The Psychology of Effective Studying

How to Succeed in Your Degree

PAUL PENN

First published 2020
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge
52 Vanderbilt Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data
A catalog record has been requested for this book

ISBN: 978-1-138-57090-0 (hbk)
ISBN: 978-1-138-57092-4 (pbk)
ISBN: 978-0-203-70311-3 (ebk)

Typeset in Sabon
by Wearset Ltd, Boldon, Tyne and Wear

Contents

Preface

Take care to get what you like, or you will be forced to like what you get.

George Bernard Shaw

Well that's great. One quote into my first book and I've just realised that I'll never say anything as concise and eloquent about studying as a playwright from a period of history where you could walk into a chemist and buy arsenic pills as a tonic for a dwindling libido. I guess it's not like you could have complained if the pills you've bought for being dead from the waist down end up making you, well, just plain dead. Anyway, I digress. The point (yes, there is one) is that wanting to do something is one thing, knowing how to do it effectively is quite another. Indulge me by identifying what the following statements all have in common: "I study psychology"; "I study engineering"; "I study physics"; and "I study English literature". The answer is, of course, that the verb 'study' always comes before the subject being studied. Accordingly, developing effective study skills should always come before developing subject-specific knowledge; they are the tools that empower a student to succeed, whatever their choice of

degree subject. Unfortunately, both research and bitter experience suggest that this is far from invariably the case.

I'd like to tell you about an experience I had as a junior academic that provided the impetus for the development of my lectures on the application of psychology to the development of study skills. It was this material that served as the catalyst for this book. This tale also nicely illustrates just how predisposed even students of psychology can be to using study practices that are as effective as an ejector seat in a helicopter, but slower and more painful! It was a Friday morning (never a popular slot). I was giving a lecture that I thought was being well received. The students who had the Amazon. com or Candy Crush applications installed on their smart devices were happily oblivious to my efforts. Those who had yet to download these apps were smiling politely. About 30 minutes into the lecture a student raised their hand and asked if I could possibly slow down a bit as she "couldn't keep up with" me. To be fair to the student, I have been known to lecture at speeds approaching a Busta Rhymes rap when I'm enthusiastic about something. Joking aside, the student's appeal had stopped me in my tracks somewhat. A bit of investigation confirmed my suspicion. The student in question was trying to make notes on the lecture by taking down what I was saying as close to verbatim as possible. This was a redundant exercise given that the lecture was being audio- and video-recorded. I was reluctant to point this out lest I came across as horribly condescending. I was also concerned that I might have got fixated at being on camera and used my trusty laser pointer to facilitate an impromptu audition for the next *Star Wars* movie.

The student's request aroused a concern that they might not be the only one using the verbatim copying approach. So, I asked the class a simple question: "how many of you are taking notes that are basically excerpts of what I am saying?" Most of them put their hands up. I followed up by asking them to keep their hands up if they could explain the part they'd learned about how memory works that had informed this note-taking approach. All hands were abruptly lowered. Amazon.com orders were put on hold. I think some of the people playing Candy Crush might have even paused their game! I suggested to the class that budding psychologists trying to take verbatim notes from a lecture is a bit like budding chemists looking for a gas leak with a lit match; they should really know better!

Here's the moral of the above tale. If even students who are studying psychology are prone to fundamentally bad study practices, then those who won't get exposition of topics like attention, memory and decision making as part of their degree are even more vulnerable. Happily, there is a simple solution. Acquiring just a bit of knowledge about the application of some well-established findings in psychological research can empower you to study much more effectively. In doing this you become the master, as opposed to victim, of your grades at degree level. That's my main motivation in writing this book. I want to help you learn to study more effectively by encouraging you to adopt effective practices that are informed by psychological research. My other motivation in writing this book is to provide me with an outlet for my references to internet culture and rather sad obsession with the 1980s.

Be honest, how much effort have you previously invested in learning to study more effectively? I wouldn't blame you if you were not well disposed towards study skills tuition. In all honesty, as an undergraduate student, I certainly wasn't! Because of this, for the first year or so of my degree, I blundered along committing exactly the kind of errors in my approach to studying that I'm going to try and prevent you from making with this book. Back then, had you asked me about my disinclination to engage with study skills material, I would have rehearsed the following argument. I had received sufficiently good A-level grades to get onto the degree. I was there to study psychology (not education). Also, to be frank, I did not want precious lecture or tutorial time occupied by someone telling me how to do something that I'd been working on in formal education since the age of five. Enough already! As we shall see in Chapter I, my reluctance to develop my methods of studying was in no small part due to some basic errors in my perception of my abilities. Studying psychology had yet to inoculate me against these errors. Well, either that or I skipped the relevant classes! There was, however, another reason for my reluctance to engage with any skills-based material. Can you guess where I'm going with this?

I got a study skills guide as part of my induction into university and can honestly say that it changed my life. By that, I mean that I used it to prop up the PC monitor on my desk at home. Not exactly the use that the author had intended for their efforts, I'm sure. I just didn't get on with it I'm afraid, but it's hard to tell if that was a reflection on the book, or just my attitude towards study skills tuition

generally. I'd like this book to serve as something other than a monitor stand for you. So, before I put my fingers to the keyboard to produce the proposal for this text, I had another look at my old study skills book and examined some of its contemporaries. I didn't find one that made me think: "if I'd had this as a text when I was a student, I might have spent some time back then practising what I now preach". This got me thinking about what I could do to create the kind of text that I would have used. The remainder of this preface is devoted to me outlining what I've done differently to make this book a useful go-to resource for you. In doing this, I'm going to avoid being critical about other study skills texts. Instead, I'm going to tell you about the positive things I shall endeavour to do in this book. This approach has two advantages. First, it will be less of a turn off for you. Second, it negates the need for me to take Brazilian jiu-jitsu lessons on the off chance I bump into any authors of previously published study skills texts.

The most important part of the mission statement for this book is to ensure that, wherever possible, the advice offered is transparently informed by psychological research. The instruction I offer will not be based on well-intentioned pontificating around my anecdotal experience of being a student or lecturer. This is your assurance the guidance offered within these pages has a good chance of proving helpful if you implement it. I'm going to be using some key psychological research to illuminate effective study practice. However, this is not a psychology textbook. As such, I won't be filling each chapter with fully comprehensive reviews of the literature on particular topics. The research that I do

cover will, by necessity, be limited, selective and used in an illustrative fashion. At various points I will indicate more comprehensive references for anyone that wishes to do further reading. This may sound like a convenient way to insulate myself from a barrage of comments from my peers to the effect of: "a-ha, but you didn't cover study x, y, z". That's because it is! Also, an author must leave something for the second edition *winks*.

On the subject of scope, this book is not a completely exhaustive skills resource. It doesn't contain any chapters dedicated to things like adapting to university life (hint: make finding out when happy hour is on at the student bar a priority). Instead, I've tried to distil things down to the most fundamental topics and keep the amount of advice on each of them manageable and easy to implement. You will note from the contents page that I'm covering the core requisite skills of studying at degree level in eight chapters. Each chapter concludes with a summary that reiterates the key advice that will make your studies more efficient, productive and enjoyable. You can use these chapter summaries as a quick reference once you've read the book. Yes, this does mean that you could just skip to the chapter summaries if you only want the abridged tips and tricks of the trade, as it were. However, you needn't worry about your already significant course reading load being compounded by a study skills text of a size equivalent to *War and Peace*. Sorry if this makes you feel a bit cheated, but I have a life (potentially) and so should you. The downside of its relative brevity is that this book won't make anywhere near as good a monitor stand height enhancer as would have otherwise been the case.

Third, and finally, I'll admit that the promise of some academically informed study skills advice doesn't sound like a barrel of laughs. Let's be honest, in the entertainment stakes it's unlikely that any skills text is going to compete with the latest *50 Shades of Grey* novel. If you're interested, Christian Grey and I do have one thing in common: we both have a pleasure room. Admittedly, mine is less S&M gear and more Hornby 00 railway, but the effect is the same: only a special lady could look inside that room without immediately running away. A study skills text may not be as intrinsically appealing as a racy novel. If you think it is, I'd suggest that you probably need therapy. However, it should at least be marginally more engaging than the assembly instructions for an Ikea wardrobe! Consequently, you won't find an abundance of bullet points, fact sheets, diagrams or checklists in this book. Instead, I've broken all of the chapters down into sub-sections, each of which is a manageable size and has its own specific message. I'll be using deliberately esoteric headings, questions, assorted quotations, various references to popular culture and irreverence to try and keep things stimulating and challenging. If I don't succeed then, unlike the Ikea wardrobe assembly manual, at least this book doesn't come with a bag of fittings for you to lose behind the sofa.

I have one request to make of you as you work through this book. You'll notice that I use key advice to delineate sub-sections within each chapter. When you see a piece of key advice, I'd like you to read the next sub-section of text with a view to answering the following simple question. "How is this key advice informed by the text that follows it?" Before you move on to the next piece of key advice and its associated

section of text, I'd like you to think of an answer to that question. That's it! There are no right or wrong responses. The important thing is that you think of an answer that makes sense to you and that you can explain it! If you can find somewhere to write down your response, all the better! The rationale for me asking you to do this will become clear as the book progresses. For now, trust me on this one: it's worth the effort!

I hope you enjoy this book and, above all else, I hope it helps you to enjoy your studies. I wish you every success.

1

Introduction

Metacognition, the foundation of successful studying (or at least how to avoid being ‘that person’ on the TV talent show)

Nothing is so difficult as not deceiving oneself.

Ludwig Wittgenstein

Key advice: the least skilled are often the most deluded about their ability

You know that look, don't you? That one that Ant and Dec give the camera on *Britain's Got Talent* just before something painful happens. This act will usually have been preceded by several hopefuls that were entertaining, but probably less destined for Broadway, Hollywood than Butlins, Bognor Regis. "This is Doreen from Doncaster" smirks Ant. "She's going to give us a moving rendition of My Heart Will Go On from the feature film *Titanic*", exclaims Dec (who is visibly having trouble containing the giggles). As Doreen shuffles onto the stage living rooms across the nation think in unison: "This is going to be awful. Turn it up!" Of course, poor Doreen murders the song and throughout the country pet dogs howl and hearing aids feedback. Some people even contemplate shoving screwdrivers in their ears when they realise that their fingers aren't up to the job of muting the assault on their hearing. Then it ends and all falls silent for the verdicts from the judges. These are only marginally less painful than the performance. It's OK because this was clearly a joke, right? No one could be that bad and not realise it. Doreen just wanted five minutes of TV exposure to generate some infamy. Mission accomplished. Well played Doreen; many thanks for the car crash TV moment. Except she's not smiling. She looks surprised at the verdicts and her expression betrays indignation and hurt feelings. At this point, people on settees across the land look at each other and say: "It's like she's only just

realising that she can't sing a note! How could she not have known this already?" In academic terms, the *Britain's Got Talent* moment often occurs in the examination room and is a more private, but no less dramatic, crisis. It was brutally (and beautifully) concisely summed up by a piece of graffiti etched into an exam desk I was seated at for my GCSE geography paper back in 1992. It read simply: "Oh Sh*t! There goes college, 1992." If you're currently smiling because you relate to that sentiment, then consider yourself busted. This means that, on at least one occasion, you did an academic version of Doreen on *Britain's Got Talent*. The question is: why?

You will probably have heard the old maxim that the first step on the road to recovery is acknowledging you're sick. In the same way, the first step on the road to improving your study skills is acknowledging that there is room for improvement. This means that you must be able to effectively monitor and evaluate your current level of attainment. In psychology, we refer to this as metacognitive ability. If your metacognition isn't veridical then your academic development is fundamentally handicapped right from the outset. Why would you spend time working on a skill if you think you are already good enough at it? Kruger and Dunning (1999) provided the seminal paper in our understanding of metacognitive ability. In their first experiment they asked psychology undergraduates to review a series of jokes that had been pre-rated for humour by a panel of professional comedians. They were asked to provide their own ratings for how funny they thought the jokes were without seeing

the prior evaluations from the professionals. So, the performance measure for the participants was the extent to which their judgements of humour corresponded with that of the panel of professional comedians. After they had given their ratings, participants were then asked to predict how well they thought they could judge the quality of the jokes in relation to their peers. They did this by giving a percentile estimate of their position within the group of participants. For example, saying '50%' would mean that they thought their performance put them in the middle of their group. Overall, the results indicated that the students over-estimated their ability in relation to their peers. However, that was not the headline finding. A rather cruel twist emerged when the data was examined from the least competent at rating the quality of the jokes (i.e. the bottom 25% of the group). These individuals exhibited the biggest gap between their estimated and actual levels of ability relative to their peers. In other words, the more incompetent they were, the more deluded they were about their competence. Consider yourself forewarned. If you're at an open microphone night in a comedy club and a psychologist decides to share some of their material, hit the bar; you won't be missing much.

At this point you might question whether the results of a study examining the relationship between perceived and actual ability at rating humour translate to more academic contexts. Unfortunately, in the very same study, Kruger and Dunning found an identical pattern of results in tests of logical and grammatical ability. Over four experiments they reported that participants whose objective

performance put them in the bottom 25% of a group gave subjective estimates of their ability that placed themselves near the top third of that group. OK, so that's not a great omen, but it was just one series of experiments, right? I'm afraid not. The Dunning–Kruger effect, as it has become known, has been very well replicated over two decades. It's the chief villain of the peace when it comes to metacognition. It doesn't just affect an individual's estimate of their performance relative to a group of peers. Researchers have also found that it applies when people are asked to predict their own attainment in isolation. So, it also shows up when you ask people to predict their score on a test. The least competent individuals exhibit the greatest discrepancies between their anticipated score and their actual score.

At this point I'm hoping it's obvious why any book that aspires to help you develop your study skills needs to start off with the Dunning–Kruger effect. It's the most fundamental metacognitive barrier you'll face on the road to improving your competence at studying. It can only be addressed with concerted effort to get the very kind of help and instruction that it lulls you into thinking you don't need. If, having read the above, you're concerned enough to keep reading, fantastic. If you're still convinced you don't need any help and have only read this far because your smart phone battery has died, then prepare for some discomfort.

Delusion comes in many forms, usually quite flattering

2

Key advice: having information available to you gives you an illusory impression about how much of it you've absorbed

We're over the first hurdle to this book being useful to you. You're still reading, which means you're receptive to the suggestion that you might benefit from some study skills instruction. Unfortunately, the Dunning–Kruger effect isn't the only metacognitive quirk that can condemn us to being perpetually dumber than we should be. With that in mind, we now run into a second issue, quite closely related to the first. Let me put it to you by asking a question. How good do you think people are at judging whether they will be able to recall a piece of information? Koriat and Bjork (2005) were interested in just this question. They also wanted to establish whether people could spot features about the way that information is presented that can determine their likelihood of being able to recall it. For example, let's say I present you with the following word pair: 'Fire' and 'Blaze'. Then, following a period of time, I show you one of those two words and ask you to recall the word it had been paired with. How confident (think of a percentage) would you be in recalling that word? Now, would that figure differ according to which of the two words I used as the cue and which served as the required answer? This scenario corresponds with the basic experimental set up of Koriat and Bjork. In their

experiment, participants were asked to memorise a series of pairs of words. Following the presentation of each pair they were asked to indicate the probability that they would recall the second word when presented with the first. This is known as a judgement of learning. Here's where the clever experimental manipulation occurred. Think of the word pair I gave you above. How many words can you think of as being associated with the word 'fire'? Quite a few, I'd imagine: 'man', 'fighter', 'exit', 'axe', 'escape', 'engine', 'extinguisher', 'storm', 'fly'. Be honest, how far would the word 'blaze' have come down that list? The experimenters called this a backwards pairing, i.e. the target word was not likely to be elicited by the prompt word. In contrast, how many words can you think of as being associated with the word 'blaze'? Not that many, I'd guess. In fact, the word 'fire' would probably be the first, if not the only, word that came to mind. This was referred to as a forwards pairing, i.e. the target word was very likely to be elicited by the prompt word. Of course, the likelihood of remembering a target word under forwards pairing is much greater than backwards pairing. Do you think the participants in this experiment realised this and gave their judgements of learning accordingly? Did you? Overall, the participants gave judgements of learning that were equivalent for the forwards and backwards word pairing conditions. However, as you might now expect, their recall performance was significantly worse for the backwards pairings.

The illusory impression of learning evident in Koriat and Bjork's study was caused by the participants not

anticipating the discrepancy between the conditions of learning and those of testing. They didn't realise that although the forwards and backwards word pairings appeared equally easy to remember when both words were present, only one of the words would be present upon testing. Therefore, they didn't take account of how readily each word in the pair generated the other word in making their judgement of learning estimates. An analogous judgement of learning error can easily occur when you are reading your source materials and considering the likelihood you will remember what you have read. Things that seem obvious or easy when you have the questions and the answers are not so easy when you're only left with the questions. Just like forward versus backward word pairings, answers generate questions more readily than questions generate answers. You might want to keep this in mind next time you're *sure* you'll remember something you've just read for that forthcoming test!

3

Key advice: being able to remember something is not an indication that you understand it

So, people aren't necessarily great at judging whether they have committed bits of information to memory. However, you might argue that this is a bit pedantic and that what

matters more is how accurately people can judge whether they have understood the gist of something? OK, let's go with that line of thinking, but first it's worth pausing to consider how you might set up a parsimonious experiment to test comprehension. How do you ascertain whether someone understands a piece of information, as opposed to just whether they can recall it? Well, one approach is to see if they understand the meaning of the information by deliberately manipulating it so that it makes less sense. An easy way of doing this is to use contradiction. To spot contradictions you need to understand the information well enough to know that some of its constituent parts can't logically co-exist. For example, let's say you read a piece of text that claims that an individual was born on a particular date in one sentence, but then gives a different date in the following sentence. If you had understood that text, you would spot the contradiction because you know that it's not possible for someone to have two dates of birth. Therefore, spotting contradictions is a useful index of whether someone has understood a piece of information. Glenberg, Wilkinson and Epstein (1982) conducted an experiment that used contradictions in text to establish how well people made judgements about whether they had understood what they had just read. Participants were asked to read a passage at their own pace and as many times as they liked. They were told that they would be tested on the content and that the text could contain one or more contradictions that they should search for as they were reading. The participants were instructed to note down the numbers of any lines of text that contained

contradictions and briefly indicate why they thought the information was contradictory. Having read the passage until they were content, the participants were then asked to judge how well they understood the text on a four-point scale and asked two true/false questions about the contents of the passage. They repeated this procedure for other passages of text, covering different topics. Each passage was either one or three paragraphs in length and, unbeknownst to the participants, there was contradictory information in every text. The contradictory information always appeared in the same place: the last two adjacent sentences right at the end of the piece. If a participant claimed to understand a passage of text and then correctly identified the contradictions present, then their perception of their understanding was accurate. However, if they claimed that they understood the text, but didn't spot the contradictions then they were exhibiting what psychologists refer to as an illusion of knowing. In other words, they thought they had understood the material when, actually, they hadn't! Remember, these were undergraduate psychology students who had been explicitly warned about contradictory information and told that they would be tested. They had to read short passages of text, where the contradictions were always in the same place and they got as long as they wanted to read and re-read each passage. Short of highlighting the offending text, the experimenters couldn't have done much more to tip the odds in favour of the students. So, what proportion of them do you think reported understanding the text, but missed the contradictions present? Go on,

have a guess. Would you believe that up to 51% of them reported that they understood the text well, but missed glaring contradictions?

Having an inflated sense of the extent to which you understand something is not helpful at the best of times. Anyone who has previously handed in a piece of coursework and confidently expected it to be met with a Nobel prize only to be horrified when they get the academic equivalent of a Golden Raspberry will attest to this. However, when illusions of knowing compromise your benefit from study skills material designed to teach you how to get good grades, it's particularly damaging. For now, it suffices to say that all those times you binge read a 30-page book chapter and gave yourself a pat on the back for your Zen-like powers of comprehension might not have been entirely warranted. Still, hindsight is 20:20, right? Speaking of which…

4

Key advice: knowing something and implementing what you know are not the same thing

We now turn to the last major obstacle to you benefiting from this book that I'm going to cover in this introduction. I'll illustrate this in practice by using the TV game show *Who Wants to Be a Millionaire?* Here's the scenario: the contestant is up to, say, £64,000 and then gets a question

that you are convinced you know the answer to. They, on the other hand, do not share your confidence. Your immediate reaction is probably to scoff and think: “Come on, this is an easy one.” The contestant asks the audience, but they come back with a completely equivocal response. This makes you even more incredulous. Desperate, the contestant then phones a friend who turns out to be similarly stumped. At this point, you’re shouting the answer at the TV (like they can hear you!). If you aren’t watching the TV on your own, it’s almost guaranteed that some smart ass in the room will say: “The question is only easy when you know the answer.” At this point you’ll dismissively say: “Well, duh!” Nonetheless, you’ll remain quietly incredulous at the hapless contestant’s plight. Are they really the one who is being clueless in this scenario? Or could it be the person who is incredulous that anyone might not be able to answer the question about the mechanisms of coastal erosion? I’ll give you a hint: it’s you! Sorry! Don’t be too hard on yourself, you’re just demonstrating another well-known metacognitive failing called the hindsight bias. As it turns out, we tend to view things that we know as being obvious/easy because we can’t, or won’t, take a perspective detached from our own knowledge. Fischhoff and Beyth (1975) demonstrated this in a classic experiment. They examined the difference between judgements of the probability of an outcome before an event (predictive judgement) and after the event (postdictive judgement). Their experiment revolved around an imminent visit to China by President Nixon. They postulated certain possible outcomes such as: “The USA

will establish a permanent diplomatic mission in Peking, but not grant diplomatic recognition" (p. 6) and asked the participants to rate the probability of the outcome occurring. A couple of weeks following Nixon's visit, the participants returned and were asked to recall their predictive estimates of each of the outcomes occurring. They were also tested on their knowledge about whether each outcome had occurred. Knowing an outcome should not affect the recall of the predictive judgement of its probability. The outcome was not known at the time of making the predictive judgement. Therefore, there is no need to adjust that predictive judgement irrespective of whether it turned out to be accurate. Be that as it may, the experiment found that for outcomes that were believed to have occurred, postdictive judgements were higher than predictive judgements. Conversely, for outcomes that were not believed to have occurred postdictive judgements were lower than predictive judgements. The participants were systematically adjusting their recollection of the predictive estimates they had given to create the impression that they 'knew it all along'.

The hindsight bias can be a thorny issue with respect to study skills. As an example, whilst reading the last few pages, have you thought that any of the information being imparted was nothing new and/or obvious? However, what if I now asked you to explain each of the metacognitive issues covered thus far and, more importantly, suggest what might be done to alleviate them? Therein lies the problem: if we recall knowledge as being easier/obvious/more predictable than it was at the time of

learning, then we tend to stop engaging with it at a superficial level. This tends to beget over-confidence and puts the brakes on further learning. Be honest, have you ever bunked off a study skills class or skipped over study skills course materials believing in earnest that there can't be much in there that you didn't already know? With any luck, you're starting to see that the Dunning–Kruger effect, the illusion of knowing and the hindsight bias are not disparate concepts. They are each part of an inter-related suite of metacognitive flaws that can handicap the development of your study skills right from the outset. So, what can you do about this?

The enemy within

5

Key advice: many students unknowingly use ineffectual study strategies that make them more vulnerable to metacognitive errors

To best understand what we might do to minimise the risk of falling foul of the metacognitive errors referred to previously, let's quickly revisit the Dunning–Kruger effect and consider what causes it. Think about the consequences of being incompetent (not exactly a pleasant thing to do, I know). The first is obvious: you won't perform well under conditions when the applicable ability is scrutinised. The second consequence is more

insidious: you won't realise that you won't perform well, because you don't know what constitutes good performance or how to achieve it. As far as you're concerned your level of performance is already adequate! This is a gloriously cruel vicious circle: it's the same knowledge and skills that you need to be good at something that you also need to evaluate how good you are. So, what do you do to break the circle? Well, in answering this, let's put the spotlight on you for a moment. What I'd like you to do is get a scrap of paper and quickly note down what kind of strategies you use when studying. Then, you should rank order them from the most frequently used at the top of the list, to the least frequently used at the bottom of the list. Quickly do that before you read on. Now, be honest, did your list include re-reading as either the most, or one of the most, frequently used study strategies? If the answer is 'yes' then you're in good company. Karpicke, Butler and Roediger III (2009) asked a sample of undergraduates to do what I've just asked you to do. They found that 83% of students reported using re-reading and 54% of them identified it as their number one study method. Now, back to your list of preferred study methods. If you included practice testing on your list, was it below re-reading in terms of the frequency with which you use it? If the answer is 'yes' then, once again, you're in good company. Karpicke and his colleagues found that only 10% of students reported using practice testing (referred to as retrieval practice) and only 1% reported it as their top ranked study strategy. Even when given a forced choice response with practice tests as an option

alongside re-reading and ‘other study practice’, only 18% indicated a willingness to use it. “So what?” I hear you say: if students prefer re-reading over practice testing as a study strategy then what’s the problem? Well, which of these two strategies do you think would be more effective in combating errors in metacognition? If the penny hasn’t dropped yet, think about the following question. What is the one thing that the studies we’ve reviewed on the Dunning–Kruger effect, illusion of knowing and hindsight bias had in common? They all involved some form of test. You may think you’re great at something, but if that score on the test (i.e. the evidence) says otherwise then that’s your metacognitive wake up call, so to speak.

6

Key advice: having a fixed view of intelligence promotes the use of ineffective study strategies and is not conducive with learning

There is nothing remotely novel about advocating the value of practice testing in learning. Literature indicating that repeated self-testing (i.e. retrieval practice) of material produces superior recall to an equivalent period spent re-studying has existed since the early part of the twentieth century. This well-established finding is called the testing effect. Look, I didn’t name it, OK? There has been something of a resurgence of interest in the testing effect

over the last decade and support for its use is pretty much unequivocal. So, if it's so great, why aren't more students using it? Well, one explanation is that students are simply unaware of its effectiveness. In the study by Karpicke and his colleagues only 8% of the students indicated that they thought it would be an effective learning aid. Karpicke and Roediger (2008) manipulated the approach used by students in studying material (re-reading versus retrieval practice). They demonstrated that predictions of subsequent performance on a delayed test from the students were similar between these learning conditions. However, their actual performance was superior in the retrieval practice condition. In other words, even when students are instructed to use retrieval practice, its value is not necessarily self-evident.

Some of the reluctance to use self-testing might be due to ignorance. However, it might also be the case that our notions of learning and intelligence affect which study strategies we elect to engage with. Ehrlinger and Shain (2014) point to research that has examined student theories of intelligence. They distinguish between an incremental and an entity view of intelligence. In the incremental view, intelligence is seen as something that can be developed. In the entity view, intelligence is seen as fixed and something you're stuck with. Not surprisingly, the view of intelligence that a student takes affects their goals. Those who view intelligence as something that can be developed tend to adopt mastery goals and focus mainly on knowledge/skill acquisition. In contrast, those who think that intelligence is not something that they can

cultivate tend to adopt performance goals, which focus more on avoiding failure and managing the impression of intelligence. These goals influence the study strategies that a student uses. Sure enough, it's the students who exhibit the fixed view of intelligence who tend to be the ones that are motivated by performance goals. These students are least inclined to use study strategies, such as retrieval practice, that entail feedback to the effect of: "You've not got this yet." No prizes for guessing what this does to their metacognition. You'll have heard the adage that "if you go looking for trouble, you find it". Well, in terms of academic success, it's not looking for trouble that tends to cause the biggest problems.

Summary

Preaching to the (hopefully now) converted

Let's summarise the main points covered in this chapter about metacognitive errors and how you can mitigate their impact when studying.

- Your perceived and actual levels of competence can be disparate. It's the least competent that usually hold the most exaggerated view of their ability (the Dunning–Kruger effect). This is a huge obstacle to your development. Therefore, you should formulate your impression of your learning based on what you can demonstrate you know, not on what you believe you know.

- You can get inflated impressions of the amount of information you have absorbed when the source of that information is in front of you. We often disregard the importance of the presence of sources in our judgements of how much we know. Therefore, it's wise to avoid having source material to hand when trying to assess the extent to which you have committed information to memory.
- You are liable to have an inflated sense of the degree to which you understand something that you have read. We often fail to spot signs that our comprehension isn't sound by, for example, missing glaring contradictions in a text.

Therefore, you should not use your ability to recall information as a proxy for a measure of whether you understand it.

- It's easy for you to look back on knowledge you have gained as something you've known all along, or retrospectively rate the acquisition of that knowledge as being much easier than it was. Consequently, it's wise to reflect on more concrete metrics of ease of learning, such as the time required to acquire previous knowledge. Do not rely on your current impression of how obvious acquired knowledge seems when thinking about future learning.
- It's likely that you're not extensively using the strategy of retrieval practice (self-testing) when you study. This is the study strategy that research has shown to be most effective in promoting accurate metacognition. Start looking at self-testing as a tool of learning. Remember that the information you get from testing yourself is an integral part of learning, whether it's flattering or not! As we shall see in Chapters III and VIII, testing is your closest ally when studying, not your enemy.

Accurate metacognition is critical for successful studying. Unfortunately, we are all vulnerable to metacognitive errors that lull us into thinking that our approaches to learning are more effective than they really are. This makes us unreceptive to advice on how to study more effectively and reluctant to engage with sources of

support. To this end, much of this chapter has served as a 'warning shot across the bows' so you are more receptive to the guidance offered on effective study practices contained within the following chapters. You also now have some preliminary advice on how to engage with this (or any text) that should help you avoid falling foul of the metacognitive errors we've referred to.

I'd like to end this chapter with some words of encouragement. As you progress through this book, you might get a dawning sense that your efforts to improve the way you learn are making you feel dumber rather than smarter. If so, don't be discouraged! This is what it feels like when metacognitive errors start losing their hold on you. Progress, more often than not, involves a degree of discomfort. In any case, by now you should be suspicious of anything that seems easy on reflection!

References

Ehrlinger, J. & Shain, E. A. (2014). How accuracy in students' self-perceptions relates to success in learning. In V. A. Benassi, C. E. Overson & C. M. Hakala (Eds.). *Applying science of learning in education: Infusing psychological science into the Curriculum*. Society for the Teaching of Psychology. Retrieved from http://teachpsych.org/ebooks/asle2014/index.php.

Fischhoff, B. & Beyth, R. (1975). I knew it would happen: Remembered probabilities of once–future things. *Organizational Behavior and Human Performance*, *13*(1), 1–16.

Glenberg, A. M., Wilkinson, A. C. & Epstein, W. (1982). The illusion of knowing: Failure in the self-assessment of comprehension. *Memory & Cognition*, *10*(6), 597–602.

Kruger, J. & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, *77*(6), 1121–1134.

Karpicke, J. D., Butler, A. C. & Roediger III, H. L. (2009). Metacognitive strategies in student learning: Do students practise retrieval when they study on their own? *Memory*, *17*(4), 471–479.

Karpicke, J. D. & Roediger, H. L. (2008). The critical importance of retrieval for learning. *Science*, *319*(5865), 966–968.

Koriat, A. & Bjork, R. A. (2005). Illusions of competence in monitoring one's knowledge during study. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *31*(2), 187–194.

II

Conquering procrastination

Why it's so hard to DO IT. JUST DO IT!

In the universe great acts are made up of small deeds.
Lao Tzu

1

Key advice: understanding procrastination is

the key to managing your time more effectively

If you recognise the Shia LaBeouf “DO IT” line in the title of this chapter, then you know the YouTube video I’m referring to. Be honest, when you first saw it should you have been getting on with work at the time? Me too! Oh, the irony: using a video intended to encourage you to stop putting things off to put off doing work! I’ll be honest: this chapter was originally going to follow a very different format. I was going to compose a more conventional time management and organisation chapter. I was going to tell you about how important it was to understand and reflect on your usage of time, to identify your deadlines and be proactive in preparing for them. I was going to advise you to make contingency plans for when life just refused to play ball with your carefully constructed Gantt charts. I was going to … right up to the point where I looked at my own carefully created Gantt chart for the development of the draft of this book. Even though I had only just started writing Chapter II, I was already a month behind my intended schedule! What happened? Had anyone died? Not that I knew of. Had I won the lottery? Here’s a hint: I continued writing this book! Had I been fired, made homeless, divorced, been stranded in a remote location and forced to live rough Bear Grylls style? Well, I did have to give a hotel I stayed at one weekend only three stars on Trip Advisor because the bed was hard and the food was bland. Other than those very first world problems I don’t have any real excuses. Sure, a new term had started at

university, which is always a bit chaotic. However, I had planned for this. I had even prepared for some lectures over my summer vacation to clear the decks so I could make progress with the book at the start of the new term. If I'm honest, this was anything other than the first time my best laid time management plans have gone to pot in my academic career. Tick the following examples off mentally as you recognise them. There were the notes I'd promised to make time to produce after my lectures, but didn't. That test I planned to revise for a good two weeks before the exam, but never quite got around to it. That essay that I'd scheduled to complete a full couple of days before the submission deadline, but ended up working on late into the night before it was due in. If none of the above examples resonate with you then I suggest that you, Sir/Madam, are: (a) fibbing, or (b) fibbing! Why do we do this to ourselves? Do we not learn from bitter experience? Maybe we are just a bunch of masochists that secretly enjoy making life infinitely more unpleasant for ourselves than it needs to be? Perhaps indolence is an integral part of the human condition? Alternatively, maybe it's because we don't really understand that most pernicious obstacle to seeing through our intentions and plans in a timely fashion: procrastination.

Rozental and Carlbring (2014) captured the essence of procrastination very concisely by defining it as: "One's voluntary delay of an intended course of action, despite being worse off as a result of that delay" (p. 1488). Procrastination is by no means an uncommon issue and students seem to be particularly vulnerable. It's not

unusual to find reports that puts the prevalence of problematic procrastination in undergraduates as being 70% or above (e.g. Klassen, Krawchuk & Rajani, 2008). Meta-analysis of the research indicate that procrastination tends to be associated with negative academic outcomes (e.g. Kim & Seo, 2015) not to mention increased stress and anxiety (e.g. Krause & Freund, 2014).

Here's the issue with most advice on time management: it's all well and good knowing how to plan your time, but for a plan to work you must see it through. Procrastination is the enemy of seeing your plans through. Therefore, knowing how to recognise and deal with procrastination is a prerequisite for improving your time management. So, in this chapter I'm going to help you understand why we procrastinate and what you can do to avoid it. Procrastination is a rather more complex foe than you might have imagined. I could write an entire book on it, but probably wouldn't get around to it … Boom, Boom!

Procrastination: first, know the enemy of time management

Appropriately enough, psychologists, economists, sociologists and philosophers have only really got around to making significant in-roads into understanding procrastination in the last 30 years or so. However, over that time several themes have emerged in research that addresses the likelihood and extent of procrastination occurring. It's worth having a quick look at these themes so you can see the components of what Pychyl (2013)

referred to as the procrastination puzzle. If we understand how this puzzle works, we can solve it.

2

Key advice: you are more likely to procrastinate when you doubt your ability to get something done

You won't be surprised to learn that research has indicated that an individual's belief in their ability to get something done affects the likelihood that they will procrastinate. If you expect to be successful, you tend to crack on with things in a timely manner. On the other hand, if you harbour doubts that you will be able to complete a task successfully then the tendency to put it off will be that much greater. Psychologists refer to this as perceived self-efficacy and meta-analysis of the literature indicates that it is a reliable predictor of procrastination (e.g. van Eerde, 2003). The insidious thing about depleted perceived self-efficacy is that it tends to be self-reinforcing. If you don't feel up to completing a task, you won't engage with it optimally and this will have a deleterious effect on your performance. The consequence of your reduced performance is likely to be a negative (or at least a less positive) task outcome. You'll remember this negative outcome the next time you encounter a task that makes you doubt your self-efficacy. This memory further compromises your perceived self-efficacy and exerts an

even greater toll on your engagement with, and performance, on the task at hand. Psychologists refer to this as a self-fulfilling prophecy. You might call it a vicious circle. I'd suggest that no one has ever described it more succinctly than Henry Ford when he said: "Whether you believe you can do a thing or not, you are right." This is fitting given that he is often credited as being the father of the moving assembly line where procrastination would have been most difficult and certainly not have gone unnoticed.

3

Key advice: boredom is an invitation to procrastinate

Newsflash: the likelihood that someone will procrastinate is affected by the characteristics of the task. Tasks that are deemed aversive are more likely to beget procrastination than tasks that are deemed less aversive. Hardly rocket science, granted. Has anyone in the history of humanity enjoyed putting out the recycling? However, task aversiveness is about more than just the intrinsic pleasantness of the task, it's also about the anticipated outcomes of the task, or incentives associated with that task. Doing the recycling doesn't seem quite so bad if it frees up the kitchen for having your mates over for beer, pizza and exchanges of liberal innuendo. Err, I mean a glass of wine, a cheeseboard and a robust discussion of

metaphysics! As Lay (1992) argued, defining the aversiveness of a task must consider the interactions between individual and task characteristics that give rise to things like excitement, boredom or uncertainty. However, which of these person-task characteristics are most strongly associated with task aversiveness and conducive to procrastination? Also, are such characteristics as important at the beginning of a task as they are at its conclusion? These were the questions that Blunt and Pychyl (2000) were interested in. They asked participants to generate lists of personal projects and rate each of them in respect of task dimensions such as the control they had over the task, the uncertainty associated with the task and how much fun it was. Participants were also asked to rate tasks in terms of their aversiveness and indicate the extent to which they felt they had procrastinated in doing them. These ratings were taken for each task at the following stages: conception; planning; execution; and completion. Three task dimensions emerged as being most strongly predictive of reported levels of task aversiveness and procrastination. See if you can figure out what they were? Go on, take a wild guess! Ahem, drumroll please! In order of villainy, the task dimensions most strongly associated with viewing a task as aversive and conducive to slacking off were boredom, resentment and frustration. This was true of all stages of the task's lifespan; from inception to completion.

4

Key advice: your personality is not to blame for procrastination, but you might have certain traits that make you more vulnerable to it

You know, of course, that revising is going to pay off in the long run. However, in the here and now that re-run of season one of *Friends* seems to be a much more rewarding use of your time. Season one contains the episode where Joey flunks yet another audition because he was watching TV with Chandler when he should have been reading his lines. Silly Joey! Maybe Joey is just the kind of person who prefers to do things on a whim, be spontaneous, live for the moment? Maybe there is a procrastinationprone personality? That idea sounds plausible. Blaming your personality for procrastination would certainly be a most convenient way to rationalise it. However, meta-analyses (e.g. Steel, 2007) of research on procrastination suggests that there isn't a procrastination-prone personality per se. It's more accurate to say that there are components of certain personality traits more strongly associated with the tendency to procrastinate than others. A component of the personality trait of extraversion, i.e. impulsiveness, is a solid predictor of procrastination. Similarly, components of the personality trait of conscientiousness such as distractibility and self-control are reliably related to the likelihood of procrastination. Taken together, these components constitute an individual's sensitivity to delay. Individuals who have a high sensitivity to delay are impulsive,