A woman's profile is shown in silhouette, facing right. The interior of her head is filled with a vibrant sunset over a calm ocean. The sun is low on the horizon, casting a golden glow across the sky and water. The sky transitions from a deep blue at the top to a bright orange near the horizon. The water reflects the colors of the sunset, creating a shimmering effect. The woman's hair is pulled back, and she is wearing a dark-colored top.

# FRONTIERS IN THE NEUROBIOLOGY OF VALUES:

New Challenges  
for mental health  
professionals in the  
new landscape of  
work

The co-authors of this article are 30 years apart in age, genetically bonded as biological father and son, and united in making value-driven decisions every day. We communicate even if our values are not always the same. We strive to do what is right for our environments, minds, and biology and maintain our homeostasis. What is the impact of those personal choices down the line? Does the management of our decisions, actions, and response to stressors affect our children and grandchildren?

by Simon L. Dolan  
& Tom L. Dolan

If you are familiar with the concepts of Managing, Leading and Coaching by Values (Dolan 2011, 2021, and 2023) which emphasise stress and values interaction, you may recall the triaxial model which helps identify and rank individual core values to enhance general well-being and boost productivity (by reducing stress). In diagnosing what is important to you and then finding a way to apply those core values to your daily behaviour, you create an alignment resulting in enhanced mental health and productivity (see also: Garti and Dolan, 2019 and 2021). The rub, as they say, is balancing this with your life/work goals and objectives, which is inevitably easier said than done.

### Developments in neuroscience indicate that values evolved as the human brain did, with each affecting the other.

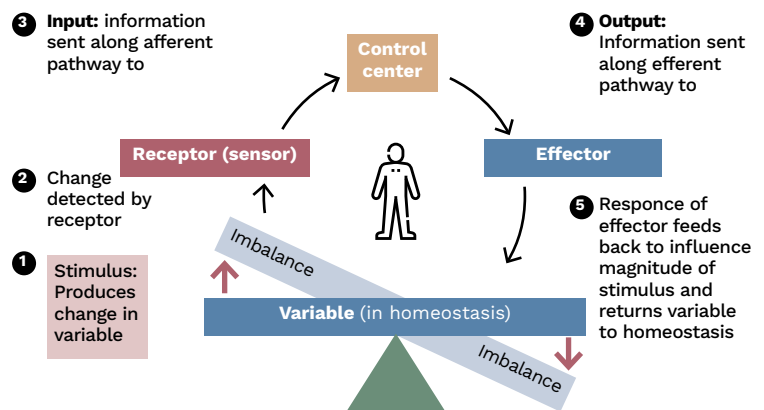
This article is focused on (and sometimes forecasts) possible future events from an admittedly odd (we prefer innovative) perspective connected to the neurobiology of values. Admittedly, some of the newer ideas we present in this paper are speculative. More research is certainly needed to substantiate some of our propositions. We do not claim this research to be exhaustive. Nonetheless we feel there is enough here to present you with this “appetiser” of sorts. Perhaps it can help stir reflection around the ideas of resilience, mental health, and what the future holds.

So, let’s start with the basic assumptions and current practices and gradually move towards new paradigms and the future. Values, Managing by Values, leading by values, and Coaching by Values are dynamic concepts and methodologies. They have evolved dramatically since the first author began his academic journey in the early 1980s (he was the co-founder of **ISSWOV**, the International Society for the Study of Work and Organisational Values – [www.isswov.net](http://www.isswov.net)). The study of values is in continuous evolution. Values are part of nature. Some claim that if we do not change or even transform our current values, an entire civilisation is at a risk of becoming extinct (Raich, Eisler and Dolan, 2014). If you are creative and innovative, and have genuine concern about the future, you may decide not to wait any further and implement some of the more concrete ideas proposed hereafter immediately.

## THE NEUROBIOLOGY OF VALUES

How do humans develop the values that permit us to classify objects as beautiful or ugly and to judge actions as good or evil? Where are good social conduct and ethical principles grounded? We have long been preoccupied with such questions. Some of the answers may be found in our evolution, specifically in our neurobiology. Recent research suggests that the evolution of human values may be imprinted in the human brain, both in its gross anatomy and in the finer details of its physiology, including brain chemistry. Developments in neuroscience indicate that values evolved as the human brain did, with each affecting the other.

Humans have been pondering the origins of their values for centuries. Until recent times, such issues were primarily the province of philosophers, theologians, sociologists, and historians who studied the universality of, or variations in, specific values across different cultures. Neuroscience and other scientific disciplines are making a more objective and experimental approach possible. The imaging techniques used to display the living brain, for example, allow us to see which areas of the brain are activated when people are manifesting different classes of values. And because the field of neuroscience is expanding to include neurophysiology, neurology, and anatomy, among other areas of science, more tools will likely be available soon to further our understanding of this complicated, vexing, and wonderful issue.





In recent years, several concrete observations have laid the foundation for a neuroscience of values. Brain images of people responding to questionnaires designed to evaluate moral and ethical attitudes show clearly that certain attitudes are associated with certain parts of the brain. We have also learned that specific neurons or neural networks are involved when a person is displaying a sense of empathy. Data from some brain-imaging studies suggest not only that there is a cerebral substance connected with values associated with empathy, but also that it developed by evolutionary selection.

One proposed explanation is that the biological blueprint of human values stems from the “life regulation system”, which is known as homeostasis. All life forms have systems that permit them to maintain biological processes within a range compatible with life. In complex species (like the human), the regulation of life depends on a close interaction between brain systems and body-proper systems and is controlled in effect by a specific collection of well-coordinated brain regions. Life regulation is not automatic; it involves choices and preferences, but at the most basic levels those choices and preferences are made subconsciously. The life regulation system, or homeostasis, is built to achieve certain goals, among them the maintenance of health, the prevention of circumstances leading to death, and the procurement

**Emotions and feelings, like wrath, fright, passion, love, hate, joy, and sadness, which are mammalian inventions, originate in the limbic system.**

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of states of life tending toward optimal function, rather than merely neutral or defective function.

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Homeostasis inherently embodies values in the sense that it rejects certain conditions of operation, those that would lead to disease or death, and seeks conditions that lead to optimal survival. Therefore, one can claim that what we call “good” and “evil” are aligned with categories of actions related to ranges of homeostatic regulation. What we call good actions are, in general, those actions that lead to health and well-being in an individual, a group, or an entire community. What we call evil, on the other hand, pertains to malaise, disease, or death in the individual, the group, or the community.

The same can apply to other values, such as efficiency or inefficiency. The inefficient part of the regulatory spectrum is characterised by higher energy consumption, inadequate performance, impediments, and the like. At the dawn of the human values, we presume, objects that were classified as beautiful were associated with efficient

states, either because they occurred in life circumstances in which the homeostatic range was efficient or because the objects themselves can cause efficient homeostatic states.<sup>1</sup>

Throughout the years of researching and writing about culture, we have insisted that social and relational life is strongly linked to beliefs, values, and attitudes, which are themselves governed by an anatomical substance. This has been studied using brain-imaging techniques. Davidson<sup>2</sup>, for example, found that activity in the ventromedial prefrontal cortices of the brain (VMPEC) is greatest in people who are very compassionate and caring. His work also showed the remarkable heterogeneity among individuals in their affective style and values. Viewing Davidson’s work considering the homeostatic theory of values, one can hypothesise that human values evolved along with the species to ensure maximum survival and that these values in turn may have caused cerebral modifications. Is there a relationship between changes in the human



frontal brain areas and the emergence of values? A variety of scientific evidence confirms the existence of a neural network that is activated during the exercise of some values (moral, ethical). This network links the prefrontal and medial temporal lobes.

Throughout its evolution, the human brain has acquired three components that progressively appeared and grew one on top of the other, similar to strata in an archaeological site. The oldest (the archipallium or primitive) is located at the bottom and to the back; the next one (the paleopallium) is in an intermediate position; the most recent (the neopallium, also known as the superior or rational) is situated on top and to the front. These are like three biological computers that, although interconnected, retain their types of intelligence, subjectivity, sense of time and space, memory, mobility, and other, less-specific functions.

In 1878, the French neurologist Paul Broca (see section in the History of Neuroscience) called attention to the fact that, on the medial surface of the mammalian brain, right underneath the cortex, is an area containing several nuclei of grey matter (neurons) that he called the “limbic lobe” (from the Latin word *limbus*, meaning border or edge), because it forms a kind of border around the brain stem. Today the limbic lobe together with certain adjacent deep structures including the amygdala is known as the limbic system. Research suggests that specific affective functions (e.g., some emotions) are developed in this region – such as those which induce females to nurse and protect their toddlers and the playful moods that engender ludic behaviours. Emotions and feelings, like wrath, fright, passion, love, hate, joy, and sadness, which are mammalian inventions, originate in the limbic system.

It is important to stress that all the structures in the brain interconnect intensively. Some contribute more than others to this or that kind of emotion, but no one is by itself responsible for any specific emotional state. The prefrontal area is connected to the limbic region, so when it suffers a lesion, the person loses his or her sense of social responsibility (associated with the limbic system), as well as the capacity for concentration and abstraction (associated with the prefrontal area). When prefrontal lobotomy was used for treatment

of certain psychiatric disturbances, the patients entered a stage of “affective buffer”, no longer showing any sign of joy, sadness, hope or despair. In their words or attitudes, no traces of affection could be detected.

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## NEUROSCIENCE, EMOTION, AND VALUES

What is the relationship between emotions, on the one hand, and values, on the other? We claim that emotions are connected to values because they involve appraisals. So, we can even suggest that emotions are correlates of values. The simplest version of this view is the claim that to feel one type of indignation (emotion) is to believe or judge that a situation is unjust; that is, if we believe a situation is unjust, we will become angry when confronted with it. In keeping with this view, one would see a correspondence between the importance a person ascribes to a value and the frequency of his or her emotional experiences related to that value.

**Therefore, we would expect to find the following:**

1

Fear associated with **security values**. (People who frequently feel afraid in daily life ascribe great importance to security values because both fear and security values share the goal of realising safety.)

2

Feelings of **disgust and contempt** negatively related to conformity values.

3

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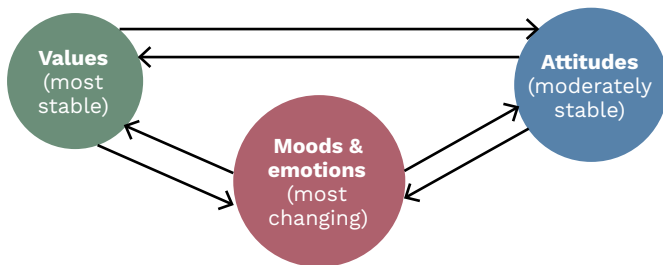
Feelings of **affection and concern** for others related to the values of benevolence and universalism. (Both express pro-social tendencies.)

5

Feelings of **pride** related to achievement and self-direction values. (Both express the importance of success and goal-attainment.)

Feelings of **guilt and shame** related to conformity values. (Whereas pride often involves a positive valuation of the self, shame and guilt involve negative self-evaluation, often following failures to live up to moral or social standards.)

## Values, Attitudes, Moods and Emotions



Therefore, emotions are triggered by the brain following a sequence involving values. In the triaxial model proposed in Dolan *et al.* (2016), there is the axis of emotional values. One of the values connected to this that has been studied frequently is empathy. **Empathy** is a value that allows us to relate to the emotional states of others. This value is critical in regulating social interactions, as it enables an individual to effect social bonding and exhibit care for others. Interestingly, scientists studying empathy in both children and animals have concluded that it is a major ingredient in explaining human and primate behaviour. We see compelling evidence for the strength of the empathic reaction in scientists' findings that rhesus monkeys refuse to pull a chain that delivers food to them if doing so shocks a companion. These monkeys literally starve themselves to avoid inflicting pain on another.

**We see compelling evidence for the strength of the empathic reaction in scientists' findings that rhesus monkeys refuse to pull a chain that delivers food to them if doing so shocks a companion.**

### USING VALUES TO MANAGE EMOTIONS

Can you imagine a world with no emotions? No happiness, no sadness, no anxiety, no love, no pleasure, no pain, no frustration, no urges ... no addiction. Every single one of us simply going about our day, doing whatever it is we are supposed to do (whatever that might be in a world without emotion). Don't just read this and move on. Take a few minutes to really imagine it. Imagine what your life would be like without emotions. Imagine what your soul would be like without emotions. Consider this, without getting

too philosophical: would you even have a soul? There was an inciteful film released in 2002 that touched on exactly this theme (called *Equilibrium*, directed by Kurt Wimmer and starring Christian Bale).

Without emotions, you and I would be nothing more than physical bodies and the electrical impulses that produce the energy to run them. All thoughts would be functional. There would be no good or bad. No evil. No hatred. No love. In essence, we would be machines. What makes us human is our emotions. What allows us to experience the wonders of life – as well as the sorrow – is our emotions. Without emotions, not one of us would ever struggle with a single compulsive behaviour. There

would be no addiction. Life would be ... *wonderful*? Now, take this one step further. If a life without emotions equals a life without certain behaviours, can controlling these behaviours be reduced to the “simple” task of managing our emotions? When we learn to manage our emotions, we have

learned to manage our behaviour.

There are two types of emotions you need to be aware of in the addictive environment: value-based emotions and behaviour-based emotions. Physiologically, they may be identical. Behaviour-based emotions are the emotions that are experienced as a result of the triggering stimuli and the compulsive ritualistic behaviour that follows. And so that we are clear, the “behaviour” can be fantasy, masturbation, pursuing a romantic interest, stalking, smoking, drinking, gambling, eating, or any other action that can alter one's emotions (which can be just about any behaviour imaginable – in the right circumstances). Such stimuli and behaviour elicit immediate emotional reactions that can overwhelm a person's value system and, over a sustained period, progressively destroy values altogether.

Value-based emotions are considerably different. They are based not on the reaction to stimuli, but in the preparation for it. They are based on a foundational commitment to long-term growth and life management. They are based in having developed an open and honest line of communication with oneself. Consider a marathon runner who sprints to the lead in the first couple

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of hundred yards. The sprinting causes the runner to briefly experience the pleasure of winning, but the situation is not sustainable. Soon, his or her body will wear down, and all the tools that he could have used to win the race will no longer be useful. They will have lost their value. His entire race will be reduced to the single action of sprinting and resting, sprinting and resting. Addiction is similar. The behaviour-based emotions are the sprint; the value-based emotions are the tools that will keep one in the race for the long haul.

Psychologists, therapists, and other health professionals normally work on altering and changing the negative consequences of behavioural-based emotions. In the first author's books and published articles, he shows that by reducing incongruence or by contrast enhancing congruence of values, we can lead better lives both at work and off work (for example: Bao et al., 2013). When our actions are consistent with our established values, positive emotions result. When our actions are based on spontaneous reaction, instability and chaos

**The behaviour-based emotions are the sprint; the value-based emotions are the tools that will keep one in the race for the long haul.**

may result. The trick to managing the two in unison is being aware that behaviour-based emotions can produce overwhelming changes in the here and now. Value-based emotions produce powerful, sustained emotions over time. There is a healthy time for both.

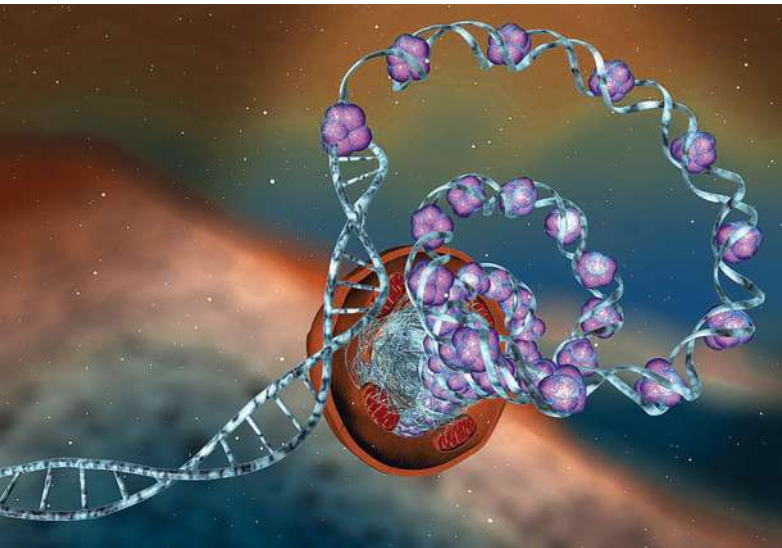
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### **IS THERE A HEREDITARY, NON-GENETIC BASIS OF VALUES?<sup>3</sup>**

Over a decade ago (in 2013), the then UK attorney general, Dominic Grieve, provoked a stir in the media by suggesting that some minority communities based in the UK – Pakistani in particular – come from an origin where corruption is endemic. In fact, what he said was that cultural values are inherited.<sup>4</sup> Experience and science say that observable features (called phenotypes) such as physiology, morphology, skin colour, IQ, etc., are based on inherited DNA, and therefore could be applied to



different racial groups. But the question persists as to whether factors such as sociability, mental attitudes, the tendency to crime and corruption (among others) are also innate and inherited, or simply culturally learned, and will disappear over generations as immigrants assimilate and adapt to other customs and practices.



Recent studies have shown that there is a process called epigenetics (these are inherited changes in gene activity that are not caused by changes in the DNA sequence) in which conditions experienced by previous generations cause subtle changes in the way genes work. In one famous experiment, researchers trained mice to fear a cherry-like aroma and, despite not meeting the smell before, their offspring exhibited a terror response to a cherry blossom smell versus a neutral smell. It certainly makes one wonder.

There are many similar anecdotes with experience in human beings. Children who have experienced the horrors of wars can go beyond fear of war of other generations. There are also many stories that lead to a common syndrome, called "the second-generation syndrome", of the Holocaust

**Non-genetic inheritance is not limited to the first generation of the progeny, but it can involve grandchildren and even other generations.**

survivors. Although there is no scientific research that clearly shows the mechanism by which phobias, fears, and other extreme experiences are transmitted through generations, through the transmission of the "memory" of the experiences of ancestral generations, more and more theories about this are becoming known. Recent research with animals seems to provide "convincing" evidence of the biological transmission of such "memory", along with associated brain changes, of adult male mice that was evidenced with their children and then grandchildren.

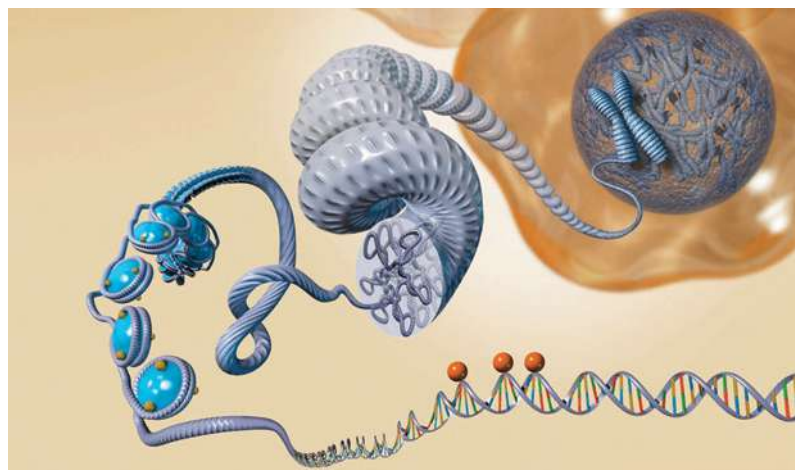
Let's clarify this proposal further. Inheritance is typically associated with the Mendelian genetic laws of transmission of information from parents to offspring by alleles (DNA sequence). However, there are increasing empirical data suggesting that traits (and perhaps some that are value-driven) can be acquired from ancestors by mechanisms that do not imply genetic alleles, referred to as non-genetic inheritance. Information that is not genetically transmitted through the generations includes the traumatic experience of parents and long-term exposure to certain environments (i.e., living within a context of incongruence between important values) that could have effects on parental cell mutations and polymorphisms.

Non-genetic inheritance is not limited to the first generation of the progeny, but it can involve grandchildren and even other generations. Non-genetic inheritance has been observed for multiple traits including global development, cardiovascular risk, and metabolic symptoms, but this presentation will focus on the inheritance of behavioural patterns related to living through chronic (or long-term) periods of value incongruence. Generational non-genetic inheritance is often interpreted as the transmission of epigenetic marks, such as DNA methylation and chromatin modifications, through gametes (trans-generational epigenetic inheritance). However, the information can be carried through generations by many bioactive substances, including hormones, cytokines, and even microorganisms, without the involvement of the gametes.



Thus, based on experiments with animals and limited anecdotes of empirical data in humans, it is presumed that both acute traumatic experiences and chronic situations such as living incongruently with your core values can trigger diseases. Moreover, they can also affect the first and second generations through mechanisms of hereditary processes that are not genetically transmitted. Remember that using the term "epigenetic" to describe processes that are not heritable is controversial. Unlike genetics based on changes to DNA sequencing (genotype), changes in gene expression or cellular phenotype of epigenetics have other causes, hence the use of the prefix "epi-" (Greek *epi*: over, out of, around). If we are talking about animal experiments, we wish to share a classic example. Fearful memories persecute descendants of mice; the genetic footprint of traumatic experiences carries at least two generations<sup>5</sup>. In this experiment, baby mice – and even offspring of offspring – may inherit an association fearful of a certain odour with pain, even if they have not experienced pain themselves, and without the need for genetic mutations. Certain fears can be inherited through the generations, as suggested by a provocative study of the behaviour of mice. The authors suggest that a similar phenomenon could influence anxiety and addiction in humans. But some researchers are sceptical of the findings because a biological mechanism that explains the phenomenon has not been identified. Researchers propose that DNA methylation, a reversible chemical modification of DNA that typically blocks the transcription of a gene without altering its sequence, explains the inherited effect.<sup>6</sup>

And what about human beings? Studies have hinted that environmental factors can influence biology more rapidly through "epigenetic" modifications, which alter gene expression, but not their actual nucleotide sequence. For example, children who were conceived during a harsh famine in the Netherlands in the 1940s are at increased risk of diabetes, heart disease, and other conditions, possibly due to epigenetic alterations of genes involved in these diseases. A very extensive study of 350 twins (in Minnesota) concluded that for most of the measured traits, more than half of the variation was found to be due to inheritance, leaving less than half determined by the influence of parents,



the home environment, and other life experiences. Based on this evidence, we would like to propose the following hypothesis that occurs for acute reasons (for example wars, concentration camp, etc.), or chronic long-term situations like living in chronic situations of values incongruence:

**It ends in triggers through epigenetic changes that can be inherited in up to two generations.**

If what we have described so far makes sense, let us conclude by making some tentative propositions:

1

Is it possible that behavioural traits such as corruption, aggression, criminality, disobedience, violence, disrespect, and other values borne or exercised by parents pass through two generations of offspring?

2

Should we try and intervene and help modify such undesirable traits, which would, if it were effective, prevent potential undesirable behaviours in the next two generations?

3

What would be the role of future therapists, psychologists, and coaches in reducing the unwanted behaviours, knowing that they are now aware of the fact that they are not only helping the client/coachee (right now), but possibly two further generations?

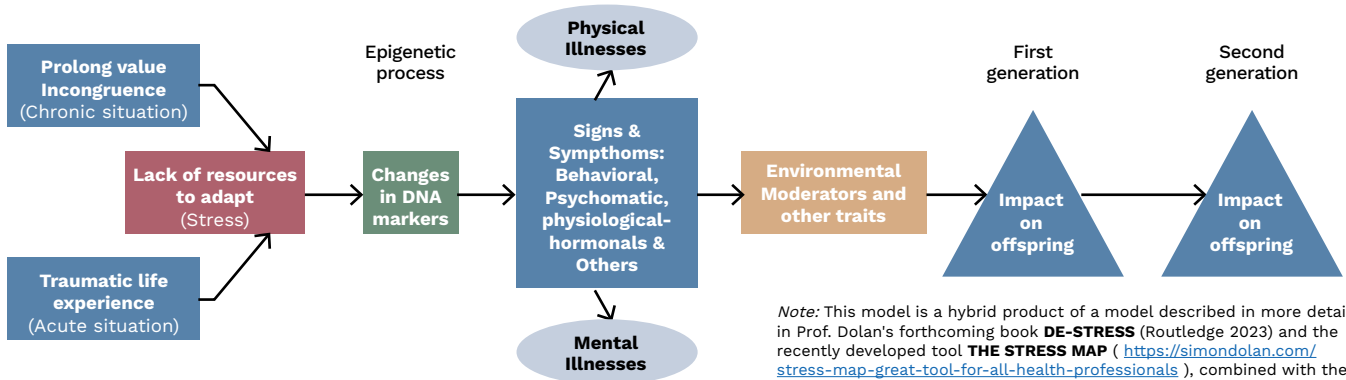
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And finally, is it possible to reduce the incongruence between values (in time) in order to break the cycle of chronic stress and avoid possible mutations in the DNA that will be passed down to two generations of offspring?



**EXHIBIT 1**

**A proposed epigenetic model explaining the relationships between value trauma and incongruence and effects on two generations**



Note: This model is a hybrid product of a model described in more detail in Prof. Dolan's forthcoming book **DE-STRESS** (Routledge 2023) and the recently developed tool **THE STRESS MAP** ( <https://simondolan.com/stress-map-great-tool-for-all-health-professionals> ), combined with the consequences of epigenetic processes

**Children inherit the suffering of their parents**

For years, animal studies have shown that certain environmental factors cause changes in genetic information that pass from one generation to another. It's like they leave marks that will turn off or alter genes but without altering the DNA. It has been proven that the sugar taken by parents can make their descendants obese or that the bad food of the grandparents would harm the health of their future grandchildren. Despite the great impact it could have on science and health, little is known about these epigenetic mechanisms in humans, and knowing more would require experiments that ethics does not allow.

There is another fact that reinforces the thesis of epigenetic base: within the same family, children born of prisoner of war survivors were up to 2.2 times more likely to die before their peers of the same age.

"There is certainly intergenerational transfer of traits in humans, something that can occur by well-known methods, such as genetic inheritance, or cultural heritage, such as learning", recalls professor at the University of New South Wales (Australia) Neil Youngson. "What is special here is that this research shows a different inheritance mechanism, epigenetics, in which an environmental exposure (in this case hunger or stress, the authors cannot tell which one) induces molecular changes in the gametes which, in turn, affect the health or behaviour of their descendants", explains this investigator.

And, there is one last fact of the study of prisoners of war that intrigues scientists: the trauma of so much suffering was only inherited by the sons; the daughters were not affected to the same degree. Neither the authors nor the experts consulted know for certain the reason for this discrimination by sex. Perhaps a current study in progress might explain the gender variations of the third generation of the grandchildren and granddaughters of these soldiers.

Source: El Pais Digital, 21 October 2018, article by Miguel Angel Criado. Free translation of some excerpts from this article.

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Honestly, our intuition in response to all these questions / propositions is **yes**. Imagine the consequences for coaches and other health professionals. Now, if they do good work in diagnosing value incongruence and signs and symptoms of chronic stress, not only will they be helping a coachee/client/patient to overcome their problems and have a better quality of life, but indirectly they are helping their children and the children of their children. **Wow! This is heavy stuff!**

**CONCLUSION**

We often hear older folks becoming nostalgic about the simpler times that they lived in. Life has certainly changed in significant ways compared to even 20 years ago. You may have also noticed mental health becoming a more common concern. This is also an indicator of the changing times. We live in a far more connected world where change is a constant due to globalisation (e.g., COVID-19) and constant innovations in technology.

Turbulence, high demands, and urgency are all characteristics of a VUCA world. This translates to high pressure, stress, and potentially burnout for the individual working and living in a VUCA world. An antidote has been offered, labelled with yet another buzzword: "Agile".

This is a new phase of human civilisation that we have entered as a global society, for which we look for solutions at the individual as well as the organisational level. And another buzzword is emerging "Resilience".

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But how can we become resilient if the term is connected to our physical, emotional, spiritual, and mental states. Living in a VUCA world increases the likelihood that stress will be on the rise and resilience might be even harder to achieve. The latest discovery in neuroscience shows clearly that it might cause epigenetic changes (see, for example: NIH research matters, 2010).

So, what is the new role of mental health professionals in this new landscape? First and foremost, we need to treat people that have clear signs and symptoms of stress. Then we need to refine the tools that will enable not only detecting episodes of acute stress but also measure the “density” of chronic stress<sup>8</sup>. We further claim that reducing value incongruence amongst our core values plays a major part in reducing stress (thereby reducing the likelihood of epigenetic DNA changes) and enhancing resilience (Garti and Dolan, 2021).

### WHO and ILO call for new measures to tackle mental health issues at work

An estimated 12 billion workdays are lost annually due to depression and anxiety costing the global economy nearly US\$ 1 trillion

WHO’s World Mental Health Report <https://www.who.int/publications-detail-redirect/9789240049338>, published in June 2022, showed that of one billion people living with a mental disorder in 2019, 15% of working-age adults experienced a mental disorder. Work amplifies wider societal issues that negatively affect mental health, including discrimination and inequality. Bullying and psychological violence (also known as “mobbing”) is a key complaint of workplace harassment that has a negative impact on mental health. Yet discussing or disclosing mental health remains a taboo in work settings globally.

COVID-19 triggered a 25% increase in general anxiety and depression worldwide, exposing how unprepared governments were for its impact on mental health, and revealing a chronic global shortage of mental health resources. In 2020, governments worldwide spent an average of just 2% of health budgets on mental health, with lower-middle income countries investing less than 1%.


Source: WHO <https://www.who.int/news/item/28-09-2022-who-and-ilo-call-for-new-measures-to-tackle-mental-health-issues-at-work>



At the organisational level a new stream of consultancy is emerging: resiliency consultants. They help organisations and their leaders develop new competences that are essential. These are leaders that will not add to further toxicity at work, that will enhance a flexible and value-shared culture, and will provide a culture of trust (see: Dolan, 2023). And at the individual level, a new stream of coaches is emerging that helps people overcome and even thrive in a VUCA world by a way of responding to events that controls how they affect us, not the events themselves. Resilience enables the beholder to maintain composure and react calmly to VUCA, by maintaining a positive mindset and ensures, for example, that we optimise the use of dopamine in the establishment of our healthy homeostasis (see: Dolan and Brykman, 2022).

Neuroscience is teaching us that there are a few key areas that make up how emotions work in the brain. Our prefrontal cortex, which exists in human brain, is involved with emotional



regulation and decision-making. This is where we store our sense of self, our value system, our self-control. We use the prefrontal cortex to suppress emotions. While all are important, in this paper we stressed the importance of values and the great need to reduce value incongruence as a path to enhance resilience in this generation, as well as in future generations. 

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- <sup>2</sup> See Davidson, R.J. (pp. 67–90) in: Changeux, J.P., Damasio, A., & Singer, W.J. (Eds.). (2005). *Neurobiology of Human Values*. Springer.
- <sup>3</sup> This section is quite speculative. It is a synthesis of Prof. Dolan's talk at the Expo-Coaching conference in Madrid in 2016, as well as ensuing presentations in a dozen other international conferences thereafter. Remember that the suggestions represent only plausible hypotheses, and these were not studied sufficiently or supported by rigorous empirical research. At the same time, every time we present this thesis, the reaction of the audience is enthusiastic, and it seems that it hit a relevant cord, as audiences concurred with the message. Actually, such feedback was the impetus to writing this paper.
- <sup>4</sup> See: Dominic Grieve's comments on British Pakistanis branded offensive | Dominic Grieve | The Guardian
- <sup>5</sup> See: <http://www.nature.com/news/fearful-memories-haunt-mouse-descendants-1.14272> December 2013
- <sup>6</sup> The important terms to understand are: **non-genetic inheritance** – occurs when bioactive substances, including hormones, cytokines, and even parental mutations of microorganisms, have an impact on the next generation; it is also called a non-Mendelian inheritance ([https://en.wikipedia.org/wiki/Non-Mendelian\\_inheritance](https://en.wikipedia.org/wiki/Non-Mendelian_inheritance)); **polymorphism** – the occurrence of two or more distinctly different morphs or forms; **genetic transmission** – Mendelian – is inheritance of biological characteristics following the laws proposed by Gregor Johann Mendel in 1865 and 1866, and rediscovered in 1900; **genetic alleles** – one of several alternative forms of the same gene or same genetic locus.
- <sup>7</sup> The methodology on how to do that is described in Dolan (2011), Dolan (2021) and Dolan (2023)
- <sup>8</sup> Density is a term we apply and use in the STRESS MAP tool. It is an algorithm that multiplies the frequency of a sign or symptom of stress by its severity.
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