How to Be Human

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Introduction

Take a look at yourself

A few years ago – more than either of us would probably care to admit – we both attended a *New Scientist* event on the nature of animal minds. In one memorable talk, an eminent biologist described how sheep get nervous if they are left alone – they evolved to live in flocks, after all. His remedy? Put a mirror in the pen. It fools them into thinking they have company.

Sheep are not much blessed with self-awareness. Like most other species on Earth, they cannot recognise themselves in a mirror. But, as a member of the planet's smartest species, you are different. You know it's you gazing back out of the glass.

This rare ability is shared by only a handful of brainy species. In humans it's a milestone of infant development, showing that a child is acquiring a sense of self. In turn, this helps to kick into action memory and important social skills, such as reading the intentions of others.

Your own memory, sense of self and mind-reading abilities have been crucial in shaping who you are. And 'you' is what this book is all about – how you got to be who

you are and what makes you tick. We'll also look more widely at 'us': what sets humans apart from other animals and how we can be so similar yet individually unique.

The nature of humans has intrigued scholars for many thousands of years. The ancient Greek philosopher Socrates is said to have started the ball rolling, though it was his successors Plato and – especially – Aristotle who had the most influence on subsequent thought. But Aristotle, as usual, got plenty of things wrong: he believed that the heart was the seat of thought and reason and the brain was for cooling the blood, for example. That view held for nearly 2,000 years until William Harvey discovered that the heart is simply a mechanical pump.

As with many discoveries in science, that brought our view of ourselves down a peg or two. We once considered ourselves to be a special (though fallen) creation of God, made in His image and living at the centre of a cosmos made for us; nowadays, we're more likely to understand ourselves as an accidental product of evolution living in an uncaring cosmos with only our deeply flawed brains to guide us.

But at least we have retained our sense of humour. As the American essayist Christopher Morley once said, a human being is basically 'an ingenious assembly of portable plumbing'. There's more to us than that, of course, and the discoveries of science have uncovered a creature way more fascinating than any theological ideal. Who would have thought, for example, that laughter has less to do with humour than it has social control?

So what is a typical human like?

There's no doubt we're smart. Our big brains are the main reason we live such different lives from the rest of Earth's inhabitants; they have enabled us to go from savannah-dwelling hunter–gatherers to the creators of a civilisation with aspirations to cure death, colonise other planets and build machines that are even smarter than us.

We've been on a 7-million-year evolutionary journey from when we last shared an ancestor with chimpanzees. Darwin's big idea has proved crucial to understanding ourselves, from why each of us has a different personality, where our morals come from, to why only some of us can digest milk.

Being upright, and not walking on all fours, enabled our hands to become strong, dexterous, multifunctional tools perfect for turning thoughts into things, such as stone axes, music, skyscrapers and text messages. It also allowed us to evolve into supreme endurance predators, able to run quarry to exhaustion. Without this bounty of high-quality protein it is unlikely that our ancestors would have evolved their big brains.

One trait we tend to overlook is our predilection for possessions, yet it is a defining characteristic of our species. Early humans would probably not have migrated from Africa without warm clothing, tools for hunting, gathering and preparing food and the means to make fire. No other animal depends on so much stuff to survive. It is also via possessions that we express many other facets of our character including status, symbolism and aesthetics.

We're also incorrigibly talkative. We are the only creatures with complex language, which has enabled us to create knowledge, add to it and pass it on to others. Language also facilitates our intensively social nature: to be talkative we need somebody to talk to. We thrive in the presence of friends and family and wither without them. But language also helps to divide us into mutually unintelligible and often hostile tribes.

If this description sets the scene for this book, the drama itself focuses on the human condition, the experience of being alive and the events and stages we face in our journey through life. You'll find here what science tells us about generosity, belief, disgust, why we pick up bad habits and find it hard to kick them. We'll also cover life's phases from birth to death, how children change their parents and the upsides of old age.

Understanding humans and their place in the cosmos is fundamental to what we do at *New Scientist*. The text of *How to Be Human* owes so much to the insatiable curiosity and expert knowledge of our brilliant colleagues, and to the dozen guest authors, who write here on topics such as the nature of friendship and why we get hooked on religions. When it comes to illustrations, Jennifer Daniel has provided highly entertaining infographics covering everything from the curious concept of personal space to the link between Stephen Hawking and Black Sabbath; while Kirstin Kidd has found fascinating photographs revealing what it means to be human that range from 30,000-year-old art right up to the latest technology for

freezing people who want a second chance at life. We only hope you enjoy reading this book as much as we've enjoyed writing it.

This is undoubtedly a great time to be writing about humans. Science is generating so many insights on so many fronts. Take for example, the sequencing of the human genome which is not only revolutionising medicine and human biology but it's also revealing home truths about our ancestors, who clearly enjoyed sexual liaisons with Neanderthals.

And in a few decades, the human mind has been transformed from an inscrutable black box into a series of spaces wide open for interrogation. Neuroscientists and psychologists can now see thoughts form in the brain and reliably predict the mistakes people will make from biases deep in their unconscious.

Let's finish with a confession. Our choice of book title *How to Be Human* might imply that we have (or think we have) all the answers. We don't. This is not an instruction manual or self-help book. Rather, it describes how far science has come in answering some of our biggest questions about ourselves, and many of the small ones too. As Socrates himself said, an unexamined life is not worth living. So get to know yourself better.

Graham Lawton and Jeremy Webb
June 2017

1 Human Nature

What sort of creatures are we?

Why do we laugh, blush and kiss?

What has language ever done for you?

What are you like?

What is this thing called personality?

Where does morality come from?

Angels or demons?

Why are humans so generous?

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The strange nature of belief

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What sort of creatures are we?

If alien biologists visited Earth they would certainly notice us, and would have no trouble identifying our defining characteristics. Their list would include intelligence, language, sociability, religiosity, technological prowess and a liking for material possessions. These characteristics are at the core of what we call human nature.

But they are far from the only ones. Humans typically display many other, less obvious, traits that maybe we are too close to the subject to see. If you thought you knew what humans were like, then think again.

The first of the less obvious traits that our alien biologists would note is playfulness. Even before we walk or talk, we play. It comes naturally to us and occupies much of our childhood.

Playfulness itself doesn't make us unique: all mammals, some birds and a few other animals play. But no other species pursues it with such variety and vigour. The ways we play include such activities as games, jokes, sports, music, dancing, art and plain old horsing around. We play with each other, with objects, with language and with our

imaginations. We play in the real world and in virtual ones. We are also unusual in that we retain our juvenile sense of fun into adulthood. The only other primate to do that is the bonobo.

Why do we do it? One factor may simply be the availability of leisure time. In the wild, adult chimps spend around 8 hours a day foraging. Given more free time, they play more. However, play isn't simply a way of whiling away the hours. It is also an evolutionary adaptation for learning. The adult world is socially and physically complex, and play is largely a preparation for entering it.

Purposeful play

Four primary purposes have been identified for play – physical development, social development, hand–eye coordination and training for the unexpected. Not for nothing is it called 'the work of the child'.

As well as playing, young humans also spontaneously embark on another quest that marks us out from other animals. From earliest infancy, we constantly seek to sort the world into categories, try to understand how things work, make predictions and test them. This is the quest for knowledge, and it is evident in a range of human inventions from time, calendars and cosmology to family names and measurement. It is also the essence of science.

Very superstitious

Barack Obama used to play basketball on the morning of an election. Golfer Tiger Woods wears a red shirt when competing on a Sunday. Most of us have superstitions, even though we know rationally that they cannot work. Yet superstition is not entirely nonsensical. Our brains are designed to detect patterns and order in our environment and to assume that outcomes are caused by preceding events. Both abilities evolved for good reason. Our ancestors would not have lasted long if they had assumed that a rustling bush was caused by the wind rather than a lion. But this survival adaptation leaves us wide open to misattributing effects to causes, such as a football team winning because they're wearing lucky underpants. In other words, superstition.

Abstract thinking

Again, it is not totally unique. All animals need thinking of this sort to survive. Pigeons, for example, can learn to discriminate between cars, cats and chairs. Dogs can associate the sound of a bell with food, and when chimps try to extract a nut from a tube, they are performing a simple experiment.

Clearly, though, no other animal does science to the extent that we do. What sets us apart is the ability to

grasp abstract concepts. Chimps struggle with this. For example, while they quickly learn that heavy rocks are better for smashing nuts, when it comes to a general understanding, they fail. If they hear two objects drop and one goes 'crash' while the other goes 'clack', they can't infer that one of those objects will be good for cracking a nut and the other won't. Crucially, this understanding allows us to use what we have learned in one domain to make causal predictions in another. We can predict that the object that is good for crushing nuts will probably sink and the other float, for example.

Another trait that distinguishes us from less scientific animals is an eagerness to share what we have discovered. Once we figure something out, we announce it to the world, which is why all scientifically minded humans, not just Newton, can stand on the shoulders of giants.

Aside from discovering the laws of nature, we also have an urge to create laws to regulate human interaction. This 'legislativeness' is another thing that defines us as a species.

The question of whether every human society has formal laws is far from settled, but they do all have rules. This is a peculiarly human trait. Chimps stick to simple behavioural rules governing things like territory and dominance hierarchies, but we have developed much more elaborate systems of rules, taboos and etiquette to codify behaviour. Though every society has different rules, they always involve regulating activity in three key

areas – a sure sign that these are fundamental to human nature.

First and foremost are rules about kinship, including who counts as kin and the rights and obligations it confers in relation to the inheritance of goods and status. Every society also recognises the concept of kinship by marriage, as well as incest taboos prohibiting sexual intercourse between immediate family (though royalty is sometimes exempted).

Drawing the line

After who's who, the next concern is safety, so every culture also has rules about the circumstances under which one person can kill another. Condemnation of murder is universal, though its definition varies. In some societies, any stranger is fair game. Others allow killing to avenge the murder of kin, and many allow the group to kill someone who violates its norms. But every group draws the line somewhere.

Every society also has rules governing access to material goods. The notion of private property is by no means universal, but people everywhere have rules that stipulate who is entitled to use certain things at certain times, as well as punishments for people who break them. These vary widely from a simple first come, first served, to elaborate systems of private ownership.

Secret sex

Kinship, safety, stuff. Across the whole range of human cultures this is what our rules say we care about. Another is sex. Nothing reveals an animal's nature quite as well as its sexual practices, and humans certainly have some odd ones. Women are continually receptive and have concealed ovulation – that is, there is no external sign that they are ready to conceive. We are generally monogamous but live in large mixed-sex groups, which is unique among primates. But surely nothing is quite as puzzling as our predilection for clandestine copulation. Why do humans have sex in private?

This coyness is not just a product of specific cultures or morals; it is the rule across all societies. There is the odd instance of public ritual sex, and drunken orgies are certainly not unknown. But where there is no alcohol – as would have been the case in the past before agriculture – sexual privacy is the norm.

To see how unusual that is, consider our close relatives. Among orang-utans and gorillas, where there is a lot of inter-male competition, alpha males copulate openly. In bonobos, sex is a free-for-all with no privacy sought whatsoever.

Our innate demand for privacy probably evolved in response to our increasingly complex sexual politics. For a start, women won some control from men by evolving concealed ovulation and continual sexual receptivity to confuse paternity. Then our ancestors did something completely different from other great apes – males and females started sharing parental care. Monogamy was

born, and along with it the need to strengthen the pair bond. Privacy may have emerged as a way to increase intimacy.

But as well as strengthening relationships, clandestine mating also makes it easier to get away with infidelity. And infidelity appears to be very common. It is widespread in all traditional cultures, and private sex allows it to occur without loss of reputation.

Another very human trait, envy, may also play a part. Since men can never get enough of it, sex is a precious commodity and therefore best enjoyed covertly to avoid inciting covetousness. Like food in a famine, somebody who has plenty would be wise to eat it in private. A sexual act, even among consenting adults, has a high probability of upsetting someone. Parents or community members may disapprove and for children it can lead to the creation of rival siblings. So perhaps clandestine copulation simply follows the precautionary principle.

Making a meal of things

Food is another of life's pleasures, and compared with other animals, the feeding behaviour of humans is odd. Where they just eat, we make a meal of it. The main difference is down to one of humanity's greatest inventions: cooking. People in every culture cook at least some of their food.

Culinary culture includes the strange phenomenon of ritualised, familial food-sharing, otherwise known as mealtimes. Chimps eat their food individually as they find

it throughout the day. But in every human society, people gather in family groups at more or less regular times of day to eat food that has been prepared communally, usually by women. There's also feasting. From sharing the spoils of a good hunt to celebrating a special occasion, every society does it. And here you are more likely to find men cooking. We even see this in our own backyards, where they do most of the barbecuing. It may have something to do with establishing status, by being generous with high-quality food.

For humans, eating is about much more than nourishment. Food is used to form social bonds. Mealtimes are the centrepiece of family life; feasting bonds friends, colleagues and communities; and we also use food to consolidate more intimate relationships.

Gossip's hidden value

Mealtimes are also full of something else that defines our species: chatter. Language was once thought to be the defining characteristic of humans. These days we are more likely to consider it as part of a continuum of animal communication. Nevertheless, nobody doubts that it has shaped our nature profoundly. Language is central to many human universals ranging from education, folklore and prophecy to medicine, trade and insults. Arguably, though, our way with words reaches its apogee in something that is often considered trivial or even shameful: gossip.

A compulsion to talk about other people is only human. And it is not nearly as frivolous as you might think. Some anthropologists believe we gossip to manipulate the behaviour of others, which may help to explain why gossip often takes place within earshot of the person being gossiped about. Among the Kung Bushmen of Africa, for example, that is the case 70 per cent of the time.

But gossip doesn't just serve to name and shame. Barbed comments are relatively rare compared with innocuous ones. Gossip may be the human equivalent of primate grooming – our social relationships are too numerous to cement each one with time-consuming grooming, so we chat instead. Even the most powerful movers and shakers depend on it, though they may call it by some other name. After all, most business could easily be transacted by phone or email, but people still meet face-to-face so that they can bond over casual conversation at lunch or on the golf course.

A juicy titbit of gossip is like a gift – and, incidentally, gift-giving is another human universal. Both are like glue that binds societies together. A society without gossip may simply dissolve, as people wouldn't have any common interest in staying together.

Arty farty

Explaining the human urge to create works of art is a challenge. Darwin suggested it has its origins in sexual selection: like a peacock's tail, creativity is a costly display of evolutionary fitness. When women are at their monthly peak in fertility, they prefer creative men over wealthy ones. But sex alone may not explain the evolution of art. Another idea is that the drive to seek out aesthetic experiences evolved to push us to learn about different aspects of the world. Art is a form of intellectual play, allowing us to explore new horizons in a safe environment.

Why do we laugh, blush and kiss?

Human behaviour is extremely flexible and varied. Most of what we do serves an obvious function: we eat, sleep, talk, groom, have sex, travel, work, exercise, entertain ourselves and, given half a chance, loaf around. But there are still some corners of our behavioural world that we really do not understand.

One of our most mysterious acts is blushing. In a species with a reputation for cunningly manipulating others to maximise personal gain, reddening of the cheeks is difficult to explain. Why would humans evolve a response that puts us at a social disadvantage by forcing us to reveal that we have cheated or lied?

It is a question that Charles Darwin struggled with. He pointed out that while all people of all races blush, animals – other primates included – do not. When it came to explaining the evolution of 'the most peculiar and the most human of all the expressions', he was at a loss. That has not stopped others from trying.

A show of honesty

One suggestion is that blushing started out as a simple appeasement ritual: a way to show dominant members of the group that we submit to their authority. Perhaps later, as our social interactions became increasingly complex, it became associated with higher, self-conscious emotions such as guilt, shame and embarrassment. This would seem to put individuals at a disadvantage, but blushing might actually make a person more attractive or socially desirable.

That may be because it is a hard-to-fake signal of honesty. Women blush more than men, leading to the suggestion that blushing evolved as a way for women to demonstrate their fidelity to men and so enlist their help in rearing offspring. Blushing says 'I can't cuckold you. If you ask me about infidelity, I can't lie – my blush would give me away.'

Similarly, blushing could have emerged as a way to foster trust. Once blushing became associated with embarrassment, anyone who did not blush might have been at a disadvantage because we are less likely to trust someone who appears never to feel ashamed about anything.

Embarrassing situations are also likely to elicit another peculiar human behaviour: laughter. You may think it is obvious why we laugh. But most laughter has nothing to do with humour.

Who needs humour?

Starting in the late 1980s, psychologist Robert Provine of the University of Maryland carried out a 10-year study of laughter in various natural habitats. He visited shopping malls, school classrooms, sidewalks, offices and parties. After recording more than 2,000 instances of laughter, he concluded that laughter is prompted less by amusing jokes than by banal comments. Statements such as 'Do you have a rubber band?', for example, which was enough to make someone in a Baltimore shopping mall chuckle.

Provine's conclusion was that the essential ingredient for laughter is not humour but other people. Laughter is a social signal that we use in all sorts of situations to bind ourselves together.

Conversational laughter acts as a social lubricant. It engages listeners and dispels tension, aggression and competition by putting people at ease. Nervous laughter can make light of a stressful or psychologically difficult situation. And, through its contagious nature, laughter can unify the mood and behaviour of a group, promoting coordinated activity for the greater good.

Laughter can also be used as a tool of social control. As we master its subtle cues we begin to use it to manipulate those around us. An 'in' joke can exclude outsiders from a clique. Laughter can be used to show who is boss and malicious laughter is an effective weapon of intimidation. Laughing at someone rather than with them can pressure them to conform or push them away.

Another strange behaviour that usually needs more than one person to be present is kissing. It is not practised

in all cultures, so it cannot be in our genes. So why do so many of us lock lips, and why does it feel so good? There is no shortage of speculation.

One idea is that our first experience of comfort, security and love comes from the mouth sensations associated with breastfeeding. In addition to this, our ancestors probably weaned their babies by mouth-to-mouth feeding of chewed food, as chimpanzees and some mothers do today, reinforcing the connection that people feel between sharing spit and pleasure.

Another idea is that kissing has its origins in foraging. Our ancestors were first attracted to ripe, red fruit, then co-opted this attraction for sexual purposes, developing pronounced red colouration on genitals and lips. When it comes to the physiology of kissing, we are on slightly firmer ground. Our lips are among the most sensitive body parts, packed with sensory neurons linked to the brain's pleasure centres. Kissing has been shown to reduce levels of the stress hormone cortisol and increase the bonding hormone oxytocin.

There may even be a link between kissing and the way we assess the biological compatibility of potential partners. Research conducted in recent years has revealed that we are most attracted to the smell of sweat from people whose immune system is most dissimilar from our own – with whom we are likely to produce the healthiest children. And of course kissing allows us to get up close and personal enough to sniff that out.

Pick that one out!

In 2001, two researchers at the National Institute of Mental Health and Neurosciences in India won an Ig Nobel prize for their research into a very odd behaviour. Chittaranjan Andrade and B.S. Srihari asked 200 adolescents about their nose-picking habits and found that almost all of them admitted doing it an average of four times a day. Nine pupils even owned up to eating their bogeys. Why would anyone do that? Andrade points out that there isn't any nutritional content in mucus. It is possible that ingesting nasal detritus might help build a healthy immune response: lack of exposure to infectious agents is known to increase susceptibility to allergies. The only actual research on nose-picking dates back to 1966, when Sidney Tarachow of the State University of New York found that people who ate their bogeys found them 'tasty'. Yum ...

What has language ever done for you?

Try striking up a conversation with a newborn baby and you'll find it gets very one-sided very quickly. But try again three or four years later and you may struggle to get a word in edgeways. It won't be the most sophisticated conversation, but it will be better than you'll ever get out of a cat, dog, or even a talkative parrot. An average four-year-old has a vocabulary of about 5,000 words and sophisticated knowledge of how to string them together. Incredibly, nobody teaches them how to do it.

Our facility for language is perhaps the defining feature of our species. Wherever you find people you also find language, both spoken and written. We acquire it effortlessly as toddlers and use it every day of our lives. Without it, trade, tribes, religions and nations couldn't have existed, and civilisation as we know it would be impossible.

The language instinct is almost irrepressible. When people with no shared language are thrown together, they quickly invent a rudimentary system of verbal communication called a pidgin. Within two to three generations these can evolve into fully fledged languages.

Deaf people have also spontaneously invented new sign languages.

Linguists define language as any system that allows the free and unfettered expression of thoughts into signals, and the conversion of such signals back into thoughts. This sets human language apart from all other animal communication systems. A dog's bark, for example, can only convey a limited amount of information: that it is hungry or has spotted an intruder. But cannot tell the story of its puppyhood or describe the route of its daily walk. Human language is unique in that it can convey almost any idea or event, even impossible ones.

Today, 7,000 or so languages are spoken – including sign languages – and countless more have gone extinct. Despite their obvious differences, deep down they are all the same, in that they can communicate the full range of human experience. That suggests language evolved long before our ancestors migrated out of Africa and around the globe starting some 100,000 years ago.

Social glue

Language was clearly one of the adaptations that allowed us to conquer the world and beyond. It is intimately tied to our intensely social and usually cooperative nature and probably evolved in parallel with it. Human societies are glued together by language. Traditional hunter–gatherer groups typically live in bands of about 100–150 people, which is too many to maintain good relations through actual contact. So we talk about one another instead.

Language also allows us to exchange favours, goods and services, often with others outside our immediate family. These complicated social acts require more than grunts.

If language defines us as a species, it also moulds us as individuals. Back in 1940, linguist Benjamin Lee Whorf proposed that the language we speak influences how we see the world. He suggested, for example, that people whose languages lack words for a concept would not understand that concept. The idea was relegated to the fringes until the early 2000s, when a few researchers began probing a related but more nuanced idea: that language can influence perception.

Greek, for example, has two words for blue – *ghalazio* for light blue and *ble* for dark blue. Greek speakers can discriminate shades of blue faster and more accurately than native English speakers.

Language also affects our sense of space and time. For English speakers, time flows from back to front: we 'cast our minds back' and 'hope for good times ahead'. The direction in which our first language is written can also influence our sense of time, with speakers of Mandarin more likely to think of time running from top to bottom than English speakers. Some peoples, like the Guugu Yimithirr in Australia, don't have words for relative space, like left and right, but do have terms for north, south, east and west. They tend to be unusually skilled at keeping track of where they are in unfamiliar places.

The language we speak may even affect who we are. Neuroscientists and psychologists are coming to accept

that language is deeply entwined with thought and reasoning, leading some to wonder whether people act differently depending on their language. Research in bilinguals suggests they do. In the 1960s sociolinguist Susan Ervin-Tripp asked Japanese–English bilinguals to complete unfinished sentences in both languages. Her subjects used very different endings depending on the language they were using. Given the sentence 'Real friends should …' a typical Japanese ending was '… help each other out,' but in English it was '… be very frank'. Overall, the responses reflected how monolinguals of either language tended to complete the task.

Differences in attitude

Another experiment had bilingual English–Spanish volunteers watch TV adverts, first in one language, then in the other, and then rate the characters. When the ads were in Spanish, volunteers tended to rate the women as independent and extrovert, but after seeing them in English they described the same characters as hopeless and dependent.

Similarly, bilingual Mexicans describe their own personalities differently in different languages. In Spanish they tend to be more humble than in English, perhaps reflecting divergent US/Mexican attitudes to assertiveness.

Language can even shape your memory. Spanish speakers are worse at remembering who caused an accident than English speakers, perhaps because they

tend to use passive phrases like '*Se rompióel florero*' ('the vase broke') that do not specify the person behind the event. To a large extent, you are what you speak.

Why are there so many languages?

If language evolved for communication, how come most people cannot understand each other? The Old Testament story of Babel explains it as God's way of preventing humans from becoming too powerful, by stopping them from cooperating. Oddly, this may not be far from the truth.

By nature, we are tribal and xenophobic, affiliating with our in-group and fearful and disdainful of outsiders. Language is both a powerful marker of tribal identity and a cypher that can prevent outsiders from eavesdropping. There are many recorded instances of groups deliberately changing their language to include insiders and exclude outsiders, and this may be a powerful driver of linguistic divergence.

What are you like?

When it comes to personalities, no two people are alike. Yet psychologists reckon they can describe the complete spectrum of individuality with just five broad traits. Each of the 'Big Five' - openness to experience, conscientiousness, extroversion, agreeableness and neuroticism - defines an axis along which we all fall

FOR EACH PERSONALITY TRAIT:

HIGH SCORERS ARE ... ⟷ LOW SCORERS ARE ...

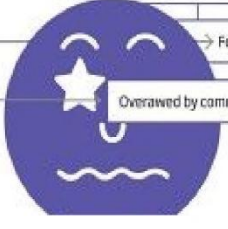
Trait #1 The depth, and complexity of

Open to experience

- Inquisitive
- Imaginative
- Interested in art
- Excitable
- Lovers of variety
- Liberal-minded

Trait #3 The extent to which people are sociable ... or not

Extrovert		Introvert
Cheerful and radiate joy	⟷	Seldom amused
At home in crowds and parties	⟷	Loners
Friendly and open	⟷	Reserved
Always busy	⟷	Happy to take things easy
Natural leaders	⟷	Followers
Lovers of excitement	⟷	Overawed by commotion



Trait #4 Attitudes other people

Agreeable

- Trusting
- Welcoming and altruistic
- Frank and sincere
- Happy to compromise
- Compassionate
- Modest

What is this thing called personality?

One of the most striking features of life is how differently each of us approaches it. Some people love bright lights and fast cars, others will go to any length to avoid such things. A novel social situation that is a treat for one individual is a cause of sleepless nights for another. Some people fret about saving for their pensions, whereas others spend money as soon as, if not before, they have it. Where do such differences come from?

Circumstances undoubtedly play a part. Some human behaviour is easily explained by social context – for example, people living in a dangerous environment generally think in a more short-term way. Other variations are simply quirks. What interest psychologists most, though, are the systematic ways in which individuals differ, otherwise known as personality traits.

Why do we all have different personalities? Why hasn't natural selection homed in on optimum character traits instead of allowing so much variability? As the study of personality moves onto a more scientific footing, we are starting to understand the underlying neurobiology, and to see that each personality trait is beneficial in certain

circumstances and costly in others. We may think that some personality types are more desirable than others, but there is no 'best' personality. It takes all sorts to make a world.

Psychologists think of personality traits as thermostats within the brain, each regulating a range of behaviours and attitudes. Some of these behaviours and attitudes seem to be linked. For example, people who are highly competitive and like loud music and travel tend also to have high sex drives. People who have a specific phobia tend to worry a lot about other things too, and they are more prone to depression. The same people who have trouble resisting the temptation to take drugs have an increased likelihood of developing problems with gambling and antisocial behaviour in general. From such correlations, we infer that there are a limited number of thermostats, each working independently. Your thermostat setting represents where you stand on a continuous scale for each personality trait.

Five key thermostats account for most of the variation in personality. These big five – extroversion, neuroticism, conscientiousness, openness to experience and agreeableness – define five axes along which all individuals fall. Your personality consists of five different scores measured by a personality questionnaire. Since each axis is continuous and they are independent of one another, there are countless unique personality configurations.

How you respond

Where you stand on any one of the big five will show up in a particular type of situation. A person's level of extroversion manifests itself in response to pleasure-seeking or risk-taking activities, with the most introverted people seeming to find these least rewarding. When things get threatening or dangerous, or are perceived to be so, neuroticism is key – highly neurotic people will become anxious or stressed, whereas low scorers won't be so badly affected.

Conscientiousness is all about where your goals are oriented. High scorers stick rigidly to plans or principles while low scorers are more spontaneous. Agreeableness comes to the fore in our personal relationships. Highly agreeable people pay attention to the needs and emotions of others. Low scorers are not so oriented to these cues. Openness determines a person's response to ideas. High scorers like to entertain aesthetic, metaphorical or esoteric ideas; low scorers avoid them.

We are now beginning to relate the big five to the brain. Take neuroticism. Neuroscientists know which parts of the brain are involved in the response to threats: activity centres on structures called the amygdalae. Brain scans reveal that the amygdalae of individuals who score highly in neuroticism have a higher baseline level of metabolic activity than those of low scorers. High scorers also show greater activity in response to distressing stimuli. There is even evidence that the size of the amygdalae is

proportional to a person's neuroticism score. Amazingly, the simple, self-rating questionnaires used by personality psychologists actually turn out to measure something about the nervous system that can be verified through objective scientific techniques.

Looking in the mirror

You can roughly measure your own personality by thinking about your typical behaviours. Faced with a potential threat, are you anxious or unflappable? Are you intrigued by new ideas or prefer to stick to what you know? Do you make concrete plans or just let things happen? Are your dealings with others warm or stand-offish? Are you outgoing and enthusiastic or quiet and stoical? If you lean towards the first on any of these, you are likely to score highly on the relevant trait: neuroticism, openness, conscientiousness, agreeableness and extroversion (see 'What are you like?').

Rewarding activities

We can tell a very similar story for extroversion. A suite of structures in the midbrain is responsive to stimuli that betoken rewards: sweet foods, money, pictures of members of the opposite sex, addictive drugs and so on. These reward centres depend on the neurotransmitter dopamine. There is a linear relationship between a

The key to this conundrum is that natural selection is not always consistent. How this influences the evolution of personality has become clear as researchers begin to consider rudimentary personality traits in wild animals. For example, birds called great tits exhibit variation in their exploration behaviour. Some individuals inherit a highly exploratory personality and others a more cautious one. If you measure this trait in wild great tits and relate it to their survival, you find that in years when food is scarce, female birds with an exploratory personality are more likely to survive. In these circumstances it pays to disperse further. However, when resources are abundant, cautious females are more likely to survive. With food plentiful, dispersing too far is an unnecessary hazard. (For males this pattern is reversed, reflecting the different survival pressures that they face.)

This illustrates a powerful point: the optimum level of a personality trait depends on the details of the local ecology. When these vary dramatically across space and time, natural selection cannot home in on a single optimum way of being. That explains why the population of great tits includes both exploratory and cautious individuals.

It also explains a discovery about personality traits in sticklebacks. Those that live in waters where they are under threat of predation are consistently aggressive towards each other and bold towards predators. But where predators are lacking, no systematic character traits are detectable. In other words, a personality trait

emerges in the unpredictable environment but not in fish for which life is more stable.

Such findings have obvious extensions to humans. If our range of personalities has evolved as a consequence of a changeable world, then we should expect that each trait is advantageous under some circumstances and costly under others.

Double-edged traits

That is what we find. Adults with high scores for extroversion have more sexual partners and do better in economic and career terms on average. But they are also more likely to be hospitalised as a result of an accident or illness, and have less stable family lives. Since they are more likely to divorce, the men often end up not living with their children.

It is tempting to think of extroversion as an unalloyed blessing, but it is not. Being extrovert will attract you to certain types of situation, bringing certain types of life opportunities – you will do well in some settings. But your personality will entail risks, and some alternative pathways might be closed to you. There will also be situations for which your personality is too risk-prone.

We can see this principle at work with another of the big five, agreeableness. Highly agreeable individuals have good social networks and support. This is because they attract and retain friends and allies. In many ancestral environments, not to mention the present day, this would have served them well. However, in devoting time and

effort to the needs of others, they incur costs in terms of their own agendas.

Agreeableness is a negative predictor of success, for example, in the worlds of executives and artists, where people need to put themselves first and focus on what they want. What is the optimum level of agreeableness? Apart from it not being at the extremes of the distribution – psychopaths at one end and people with something called 'dependent personality disorder' at the other – there is no correct answer. Whatever your level of agreeableness, there will be benefits and costs.

Likewise, high conscientiousness may help you get the job done, but could also blinker you to other possibilities that might occur to a more easily distracted person, or someone whose approach to life is more flexible. High openness, meanwhile, has been linked with increased social and sexual success. These advantages, however, tend to accrue mostly in historical eras and geopolitical contexts in which artistic types are highly valued. At other times and places, particularly when a population is struggling for survival, practical and capable characters will be much more in demand. Even highly neurotic people can console themselves that when the threat of danger is real, their vigilance may serve them better than the heedless attitude of more laid-back individuals.

Can you change?

The better you know your own personality, the more aware you will be of its costs and benefits. This puts a new spin on the old question of whether you can change your personality. To some extent we can alter who we are, but we might be better off recognising that for almost any personality profile, there is an optimal environment. So if your personality causes you grief, why not try changing the niche you occupy in this complex ecosystem that is modern life?

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Where does morality come from?

Whoever first came up with the idea that humans have an angel on one shoulder and a devil on the other was onto something. We are both the basest of animals and the most noble. Ours is a species capable of cruelty, genocide, war, corruption and greed. Yet we can also be caring, kind, fair and philanthropic. What lies behind this dual nature?

Our capacity for good and evil has exercised philosophers from at least Plato onwards, but today some of the most exciting ideas are coming from evolutionary biologists. They have probed questions of altruism, conscience, prejudice and hatred. Their answers suggest that good and evil are not really all that different.

Pure altruism

Let's start with goodness. The key to virtue is altruism, which is by definition selfless. Genuine altruism is rare in nature. Many animals help others, but only their relatives. In evolutionary terms that is actually a form of selfishness, since it ensures the survival of their own genes.

personally beneficial but will be good for society if everyone does them – things like voting, recycling and giving money to people in need. Such behaviours appear to be driven by a learned association we call 'conscience'.

We learn the social rules of our culture and they become linked in our brains with emotions such as pride and honour, shame and guilt. Selfishness may be in your interest, but it is associated with negative emotions, whereas virtue prompts positive ones.

The pleasure we get from such good deeds is probably induced by a cocktail of neurochemicals including oxytocin. It is normally associated with feel-good activities such as sex and bonding, but is also linked to morality. People with more oxytocin are more generous and caring, and our oxytocin level increases when someone puts trust in us.

Altruism, then, makes us less selfish but, perversely, is also behind some of our most heinous acts. That's because the flip side of generosity to one's in-group is meanness to outsiders. This is underpinned by oxytocin, too, and is sometimes called the 'mama bear effect' because it mirrors the urge to defend cubs at any cost. As a result, altruism can promote atrocities such as racism, genocide and war. Just as almost everyone is capable of altruism, under different circumstances we are also capable of evil, from bullying and corruption to torture and terrorism.

The upshot of this is that good and evil are two sides of the same coin. Evolution has made us both, and we cannot

In fact, reputation appears to be the rock upon which generosity is built. When anthropologists gave Fijian men a sum of money roughly equal to a day's wages, and the choice of sharing their windfall with people they knew, they proved surprisingly generous. On average, they kept just 12 per cent of the money for themselves, and about half the men gave it all away.

When asked how they chose who to share their money with, almost all said they gave to people who needed it. However, closer statistical analysis showed that reputation was almost as important as need. Men who had a reputation for giving tended to be the ones who received more. In day-to-day life, norms of generosity, love and respect drive decisions about sharing more than cold cost–benefit calculations do. This reinforces the idea that generosity is good. But do humans become less generous when they live in more complex societies?

Choosing who to help

People in Western societies often walk past beggars on the street. But that could be because they know that social institutions exist, and expect them to step in and help.

In fact, Westerners often give generously to strangers. When natural disasters occur, often in distant lands, people donate to charity without any expectation of return.

Arguably, that is even more generous than a system like osotua. People living in smaller-scale societies tend to direct their generosity towards people they know. Fijians,


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(mostly) related individuals in frequent conflict – and occasional alliance – with neighbours. Archaeological evidence going back 12,000 years and studies of tribal peoples suggest that around 15 per cent of all deaths in these societies stemmed from inter-group violence. Tribes made up of individuals prepared to fight for a common good had a competitive edge over those that weren't, and so tribal violence was selected by evolution. Unfortunately we have dragged its baggage into the modern world.

Tribalism and the discord it engenders are frighteningly easy to induce, as social psychologists have long been aware. More than 40 years ago, the late Henri Tajfel showed that dividing a group of strangers into two teams based on arbitrary criteria such as whether they preferred the paintings of Klee or Kandinsky triggered their tribal instincts. Members of the Kandinsky tribe behaved favourably towards team-mates while treating members of the other team harshly, and vice versa. Since then, many experiments have revealed how the flimsiest and most transient badges of identity can trigger people to divide themselves into 'us' and 'them' – even the colour of T-shirts randomly assigned by psychology researchers can do it.

Paradoxically, these antagonistic tendencies may be driven by a much more noble side of human nature: our unparalleled capacity for large-scale cooperation and altruism. Few activities draw on these traits like fighting on behalf of our group. Love for one's own group could easily have co-evolved with hostility towards outsiders,