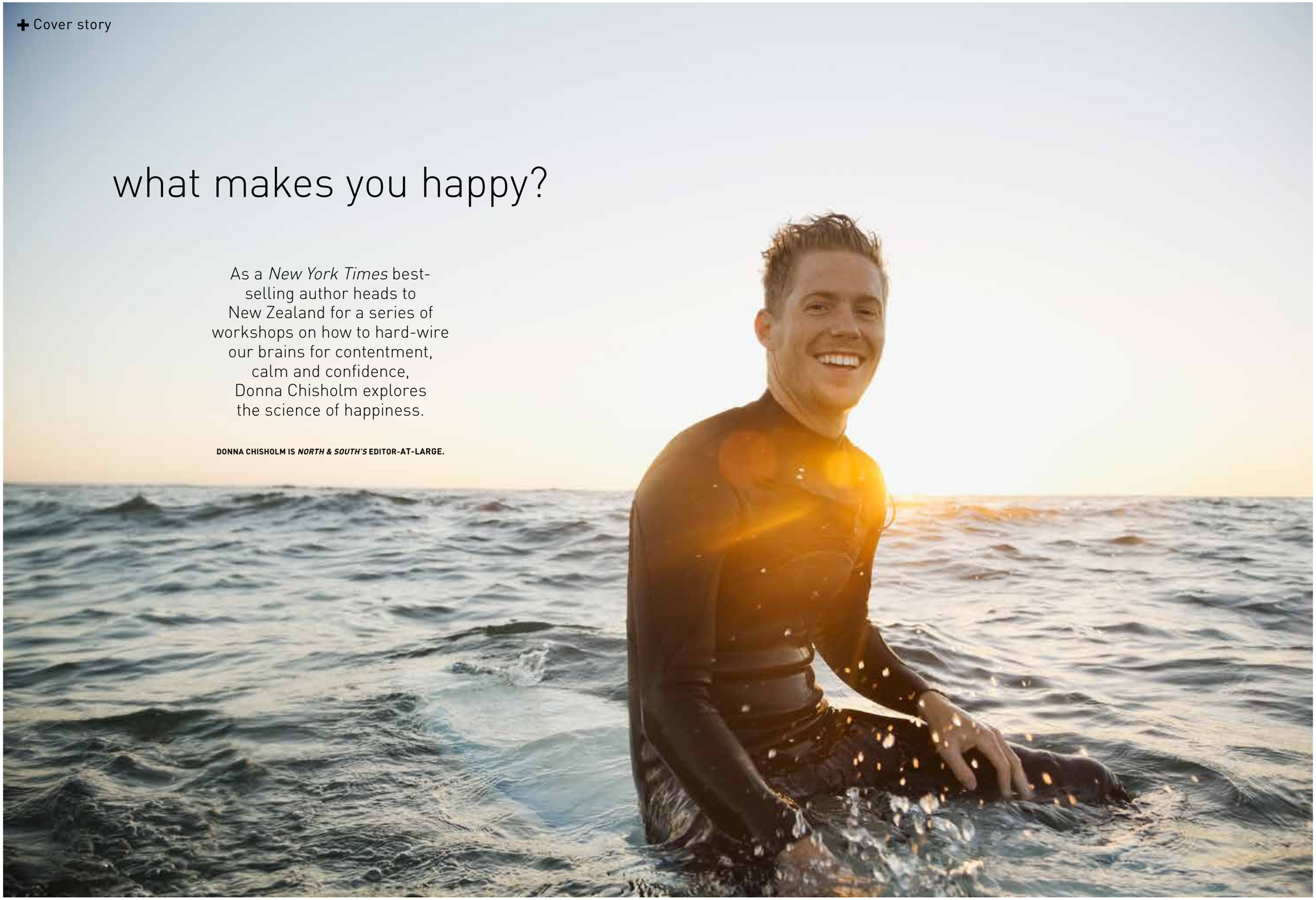
what makes you happy?

As a *New York Times* best-selling author heads to New Zealand for a series of workshops on how to hard-wire our brains for contentment, calm and confidence, Donna Chisholm explores the science of happiness.

DONNA CHISHOLM IS *NORTH & SOUTH'S* EDITOR-AT-LARGE.



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Psychiatrist Tony Fernando is on Wellington's Willis St when he spots the young homeless man, sitting on the footpath, hunched under a black hoodie.

"There's a supermarket down the street, do you want me to get anything for you?" he asks him. It's a rare question and the man, who looks in his 20s, is briefly taken aback. "Oh, can you get me some muesli bars?" Not beer, smokes or a pie, but muesli bars. Why? Because they last a long time without going off, and the pieces can be rationed, he says.

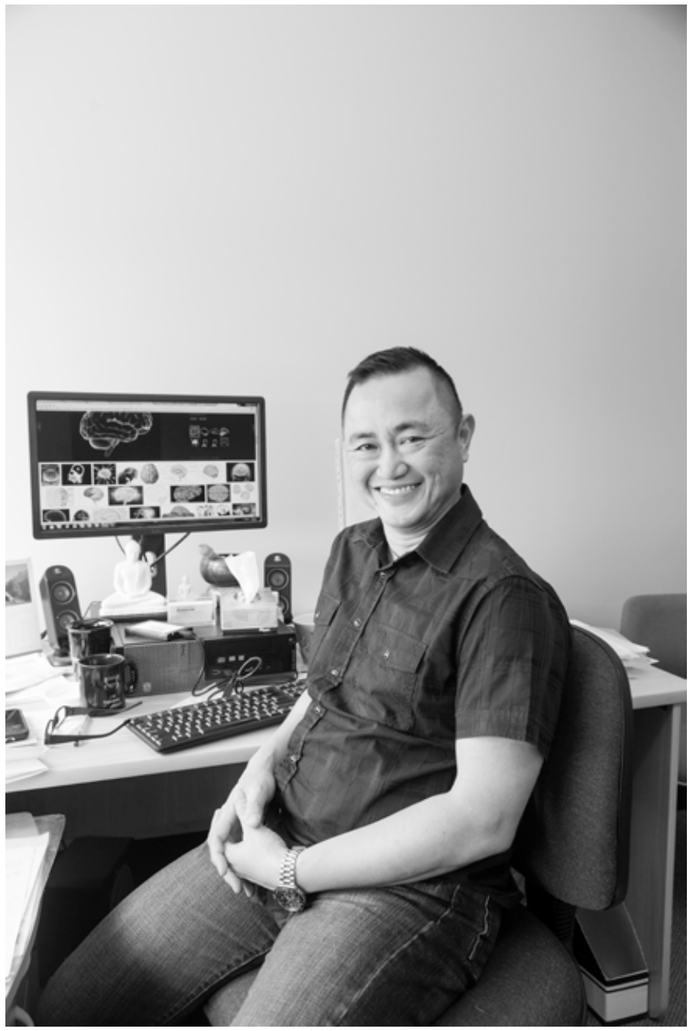
Further along Willis St, on his way to New World, Fernando happens on a second man sitting on the footpath. His cap reads, "I love potatoes." The doctor asks if he, too, would like anything at the supermarket. "A pie!" the man says.

At the supermarket, shopping for the two men, Fernando is happy. Far happier than if he was doing it for himself. "I added some bits. Adding the bits was more fun." The muesli bars are on special – two packs for $5, so Fernando buys two. He buys a chicken pie, two bottles of upmarket mango and orange juice – the sort he never gets himself because they're too dear – two Tip Top Trumpets and two packs of three Ferrero Rocher chocolates. He adds a $1.50 chocolate bar for himself.

As he hands out his gifts, he tries to video the men's reactions in his mind, recording how their gratitude lifts him in return. "I felt warm, content, meaningful." He writes about the experience that night in his gratitude diary. Cost of the shopping? $22. The payback in happiness? Priceless.

Fernando, who is doing a PhD in compassion in medicine at Auckland University, was in Wellington that day to present a lecture, "The Science of Happiness", to a group of public hospital specialists. He told them how the brain can be trained to make us happy and that kindness and compassion are the best and most sustainable ways to achieve happiness. "We sit," he said, "on a goldmine of happiness."

On Willis St, he walked the talk.



Psychiatrist Tony Fernando.

American neuropsychologist Rick Hanson, author of the *New York Times* best-seller *Hardwiring Happiness*, is firing like an excited synapse down the phone line from California, on the eve of his coming New Zealand tour.

If any brain is wired to find the good in life, it is Hanson's, as he launches into the interview with the energy and enthusiasm of a new puppy. "I just thought how kind of neat it is! That we're talking and you're 10,000km away and you sound like you're just on the other side of my office door. So many things we take for granted, like all the bad things that didn't actually happen, like, 'Gee, I haven't had a paralysing stroke yet today. Woohoo! It's great! The power didn't go out – thank you.'"

Our conversation is less than two minutes old and Hanson is already basking in three things he's grateful for. But then, it's what he does. Since 2009, when he published *Buddha's Brain: The Practical Neuroscience of Happiness, Love and Wisdom*, Hanson has made a career out of helping the rest of us change the wiring of our brains so we can be happier.

Hanson and a growing body of scientific researchers internationally are showing how we can use the neuroplasticity of our brain – its ability to change through experiences – to learn happiness and contentment in the same way we can learn to play the piano. But where once the old Indian guru's advice "Don't worry, be happy" might have seemed an unattainable, easier-said-than-done piece of happy-clappery, the scientific evidence is growing to prove our minds really do have it over our (grey) matter.

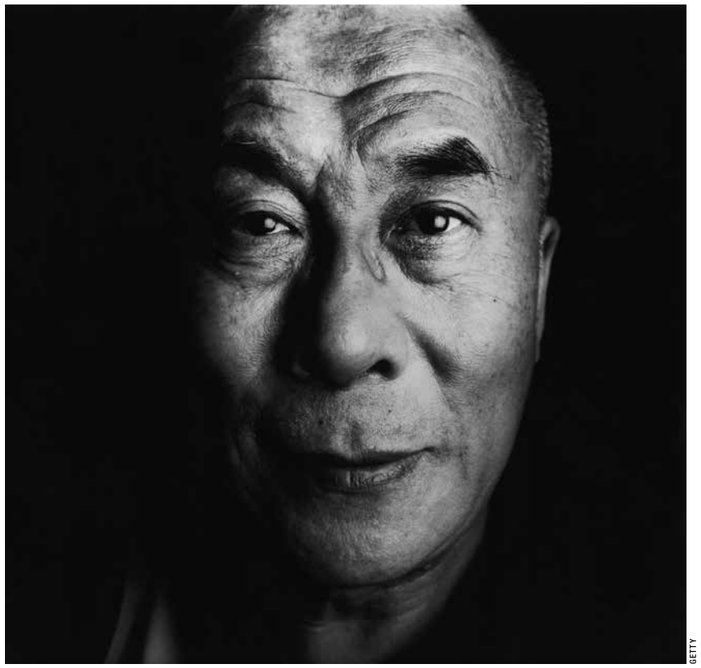
In the five cups of soft tofu-like tissue that make up our brain, 10 trillion synapses are firing, connecting roughly 100 billion neurons. Active synapses become more sensitive and new ones start growing within minutes; less active connections wither and die. It's relatively new thinking – as recently as 30 years ago, neuroscientists believed adult brain cells couldn't regenerate. That's now changed with the saying, "Neurons that fire together, wire together."

The term "Buddha's Brain", popularised by Hanson's book, was first coined by University of Wisconsin professor of psychology and psychiatry Richard Davidson, who demonstrated the functional and structural differences in the brains of meditating Tibetan monks.

His collaboration with the Dalai Lama began more than 20 years ago, when the Tibetan spiritual leader invited him to put Buddhist practices to scientific test. He ultimately sent eight of his most experienced meditators, who'd had 10,000 to 50,000 hours' experience, to Davidson's lab for brain scans and EEG testing.

In 2004, Davidson showed how "compassion meditation" enhanced activity in the left prefrontal cortex of the monks' brains – the area associated with positive emotions, such as happiness. The monks, whose results were compared with those of untrained students, had higher levels of brain impulses known as gamma waves, which are connected to higher mental activity and awareness. They were "extremely large" increases, Davidson said, "of a sort that has never been reported before in neuroscience literature". Those who had completed the most meditating hours showed the greatest brain changes.

"What we found is that the trained mind, or brain, is physically different from the untrained one," Davidson said. This showed that strengthening neural systems isn't fundamentally different



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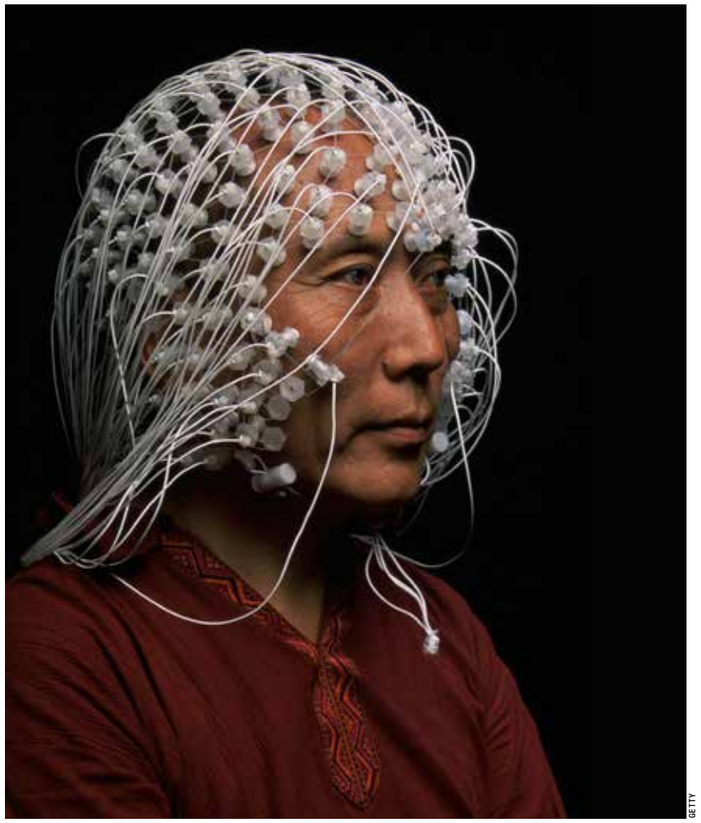

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Top: The Dalai Lama has collaborated with scientific researchers for more than 20 years. Above: A meditating Buddhist teacher wears an array of EEG sensors, used to measure brain activity, in Richard Davidson's lab.

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"You grow mental resources like toughness, resilience, grit, optimism or self-confidence by converting positive experiences to neural structure."

from strengthening muscles with physical exercise.

Crucially, the brain usually can't distinguish between the experience of an actual event and imagining the same thing. In 2003, an Ohio university study showed people who simply imagined laughter or crying triggered their brains in the same way as an actual happy or sad event.

In *Hardwiring Happiness*, Hanson offers a step-by-step guide for those of us who may not have a spare 50,000 hours to contemplate the meaning of life, but want to be happier. He says you don't have to be a monk to lay down helpful neural pathways. For example, London cabbies memorising "The Knowledge" map of the capital have been found to have thicker neural layers in the hippocampus, the area of the brain that also helps make visual-spatial memories. Mindfulness meditators, says Hanson, have increased grey matter in three key regions – the prefrontal areas behind the forehead that control attention, the insula, which we use for tuning into ourselves and others, and the hippocampus.

In January last year, *Time* magazine called it the "Mindfulness Revolution" – "the science of finding focus in a stressed-out, multitasking culture". Mindfulness is top of Hanson's recommendations for hardwiring happiness but he says it's only part of the story. He wants us to focus also on the little things that make life worth living and the happiness they bring, whether it's appreciating acts of kindness or the beauty of a garden, or observing the cosy contentment of the family cat snoozing.

If we think of the mind as a garden, he says, mindfulness alone would be akin to observing it. To make positive changes, though, we need to do more – pulling weeds and planting flowers, he calls it. While this doesn't mean there's anything wrong with the practice itself – "it's wonderful" – he's sometimes seen the downside, in those who assume that qualities such as compassion or resilience are somehow inherent in mindfulness itself.

"They think the strengths will grow on their own, or that feelings of inadequacy, anxiety, envy or anger will just fade away if they practise mindfulness."

The original saying of guru Meher Baba, "Don't worry, be happy" also included two more important words that have been dropped from the modern phrase: "Make efforts."

"You grow mental resources like toughness, resilience, grit, optimism or self-confidence by converting positive experiences to neural structure. You have to have that emotional experience, stage one, but stage two, you have to install it into your brain. If it doesn't convert from short-term memory to long-term storage, it's only a pleasant passing experience; it has no lasting value."

So, how do we do that? *Hardwiring Happiness* spends more than 200 pages explaining how to put the theories into practice, but in essence it comes back to what Fernando did in Wellington – putting a kind of mental video camera into our brain so we can record the good thoughts and feelings, then put them on freeze-frame or slow-mo to play and replay them, turning a fleeting event into an experience.

"The brain takes its shape from what the mind rests upon," Hanson says. If you keep resting your mind on "self-criticism, worries, grumbling about others, hurts and stress", your brain will be shaped into greater reactivity and vulnerability to anxiety and depression. Resting it on the good – pleasant feelings, the things you do get done, physical pleasures – means that over time your brain will take a different shape, "one with strength and resilience hardwired into it".

Rick Hanson wants us to focus also on the little things that make life worth living.

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It's tempting to suspect that Hanson's attitudes – at 62, he describes himself as feeling "really awash in wellbeing" – stem from a happy upbringing and a lucky life. Not so, he says. "There was in my family a lot of unnecessary bickering, judging and criticising. That sounds trivial, and compared to what so many people go through, it is trivial. But personally I really withdrew. I experienced a tremendous amount of rejection and loneliness."

In college, he says, he stumbled on the first experience of what would become his life's work. As a nerdy, skinny, bespectacled outsider, he says he found he could turn a small event, "a few guys saying, 'Come on, let's go get a pizza', or a young woman smiling at me", into a good experience that he held on to, rather than brushed off. "In effect, I was taking in the good, a dozen seconds at a time. It was quick, easy and enjoyable. And I started feeling better."

In New Zealand, Hanson will meet the Mental Health Foundation, which runs a mindfulness programme in 14 schools and wants to expand it into workplaces and healthcare. "We're detecting a hunger for it from different organisations and professions," says foundation CEO Judi Clements.

"We don't suggest mindfulness is the answer to everything, just that it's a very valuable technique, to be able to manage emotions and avoid that scattered, frenetic thinking we are so often prey to. Children are told to pay attention, but aren't told *how* to."

Preliminary results from independent research on the outcomes, three months after the programme ended, found the children had sustained increases in wellbeing.

The foundation is also about to pilot an online "wellbeing game", which has historically run for only a month every October, in several workplaces starting this summer. Participants in the game compete by seeing who can log up the most hours involved in the foundation's five paths to wellbeing – being active, connecting, taking notice, learning and giving.

The project leader, Christchurch-based Carsten Grimm, did his psychology masters paper on the orientations to happiness, first described by influential US psychologist Martin Seligman (who's widely credited as the father of the positive psychology movement). In 2005, Seligman and others proposed that the first route to happiness was through pleasure, the second through meaning and the third through engagement.

Grimm's study investigated whether those orientations were grounded in the way people behaved every day, and traced the activities and corresponding

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BRAIN TEASERS

So, if happiness is all about changing the ways our synapses fire, what can researchers at the pointy end of brain research tell us about what they see in the lab?

Associate Professor Johanna Montgomery, principal investigator at the Synaptic Function Research Group in Auckland University's Centre for Brain Research, says while Rick Hanson's theory – that changing our brain activity at a synaptic level changes our behaviour – is a logical explanation based on studies from other animals, we haven't yet got the technology to prove it scientifically in humans.

While MRI scans show increased blood flow to different areas of the brain with positive stimuli, she says that's a long way from showing the synaptic connections themselves are strengthening, although logic suggests that would be the case.

In the lab, when scientists want to make synaptic connections and communication stronger, they induce repetitive electrical stimulation, mimicking the high-frequency firings that happen naturally in the brain every second.

You can think of the synaptic firing connecting the neurons in our brains as something akin to a telephone line, she says, with the hormones released in response to good or bad emotions – such as adrenaline, cortisol, dopamine or oxytocin – acting to regulate the activity of the line, like weather. More is known about the impact on brain activity and memory of fear and stress than the effects of the "happiness" hormones. For example, prolonged stress or post-traumatic stress, and the resulting increase of corticosteroids, alters synapse plasticity in different ways to a positive experience.

Post-mortem studies have also shown that the hippocampus in the brain of people with depression is often atrophied, with fewer neuronal connections. But is that cause or effect?

The Centre for Brain Research is developing the ability to grow living brain cells from tissue taken immediately after death, and Montgomery says studying neurons which have actually "experienced" the condition could provide some important insights. "Bridging the gap between what is happening at a synaptic level and what is happening at a behavioural level is the next frontier of neuroscience research."

Centre director Professor Richard Faull says we may never be able to prove it, but that doesn't mean the effect isn't real. "The fact that your mind – who you are, your whole future vision, how you feel about yourself, your enthusiasm and your passion – actually changes how your brain works is irrefutable. But it won't ever necessarily be explained by science."

happiness scores of 173 people. Participants completed an online questionnaire and Grimm texted them three times a day for a week, asking what they were doing and how "pleasurable, meaningful and engaged" they felt.

"The idea is we all have a dominant route to happiness, so my original thinking was if this is true, then perhaps the pathway to happiness is satisfying that dominant orientation because it matches." What he found, though, was that those who strongly oriented to all three routes to happiness were the happiest, suggesting it's better to have balance than focus on the one you most identify with.

The behaviour that got the biggest ticks in all three boxes was sex, while caregiving or volunteering scored highly for meaning and engagement but lower for pleasure. Facebooking, surprisingly, while common, scored near to bottom on all three counts, only beating "being sick" in the overall happiness ratings.

In *Hardwiring Happiness*, Hanson makes the point that, in evolutionary terms, the brain is wired to look at the negative and that negative experiences stick more readily than positive ones.

He says because of this evolutionary "negativity bias", our brains are like Velcro for bad experiences and Teflon for good ones. "We learn faster from pain than pleasure."

The brain rapidly sensitises to negative stimuli in a way that it does not sensitise to positive ones. Stress releases cortisol, which acts on the amygdala in the brain, our internal alarm bell, making it ring more readily and more loudly. Cortisol also overstimulates and kills neurons in the hippocampus – the area that can inhibit the amygdala and calm it down. Trying to hard-wire the positive experiences is about levelling an already uneven playing field.

However, don't confuse what Hanson is preaching with "positive thinking", though it may sound superficially similar.

"I don't believe in positive thinking. I think it's hooey." Fixating only on the positive means losing sight of "the whole mosaic of reality", he says. "If we're just absolutely red-lining on physical or emotional pain, in that moment all we can do is ride out the storm and any kind of looking around for good news or something else to be grateful for is total bullshit."

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Pain pushed away too quickly just goes "underground" and returns to bite us, he says. "There's a normal rhythm where you feel the pain, you bear it. The best 'positive' you may be able to register during this time is that you are surviving, it's not killing you. But at some point – the Goldilocks point – you can start letting it go; you can say, 'I don't need to keep thinking about this,' or maybe, 'This hurts too much and I need to move on.'"

Back at Auckland University, health psychologist and associate professor Nathan Consedine, who is supervising Tony Fernando's PhD, greets our relentless quest for the secrets to happiness with a jaundiced sigh.

"The more you chase it, the less you get it," he says, quoting studies showing people who value happiness are, in fact, less happy. "The primary mechanism seems to be that when you value things, it creates an implicit expectation that an outcome will be good and then you set yourself up for disappointment. The paradox is the possibility that happiness comes from not trying to have it, but from just being in life."

Consedine, who's researched emotions for 20 years, says what makes happiness interesting from a scientific and philosophical point of view is that it's "incredibly valued" by Westerners who are leveraging Eastern techniques, such as Buddhist meditation, but Eastern populations, including Buddhists themselves, "aren't particularly concerned about being happy".

"What the Dalai Lama says basically boils down to 'kindness is everything'. Kindness is a state of mind and a pattern of behaviour, but it's not the same thing as happiness. The Eastern approach, of mindfulness and meditation, is not designed to make you happy; that's not the goal. The paradox is you become less negative and more positive – ie, happier – as a function of accepting emotions as they come. The idea permeating that approach is that part of the reason a negative response – be it anger, jealousy, sadness, fear or anxiety – lasts is that you're investing huge amounts of energy trying to make it go away. This effectively adds fuel to the fire. Leaving it alone and just observing it, and letting it come and go in a natural cycle, makes it pass much more quickly. Happiness is made much easier, because you're not *trying* to be happy."

Consedine says he's not disagreeing with Hanson and Davidson's theories about rewiring our brains to change our outlook on the world. "Sure, it's hypothetically possible, but at this stage we don't have the evidence for it. To talk in this language is risky, because the brain changes all the time. To systematically shift the set points of how we respond emotionally to the world takes time."

The problem is figuring out whether the differences in the brain activity and structure of the kind Davidson observed in the monks are a cause or a consequence of their lifestyle. He points out that up to 50 per cent of happiness is the result of our genes, not our environment. "Some babies are happy and some babies are grumpy and that goes right through life." And, in our environment, it's not about how rich we are or where we live. "The 'happy' countries are countries like Denmark, where they smoke, they drink and have the worst weather on the planet. In general, their expectations for happiness are lower. They don't expect to be happy, so they exceed expectations much more often." Indeed, one study found American multimillionaires rated their happiness levels, on average, around 5.8 on a scale of 1-7. Calcutta slum dwellers rated theirs at 4.6.

Consedine says he's not sold on the idea that "happiness is all there is".

"I'm a friendly person but I wouldn't describe myself as a happy person. I take satisfaction out of life from the meaning I derive from work and family. I certainly have never been prone to seeking hedonic pleasure."

The big question, he says, is whether we should be actively trying to be happy at all and "that's unclear to me". And, yes, there are downsides to happiness. A study by a Yale graduate published in November, for example, showed that people who were happier were less empathetic. Consedine says that's probably because happy people are strongly motivated to stay happy, because it's "innately pleasant". "Engaging empathically with other people typically involves engaging with their distress and that's going to negatively impact your own happiness."

Well, unless you're Tony Fernando,

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Above: Health psychologist and associate professor Nathan Consedine. Right: People who have lower expectations of happiness may be more likely to achieve it.

Consedine points out up to 50 per cent of happiness is the result of our genes, not our environment.

who was training to be a Catholic Benedictine monk in the Philippines before switching to medicine. He became interested in researching happiness after reading the Dalai Lama's *Art of Happiness* 10 years ago. He picked it up at an airport only because it was co-authored by a psychiatrist, but he has been following its teachings ever since.

With neurotransmitters associated with various types of happiness already identified – serotonin, which controls mood; dopamine, which is involved in excitement and reward; and oxytocin, which is linked to bonding – he says it's conceivable we'll one day see a "happy pill".

Drugs such as anti-depressants and anti-anxiety medications don't make us happy – if and when they work, they simply return us to our natural mood baseline.

While the perils of taking illegal drugs for the highs they bring are well known, trials have also shown the potential risks of trying to harness the power of our natural neurotransmitters. Research published in *Science* a few years ago found participants given intranasal oxytocin felt more connected to their group, but became more tribal and aggressive towards outsiders. As the *New York Times* noted, oxytocin had turned out to be the hormone of the clan, not universal brotherhood.

But if a safe, effective happy pill came on the market, would someone like Fernando need it, or take it? The Dalai Lama was asked the same question once, Fernando says. "He said yes. If you could take a pill to make you genuinely happy, why wouldn't you?"

In the meantime, he's doing his best from the inside out. He says a Buddhist teacher once told him, "If you want to soar like a dove, you need two wings – one mindfulness and the other compassion."

For now, that's enough for Fernando. Whether he's changing the way his brain fires along the way doesn't remotely bother him. "My goal is not to be neuroplastic," he says. "My goal is to feel at ease and at peace." +

• *For information on Hanson's workshops in Auckland, Wellington and Christchurch in late January, go to rickhanson.net.*