

Difficult times often lead to great innovations – after all, necessity is the mother of invention. So, if you are feeling the pinch in your purse, now is the time to capitalise on your creativity. **Alison Motluk** explains how

Creative solutions

1 Embrace your inner grouch

It's hard to stay upbeat when your penny-pinching bosses are counting paper clips and coffee grains, but here's some good news: you don't need to be cheery. Workplace discontent may just be a vast, untapped source of creativity.

"For a long time, it seemed that all companies cared about was job satisfaction," says Jing Zhou at Rice University in Houston, Texas. She and colleague Jennifer George wondered whether dissatisfaction was really such a bad thing. To find out, they surveyed 149 employees at a drilling equipment company. Without revealing their ultimate purpose, they asked workers dozens of questions about their work lives, including some to assess their level of job satisfaction. They also interviewed the workers' supervisors and asked them questions about which workers regularly came up with "creative solutions",

"fresh approaches" or "new ideas".

Surprisingly, people who were dissatisfied and willing to pipe up were found to be the most creative (*Academy of Management Journal*, vol 44, p 682). "It was very striking," says Zhou, "and counter-intuitive."

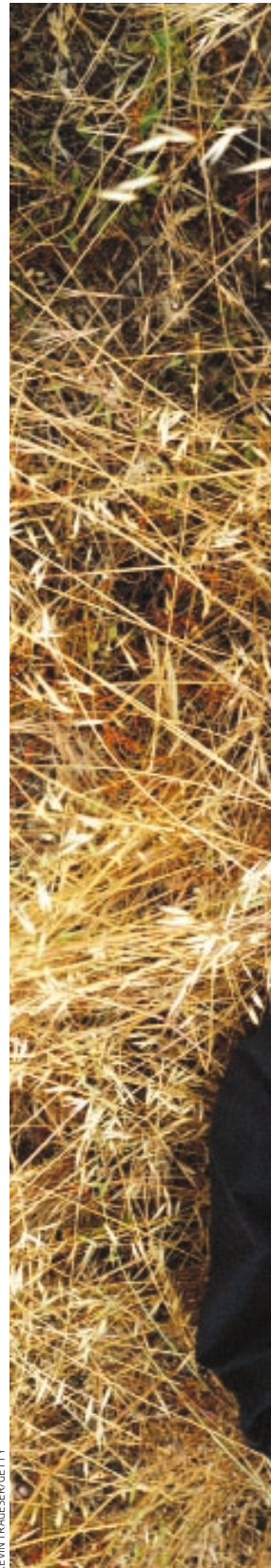
Zhou and George reckon that employees who become disgruntled have four options. They can jump ship, taking any ideas they might have had on how to improve things with them, or they can stick around and whine, reaffirm their allegiance, or shirk their work. Neither the loyalists nor the shirkers have any impetus to work for change. The whiners, by contrast, spend a significant part of their day ruminating on how things can be improved. That is a creative force we can no longer afford to ignore, Zhou argues.

She points out that disgruntled employees are often discouraged

from voicing complaints, so their valuable insights are stifled. The study found that the creativity of whiners could only be harnessed with the help of supportive colleagues who listened to and channelled their discontent. "Top managers really need to rethink how to do things," she says.

In a similar vein, Bruce Charlton at the University of Buckingham in the UK says that by overvaluing people who toe the line we are killing creativity in the sciences. In a paper entitled "Why are modern scientists so dull? How science selects for perseverance and sociability at the expense of intelligence and creativity", he argues that the long, tedious road to tenure ruthlessly weeds out the more imaginative people in favour of conscientious scientists who won't rock the boat (*Medical Hypotheses*, DOI: 10.1016/i.mehv.2008.11.020).

KEVIN TRACES/GETTY





Let your mind wander

"Chance favours the prepared mind." That was Louis Pasteur's mantra, and new research suggests he may have been on to something. Interestingly, though, the "prepared mind" may be more flypaper than bear trap.

John Kounios at Drexel University in Philadelphia, Pennsylvania, and Mark Jung-Beeman at Northwestern University in Chicago were interested in knowing what was going on in the brain in the run-up to a eureka moment. To find out, they scanned the "resting" brains of volunteers as they waited to be told what the experiment entailed. Then the researchers gave them anagrams - "MPXAELE", for example - and afterwards asked them to indicate whether the solution had just come to them as an insight or if they'd had to work it out. Comparing the activity in volunteers' resting brains, Kounios and Jung-Beeman found clear differences, with those who reported using insight seeming to let their minds wander. They had more activity in their right hemisphere, which is associated with processing loose associations, and more diffuse activity in the part of the brain that processes vision (*Neuropsychologia*, vol 46, p 282). The researchers suggest this may allow them to sample their world more broadly for connections that could trigger an "aha" moment.

Joydeep Bhattacharya at Goldsmiths University of London has also found that an unfocused brain is most likely to generate creative solutions. He gave volunteers particularly difficult word association puzzles: finding the word that unites "skirts", "black" and "put", for example. Bhattacharya monitored their brain waves as they worked themselves into an impasse. Then he dangled a clue, the first letter of the unifying word - in this case, "o".

The clue was enough to deliver the answer for people whose brain activity during the test had revealed a lot of slow alpha waves and few high-frequency gamma waves - the sort of pattern you would find in someone relaxing with their eyes closed. By contrast, people who had shown little alpha but a lot of gamma activity - normally linked to focused thought, consciousness and higher reasoning - still didn't strike upon the answer (*PLoS ONE*, vol 3(1), p e1459). "Whether the clue would be successfully utilised depended crucially on their prior brain state," says Bhattacharya. He now wants to know whether deliberately putting your brain into a relaxed, defocused state could increase creativity. A recession-busting way of doing that might be simply to take a shower or go for a walk in the woods.

Play the piano

3

Music may provide more than just a brief respite from the economic downturn – it may help you cultivate the ingenuity to rise above it.

Sohee Park and her colleagues at Vanderbilt University in Nashville, Tennessee, wanted to find out what was different about the brains of people who are good at “divergent thinking” – creativity characterised by coming up with novel ideas. She recruited 20 students of classical music, who had each had at least eight years of formal training, and 20 people matched for age, gender and IQ. The volunteers were each given one or more objects – for instance, a toothbrush, toothpaste and dental floss – and asked to come up with

alternative uses for them. The musicians, it turned out, were far more creative. What’s more, brain scans taken during the task revealed that while the non-musicians primarily employed their left frontal cortex, the musicians used the right-hand side too (*Brain and Cognition*, DOI: 10.1016/i.bandc.2008.07.009). This is unusual, says Park, and suggests the musicians are accessing more information: “It could be that by training with both hands, they have been forced to communicate between both sides of the brain.”

So should we all start a vigorous course of musical training, or take up other ambidextrous activities, such as karate or touch-typing? Park admits that it is not clear whether an enhanced ability to think using the left and right brain simultaneously is the cause of good musicianship or a consequence of it. Nevertheless, she points out that no matter what your age, your brain is affected by the things you do. “There’s still cortical reorganisation, even when you’re older,” she says, so it is never too late to change your mind.



GIJFSON/LEBRECHT

Colour your world blue

It may be nothing more than an association with big skies and the open seas, but beholding the colour blue makes you more creative. Juliet Zhu at the University of British Columbia in Vancouver, Canada, compared the effects of red and blue on people’s behaviour. While red tended to sharpen the memories of her undergraduate volunteers, blue helped to unlock their imaginations. For example, when they were given toy parts in either blue or red, the toys that the volunteers constructed in blue were rated as much more creative than those made with red (*Science*, vol 323, p 1226).

Two’s creative company

5

4



ATLANTIDE PHOTO TRAVEL / CORBIS

Fight that recessionary impulse to go into hiding until your Nobel prizewinning concept is fully formed. According to Vera John-Steiner, at the University of New Mexico in Albuquerque, the best ideas are forged not in moments of solitary genius, but during exchanges with trusted colleagues. In her book *Creative Collaborations*, John-Steiner studies what went right with famously creative duos such as Albert Einstein and Niels Bohr, Marie and Pierre Curie and Margaret Mead and her daughter M. C. Bateson. "Social interactions are crucial," she concludes. "They provide a non-judgmental ear for emerging ideas."

Socialising with colleagues has long been recognised as important for creativity. The great European scientists went hiking together, John-Steiner points out, and sometimes even formed amateur music ensembles. What's more, if the Great Depression is anything to go by, hard economic times may actually be a catalyst for greater collaboration and innovation. It was a time of great creativity, she says, everywhere from the theatre to laboratories of theoretical physics.

Live abroad

6

It is a common escapist fantasy: ditch the daily drudgery, leave your troubles behind and build a new life somewhere else. The idea that living abroad spurs creativity has been in the popular psyche for eons. What would Gauguin have been without Tahiti, or Hemingway without Spain?

Adam Galinsky at Northwestern University in Chicago and Willam Maddux of INSEAD, a business school in Fontainebleau, France, decided to put the anecdote under the microscope. In one experiment, they found that people who had spent time living outside their own countries were more likely than people who hadn't to solve the "Duncker candle problem": given only a box of thumbtacks and a candle and told to fix the candle to a wall, you need to divine that the tack box can be used as a shelf. What's more, the longer someone had lived abroad, the more likely they were to solve the problem. Time spent ➤

abroad also predicted whether another set of individuals would be able to reach a deal in a seemingly intractable negotiation.

Just thinking about your time as an expat before engaging in a task can boost your creativity, the researchers found. They primed volunteers, all of whom had lived abroad, by asking them to write about their time spent either in a foreign country, travelling, at home or in the supermarket. They found that the first group did significantly better than the others on a subsequent word-based creativity task (*Journal of Personality and Social Psychology*, DOI: 10.1037/a0014861).

Of course it may be that creative people are also more open to new experiences and so more inclined to live outside their country of birth. However, Galinsky and Maddux reckon it also works the other way around: that the process of adapting yourself to a foreign culture – learning to think and behave in different ways – may give you a creative edge. Experiencing a different culture may make you less fixed in your thinking and more able to accept and recombine novel ideas.

7

Be more playful

When times get tough, many people turn serious – this is no time for girls' giggly nights out or to go paintballing with the guys. Or is it? Some researchers believe that horsing around may be better in the long run than hunkering down. Play, they say, not only frees up your mind, it keeps you nimble for when the unexpected happens. "It's a survival drive that we have minimised in our culture," says Stuart Brown, a psychiatrist who founded the US National Institute for Play in Carmel Valley, California.

People are wrong to regard play as just a frill, says Marc Bekoff at the University of Colorado at Boulder. He studies play behaviour in social carnivores such as wolves, coyotes and dogs, and believes that it allows individuals to try out new things because they can make mistakes without penalty. "Play encourages taking reasonable risks," he says. "It allows you to be flexible and creative." Brown agrees. "The search for novelty and the desire for something fresh is a hallmark of the state of play." And of course novelty and freshness are also central to creativity.

Brown sees play as a special biological state, like sleep. It seems to be important throughout the human life cycle, but particularly so in childhood. In this respect we are like other social species. Sergio Pellis at the University of Lethbridge in Alberta, Canada, put juvenile rats in cages that allowed them to sniff, groom and interact with others, but not to engage in rough-and-tumble play. These animals grew up unable to adapt to novel situations, says Pellis. Brown's studies of adults who were deprived of play in childhood reveal similar damaging effects.

At the very least, then, we should equip the next generation for the inevitable recessions of the future by encouraging water fights and inviting imaginary friends to join in.

JUPITER IMAGES



Raise a glass

Drowning your sorrows is always an option, but could there be creativity in the bottom of that glass too? Unsurprisingly, several researchers have endeavoured to find out. After all, many of the most creative pursuits – jazz, for instance, and poetry – are associated with heavy boozing. Alas, not just one but several separate studies have come to the same conclusion: drinking alcohol does not make you more creative, it just makes you feel that you are, which, as everyone knows, is the next best thing. ■

Alison Motluk is a science writer based in Toronto, Canada