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Why humans look on the bright side

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We all like to think of ourselves as rational creatures who smartly prepare for the worst. We watch our back, weigh the odds and pack an umbrella when the skies look threatening.

But although we take such precautions, we generally expect things to turn out pretty well – often better than they do.

The belief that the future will probably be much better than the past and present is known as the optimism bias, and most of us tend to overestimate the likelihood of good things happening to us and underestimate the chance that bad events will come crashing down.

For instance, people hugely underestimate their chances of losing their job or being diagnosed with cancer. They also envision themselves achieving more than their peers and overestimate their likely lifespan, sometimes by 20 years or more.

In short, we are often more optimistic than realistic.

Take marriage, for example. In the Western world, divorce rates are higher than 40 per cent. But newlyweds estimate their likelihood of divorce at zero. Even divorce lawyers, who should know better, hugely underestimate their own likelihood of divorce.

Although the sunniest optimists are just as likely to divorce as the next person, they are also more likely to remarry. In the words of the 18th-century English author Samuel Johnson: "Remarriage is the triumph of hope over experience".

Many of us who have children believe they will be especially talented, even while thinking our neighbour's kids aren't all that promising. A survey conducted in 2007 on behalf of the BBC found 93 per cent of respondents were optimistic about the future of their family, while only 17 per cent were hopeful about the future of other families.

Collectively, we can grow pessimistic – about the future of our fellow citizens, about the direction of our country, about the ability of our leaders to improve education and reduce crime – while we continue to think our own future is bright.

Why does optimism about our personal future remain incredibly resilient? It is not that we think things will magically turn out OK for us, but rather that we believe we have the unique abilities to make it so.

Optimism starts with what may be the most extraordinary of human talents: mental time travel, the ability to move back and forth through time and space in one's mind. To think positively about our prospects, it helps to be able to imagine ourselves in the future.

Our capacity to envision a different time and place is critical for our survival. It allows us to plan, to save food and resources for times of scarcity, and to endure hard work in anticipation of a reward.

While mental time travel has clear survival advantages, conscious foresight came to humans at an enormous price – the understanding that death awaits. The knowledge that old age, sickness, decline of mental power and oblivion are

somewhere around the corner can be devastating.

Ajit Varki, a biologist at the University of California San Diego, argues that the awareness of mortality on its own would have led evolution to a dead end.

The despair would have interfered with our daily function, bringing the daily activities needed for survival to a stop. The only way that conscious mental time travel could have arisen is if it emerged along with irrational optimism.

The knowledge of death had to emerge in parallel with the persistent ability to picture a bright future.

The capacity to envision that future relies partially on the hippocampus, a brain structure crucial to memory. People with damage to the hippocampus are unable to recollect the past; they are also unable to construct detailed images of future scenarios. The rest of us constantly voyage back and forth in time; we might be thinking of a conversation we had with our spouse yesterday and then immediately jump to our dinner plans for tonight.

But the brain doesn't travel in time randomly. It tends to engage in specific types of thoughts: we consider how well our children will do in life, how we will obtain that desired job, whether our team will win, and we look forward to an enjoyable night on the town. We also worry about losing loved ones, failing at our job or dying in a plane crash.

But research shows that most of us spend less time mulling over negative outcomes than over positive ones. When we do contemplate defeat and heartache, we tend to focus on how these can be avoided.

Why do we maintain this rosy bias even when information challenging our upbeat forecasts is so readily available? We experience positive and negative events in our lives. We know the economy is unstable, for example, but still we remain optimistic about our own future. When expectations are not met, we alter them. This should eventually lead to sober realism, not blind optimism.

Only recently have we been able to decipher this mystery. My colleagues and I at University College London recently scanned the brains of people as they processed positive and negative information about the future.

Among other things, we asked them to estimate how likely they were to encounter 80 negative events in their life, including developing cancer, having Alzheimer's disease and being robbed.

We then told them the likelihood that a person like them would suffer these misfortunes; for example, the lifetime risk of cancer is about 30 per cent. Then we asked again: how likely are you to suffer from cancer? We wanted to know if people would change their beliefs according to the information we provided.

It turns out they did, but mostly when the information we gave them was better than they had expected.

If someone had estimated their risk of cancer at 50 per cent and we told them the average likelihood was only 30 per cent," the next time they would say, "Maybe my likelihood is only 35 per cent." So they learnt easily and quickly.

But if someone started off estimating their cancer risk was 10 per cent and we told them it was about 30 per cent, they would scale up only gradually. The next time, they might say that their likelihood was only 11 per cent.

It is not that they did not learn. They simply decided the figures we provided were not pertinent to them.

This disconnect is related to something scientists call prediction errors, which describe the difference between what you expect and what happens.

When we gave our research volunteers information about likelihoods, we scanned their brains looking for changes that might relate to the gap between their estimates and the information they received.

A few brain areas, including the left inferior frontal gyrus 1, responded to unexpected good news. For example, when someone thought his likelihood of cancer was 50 per cent and we told him it was 30, this region responded fiercely.

On the other side of the brain, the right inferior frontal gyrus responded to unexpected bad news. But it did not do a good

job. The more optimistic a person was, the less this region seemed to process bad news. If your brain is failing to respond to unexpected bad news, you are constantly wearing rose-tinted glasses.

These findings are striking. When people learn, their neurons encode desirable information that can enhance optimism, but the neurons fail at incorporating unexpectedly undesirable information.

Everyone shows an optimistic bias. In a study not yet released, my colleagues and I found that people of all age groups changed their beliefs more in response to good news, and discounted bad news.

Even more surprising was the finding that children and elderly people showed more of a bias than college students. The young and the old were quite good at responding to desirable information: everyone updated their beliefs similarly when they learnt they were less likely to get cancer or have their credit card stolen than they had initially believed. But when they learnt their chances were worse, children, teenagers and older adults seemed to ignore this information more than college students and middle-aged individuals.

The behavioural economist Andrew Oswald has found that from about the time we are teenagers, our sense of happiness starts to decline, hitting rock bottom in our mid-40s. (Middle-age crisis, anyone?) Then our sense of happiness miraculously starts to rise rapidly again as we grow older. This finding contradicts the common assumption that people in their 60s, 70s and 80s are less happy and satisfied than people in their 30s and 40s.

Could it be that these changes have something to do with raising children in our 30s and 40s, that having children in the household has a negative influence on our happiness?

Oswald ruled out this. He also controlled for people being born in better times, marital status, education, employment status, income. The age pattern persisted. Even more surprising, the pattern held strong even though Oswald did not control for physical health. In other words, older individuals are happier and more satisfied than middle-aged individuals, even though the health of the former is generally worse.

Oswald tested half a million people in 72 developing and developed countries. He observed the same pattern across all parts of the globe and sexes. Happiness diminishes as we make the transition from childhood to adulthood and starts rising as we grow wrinkles and acquire grey hair.

Oswald did observe some interesting differences. The age at which happiness is lowest is different around the world. In Britain, happiness reaches rock bottom at 35.8 years of age, before it goes up again. In Italy, happiness hits its ultimate low much at 64.2 years. And while women reach the bottom of the happiness barrel at 38.6 years on average, men reach it at 52.9 years.

Oswald also observed that Americans have been growing less happy since 1900. But in Europe happiness has been increasing steadily since 1950, after 50 years of decline. Why the difference? We don't know.

A possible explanation for the age findings is that happy people live longer and pessimistic ones die earlier, so those elderly individuals who remain for scientists to test are happier than the average 30- or 40-year-old.

Another possibility is that older individuals have experienced a larger range of adverse events, so they are less likely to view these events as frightening and consequential. Thus, their psychological coping mechanisms may be better.

A third potential explanation is that the decreased ability in older adults to take bad news into account may enhance their optimism and thus increase their happiness. The decline may be connected to age-related changes in frontal lobe function, which is important for incorporating new information into prior beliefs.

It is tempting to speculate that optimism was selected by evolution precisely because, on balance, positive expectations enhance the odds of survival.

Research findings that optimists live longer and are healthier, along with the fact that most humans display optimistic biases – and emerging data that optimism is linked to specific genes – strongly support this hypothesis.

But the optimism bias also protects and inspires us. It keeps us moving forward, rather than to the nearest high-rise ledge. To make progress, we need to be able to imagine alternative realities – and not just any old reality but a better one. And we need to believe we can achieve it. Such faith helps motivate us to pursue our goals.

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