sorry for the pun!) that, you are ready for Part II where we will delve into the details…

Finally, I added this checklist for the benefit of Part I. The intended purpose was that I had feeling that many readers (who do not know the intention of the diet) would read Part II and think "yeah I didn't believe that anyway". We will go into that in Part III, but if you read on from these 13 points in Part I, there must have been something that had in some way convinced you to read on. Think about it like this: before reading this book, if your friend had said to you "hey I think you should try this diet. Basically all you do is stop drinking any fluids", how would you have reacted? Comparatively, after reading those 13 key messages after Part I, how did you feel? If you did not think the idea was equally as bonkers as when your hypothetical friend suggested it, then my tricks worked their magic.

2.8 Extra tricky details

Before moving on to discuss cognitive biases in Part III, I want to discuss a few tricks in more detail. Note that throughout the book, the fallacies have gone from mild (**appeal to authority**) to quite extreme (**misrepresenting/fabricating evidence**, **claims without**

evidence/ipse dixit, **cherry picking**). This is because the first part of the argument needs to sound plausible, hook you in, get you on side. Once you're in, your trust has been gained so more liberties can be taken; you're less likely to be sceptical and/or fact check at this point. So I start with some mostly (albeit spun) truths, and work my way down to in some cases complete fabrication of what studies showed. Studies I have misrepresented are often more technical to read and this is deliberate to ensure you cannot call me out on my bullshit. I get the impression this is how many people get lured in; something small seems interesting, which leads to something else, eventually going down a bullshit wormhole (I am pretty sure website algorithms actively encourage this). I guess this means that some types of misinformation could be "gateway bullshit" to a much darker and less trusting world.

This bullshit gateway works in another way too in that your **ego** will stop you wanting to sound stupid. My narrative is gradually working to build your trust in me, and **prime** you for my story. As the book gets deeper and I start throwing about bigger bullshit, wilder claims etc, I have almost broken down your confidence and replaced it with my authority. So if at any point you think "hang on, does that actually make sense?", you're more inclined to agree with my interpretation and think you probably just do not understand, rather than potentially having to admit being wrong if you were to call me out. I would hazard a guess that for many peddlers of bullshit, this is not a deliberate act—they have either copied someone else citing the study (but they did not check whether the claim is correct, or they may also not want to call it out for fear of feeling stupid), or they actually do not understand the study so have honestly misreported it.

Admittedly, this does sound rather **conspiratorial**. These are simply my understanding of how such ridiculous claims manifest so widely in the population. It is an artefact of human cognition, something we have to actively work against. Whilst for the most part I do not think the majority of bullshitters necessarily do this deliberately, I think there are some leaders of movements who make a career out of this stuff very intentionally, so they may use these tricks deliberately. This is all rather manipulative, but some things are quite standard sales tricks, or work along the same kind of principles. There is actually nothing magic here, I just feel the pursuit of knowledge should not be perverted by manipulation. But interpreting evidence is a specialist skill; unfortunately most people cannot do this well, and I would argue that, generally speaking, this takes training, practice, and experience of research to acquire this skill well. We will discuss this more in Part III.