Although brains are most often associated with generating thoughts, a close examination of our neural maps reveals a different story. In reality, most of the brain’s real estate is devoted to movement. A generously sized strip of the brain’s outer layer, known as the motor cortex, enables us to move specific muscles; the large central area called the striatum is responsible for the effortless initiation and execution of movement sequences; and the large structure on the back of the brainstem, known as the cerebellum, is involved in motor coordination. In fact, nearly 80% of all the brain’s neurons are located here. Why such an investment in movement? Before philosophy and calculus occupied our human neural timecards, survival depended on animals moving through their environments and interacting with their surroundings in adaptive and effective ways.

As depression rates increase, getting hands-on with our environment may be the best thing we can do for our mental health

by Kelly Lambert

Although brains are most often associated with generating thoughts, a close examination of our neural maps reveals a different story. In reality, most of the brain’s real estate is devoted to movement. A generously sized strip of the brain’s outer layer, known as the motor cortex, enables us to move specific muscles; the large central area called the striatum is responsible for the effortless initiation and execution of movement sequences; and the large structure on the back of the brainstem, known as the cerebellum, is involved in motor coordination. In fact, nearly 80% of all the brain’s neurons are located here. Why such an investment in movement? Before philosophy and calculus occupied our human neural timecards, survival depended on animals moving through their environments and interacting with their surroundings in adaptive and effective ways.

With so much of our brain’s resources devoted to movement, it is interesting to consider the impact of our increasingly sedentary lifestyles on these pervasive neural circuits. As our activity levels have decreased throughout the past century, rates of depression have drastically increased. Considering that antidepressant use increased by a whopping 400% from the ’90s to the ’00s, it is becoming increasingly clear that our brains are not functioning at optimal levels. Sadly, the increased antidepressant rates also suggest that the traditional pharmacological treatment strategies are not providing relief for millions of individuals.

As alternative approaches to treating the debilitating symptoms of depression are considered, it may be wise to go back to our neural roots and consider the role of physical activity in the lives of our ancestors. Anthropological evidence reveals that our hunter-gatherer ancestors had extensive skeletal musculature, suggesting that they exerted more physical effort than required in modern societies to obtain necessary quantities of food and other life resources. As we have worked towards a more prosperous lifestyle, have our neural circuits been downsized in a similar manner as our forearm muscles?

The first clues about the importance of using our hands for crafting, handiwork and chores emerged from epidemiological research suggesting that individuals born before the first third of the 20th century are up to 10 times less likely to report suffering
from depression than individuals born in the middle third. Although many lifestyle and cultural changes have occurred over the past century, one notable difference is the diminishing role of physical effort and work as time-saving appliances and service-oriented businesses have emerged. When the New York Times reported on the introduction of the television at the 1939 World’s Fair, the narrative confirmed that the average American family was too busy to sit in front of this new entertainment box and it would never be a serious competitor to radio broadcasts. This example serves as a vivid reminder of how quickly and dramatically our lifestyles have changed. Whereas it is unlikely that a rapid-onset genetic or biochemical modification has accompanied the increased rates of depression observed throughout the past century, research suggests that diminished physical effort has neurobiological impacts that could lead to the emergence of depressive symptoms.

If our drive to create a prosperous society requiring minimal physical effort to produce our valuable resources has negatively impacted our brain’s optimal engagement levels, then this lifestyle choice may be one of the single most regretful ‘advancements’ for our species. We may be in the midst of an experiment of our own making, in which we are systematically removing the valuable interactive behavioural responses that enabled our brains to maximise their problem-solving ability. Although many of us complain about working too many hours each week, we seem to have a lot more time for resting and entertainment these days, with fewer of us holding jobs that require any form of mastery over our physical world. Considering that the hands are, arguably, one of the most potent activators of the brain’s circuits, a hands-free lifestyle focused on virtual, rather than actual, worlds may ultimately translate into disengaged, anaesthetised neural networks. Philosopher Matthew Crawford argues in his book, The Case for Working with Your Hands, that our motivation to build a knowledge-based workforce may have produced less challenging contexts for our brains and mental functions than more traditional manual labour workforce settings. This is also true of our homes. Just a few generations ago, most individuals took pride in repairing appliances, mending torn clothes and cooking meals for large family gatherings. Today, we have appliance repair workers, seamstresses and caterers on speed dial to ensure that we avoid these annoying, mundane tasks.

After obtaining his PhD in political philosophy and working in a thinktank, Crawford quit his job and opened a motorcycle repair shop. Interestingly, he felt that his brain was more engaged following his transition from a knowledge worker to a manual worker. It seems the dichotomy between manual work and knowledge work is inaccurate, as it is very likely that more of the brain is engaged in many physical jobs that require the use of one’s hands, forcing us to re-evaluate perceptions that manual careers are less cerebral than knowledge-based ones.

As we bypass opportunities to repair, create and design our environment, we may be losing valuable
opportunities for perceived control, in a world that seems to be spiralling out of control. With newsfeeds constantly projecting images of gloom and doom, it is easy to feel our sense of control diminishing. Being deprived of opportunities to interact with our material worlds in ways that produce positive tangible results may leave us with a sense of passivity and learned helplessness, a perfect formula for the emergence of depressive symptoms. Before we all quit our office jobs, however, there may be a compromise that enables us to frequently remind our brains that we have some degree of control over our environments. Intertwined in our daily career routines, even small doses of household chores, gardening or crafts should be embraced as necessary components of our recommended daily behavioural diets for maintaining optimal mental health.

Neuroscience and psychological research are beginning to confirm that recent trends of increased DIY projects and hobbies may constitute a more comprehensive brain therapy than the traditional pharmacological approach. Although the pharmaceutical industry has targeted the neurotransmitter serotonin, depression symptoms are also related to compromised levels of dopamine, a neurochemical involved in movement, pleasure and anticipated rewards, as well as increased levels of the stress hormone cortisol. While neurotransmitters cannot be easily measured in the brains of living patients suspected of suffering from depression, research indicates that up to half of individuals diagnosed with depression have increased stress hormone levels. Accordingly, keeping stress hormones and neurochemicals such as dopamine at healthy levels via behavioural measures such as crafting or meaningful work may ultimately have a significant impact on preventing and treating depression.

The notion that crafting may facilitate emotional wellbeing is not new. During the 19th century, physicians used to ‘prescribe’ knitting for women to counteract anxiety and discontent. Based on what we now know about the anatomical and chemical functions of the brain, the efficacy of crafting for the treatment of depression makes a lot of sense. Engaging in tasks such as knitting involves the integrated use of our hands, which activates large portions of the brain. Repetitive tasks are known to activate the serotonergic system, the system targeted by antidepressants that is involved in mood regulation and many other functions. Counting stitches may distract the knitter from anxiety-provoking thoughts. Anticipating the final product, and the accompanying sense of accomplishment, engages the dopaminergic system, leading to a sense of pleasure. If knitting is done in the context of a supportive social group, social neuropeptides such as oxytocin may decrease stress hormone levels.

A recent study in the British Journal of Occupational Therapy confirmed that the theory behind the effectiveness of knitting is well-founded. When 3,500 women were surveyed, a positive effect was observed between knitting and variables such as happiness, calmness and higher cognitive functioning. Additionally, research published in the journal Psychosomatic Medicine indicated that patients with chronic disorders such as asthma, arthritis and diabetes report fewer symptoms of depression if they have gained a sense of mastery over some type of hobby or crafting. Although the data are still being collected, Stephanie Westlund recently described the beneficial effects of gardening in veterans suffering from treatment-resistant post-traumatic stress disorder in her book Field Exercises.

The work with gardening is an extension of research conducted on rats in my laboratory. Rats trained to dig up their coveted sweet cereal rewards each day exhibit healthier levels of stress hormones and enhanced evidence of emotional regulation than their rodent counterparts that are merely given the same number of rewards, regardless of their efforts.
(dubbed the ‘trust fund rats’). We refer to the positive associations between invested effort and positive outcomes as effort-based rewards.

Unlikely lessons about the reinforcing properties of effort-based rewards may also be learned from the history of cake mix sales. The first cake mixes did not require consumers to add any ingredients but to simply pour the batter in the pan and bake. However, it was the subsequent marketing decision to require the consumer to make the extra effort of adding eggs and water that was credited with higher sales. In a recent issue of Bon Appétit magazine, journalist Michael Park described how another successful modification in cake mix marketing was literally the icing on the cake. Around the 1950s, emphasis was placed on adding a personal signature to cakes via the incorporation of various icing designs. It appears that allowing consumers to add this extra effort solidified the long-term sales success of these mixes. As observed in my laboratory rats, a little effort seemed to be the perfect ingredient for life’s sweet rewards.

Observations in the lab and in the real world are helping us understand why the more engaging cognitive-behavioural therapeutic approaches for depression are around 50% more effective than their pharmacological counterparts. As many contemporary societies require less hands-on work and activities, recent trends in hobby shops and DIY stores suggest that these activities may serve as the antidote to the hands-free, knowledge-based society that we have created. If decades of increasing passivity have redesigned our brains toward a profile of enhanced susceptibility to emotional disorders, recent trends towards what may be viewed as compensatory crafting may also redesign our brains towards a learned resilience. The recent boom in neuroscience research confirming the pervasive existence of neuroplasticity (the production of new brain cells or restructuring of existing neural circuits), even in adult brains, provides a putative neurobiological mechanism for how lifestyles and behavioural training can change our brains.

An additional benefit of crafting may be that it combats the toxicity of boredom that has become a by-product of our efficient, technologically driven culture. As described by Harvard anthropologist Richard Wrangham in his book Catching Fire: How Cooking Made us Human, when our ancestors started cooking their food, providing calorie-rich meals that could be eaten faster than raw foods, the time requirement for foraging and hunting was drastically reduced. With more time available, our ancestors are likely to have benefited from the creation of constructive ways to occupy their time to keep their brains engaged at a healthy level. I recently returned from taking my comparative animal behaviour class to observe semi-free ranging java macaque monkeys at the DuMond Primate Conservancy in Miami. As primate behaviour goes, these animals exhibit virtually all the behaviours observed in healthy monkeys living in the wild. Even so, I was struck by what appeared to be excessive stretches of time when the monkeys were doing nothing, just sitting and resting. I could not help but imagine them filling this time with macramé or woodworking; anything to keep them busy and engaged. Could their brains be redesigned towards increased complexity if they incorporated more handiwork into their behavioural repertoires?

From the time our human ancestors started sketching images on the caves, their creative and fine-tuned motor responses merged to explore endless methods of manipulating environments. According to University of California, Davis neuroscientist Leah Krubitzer, the hands provide a tool that enables humans to determine the boundaries of their physical world and how elements of the environment can be manipulated. With each crafting endeavour, an enhanced understanding of the complex world emerged, leading to a stronger sense of self-efficacy and mastery. Tweaking our environments through DIY activities and crafts may redesign our brains towards responses that build a buffer against the emergence of depression. All this, and yet no known side effects? That’s difficult to capture in a single pill.