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Mind-sets, Self-talk and Changing Behaviour

This chapter explores how the science of mind-sets and of self-talk provides a potential route to allow individuals to control and change their behaviour.

> *There is no expedient to which a man will not go to avoid the labor of thinking* (Thomas A. Edison, inventor)

Learning Language and Using Language

Can you remember back to the age of three, or four or five? Can you remember the strangeness of learning that black marks on a page are associated with sounds? Can you remember how these sounds when put together became something you already knew—words? Can you remember something just as strange? Taking a small pencil or crayon or piece of chalk—something you used for daubing the freshly painted walls—and learning to make small movements on a piece of paper? These strange little marks—letters—had particular sounds associated with them, and when these marks were combined they did something almost magical: they made something that you already knew and used to control and manipulate your own world—words and sentences and stories. You probably can't remember learning to speak your native language however; learning your native tongue is as effortless as learning to read and write are effortful. Language is an astonishing capacity: once language learning starts children learn an average of

perhaps tens of words per day for years, to the point where they have a working vocabulary of maybe ten thousand or more words. These very differing abilities—speaking, reading and writing—all involve a massive and dramatic reorganisation of the brain, and they directly reflect how culture and experience shape and change the brain. This reorganisation as a result of being exposed to language and culture is possible because the brain itself is plastic.

Perhaps one of the greatest triumphs of modern neuroscience has been the finding that the brain is plastic—that it changes as a result of experience. Culture imprints itself on the developing brain, as does education, social experience and everyday life. Sometimes the traces of this imprinting can be enduring, sometimes not: experiences during the early years of life tend to provoke greater changes in the organisation of the brain. Learning to read and write causes widespread and more-or-less enduring changes in the structure, function and organisation of the brain. So much so that these functions become part of you. It is impossible for a fluent native experienced reader to see words and not interpret them as such, assuming your vision is normal. This is true in much the same way that the injunction 'think of a small furry dog' automatically elicits the image of a small, furry dog.

The Neuroplastic Brain

Formally, neuroplasticity is the capacity for the brain or its component parts to change as a result of experience, injury or development. The brain remains plastic throughout its lifespan, contrary to the old hard-wiring idea. The idea of hard-wiring may have grown out of the fact that it has been very difficult to demonstrate newly born cells in the brain—the number of brain cells you are born with is certainly vastly greater than the number you die with. We do now know that continued production of brain cells (neurogenesis) occurs in a limited number of brain areas—particularly in areas concerned with memory (such as the hippocampus). That is one type of neuroplasticity—new brain cells. Another type of plasticity results from creating or building new connections between brain cells, which changes how brain cells connect and communicate with each other through the differing and complex circuits of the brain. This process is brain-wide, and it continues throughout the whole of life. We now have very strong and compelling evidence that the old adage 'cells that fire together, wire together' is substantially true. Without

this strengthening of connections as a result of activity, learning and memory would be impossible for a brain to achieve (Holtmaat and Caroni 2016).

This discussion is rather abstract—it is true in a trivial sense that the brain changes and rewires itself because of the activity that it, you, engage in. Is there an active way we can modulate this process? The growing answer is yes, at least in particular domains, by changing how we characteristically talk to ourselves about our abilities and capacities—our characteristic 'mind-sets'. We will focus here especially on applying neuroplasticity to yourself—by adopting a '*growth mind-set*' (rather than a '*fixed mind-set*') about your own potential. A 'growth mind-set' is a way of thinking that you are capable of learning across all domains. Mind-sets are inscribed in the brain and are detectable in the brain's electrical activity (the electroencephalogram or EEG). The good news is that they can be changed, and for the better. The changing mind-set approach—where the focus is on task and improvements based on effort—is scalable within organisations, as recent data very clearly show.

How and Why We Talk to Ourselves, and Why this Matters

The French philosopher Rene Descartes famously said '*Cogito ergo sum*'—I think, therefore I am. Descartes' point was that to prove you existed, you had to be able to think, and that the act of thinking implied an 'I' or an ego that engaged in that particular act of thinking. Going beyond this, though, we can ask: what is it that I think? What is the form in which thinking occurs? Is it in words, is it in images, is it in feelings, or is it in tastes, smells, or some combination of all of these senses? Just sit back, close your eyes for a moment and observe your thinking. Pay attention inward, but don't direct your attention in any particular way. You should notice that you have a continuous stream of thoughts, ideas, images and feelings, flowing through your consciousness. The act of paying attention to your inner life, the contents of your consciousness, as it were, is known as 'introspection'. Now push this mode of thinking along a little further. As you go about your daily life, do you talk to yourself? Do you talk to yourself a lot? Or not at all? As adults, we're usually at least a little embarrassed by being overheard when we are talking to ourselves out loud. We will apologise to others if we are caught talking aloud. Social mores sometimes suggest that people who talk to themselves audibly, in the presence of others, may not be in the best of

mental health. I suggest social mores rather than psychopathological diagnosis, because, of course, children talk audibly to themselves, particularly between about the ages of three and eight or nine years, when their self-talk starts to become internalised.

Self-talk is actually a remarkably common feature of our mental lives and our behaviour. We are quite happy, for example, to note its existence in sports performers—John McEnroe, the famous tennis player, for example, was often heard speaking loudly in abusive terms to himself (and of course, he would often speak in strong terms to umpires and others). The psychologist Charles Fernyhough characterises thinking where we are engaged in some form of inner speech as a kind of a conversation, and this conversation may be replete with all sorts of words, telegraphic expressions and the like. This form of inner speech, of course, occurs in consciousness, and we are aware of it, and we are aware of contributing to it. And in contributing to it, we are actively changing the direction and flow of consciousness, and in turn we are aware of the change of direction and flow. This is not the whole story, however. Lots of mental activity happens outside the purview of consciousness. You, as the reader of this text, are not aware of the activity in the retina, or the other way stations through the brain, which convert little scratches or daubs on a page into words and sentences and meaning. The kind of mental activity that happens outside consciousness contributes to consciousness itself, because, of course, you are aware of the intrusion of the words that you are reading into your mental life.

Thought, Self-Talk and Behaviour

The relationship among thinking, self-talk and behaviour is not, by any means, straightforward. One very popular form of self-talk is a new year's resolution. It is an example of something that people may commit to publicly, but certainly will state they are committing to privately. They do so in the form of words, and more often than not they fail. They vow to give up cigarette smoking, or they promise themselves to cut down on the eating of chocolate. They promise themselves to get fit, join a gym, and then don't go to the gym after the first two or three weeks of January have passed. This failure of a verbal resolution involving behavioural change shows that there is no straightforward or close coupling between what we say to ourselves and what we do.

Here I examine self-talk as a phenomenon to provide us with a framework for understanding what self-talk is all about. Then, I want to set self-talk within a behaviour change context, focused on two well-founded methodologies from psychology and neuroscience: namely, rescripting or redirecting, and the induction of mind-sets.

Self-talk is a primary experience, in the sense that it is something that we are immediately aware of and can respond to. However, it is a private experience and the contents of self-talk may be something that we subject to a high degree of self-censorship or self-selection. We are all well aware, of course, of individuals for whom whatever thought happens to be in their mind appears to be blurted out, without much self-censorship (think Homer Simpson). Thinking is a covert, private activity and we all have a right to assume that the contents of our consciousness are not directly accessible to others, except insofar as we might describe the contents of our consciousness to others. Here, a note for the slightly paranoid: brain imaging machines, or indeed polygraphy devices beloved of police forces, especially in the USA, do not reveal the contents of your consciousness, nor indeed in principle, can they. My previous book (O'Mara 2015) deals with this topic in great detail. Here, it is sufficient to note that brain imaging allows you to visualise, in an averaged brain, in a group context, activations that are associated with particular brain regions or the network of activations associated with brain regions. The wonderfully coloured blobs that appear in brain imaging papers do not in and of themselves directly tell you the contents of the activity in that brain region. There is no need to worry at all about the existence of the lie detection machines that can reveal what it is that you are thinking, and organisations shouldn't waste their time and money exploring this possibility.

There are several methodologies for measuring what it is that we say to ourselves. Fernyhough deals with these in great detail, and I summarise the two principal ones here. The first involves '*experience sampling*', a technique that involves a randomly generated sound on a bleeper or on a smartphone and the participant simply recording what it was they were thinking about at that moment in time. The other principal methodology is that of the self-report inventory. In self-report, you attempt to remember what it is that you say to yourself under what circumstances, and you record your thinking or self-talk along a variety of differing questionnaire-specified dimensions. A central claim, which will feel introspectively correct to most people, is that self-talk is covert, private and has properties of free-ranging association that overt speech simply doesn't have. What we think and what we say are not the same. One way of thinking about inner speech is that it is a dialogue rather

than a monologue. In other words, it is a debate, rather than a simple declamation or declaration. There are also forms of pathological self-talk. In major depressive disorder, sufferers will often report that their self-talk is very negative, in an evaluative sense, where they say to themselves that they are worthless, useless, hopeless or whatever. Pathological self-talk is also reported commonly in psychoses such as schizophrenia, but here the self-talk, in some sense, feels like it is outside the head, as if you are being spoken to. Fernyhough refers to this kind of self-talk as 'voice hearing'.

Why should we be interested in self-talk at all? A particular reason for being interested in self-talk is that it is one of the central aspects of our lived daily experience, and the way we talk to ourselves about what it is that we are doing, about what we intend to do or that we have done, may have important effects on how we regulate our own behaviour. In other words, by understanding and perhaps changing how we talk to ourselves, we might improve performance in all sorts of ways. Fernyhough (pp. 11–12) makes the key claim that 'inner speech….helps us to regulate our behaviour, motivate ourselves for action, evaluate those actions and even become conscious of our own selves…mental voices draw on some of the same neural systems that underlie external speech'. This is a very important claim, because it emphasises that the purpose, or at least a central purpose, of inner speech is to ensure that action systems in the brain are entrained, and behaviour is correspondingly generated.

Self-Talk and Performance

Self-talk has been examined in a variety of contexts. Among sports people, for example, it is thought to serve at least two functions. The first is a straightforwardly cognitive one, where you plan what it is that you are going to do now, and what you are going to do next. The second function is a motivational one, where you can engage in self-praise for a shot that has been properly hit or self-criticism for something that has been done badly. Here, self-talk engages error-correcting mechanisms. Finally, self-talk can consist of language and words that help you achieve a particular psychological state in order to perform appropriately and effectively. The key thing here is that self-talk has an important self-regulatory function, especially in contexts that are high stakes, such as sports competitions. The process of psyching oneself up is probably most easily executed in words, rather than in images. This latter possibility exists as well, but visualisation may require extensive training,

whereas the appropriate use of words can narrow the focus of attention quickly and dramatically, which is a useful and central cognitive facet of self-talk. Self-talk during these high-performance events also allows some form of distancing from the self to occur, where the perspective adopted is of one person speaking to another, saying something like 'You've done this before; you can do this now; you can do this'. Here, the self is treated really as an object rather than a subject, and the dialogic or 'debate-like' quality of self-talk becomes very obvious.

Self-Talk and Planning for the Future

Self-talk supports planning of future behaviour, because you can construct and test a variety of counterfactual scenarios—counterfactual because they have not yet happened, but stating the scenarios out loud allows the testing of the scenarios against reality, and perhaps even estimating the likelihood they will happen. Taking these kinds of perspectives allows you, also through the medium of self-talk, to try and figure out what it is that somebody else might be thinking, or likely to do. In other words, to do that very human thing of trying to figure out what it is that somebody else is thinking, or likely to say. Scenarios like this, of course, play out in debates and negotiations where the key variables are to try and understand what it is that the opposing side might say, what moves they are likely to anticipate or how they might view a particular problem. Here we see that a key function of internal speech or self-talk lies in the understanding and managing of complex and potentially difficult social situations. Engaging in such covert speech also serves a protective function because it allows you to formulate plans and intentions without revealing them to your opponent.

What are the characteristics of internal speech that makes it so useful? Fernyhough and his collaborators claim that internal speech tends to be fast, it tends to be telegraphic in nature, and rarely, if ever, will it consist of fully formed sentences. It therefore is a very efficient form of, in Kahneman's terminology, system 1 thinking. The contents of the rapid search of memory and of pattern-matching are delivered quickly and very speedily into consciousness, and only then are they turned into external or audible words and speech. Simon McCarthy-Jones and Charles Fernyhough (2011), in an important survey of internal speech, suggest it has four principal properties. The first is that it is dialogic; in other words, it is a conversation between differing points of view and differing perspectives. The second is that it is

condensed. The third is that it may have voices of people present, and the fourth characteristic is that it can be evaluative or motivational, where people use inner speech to assess what it is that they have done, or what they are about to do, and to provide energy to continue doing what it is that they may already be doing.

Brain imaging studies of internal speech are difficult to execute, but they have been conducted. 'Theory of mind' is our capacity to infer the mental life of other human beings, and a specialised network in the brain is activated when we consider what it is we believe others are thinking (the 'mentalising network'). Alderson-Day and colleagues (2016) show that the parts of the brain that are involved in Theory of Mind (ToM) are also the same parts of the brain that are involved in inner speech. It is reasonable to think that inner speech is supported, at least in part, by the brain's mentalising network, or that it provides input to the brain's mentalising network—that part of the brain that attributes agency to humans and indeed other entities such as cartoon characters or companies. We will meet the mentalising network again when we explore perception and brand perception in Chapter 5. We will now move from thinking about inner speech as the primary internal contents of consciousness, and think about how internal speech, when appropriately entrained, might manifest itself in changing behaviour.

Neuroplasticity, Brain Plasticity and Mind-Sets

Neuroplasticity (or brain plasticity) is the idea that the brain changes as a result of experience. It is also the idea that the brain changes as a result of the way the brain talks to itself, or, in other words, *how you talk to yourself about your interests, capacities and abilities*. This self-talk activates circuits and networks within the brain—this seems almost a tautology, but is worth emphasising nonetheless. People vary in how they see their own interests, abilities and capacities. This overall sense of how it is that you conceive of yourself is referred to as a '*mind-set*', a phrase, in its contemporary usage, we owe to the psychologist Carol Dweck. Dweck distinguishes two differing types of mind-set. The first is a growth mind-set, and the second is a fixed mind-set. A growth mind-set takes the view that your capacities, your abilities, your talents are malleable and that they can be improved through directed, focused and attentive practice. A fixed mind-set, by contrast, suggests that your talents, your abilities, your capacities are fixed. In other words they are immutable and do not change as a result of practice. We see

this very commonly where people will say '*I'm not a mathematical type*'; '*I'm not an artistic type; I can't learn how to draw*'; or '*I'm not musical and I can't learn how to play a musical instrument*'. Similar strictures apply to how we interact with each other and especially how we speak to children. It's very commonly the case that parents will act to self-limit what their children are capable of by dismissing their abilities in a particular domain by saying '*Little Tommy isn't particularly sporting*' or '*Little Alice is no good at the piano*'. Children internalise these comments and will come to believe that they are, in fact, true. The key concept underlying the idea of mind-set is that those of us who regard our talents and our abilities as incremental and capable of being honed can show improvements in performance that do not appear in individuals who regard their own capacities and talents as entities reflecting an underlying, unchanging trait.

How to Change Mind-Sets

Dweck has conducted extensive observational and experimental work in a wide variety of populations, including populations that live and work in difficult or adverse circumstances, such as under-resourced inner-city schools. In one study, Blackwell and colleagues (2007) focused on achievement in junior high school. They administered a simple questionnaire to assess the degree to which people self-reported themselves as either having a fixed mind-set or a growth mind-set and then tracked academic performance over the course of the following two years. What they found was that those who self-reported as having a growth mind-set showed consistent semester-upon-semester improvement in academic performance, whereas those who reported having a fixed mind-set showed semester-upon-semester decline in performance. Now, you could argue that these are merely observational data, and you would be correct. There may be some other underlying variable that explains why there is a persistent difference between the academic performance of those with a growth mind-set and those with a fixed mind-set. That's why conducting experiments is important. In another set of experiments reported in the same paper by Blackwell, Dweck and her colleagues show that simple interventions can change a mind-set for the better. The interventions revolve around the type of feedback and praise provided by teachers to their students. Three types of feedback were encouraged, randomised according to the student type. The first is praise for a trait (in this case, intelligence) where the teacher would consistently say something like 'Wow,

that's a really good score; you must be smart at this'. The second type of praise focuses on the behaviour and motivation, in other words, praise for the effort or process that the student engages in (for example, 'Wow, that's a really good score. You must have tried really hard'). And then the final group, the control group, get a simple piece of feedback saying little more than 'That's a really good score'. These students then are tracked over the succeeding period of time, and you find that students who are allocated to the effort group show an enhancement in performance in comparison to the control group and to the entity or trait praise group. This is a remarkably simple intervention. The focus is on providing appropriate feedback for meaningful effort engaged in, rather than simply providing praise for one's intelligence. The difference really comes down to the idea that students can learn that with focus and a determined effort to improve, they can improve, relative to where they were, compared with students who regard their performance as arising from a fixed trait such as intelligence, which they are unable to affect in any way. In this sense, consciously adopting a new mind-set by means of the feedback that teachers provide, or supervisors provide or, just as importantly, the way you speak to yourself is a radical act of self-defined neuroplasticity. Rather than saying to yourself 'I can't do it' because I'm not smart enough, you say to yourself 'If I work hard at this; if I focus on the problem, I can learn to get better'. And getting better, in itself, is a source of intrinsic reward—the kind of reward that comes with mastery of a new and difficult topic or domain.

Dweck provides a particularly dramatic example of the effect of praise for effort as opposed to praise for intelligence in a paper with a title that emphasises the theme of what has been said to this point: 'Subtle linguistic cues affect children's motivations' (Cimpian and colleagues 2007). In this study, Dweck and her colleagues focused on puzzle-solving performance in young children. Half were assigned to a group where they were simply praised for being smart during the course of problem-solving, and half were assigned to a group where they were praised for 'working hard' for solving the puzzles. Both children in both groups, of course, will feel pretty good about themselves, having been given such feedback. Now, the question is, how does that feedback subsequently affect performance? Dweck, in the second phase of the study, offered the children a choice of either a puzzle to solve or difficult or challenging puzzles to solve. What she found was quite remarkable. Of the children who had been offered praise for working hard, approximately 90% of them chose the difficult or challenging puzzles in the second phase of the experiment, whereas the majority of those praised for their intelligence chose the simpler puzzles. In a third phase, the children

were then asked to solve mixed puzzles, difficult and simple puzzles, and the result still came through. The group that had been praised for working hard solved 30% more of the difficult puzzles compared to the group that had been praised for their intelligence, who actually solved 20% fewer of the difficult puzzles. This is quite some difference in performance, found in a group of seven-year-olds who were provided simple feedback about performance.

Mind-Sets in Work and in Organisations

In a managerial or organisational context, the lesson here should be clear: feedback, whether it's of the bullying type (you can't do this job because you're stupid) or of the supposedly constructive type (I haven't assigned you to this work group because I found you're not so good at doing these types of jobs) can actually be very destructive of performance. The lessons for managers, therefore, are straightforward. Managers should take the view that staff who aren't performing well on a particular task may not be performing well simply because the staff have not been trained properly for that task, not because they are stupid or lazy, or some other trait that is within the person. Managers, when they're providing feedback, should focus not on praising some underlying unobservable trait that is responsible for job performance, but actually focus on the behaviours that led to successful outcomes and on the outcome or performance of the job itself. This requires quite a shift in how many managers think about how feedback should be provided.

Mind-Sets and Activity in the Brain

Mind-sets are reflected in the underlying electrical activity of the brain. It is possible to measure the electrical activity of the brain by attaching electrodes to the scalp via a cap that is worn on the scalp and amplifying the signal that is obtained. The on-going electrical activity is referred to as the 'electroencephalogram' (or EEG). The consistent, over time, response of the brain to a particular stimulus (for example, a visual stimulus that might appear on a computer screen, a sound that from a speaker or a motor movement that the person makes) is referred to as an 'event-related potential' (or ERP). The ERP emerges when many trials are summed, one after the other.

Hans Schroder and his colleagues (2014) have shown that how the experimenter instructs the subject at the start of a simple task can have profound effects in terms of how the brain allocates resources to task performance. They chose what is known as a 'visual flanker' task. Here participants are presented with five-letter strings, for example, MMMMM or NNMNN, and the task of the participant is to judge whether the central letter (M) is the same as or different to the letters that flank it. If subjects are instructed at the outset that this is a task that it's not possible to improve on (in other words, that you are as good as you are and that's it) or that it's a task that they can improve on in other words, you can get better with effort and practice. You see a dramatic difference in performance and also a dramatic difference in the allocation of neural resources to, in particular, the awareness and allocation of attention to mistakes (the so-called error positivity component) during performance of this task. In other words, the language that is used by the experimenter has a very profound effect in terms of the underlying allocation of resources to task performance and task correction by the brain and also to behavioural outcomes. The lesson here should be clear: how managers, teachers and others who are charged with providing feedback can have a very important effect on task performance by individuals. Feedback that suggests, for example, that 'As far as I'm concerned you did badly on this task because you're stupid' is feedback directed towards an underlying and not directly observable trait, whereas feedback that's focused on an observable trait, for example, 'You did badly on this task because you haven't been properly trained and you haven't paid attention to the appropriate parts of the task' is much more likely to have a much greater effect on performance. Perhaps the key point to bring out here is that we humans are not just language-using animals, but we are social language-using animals, and how we use language with each other can have an important effect on subsequent on-the-job performance. This is so obvious that it shouldn't need to be stated, but it is characteristic of our interactions that we pay little attention to how our words are designed or not designed to enhance performance in the first place. So, subtle changes in the use of language by experimenters, by managers, by leaders, can have very profound effects on subsequent performance in a task.

Mind-Sets in Sport and Aviation

Does this kind of effect extend beyond academic performance? The answer is yes. In a study focused on observational learning, Andrieux and Proteau (2016) made an important observation about how we learn from others.

They focused on complex motor sequences (think, for example, how you learn a golf swing. You do so partly by observing others and partly by being instructed by others. Similarly, when you learn how to drive a car, you observe partly by observing others drive, but you also observe by being instructed while attempting to learn how to drive). What they found was quite remarkable. Participants observed models demonstrating a motor task at differing levels of competence and were given advance instructions stating the quality of the performance of the trials that they are about to observe (beginner; novice; intermediate; advanced; expert). Knowing in advance the level of performance and the classification of that performance markedly improves learning compared to being told after the trial was completed about the level of performance. In other words, the linguistic descriptor provided regarding the person that you are about to learn from has marked effects on subsequent learning of that task. The authors suggest that this form of prior instruction may prime the action observational network of the brain in ways that providing similar kinds of feedback after task performance does not.

The effects of how we speak to ourselves can be shown even more dramatically than the slightly prosaic example of learning how to swing a golf club. In an important study, Samuel Vine and his colleagues (2015) focused on pilot training. They had trainee pilots answer two questions about how they would deal with an engine failure occurring soon after take-off: this is one of the most dangerous things that can happen to a plane and requires considerable effort to re-land the plane safely. The trainee pilots were asked two questions. The first was 'How demanding do you expect the task to be?', which they had to score from 1–6, where 6 was extremely demanding and 1 was not at all. The second question was 'How able are you to cope with the demands of the task?', again similarly scored on a 1–6 scale. They then subtracted the first score from the second score to derive a simple measure of the emergency either as a challenge or a as a threat. A challenge is how the pilot perceives him- or herself as being capable of rising to the demands of the occasion, and a threat is where they have insufficient ability to cope with the demands of the occasion. What they found was that pilots who judged the engine failure soon after take-off as a threat performed worse across the board as compared with pilots who regarded it as a challenge. This was irrespective of actual performance in the simulator, or how a flight instructor, blinded to the condition, judged their performance, or how automated measurements of where they were looking to or gazing in the environment, or gazing at the control panel, were conducted. Again, this study does not go on to try and intervene to challenge the pilot's mind-set. But what it does do is focus on how the way the pilots conceive of their own capacities and abilities determines how well they are able to cope with an

emergency situation and then subsequently to perform successfully or not in that situation. The lessons by now should be clear. How others speak to us and provide feedback on our performance, matters, but how we speak to ourselves about how we perform also matters. Focusing on performance, rather than on fixed traits, has a dramatic effect on our subsequent on-the-job performance.

Are Mind-Set Interventions Scalable Within Complex Environments?

One of the themes of this book is that the interventions that we can make within organisations to improve job performance and other types of performance can be relatively simple, straightforward and not costly. They should also not involve the investment of great amounts of time either to generate the intervention or for the intervention itself to be performed or for the assessment of the intervention's efficacy to become known. Here I focus on a simple and scalable intervention that may greatly enhance performance. One of the key problems with psychological interventions is that they take a considerable period of time to work. Experimenting with simpler, short forms of intervention is a very worthwhile endeavour. Dweck, with David Panesku and their colleagues (2015), has performed a scalable intervention on academic performance, involving approximately 1600 students in 13 geographically diverse high schools. The method they chose was simple and extremely cost-effective. They devised several straightforward interventions, as follows. The first was a single 45-minute online session that focused, using a summary article describing how the brain changes positively in response to a challenge; how it can grow and reorganise itself when students work hard and with focus on a task; and how neuroplasticity can enhance their performance on tasks that they would ordinarily see as being difficult. The students were also asked to perform two writing exercises. The first was to summarise the latest scientific findings on neuroplasticity in their own words. They were also asked how they would address a student who is becoming discouraged as a result of poor performance in school and what they would say to such a student about the importance of focusing on incremental changes in their talents as a result of motivated practice at tasks that they found difficult. Compared to controls, they found that the simple interventions just described enhanced grade point averages in high school students very substantially. Moreover, this intervention also reduced the chances of a student dropping out from high school very dramatically. The key point from a study of this type is that, with large workforces and

good available online materials that have been prepared carefully with the focus on teaching the consumers of those courses what it is that they can change about themselves, can lead to profound enhancements in performance over the longer term. It is important, however, that the idea spurring a growth mind-set is not misunderstood. Offering praise for effort without emphasising the importance of focus, of attention to detail, to conscientiousness during task performance, and all the other variables that contribute to mastery, is pointless. Learners must understand that while what they are attempting might be difficult, they can improve their own performance, relative to where their performance used to be in the absence of paying attention to the components of successful performance. Dweck has suggested that merely telling your learners to try hard and to keep the focus on effort is just 'nagging'. The real point is to ensure that children understand that making an effort can be hard, but that adopting a metaphor like 'the brain is like a muscle' and that you must actively work it in order to see gains, is the best way to engage a growth mind-set. To reiterate, growth mind-sets shift attention away from individual traits and shift attention to the task and to learning. A growth mind-set, when effectively managed, emphasises the role of effort in creating talent. When Homer Simpson spoke to his children, Lisa and Bart, about a scheme of theirs that did not work, he said '*You tried your best and you failed miserably. The lesson is, never try*'! A growth mind-set is diametrically the opposite of Homer's. A growth mind-set helps maintain confidence and effectiveness, despite adversity, setbacks or challenges. The self-talk and behaviours involved in adopting a growth mind-set, compared to a fixed mind-set, result in a difference in the allocation of the brain's resources to performance on a task, especially toward monitoring for errors. Errors are a useful guide to learning because they provide feedback on where performance needs to be corrected. A growth mind-set interprets errors as being necessary for learning and providing the opportunity to learn. Thus, mind-sets can be conceived of as a form of radical, self-imposed neuroplasticity, because mind-sets can be taught, can develop as the result of what others say to you, but also, what it is that you say to yourself about your own capacities and capabilities.

Exercise

1. When giving feedback to staff (or indeed others—it doesn't really matter), do you focus on their behaviour—something that they can change? Or on their supposed character traits—something they can't change?

2. When people give you feedback on your performance, what do you hear? What do you say to yourself? Do you say 'I can get better next time, if I engage in focused effort to learn from my mistakes?' Or do you just give up, and say to yourself that you're no good?
3. Think of a skill you don't have, but might like to have. *What comes to mind?* Are the thoughts from a fixed mind-set ('*I'm not arty, so I'm not doing that*') or a growth mind-set ('*I can learn to try, if I try, and I will get better with practice*')?
4. How might you change what you usually and characteristically to colleagues to help change their performance for the better?
5. How might you change what you usually and characteristically *to yourself* to help change your own performance for the better?
6. What lessons regarding mind-sets could have been usefully applied to Tom Spengler?
7. Test your mind-set online at http://mindsetonline.com/testyourmindset/step1.php

Further Reading

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