



Imagine – How creativity works by Jonah Lehrer

Jonah Lehrer

The New York Times Bestseller



How Creativity Works

Content = ***** Readability = *** Clarity & Structure = ****

(<http://www.youtube.com/watch?v=lfn4osOv-JU&feature=related>)

IN A NUTSHELL

This book explores the science of creativity. Some of the key enhancers of creativity include: Shifting attention and being open; Overcoming fear; Quietening the inner voice and letting go; Remaining an outsider; Working with diverse people (including some you do not know); Encouraging critical debate; Creating random collisions of people & ideas and avoiding drugs.



KEY PRINCIPLES

Creativity/Innovation is directly linked to market success. Procter & Gamble (the soaps to scents manufacturer) employ more scientists than any other company in the world.

PART 1 - ALONE

The emotions of creativity

The process of creativity often reaches an impasse where neither rational thought nor analysis can crack the problem – leading to feelings of frustration and hopelessness. The ‘giving up and moving on’ are critical parts as that then allows the unconscious brain to engage with the problem (actually pushing to find the answer often pushes it further away). Often then the resolution is a ‘Eureka!’ type moment – surrounded by a feeling of certainty.

The sSTG/Right brain

Beeman developed a whole series of brain teasers and observed the brain under fMRI scanning. He observed that people first undertook a mental search in their left brain. However, the left brain tires quickly and the subjects got frustrated. Then activity switched to the right brain and often the answer is found. They identified the anterior superior temporal gyrus (aSTG) to be the primary source of insight (located just above the ear). Beeman postulated that the right brain was responsible for helping us see things holistically.

Right hand brain damaged patients when asked to draw a house, draw poorly the component parts (or miss them out) but the overall shape and positionings are correct. Conversely, left side brain damaged patients, draw perfect windows and doors, but the ordering is random.

Brain teaser: A giant inverted pyramid is perfectly balanced on its tip. Any movement will topple it. Underneath the pyramid is a \$100 note. How can you remove the \$100 note without disturbing the pyramid?

Alpha waves (condition blue)

Research has highlighted that 8 seconds before moments of inspiration, the brain emits a steady rhythm of alpha waves from the right brain. Alpha waves are classically associated with relaxing activities, such as taking a shower or when waking up. Researchers have found that when people are happy they are more creative.



Shifting attention and being open

Over focus inhibits creativity. Once we stop focusing on the issue, we allow new thoughts to come into our heads that can stimulate new solutions. Patients with ADHD appear to be more creative as they are constantly shifting attention. Thus it's often only when we stop looking that we discover.

Dick Drew was a sandpaper salesman in 1925. He noticed the car sprayers used butchers paper to ensure an even spray line. However, the removal of it pulled some paint away. He realised they needed a lighter sticking tape (similar to that used on the sandpaper sheets he sold). His other big insight came from realizing one could store it in a roll rather than as long sheets – hence the birth of masking tape and the beginning of 3M. Both events came from a flash of inspiration.

Institutionalising creativity within 3M

3M have institutionalised some of the key principles of creativity into their organisation:

- 1- Attention shifting– i.e. to focus on something different for 15% of their time.

In one experiment, students did a creativity test, whilst being distracted by a noisy air con unit/people talking. They were rated 7x more likely to be creative achievers than those without the distraction. Because they had more trouble filtering out the outside world, they let more of it in. Hence why going for a walk or working on something else can be more productive.

Post-its were born out of a daydream in church (as choristers have to mark the pages).

- 2- Horizontal sharing – Breakthroughs often arise out of cross fertilization of ideas – hence their annual tech forum (Google also do a similar event called Crazy Search Ideas (CSI)). Furthermore, they regularly move their scientists around.

Examples from history: Gutenberg applied the principles of winepresses to his printing press; The Wright brothers applied their knowledge about bicycles to their flying machines; Velcro came from seeing burrs stuck to de Mestral's dog and Google's algorithm came for the application of the way academic journals are ranked.

A variation of this is seeing the problem through different perspectives. The key is to be prepared to consider information that on the surface may seem irrelevant.

The role of colour in helping to simulate creativity

In experiments in Colombia, they found that students tested with a series of basic cognitive tests against a blue background were twice as likely to be creative than those against a red background.



The role of drugs in stimulating (and inhibiting) creativity

WH Auden was addicted to Benzedrine (as was Robert Louis Stevenson, Jack Kerouac, Graham Greene and Philip Dick). It seemed to give them the energy to do large stints of work ("It turns me into a working machine" commented Auden).

Dick wrote 16 novels in 5 years, and Kerouac wrote 'On the road in a three week, 18 hour day 'kick-writing' session. Likewise, mathematician Paul Erdos co-authored 1,475 peer-reviewed articles over his career (One every two weeks).

Creativity is not just moments of inspiration - it also requires periods of continued persistence – this is where stimulants can help. However the key creative period is often reduced by stimulants.

For example, whilst amphetamines increase attention, it shifts our internal focus onto the prefrontal cortex and away from the right hemisphere, thus actually restricting the creation of bigger ideas. Thus amphetamines work best at the later honing stage.

Seeing things anew

To gain new insights we often have to stop seeing the way we used to (as this blinds us from seeing things in different ways). The German Philosopher, Martin Heidegger suggests the way to cut through the clutter is to use the 'knife of conscious attention'.

There is a strong correlation between working memory and general intelligence – the more bytes of information you have 'open' at any one time, the greater the possibility of creating bridges.

Rejection as a key function of creativity

Creativity is hard work – it often takes great persistence to relentlessly refine one's ideas – to stick with a problem until it 'surrenders'. A great part of creativity is chucking things away.

Beethoven often developed up to 70 versions of a phrase before settling on just one (but it was the other 69 that made him know which one was the best).

The role of perseverance in creativity

Psychologists have discovered there is a close relationship between success and *grit* - the ability to persevere "Nobody is talented enough to not have to work hard". *Grit* allows us to maximise the potential of our natural ability.

Depression and its role in driving persistence

Depression is often associated with creatives – 'troubled geniuses'. Plato and Socrates were known to suffer from melancholia.



Famous writers have been found to be 8x more likely to suffer from depression versus the general population.

Joe Forgas, a psychologist has studied negative moods and creativity and found a little melancholy sharpens the spotlight of attention/observation (and increases their persistence as they are often seeking answers which they might not be looking for if swimming in a sea of happiness).

Showing depressive films to subjects led to more creative writing than feel-good films.

Likewise bi-polar patients are often also highly creative. In one study nearly 40% of the creative people interviewed had a bi-polar disorder.

Risk, courage and fear

Dropping the fear and being prepared to fail is a key factor in creativity. Perfectionism restricts creativity. The New Orleans Centre of the Creative Arts has a big sign that says “Fail Big!”

Two big funders of bio-medical research - the National Institute of Health (NIH) and the Howard Hughes Medical Institute (HHMI) have different strategies for funding. The NIH has a rigorous set of criteria. They reward funds to lower risk projects and funding against specific projects. The HHMI instead focuses on providing funding to the scientist, allowing him/her much greater freedom in his/her research. When analyzed, it was found that the HHMI had actually funded far greater successes versus the risk adverse strategy adopted by NIH. HHMI also had a larger number of failures but their willingness to embrace failure as a key component of success was compensated by the much bigger gains in medical advancement.

How perfection inhibits creativity

You must be prepared to fail to be creative. Yo Yo Ma, the famous violinist, said, “Perfection is not very communicative...if you are worried about not making any mistakes, then you will communicate nothing...I welcome the first mistake as then I can shrug it off...and turn off that part of the mind that judges everything...it's when I am least conscious of what I'm doing, when I'm just lost in the emotion of the music, then I'm performing at my best.”

Joshua Funk, the artistic director of Second City in Hollywood explains, “You have to work at *not giving a F****”. For him the key to good improvisation is to quieten the inner critic and ‘get out of your head’.

Quieting the inner voice and letting go

When creatives are mapped under fMRI scans, there is increased activity in the dorsolateral pre-frontal cortex. The DLPFC is associated with self-control from actions that could be embarrassing for ourselves. It appears creatives inhibit these inhibitors – they let themselves go, thus allowing greater freedom of expression.



Interestingly, the DLPFC is the last part of the brain to mature, which happens after childhood - hence why we often cite children as being the most creatively free.

Some people with pre-frontal dementia, before they finally lose their mind have a period of massive creativity (as the DLPFC is rapidly destroyed, as a result, nothing is censored).

In some ways we experience this same creative freedom when dreaming, as the PFC is asleep, allowing the rest of the brain free reign.

Kierkegaard described sleep as the height of genius. In experiments it's been found that when the participants are encouraged to go into REM sleep, they solve 40% more puzzles. Anecdotally Keith Richards sang the first lines of 'I ain't got no satisfaction' into a running tape whilst asleep.

Spontaneity

Spontaneity (i.e. letting go and trusting one's instincts) is a valuable source of creativity cf Jackson Pollack's art, Lenny Bruce spontaneous inventing of jokes and John Coltrane/Miles Davis in their jazz sessions. But this spontaneity is usually based on years of practice, which they can unconsciously draw upon.

The outsider's perspective

We are often trapped by the knowledge we have ("A way of seeing is also a way of not seeing" said Kenneth Burke). Having an outsider perspective helps us see with a fresh perspective.

Don Lee – a cocktail creator was a chemist, so saw the mixing of drinks differently. He had the benefit of being naïve (so did not know the assumed paradigms that block experienced people).

www.innocentive.com – set up by Eli Lilly as a way to solve profound problems by asking help from outside the company. Now used by many different companies.

Analysis showed that 40% of the most difficult problems were solved within 6 months, and more often it came from someone outside the field – Chemists did not solve chemistry problems – they solved molecular biology problems – i.e. close enough to understand but not so close to become blinkered (smart strangers).

The naïve outsider

Likewise the youth are naïve so tend to be the most creative. As we get older, we become more entrenched making it more difficult to see things from a fresh perspective.

Quetelet found that playwrights often wrote their best work early in their careers because they were more open to new ideas. Likewise, Physicists also tend to make their most important discoveries early in their career (<30).



Thus the recommendation is to stay an outsider. Traveling (and ideally living abroad) makes you realise that something can be seen from a multiple perspective.

Barbie came from a naïve wife of a Mattel toy executive who identified an insight that young girls want to experiment/project their future identity through an adult doll – whilst all the executives in the toy business believed girls only wanted to play with baby dolls.

PART 2: TOGETHER

Increasingly we need teams to perform (esp. on the creativity front) as problems are becoming more complex which require a multiple perspective/experience to solve.

Studies by Kellogg's Business school have shown the massive growth of scientific collaboration. In 19.9m peer reviewed papers and 2.1m patents over the past 50 years they found a growth in the size of teams (average now 10 people).

Cultural diversity as a way of stimulating the outsider perspective

Places with a high cultural mix tend to be more creative. In Silicon Valley, 52% of companies have been **co**-founded by immigrants.

The Q factor

Brian Uzzi a sociologist at Northwestern has identified the Q factor by studying what makes or breaks Broadway musicals. The ideal mix is a majority who have worked well together in the past, but combined with a number of new people who can challenge and input fresh ideas.

Creating spontaneous interactions of different people - The example of Pixar

Pixar was born as a computer company than drifted into film. One of its key advantages was it had a real mix of skills (from cartoonists to computer scientists), which led to a constant free-flow of ideas.

Steve Jobs recognised that creativity comes from creating a free flow of conversations and ideas from an eclectic mix of people. So he moved everyone into one building, built a big atrium to create 'forced spontaneous interaction' ("Everybody has to run into each other"), with centralised meeting rooms and post boxes. He even ripped out all the bathrooms and made one central toilet block in the Atrium, forcing people to mingle there. He also institutionalised social activities (there are 11 drinking holes on campus and a university running 110 courses as he recognised not only the power of learning but the critical need to force people to get to know other people in other departments).



Why criticism builds ideas - The example of Pixar

Research behind Osborn's mould changing 'brainstorming technique' has demonstrated that the key principle of not criticising another person's idea actually reduces the quality of the ideas generated. It is the very act of challenging an idea that ensures it is properly thought through and not progressed in a half-baked form.

The movie industry was focused on 'the idea' whilst Pixar was also focused on 'the execution'. Thus they argued long and hard over every shot. Everyday there was a meeting of all the senior execs to review what had been produced the day before. Whilst there was a lot of respect, these meetings were crushingly brutal in their feedback (but was accepted as everyone was signed up to the idea of making the best animation films in the industry). The feedback was based on the principle of focusing on the idea not the person. The thought was that is was a shared responsibility and culpability and not about individual blame. There was a recognition that failure is part of the creative process so embrace it: "Talent fails everyday...screw-ups are an essential part...we want to screw up as quickly as possible. We want to fail fast and then we can fix it - together" They also operated an idea called 'plussing' whereby when criticizing a point, one also aims to find a plus point e.g. a build from the idea.

How distance affects collaboration

The Allen curve defines the likelihood of someone conversing with another person in the office is directly related to distance. For example, a person is 10 times more likely to talk with a colleague who sits at a neighboring desk as to someone who sits 50 metres away.

Research amongst the best scientific papers found they were written by teams who worked less than 10 metres apart (as opposed to collaborations over many miles).

Thus the key learning is if you want to boost innovation and creativity, create structures and processes that bring the key people closer together as often as possible.

Whilst we may therefore think the digital opportunities addresses this, personal contact is emotionally richer than anything achieved over Facebook or an email (as Steve Jobs said, "When they make eye contact, things happen").

How multiple interactions improves performance

Research has shown that the highest performing employees were the ones who most consistently engaged in the most interactions with other people.

High performers consulted 4-9 colleagues on a project whilst low performers only contacted 1-2. Simply increasing the number of interactions led the same person to significantly increase their performance.



Sharing - How patents kill innovation

Patents actually kill innovation as they 'lock' people out of new ideas, preventing the ability to further refine and develop them. The first stage of innovation is rarely the finished product. Innovation on innovations is where we see many incremental advances (cf how Apple's open technology policy helped lift i-Phone and i-Pad sales).

Culturing in creativity - an example from advertising

Wieden & Kennedy, a top advertising agency operates on similar principles: Devising lots of cross team building opportunities; The fostering of diversity (they want people to find their own unique voice); The hiring of the best people (and then to get out of their way) and the embracement of failure - "Fail Harder" is one of their mottos.

How open sharing of ideas generates economic growth

In 1990, economist Paul Romer devised a new theory of economic growth. Economics is usually rooted in the mindset of scarcity of resources. But ideas are an inexhaustible source. And critically, one idea tends to spark another. Thus places that encourage sharing of ideas (such as Silicon Valley) create massive wealth - because they are environments that allow ideas to multiply.

How city diversity and density can inspire creativity

More people in the world live in cities than live outside of cities. Robert Lucas, the Nobel peace prizewinner for economics compared the crowded streetwalk to a 'spontaneous ballet', filled with people from all walks of life creating random, casual exchanges. This diversity sparks creativity in those open to see and hear it.

West, a physicist, applied the principles of particle physics to urban development, and with Bettencourt, analyzed data to demonstrate that when people come together, they become more productive. They arrived at a magic number of 1.15 - which means that across a wide range of different measures of output, a person living in a city of more than one million will be 15% more productive than a person living in a smaller community - be it in terms of patents, money earned, products produced, level of IQ, speed of walking etc etc.

It would seem that the most creative cities are the ones that have the most interpersonal 'collisions' of people. Thus if a city or company want to increase its creativity, it needs to devise ways of increasing the potential for interpersonal collisions.

San Jose, for example has the highest number of patents of any city in the world. It is made up of thousands of small companies, where the cross-reliance on each other's skills forced greater integration of different companies with different skill bases. They were also much more relaxed about sharing of information. Furthermore, the social scene was quite close so everyone fraternised together. And being small companies there was a healthy cross flow of people swapping jobs.



Why a wide network of loose ties helps drive innovation

Around the world, people tend to have an average of 4-7 close ties, but it's having a wider network of weaker ties (especially people from different areas of expertise) that are important in influencing the innovation culture of a place. Research in patents has shown that people with a wide network of weak ties are three times more innovative than those with a smaller, more insular network.

Israel is the fastest growing country in terms of technology - since 2008 it has attracted more than \$2bn in investment. The reason it has exploded with innovation is due to it being the second densest country in the developed world leading to a massive network of connections in the country - i.e. everyone knows everyone else. Every male under 45 still has to undertake a number of weeks a year in military service thus renewing and growing their contacts.

How organizational growth can stifle creativity

The modern organisation has an average lifespan of just 45 years. Only two of the organisations that made up the original Dow Jones index are still in business. The issue is that organisational growth usually stifles creativity. To manage their growth, they develop hierarchies and processes that stifle dissent and suffocate social networks - the very lifeblood of innovation.

West and Bettencourt analyzed over 8,500 organisations - they found corporate productivity (i.e. profit per employee) dropped as organisations grew in size.

How education can stifle or enhance creativity

Creativity has moved in spurts throughout history. The period of the great philosophers of Socrates, Plato, Herodotus was between 440BC-380BC. The great Italian artistes were active between 1450 and 1490, whilst William Shakespeare, Christopher Marlowe, Ben Johnson, John Milton, and Francis Bacon were all writing in the mid 1580's.

All great periods of creative explosion are linked with a growth in educational expansion (which opens up people's minds to new ideas). A culture unconsciously suppresses new ideas as it reinforces what is currently in vogue at the time. It is only when there is a period of 'awakening' that new ideas are given the opportunity to germinate.

Teaching tends to suppress a child's creativity. Yet there is a recognition that creativity is a key skill required for the 21st century, but we are not supporting our children in developing their creativity.

In a piece of research, teachers were found to associate the key attributes of creativity (such as freely expressive) with the children they least liked - as typically creative students are harder to control.

Children do not learn from being taught - they learn more from experience, experimentation and play.



The New Orleans Centre of the Creative Arts do not make their students sit down for lectures on art. Instead they spend time creating (with guidance from working artists). Whilst they will not all become artistes, they learn the key skills of life: how to cope with complexity, how to bridge disciplines, self motivation, dedication, focus, coping with criticism (both from self and peers) and persevering when things do not go well.

A group of talented people pushed together tends to grow their overall ability - the students inspire and challenge one another.

How cultures can either support or suppress creativity

A culture places importance on some things (at the expense of others) - such as sport. This then focuses people's activities towards that goal. Thus an organisation/culture that recognises the importance of creativity (and subsequently rewards it) will help increase its level of creativity.

CRITICISMS

Another well-written book from Lehrer - again full of anecdotes and interesting experiments. In reality however, there are only a few new insights for me in this well trodden field of creativity. Maybe an unfair criticism but this book is not the definitive summary of what inspires or inhibits creativity.

Sadly this book has been steeped in controversy as he admitted to making up quotes about Bob Dylan. Putting that aside (as I have in this summary), the rest is still good content.

Answer to brain teaser – set it alight – no one said you had to keep it.

Techniques & mindsets to open up creative thinking

We need creative thinking in all aspects of our lives.

Increasingly we are all under pressure to deliver more from less. Rational solutions can only take us so far.

A creative approach can help us resolve issues over people, budgets and process.

This one day workshop is full of practical techniques and fun exercises that will help build a greater belief in our own creativity.

