Cracking the Creativity Code

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Zoom in/Zoom out/Zoom in Framework for Creativity, Fun, and Success

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and
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The Last Chapter

How Come Nobody Thought of That Before?

So, dear reader, you are about to flip to the last chapter to see what you might get out of this book, after reading it. Am I right?

Almost every reader does this. So do I.

Publishers and authors believe naively that their readers are obedient and disciplined, who wouldn't dare skip to the next page before finishing the current one.

I have hair-raising news for them. In the dark, when nobody's looking, crafty readers tend to skip dull or unimportant parts and look for the real meat, which is often at the book's end. The solution to the mystery, the happy, sad, or surprising end, the main insights, are usually kept for the end.

This is how we look at the landscape spread out in front of us. First, a wide look at the horizon, then back to focus on interesting details we've discovered. This is how we learn to understand something new—first, a quick look at their resumés, then a deeper look at some of the details that catch our eye. I imagine that more than once, during an especially annoying and tiresome conversation, you've said, "OK, just get to the point!"

So we will begin our book from the end. The last chapter will be the first chapter and the rest will follow. When you finish reading it, you will know better whether it's worth reading the rest.

We hope that after you read our book and did some or all of the exercises we propose, you were convinced about what is most

important for us—that you were born as a creative person, and that *creativity is in the nature of every human being.*

Our book, we hope, convinced you that what you need to do is to begin *to use your creative powers.*

We define creativity as: *Increasing the number and range of choices, adding ones you did not think of previously.*

The incredible human quality of creativity has been blocked and repressed by your parents, teachers, politicians and religious clerics, in a systematic and ferocious regime whose main purpose is to make you obedient, willing to carry out orders without question, without independent thought. Why? Because such thought disturbs the existing order, the *status quo*—in other words, the power and status of other people.

We hope we persuaded you, the reader, as you read our book, that creative thinking is a *source of personal and collective freedom.*

Only a creative person can be born into an enslaving society (physically or mentally enslaving), and rebel, because in his or her mind's eye, other, better ways exist for doing things.

We hope you will be convinced that every human revolution begins *with freedom of thought—with creativity that finds choices nobody ever thought of before.*

We hope that you will be persuaded that creativity is a way of life. Not just to improve artistic or technological works, but a comprehensive way of life that applies to every single detail in our lives, small and large.

Creative thinking frees us from bad eating habits and opens healthier, more stimulating possibilities. It frees us from the bondage of daily routine, social life, lifestyle, and from boring sex.

The aspiration to capture the creative capabilities that lie deep in every one of us is a source of endless joy. It is the greatest gift given by God to humanity.

We hope that the tools our book provided—mainly, Zoom in/Zoom out/Zoom in (Zi-Zo-Zi) on the Imagination Elevator—gave you the key to unlock the innate creativity that lies within you and within everyone, now locked up in the dark cellars of your brain by all those who want you to be diligent, efficient, obedient, routine, and disciplined, and who have taken away your God-given gift: The freedom to think, the power to create.

Take it back! Enjoy it! It's yours!

1 Your Brain as a PC

I intended to begin the first and second chapters with something entertaining, a few jokes and riddles, that would help clarify how creative you can be. On a second thought, I prefer to begin with a chapter that discusses how your brain functions, to show you how our brains enable us to be creative.

I will attempt to describe very simply how the brain operates like a PC (personal computer) placed on our shoulders. Like all PCs, our brains have

1. a central processing unit (microprocessor),
2. memory,
3. sensors that receive information: video, audio, taste, smell, touch, absorbing external data and internal data regarding our body systems;
4. installed software—for running and controlling our body systems, and
5. acquired software—such as habits, instincts, and reflexes for making our day-to-day functioning efficient, or for enabling rapid reaction in extreme situations.

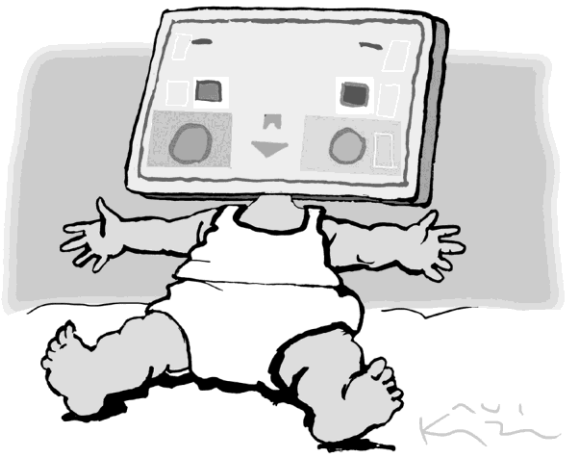
In our mother's womb, we already began to receive initial data with our sensors, we heard sounds and felt motion, and when we burst into the world, we began to operate additional sensors. The

data that began to flow to our brains were first stored in its crude form, without real meaning, except for *pleasant* or *not pleasant*.

But slowly, our brains began to distinguish between recurring stimuli, defined as important, stored in our memory files as, for instance, *mother*, and random stimuli sent directly to the waste basket.

This sophisticated mechanism in our brains knows how to rank important pieces of information according to the number of times we are exposed to them. Does this remind you of Google search?

In your first days on earth, after you are born, you are exposed intensely to your mother's body. You do not know what *mother* is, who *mother* is, but you are exposed again and again to her warm and tender touch, to her odor, to the taste of her milk, to the sound of her voice, and slowly to her face. The messages that repeated themselves with great frequency cause you to recognize the immense importance and pleasure she caused you, to recognize your desire to be near her.



Baby Computer

Only later, did you learn that this file, in which all the data were compiled, was called *mother*, or *mom*. This is how you learned to recognize the teddy bear in your bed, and to gather information about it in the file *teddy bear*, and slowly your world grew wider, as you added additional files in your personal database in your brain.

The repetitiveness is a key factor in this process, because even as a baby you were exposed to an infinite number of useless details that served no purpose and did not need to be accessed quickly. When

your brain needs a particular piece of information, it finds it, just like Google's search algorithm, searching first, with high priority, the files that are repetitive and highly connected.

This fact is used most effectively, with mathematical precision, by advertising personnel. In the advertising world, the guiding principle is, if you've been exposed to an ad fewer than four times in a row, it's as if you never saw it.

You *think* you saw it, and you *think* you will remember it, but it will be erased from your memory almost instantly by the unceasing massive flow of information that constantly bombards your brain.

The database in your brain is based, like a PC, on stored files, arranged by headings and subheads. For instance, under the heading *drinks*, you have the subheadings *still drinks*, *carbonated drinks*, *alcoholic drinks*, *juices*, *milk drinks*. Under the subhead *carbonated drinks*, there are additional sub-subheads, *soda water*, *Coke*, *Sprite*, *Fanta*, and so on.

Under the subhead *Coca-Cola*, there is all the information you've accumulated in your memory about this drink: Its taste, color, bottle shape, or can shape, the way Coca-Cola is written, sensory experiences related to drinking Coke, ads for Coke, and so on. Perhaps even the story of the American pharmacist who invented the secret formula for Coke, as a remedy for stomachache.

When you say, *mother*, you open a massive file, containing data from your first days of life; when you say *Coca-Cola*, you open a smaller file, but one that still can contain a huge amount of data.

When you say *Einstein*, you open a still smaller file, which for most human brains includes a photograph of the man with a moustache and busy hair and information about this great physicist, Nobel Laureate, inventor of relativity, linked with the atomic bomb, and perhaps other information.

When you say *elephant*, you open a file with the picture of a huge bulky animal with information about it.

Everything we know is defined in the computer memory of our brain by some word, through which we construct a file that gives us access to the information we know.

Why is it so important to strengthen our creativity?

Because we must understand that all the known brands were embedded in our brains by repetition of very limited information.

In the brain of a child who grew up in a distant rural part of China, the word *chopsticks* is embedded under the file name *eating utensils.* This is what they learned from the day of birth and they cannot imagine anything different from chopsticks. In their brains, there are no files for *fork and knife*.

And you, who is familiar with knives and forks and with chopsticks, did you know that you can eat with *taktoto*?

You didn't?

Have you ever heard of *taktoto*?

Apparently, you have no file in your brain for *taktoto*.

You need not apologize, because very few people know how you eat with *taktoto.* In fact, only one person—me, because at this very moment, I invented *taktoto. Taktoto* is a long wooden clothespin that is very convenient for eating. You squeeze the long end, grab a morsel of food at the end of it, and put it in your mouth.

Clothespin

Taktoto seems to me more convenient than chopsticks, which are hard to grasp for a Westerner, and enables you to eat with one hand, far easier than with a knife and fork.

Take a clothespin and try it for yourself.

Now, why did I invent the *taktoto* at this moment? Not to become wealthy, but to prove that there are an infinite number of ways to create eating utensils, beyond what exist in our minds already.

This infinite range of choices is the source of creativity.

As babies, when the concepts of *chopsticks* or *knives and forks* have not yet been stamped into our brains, we regarded everything around us as a potential eating utensil. As a baby, I once tried to eat

porridge with my mother's hairbrush. It wasn't a great idea, but it was a creative new choice. And it could be great for pasta lovers who have trouble winding the pasta around their forks.

An important step toward realizing your creative potential is to internalize this fact:

Everything you know about life is random and incomplete.

And:

Everything can have many alternatives, an infinite number of them, you need to only imagine them.

Our imagination is the tool that enables every person to go beyond the limited number of alternatives already defined by their brains and to define and create new exiting alternatives. That is creativity.

The next chapter is devoted to the magic of our imagination.

Your Imagination
The Tool That Is Beyond *Our Imagination*

Our mythological ancestors, Adam and Eve, were expelled from the Garden of Eden because they ate the forbidden fruit from the Tree of Knowledge. Who then was allowed to eat the forbidden fruit? Apparently, only God himself.

And what was the fruit of the Tree of Knowledge? What knowledge did it confer on human beings? Could it have been … imagination? The power to imagine, to see things in our mind's eye? The ability to distinguish between humans and other animals? The ability that brings humans close to being divine, that creates new worlds in our minds' eye and even implements some of them?

Dogs, cats, even monkeys, live solely in the present. They don't wallow in nostalgic memories and don't weave dreams for some distant future. They live entirely in today. Their lives are lives of pleasure, a Garden of Eden.

Animals have no fear of the unknown future and no regrets about mistakes of the past. The moment their physical needs are met, they are happy and contented, until they get hungry or thirsty again, and again are sated. They remain in paradise.

But we humans have been expelled from paradise.

The moment we were given the divine gift of a creative imagination, we were assaulted by fears and regrets. In our minds' eye we began to create terrifying scenarios of anticipated disasters and

alternate *scripts* for what we might have done, could have done, in the past, if only we had been smarter.

In the mythological story of the Garden of Eden, we were given two punishments. Men were punished with hard labor: the Bible says, "by the sweat of your brow, shall you eat your bread." The good old days are gone, when you could go into the forest, pick some fruit, hunt an animal or two and eat its flesh, then rest happily in the shade of a leafy tree. Now that you have an imagination and you can see the future, go out into the fields, plough, sow, reap, grind flour, knead bread, and eat the break you bake. A whole year of hard, wearying labor is your punishment for having an imagination, stolen from God. And women? "I will make your pains in childbearing very severe; with painful labor you will give birth to children." (*The Bible*: Genesis, 3, 16). The female animal does not anticipate what awaits her, when she gives birth to her young. She also does not anticipate in advance the tremendous effort that will be required to raise them. Now, when woman is given the imagination that enables her to see what the future holds in store, she knows that along with joy will come great pain.

We human beings are apparently the only creatures who realize that one day we will die. This knowledge shapes our lives and causes us to search for meaning in our lives, it is this knowledge of our death that impels us to create, to innovate, in order to put our stamp on the world after we die.

Garden of Eden

The mythological Tree of Knowledge is a tree of the past and the future, and its fruits are our imagination.

I want to tell you a fairly short story that will show concretely how to use your imagination for any purpose you choose. The story has several parts. Please don't abandon it halfway through, because that might be painful.

Taking the Imagination Elevator to the Land of Unlimited Possibilities

IF I WERE YOU, I WOULDN'T BELIEVE THIS STORY

I know well that there isn't the foggiest chance to persuade you that the story I am about to tell is true. It really did happen and I want to share it with you.

To tell you the truth, I myself do not wholly believe this story and I am keenly aware that its credibility, crafted with great care over several decades, is subject to challenge.

Therefore, I will try to describe exactly what happened 10 years ago or so, in great detail, in order to satisfy even the most suspicious reader.

I will allow myself to reveal what happened on that particular day, only now, because of a non-disclosure agreement (NDA) which I signed, for the figure who revealed himself to me as a heavenly angel.

The fact that I signed a secrecy agreement for him is in itself surprising, because I never ever before, on principle, signed non-disclosure agreements (NDAs). I regard NDAs as an insult and as an expression of lack of confidence; This is justifiable, because I know that I am unable to keep a secret. But this time was different. I signed the obligation and even kept it for almost 4,000 days.

What a relief for me to free my tongue from its restraints and tell all. It was on Saturday, July 2, 2002.

The time was 10:23 a.m., when out of sheer desperation I typed, unintentionally, on the laptop resting on my knees: Oh God, why have you abandoned me?

I remember the precise hour because at that moment the toaster in the kitchen buzzed, telling me the toast was ready, and I glanced at my watch to make sure that it was time for my brunch. I should make a note here that I am a very organized person, who insists on eating brunch exactly at 10:30 a.m. I am mentioning this so that you understand that I am not a flighty, scattered type, as you might come to think in just a few moments.

I sat on the red leather sofa in my living room, opposite a window that looked out from the 53rd floor on the astonishing Manhattan skyline.

I was in New York at the time to work on a new internet project that I was doing for the global ad agency McCann-Erickson, for which I worked.

It was an idea that I initiated and I was asked to lead its implementation. In parallel, I continued to participate in other projects of the Tel Aviv branch office, from which I had come.

From time to time, I was tossed campaigns that nobody else was interested in working on. In general these were small unimportant campaigns, but our policy at McCann-Erickson was to battle for every single client, even the smallest of them, and avoid (at all cost) losing it to a competing agency.

This was true of the campaign of the Israel Council for marketing citrus fruit, which was placed in my hands a few days earlier.

That morning, I sat on the red leather sofa, watching the west side with my laptop on my knees, staring at the blank screen and asking myself, why in the world do you need to advertize oranges in Israel??? After all, this is like running a half-price campaign for ice cubes in Alaska.

At the beginning of the previous week, I received, via email, an extensive market research on the consumption of oranges in Israel. The research indicated unambiguously that every Israeli knows about oranges, loves oranges, and buys large quantities of oranges. Per capita consumption of oranges in Israel is the highest in the world.

Why in the world do you need a campaign for oranges??? It's a shameful waste of money.

Author: Please provide shortened title for this chapter for the running head (due to the space constraint the entire title cannot fit here).

There was only one convincing reason for the campaign—if we do not waste this money, then another ad agency will, and it will make a nice profit from it.

The question was, what new idea will excite the Citrus Marketing Council this year? Nobody, including me, had the slightest idea.

I spent the entire morning staring at the computer screen, watching the Hudson River below me, looking at the ships cruising up and down the river.

At dawn, the Hudson River was grey as steel. As the clouds dispersed and the blue of the sky appeared, the river changed colors.

The flats of New Jersey met the horizon beyond the skyscrapers that rose from the basalt rock of Manhattan, like magical giants in a child's storybook.

Up on the 53rd floor, I truly felt as if I were part of a mythical story, floating in a hot air balloon between heaven and earth, closer than anywhere else to God, if he does exist.

Perhaps this is the reason that my fingers typed into a search engine: God, give me a thread of an idea.

When I got up and went into the kitchen, something moving on the panoramic window ledge of the living room caught my eye. It looked like a window cleaner, like the ones that dangle from the roof and clean the windows of skyscrapers.

But—on a Saturday morning? It can't be—and no one informed me in advance.

He was short and looked like a small astronaut wearing a silver space suit. He wore a helmet and had a backpack with two wings on it.

I saw him hovering near the window facing west,

Zi-Zo-Zi(1)

extending a small hand to the tiny crack I had left in the window to air out the room, and opening the window wide. I was paralyzed with fear. I wanted to dash to the telephone to alert security on the ground floor, but I was not able to move.

You know the feeling of impotence in nightmares? When you understand that something bad is happening to you, you know what to do but you aren't able to lift a finger.

I was only able to make myself very small, covered my head in my hands and waited with a pounding heart for the blow that would soon land on me.

"I think your toast is burning," I heard him say in a small child-like voice, "you'd better take it out of the toaster!"

I slowly looked up.

At first, I saw the astronaut's silver overalls and the helmet that he held in his small hand. I continued to look up in fear, until I saw his face. Today I can say that he had the face of an angel but then, at the time, he appeared to me like a chubby child with a sweet cherubic face, framed by golden curls. His eyes were blue, his skin pink, and his thick lips were ruby red.

Zi-Zo-Zi

The face of an angel.

My pounding heart gradually began to beat normally.

This little beauty took off his astronaut's overalls and laid them on the small loveseat near the window from which he flew in.

He looked around him:

"Your home is very nicely decorated, I like the Italian décor," he said, and went to the loveseat, checked it out up close and patted its concave back with his palm. "I like the concave curved lines, it looks like the Manhattan skyline as it appeared from the sky when I was landing."

"It's by Cassina," I mumbled, "this model is called Manhattan Sunset."

"Cassina!" said the pretty angel in admiration, "of course! It seems to me that even some of the angels were designed by Italian artists. Your red sofa is also very lovely and the glass table … oh, I'm sorry! I've forgotten to introduce myself!"

He walked toward me lightly as a dancer, extended his hand, and said "Permit me to introduce myself formally. My full name is Angel Zi-Zo-Zi-God." He pronounced the syllables distinctly, one by one, slowly, aware of my difficulty in understanding his name. "I am Heavenly Vice President of Creative Services, and a special flying emissary of the Heavenly President for Special Missions. My name is unusual, I'm aware of that, the blame rests squarely on my excessively creative parents."

I had no idea what exactly was happening in the room. Many thoughts ran through my head but the good manners my parents taught me didn't allow me to reject his outstretched hand. I shook it and murmured, "I think you're right about the toast."

I hurried into the kitchen, to escape the presence of this stranger and to gain some time to think. I didn't feel threatened; His appearance was reassuring and I suddenly felt a strong need to talk to him. I extracted the burned slices from the toaster and asked:

"Would you like something to drink? Hot? Cold?"

He came into the kitchen and examined the toaster closely.

"Very old fashioned, it's time to replace it with a more modern model, isn't it?"

"The toaster is actually quite new," I said defensively, "I bought it just six months ago but the truth is, I never manage to calibrate the toaster precisely so that the toast doesn't burn, when, you know, the bread is a bit drier, or a bit less dry, than usual. So, what will you have to drink?"

Zi-Zo-Zi(2)

"Orange espresso," he said.

I had never heard of orange espresso and I decided to use a trick of apprentice barmen.

"How exactly would you like it?" I asked, as if I had prepared thousands of orange espressos and encountered every possible preference.

He smiled knowingly: "One third of a cup of naturally freshly-squeezed orange juice and a double espresso. You can add more or less juice according to taste, but this is the proportion I prefer."

"Of course, that is the classic recipe," I said, like someone who for years had orange espresso in the morning, every morning.

"Orange espresso gives me everything in one cup. It's healthy, full of energy and it's also tasty. What else does one need in the morning?" said the Heavenly Vice President of Creative Services, whose name I just could not remember.

He read my thoughts.

"Call me Zi-Zo-Zi."

His name was the smallest of my problems in this whole story, I thought to myself. I turned on the espresso machine and as I poured the orange juice into two mugs, I understood that I was beginning to get a hint for a new campaign for oranges. If only a small fraction of those who start their day with cappuccino or espresso shifts to orange espresso—well, I would be a big winner.

Zi-Zo-Zi read my thoughts again.

"In the winter I drink it hot, tomorrow try to warm the juice in your microwave oven and then mix it," he suggested, "it's great!"

Preparing the beverage made me forget for a moment the weird situation I was in, but Zi-Zo-Zi brought me down to earth.

"Do you believe in angels?" he asked.

"Of course, I don't believe that there are such things as angels," I said without hesitating.

"So what am I?" he asked provocatively.

"I don't know," I said, "there is some trick here that I don't yet grasp."

Suddenly, I understood. Everything was completely clear to me. I ran back into the living room and looked around. I went to the window and glanced out. I know, it's a trick from the TV program Candid Camera, they want the whole world and my wife to laugh at me, it's obvious!

"False!" said the would-be angel decisively. "There ARE angels. And I am one of them. It's a fact, you asked for help, and now you have it. You remind me of someone who looked for a parking space in center city last week. He searched for an hour and found nothing. In distress, like you he appealed to God and asked for help. The Good and Gracious Lord at once arranged the solution and in five seconds a perfect parking space opened for him, right in front of his eyes."

"What did this person do? He raised his eyes to heaven and said, God, don't trouble yourself, I managed on my own. We laughed at this one in heaven for a whole week!"

The story was a good one but it did not especially convince me. I continued to search for hidden cameras but I didn't find a single one.

Zi-Zo-Zi continued:

"I was sent to help you with your oranges campaign and on this occasion, to improve your creative talents as well. Don't worry, it won't cost you a cent. You only need to sign this confidentiality agreement for 10 years. It's a formality, everybody signs it."

He pulled out of his backpack, attached to his overalls, several forms and a pen, and pulled out a small bow as well, to which several small arrows were attached with pink silk.

"What's that!" I was taken aback.

"Oh, it's nothing," he answered in embarrassment, "it's … connected with another matter."

"Sado-maso? Maybe, you have some gilded handcuffs in there?" I suggested, worriedly.

"Heaven forbid," he said, "no way!"

"I will *not* sign anything, until you explain this to me," I announced determinedly and moved as far away from him as I could.

"All right," he sighed, "because of a manpower shortage in angel power, I was asked by our Love Heaven to do another mission, on this occasion, in Manhattan, when you and I are done. At 4 p.m. an initial get-to-know-you meeting will take place at Starbuck's, right at the corner, and I've been sent as Cupid's replacement to shoot love arrows into the two people's hearts. That's all!"

That's all?! I reflected, that's more than I can take, but—what do I have to lose? This child doesn't look dangerous, and in any event I don't intend to tell anyone about this unreal encounter I am experiencing, that's all I need, for people to think that I see angels walking around in my living room … go with it, I said to myself, flow with it, I wonder where it will all lead, but in any event I got the idea for orange espresso.

"Give me the forms," I said impatiently, "let me sign them, let's be done with the formalities and get to work!"

THE IMAGINATION ELEVATOR

I went into the kitchen to finish preparing the orange espresso for us. I believe that I am a very creative person, that is, I'm able to think unconventionally. This ability has brought me a good living for decades of work in the advertising industry. Again and again I had to search and find the unusual, the extraordinary, what has not been seen and advertised and turn it into a surprising campaign, innovative and emotional. This openness that I excelled at clearly did not help me, when someone claiming to be a heavenly angel appeared before me.

The fact that I saw him with my own eyes flying outside the 53rd floor didn't help, nor did his ability to read my mind. At some point, apparently, openness reaches its limits and nothing can help.

Patience, I said to myself, in the end the cat will be let out of the bag.

I sipped the drink that I made. Excellent!

Zi-Zo-Zi stood next to me and scanned my reaction.

"Excellent!" I said. "How did you invent it?"

"I didn't invent it," he corrected me, "I found it, I discovered it, that is the big difference, and in that is the whole idea!"

"Meaning?"

"There are no inventions, there are only discoveries. Everything already exists, potentially. You only need to realize it, to transform it from one option out of many into something tangible. Orange espresso always existed as an option, as a possibility, but nobody ever thought to make it happen in reality. Nobody invented the wheel, they simply discovered it as an interesting possibility and began to use it."

"So, what do you have to say about the person who invented the name Coca-Cola?" I asked.

"He didn't invent it. The unique sequence of letters and sounds has always existed, the American pharmacist who blended the hugely successful drink, simply chose, with great insight, this possibility out of an infinite number of other permutations. Imagine if he had chosen a different set of letters, like 'mactocetylmene'...."

"According to your approach," I claimed, "every invention not yet discovered already exists. So … where are they? How can we find them?"

"That is the best question you've asked so far. I'll take you up there in the elevator. How many stories does this building have?"

"Fifty-five," I said.

"Good, so we'll take the elevator up to a few potential stories, that could have been built but were not, for example—floor 998, and there we'll find some inventions not yet discovered. On the 776th floor we'll see all the toasters that have not yet been discovered, and on floor 989 we'll see all the campaigns for oranges that have not yet been publicized. There you can choose for yourself a new original campaign for your client."

"Is it that simple?" I wondered.

"Not exactly," said Zi-Zo-Zi. "Let's sit down and have our drinks, and then we'll be on our way."

We sat next to each other on the red sofa.

Zi-Zo-Zi glanced around the room.

"I already told you that I like your décor, it's very clean, well selected. You do three things in your life: Choose, choose, and again choose from morning to night, you make choices. You Jewish people (actually, it was Rabbi Akiba) say—everything is predetermined, yet we have free choice. What that really means, what Rabbi Akiba meant, is that all the possibilities exist and human beings have been given the freedom to choose the option they prefer to implement. Sometimes our choices are good and other times, they are not, but everything has existed since the beginning of time."

"Do you really believe that all possibilities are open to us?" One of my friends, a philosopher, argues that "Just Do It!" (the Nike mantra) is a deception and a fraud.

It's the word of a philosopher against the word of a heavenly angel, you decide for yourself. Yes, everything is possible, but not everything can be implemented immediately and with the same ease. Creativity must also find expression in the correct choice that can be implemented in the present, out of the infinite number of possibilities that exist potentially. This requires maximum mental flexibility, to do "mental zoom in/zoom out."

"What is that!?" I asked. "Like, in photography? Zoom lens?"

"Yes, the way to develop creativity is to develop the ability to focus on a particular topic or problem, and then, to free yourself from that constraining focus and to see the very big wide picture of all the possibilities, only to then return and refocus on the most interesting possibility or option, of all the ones available."

THE PARADISE OF ADMEN

"Let's take a concrete example," Zi-Zo-Zi suggested, "your toaster." "In order to discover a better one, you need to first 'zoom in,'" you must analyze it in depth, to understand how it works, it's advantages and problems. And then, in the second stage, "zoom out,", free yourself of all that you know about toasters completely and think about what you would dream about and imagine, in a world of magical toasters where there are no financial or technological constraints. This is the stage where you ride up the imagination elevator to the place where all the potential toasters exist and where

almost none have actually been created. Try to visualize them in detail, in concrete terms, their shape, color and how they work as if you are standing there and testing them in a consumer electronics store. Yes you can, just try it, the human imagination can do this, and the more you do it the better you get at it."

"And then, you come to the third stage," Zi-Zo-Zi said, "the return to zoom in. Here you are asked to land on the solid ground of reality, in order to evaluate in practical terms each of the options you chose and to decide which of them is worth implementing, here and now. Zoom in, zoom out, zoom in. That's the whole *Bible* on one wing. I know it sounds complicated, but in a few moments you will experience it for yourself and you'll understand that it is actually very simple and very enjoyable."

The "*elevator*" sounded to me completely fallacious, but all the rest was logical and convincing.

In my experience, I learned that in order to get to a truly brilliant creative solution, you have to invest a lot of effort in learning the subject. The stories of people who wake up in the middle of the night with a great idea, in a domain they do not understand, those are simply legends. The real difficulties begin, in general, when the zoom-in constrains the imagination. Then, instead of working on new ideas, we work only on improving existing ideas.

On the other hand, I know of a great many idea originators who got stuck with impractical ideas. When one of them suggested to me to screen an ad onto a cloud above London, using a laser, I applauded warmly but suggested that we not propose the idea to our client before some minor technical problems were resolved, to make the idea possible. I've never yet seen such a screening, but I'm sure it's just a matter of time, everything is possible

Zi-Zo-Zi is right, the most common problem in the realm of creative thinking is the lack of mental flexibility, the inability to soar into the clouds and then land on the ground, to expand and to contract, to shift from what exists to what could be, and then come back to what is possible.

"What about the elevator? When are we going up?" I asked impatiently.

He finished his drink and stood up on his small feet.

We went into the long hallway and walked to the elevator. I couldn't stop myself from asking him who is the neighbor for whom he is matchmaking in the afternoon.

Zi-Zo-Zi looked at me with a smile and said,

"You know that I cannot answer your question. This is a very discrete matter, but I have a nice story about your neighbor, concerning creativity, he is very creative and that's how he got this date, I'll tell you about it when we come down."

When we got to the elevator, he pressed a hidden button that apparently I was unable to see.

"We're going up," he announced cheerfully.

I knew that above us, there were only two floors of penthouses, and that Howard Stern lived in one of them. I didn't imagine that God too could afford a penthouse in this building.

The elevator shot up like a racecar. I could feel that we were going up a great many floors, tens of them. I felt the air pressure in my ears and the acceleration pressed me against the floor. Then, very slowly, we stopped.

"We're here, at the 989th floor, the floor of the campaigns that haven't yet been implemented," Zi-Zo-Zi announced … "I want to take a short walk with you through the area of the campaigns for oranges." We were in a huge empty safe, infinitely large, and I couldn't see where it came to an end. It had no ceiling or floor, only thousands of posters hanging in the air. "Concept boards," in the language of advertising. They were not carefully designed and crafted posters, but rather sketches, very basic combinations of a few words together with simple illustrations that convey the basic idea. This is the essence of the ad idea. When we work on a campaign, the "idea people" prepare, in the early stages, a large number of concept boards, in preparation for the discussion with the larger group in which the winning idea would be chosen.

"You're right," Zi-Zo-Zi said, without my having said a word.

"You can read my thoughts?" I thought, without actually saying a word.

"Of course," he answered, with an impish smile, "reading thoughts is an essential working tool for every angel," and signaled me to follow him.

"He walked quickly and didn't let me look at length at the concept boards on the way. From the little I saw, it was very much like what I was accustomed to see in concept meetings that we held in our office. Most of the ideas were not interesting but here and there, there were a few flashes of brilliance. In my experience I have learned to embrace all bad ideas and to examine each with the patience of a hunter, in order to discover suddenly the diamond in the mountain of gravel. This is the expertise of an experienced adman and it is as important as the skill of the idea people to bring scads of great ideas. One of the great revolutionaries in the advertising world, William Bernbach, claimed that creativity is the ability to choose the correct option. There is no shame in proposing bad ideas, to the contrary, because hiding among them there are always a few good ideas. When we had brainstorming meetings, there were always people who were quiet, because they felt their ideas were not good enough, or those who began by saying, "I'm going to suggest something idiotic, but …"

The best and most experienced idea people would always say whatever was in their minds at the moment, without filtering it, without apologizing and without being insulted if their ideas were not greeted with applause. They simply poured out ideas and waited for the patient hunter sitting opposite them to pounce on one of them eagerly and announce, "Yes! That's it!"

In many cases, the final choice surprised many people who did not believe the chosen idea was in fact the very best one, but who accepted the choice of the creative director like parents who are proud of all their children. They know that their role is to generate a vast number of ideas and spread them out on the work table and that someone more experienced than they knows which of them will work, within the existing constraints of time, place, and budget.

"Of course, you are right," Zi-Zo-Zi said, reading my thoughts. "People usually divide into two groups—there are the *'crawlers'*, those who have less currentability to fly and who are firmly rooted in reality, they know and understand reality well, but are not able any longer to soar outside it and think about options that do not yet exist. And then there are the *'fliers'*, those who are detached from reality and are able like us now to float into regions yet unexplored.

It is very rare indeed to find people who combine both capabilities in their behavior, even though both skills, crawling and flying, are bestowed on every human being. In our experience in Heaven, with creativity, we have found that with the right kind of practice everyone can improve their abilities, of both types. Of course, you can get good results simply by teamwork between crawlers and fliers. This is how you work in your ad agency, right?"

"Exactly."

"The point is, everyone brings their own talents to the table, and nobody really tries to embrace mental flexibility, to learn how to do the full process, crawling and flying, on their own. Gaining this ability would give everyone the possibility to be more creative than they are at present, not only at work but also in their daily lives, in the way they dress, eat, have fun, and make love."

"I agree with you, Zi-Zo-Zi, I know this first-hand, my work in advertising requires me to practice zoom in/zoom out/zoom in every single day."

"So, perhaps you should write about this, instead of messing around with oranges?" he suggested.

"Let me think about that … but meanwhile, let's look at some of the campaigns."

"Here they are," said Zi-Zo-Zi, waving at them, "they're all here!"

WHAT CAN YOU DO WITH ORANGES?

I walked around and contemplated. As I mentioned earlier, I saw a great deal of silliness. There are many wild and wonderful ways to say anew what has already been said in other ways about oranges: Health, vitamin C, refreshing taste, refreshing juice. In one of the posters, under the illustration of an orange were the words "packaged in organic materials." In the next poster was the headline: "the packaging is recycled into jam, sweets, cake … and organic fertilizer." In the following poster, under the orange illustration were the words: "In a perfumed gift package," and in the next—"In a one-time package that retains freshness, taste and vitamins," and so on…. I liked this campaign because it dealt in a surprising and

elegant way with a problem that troubled me, the fact that there is really nothing new you can say about oranges. This campaign spoke about the orange peels nobody pays attention to, but which are an integral part of the product and its quality.

"Very nice!" I said to Zi-Zo-Zi, "Praiseworthy creative work! It's time for someone to implement it."

"Come with me and I'll show you where I got the orange espresso," he answered, and pointed with his left hand. We walked a few steps and stopped near an orange–brown poster.

The illustration was a glass of orange juice and above it, the word: Health. Next to it was a cup of espresso, and above it, the word: Energy. And between the two: A large plus sign.

Next to the illustration was another one, a tall glass with an orange–brown color, and under it the words: Orange Espresso: Start Your Day With A Lot of Health and Energy.

It was brilliant.

The poster next to it had some bitter chocolate and on it, sugared orange peels. The heading was: Like the taste? Try orange espresso energizing and healthful every morning!

Orange Coffee

"I'm grabbing this campaign!" I told Zi-Zo-Zi, "it's not only creative and elegant but also very effective!"

"Maybe you should see something else? This campaign is too good for your clients, I'm serious, they're liable to say, why should we use our own good money to advertise coffee? I'm sure you're familiar with clients like that. Let me show you something that is very creative and much easier to sell to your clients."

We stopped next to a poster, with an orange drawn on it and beneath it, the words: "Have an orange—you know why!"

I loved the idea. It probably would not increase sales, like orange espresso, but it would make a nice campaign, entertaining, refreshing, people would like it and maybe they would indeed buy a few more oranges when they went shopping.

"Go for it!" Zi-Zo-Zi recommended. "You can do orange espresso in a few years."

We did go for it and the rest is history. The campaign was a huge success, and even succeeded in increasing the purchase of oranges somewhat.

The following year, we lost the account, because we were 30 minutes late with our presentation. So, orange espresso remained on the 989th floor, waiting for an ad executive to take the *up* elevator.

FATEFUL HIGHLY-FOCUSED PURSUIT

"We have to hurry," Zi-Zo-Zi said, "The couple I'm after is already on their way to Starbucks."

"Let them get acquainted for a while, before you shoot your arrows," I suggested, "at their age, love at first sight isn't especially appreciated. Let them feel that they are not tempted by shallow external appearances but rather, they have discovered meaningful depths within each other."

"Okay," Zi-Zo-Zi agreed. "Let's go down. I think you finally get it."

When we went back down to my apartment, I just couldn't control myself.

"So, who is this romantic neighbor of mine? I promise not to reveal it to anyone!"

Zi-Zo-Zi smiled. "I understand that a scrap of juicy gossip is worth far more, in your eyes, than all the insights in the world on creativity. I will not tell you who the person is, but as I've already told you he has shown a great deal of creativity in his romantic pursuits."

Zi-Zo-Zi sat down on the carpet and began pulling out of his backpack the equipment he needed for his upcoming mission. First he

pulled out a bow, decorate with small gilded flowers, then, two thin arrows, a wreath of red roses and a rose-colored silk robe.

"Your neighbor became a widower more than a year ago, his wife died of cancer."

"I think I know who it is," I said. "Does he work at A.B.C.?"

Zi-Zo-Zi did not react but continued to talk, while attaching the wreath of roses to his head.

"After a year of mourning, your neighbor felt that he must try to rebuild his relationships with the opposite sex. He began to frequent bars, but did not find a suitable partner there, especially since he did not like alcohol in particular, he much preferred jogging in the Park."

"Maybe orange espresso attracts him," I noted, but Zi-Zo-Zi was deeply into his story and ignored my wisecrack.

"His effort to use the Internet dating services also did not produce any results," he continued. "He had no idea how to even begin to choose someone, out of the hundreds of thousands of single women in the database. There was one women who captured his heart, but she lived in California and he was looking for someone in Manhattan."

"This HAS to be the person from A.B.C.," I said decisively. "His offices are at the corner of our street at Columbus Avenue, opposite Starbucks."

Zi-Zo-Zi did not respond.

"One morning, during his morning jog in Central Park, he had a zoom-out idea. He saw himself in a bird's eye view, running among hundreds of other men and women, who all began their day as he did, with a morning jog. He said to himself 'Hey, maybe the one I love is at this very moment running together with me in Central Park!'"

"So, how do you find a needle in a haystack?" I asked.

"You think creatively," smiled Zi-Zo-Zi, looking like someone about to give candy to a baby. "Instead of looking for the needle, you let the needle look for you. This is also a possibility. Think about a strong magnet, if you pass it over the haystack, the needle will stick to it, right?"

I nodded in agreement.

Your creative neighbor chose this option. His *magnet* was a T-shirt, upon which he wrote in ink, both front and back, "looking for a partner to run with," and his phone number.

"Smart," I said.

"Smart? Brilliant!" enthused Zi-Zo-Zi. "On the very first day, he got tens of phone calls. Most of them were from women in the neighborhood, those who liked sports and running like him. Most were roughly his age, because they saw him and realized he was not a kid. For those women who called him, he had already passed the external test, for his appearance, and what was left for him to do was to chat with each on the phone and to find which of them he could exchange emails with, in a deeper fashion, for those who sounded interesting, and then finally, arrange to meet, and that's exactly what happened now, down there at Starbucks, and I am going to shoot the last arrow, in order to complete this sweet love story."

Zi-Zo-Zi wore his Cupid costume, ready and willing to spring into action.

"Good luck!" I said, "You've helped me a lot!"

"Every human being is born with the same elevator you and I rode up and down. When you people grow older and mature, you are ashamed to use this creativity, it appears to lack seriousness, it's illogical, unscientific, immature, childish. And this is precisely how you relate to the small handful of inventors and discoverers, as weird eccentric types. Nonsense! Up there, in the virtual reality, lies a wealth of things not yet discovered and every single person can reap them, if only they would go back and use the elevator given to them in childhood."

He put his backpack on, went to the open window, waved goodbye and flew out.

I stuck my head out the window and saw him fly around the corner of the building, on his way to his love mission.

THE END

When I ask myself today, 10 years later, if I believe in angels, the answer is, no. Unambiguously, I do not believe in angels.

So, how can this be consistent with the appearance of Zi-Zo-Zi?

It is perfectly consistent, because—he never ever appeared in my life.

If so, then how can I justify the story I just recounted?

The answer is simple and sincere. I found the story on Floor 889, the floor containing all possible stories that have not yet been told. All those who are interested are invited to go up to this floor, and to imagine the infinite number of bound volumes of stories as yet untold, to find a good story, and to transfer it to their computer screen.

By the way, those who want to make money from this should choose another floor, the floor of new businesses.

Creativity in Action

Stories to Aspire and Inspire

INTRODUCTION

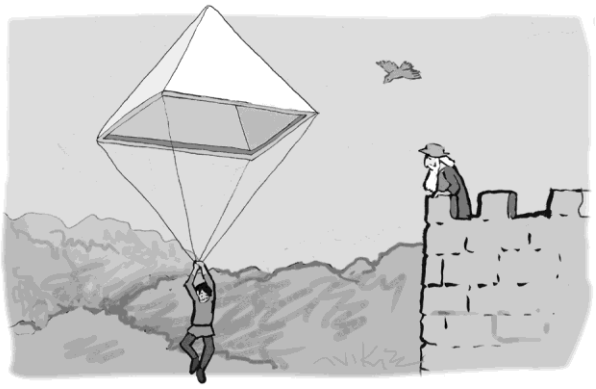
Creativity is the production of novel, useful ideas, by widening the range of choices. The two tests of creativity are, first, is it new? And second, it is useful? New or novel, relate both to time and place. Something new can be an idea used long ago, then forgotten, reviving it is also creative. Something new can be an idea used somewhere else in the world, that is transplanted to a new geography. Both types of creativity are highly productive, because they are based on ideas that have already proved themselves, in another age or another place.

Creativity generates inventions, which in turn drive innovation, the process of translating a creative idea or invention into a good or service that creates value for which people will pay. There are vast numbers of creative ideas that never reach implementation. An extreme example is that of the parachute.

Leonardo da Vinci (1452–1519) invented a triangular parachute, long before Man achieved flight. (He also invented the airplane, at least on paper). The idea was highly creative, both novel and useful hundreds of years later. In 2008 a Swiss engineer named Olivier Vietta-Teppa built da Vinci's parachute, based on the diagrams in da Vinci's notebooks, and with it leaped out of a helicopter.

(He landed safely.) Many of da Vinci's path-breaking ideas were creative but few were innovative, because extremely few were actually built (e.g., the military tank, the machine gun, the submarine, the airplane, and many more). Vinci deeply abhorred war and killing and was reluctant to contribute to them, even though he was well paid to invent new instruments of war by Italian city-states.

Successful creativity combines novel, useful ideas that widen the range of our choices far beyond what now exists, with creative ways to implement the ideas and sustain how they are produced and distributed, hopefully globally. The stories in this chapter provide illustrations of creativity drawn from a wide range of creative endeavors—music, art, business, food, transportation, health, movies, space, theater, education, advertising, technology, and electronics. They aim to inspire—and to help you to aspire to do the same. Each story includes a brief explanation of how the zoom in/zoom out method contributed to creative success.



Leonardo da Vinci's Airplane

MUSIC

Georges Bizet (1838–1875) died at age 37. His opera Carmen premiered at the Paris Opera Comique in 1875.

Until Carmen, there were strict rules for composing operas. Grand operas (e.g., those of Wagner) had larger-than-life tragic themes. Comic operas featured lighter-than-air love stories, large choirs, and no social themes.

Georges Bizet

Bizet was a virtuoso pianist and aspiring composer. He chose to innovate by breaking the rules. *He chose to combine both tragic and comic opera—in a single work.* His Carmen debuted at the Comic Opera, but it had a tragic theme. The first act was more or less conventional, light, and comic. The audience applauded. But then it was all downhill. The audience and the critics panned it after seeing the tragic Acts 2 and 3. Carmen violated what they expected. They did not expect tragedy. So the audience reacted angrily. Bizet died, broken-hearted a few months later.

The same year he died, Carmen was performed 46 times. Each time, its popularity grew. Today, it is unchallenged as one of a handful of truly beloved timeless operas.

Was Bizet's new opera useful? At first, it was rejected. But soon, its popularity mushroomed. It has given pleasure to untold millions. Some novel ideas take time to prove their usefulness.

The opera Carmen is a Zi-Zo creation. Bizet *zoomed out* to view opera and the two existing categories, kept completely separate. He then *zoomed in* to combine the two in Carmen. Some innovations that are especially radical are met with protests, precisely because they are so new and different. Stravinsky's Rite of Spring, a ballet and orchestral work, caused a near-riot when first performed (in Paris, on May 19, 1913) because it had so many novel ideas (tone, dissonance, meter, and rhythm). *This is why works of art in music, art, etc. need to be disseminated widely.* Only in this way can the taste of the public truly judge, over time, what is great and useful and what is not.

One of the Zi-Zo-Zi theme has a mathematical formula: X + Y. This means, create by combining things that have not been previously put together. As part of the zoom out process, you find elements that can be combined with other options you have created, elements that exist already standing alone. Bizet combined tragic and comic opera. For his audience, it was jarring, because they were shown something they had never seen before, something they did not expect. But in the end, it triumphed.

ART

Picasso: Lifelong Discovery

Pablo Picasso (1881–1973) created his first work of art in 1901. His last was created in 1973, the month he died. His life was therefore a 72-year-long unending stream of path-breaking creative works, in paint and in sculpture. He worked with oil, watercolors, pastels, charcoal, pencil, as well as a variety of sculpting materials. Picasso came to work in his studio nearly every single day, through disruption, world war, illness, marital disputes and other distractions. He loved the *act* of creation, not just the results or the fruits. His life shows why creativity is a structured process driven by investment of thousands of hours of hard work, done by those who love the act of creation, not just its fruits.

Picasso's guiding principle was that of exploration: "If you know exactly what you are going to do, what is the point of doing it?"

Pablo Picasso

he once said. He constantly changed styles, he pioneered new movements in art but never really joined them, and he broke the rules, as everyone knows who has ever seen a Picasso painting.

A widely used tool in business innovation is that of *discovery and delivery*. This is a questionnaire that tests two key dimensions of innovation: Discovery (creative ideas) and delivery (implementing them). Picasso had both. He was driven throughout his life by discovery. But as a gifted painter and sculptor, he also was good at *delivery*, at implementing his ideas. Both were vital. With *delivery*, Picasso's drive for discovery would alone have been insufficient to change the world.

The Zi-Zo-Zi theme: *Discovery*—try things, experiment, prototype—and never stop innovating. Look for the widest possible range of options, and persist in this search. Do not be deterred if you do not know exactly what you are going to do. Do it anyway and you will find out. One of the best definitions of entrepreneurship is "leaping off a cliff and building an airplane on your way down." Creative people do this all the time.

Marina Abramovic: The Artist Is the Innovation

On March 2010, *The New York Times* reported, "with the opening on Sunday of 'Marina Abramovic: The Artist Is Present', a long-building energy wave of performance art hits the (New York) Museum of Modern Art full force." She was the subject of a CBS Sixty Minutes profile. (The photo shows *Imponderabilia*—viewers must pass between the two naked bodies).[1]

What can we learn from the performance art of Marina Abramovic?

Marina is in her 60s. She's been doing *performance art* for 40 years, always billed as *alternative art*, meaning *weird, not serious*. And she's tired of that name. (By our definition of creativity, all creative ideas are *alternatives*, because they widen the choice of alternatives facing us. So, all art is *alternative*.)

Performance art is "a performance presented to an audience, traditionally interdisciplinary. Performance may be either be scripted or unscripted, random or carefully orchestrated; spontaneous, or otherwise carefully planned with or without audience participation.

The performance can be live or via media; The performer can be present or absent and involves four basic elements: Time, space, the performer's body, or presence in a medium, and a relationship between performer and audience."

Here are some of Marina's innovations:

1. For *Rhythm 0* she placed 72 objects—including a candle, a rose, a scalpel, some pins, and a gun—on a table and invited audience members to apply them to her body in whatever way they wanted as she stood, unresisting, for six hours.
2. For a 1973 piece called *Rhythm 10,* she turned on a tape recorder, splayed out her hand on the gallery floor, then quickly and repeatedly stabbed at the spaces between her fingers with one of the 10 knives, changing knives each time she cut herself.
3. Marina and the German artist Frank Uwe Laysiepen faced each other and together held a large bow and arrow. Ms Abramovic grasped the bow while Mr Laysiepen pulled the string taut, aiming the arrow at her heart.
4. The meditative *Nightsea Crossing,* involved both preparation and repetition. Conceived to be performed 90 times, it consisted of them sitting at either end of a plain wooden table staring into each other's eyes for hours, until physical discomfort or exhaustion forced them to stop.
5. The stage for their final performance, in 1988, was the Great Wall of China. Starting from opposite ends of the wall, they walked toward each other for three months. Originally the meeting was to have been the occasion for their marriage; In the event it marked their break-up. Uwe fell in love with his Chinese translator and by the time he met Marina, the translator was pregnant.
6. In the much noticed *House With An Ocean View* (2002) she lived in Sean Kelly Gallery in Chelsea for 12 days, confined to three container-like rooms—together they suggested a triptych altarpiece—elevated above the floor, with the front wall open, allowing visitors to watch her ritualistically nap, shower, dress, drink water, and urinate, then do the same all over again.

Great creativity often redefines a *domain*. It widens our choices by expanding the borders of the field in which our imaginations work. Creative people redefine the map of the world much as Columbus did with his daring voyage in 1492.

Abramovic has redefined what art is and how it is perceived. In general, the more radical the creativity, the greater the controversy it arouses. Innovators may judge their success by the heat of the debate their work generates.

The Zi-Zo-Zi theme: Widen your choices—expand the bor- ders of your domain. Seek options others may find bizarre or even unacceptable, beyond the existing borders of your art or domain. In art, as in politics and geography, expanding borders is exceedingly challenging, but when you succeed, infinitely rewarding. There is a business application as well. Harvard Business School Professor Ted Levitt counseled managers to ask daily, what business am I in? Drawing the borders of the business too narrowly—for instance, "we're in the movie business," rather than *the entertainment business*— can imperil the business. Expanding the borders of the business can lead to powerful innovations.

BUSINESS

In 1980 15-year-old Michael Dell, a high school student in Austin, TX, bought an Apple II computer, took it apart, and found that the components were made by someone other than Apple. His conclusion: If you knew where to buy the parts, and how to assemble them, you could make the computer yourself.

In 1983, Dell bought a batch of IBM PCs wholesale, souped them up by adding extra components, and tailored each computer to suit each customer (unheard of at that time). In 1985 he started building PCs (called the Turbo PC), custom-made for mail-order customers. They were half the price of a comparable IBM PC. Dell used the principle: Value up, cost down. He saved cost by cutting out the middleman. He had no inventory. To create added value, he designed computers exactly the way the customer wanted—markets of one. By 1987 he was getting 2,500 calls a day. At one point Dell was the world's leading computer company. Dell's only real creative

innovation was not in technology, or product—but in the way the product was made and sold, known as the direct-sale model (from producer directly to buyer). Dell still remains among the top five companies in its field. Even though Dell's creative idea is now 28 years old, and cannot be protected by a patent, Dell remains its main practitioner; Dell is simply better at it than its imitators. The idea itself has been adapted, evolving from telephone orders to web-based orders driven by tailored company web sites.

Dell did a *zoom out*, to learn what personal computers were made of, and how they were made. He then did a *zoom in*, and invented a way to improve them, by building them himself according to what people actually ordered, not according to what producers thought they should have. Dell continually does *zoom out* to track trends in the market and to evolve and improve its business design. It stays abreast of competition through the enormous daily flow of orders from buyers who tell Dell daily what is hot and what is not, a key source of instant information that the standard retail model cannot provide.

Dell Computers illustrates a key notion in innovation. Creativity applies not only to products (gadgets) and services, but also to processes—to the way things are done (such as, the way computers are made and sold to buyers). Research reveals that investment in process innovation pays far better returns than innovation in products, because process innovation rarely fails.

The Zi-Zo-Zi theme: HOW things are done is a source of creativity, not just WHAT is done. Widen the range of choices in how things are done (processes), not just in what is done (products and services). Creativity in how the business is run can be as important, or more so, than what the business makes and sells.

FOOD

M&M's is a chocolate and peanut confection known all over the world, made and sold by Mars Inc., a global company. M&M's, a peanut or glob of chocolate covered in hard candy, has barely changed for decades. How they were invented is revealing.

Forrest Mars inherited a family candy business founded by his father that had gone bankrupt twice. After college, Mars left for

Europe, in 1932. In England he started his own chocolate bar company called Mars bar. *In England, he heard about Spanish soldiers who ate sugar-coated pieces of chocolate that didn't melt because they were covered with hard candy.* In 1937 a British candy company called Rowntrees introduced a version of the chocolate drops to England, calling them Smarties. Forrest bought the rights to Smarties for America, then came home in 1939 to manufacture his own version, under the name M&M's. The second "M" came from his partner, Bruce Murrie, son of the founder of Hershey's, a huge American chocolate company. Forrest chose Murrie because he knew he would need a strong strategic partner, good at making large quantities of chocolate.

Soon World War II broke out. Forrest knew that M&M's would be a hit with soldiers. He was right. They became part of American soldiers' staple rations. Of course, after the war, when eight million soldiers came home, they continued to buy M&M's.

Forrest Mars did not invent M&M's. Spanish soldiers did. And Rowntrees perfected them. All Mars did was to bring the idea home to America. Was this creative? Indeed it was. A novel idea was brought to the United States, where it did not exist. To that imitative creativity, was added innovative skill, joining with the operational capability of Hershey's, to implement M&M's.

Zoom out can generate creativity, simply by locating an idea and transplanting it to a location where it does not exist. Often, the idea need to be adapted. (Nestle's innovation, introducing Magnum chocolate-coated ice cream bars to Israel, failed, until Nestle realized Israelis preferred milk chocolate coatings to dark chocolate.) This is why global benchmarking—scouring the world for creative ideas that can migrate elsewhere—is a powerful tool for innovators.[2]

The Zi-Zo-Zi theme: Sharp-eyed observation can be as powerful as intuitive creativity; finding a creative solution can be as effective as inventing one from scratch. This is why the zoom out stage is so productive and so crucial. It is why creative people travel widely, and scan the world of ideas for things that are new, interesting, unusual, unconventional. Imitation can be a key part of creativity, when you adapt an existing idea to a new realm and thus, create an option that did not exist before.

TRANSPORTATION

Sometimes, creativity creates novelty by reviving what is very old and no longer popular. This, too, is creativity.

In San Francisco, Delhi, Dubai, and elsewhere, a powerful trend is sweeping the world of cycling. Increasing numbers of people are buying 60's bikes, or fixed-gear bikes—bicycles that have only one gear and no way of braking except slowing or dragging a foot. They are simple, tough, durable, and build fitness (imagine riding up a San Francisco hill in first gear!). This trend goes against the trend toward $2,000, 18-gear bicycles along with colorful Tour de France fashion in skin-tights, helmets, and matching water bottles.

Fixed-gear 60's bikes are part of what is known as the *austerian* movement—austere is good, less is more, make do with cheap and simple rather than expensive, showy and conspicuous. Austerianism, in turn, is part of the new pro-environment green movement. It is also a proven approach to creativity—take a known device, and remove functions from it (like gears), rather than adding new functions to it, which is how we usually assume that innovation works.

The Zi-Zo-Zi theme: These bicycles are an example of how nostalgia can be a strong basis for creativity. Revive what once was novel, but is now forgotten. Not everything obsolete is worth reviving, but some things are, especially when they are ultra-simple. Zoom *out* includes zoom *back* (in time), to find things that were once creative; options that were once popular, but faded away.

HEALTH

How can one bring medical care to remote villages in India? Often, children and adults in India have medical problems that can be cured easily with surgery or other care, things like cleft palate or cataracts—but suffer with them for their entire lives, because they cannot afford medical care in the cities, or even get to the cities, where hospitals and clinics exist. A major tool for stimulating creativity is simply to find very hard questions, like the one above, and then seek to answer them with the powers of creativity, finding new and better choices.

India's rail network is one of the largest in the world. It transports 18 million passengers yearly, has 1.4 million employees and has a route covering nearly 40,000 miles.

In 1991, Indian Railways and the Indian Health Ministry joined forces to provide a simple solution to providing basic medical care for remote poor villagers. They called it Lifeline Express, or Jeevan Rekha Express. A train equipped with modern medical equipment and operating theaters and staffed with volunteer doctors and surgeons. The train was run through the length and breadth of India to more than 7,000 stations. The villagers were informed in advance, they were examined quickly and those best suited for the Lifeline Express care were chosen. The project is supported by Impact UK (a charitable foundation), Indian businesses, and individuals. Some 400,000 Indians have benefitted so far. A second train has now been added.

Lifeline Express focuses on the following:

1. Orthopedic and surgical intervention for correction of handicap and restoration of movement, especially those as a result of polio.
2. Ophthalmological procedures and interventions, e.g., cataract surgery and intraocular lenses.
3. Audiometry and surgical interventions for restoration of hearing.
4. Surgical correction of cleft palate.

Other countries, such as China, have begun imitating Lifeline Express.

Lifeline Express is a special case of Zoom Out. After defining a problem, creative people zoom out to survey various ways that people and goods are transported in India, not solely health services. After spotting India's extensive rail network, it was only a short leap from there to create the Lifeline Express.

The Zi-Zo-Zi theme: If you cannot bring scattered clients and customers to enjoy an innovative product or service, perhaps you can bring the product or service to the clients. This too creates a new option. Ways of transporting a good or service, and delivering it, is a huge source of creativity, and not just the good or service in itself.

ENTERTAINMENT (MOVIES)

Feature films have generated a massive amount of junk, and perhaps a much less massive amount of astonishing creativity. According to pictureshowman.com, some 210,841 feature films were made, between 1906 and 1999, in 51 countries, from Algeria to Yugoslavia; Tied for the lead are the United States and India, with 31,000 each.

From 2000 to 2010, approximately 50,000 feature films were made, with India (Bollywood) now leading the United States (Hollywood) by a wide margin. With so many feature films existing, one wonders how it is possible to come up with truly new ideas for films. According to columnist Maureen Dowd, writing in *The New York Times*, a new feature film "hit the Cannes Festival like a thunderclap."[3] The film was written and directed by a French writer, Michel Hazanavicius, and is called *The Artist*. It is about a silent movie star who can't accept talkie films and crashes and burns. And yes, the film itself is silent. *No sound. Silence.* Like the single-gear bike, The Artist is a retrogression, a step backward, to the era when movies had no sound track.

The Artist merges two key principles of creativity. One is *reduction* or *subtraction*—innovate by eliminating rather than by adding. Hazanavicius eliminates sound, or rather, adds silence, perhaps the rarest of all luxuries in modern life. (When did you last enjoy true silence? Where can you actually find true silence?). Indeed, reducing, or subtracting, features from existing products or services actually adds to them—adding simplicity, which is also an increasingly rare attribute of modern life.

The second is *nostalgia*—evoking something we once loved but which became obsolete. Silent movies were made obsolete by sound tracks—just as TV replaced radio, cell phones replaced payphones, laptops replaced desktops, wireless replaced modems. Why not think about ways to restore legacy technologies in unique creative ways?

Hazanavicius began directing in 1988. He directed commercial advertisements, then created a feature-length film made up entirely of clips from old Warner Brothers studio films. Making a silent film was a huge gamble, which paid off. Dowd quotes Hazanavicius on silence: "I compare [silence] to the zero in mathematics. People

think it's nothing, but actually it's not. Silence can be very powerful."[4] Invention of the *zero* in math was an enormous breakthrough.

Hazanvicius did a *zoom out* in creating his movie—his zoom out was not geographical, across the world, but historical, back in time. History can be a powerful tool for creativity. By knowing how things have developed and evolved we can sometimes recreate things that were once novel and popular, and revive them.

The Zi-Zo-Zi theme: As with the retro bicycle: Zoom out includes Zoom back in history—nostalgia, obsolete products are a powerful source of creative ideas. Explore options of creative ideas used in the past and then abandoned.

SPACE EXPLORATION

Are you creative? If not, perhaps the reason is you are trying to think outside the box, as many experts recommend. But the true secret to creativity and innovation is sometimes thinking *inside* the box—the right box, that is.

Here is an example. Years ago, engineers and scientists at NASA dealt a severe blow. Because of problems with their launch rocket, the Mars explorer they had designed, paring down its weight to the bare minimum, was found to be too heavy. The rocket could not get it to Mars. It looked like the mission would have to be cancelled. The *box* (weight constraint) had changed—and threatened the idea itself. In large-scale projects, this happens often.

One creative engineer refused to give up. He solved the problem with creative thinking that was both inside the box (the minimal rocket thrust) and outside the box (trajectory).

The Mars explorer was not launched *toward* Mars. It was launched in the *opposite direction*, toward Venus! The rocket had just enough thrust to get it there. As it circled Venus, the planet's gravity acted like a slingshot, accelerating the spacecraft and shooting it toward Mars. It reached Mars and sent back thousands of photographs.

Who said you had to aim at Mars? Only a creative person, skilled at widening the range of choice, would think of sending the spacecraft in the opposite direction.

Research on creativity shows that truly successful innovative thinking, the kind that creates profitable commercial successes, is not done by chaotic brainstorming. Rather, practical creativity is highly disciplined, built on hard work, with clear milestones and goals, and a systematic process. Hebrew University Professor Jacob (Yanko) Goldenberg has developed one such system, known as innovation templates. His method is based on that developed by Russian inventor and scientist Altschuller, who studied thousands of creative ideas and identified the patterns that created them. Goldenberg's method is now applied successfully by the Israeli consulting firm SIT (Systematic Inventive Thinking), which has used it to create winning new ideas for global companies like Philips and Johnson & Johnson.

"Don't listen only to the voice of your customer," cautions Goldenberg. Customers are creatures of habit, get used to products and get used to overcoming deficiencies inherent in the product. "Listen to the voice of your product." Analyze your products' features. Think about how you can create winning new products by: removing a feature (for instance, eliminating the recording ability of a tape recorder, creating the Walkman), or adding a feature, or combining features (the Viewmax, which combines a TV and VCR in the same box, saving the cost of a tuner). Let your product itself (thinking in the product box) show you how to think outside the box to meet needs your customers have but may not have been aware of.

Social psychologist Mihaly Csikszentmihalyi studied 91 supercreative individuals and framed some of the rules they follow. Typically they exercise their creativity muscle every single day.

The Zi-Zo-Zi theme: Think INSIDE the Box—but, only the *box* that comprises the true unavoidable constraints; ignore all those constraints that can be ignored. Telling the difference between them is very difficult, and often holds the key to successful creativity. You cannot ignore ALL constraints, because some of them are real. But you can and should ignore constraints everyone *thinks* are real, but which in fact are really not. Telling the difference is an ability that creative people have, and cultivate.

THEATER

Six Characters in Search of an Author (Italian: *Seipersonaggi in cercad'autore*) is a 1921 Italian play by Luigi Pirandello. An absurdist metatheatrical play about the relationship between authors, their characters, and theater practitioners. It premiered at the Teatro Valle in Rome to a mixed reception, with shouts from the audience of *Manicomio*! (*Madhouse*!), though the reception improved at subsequent performances—helped when Pirandello provided for the play's third edition, published in 1925, a foreword clarifying its structure and ideas. The crowd reaction to Pirandello's creativity resembles the initial reaction to Bizet's Carmen and Stravinsky's The Rite of Spring.

The play had its American premiere in 1922 on Broadway at the Princess Theatre, and was performed for over a year off-Broadway at the Martinique Theatre beginning in 1963.

In the play, an acting company prepares to rehearse a play, The Rules of the Game, by Luigi Pirandello. (Pirandello perhaps ironically hints that he is smashing the *rules of the game* in a play with that name.) As the rehearsal is about to begin the play is unexpectedly interrupted by the arrival of six strange people. The Director of the play, furious at the interruption, demands an explanation. The Father explains that they are unfinished characters in search of an author to finish their story. The Director initially believes them to be mad, but as they begin to argue amongst themselves and reveal details of their story he begins to listen. While he isn't an author, the Director agrees to stage their story despite the disbelief amongst the jeering actors.

The creativity here lies in Pirandello's breaking the rules of play-writing. Instead of a structured play with defined characters and plot, he wrote a play about the process of creating a play itself. For theater-goers used to conventional plays, Pirandello's innovation was disturbing—it was not what they expected. Hence they reacted with anger, like audiences' reactions to Carmen or to Rite of Spring. Pirandello widens our choices, by offering a play that is unlike other plays. It is novel, and ultimately, valuable, because over time the play has proven highly popular. Samuel Beckett's Waiting for Godot similarly broke new ground. The play never makes it

clear who Godot is, why the actors await him, and what the context is. Sometimes, the key to creativity is not what is created but what is left ambiguous, for our own imaginations to determine. Often, truly creative breakthroughs arouse fierce opposition, when crowd and customer expectations are jarringly unfulfilled.

The Zi-Zo-Zi theme: initial reactions to an innovation, like the audience's reaction to Six Characters, or to Bizet's Carmen, are often hostile, especially when the innovation is truly radically new. Truly creative persons are not deterred by this. Sometimes, the more hostile the reaction of a market, or audience, to a creative option, the more creative we believe it is. Things that are humdrum, uncreative, are rarely greeted with hostility. There are two reasons for negative customer and crowd reaction to an innovation: the innovation is unworthy or it is so radically new and valuable, it jars our love of the familiar. The lesson here is, do not abandon your creative idea at the first whisper of rejection. Persist long enough to give it a fair try at survival.

EDUCATION

Field of Dreams I: Hole in the Wall

An Indian education innovator named Sugata Mitra recounts the following story:

"I started in 1999 to try and address this problem [of education in poorer countries] with an experiment, which was a very simple experiment in New Delhi. I basically embedded a computer into a wall of a slum in New Delhi. The children barely went to school, they didn't know any English—they'd never seen a computer before, and they didn't know what the Internet was. I connected high speed internet to it—it's about three feet off the ground—turned it on and left it there. After this, we noticed a couple of interesting things, which you'll see. But I repeated this all over India and then through a large part of the world and noticed that children will learn to do what they want to learn to do."

This is the first experiment that we did—an eight-year-old boy teaching his student, a six-year-old girl, and he was teaching her

how to browse. This boy here in the middle of central India—this is in a Rajasthan village, where the children recorded their own music and then played it back to each other and in the process, they've enjoyed themselves thoroughly. They did all of this in four hours after seeing the computer for the first time. In another South Indian village, these boys here had assembled a video camera and were trying to take the photograph of a bumble bee. They downloaded it from Disney.com, or one of these web sites, 14 days after putting the computer in their village. So at the end of it, we concluded that groups of children can learn to use computers and the internet on their own, irrespective of who or where they were. At that point, I became a little more ambitious and decided to see what else could children do with a computer. We started off with an experiment in Hyderabad, India, where I gave a group of children—they spoke English with a very strong Telugu accent. I gave them a computer with a speech-to-text interface, which you now get free with Windows, and asked them to speak into it. So when they spoke into it, the computer typed out gibberish, so they said, "Well, it doesn't understand anything of what we are saying." So I said, "Yeah, I'll leave it here for two months. Make yourself understood to the computer." So the children said, "How do we do that." And I said, "I don't know, actually." And I left. Two months later—and this is now documented in the Information Technology for International Development journal—accents had changed and were remarkably close to the neutral British accent in which I had trained the speech-to-text synthesizer. In other words, they were all speaking like James Tooley. So they could do that on their own. After that, I started to experiment with various other things that they might learn to do on their own.

I called in 26 children. They all came in there, and I told them that there's some really difficult stuff on this computer. I wouldn't be surprised if you didn't understand anything. It's all in English, and I'm going. So I left them with it. I came back after two months, and the 26 children marched in looking very, very quiet. I said, "Well, did you look at any of the stuff?" They said, "Yes, we did." "Did you understand anything?" "No, nothing." So I said, "Well, how long did you practice on it before you decided you understood

nothing?" They said, "We look at it every day." So I said, "For two months, you were looking at stuff you didn't understand?" So a 12-year-old girl raises her hand and says, literally, "Apart from the fact that improper replication of the DNA molecule causes genetic disease, we've understood nothing else."

Field of Dreams II: Tablets for Illiterate Children

A recent article in MIT Technology Review reports on how One Laptop Per Child (OLPC) project, led by Nicholas Negroponte, has morphed into One Tablet Per Child—and how children in a remote Ethiopian village, with no access to schooling, have conquered tablet computers with preloaded programs in English with exceptional speed! They even hacked the tablets and enabled disabled cameras!

Ethiopia

The devices involved are Motorola Xoom tablets—used together with a solar charging system, which OLPC workers had taught adults in the village to use. Once a week, an OLPC worker visits the villages and swaps out memory cards so that researchers can study how the machines were actually used. After several months, the kids in both villages were still heavily engaged in using and recharging the machines, and had been observed reciting the alphabet song, and even spelling words. One boy, exposed to literacy games with animal pictures, opened up a paint program and wrote the word *Lion.*

The experiment is being done in two isolated rural villages with about 20 first-grade-aged children each, about 50 miles from Addis Ababa. One village is called Wonchi, on the rim of a volcanic crater

at 11,000 feet; the other is called Wolonchete, in the Rift Valley. Children there had never previously seen printed materials, road signs, or even packaging that had words on them, Negroponte said. Earlier this year, OLPC workers dropped off closed boxes containing the tablets, taped shut, with no instruction. "I thought the kids would play with the boxes. Within four minutes, one kid not only opened the box, found the on-off switch … powered it up. Within five days, they were using 47 apps per child, per day. Within two weeks, they were singing ABC songs in the village, and within five months, they had hacked Android," Negroponte said. "Some idiot in our organization or in the Media Lab had disabled the camera, and they figured out the camera, and had hacked Android."

Elaborating later on Negroponte's hacking comment, Ed McNierney, OLPC's chief technology officer, said that the kids had gotten around OLPC's effort to freeze desktop settings. "The kids had completely customized the desktop—so every kids' tablet looked different. We had installed software to prevent them from doing that," McNierney said. "And the fact they worked around it was clearly the kind of creativity, the kind of inquiry, the kind of discovery that we think is essential to learning." "If they can learn to read, then they can read to learn."

Giving computers directly to poor kids without any instruction is even more ambitious than OLPC's earlier pushes. "What can we do for these 100 million kids around the world who don't go to school?" McNierney said. "Can we give them tool to read and learn—without having to provide schools and teachers and textbooks and all that?"

Children are innately creative. This means that they are outstandingly excellent at exploring and at discovery. This in turn means that if we give children tools to help them explore and discover, on their own, they will prove surprisingly good at it. Children will do *zoom out* if they can, driven by their curiosity, even if they lack formal education, and language, and have not seen advanced technology before. Perhaps we need to reform education, in this direction, in the direction of self-driven discovery, rather than teacher-driven instruction.

The Zi-Zo-Zi theme: Creating new options sometimes involves trying them out, because in many realms we have no idea what will

work and what will fail. So experimentation is a key part of the Zi-Zo-Zi process, as Sugata Mitra and Field of Dreams showed; the results of these experiments surprised everyone.

ADVERTISING

The logo here is a rebus borrowed by Milton Glaser from a Montreal radio campaign. CJAD, in Montreal, Quebec, Canada ran a campaign entitled *Montreal, the city with a heart*. The logo consists of the capital letter I, followed by a red heart symbol (♥), below which are the capital letters N and Y, set in a rounded slab serif typeface called American Typewriter.

In 1977, William S. Doyle, Deputy Commissioner of the New York State Department of Commerce hired advertising agency Wells Rich Greene to develop a marketing campaign for New York State. Doyle also recruited Milton Glaser, a graphic designer to work on the campaign, and created the design based on Wells Rich Greene's advertising campaign. Glaser expected the campaign to last only a couple months and did the work for nothing. The innovative pop-style icon became a major success and has continued to be sold for years. In the popular mind (though this was not the original intention) the logo has become closely associated with New York City, and the placement of the logo on plain white T-shirts readily sold in the city has widely circulated the appearance of the image, making it a commonly recognized symbol. Glaser's original concept sketch and presentation boards were donated by Doyle to the permanent collection of the Museum of Modern Art, New York. The image became especially prominent following the September 11 terrorist attacks on the city, which created a sense of unity among the populace. Many visitors to the city following the attacks purchased and wore the shirts bearing the I Love New York logo as a sign of their support. Glaser created a modified version to commemorate the attacks, reading "I Love NY More Than Ever," with a little black spot on the heart symbolizing the

World Trade Center site. The black spot approximates the site's location on Manhattan Island.

"I Love New York" song was written and composed by Steve Karmen in 1977 as part of the advertising campaign. In 1980, Governor Hugh Carey declared it as New York State's anthem. In a move that was remarkable for Karmen, who is well known for retaining the publishing rights to his songs, he gave the rights to the song to the state for free.

The Zi-Zo-Zi theme: If you truly want to create new options and change the world, sometimes it is most effective to simply give them away, rather than try to capture all the benefits with patents or copyrights.

TECHNOLOGY

3D Printing

Additive manufacturing, or 3D printing, is a process of making three dimensional solid objects from a digital model. 3D printing is achieved using additive processes, where an object is created by laying down successive layers of material based on inkjet technology. 3D printing is considered distinct from traditional machining techniques (subtractive processes), which mostly rely on the removal of material by drilling, cutting, etc. 3D printing is usually performed using a materials printer, and since 2003 there has been large growth in the sales of these machines. Additionally, the cost of 3D printers has gone down. The technology also finds use in the fields of jewelery, footwear, industrial design, architecture, engineering and construction (AEC), automotive, aerospace, dental and medical industries, education, geographic information systems, civil engineering, and many others.

Chuck Hull is known as the inventor of 3D printing. Some 30 years ago, Hull was working in Southern California at a mid-size manufacturer called Ultra Violet Products. Hull helped develop the company's ultraviolet-light curable resins, which were used to add protective coatings to furniture and other surfaces. Hull began experimenting after hours with laying down numerous coats of

the resin to make plastic models and thus 3D printing was born. In 1983, Hull formalized this technology, called stereo-lithography, and later founded 3D Systems in 1986.

The creativity of 3D printing is driven by *zoom out*—ask, how can we make things other than the conventional ways (extrusion of plastic, metal molds, lathes, etc.), then explore technologies far afield, such as inkjet printing. This is both out-of-the-box thinking (seeking processes beyond what exists today), and in-the-box thinking, because it meets constraints regarding accuracy, materials and speed that cannot be discarded or ignored.

The Zi-Zo-Zi theme: One way to create new options is to zoom in on a problem (how to create, for instance, prototypes quickly and inexpensively), and then zoom out, to search for technologies seemingly utterly unrelated, like inkjet printing, and adapt them to the zoom-in problem. Once we see how 3D printing is done, it is obvious. But the leap of creative insight that enabled creative individuals to see how the inkjet process could squirt a kind of glue, rather than just ink, onto a three-dimensional surface, rather than onto paper, was exceedingly difficult. So was the implementation, once the idea was conceived. An important method for *zoom out* is benchmarking—searching for best practices far beyond the domain or industry in which the original challenge or problem resides.

ELECTRONICS

The Story of the Light Bulb (Carbon Filament)

Thomas Edison did not invent the electric light bulb. Others preceded him. But Edison had a key insight from the start into what the right value-creation statement was for electricity. Electricity is not power, he observed. Electricity is a method of transporting power. By formulating the challenge of electricity in this way, Edison was led to creative ideas that otherwise would not have emerged.

Once this core principle was understood, the key part of the business design for electric lighting became clear: build power stations and electric wires that could quickly and dependably bring electric power to every place that needed and wanted it. Transport

the power to where people wanted and needed it. Franchise the system in America and Europe and raise large amounts of capital. Attract public excitement to generate buzz and interest that creates demand for power and incentives for investors. Replace gas lighting with electric lighting instantly and everywhere.

Michael Porter distinguishes five powerful forces that drive competition; one of them is supplier relations. One of Edison's critical decisions related to the light bulb's key component: the material of which the filament is made. In incandescent lighting, an electrical current flows through a filament, which glows and transforms electrical energy into light. Finding the right material for this filament was crucial. It was not easy.

The technologically optimal material was platinum. A competing British inventor chose it, yet Edison selected carbon. Why? One version is mystical—a *Eureka* insight gained as the inventor sat in his laboratory toying with a piece of compressed lamp black mixed with tar, designed for use in his telephone. Voila! He saw the threadlike shape of the lamp filament before him.

But the real, more mundane reason probably has more to do with Edison's understanding of business design. In the early Fall of 1879, he decided to abandon platinum as the filament material for light bulbs. The reason was bad economics—scarcity and cost. At the time, there were few commercial uses for platinum. Platinum was widely found in mining regions of Western United States—but mine owners had no reason to produce it. Platinum was then expensive and would likely remain so. When light bulbs went into mass production, it would be risky to assume availability of sufficient platinum. Edison knew that using a much cheaper material for the filament would lower production costs and market price, and make light bulbs cheaper and more appealing for consumers. He always went for the jugular of the mass market. While this reasoning sounds simple after the fact, many innovations founder on unfounded dreams that components and technologies will be available precisely when they are needed, at the right price.

Edison was able to combine the visionary qualities of *dreamer* with the hardheaded business sense of entrepreneur–manager, and he knew when to use each quality. His Menlo Park, NJ lab had

long experience with various forms of carbon, used in telephone receivers. In the end, the decision to favor carbon over platinum was a key decision that alone may have meant the difference between success and failure. It was a case of economics trumping technology.

Edison faced competition from a brilliant English inventor named Joseph Wilson Swan, who at times moved into the lead as the acknowledged innovator in electric lighting. Swan demonstrated a carbon-filament light bulb in February 1879, eight months before Edison did. Using some of Edison's P.T.-Barnum-like theatricality, he lit up a wealthy merchant's library, picture gallery and dining room with 45 frosted lamps.

But Swan did not have Edison's vision. From the start, Edison saw electric lighting as a disruptive technology that would quickly and utterly replace gas lighting, then the preferred technology, and said so bluntly. Swan denied this and mocked Edison for saying it. He felt that electricity and gas would coexist, and proceeded with great caution. And in the end he used platinum filaments, rather than carbon.

Edison knew about Swan. Swan had written to Edison, in September 1880: "I think I am in advance of you. I now think I have shot ahead of you," he said. But Edison knew a key fact: the race was not to the swift but rather to the man with bravado, endurance, and money—none of which Swan possessed."[5] Edison attacked Swan; the Edison Electric Light Company sued the Swan United Electric Light Company for infringement of the Edison patents. Swan's stockholders chose to join Edison rather than try to beat him.

The infrastructure for electric lighting was very costly. Edison understood from the start that he had to raise large amounts of capital. He took great pains to inflame and excite the financial lions of Wall Street, including J.P. Morgan (who became an early stockholder in Edison's company). He chose to electrify Pearl St. in downtown Manhattan as one of his first demonstration projects, mainly to catch the attention of—and financial resources flowing from—the Wall Street bankers.

Often his financial backers became impatient. Edison was regularly able and willing to mount demonstrations—including in 1879,

the 30 candle-power carbon-filament light bulb that burned for an amazing 100 hours—that kept his investors' excitement high and their wallets open.

The Phonograph

In many innovations, there is a seemingly unimportant product attribute that takes on mythical psychological proportions. For the phonograph, its ability not only to capture the human voice but to preserve it for eternity, a feature Edison hyped endlessly, was this feature. Edison zeroed in on this feature. He came to it, because Edison was very hard of hearing, almost deaf, from an early age. He thus knew that sound waves were tangible, physical, because he could feel them on tabletops through his finger tips. This brought him the key insight: If sound waves were tangible, physical, then they could be captured and storied by physical means.

Edison

Edison and his close colleague and friend Charles Batchelor went to the Philadelphia Inquirer to demonstrate the phonograph. They were then summoned by the President of the United States, Rutherford B. Hayes, for a private phonograph session, and ended up staying at the White House until 3 a.m., because the President wanted his wife to see the marvelous machine and woke her up to do so. Like many inventors, Edison loathed doing public relations… "the reporters who have come down here (to Menlo Park)… have already unstrung my nerves," he protested. Yet "the public Edison possessed more

than a touch of the circus magnate P.T. Barnum to offset whatever reluctance he may have felt deep within."

Edison was an associative creative thinker—constantly linking seemingly unconnected areas. As a telegrapher, he perceived a need and quickly invented a method for recording incoming Morse code messages that operators could not jot down quickly enough.

In 1877, experimenting with the telephone, Edison patented an enhanced automatic telegraph that indented on a revolving disc characters received from a distant transmitting station; the same sheet then transmitted the message. He then worked on a music-transmitting machine using a vibrating metal diaphragm that activated an electrical current through resonating contact levers. This soon led to the phonograph. One invention became a platform for another.

Edison constantly sought new and different ways to commercialize his inventions. After inventing the phonograph, by Christmas 1878 he hinted that "many novelties and toys derived from the phonograph could be widely available if the right backers could be found", showing his eternal focused quest for funding.[6]

Edison's work with compressed carbon for telephones led him to discover that this material was sensitive to radiant heat. This in turn produced his *tasimeter*, an instrument for measuring radiated heat based on the distortions it caused in carbon buttons. The buttons changed their size and resistance minutely relative to the heat radiating on them, a shift that was calibrated and measured by finely threaded screws. In 1878, Edison traveled to Wyoming to view an eclipse of the sun and test his tasimeter (to measure the sun's infrared radiation). He at once projected this technology into a wide range of products: detecting invisible stars, measuring wind velocity, weighing small objects, taking body temperature, sensing icebergs at sea, sensing perfume as an *odorometer*, and measuring moisture.

The technology was unsuccessful; his tasimeter turned out to be too fickle and delicate. (Contrary to legend, a great many of Edison's ideas failed). But it showed Edison's platform thinking that characterized his business model for electric lighting, too. Edison conceived of electricity as a power source not just for lighting, but

for sewing machines, fans and other appliances. His imagination had no bounds; his business sense was carefully bounded in the realities of money, investors, production costs, and shareholder interests.

Edison's company took out 216 patents on electricity and lighting, anticipating what is known today as *picket patenting* (circling a core technology with a picket-fence ring of protective patents, just as American settlers heading out West circled their wagons against attack). A subsidiary of the Edison Electric Light Company known as the Edison Company for Isolated Lighting reached agreements to license Edison patents for incandescent lighting in 200 sites across the United States—mills, plants, ships, hotels, stores, and homes. And in Europe: "… 158 isolated plants were humming in Berlin, Manchester, Paris, Bordeaux, Amsterdam, Munich, Bologna, Rome and other cities."

Edison did much more than run a unique idea factory at his Menlo Park laboratory. He also labored long and hard to build a managerial cadre and hierarchy, choosing talented brilliant young managers like John Lieb, a mechanical engineer who at age 22 threw the switch at the Pearl Street inaugural lighting demonstration. Lieb was sent to Milan, building that installation into Europe's largest electricity plant. He later returned to Edison Electric in New York City. Lieb and others were part of a strong management team that Edison assembled, who were early pioneers of an American form of managerial capitalism different from that led by robber barons, bankers, and industrial statesmen.

In terms of zoom in, zoom out, Edison demonstrated the crucial importance of *big picture thinking* driven by Zoom Out. He understood electricity as an entire ecosystem, with generators, dynamos, lines, light bulbs, and other elements, all of which had to integrate smoothly with one another, and which would take very large amounts of capital to implement. He understood the zoom in aspect, by showing how electricity could light homes, with light bulbs that were affordable. And above all, he grasped the principle of *fail often to succeed faster*. He tried thousands of experiments on light bulb filaments, failing each time, but believing each time that every failure moved him close to the final solution.

SUMMARY AND CONCLUSION

Harvard Business School Professor has defined *disruptive innovation* as innovations that change not individual products, but entire markets. The motor car, for example, was just such an innovation. Many of the stories recounted in this chapter are of this nature.

Disruptive innovations reshuffle whole industries, when market leaders spot new technologies but scorn them because they perform poorly and are less profitable than their existing ones. They fail to understand that disruptive innovations may seem unattractive at first—in fact, they always appear unattractive—but have a very steep gradient of improvement. It is far harder to detect these steep gradients than to measure the existing faults of disruptive innovations at early stages. Businesses tend to miss them when they define their own businesses far too narrowly, as management guru Peter Drucker counseled. One way to avoid this is for innovation leaders to constantly question, "what business am I in?" When laser disks replaced *floppy disks,* for instance, companies producing the latter defined their business as floppy disk production rather than data storage. Had they broadened their vision, they would have been better able to widen the range of choices (our definition of creativity) and embrace laser disk technology much earlier. PCs were disruptive to minicomputers; cloud computing is disruptive to USB flash drives; smartphones and tablets are disruptive to PCs and laptops; and so on.

Who are the creative people who generate disruptive innovations? In their recent book, Dyer, Gregersen, and Christensen[7] insist this is not driven by heredity, by a gene. Rather, disruptive innovators have five key skills, all of which can be sharpened and learned, as we propose in this book. The five skills are: four behavioral skills (questioning, observing, networking, and experimenting) and one cognitive (thinking) skill (associational thinking—the ability to link unrelated ideas in novel ways to create value). These five skills are all *discovery skills,* useful for innovation. But innovation demands implementation. There are also *delivery skills,* used to deliver innovations to the market successfully. The authors note

that "most senior executives excel in the delivery skills, but are only above average in discovery skills" (p. 32). This is because in its early stages a company is driven by discovery. But later, as it grows and expands, it is driven by delivery. And delivery tends to crowd out discovery. This is one reason why big companies find it so hard to innovate disruptively.

Few of us excel *both* at discovery and delivery. In terms of our model, few excel both at the zoom out stage, riding the imagination elevator to the clouds and imagining a wide range of creative options, and equally at the zoom in stage, planting your feet on the ground, choosing a practical option and then delivering it on time and on budget. Dyer et al. have a very useful short questionnaire to help each of us diagnose at which skill set we excel, discovery or delivery (pp. 38–40). But most of us know intuitively at which skill set we excel. And in any case, every skill in existence can be sharpened by practice, repetition and hard work.

In this chapter, we provided narratives of disruptive innovators in a wide variety of activities: Music; Art; Business; Food; Transportation; Health; Entertainment; Space exploration; Theater; Education; Advertising; Technology; and Electronics. These innovators have greatly enriched the lives of millions of people, applying their creativity with courage and audacity to widen the range of choices in every aspect of life.

True, they are a relatively small handful of exceptional people. Imagine, then, if all of us undertook to build our creative skills—and emulate those who enriched our lives. We would quickly discover a double gain—the fruits of our creativity and the immense fun of the creative process in producing them.

NOTES

1. Cotter, Holland. (March 12, 2010). Art review: Marina Abramovic: The artist is present performance art preserved, in the flesh. *The New York Times*.
2. Ross, Emily & Holland, Angus. (2006). *100 great business ideas and the minds behind them.* Quest: Singapore, pp. 182–186.
3. Dowd, Maureen. (December 6, 2011). Silence is golden. *The New York Times*. Retrieved from http://www.nytimes.com/2011/12/07/opinion/dowd-silence-is-golden.html (accessed June 7, 2014)

4. Ibid.
5. Baldwin, Neil. (2001). *Edison: Inventing the century*. Chicago, IL: University of Chicago Press, p. 124.
6. Ibid., p. 91.
7. Dyer, Jeff, Gregersen, Hal, & Christensen, Clayton M. (2011). *The innovator's DNA: Mastering the five skills of disruptive innovators.* Boston, MA: Harvard Business School Press.

So—How in the World Do You Create?

I will try to condense all my explanations regarding zoom in/zoom out into a series of practical steps that characterize *every* creative process, the basic foundation of which is the Zi-Zo-Zi principle: Zoom in, zoom out, and then zoom in again.

THE FIRST STAGE: ZOOM IN

At this stage, you can focus on your own creativity or inventiveness. It can be either random or highly planned.

1. An Ethiopian shepherd noticed that his goats were dancing and prancing, after they ate the fruit of one of the bushes on which they grazed. He decided to find out why? The result was the discovery of coffee.
2. The secret of roasting coffee beans was discovered by an African clergyman who examined the remains of a campfire that he had lit and his attention focused on some beans that were left among the ashes. Those were coffee beans, whose taste was outstanding.
3. Chinese tea, too, was discovered by accident, by a Chinese person into whose cup of boiling water, tea leaves fell by chance. He didn't spill the water and tea leaves onto the

ground, but examined it and studied the drink's taste and its effects.

4. In 1865, Charles Goodyear accidentally spilled a mixture of natural rubber and sulfur on a hot stove. He found that the resulting product had superior qualities. This process was eventually refined to become vulcanized rubber and the foundation of a highly successful tire company.
5. In addition, many medicines and vaccinations were invented as a result of *zoom in* for interesting phenomena. Viagra was discovered, as a result of a failed attempt to develop a drug for other purposes. The scientists noted that all those treated with Viagra had strong sexual erections, enabling them to overcome impotence. They seized on this, even though it was not the original goal of their research, and developed a revolutionary and highly profitable drug.

Writers, playwrights, scriptwriters, and poets, too, derive inspiration from random events that catch their attention. It could be a story, a personal experience, or almost anything. They focus in on it, study it in great detail, and construct from it a new creation.

The key to zoom in is the curiosity to examine strange, unexpected, and different things in depth. Precisely those things we do not expect, that went wrong, those are the ones that invite us to check them out more carefully and to find in them potential for something new and different.

It can be a dish of spoiled food, or it can be wine that seems to have spoiled (this is how brandy and cognac were discovered).

It can be a broken device, which, when we examine it and try to fix it, results in a new device, much better than the broken one.

Even a quarrel with someone can end in a wonderful friendship, if the two foes take the trouble to get to know one another better.

But the zoom in phase need not always begin by chance.

In many cases, zoom in is the result of an inventor or creative person, who purposely want to innovate in some domain. Nearly every business organization employs those engaged in Research and Development, whose objective is to produce an ongoing stream of

technological, marketing and business innovations, in the organization's specific activities. Research centers employ scientists who seek new drugs to cure specific illnesses, find certain physical particles (like the mysterious Higgs boson) or find creative solutions to complex mathematical problems.

In all these cases, the creative process begins with zoom in—in-depth study of the domain of the problem and of the knowledge that has accumulated in this domain. In order to create in a manner other than by accident, the creator or inventor has to become expert in the domain, and the more he delves deeper into it, the greater is his or her ability to be creative.

Great artists, too, did not create or innovate, without impressive, deep expertise.

Picasso broke all the rules in painting, but first, he had impressive knowledge and extraordinary skill in classical painting. Without this knowledge, he would not have been able to initiate a path-breaking new approach and launch such a bold new direction in art.

Of course, even a carefully planned and organized path to a new creation compels us to be exceptionally curious. In many cases, the more experts broaden their knowledge of a particular realm, the more they gain inspiration in finding new solutions from completely different realms.

There are mathematicians who get inspiration from the world of music, and in their mathematical solutions seek the quality of esthetic beauty.

Some highly admired commercial innovations developed by business persons or researchers were inspired by in-depth study of military strategy.

In general, the more we know, the deeper and wider our knowledge, the greater the likelihood of creating something really new, even in a preplanned organized process. However, acquiring knowledge of what exists must not dampen our creative efforts to generate new options, things that do not yet exist.

To sum up—in the initial zoom-in phase, the key is curiosity, careful in-depth observation, and the detailed study of the phenomenon that interests us.

It is highly desirable not to leap to premature conclusions at this stage and to avoid excessive haste and enthusiasm, in dashing to

apply for a patent or build a factory … this is only the first stage of a full multistage creative process.

THE SECOND STAGE: ZOOM OUT

The moment we discover something interesting, either by chance or by intention, the second stage begins, the stage of widening our options.

In the zoom-out stage, we have the opportunity to use our imaginations, in trying to imagine as many alternatives or choices as possible, as many uses of the random effect we observed, or the purposeful innovation we intentionally discovered.

The most effective tool in this phase is the sketch. The more sketches you produce, the more likely you will attain in the end a wonderful invention or creation.

A sketch is a quick drawing, on paper, of a basic idea.

As we know, paper accepts absolutely anything… this is a wonderful characteristic of the sketch, that allows us to draw everything without any technical, economic, social or legal obstacles.

You can label a sketch with the words: "We will destroy enemy submarines by bringing the Atlantic Ocean to a boil."

True, the method for boiling the Atlantic Ocean is unclear, but maybe, someone will get another idea from this one… in any event, it is worth including this wild option in the collection of sketches on the wall, even if it seems at the moment that this sketch will quickly find its way into the waste basket.

The zoom-out process, embarking with our imaginations on journeys to distant places, in order to find ways to do things well beyond what is done today, is highly enjoyable—on one condition. The condition is: Everything is possible, there are no constraints, no criticisms, no self-criticism and no nay-saying from others.

Criticism kills every effort to innovate.

The phrases, "but it's not practical," "but it's idiotic!," "but it won't work," "but it isn't commercially feasible," "but it's not legal," "but nobody does it like that," "but it's ridiculous," "but you can't be serious," "but somebody must have done it already," …these are all bullets fired from a rifle that shoots down any innovation before it is born.

Often, brainstorming aimed at encouraging new ideas is problematic, because many people participating are afraid to appear silly or stupid by raising stupid ideas. This is especially problematic in brainstorming sessions held under the watchful eyes of the boss.

But even when the boss isn't around, there are many people who are very demanding of themselves. The great advantage of zoom out as a stage in the creative process is that it offers *complete freedom,* because we know for sure that we will in the end reach the third stage, zoom in, where all ideas will be examined carefully and realistically, so nothing disastrous will happen if somebody suggests that we boil the ocean. The more ideas we have, the more sketches that are stuck up on the wall, the more new ideas are encouraged, and in the end the more likely it is that one of these ideas will in the end be chosen.

I remember fondly an exhibition I saw in London of Picasso's sketch books. Picasso ostensibly took canvas and impulsively painted on it what was initially described as scribbling. It turns out that Picasso worked very hard on every work of art and prepared himself by doing a large number of sketches before he decided which of them is the perfect *scribble*. His sketches were impulsive, liberating, and from them he chose the best and painted the final work of art with great care.

Writers, poets, playwrights, screenwriters, composers do short sketches of their creations before they decide on the final version, and so do engineers and scientists.

Liberating ourselves from constraints to generate a range of solutions will bring, in the end, without our conscious knowledge, a solution that emerges as the winning choice; the more of them, the better.

The worst mistake is to fall in love with one of the solutions, in the zoom-out stage, without allowing a much better solution to emerge, seemingly from nowhere. Do not fall in love with your ideas too quickly.

To sum up this phase: Prepare as many sketches as you can of innovative solutions, alone or in a group, but without any criticism or constraints whatsoever. Do *not* judge them at this stage, and wait patiently for the third and final phase.

STAGE THREE: ZOOM IN AGAIN

At this stage, you gaze admiringly at the wall covered with pages or notes, each of which contains a sketch or short description of an idea. Which of them is best?

Now we come to the critical stage that evaluates the potential feasibility of each idea.

An interesting phenomenon is that the people who come up with ideas have great difficulty in judging them. Who can answer the question, which of your children do you love most? The answer is, in general, all of them, each one in their own way. This applies to the ideas to which we give birth, too.

Experience teaches that in contrast with the zoom-out stage, in the third stage we really do need critical persons who will try to attack the various solutions.

This is where we need those who ask, how exactly do you intend to bring the Atlantic Ocean to a boil? And it is good that they ask this.

Those who came up with the original idea are liable to feel insulted or humiliated, but the arrows of criticism actually are good for you. They will keep you from failing, in adventures that can end in painful disasters.

Large organizations have learned to separate those who create original ideas and the managers who decide on their implementation.

Many failures of entrepreneurs stem from the fact that entrepreneurs are both the creators of ideas and those who write the checks. It is highly desirable to avoid this.

At this stage, we begin to remove sketches from the wall and toss them in the waste basket. At the end of this cruel process the creative idea that has survived all the critical slings and arrows emerges, and its chances of success are very good.

Even if you are not part of a large organization and are simply ideating for your own enjoyment, it is still highly recommended to invite others to comment and to request their opinions, just like the chef who offers others a spoonful of soup to hear what their palate says about it.

To sum up this phase: This is the time to focus on every idea and to critique it from every possible angle. It is highly recommended,

though very difficult to do, to leave this tortuous yet essential phase to others.

The final result is evolution, technological, artistic, or commercial progress. As in Nature, progress occurs through creation of many new mutations and the cruel survival of the fittest, which through natural selection leaves only the best of them to endure.

Recently, we discovered that our three-phase zoom in/zoom out/zoom in model is actually confirmed by brain research. In this research, a device known as functional MRI (magnetic resonance imaging) is used to map the areas of the brain that are activated when people do various tasks. Scientists have now used this device to better understand the neuroscience of creativity.

According to this very recent work, three different brain networks are used in creativity.

1. The first is *the executive attention network.* This network is recruited when "a task requires that the spotlight of attention is focused like a laser beam…[and] is active when you're … engaging in complex problem solving." This is our *zoom in*.
2. The second is *the imagination network,* used when "imagining alternative perspectives and scenarios to the present." This is our *zoom out*.
3. The third is *the salience network.* It "monitors both the external events and the internal stream of consciousness and flexibly passes the baton to whatever information is most salient to solving the task at hand …," i.e., it takes the *zoom out* imagination elevator harvest of ideas and with zoom in, chooses the best one, based on what we know and have learned. This is our *zoom in*.

Neuroscience shows that different parts of the brain are activated, "at different stages of the creative process."[1]

NOTE

1. Kaufman, Scott Barry. (2013). The real science of creativity. Retrieved from http://blogs.scientificamerican.com/beautiful-minds/2013/08/19/Kaufman's Scientific American blog, in turn, is based on: Vartanian, Oshin, Bristol, Adam S., & Kaufman, James C. (eds). (2013). *Neuroscience of creativity.* Cambridge, MA: MIT Press.

Build Your Creativity Muscles

10 + 1 Exercises for Heavy-Lifting Change-the-World Innovators

For 400 years … mainstream medicine and science believed that brain anatomy was fixed. The common wisdom was that after childhood the brain changed only when it began the long process of decline … nor could the brain ever alter its structure and find a new way to function. The [modern] idea that the brain can change its own structure and function through thought and activity is … [a revolution]…. A band of brilliant scientists, at the frontiers of brain science, in the late 1960s or early 1970s made a series of unexpected discoveries. *They showed that the brain changed its very structure with each different activity it performed, perfecting its circuits so it was better suited to the task at hand.* They began to call this fundamental brain property "neuroplasticity"…. They showed that thinking, learning and acting can turn our genes on or off, thus shaping our brain anatomy and our behavior…. [But] neuroplasticity isn't all good news. Once a particular plastic change occurs in the brain and becomes well established, it can prevent other changes from occurring.[1]

This chapter comprises 10 exercises, plus one, that can help your brain become more creative. It is based on the simple idea, based on neuroscience, that like a muscle, the brain becomes stronger the more we exercise it.

ACT, DON'T JUST GRIPE

Background

How often do we complain about things—and just move on. What a waste. Creativity requires us to train our brains to think about positive constructive actions to solve a problem, instead of simply complaining or griping about the problem and leaving it at that. How different the world would be, if fewer people complained and more people acted on their complaints.

First Exercise: The Brain Goal

Train it to think about new positive constructive actions to solve a problem, instead of simply complaining or griping about the problem and being satisfied with that. Seize the opportunity to think about new ideas, rather than be satisfied with finding old familiar solutions.

Open a folder in your PC, tablet, notebook or smartphone, titled: Annoying Things I Will Change.

List, when they happen, processes, incidents, and observations that annoy you—that cause needless inconvenience, worry, waste of time, pain, or disruption.

Use your creativity muscles to enter the Imagination Elevator, which takes you up to zoom in, and then back down to zoom out, to find a practical way to solve the problem, so that in future there will be no need for you (and for others) to complain. Think about the simplest, most direct, most pragmatic approach, to get quick results.

Review the folder from time.

Each time you have a gripe, do this. You don't have to implement every single one. But you can tell others about your solutions and wherever possible, you should try to implement a gripe-solver.

The measure of success: *Have you replaced the habit of idle griping with the habit of taking effective action—at least some of the time?*

Zi-Zo-Zi: First, zoom in on the thing that makes you angry or annoyed. Why does it anger you? What precisely makes you annoyed? Now, zoom out. What in this wide world could eliminate

the source of your annoyance? Where are things done properly? How? Now, zoom in again—what can you bring from *zoom out* that can permanently make you feel happy rather than angry? What do you need to do to make this happen? Who can help?

Read this story to gain inspiration for your Act, Don't Gripe exercises.

Make Meaning: When Tragedy becomes Triumph

On February 6, 2010, tragedy struck a family from central Israel, hiking in the snow in the Golan Heights. The snow obscured signs warning of land mines. As a result, one of the three children in the family stepped on a mine. "We threw snowballs and played around for five minutes," 11-year-old Daniel Yuval said. "Then I remember taking a step forward and I heard the explosion. For a few minutes I don't remember much. My father picked me up." Daniel's leg had been severed by a landmine. It emerges that there are some 260,000 more landmines in the area.

Daniel is a tough, brave kid. Within a month he walked his first steps. He allowed his dressings to be changed, painfully, without painkiller. And he quickly made up the time he lost in school. After his leg was blown off, he asked his father Guy (who was carefully retracing his steps with Daniel in his arms, to avoid other mines) to stop and re-attach his lost leg.

Daniel did not wallow in his own personal disaster. He rose above it, let his imagination soar, zoomed far out and grasped the immensity of the problem of unexploded mines for the entire nation of Israel and the world as a whole. He decided to act, to prevent another disaster like his own. For this, he zoomed in, came down to ground level, literally, and built an action plan for himself.

He wrote a letter to all 120 members of Israel's Parliament, and launched a high-profile campaign to clean up land mines. He spoke to Parliament, to the Foreign Affairs and Defense Committee. A bill is now being promoted, costing $89.4 million, to clean up the land mines.

According to anti-mine campaigner Jerry White, founder of the anti-landmine organization survivor corps (White himself lost his

leg while hiking in the Golan), "Daniel Yuval is the tipping point where Israelis woke up."

If an 11-year-old can overcome losing his leg, and find meaning in the incident, to work to keep others from the same fate, surely the rest of us can find meaning in far less painful circumstances.

"When I awoke from the surgery at the hospital and saw my amputated right leg," he wrote in his letter to Israel's Knesset members, "I told my mum that I wanted no one else to ever be hurt by a landmine, and that I meant to do something about that." And he did.[2]

Transforming adversity and depression into meaning is often simply about creative thinking and then acting on it, rather than complaining. Daniel Yuval did. We can all learn from him. And Daniel? He follows artificial limb technology closely and still dreams of playing football, his main passion.

BREAK THE RULES ... *INTELLIGENTLY*

Background

All of our lives are driven by rules. We learn rules from an early age, when our parents and siblings and schools socialize us, meaning, teach us the rules of society, what society expects of us.

Innovation is breaking the rules. So creativity requires us to shift our mindsets, from *how to follow the rules* to *how to break them*. With two qualifying clauses: First, break the rules *intelligently* (and of course within the law). Simply breaking the rules causes chaos and is unlikely to create value. Break rules that hurt rather than help. And there are a great many. The hardest part: *Identifying what the rules are*, because most are unwritten and are simply assumed, accepted, by all.

Second, you have to learn the rules first in order to break them intelligently. So in this brain exercise, you are asked to invest time to *find out* what the assumptions are, written and unwritten; this will take major patience, time, and effort, more than you might think. You need to find real experts, who have tacit knowledge (unwritten knowledge), because much of the knowledge you will need is simply not written down.

Second Exercise: Open a Folder Titled *Rules to Break* (Intelligently)

Identify a realm, domain, or industry, that you are passionate about and want to innovate. Identify the written and unwritten rules. How are things done? How are they *always* done—because, well, that is how things are done.

Find a rule, or assumption, that if changed can generate added value for those in the industry. For example, a common rule of business is that you have to charge a non-zero price for your product. Netscape gave away its browser, and built a powerful business around that rule-breaker.

Enter your game-changing rule change in your folder.

Use Peter Drucker's framework to help you practice this process efficiently.

Zoom in, to discover all the written and unwritten rules about how things are done. Zoom out, to discover places and people, where things are done differently. Use the Imagination Elevator to take you to the floor where the rules are broken. Visit this floor and imagine all the ways things can be done differently. Now, zoom in, after you're collected a number of break-the-rules ideas in your backpack and taken the Elevator down to the ground floor of imagination.

How can you reinvent an entire industry?

Begin by using Peter Drucker's framework for analyzing hidden assumptions. Then read the story about the Beatles to gain inspiration for your Break the Rules exercises.

Theory of Business (Peter Drucker)

Peter Drucker:

> The root cause of [business crises] is not that things are being done poorly … but because the assumptions on which the organization has been built and is being run no longer fit reality. Every organization has a theory of business—assumptions about markets, values, behavior, competitors, technology, company strengths and weaknesses.[3]

1. Assumptions about the business environment:
    a. What are our assumptions about society and social forces and how they are changing?
    b. What are our assumptions about our markets, our customers, their values and behaviors? How well do we understand them? How will these changes impact our business?
    c. Who are our competitors—present and future? How do we identify them? How well do we know them?
    d. What are our assumptions about key technologies? Do we identify disruptive technologies?
    e. What does our company do that creates value? What is unique?
    f. Which of these assumptions is crucial for our current business strategy?
2. Assumptions about the specific business mission:
    a. How does our organization make a difference in the economy and society at large?
    b. How do we measure success?
    c. What drives behavior in the organization?
    d. What does the organization believe is its mission?
    e. Which of these assumptions is crucial for our current business strategy?
3. Assumptions about core competencies needed to accomplish the mission:
    a. What are our assumptions about the core competencies needed to achieve our mission?
    b. What must we excel at, in order to succeed and achieve or maintain market leadership?
    c. What are our assumptions about our organizations' key strengths and weaknesses?
    d. Which of these assumptions is crucial for our current business strategy?
4. Testing the Theory of Business:
    a. Do our assumptions fit reality, regarding the business environment, mission, and core competencies? Why, or why not? How do we test these assumptions regularly?

b. Which of the assumptions are doubtful, and how will this affect our current business strategy?
c. Should our business strategy be altered, in light of our re-examination of our theory of business?
d. Are the assumptions in the three key areas properly aligned (internally consistent)?
e. Do we constantly challenge every product, service, policy, distribution channel, routine, process and system?
f. If we were not in our current lines of business—what would we do differently, what areas would we enter?

Sergeant Pepper's Lonely Hearts Band

Some 46 years ago, the Beatles released their album, Sergeant Pepper's Lonely Hearts Club Band, on June 1, 1967. Apart from the wonderful songs (see the list below), this path-breaki ng album contains at least seven lessons for creativity workouts. Here they are:

Beatles

1. Creativity is the key response, perhaps the only response, to waning popularity—in the face of the nearly irresistible tendency to do more of the same. In 1967 Beatlemania was waning. The Beatles had stopped touring and it seems that they were burned out. A Beatle statement that "we are bigger than Jesus" got them expelled from Philippines. The Beatles went into the recording studio for five months—a remarkably long time, then, for one album—and emerged with Sergeant Pepper. It took huge risks—and was rocket fuel for renewal of their popularity.

2. Technology is a key source of innovation. There were several new technologies in Sergeant Pepper, including the new Dolby noise reduction, automatic double tracking (invented especially for the Beatles), vari-speeding, and a novel method for pressing LPs. The Beatles were not afraid to use every possible one.
3. But the technology was driven by product and process innovation. The Beatles innovated in the music, instruments, arrangements and even words. They used a sitar (George Harrison), and a miniature trumpet player from a London symphony orchestra, and also a harpsichord, as well as producer George Martin's harmonium. Martin was a key innovator—he had a background as a classical musician.
4. Innovate everywhere and everything. Everything about Sergeant Pepper is novel—even the cover. The cover shows the word *Beatles* written in flowers, in a flower bed, and behind that, the Beatles dressed as if they were a real Lonely Hearts Band, with a crowd of famous people behind them (Oscar Wilde, Marlene Dietrich, Karl Marx, Marlon Brando, etc.). The album was meant to be heard as a whole, not as individual songs, as one of the first *concept* albums. The lyrics to a John Lennon song came nearly word for word from an old circus poster Lennon once bought. Like the DC-3, which was a portfolio of innovations, Sergeant Pepper combined many breakthrough ideas. The Beatles were fearless, unafraid of being mocked or of failing.
5. Creativity is best when its implementation is at its best. Dell Computer Co. founder Michael Dell once said, "Ideas are a commodity, execution of them is not." Beatles hired only top-flight session musicians (musicians hired just for the recording), and the five months they invested reflects their perfectionism. That works out to 150 days for a dozen songs, or nearly two weeks per song (see below: Sergeant Pepper tracks).
6. True creativity finds commercial success—not always, but often. Sergeant Pepper was the #1 album in 1968 for 23 straight weeks. The CD, re-released in June 1987, was #3

and then again, in 1992, on its 25th anniversary, re-charted at #6.

7. Finally, creativity is often about teamwork. All the songs were written by John Lennon and Paul McCartney. While each has written great songs on his own, the songs they wrote together are unparalleled for their novelty, creativity and appeal. Lennon and McCartney were utterly different in personality, lifestyle and values. That diversity perhaps strengthened their powerful collaboration.

Sergeant Pepper Tracks

1. Sergeant Pepper's Lonely Hearts Club Band
2. With A Little Help From My Friends
3. Lucy In The Sky With Diamonds
4. Getting Better
5. Fixing A Hole
6. She's Leaving Home
7. Being For The Benefit Of Mr. Kite
8. Within You, Without You
9. When I'm Sixty Four
10. Lovely Rita
11. Good Morning
12. Sergeant Pepper's Lonely Hearts Club Band (Reprise)
13. A Day In The Life

CHANGE YOUR HABITS

Background

This brain exercise will liberate you from the prison of your habits. Warren Buffett once said, "The chains of habit are too light to be felt until they become too heavy to be broken."[4] We are all prisoners of habit.

Habit is essentially being permanently in a state of *zoom in*, a state in which for every choice, every decision, there is only one single choice—the one we have always made in the past. In this state of frozen habit, the possibility to rise out of the zoom-in state and try

something different never occurs to us. Even worse is the fact that many people glorify the permanent frozen state of zoom-in habit as an expression of consistency and permanence, without realizing that in fact it is mental stagnation.

Habit is useful; If we had to make new decisions all the time about everything, our brains would be exhausted. But habits are the sworn enemies of innovation. Because if we become habituated to doing the same thing all the time, every time, then this bad habit will be transmitted to activities that require doing something different, radically different, to innovate. So we need to practice breaking habits, and habituating our brains to things that are unfamiliar, to the point where we begin to enjoy the unfamiliar, the strange, rather than recoil from them.

Third Exercise: Open a Folder Labeled *Change My Habits*

Now: Act to break the chains of habit. Zoom in on what you normally eat, wear, buy, listen to, say. Change what you do, on a daily basis, one item at a time. Zoom out, to learn about new options in everything you do.

1. Food: Eat different things than you normally do, in your *habit* mode.
2. Clothing: Dress differently.
3. Music: Listen to different music. Love pop? Try opera for a whole week.
4. Transportation: Go to work differently, by different routes and different modes.
5. Reading: Like mystery novels? Try reading philosophy or history.
6. Friends: Have lots of good old friends? Make some new ones. Call up friends you haven't talked to in years.
7. Work: Do what you always do, in different ways. Try to eliminate some of the unnecessary things you do. Try taking on new responsibilities. And put forward new ideas.

Now, zoom-in again. List the habits you have changed. Introspect about how you feel. Is it liberating, or just annoying? Does the habit-breaking travel to your creative endeavors? Does your willingness to embrace new things, instead of living on auto-pilot and choosing by habit what you always chose, help you create new options and feel comfortable with them?

Now, read this story about successful habit-smashing about Apple founders Steve Wosniak and Steve Jobs.

Fight Groupthink: Demand Space and Time—or Chats

The Case of Steve Wozniak

Writing in the *The New York Times*, Susan Cain observes that "Research strongly suggests that people are more creative when they enjoy privacy and freedom from interruption." This is less than amazing. But she does have a serious point: "…the most spectacularly creative people in many fields are often introverted, according to studies by the psychologists Mihaly Csikszentmihalyi and Gregory Feist. They're extroverted enough to exchange and advance ideas, but see themselves as independent and individualistic. They're not joiners by nature."[5]

For innovators, this can be a huge problem, especially within large organizations. Much R&D is done in teams, with hierarchical organizations. Truly creative people, especially introverted ones, often don't function well in such environments.

But as with all issues related to creativity, there are no hard and fast rules. Cain herself gives Jobs partner Steve Wozniak some well-deserved credit:

> Before Mr. Wozniak started Apple, he designed calculators at Hewlett-Packard, a job he loved partly because HP made it easy to chat with his colleagues. Every day at 10 a.m. and 2 p.m., management wheeled in doughnuts and coffee, and people could socialize and swap ideas. What distinguished these interactions was how low-key they were. For Mr. Wozniak, collaboration meant the ability to share a doughnut and a brainwave with his laid-back, poorly dressed colleagues—who minded not a whit when he disappeared into his cubicle to get the real work done.[6]

Steve Jobs was a loner. Steve Wozniak was a collaborator and socializer. Both were exceedingly creative.

The message here is: Innovator, who are you really? Need solitude? Create it. Need socializing? Find it. Find your own unique creative style, and create your environment to optimize it. While doing so, though, see if you can become more extroverted, if an introvert, or the opposite; can you yourself become Jobs + Wozniak?

Steve Jobs 1955—2011: Two Observations

Everything that could be said, almost, *has* been said about the late Steve Jobs. Here are two brief comments about what we can learn from his life and from his work.

1. *You do not have to be born with a silver spoon in your mouth; you can be born without any spoons, in fact, and change the world.*

   Jobs' biological parents were Abdulfattah John Jandali, a Syrian Muslim immigrant to the United States, and Joanne Schieble (later Simpson), an American graduate student of Swiss and German ancestry. Jandali says he did not want to put Jobs up for adoption, but Simpson's family did not approve of their daughter's marriage. Jobs was adopted by Paul and Clara Jobs, of Mountain View, CA, who raised him. Jobs chose not to have contact with his biological father, but later did have a close relationship with his biological sister, Mona Simpson.
2. *If Steve Jobs and Steve Wozniak can bootstrap Apple, with $1,300, and reach $200 million in sales within three years—entrepreneur, so can you!*

   Jobs and Wozniak founded Apple in 1976. It was named Apple, because Jobs had an especially happy summer picking apples. Jobs sold his Microbus and Wozniak sold his calculator, to raise the cash they needed. They bootstrapped Apple and generated cash flow by selling circuit boards, while building the prototype of their personal computer. In their first year, 1977, they had $2.7 million in sales. In their third year, $200 million!

Jobs broke all the fixed habits of the computer industry, in that he did not focus on technology but rather on the user experience. He wants his customers to get not only great computer performance, but rather, mainly enjoyment. In his Imagination Elevator, he saw beautifully designed products, pleasant to use, products which when used created a sensual experience in all aspects. He decided he would bring only such products to the marketplace and conveyed his vision to the designers and engineers who worked for him.

He designed products that were innovative not in technology, but in design. They were cool. And people bought them, because to have them, and to show others you had them, was to prove you were cool. Jobs understood the *why* of cool products (why buy them?) was crucial, not so much that *what* I believe that his working-class background and adopted background gave him an insight into what ordinary people sought. As an outsider, rather than a member of the elite, he made his own rules—and broke many of the accepted ones regarding innovation.

Here are the seven innovation secrets of Steve Jobs, as framed by Carmine Gallo, a consultant who has specialized in a close study of Steve Jobs and what innovators can learn from this remarkable man. His latest book is *The Innovation Secrets of Steve Jobs*[7]. Here are the seven things we can learn from Steve Jobs, excerpted from Gallo's book. (My own comments are in italics.)

Principle One: Do what you love. Steve Jobs once told a group of employees, "People with passion can change the world for the better." Jobs has followed his heart his entire life and that passion, he says, has made all the difference. It's very difficult to come up with new, creative, and novel ideas unless you are passionate about moving society forward. *This has become a cliché, but I meet people daily who continue to violate it.*

Principle Two: Put a dent in the universe. Passion fuels the rocket, but vision directs the rocket to its ultimate destination. In 1976, when Jobs and Steve Wozniak co-founded Apple, Jobs' vision was to put a computer in the hands of everyday people. *Many of us aim far too low. Aim so high you need an oxygen mask. The act of aiming high will itself create a powerful dynamic that helps you.*

Principle Three: Kickstart your brain. Steve Jobs once said "Creativity is connecting things." Connecting things means seeking inspiration from other industries. *It's amazing how you can import ideas from other industries, when other people fail to do so. Henry Ford imported the idea of an assembly line from a Chicago meat packing plant! In this principle, Steve Jobs principally refers to zoom out, widening the sweep of your vision to include other possibilities adopted in other industries but not your own.*

Principle Four: Sell dreams, not products. To Steve Jobs, people who buy Apple products are not *consumers*. They are people with hopes, dreams and ambitions. *In other words: We buy, because we like why Apple does things, not just what it does.*

Principle Five: Say no to 1,000 things. Steve Jobs once said, "I'm as proud of what we don't do as I am of what we do." He is committed to building products with simple, uncluttered design. And that commitment extends beyond products. From the design of the iPod to the iPad, from the packaging of Apple's products, to the functionality of the Web site, in Apple's world, innovation means eliminating the unnecessary so that the necessary may speak. *Innovate by subtracting, not by adding. Simplify, simplify! Apply this to your life, too! What can you stop doing, or not do, that will make your life better?*

Principle Six: Create insanely great experiences. The Apple store has become the world's best retailer by introducing simple innovations any business can adopt to create deeper, more emotional connections with their customers. *There are no cashiers in the Apple store! Create not a store, not a business, not a product—create a customer experience!!*

In this principle, Steve Jobs refers mainly to *zoom in*, to the need to filter an infinite number of new ideas with great care, in order to choose the single winning idea, to be implemented with enormous passion and enthusiasm.

Principle Seven: Master the message. Steve Jobs was the world's greatest corporate storyteller, turning product launches into an art form. You can have the most innovative idea in the world, but if you can't get people excited about it, it doesn't matter. Start your business with a powerful mantra, three or four words. Disney: *We make people happy!* The mantra is not for your customers, it is for

you and your fellow workers. If you work at Apple, and you learn *think different,* how likely is it you will come up with a dull conventional design?

DEVELOP RESILIENCE

Background

I once surveyed a group of chip designers, highly creative people. I gave them a long list of key success factors for innovation and creativity and asked them to rank them. The surprise winner was: Resilience, followed by Stubborn Persistence, in a close second. These engineers had learned, from experience, that innovation is ridden with failures and flops. If you cannot bounce back from crushing defeats, you will never persist long enough to attain triumphant success.

Every obstacle in your path is actually an opportunity to deepen your understanding and improve your next move, on the way to achieving your goal. Failure is much like the moment when your GPS identifies a dead end. It stops, does *zoom out*, corrects your route, and then moves you onward to your destination.

This brain exercise seeks to help you train your brain to be resilient—to be, like Molly Brown, Unsinkable.

Fourth Exercise: Open a Folder Titled *Helpful Failures*

A group of Jewish *Hasidim* (an ultra-religious sect), known as Breslav, has a saying: All is for the best. A famous poster says: Fail Harder. The innovative design firm IDEO counsels, "Fail often to succeed faster."

Zoom in. List the major failures in your life. Can you identify elements of these failures that contributed later to your later success? Were they for the best? For instance many cancer survivors express gratitude to the terrible illness, because it spurred them to do things they would not otherwise have tried. Can you use this new-found attitude toward failure, in your brain, to change the way

you deal with defeat, failure, and frustration? Now, zoom out. How can you use your failures to leverage your success? What have you learned? What doors did your failures open, that would otherwise not have existed?

Now zoom in. What is your innate response to failure? Do you embrace it, welcome it, celebrate it, treat it as a necessary outcome of boldly taking risks and creating new options, some of which necessarily fail? Do you have inner resilience and strength to overcome failure and to persist?

Now read this story about triumph through adversity.

You're Fired!

Steve Jobs founded Apple in 1976, together with Steve Wozniak. By the mid-1980s, when Jobs turned 30, Apple was a $2 billion company.

In May 1985, Jobs was fired from Apple by the company's CEO (whom Jobs had hired), John Sculley. In his famous speech to Stanford's graduating class in 2005, Jobs asked,

> How can you get fired from a company you started? Our [Sculley's and Job's] visions of the future began to diverge. Our board of directors sided with him. So at 30, I am out. What had been the focus of my entire adult life was gone, and it was devastating. I felt that I had let the previous generation of entrepreneurs down…. Sometimes life hits you in the head with a brick.[8]

In an especially bitter humiliation, 500 leading Silicon Valley entrepreneurs were invited to a dinner with President Ronald Reagan—and Jobs was not.

Some 12 years later, Jobs was called back to Apple, to become its CEO, when Apple was *in free fall* and failing. The result was iPod, iTunes, iPad, iPhone, and other innovations. At one point, in 2012, the market value of Apple common stock was the largest of any public company in the world, exceeding even that of Exxon Mobile.

Jobs says, "I'm pretty sure none of this would have happened if I hadn't been fired from Apple…. It was awful-tasting medicine, but I guess the patient needed it."[9] The new improved Steve Jobs was more relaxed, more open to other people's ideas, able to surround himself

with excellent executives, able to hold on to them, and most of all, good at reintroducing fun and excitement to Apple.

One of the lessons Jobs learned, during his 12 year exile from Apple, was that of creating clean simple friendly easy-to-use products. Jobs observes: "Simple can be harder than complex: You have to work hard to get your thinking clean to make it simple. But it's worth it in the end because once you get there, you can move mountains."[10] Apple's iPod had a famous one-button design—a wheel that did everything. Originally implemented for cost reduction, the one-button innovation was highly popular because of its simplicity. Jobs discovered how to inspire his designers to create beautiful simply products, even though exceptionally brilliant people tend to seek complexity (perhaps because for them it is easy to handle). The geniuses who create breakthrough products often make them highly complex, because for them that complexity is simple; but for ordinary people, the complexity is baffling. Jobs figured out how to crack this problem. The result led to incredible success for Apple.

EXPLORE DARK CORNERS AND EXPERIMENT

Background

Innovation is not solely about creating new products or gadgets. It is about creating value by employing creative approaches to everything. Innovation applies everywhere, all the time, every place. When you use your creativity in dark corners (places where nobody thinks innovation is possible or desirable), great things happen. This brain exercise helps you explore dark corners, innovating in places where no-one thinks innovation can happen. Experiment—try things, see how they work, fine tune them, and get your brain used to doing this daily. Actively seek to be creative in areas where no one bothers.

Fifth Exercise: Open a Folder Titled *Dark Corners*

Identify a realm that is so humdrum, so ordinary, so predictable, that no one even thinks of doing it differently. Zoom in on it. Learn it well.

Now, find a way to innovate. Zoom out. Try to design an experiment (like Stew Leonard's Dairy, see below), or try to think of a nostalgia product, e.g., a phonograph player, that you could successfully revive.

Can you become a powerful innovator, simply by seeking to experiment in dark corners?

Finally, zoom in. Bring the results of *zoom out* back to the humdrum realm. How can you transform it from ordinary to extraordinary?

Now, read this story about those who have done it successfully.

That's How the Chocolate Chip Cookie Crumbles: How Ruth Wakefield's Experiment Changed the World

One of the most interesting inventions is without doubt the chocolate chip cookie. Ever wonder where they came from? From an accident—like so many good things in this world. An American woman named Ruth Wakefield opened a roadside lodge, in 1930, in an old tollhouse in Whitman, Massachusetts, on the highway between Boston and New Bedford. They served delicious Butter Drop Do cookies to their guests. But one morning, Ruth went into the kitchen to make the butter cookies—and discovered she was out of baker's chocolate!

What to do?

Improvize. She found a bar of semi-sweet chocolate in the pantry and decided to use that instead. But to her surprise, the chopped-up chocolate chunks retained their original shape instead of melting into the batter, creating the famous soft and chewy Toll House Cookie.

According to Haaretz, an Israeli daily newspaper, "the name of the game [for chocolate chip cookies] is freshness and good chocolate. Quality chocolate with at least 50 per cent cocoa will balance out the dough's sweetness and give the cookie its character…Refrain as much as possible from overworking the dough."[11]

Chocolate chip cookies are a huge industry today. In the United States alone, private label chocolate chip cookies generated revenues of $643 million in 2011. The leading name brand, Nabisco's Chips Ahoy, had revenues of $321.6 million. Ruth Wakefield, if she were alive today, would be astonished by what her cookie improvization has created.

FOCUS

Background

My MBA students submit ideas for innovative products and services, and build a business plan around them. Very often, I find that these ideas are truly wonderful, but lack focus. When you start a business, or when you implement an idea, you need the *minimum viable product* that will get to market and generate cash. For this, you need to focus on very simple ideas, simple to implement, to produce, to market, to distribute. This brain exercise aims at sharpening your focus. You may have a sweeping vision to change the world. But to make it happen, start small, keep focused, and grow the business after initial success. Build a sense of urgency, to get your product to market fast, and strip down your idea to the bare minimum necessary for this. This laser-sharp focus is something your brain can learn—and practice daily.

Sixth Exercise: Open a Folder Titled *Focus*

Now, take one of your favorite existing products or services. Zoom in. Simplify it. Remove some of its features. Focus it. Can you make it even more rewarding, pleasurable, satisfying, by taking stuff away from it rather than adding things to it, as innovators normally do? Can you define clearly the core value of the product, and then redesign it to focus clearly ONLY on that core value?

Zoom out. Take the stripped-down product or service. Who needs it? Who will like it? How will it be used? How will it be marketed?

Try this, too, for an idea you have had for a product or service. Zoom in. Strip it down to its minimum core, the minimum viable product (MVP). Can you achieve creative success by training your brain to generate MVP's? Zoom out with your MVP. Can you validate it?

Enter in your folder ideas for simplifying and for focusing existing products and services—both your own and those of others.

Now read this story.

What Innovators Learned from Rafael Nadal at Wimbledon

What *The New York Times* called "one of the greatest tennis matches ever played" between Rafael Nadal and Roger Federer ended with Nadal winning a five-hour match (in near darkness) 6-4, 6-4, 6-7 (5), 6-7 (8), 9-7.[12] It was the longest singles final in Wimbledon history, and perhaps the best. Nadal took the first two sets. Federer fought back doggedly to win the next two, in tie-breakers. The fifth and deciding set was tied 6-6. Normally there would be another tie-breaker. But not at Wimbledon, where strict rules prevail (players without exception must wear all-white clothing, for instance). There, the final set is played out, even in doubles, until one of the players leads by two sets—even if it means playing to 17-15.

What can innovators learn from this amazing final—apart from courage, stamina, persistence, will to win, character and fierce determination, shown by both players? On Israel's Channel 55, the commentary (in Hebrew) was awful. Both commentators kept saying, "lo ye-amen" (unbelievable) or simply Wow! But one commentator did note a key fact.

"Nadal's advantage was not only his physical athletic ability," he said. "He has mental strength. He does not think about the past. He does not think about the future. He is totally focused in the point he is playing NOW. This is a huge advantage."

For instance, the umpire chastised Nadal for taking too long with his service. This might have rattled many players. But Nadal remained totally focused. He had a game strategy, he stuck to it, and did not change it even when he lost two sets. He was completely immersed in the present.

In his best-selling book *The Power of Now* Eckhart Tolle notes, "most people are always trying to escape from the present moment and are seeing some kind of salvation in the future."[13]

This is true of innovators. They are fueled by dreams of some outstandingly successful future. This of course is important; an energizing vision is crucial. But it is far more important, after the vision is established, to shelve it and focus intensely on the present—on what is required at the present moment in order to implement the

future vision. Forget past failures. Forget future dreams. Focus on the practical things you need to do today, now, to succeed.

That is what Nadal did. And because he did it so well, it helped him fulfill his childhood dream—playing at Wimbledon, and ultimately, winning at Wimbledon.

GROW YOUR PERSISTENCE

Background

In the world of startups, innovation, and creativity, there are a great many stories of businesses that were on the brink of bankruptcy, closure, failure—and hung on for just a few more days, to reach ultimate success. The brain can learn to be persistent. This persistence is crucial, because there will be many occasions when innovators will think it is hopeless and decide to give up. This brain exercise seeks to train your brain to be persistent, to be stubborn—and ultimately, since the world is not built to withstand constant pressure, you will ultimately prevail.

Seventh Exercise: Open a Folder Titled *Persistence*

Now, practice persistence. Zoom in. Take a shoelace and tie a knot as tightly as you can. Now open the knot. Persist until you succeed. Do it again. Notice how, as you keep trying, little by little, imperceptibly, the knot begins to loosen. Notice how, if you believe you can open the knot, in fact you can. In your folder, list your progress in becoming more stubborn and persistent. List episodes where you persist ... and triumph. Reward yourself for these.

Now, zoom out. In your daily life, practice persisting in things that often you give up on. Train your brain to make persistence a habit. But keep in mind that blind stubbornness, in the face of impossibility, is not persistence, it is simply dumb. Make sure you practice discerning between creative persistence and blind stubbornness. (Knowing when to shut down a startup is very important; in my experience, startups are generally closed too soon, rather than too late.)

Zoom in again. Apply your newfound persistence to a challenging task. Do you succeed, where once you might have given up?

Now—read this story about persistence.

The Fuel of Persistence

Leadership educator John C. Maxwell writes a blog, Leadership Wired, which includes this amazing story about young Philippe Petit. It was sent to me by a young woman who heard my talk on Creativity + Character = Change the World at University of Toronto's Rotman School of Management. The theme of my talk was the crucial importance of strong character, especially stubborn persistence and resilience, in creating world-changing innovations.

According to Maxwell, in his essay Passion: The Fuel of Persistence, Philippe was an 18-year-old French street performer. While searching for venues for his high-wire balancing act, he read about the World Trade Twin Towers in a magazine in a dentist's office in Paris. He decided he would walk a tightrope between them.[14]

He worked on his dream for the next six years. He practiced his high-wire act endlessly and saved money for a ticket to America. Petit ascended the Tower on a Tuesday night. With a bow and arrow, his aides fired a line from the north to the south tower and spent the night securing it. Early Wednesday morning, Petit mounted the high wire. As thousands watched, the cops gathered to arrest him. Petit focused fiercely on his act, and made eight trips back and forth between the towers. Then he turned himself in.

Your reaction? Insanity? Madness? What possible value did Petit bring to the world with his stubborn persistence? A wasted six years of his life?

The value he brought to the world was to create a powerful narrative about the fuel of persistence and passion. We can only imagine how many powerful arguments were made to dissuade him, to make him give up. He never did. In French *petit* means small. But Philippe was anything but. His dream was huge and his persistence to fulfill it was even bigger. A great many successful innovators will strongly identify with Petit's story.

If the two most important factors in successful innovation are indeed resilience and stubborn persistence, then we need to practice

each. These are qualities we do not teach in MBA classes. And like our biceps, they become stronger with practice. *Practice them daily. If you give up with small things, you will likely give up on big things as well.*

HEAR, LISTEN, LEARN, TEACH

Background

We all have five senses. One of them is hearing. Many people have excellent hearing. But they do not truly *listen.* Many of us, in conversation, frame our own responses rather than truly listen to what the person with whom we're conversing is saying and arguing. Listening differs from hearing, in that listening absorbs total information, including body language, nuances, tones, word choice, etc. Listening generates the crucial information about unmet needs that generates successful creativity. And a *learning* mindset accompanies intense listening; if you train your brain to *really* listen, and to teach, to be a teacher for others, your brain will automatically sharpen its skills in learning, because you cannot teach effectively without learning and listening effectively.

Eighth Exercise: Open a Folder Titled *Listen, Learn, Teach*

Now: zoom in. Train your brain to listen differently. When you converse with people, *really* listen to what they are saying, zoom in, focus on it, concentrate on it. Note their body language, too. Let them finish. When they have, respond. Think carefully about right and left columns—the right column, what people *say,* and the left column, what they *mean,* which may be quite different. What do people *not* say that is important? In your folder, list the ways you can use to be a better listener. *Train your brain to ask questions.* Often, creative breakthroughs occur when someone asks a penetrating, seemingly simple question.

Now, zoom out. Ask dumb questions—questions whose answers seem obvious, known to all, but in fact really are not. Such questions often generate breakthroughs.

Zoom in again. List people who you think are good listeners. What do they do that you can imitate? Are your listening skills getting better? Do you hear things you might have previously missed? Do you SEE things you did not see before?

Now, read these stories.

Innovation: Lessons from Yves St. Laurent

Yves Saint Laurent, one of the world's greatest fashion designers, died in Paris on June 1, 2008. He was 71. Here is what *The New York Times* wrote about him:

During a career that ran from 1957 to 2002 he was largely responsible for changing the way modern women dress, putting them into pants both day and night, into pea-coats and safari jackets, into *le smoking* (as the French call a man's tuxedo jacket), and into leopard prints, trench coats and, for a time in the 1970s, peasant-inspired clothing in rich fabrics.[15]

Laurent

Mr Saint Laurent oftens ought inspiration on the streets, bringing the Parisian beatnik style to couture runways and adapting the sailors' peacoats he found in Army-Navy stores in New York into jackets that found their way into fashionable women's wardrobes around the world. His glamorous evening clothes were often adorned with appliqués and beadwork inspired by artists like Picasso, Miró and Matisse. Above all, he was a master colorist, able to mix green, blue, rose and yellow in one outfit to achieve an effect that was artistic and never garish.

What can innovators learn from Saint Laurent?

There are three simple lessons. First, he found inspiration, not inside his studio, but on the streets. Second, he was fearless, able and willing to break the rules of an industry that has very rigid rules. Third, he built his innovative designs on life style.

I heard a fashion expert explain Saint Laurent's success brilliantly. "His success was due to the baby boomers," explained Gil Michaely, Israeli Paris-based journalist. "He designed clothes for baby-boomer mothers who wanted to look like their daughters. He designed clothes, as well, for the daughters, who wanted to look like their mothers. And, he designed clothes for the mothers, who wanted to look like their [wealthy, successful] husbands."[16] Saint Laurent invented the pants suit, which now has become a high-fashion item women wear not only to work but also to parties and evening social events.

"My small job as a couturier," *The New York Times* quotes him as saying, "is to make clothes that reflect our times. I'm convinced women want to wear pants."

"The clothes incorporated all my dreams," he said after a show, "all my heroines in the novels, the operas, the paintings. It was my heart—everything I love that I gave to this collection."[17]

Live your dream, we tell innovators. Yves Saint Laurent not only lived his—he let other people wear them. In doing so, he made them beautiful.

Johnny Cash: How His Career Began in Folsom Prison

Johnny Cash was one of America's greatest country music singers, popular far beyond country music fans. His career took off in large part because of a bold risk he took—he

Johnny Cash

appeared before inmates in Folsom Prison, sang the song he wrote about Folsom, and then issued an album based on his live performance. It is regarded as one of the greatest country music albums ever:[18]

I hear the train a comin', It's rollin' 'round the bend, And
I ain't seen the sunshine, Since, I don't know when, I'm
stuck in Folsom Prison, And time keeps draggin' on, But
that train keeps a-rollin', On down to San Antone.

According to Wikipedia, Cash was inspired to write this song after seeing the movie *Inside the Walls of Folsom Prison* (1951) while serving in West Germany in the United States Air Force. Cash recounted how he came up with the Reno line: "I sat with my pen in my hand, trying to think up the worst reason a person could have for killing another person, and that's what came to mind."

When I was just a baby, My Mama told me, "Son,
Always be a good boy, Don't ever play with guns,"
But I shot a man in Reno, Just to watch him die,
When I hear that whistle blow in', I hang my head and cry.

Cash brought along his girlfriend June Carter, also a country singer. Her performance is also on the album. Cash got a great reception; Carter, as one can imagine, got a roof-raising one.

I bet there's rich folks eatin', In a fancy dining car,
They're probably drinkin' coffee, And smokin' big cigars,
But I know I had it comin', I know I can't be free,
But those people keep a-movin', And that's what tortures me.

What I learn from this episode is this: In a career, the shortest distance between two innovative points is almost never a straight line. In Cash's case, it was a crooked line (literally), that ran through Folsom Prison. Cash had a rapport with the inmates and you can hear it in the album. It showed he was not a spoiled country star but a real person, a working-class singer who understood those he sang for and sang about.

Innovator: In your career, innovate not just products or services. Innovate your career. Take crooked paths to your destination. Take risks. Go where others don't dare. You won't regret it.

Cash performed at Folsom Prison itself on January 13, 1968 and the At Folsom Prison album was released the same year. His career took off, and lasted several decades.

Folsom State Prison is located in the city of Folsom, California. Opened in 1880, it is the second-oldest prison in the state of California after San Quentin. Folsom was one of the first maximum security prisons, and as such did the execution of 93 condemned prisoners over a 42-year period.

INDIVIDUALIZE ... IT'S ALWAYS PERSONAL

Background

What is the most effective source of creative ideas? Answer: Yourself. Your own wants, needs, desires, gripes, problems, challenges. Use yourself as your best market research tool. Creativity is intensely personal. A huge number of breakthroughs occurred because someone wanted to have a product or service that did not exist, so he/she made one and others needed it too. This exercise helps train your brain to *empathize* (practice empathy)—with *yourself*. If *you* want or need something—chances are there a lots of others who do, too.

Once you create your innovation, find ways to make it personal and individual, for each of your customers. Today, mass production is disappearing, mass customization is taking its place. People express their personalities through what they consume and buy. Train your brain to individualize your innovations, by cultivating sensitive empathy toward others.

Ninth Exercise: Open a Folder Labeled *Personal Needs*

Zoom in. Think of a product or service or process that you wish you had. Why do you need it? Train your brain to respond to "this really doesn't meet my need" by framing "this is what would meet my need if it existed."

Zoom out. Try your idea on others. Find those who might need this product or service, too.

Now zoom in again. Refine your creative idea, using feedback and input you have received from others.

Now, read these stories.

Dropbox

Dropbox is a digital storage service that has surged to 50 million users. Steve Jobs tried to acquire it, offered $900 million—and was turned down flat.

Founder Drew Houston tinkered with an IBM PC Junior at age 5, and was programming at age 14. He had startups in high school already. Dropbox is his sixth! After reading Daniel Goleman's Emotional Intelligence at MIT, he realized that "smarts aren't enough." He started reading business books.

Houston was once riding a bus to New York. He planned to work during the 4-hour ride from Boston to NYC but forgot his USB memory stick. Frustrated, he started building technology to synch files over the Web.

Four months later, he flew to San Francisco to pitch his startup idea to an incubator. The incubator head rightly said he had to have a partner. So he found someone named Ferdowsi, who studied computer science at MIT. With just six months to go, Ferdowsi dropped out of school to work on the startup Dropbox with Drew. They got a $15k grant from the incubator, and went to work, eager to make Dropbox work on EVERY computer, including the closed-system Mac. Drew spent 20 hours a day trying to reverse-engineer "the guts of the Mac." Dropbox solves a need among people who have multiple devices—PCs, laptops, mobiles, etc.—and have multiple files and photos stuck everywhere. "Devices are getting smatter—your TV, your phone, your car—and that means more data spread around," says Houston. "You need a fabric that connects all those devices. That's what we do." And it started with something that Drew himself wished he had. Dropbox has become what Drew himself needed.[19]

Like many Web-based businesses, it is an inch from success and a centimeter from failure. At his final keynote speech Steve Jobs announced iCloud, which does basically what Dropbox does. Drew's

response: He fired an email to his staff, "we are one of the fastest-growing companies in the world," he wrote, and then added a list of other one-time meteors that fell to earth: MySpace, Netscape, Palm, Yahoo.

Drew has solved the *freemium* riddle. Ninety-six percent of his users pay nothing. He has only 70 staffers, mostly engineers, and grosses enormous revenue per employee. The revenue comes from those 4 percent who pay. He offers free 2 gigabytes, plus upgrades to 50 gigs for $10 a month or 100 gigs for $20. Growth is built into the business model. As clients store more and more data, they need more and more space, so even without new clients, Dropbox revenues will grow rapidly. Dropbox has strong VC backing, including Sequoia, Index Ventures, Greylock, Benchmark, and even Goldman, Sachs. It's close to huge success, and perhaps about to fail.

Tchaikovsky's Pathétique*: The Delight of Surprise in Innovation*

My wife and I recently heard the Israeli Philharmonic, led by conductor Yoel Levi, play Tchaikovsky's Symphony no. 6 in B minor (Pathétique). We observed a tiny lesson for innovators.

There are four movements in this wonderful work. The third movement is labeled *allegro molto vivace* which means very lively and very loud! The movement ends with a flourish of timpani and bass drum, with the orchestra playing at top volume, in a closing crescendo … and the audience bursts into applause (including me—and I know the piece quite well), thinking it is the final movement.

The conductor and orchestra waited patiently for the applause to die down, as we looked at one another sheepishly, and then began the fourth movement.

The fourth movement of the symphony is labeled *adagio lamentoso* (which means plaintive, sad), and it is very soft, quiet, somber, an elegy, with a huge gong sounding like a death knell. And the movement, and the symphony, end, like no other symphony I know, with pianissimo (very very soft), almost inaudible tones … and the conductor holds the movement, stands motionless, the auditorium is absolutely silent, you can hear a pin drop, nobody applauds,

nobody moves, the moment of utter silence is held, held, held … and then, applause!

The accepted rule for symphonies is, you end symphonies like Beethoven's Fifth, with a loud bang. Why? said Tchaikovsky. Why not end it almost inaudibly? Why not surprise the audience? Why not break the rules?

Innovators—try to surprise. Try to put at least something in your creation that is aimed at surprising and delighting, something unexpected. Listen again to the Pathetique … if you wish, just to the end of the third movement, and then the end of the fourth and last movement … and find inspiration. If everyone follows Rule #27, do the precise opposite.

Tchaikovsky died a few days after the premiere of Pathetique. The audience and critics received it coolly (hard to believe?). But Tchaikovsky himself thought it was one of his greatest works—and it was. The symphony takes 40 minutes to play—but those closing few seconds of near-silence are insightful, impressive and unforgettable.

BECOME WHO YOU ARE

Background

Someone once said, you can find out about yourself, who you are and what you seek, by investing in the stock market—but it will be very very expensive. This is true of innovation too. Before you embark on the wonderful, difficult, dangerous, uncertain, and challenging adventure of innovation and creativity, make sure you know who you are, what you seek, what you regard as success and who you are doing it for. Nietzsche once said, "Become who you are." What he meant was: Understand who you are, and then be true to yourself, in the face of enormous pressures to play roles other than the one we truly are. This brain exercise seeks to help you *join yourself*—i.e., define the core personal values and culture that comprise your inner self, and then join yourself—attach yourself irrevocably and permanently to the core that will guide you forever. This is an exercise that your brain can learn, must learn, and must practice.

Tenth Exercise: Open a Folder Titled *Join Myself*

Place in it important insights that you attain about yourself—your passions, interests, desires, goals, visions, dreams.

Then: zoom in. Look deep into yourself. Who are you? What are your goals? Can you become who you are? What are you good at? What are you poor at? Where do you want to be in 5 or 10 years? How will you get there? And above all: What are you truly passionate about?

If you do not know the answer to this question, then—Zoom out! Build your life around trying new things, new experiences, acquiring new skills. Train your brain to seek and welcome these new realms. Create a search process, take some risks, and one day you will indeed find something that ignites your passion. When you find it, you will know. Try many different things. Embark on a journey of discovery, to find your true passion. When you find it:

Zoom in. How will you implement your true passion?

Now, read these stories.

The World's First Innovator—at Age 75

"Go Forth … and Find Your Authentic Identity."

Each year, observant Jews read a chapter of the Five Books of Moses each Sabbath, in synagogue, completing the cycle over 52 weeks. The third chapter is known as *Lech Lecha,* which means Go Forth. This is what God tells Abraham. Leave your country, and go forth. "And I will make you a great nation, and I will bless you, and make your name great; and so you shall be a blessing." Abraham gathers up his household and obeys, leaving the green pastures of Haran for an uncertain future.

Biblical commentators say Go forth means *Go forth and find your authentic identity, and then become it*!. So even though he is 75 years old, Abraham sets out to find his true self, and when he does, he becomes the founder of one of the most powerful innovations in history—the notion that there is only one G-d, along with the ethical principles that accompany that idea. He will be revered, not only as the forefather of the Jewish religion but by Christianity and Islam as well.

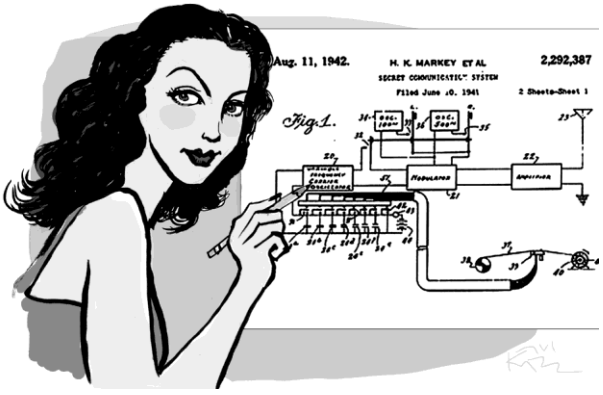
There is a useful message in this chapter. Innovators travel very great distances in their quest for relevant novelty. But the greatest distance they must travel is within themselves. Like Abraham, *we must find and define our authentic inner selves*, before finding and defining how we will change the world and discovering how we will, like Abraham, be *a blessing*.

Sometimes, this inner journey is long. As Nietzsche counseled, "Become yourself!." But how can we become ourselves, *if we do not yet know who we are?* And unless, like Abraham, we begin this journey, and go forth, we will never arrive.

If Abraham could undertake it, at age 75, what about those who are only 25?

Read these stories about self-discovery.

Was the World's Most Beautiful Woman Also the World's Smartest?



HedyLamarr

This is one of the strangest stories I've encountered, in the realm of creativity and innovation. It is about Hedy Lamarr. Very few readers will be old enough to remember this stunning Hollywood movie star of the 1940s, who appeared in *Samson and Delilah, Ziegfield Girl, Tortilla Flat,* and others. Few know her patent forms the foundation for cell phone technology. Here is her story.

Hedwig Kiesler was the daughter of a Jewish Viennese banker. She became the trophy wife of Fritz Mandl, a wealthy Austrian munitions manufacturer. The stage director Max Reinhardt encountered her, cast her in several roles (even though her husband forbade it) and Reinhardt famously called her "the most beautiful woman

in the world". And she was. She escaped from Mandl, fled with her luggage and jewelery and booked passage on a liner on which movie mogul Louis B. Mayer (co-founder of Metro Goldwyn Mayer) was travelling. When the ship docked in New York, Hedwig had a new name (given by Mayer himself, HedyLamarr, named after a silent film actress) and a contract.

During her stint with Mandl, she had learned a lot about technology. She had a drafting table at home, where she used all her downtime to invent things, like a bouillon-like cube that produced an instant soft drink when mixed with water. Together with a weird musician named George Antheil, she worked on ways to help the U.S. war effort during World War II. Together they invented and patented a radio-controlled *spread spectrum* for guiding torpedos. (They also invented a *proximity fuse* anti-aircraft shell, a version of today's smart bombs.) U.S. Patent Office Patent No. 2,292,387 showed how to synchronize transmitter (ship) and receiver (torpedo), in ways that could not be jammed, based on the idea of an 88-key player piano roll that changed frequencies according to a preset pattern. The bureaucratic U.S. Navy could not believe that a gorgeous movie star could invent anything worthwhile and rejected her idea. But in 1997, HedyLamarr, age 82 and still gorgeous, along with Antheil (posthumously), were given a Pioneer Award by the Electronic Frontier Foundation. The reason: Lamarr's patent for *frequency-hopping* formed the basis of CDMA (code division multiple access), a foundation technology for cell phones. No one was really aware of the link between Lamarr's invention and CDMA, until the Foundation gave her the award. Lamarr tried to join the National Inventors Council, a body that used creativity to help the war effort (World War II), but she was told her beautiful face was more valuable than her brain, so she helped sell War Bonds.

As a postscript: A Canadian wireless developer Wi-LAN acquired a 49 percent claim to the patent from HedyLamarr herself, in 1998, even though the patent had expired long ago and had no economic value. Wi-LAN paid for the worthless patent in shares.

HedyLamarr was born too soon. Had she been born 50 years later, perhaps she might have married Steve Jobs. If she had, who knows what she might have invented?

10 + 1. ZOOM IN/ZOOM OUT ...

Background

This exercise pulls together the previous ten. It is not solely a brain exercise; it is a way of life.

Tenth Exercise Plus One: Practice Alternating between Zoom In and Zoom Out

Zoom out widens your field of vision to include everything in the world. Zoom out to perceive and understand global trends in everything: Geopolitics, lifestyle, economics, and technology. After you spot such a trend, especially one others may not have paid much attention to, practice zoom in. Narrow your field of vision, focus it, and see if you can build a value-creating change-the-world innovation on your zoom out trend observation. Now, as you build this creative idea, you will doubtless, again, have to zoom out—to examine markets, financing, interest groups, etc. And then, again, after your second zoom out, to validate your idea, zoom in again, to focus more narrowly your idea and seek the minimum viable product. After several rounds, alternating zoom out and zoom in, your idea will be both validated (or rejected) and focused.

Sometimes, you can use zoom out/zoom in as an exercise, as practice. But once in a while, you should implement it.

NOTES

1. Norman Doidge, M.D. (2007). *The brain that changes itself*. NY: Penguin Books.
2. Maital, S. (2012). Make meaning: When tragedy becomes triumph (2). Retrieved from http://timnovate.wordpress.com/2012/01/30/ (accessed June 9, 2014)
3. Drucker, Peter.(1994). The theory of the business. *Harvard Business Review*, *72*(5), 95-96.
4. Buffett, Warren. (n.d.). Retrieved from http://www.brainyquote.com/quotes/quotes/w/warrenbuff384858.html (accessed on June 4, 2014).
5. Cain, Susan. (January 13, 2012). Rise of the new groupthink. *The New York Times*.

6. Ibid.
7. Gallo, Carmine. (2010). *The innovation secrets of Steve Jobs*. Hoboken, NJ: McGraw-Hill.
8. Naughton, John. (2011). Steve Jobs: Stanford commencement address, June 2005. Retrieved from http://www.theguardian.com/technology/2011/oct/09/steve-jobs-stanford-commencement-address (accessed June 7, 2014)
9. Ibid.
10. Ibid.
11. Tiroche, Limor Laniado. (May 5, 2011). Be Merry/If you give the world a cookie.... *Haaretz*. Retrieved from http://www.haaretz.com/print-edition/arts-leisure/be-merry-if-you-give-the-world-a-cookie-1.359921 (accessed June 7, 2014).
12. Maital, S. (2008). What innovators learned from Nadal at Wimbledon. Retrieved from http://timnovate.wordpress.com/2008/07/07/what-innovator…l-at-wimbledon/ (accessed June 9, 2014)
13. Tolle, Eckhart. (2001). *The power of now*. Delhi, India: Thomson Press.
14. Maital, S. (2012). The fuel of persistence. Retrieved from http://timnovate.wordpress.com/2012/01/21/the-fuel-of-persistence/
15. Schiro, Anne-Marie. (June 2, 2008). Yves Saint Laurent, giant of couture, dies at 71. *The New York Times*. Retrieved from http://www.nytimes.com/2008/06/02/fashion/02laurent.html?pagewanted=print
16. Maital, S. (2008). Innovation: Lessons from Yves Saint Laurent. Retrieved from https://timnovate.wordpress.com/2008/06/02/ (accessed June 7, 2014).
17. Ibid.
18. Cash, Johnny (1955). Folsom prison blues. *With His Hot and Blue Guitar*. Retrieved from http://www.azlyrics.com/lyrics/johnnycash/folsomprisonblues.html (accessed June 9, 2014).
19. Maital, S. (2011). Three stories: Startups an inch from failure and a centimeter from huge success. Retrieved from http://timnovate.wordpress.com/2011/11/08/three-stories-…m-huge-success/ (accessed June 9, 2014).

What Scholars Know about Creativity

A Journey Through the Literature

Reader, please join me on a quick and fairly painless journey through the massive research on creativity, published by scholars in academic journals and books. For those who wish to dig deeper, we provide the references, so you can find and read the articles for yourselves. Some 30 books and articles are surveyed. We sought knowledge that you can *use and apply*.

Our journey begins with the analysis of what creativity is and how it is defined, and on how modern research on creativity began, then examines research on creativity in children. We next look at research that explores various processes to facilitate and strengthen creative problem solving. Next we look at research on creativity in specific contexts: Humor, puzzle solving, jazz, and Hollywood scripts. After that, we examine research on training programs to enhance creativity and whether they succeed. We then examine creativity in teams, and the extent to which creativity can be enhanced by the context and ambience in which it thrives and the rewards creativity receives. Finally, we show that creativity is *not*, as many believe, entirely determined by our genes but rather it is stimulated and shaped by appropriate environments, good orderly processes, and above all by daily practice.

WHAT IS CREATIVITY? HOW IS IT DEFINED? HOW IS IT LINKED TO INNOVATION? CAN YOU TEST FOR CREATIVITY? IS CREATIVITY RELATED TO *SURVIVAL OF THE FITTEST*?

Our definition of creativity is "*widening the range of choices*." It is actually subsumed in much of the creativity research but not as a simple and clear definition. More conventional definitions focus on "the ability to produce something novel and appropriate, or useful."

Psychologist Robert Sternberg is one of the most innovative and prolific researchers of his generation. His own life story is revealing—he recounts being a very poor high school student, written off by teachers, who learned two key creativity skills very early: Persistence and resilience in the face of failure. Sternberg offers a clever theory of the creativity process, derived from economics.[1] "Creative people are those who are willing and able to 'buy low and sell high' in the realm of ideas." Buying low means pursuing ideas that are unknown or out of favor but that have potential. The creative individual persists in the face of resistance and eventually *sells high*, i.e., the idea becomes very popular. The individual then moves on to the next *low-priced* idea. By our definition, choosing an unpopular or unknown option is like buying a rundown dwelling in a slum neighborhood, refurbishing it and selling it at high price when the neighborhood becomes gentrified.

This investment theory of creativity, Sternberg says, requires six different resources to come together: Intellectual skills, knowledge, styles of thinking, personality, motivation, and environment. All play important roles. Sternberg argues that creativity is a decision; and skill at decision-making can be developed.[2] He offers a model of *giftedness* that has four parts, with the acronym of WICS: WICS stands for Wisdom, I for Intelligence, C for Creativity, S for Synthesize. When the C of creativity does not partner with wisdom (the voice of experience and judgment), intelligence (the ability to solve practical problems in new ways) and the ability to integrate

and synthesize, combining diverse parts into a single whole idea, it cannot itself create world-changing value.

Sternberg's WICS model raises a key point. If creativity is widening the range of choices, it is also the ability to choose wisely among those new choices. The human ability to imagine new choices, and the wisdom to pick the best of them, are very different skills, almost oil and water, because they involve the two different operations of *zoom out* and then *zoom in*. It is almost like the difficult optical problem of creating a telescope that is also a microscope. So in many cases, innovation based on creativity requires separate individuals—a zoom-out imaginer and a zoom-in manager. It is important that individuals have the self-awareness to know whether their skills are primarily in imagining, or in implementing and deciding among alternatives. Only a relative handful of geniuses combine both these talents.

In his 1990 book *Flow: The Psychology of Optimal Experience*, Mihaly Csikszentmihalyi interviewed nearly 100 creative people, in a variety of fields: Music, art, literature, engineering, and so on.[3] His goal was to achieve a deeper understanding of creativity. And he succeeded. Csikszentmihaly defines creativity as a process "by which a symbolic domain in the culture is changed." By domain he means the body of expertise in a field. To change a field, it is necessary to learn it well. The key here seems to be the ability to learn a field without becoming a prisoner of its assumptions, rules, and conventions. Often, the cognitive investment in acquiring knowledge, over a period of years, is so huge that experts are reluctant to devaluate it by making it obsolete through creative ideas.

Flow is a skill creative people have, which enables them to distinguish bad choices from good ones (consistent with our own definition of creativity) and involves clear goals, immediate feedback, focus, no fear of failure, and *autotelic* activity, meaning that the act of creativity becomes its own purpose.

Can you test for creativity and measure it, like IQ, in individuals? Dr E. Paul Torrance developed the TTCT, Torrance Tests for Creative Thinking, in 1957.[4] It is a fairly simple 90-minute set of tasks, extended in 1966. His tests have five activities: Ask-and-guess, product improvement, unusual uses, unusual questions,

and *just suppose*. Torrance uses a very long complex definition of creativity. A short version of it, based on Kyung Hee Kim[5] is: "Creativity is a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on, searching for solutions, making guesses, formulating hypotheses, testing and retesting them, modifying them, and finally communicating the results."

Kyung Hee Kim concludes wisely that creativity is multidimensional, and so measures of creativity should be based on several tests, not on a single score. He also notes that Torrance's TTCT "shatters the theory that intelligent quotient (IQ) tests alone can measure real intelligence." Creativity and IQ are very different concepts.

Recently, strong evidence was found to support the premise that IQ and creativity are almost unrelated. Back in 1958, Professor Torrance tested the creativity of a group of 400 Minneapolis children. In the 55 years since then, Torrance and his colleague Garnet Millar tracked the children, recording their patents, businesses, research papers, grants, books, art exhibits, software programs, ad campaigns—virtually everything. It turns out that Torrance's creativity index predicted the children's creative accomplishments as adults incredibly accurately. It turns out that *the correlation between lifetime creative accomplishment and childhood creativity is more than three times higher than the correlation between accomplishment and childhood IQ*. What's even more interesting, and worrisome, is this: According to the Flynn effect, named after New Zealand Professor James Flynn, with each generation, IQ goes up by 10 points. With creativity, a reverse trend was identified. American creativity scores are falling, according to Kyung Hee Kim. "The decrease is very significant," Kim says. He notes it is the scores of younger children in America, from kindergarten to sixth grade, for whom the decline is most serious.[6] While America's No Child Left Behind (NCLB) Act (2000) focuses on measuring and improving conventional learning skills, as measured by tests, creativity is suffering.

Rule-based education is hurting break-the-rules creativity, even in innately creative young children. In their book *Breakpoint and Beyond: Mastering the Future—Today*, Land and Jarman describe a longitudinal study on creativity beginning in the 1960s.[7]

Land administered eight tests of divergent thinking, which measure an individual's ability to envision multiple solutions to a problem. (NASA uses these tests to measure the potential for creative work by its employees.) When the tests were first given to 1,600 three- to five-year-olds, Land found 98 percent of them to score at a level called creative genius. But five years later when the same group of children took the tests, only 32 percent scored at this level and after another five years, the percentage of geniuses declined to 10 percent. By 1992, more than 200,000 adults had taken the same tests and only 2 percent scored at the genius level.[8]

If creativity is "widening the range of choices," and if widening the range of choices is helpful for human survival and well-being, can we say that natural selection selects more creative people over less creative ones? In this theory, spontaneous variations occur in genes that are selected when they help those who possess them survive and thrive to reproduce. Simonton notes that "if creativity requires the capacity to generate blind variations, then it is conceivable that the level of creative performance may be increased by any technique that serves to break the stranglehold of conventional expectations"[9] In other words, creative people are good at generating new options, new choices, even randomly, tossing them up into the air before evaluating them. This is not unlike the natural selection process in which gene mutations occur randomly, with most being *rejected* and a very few *selected* by the competition for resources and mates. A strong creativity process, then, should help people generate an endless flow of new choices, just as Nature generates an endless stream of genetic mutations.

In a sense, evolution and the process of natural selection based on survival of the fittest are themselves an almost ideal example of creativity that widens the range of options and then picks the best of them. Nature widens the range of options by creating random mutations. It then allows survival of the fittest to choose the best among them (only those survive to reproduce themselves). The great advantage of Nature, and evolution, is its patience—Nature can take millions of years to perfect the cockroach, for instance, while human beings have only a very short time to perfect the iPad 5. A relatively new field known as *biomimetics* (imitating nature) seeks to learn from nature and create value from it. For instance, Velcro fasteners were

based on a Swiss engineer's dog who had cockleburs caught in its fur. A study of the *barbs* and *loops* principle led to Velcro.

HOW HAS CREATIVITY RESEARCH EVOLVED, OVER THE PAST 50 OR 60 YEARS?

Some 60 years ago, a psychologist, J.P. Guilford wrote an article contrasting the crucial importance of creativity in fulfilling human potential with the neglect the topic suffered in psychological research.[10] Guilford insisted that creativity could not be understood solely in the context of *intelligence*. Sternberg and Dess noted that in 1950 only 16 journal articles were published, with *creativity* in the title. Since then creativity research has mushroomed, with two academic journals (*Journal of Creative Behavior* and *Creativity Research Journal*), devoted solely to this topic.[11]

An example of two key threads of research on creativity are *breadth of attention* and *creative problem solving*. Kasof tested the idea that creative people "notice things that easily escape attention" because they scan the horizon widely.[12] This is the quality we term *zoom out*. Here is how Darwin's theory of evolution arose from an insight he got from geologists and gave us a new and surprising way to understand how the variety of species of plants and animals evolved on our planet—a true *zoom out* example.

Darwin was exceptionally curious about everything, from the time he was a small child. In his long four-year voyage on the Beagle, he visited Chile. He made extensive notes on everything he saw. There, he climbed high mountains and noted how layers of soil had been pushed up to form mountains. In the layers he found fossils of seashells and crustaceans. Aha! He thought. These layers of seashells were once, therefore, under the sea. *How did a layer under the sea become a 12,000 ft. mountain?* Later, he found the answer in a book by Geologist Charles Lyell, who theorized (against conventional wisdom) that earthquakes pushed the earth up, twisting horizontal layers into near-vertical mountains. This process must have taken millions of years, Darwin thought. He filed this insight away—for later use in his theory of evolution, a process in which species evolve over millions of years, just as mountains do.

Darwin

Another important stream of research relates to creative problem solving (CPS), based on the work of Donald Trefinger. In Isaksen, Puccio, and Treffinger (summarized in Mumford[13]), creativity is defined as "the production of new and useful ideas."[14] The CPS process that Treffinger pioneered is an ecological approach to creativity, in which the individual, the process of creativity, the environment and the task all interact and combine to generate ideas. The basis of this research is this: "no one, is, in an absolute sense, always more or less creative. We must ask, creative at what, when, how, where, why, and with whom. We shouldn't look for creativity as something fixed and static; it waxes and wanes dependent on a combination of multiple factors".[15] The authors propose a structured process in which for a particular task, a person's creative talents are defined, and put to use in the best way, combined into a "meaningful and effective training experience." In other words, creativity can be taught, and it can be learned. "Creativity can be enhanced and nurtured,." We wholly agree. Feist and Runco,[16] and Feldhusen and Ban[17] provide good summaries of several decades of creativity research.

Despite this veritable explosion of research, nonetheless Sternberg and Lubart still believe psychologists have underinvested in the study of creativity.[18] "If creativity is so important to society, why has it traditionally been one of psychology's orphans?" they ask. Among the reasons, they cite the view that the origins of creativity are *mystical* or *divine*; the pragmatic approach, such as the work of Edward de Bono,[19] which achieved commercial success

by teaching techniques for *lateral thinking*; and viewing creativity as part of larger, more important processes like memory, perception, or intelligence.

WHAT DO WE KNOW ABOUT CREATIVITY IN CHILDREN?

Clearly, children are highly creative. Consider five-year-olds. For them anything is possible. So, *everything* is possible. They have not yet learned the rules, so, there are none. They break the rules with ease and with joy. Then, we send them to school, where they are taught rules about everything, from math to history to literature, in public school systems that were created to supply factory works during and after the Industrial Revolution—workers who, for Henry Ford, were *pairs of hands* that lamentably, came attached to superfluous brains. Today, the creativity of those brains, in the knowledge economy, is crucial. Yet for the most part, schools have not changed or adapted. They remain rooted in the 19th century, when schools sought to produce pairs of hands without brains.

Urban uses the Test for Creative Thinking, based on kids' drawings, to study creativity among four- to eight-year-olds in kindergarten and Grades 1 and 2.[20] He shows that there are six developmental stages of creativity, related to children's cognitive development. Fasko begins with Guilford's 1950 questions: Why is there so little correlation between education and creative productiveness? Why are schools not producing more creative persons?[21] One problem, he finds, is that of teachers' negative attitudes toward creative students, who ruffle the feathers of teachers by offering creative choices different from those in their lesson plans. Fasko thinks that to make schools more creative, we need to teach *teachers* to be more creative. Torrance, the inventor of a widely used test for creativity, asked 40 years ago "can we teach children to think creatively?" His answer: Yes, because "I have done it; I have seen my wife do it; I have seen other excellent teachers do it; I have seen children deemed non-thinkers learn to think creatively, and continuing to do so years thereafter."[22] Torrance's point is almost obvious. If creativity can be learned, it can be taught, because by

definition, anything, any skill, that is learned, can also be taught, provided we understand how best to do it. Torrance surveyed 142 studies on teaching creativity, many of them related to the CPS approach pioneered by Alex Osborn, to be discussed ahead.[23]

If children are indeed born supremely creative, and if formal education represses their natural creativity by insisting there is only *one right answer*, perhaps we need to educate children *less*—certainly in this specific manner.

Stretching our imaginations, as children do, may also involve another tendency of children—to fabricate stories and stretch, bend or annihilate the truth. Behavioral economist Dan Ariely shows that creative people have greater moral flexibility, defined as the ability to tell ourselves stories about how we are doing the right thing, even when we aren't. Put bluntly, creative people may be more dishonest.[24] This enables them to invent original paths around rules or conventions, telling themselves stories that are dishonest but nonetheless are believed by themselves. Some of history's greatest criminals have been highly creative in the way they fabricate and recount stories to the unwary.

IS CREATIVITY HELPED OR HINDERED BY CONSTRAINTS?

Maital and Seshadri suggest the innovative ideas can come from one of four different voices: The inner voice of intuition, the voice of the product, the voice of the organization, or the voice of the customer.[25] Simonton provides a variation on these voices, showing how creativity integrates product, person and process.[26] Scientific creativity, he shows, emerges from an optimal combination of these three aspects. And, he shows, the process has a strong element of randomness, or chance. He quotes the French mathematician Poincaré, who failed to solve a problem, went to the seaside, and on "one morning, walking on the bluff, the idea came to me …," an idea that linked quadratic forms with non-Euclidian geometry. As scientists work on a variety of problems, sometimes there is cross-talk among the projects, even when there is no apparent connection between them. Scientific research programs, Simonton says,

are highly chaotic. But only when some order is imposed on this chaos, do great discoveries emerge.

Glück, Ernst, and Unger do creativity research by asking *the horse's mouths,* creative artists themselves.[27] They compared artists "who face strong external constraints in their creative work" such as architects and designers, with artists "free to choose their topics and materials, time schedule and so on." The two groups differed strongly in how they viewed creativity, but all agreed that creativity was hard work. My own experience leads me to believe that constraints (such as lack of money, lack of time) can greatly *stimulate* creativity, when creative people have to substitute ideas for money.

Theodore Geisel (who wrote children's books as Dr Seuss) was asked by a publisher to write a book for very young children, with a vocabulary of only 200 words. Other writers declined. The severe constraint on vocabulary helped Geisel create a wonderfully creative series of children's books.

Among the most widely studied groups of creative people are industrial designers, who live and die based on their creative output. Dorst and Cross studied creativity in the design process, and emerged with an important insight: Creative designs emerge as a direct result of interaction, or *co-evolution,* between the *problem space*, that is, how the design problem is defined, and the *solution space*, that is, how the design problem is resolved.[28] These two issues evolve together, with information passing between them. Einstein was known to stress the crucial importance of how to formulate a problem, or a question. Dorst and Cross, for example, cite a study showing that the more time spent in defining and understanding a [design] problem, the better creative result he/she was able to achieve. I view this as a variation on our zoom in stage: Focusing laser-like on defining the specific problem or issue.

Dorst and Cross use the example of the Dutch Railways, who sought a design solution to newspaper litter. Getting travelers to put old papers in a recycle bin, then having someone collect them, was proposed. But the solution was flawed—it was burdensome for people to recycle newspapers, and expensive to have people collect them. If it is inconvenient to put papers in the litter bin and to collect them, why put them in, in the first place? The solution, once

the problem was framed well, was: A newspaper rack at the end of each railway car, from which travelers take papers and return them for others to read. The solution emerges only when the problem is properly framed.

Some researchers ask, is there a *general* creativity process, or should it be specific to the particular issue and problem, or *domain*, involved? Baer and Kaufman tackle this issue with their [choose an] Amusement Park Theoretical (APT) model of creativity. In this model, coming up with creative options is like designing an amusement park. Stage 1, define the initial requirements. What you do seek in an amusement park? Stage 2, define the thematic areas. What is the theme of the park you prefer? Water park? Roller coaster? Every creative work has a general theme. Defining the theme is essential for structured creativity, and is a kind of constraint that aids efficiency and productivity. Stage 3 involves choosing the domain, for example, if you want rides, do you choose Six Flags or Disney? In creative endeavors, it is crucial to zoom out and research in-depth the particular domain involved. Finally, Stage 4 is the zoom in, zeroing in on a *micro-domain,* choosing the particular attractions that, say, you want to see at the huge world-famous San Diego Zoo. This highly structured approach, argue the authors, can be effectively applied to programs for educating especially gifted persons; depending on the particular goals, gifted people can tackle Stages 1 and 2, or, if specialty knowledge is sought, tackle Stage 3 and then Stage 4 as well.

CREATIVITY IN DIVERSE REALMS: PITCHING MOVIES, JAZZ, SOLVING PUZZLES, TELLING JOKES

Hollywood

A number of research studies have been done on creativity in specific realms. Elsbach and Kramer study how Hollywood film executives and producers judge the ideas of relatively unknown screenwriters during pitch meetings, when screenwriters try to sell their ideas.[29] In many creativity processes, those who dream up ideas are separate in function and identity from those who select and implement those

ideas. This separation of zoom out and zoom in clearly recognizes the fact that *very few people are good at performing both these very different tasks.* Some of us are good at tossing ideas into the air. Some of us are good at catching them and sifting them down to choose the best option.

This is true of advertising companies, for example. In their study Elsbach and Kramer interviewed 36 informants, some *pitchers* (who present pitch ideas) and some *catchers* (those who judge them). They discovered that two different processes take place.[30]

1. In the first, *catchers* match *pitchers* according to seven known categories, or boxes: artist, storyteller, showrunner, neophyte, journeyman, dealmaker, or nonwriter. Putting the *pitchers* into boxes helped the *catchers* judge the creative ideas.
2. In the second process, *catchers* closely study their own emotional reactions, and their relation to the *pitcher*, because "you are not just buying the idea but the person who goes with it." This is similar to the venture capital process, where VC investors judge not the product but the ability of those who pitch it to implement what they project.

These two processes are closely linked, the researchers find. A key conclusion here, for creative people, is to know well the *catchers* to whom ideas are pitched, and what those catchers seek and examine.

An illustration of how catchers drive creativity is this excerpt from an interview with Brad Bird, an executive at Pixar, an animated film company founded by Steve Jobs.

> [I said,] … Give us the black sheep. I want artists who are frustrated. I want the ones who have another way of doing things that nobody's listening to. Give us all the guys who are probably headed out the door." A lot of them were malcontents because they saw different ways of doing things, but there was little opportunity to try them, since the established way was working very, very well. We gave the black sheep a chance to prove their theories, and we changed the way a number of things are done here. For less money per minute than was spent on the previous film, Finding Nemo, we did a movie that had three times the number of sets and had everything that was hard to do.

Pixar

All this because the heads of Pixar gave us leave to try crazy ideas. I would say that involved people make for better innovation. Passionate involvement can make you happy, sometimes, and miserable other times. You want people to be involved and engaged. Involved people can be quiet, loud, or anything in-between—what they have in common is a restless, probing nature: "I want to get to the problem. There's something I want to do." If you had thermal glasses, you could see heat coming off them.[31]

Jazz

The best-selling jazz album of all time is Miles Davis' Kind of Blue. Davis' sextet included truly great musicians (Coltrane, Evans, Adderley, etc.). Davis assembled the group in a recording studio and finished the album in two recording sessions, on March 2 and April 22, 1959. Each piece on the album was recorded only once; the original take was the one used. Before the sessions, Davis wrote some rough sketches for the musicians, who had never seen them before. Davis' creative innovation was to shift jazz improvisation from that based on chords—musicians are given a series of chord progressions, and improvise around them—to one based on modality, or modes. So the creativity of Kind of Blue was double—a new type of jazz, known later as progressive jazz, and highly creative improvisation within the constraints Davis imposed.

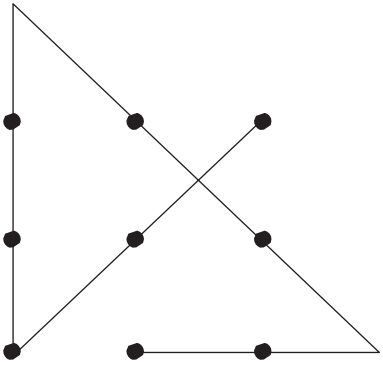
Sawyer's study based on interviewing jazz musicians helps us understand what made Kind of Blue so popular.[32] Sawyer found five

major differences between creativity in improvised jazz compared with creativity in jazz composition. The main difference was what he terms "the balance of structure and innovation in the domain, and the balance of structure and innovation within the individual." In terms of Kind of Blue, what that means is, the creativity of Davis and his musicians arose from the interaction between the structure Davis provided (a new jazz structure, based on modality, not on chords and the rough sketch of modalities he provided) and the freedom of individuals to improvise *within those constraints or structures.* A similar interaction existed in each musician, between the freedom to make choices in every bar and the constraints that the modality structure required; each musician resolved this conflict in a different manner, and the resulting tension was highly productive. It is fascinating to listen to how each of the talented jazz musicians begins with zoom in on the musical sketch written on sheet music before him, in advance, and then quickly zooms out to create infinite numbers of variations and improvisations on the theme, then returns again to the written sketch or them.

Solving Puzzles

Akin and Akin use puzzles to study creativity.[33] They employ the mutilated checkerboard (MC) puzzle (two corner white squares are removed from the 64 squares, leaving only 62; people are asked to cover the board fully with 31 dominos, each of which covers two squares, or prove this is impossible); and the nine dot puzzle (draw four straight connected lines so that each dot has a line going through it).

The MC problem has an AHA! Insight: Each of the 31 dominos must cover a black and a white square, wherever it is placed, i.e., 31 white squares and 31 black squares. But there



Checkerboard

are 32 black squares and only 30 white squares. So there is no solution.

The nine-dot problem is solved only when it is realized that lines can extend beyond the borders of the nine dots (out of the box); most subjects tend to restrict themselves to the box formed by the dots. The researchers found, in interviewing their subjects, that there is a sudden insight that leads to the solution, whose onset is abrupt, and once gained, the solution becomes trivial. Breaking out of the self-imposed frame of reference was crucial for creativity. Subjects who failed were given hints; often, the hints did not help, because the subjects simply could not see how the hint related to the frame of reference. They conclude that "two kinds of search are conducted [for creativity], one in the problem-solving mode and the other in the problem definition mode." Each is very important.

Humor

A very early article by Roy R. Behrens explores the link between creativity and humor.[34] Behrens uses two wonderful Charlie Chaplin films as examples: *Gold Rush* and *Modern Times*. In Modern Times, Charlie goes berserk, as he tightens bolts on a conveyor, and tries to treat all round things (noses, buttons, breasts) as if they were bolts to be tightened. In *Gold Rush*, Charlie is so hungry he cooks his shoe in a stew, peels off the hide and the tongue, eats the shoestrings as if they were spaghetti and eats the shoe nails as if they were bones. Behrens has the insight that Chaplin's creativity resembles that of a man named Karl Duncker, who devised a series of experiments to foster and spur creativity.

Subjects were given a nail, a weight, and a cord, and asked to make a pendulum. No hammer was provided. The solution, of course, was to hang the cord on the nail and use the weight to pound the nail into the wall. Yet only half of the subjects could perceive using the weight as a hammer. Chaplin was able to perceive a shoe as food to be cooked and eaten, a surprise that draws laughter in part because it is so unexpected. He was able to perceive a factory worker as bolting human body parts, also surprising, funny, tragic, and sad, all at the same time.

Here, creativity in humor appears in line with our definition—widening the range of choice. A shoe suddenly takes on a use beyond what most people might think of. Given a shoe and a stew, make them into a meal. Given a wrench and a nose, what can you find to tighten? Chaplin's humor becomes an example of a Duncker exercise. What could a shoe become? Chaplin's creative imagination was boundless.

CAN YOU TRAIN FOR CREATIVITY?

We have argued that if you can learn to be creative, then creativity can be taught as well. But how? A study by Scott, Leritz, and Mumford reviews a half century of creativity training programs.[35] They find that the most effective training programs were those that (a) focused on specific skills and techniques for using those skills to solve problems, and (b) used realistic practice exercises relevant to the domain, or realm, in which the creativity was to be used. They observe that some training involves divergent thinking (zoom out) while some involves convergent thinking (zoom in). Training for divergent thinking alone was less successful than that for convergent thinking, though "simple exposure to relevant heuristics, or strategies, for divergent thinking has proven effective." "Creative training appears beneficial for a variety of people," they conclude, "not just elementary school students or the unusually gifted."

Creating Optimal Conditions for Creativity to Blossom

Oldham and Cummings studied workers in two manufacturing facilities, related to engineering work.[36] They measured creativity objectively (patents, etc.) and studied the link between the ambience, or context, of the workers and their creative output. Their main finding: "Employees produced the most creative work when they had appropriate creativity-relevant personal characteristics, worked on complex, challenging jobs, and were supervised in a supportive, non-controlling fashion." This is just common sense. Find people who like coming up with ideas and are good at it. Challenge them

with complex problems. Empower them to find solutions, without overly controlling how. It is quite surprising how many organizations preach innovation, yet fulfill none of these three key conditions for creating the conditions that generate innovation.

Can a person's mood (state of mind, or feeling) influence creativity? A very large study by Baas, De Dreu, and Nijstad surveys 25 years of mood-creativity research.[37] Not surprisingly, they find that "creativity is enhanced most by positive mood states … (e.g., happiness), rather than those … associated with … avoidance and prevention (e.g., relaxed)." Fear and anxiety generated lower creativity. Moreover, these results generalized across most populations and types of creativity. Many organizations try to spur innovation and creativity through pressure and fear (only the paranoid survive). This seems counterproductive. I have found that creativity thrives best in an atmosphere of laughter and fun. Even when the mission is deadly serious, a light atmosphere can do much to help creative people succeed.

Should creativity be rewarded? Do high rewards spur high creativity? Eisenberger and Shanock address this controversial issue, showing the answer is both yes and no.[38] They begin their article by quoting former Disney movie studio mogul Michael Eisner, who said, "To make money is our only objective." This contrasts with Pixar Executive Brad Bird, quoted above, who has said, "Walt Disney's mantra was, 'I don't make movies to make money—I make money to make movies.'" That's a good way to sum up the difference between Disney at its height and Disney when it was struggling. It's also true of Pixar and a lot of other companies. It seems counterintuitive, but for imagination-based companies to succeed in the long run, making money can't be the focus. (It is interesting that Pixar has been acquired by Disney.) The authors' main conclusion is this:

> [W]hen individuals believe they can obtain rewards by being creative they become more creative. The expectation that creativity will be rewarded causes individuals to define the task as requiring creativity, to become immersed in it, and to search for novel ways of carrying it out.[39]

They go on to note that rewards also enhance creativity by increasing interest in the task. And rewards improve both self-determination and self-perception. But when rewards are linked to conventional performance, then, expectedly, creativity is dampened. They stress the importance of "establishing purpose and intention to be creative," to generate intrinsic interest in creativity—for instance, by including creative ideas as part of every job description. But rewards need not be tangible. They can also be socio-emotional. Often, peer approval itself is the most powerful motivator for creativity.

How to Kill Creativity

We agree with renowned Harvard University creativity researcher Teresa M. Amabile, who has the last word in this journey. "Creativity gets killed much more often [by organizations] than it gets supported."[40] It isn't because senior managers hate creativity. They all preach innovation. Creativity, Amabile notes, is undermined unintentionally everyday, in work environments that focus on coordination, production, and control. "In many companies, she observes, "new ideas are met not with open minds but with time-consuming layers of evaluation." The result: "Organizations that systematically crush creativity." But can you have the best of both worlds? Can you have both discipline and operational excellence, and spirited creativity? Amabile's life work shows that it is possible. Creativity occurs, she shows, at the confluence of three components: (a) Expertise (technical, procedural and intellectual knowledge. This is zoom in. (b) Creative-thinking skills, that determine how flexibly and imaginatively people address problems (this is zoom out); and (c) motivation (inner passion to solve problems at hand). At the convergence of these three lies creativity.

Amabile also dispels the notion that creative people are superstars or geniuses. "Most of the creative work done in the business world today," she observes, "gets done by people whose names will never be recorded in history books. They are people with expertise, good creative-thinking skills, and high levels of intrinsic

motivation. And just as important, *they work in organizations where managers consciously build environments that support these characteristics instead of destroying them."*

Finally, Ekvall and Britz use a questionnaire that measures the nature of life in an organization, focused on how attitudes, feelings, and behaviors support creativity.[41] They find eight key dimensions of organizational ambience that foster creativity, and, by implication, whose absence greatly hampers creativity. In order of their importance: Playfulness and humor; challenge and involvement; idea support; debate; freedom; idea time; trust and openness; and risk-taking. For individuals, teams, and small and large companies, can you ensure those eight dimensions exist and thrive? The seeds of creativity thrive in a garden soil bed that contains those eight elements.

However, scholars have defined creativity and the creativity process, or stages, over time during our journey through the research literature, we can safely conclude that in all the creativity approaches, *the element of mental flexibility exists in them all*, by combining zoom in and zoom out. We hope our new definition of creativity—widening the range of choices and focusing on the very best of them—will henceforth provide a common consensual foundation acceptable to everyone interested in better understanding creativity and finding ways to cultivate it.

RESEARCH YOU CAN USE TODAY: IS CREATIVITY WHOLLY IN YOUR GENES?

What do we really *know about creativity that ordinary people can apply and use, in their efforts to become more creative? How much of creativity is determined by heredity, our genes, our DNA?*

It is the nature of research that for every finding, a *gunslinger* will come along to refute it and shoot it down. This is how you make your name, both in the Wild West and in the competitive frontier of academe. So it is easy to be confused or cynical. But unlike what Oscar Wilde said about economists (line them all up and they still won't reach a conclusion), there *are* conclusions. Here are a few of them that I think lead to action plans at once. I choose to present them as a personal letter to each reader, to conclude this chapter.

Dear Reader,

The study of genetics, and the linking of specific genes to illness, physiology, and behavior has captured the imagination of the public, and probably yours too. After reading magazines, newspapers, and web sites, you may have come to believe, like many of us, that genes, and heredity, determine who and what we are. Specifically you may believe that *creativity* is hereditary; you either have it, in your genes, or you don't, in which case there is little you can do.

This is patently false. "Creative people, like heroes, are largely made, not born." As David Shenk explains in his book *The Genius In All of Us*, "talent is not a thing, it's a process."[42] So is creativity. And like all processes, we get better at doing it by practice and hard work. So, do not believe wrongly that you are inherently uncreative, forever. Your genes are not blueprints that make you who you are. What is true is this: "Human talent and intelligence are not permanently in short supply like fossil fuel, but potentially plentiful like wind power. The problem isn't our inadequate genetic assets, but our inability, so far, to tap into what we already have."[43] As psychologist William James noted long ago, "the human individual lives far within his limits." Genes do not work on their own. They interact with the environment, a process often summarized as genes x environment (GxE). Genes are turned on and off by our surroundings and context. This process is crucial and ongoing. As biologist Patrick Bateson noted, "genes [simply] store information coding for the amino acid sequences of proteins. That is all. They certainly do not code for particular behavior patterns."[44]

In a famous study by two University of Manitoba Scientists Rod Cooper and John Zubek, done in 1958, two types of rat pups were used: (a) dumb rats, which had tested poorly in mazes, and (b) smart rats, which had tested well in mazes. Each type of rat was raised in two different environments: Enriched (many toys, ramps, mirrors, swings, slides, bells, etc.); normal and restricted (rat slums with only a food box and water). We would expect each type of rat, smart and dumb, to improve when given an enriched environment, maintaining the gap between them, right? Wrong. In the restricted environment, both dumb and smart rats performed equally. Smart rats outperformed dumb ones in normal environments. But in the enriched environment, again, smart and dumb rats performed more

or less equally. In other words, the dumb rats improved massively compared to the smart rats when their environment was enriched. The researchers concluded that the original genetic differences between *smart* and *dumb* had not been purely genetic; they were driven by GxE, by each strain's environment. Since then, supportive evidence has mounted. Temperature determines turtle and crocodile eggs' gender. Yellow grasshoppers turn black, if exposed to a burnt environment at a young age. Locusts are more muscular in a crowded environment. And so on….[45]

Two decades ago, Carnegie Mellon University researcher John Hayes summarized "cognitive processes in creativity."[46] He sought to answer the question, "what are creative people like?" His answer: Creative people work very hard, strive for originality, are more flexible than others, and are very independent. They do not have higher IQ's, or get better school grades. He adds: "No cognitive abilities have been identified which reliably distinguish between creative and non-creative people … the surprising is that all of the variables which discriminate between creative and non-creative people are motivational." Reader, it is up to you. Creativity is about motivation, the desire to create.

Genes and environment interact, to determine who we are, in a process called dynamic development. It is how Ted Williams became baseball's greatest hitter, Tiger Woods the greatest golfer, da Vinci history's most creative individual. Each invested massive effort, work, and practice.

Recently, a 30-year-old American man named Dan McLaughlin decided to quit his job and become a pro golfer—even though he had no experience in golf and little interest in it. After 4,000 hours of practice, he has reduced his golf handicap to seven, which makes him better than 85 percent of all amateur golfers.[47] He is aiming for 10,000 hours of practice. This is the threshold described by Malcolm Gladwell, whose book *Outliers: The Story of Success* attributes extraordinary success to 10,000 hours of practice.[48] Gladwell tackles a dilemma captured by a tired old joke:

Violinist: Excuse me, but—how do I get to Carnegie Hall?

Passer-by: Practice.

What determines excellence, Gladwell shows, is not genes or heredity, but 10,000 hours of practice. The greatest human achievements are driven by disciplined practice, for at least 10,000 hours. If the standard work year comprises 2,000 work hours (52 weeks times, 40 hours a week), this means excellence requires five solid years of practice. Take for instance the Beatles. They went to Hamburg in 1960, returned in 1961, and went back and forth from England to Hamburg until 1962, performing in bars and strip joints. They had 10,000 hours of practice before they cut a single record! This is far from the common notion that the Beatles simply sat down, recorded Love Me Do and reached instant fame.

Bill Gates? Born genius? Or, the fact his parents sent him at age 12 to a Seattle private school in 1968 that had a time-sharing computer terminal linked to a mainframe. Gates had his 10,000 hours of programming before most of us knew what a computer was.

Leonardo da Vinci? Born genius? da Vinci's paintings were marvelously realistic, capturing tiny precise details of the human body. To attain this realism, da Vinci stole cadavers and dissected them, even though this was strictly forbidden by the medieval Catholic Church at the time. When he drew a hand and an arm, as in the sketch The Touch of God, da Vinci knew precisely what the veins, tendons, ligaments, and bones looked like under the skin. Art, like beauty, is far more than skin deep.

An extension of GxE reveals that you can *Train Your Mind, Change Your Brain*, the title of a book by Science Writer Sharon Begley.[49] *It is possible to change the structure and function of the brain,* and alter how we think, and how we feel, and how we act. This property of the brain is now known as *neuroplasticity* and it shows that the metaphor for our brains is not concrete, set in stone from birth, but plasticene, pliable putty we can alter at will. We can train our brains to regain use of limbs disabled by stroke, break cycles of depression, learn compassion, reverse age-related decline. The brain can heal itself after trauma, and compensate for disability. So, reader, you can do this, but it does take a great deal of hard work.

Dr Norman Doidge's book *The Brain That Changes Itself*: *Stories of Personal Triumph from the Frontiers of Brain Science,* is a fascinating account of the work of Paul Bach-y-Rita, an American scholar of

Catalan Jewish background who did pioneering studies of neuroplasticity.[50] Bach-y-Rita's father had a stroke, which caused severe brain damage. Yet with his son's help, he learned to crawl, then walk, speak and write, step-by-step, painfully, using exercises that simulated daily exercises. Doidge recounts the story of Rudiger Gamm, a young German who can compute the ninth power or the fifth root of numbers, in seconds. Is he a savant? Genetically gifted? No. At age 20, working in a bank, Gamm practiced computations for four hours everyday. A scan of his brain shows that when he calculates, his brain uses five more areas for the purpose than ordinary people. His brain uses *long memory* for calculations when most people use only *short memory*. Gamm now performs on TV.

So we can safely conclude: Reader, you *can* change your brain. Specifically, you can become far more creative. Treat your brain as a muscle, and exercise it. It will surprise you. In particular, do not for a moment believe that once lost, your creative powers are gone forever. There are creativity exercises that can help; we provide many of these in Chapter Seven.

Ethan Watters describes a relatively new science known as *epigenetics*; *epi* is a Greek prefix meaning *on top of,* so epigenetics is *on top of genetics*, or, processes that determine who we are and what we are, other than the strict sequence of DNA and genes.[51] For instance, a change in diet of lab rats led to pups that differed greatly in how they looked and how resistant they were to disease. Watters quotes Duke University Professor Randy Jirtle, who concluded from his research, "it was a little eerie and a little scary to see how something as subtle as a nutritional change in the pregnant mother could have such a dramatic impact on the gene expression of the baby."

Human beings have about 24,000 genes. These genes are often regarded as *instruction manuals* for the human body. But the genes need to be told what to do, when to do it, and where. These instructions are found in a variety of chemical markers and switches. They can be turned on or off by a variety of stimuli coming from the environment. These markers and switches that turn genes on and off are as important in determining who and what we are as the genes themselves. Most surprising, notes Watters, is that these signals can be transmitted from one generation to the next, without

a single DNA sequence being changed. "What you eat or smoke today," Watters notes, "could affect the health and behavior of your great-grandchildren."

WHY IS PURE DISORGANIZED BRAINSTORMING INEFFECTIVE? AND WHY DOES CREATIVITY NEED SOME SORT OF STRUCTURED PROCESS TO BE EFFECTIVE?

If creativity is driven not by G but by GxE, genes interacting with environment, what comprises a creative environment, and a creative process? It is widely believed that creativity thrives best in open, free, chaotic, unstructured environments. Trying to tame the tiger of creativity and turn it into a docile lamb will ruin it, many believe. But over 50 years of research on CPS, show this is false. *You need a structured process for creativity, or a kind of personal creativity machine, for creativity to thrive and improve.* This machine is different for each individual, but it always has two things in common—a well defined process, that can be used again and again, to generate a massive unending flow of creative ideas, and some type of structure or *discipline*, a series of stages, that like a machine become smoother and more productive over time.

The need for an explicit structured process to drive ideation and creativity was known as early as 1942.[52] Many of the structured formulas or processes are very similar. They all have some element of what we call, in this book, zoom out/zoom in. That is, alternating steps involving a very broad scan of what is known (zoom out) and a very focused detailed scan of the problem and ways to solve it (zoom in).

Alex Osborn was a pioneer in structured creativity research. He was also a co-founder of Batten Barton Durstine & Osborn, a leading global advertising agency. Osborn developed a seven-step model for creative thinking; most of the CPS frameworks are very similar (see Box 7.1).[53] I have collected many hundreds of essays by MBA students, each of whom defined their own personal creativity machine, the process they use to generate ideas. While differing

Box 7.1: Alex Osborn's Seven-Step Model for Creative Thinking

1. Orientation: Define the problem (zoom in).
2. Preparation: Gather pertinent data (zoom out).
3. Analysis: Break down the relevant material (shift to zoom in).
4. Ideation: Pile up alternatives by way of ideas (zoom in).
5. Incubation. Let up, rest, let ideas percolate.
6. Synthesis: Put the pieces together (zoom in).
7. Evaluation: Judge the resulting ideas (zoom out).

Source: Author's own.

widely, all these machines feature stages of zoom out and stages of zoom in.

Among the stage models for creative problem solving are those of Koberg and Bagnall[54] (the universal traveler model), which is: Accept the situation, analyze it, define it, ideate, select options, implement them, and evaluate; Robert Fritz's process (conception, vision, current reality, take action, adjust, and learn, build momentum, completion, live with your creation)[55]; Barron (conception, in a prepared mind, gestation, parturition or birth, bringing up the baby)[56]; and Rossman (observe a need or difficulty, analysis, survey of all available information, formulate all objective solutions, critical analysis of solutions, birth of the new idea, experimentation to test it).[57] Note how all these structures and stages involve alternating zoom-in/zoom-out processes.

Note that in Osborn's creativity process, Stage 4, "pile up alternatives," strongly reflects our own definition of creativity as "widening the range of choices." And the whole seven-stage process alternates between zoom in and zoom out.

One of the commonest myths about creativity is that of the *eureka*! moment—a sudden insight when the solution to a problem appears instantly. eureka, in Greek, means "I have found it!" and is said to have been uttered by Archimedes. Now, there are doubtless eureka moments, we all have had them. But underneath those moments lie endless hours, days, and weeks of thought, much of it

subconscious, as our non-conscious brain works hard on problems that obsess us, almost unknown to our conscious mind. So Stage 5 of Osborn's CPS staged model is very important—incubation, allowing problems to rest, to ferment in our brains, on the way to generating a sudden eureka moment that actually took many many hours to create.

Reader, think hard about a problem, define it well—then let it rest, while listening carefully for that inner voice that will toss you a solution. You have to listen very carefully because often the voice of intuition speaks very very softly, almost unheard, and its fruits can easily be lost or ignored in the background noise.

One of the most common expressions related to creativity is that of *out of the box thinking.* To think out of the box means to think unconventionally, different from how everyone else thinks. This of course is worth attaining. But the expression *out of the box* is problematic. Because, like it or not, reader, life imposes boxes (constraints) on us that are simply part of reality and cannot be avoided. So if you treat creative thinking out of the box as a process that ignores the real boxes we all face, your ideas will always be impractical. The hard part of out of the box thinking is like house cleaning—knowing WHICH boxes we absolutely have to keep, and think within their bounds, and which boxes we can profitably ignore and discard.

Some boxes are absolutely essential for creative thinking. Reader, consider the rather extreme statement by Jaime Lerner, who served as mayor of the Brazilian city Curitiba. Only 12 days before the 1988 election, Lerner chose to run for mayor. He won. As mayor, inheriting an empty moneybox, he found creative solutions to Curitiba's problems (gridlock, traffic, lack of public transport, crowding). His favorite saying was, "if you want true creativity, knock two zero's off your budget."[58] As a small example: Curitiba could not afford tractors and mowers to cut lawns in its parks. Lerner's solution: *Municipal sheep,* who kept the grass short and whose wool funded children's programs. Lerner initiated trading bags of garbage for bags of food; the cities' slums got much cleaner. In Curitiba's bay, garbage piled up; Lerner paid fishermen for collecting bags of garbage, supplementing their income when fish were scarce and saving huge

sums in cleanup. He kept cars out of the city center and instead ran frequent buses from peripheral parking lots. Would this have happened, had Curitiba had its pockets stuffed with money? Often, money is a substitute, not a complement, for creativity.

The way to think creatively *inside the box* is to examine very carefully all the fundamental assumptions underlying the way we define the problem. Which assumption is binding? And which assumption can be abandoned? This is a formal method for innovation developed by management guru Peter Drucker and used with great success by him.[59] It enables us to think only inside the box that is truly impervious to change.

WHAT IS THE ROLE OF TEAMS IN CREATIVITY?

Creativity is an individual sport, not a team sport. This is because ideas are born in single brains, even though the same original idea sometimes occurs simultaneously to many different brains. To implement these ideas, we need teamwork, so that creativity transforms into innovation. This is partly why so many organizations struggle with innovation. The teamwork that enables effective innovation may actually inhibit individual creativity by, for instance, stimulating groupthink, a phenomenon in which the desperate search for group consensus leads to mediocre conventional thinking. So how can the individual sport of creativity live in peace and harmony with the team sport of innovation?

One approach is that of Lockheed's *skunk works.* The skunk works was an R&D center established by Lockheed, a leading U.S. defense contractor, in June 1943, in Burbank, California. It was so named because it was close to a smelly chemical plant. Lockheed sent its most brilliant creative engineers and scientists to the skunk works, gave them very very hard problems to tackle—and then left them alone, returning a year later to harvest the solutions. The result was a string of breakthroughs in aircraft design that included the U-2, SR-71 Blackbird, F-117 Nighthawk, and the F-22 Raptor. Skunk works has now become a generic word used to describe a group within an organization that is given freedom, and zero bureaucracy, often in isolation, to develop radical new ideas.[60]

Reader, if you work in a medium-size or large organization, as most of us do, you will find that getting along with others, collaboration, teamwork, cooperation, are all highly valued and even subject to monetary incentives. Find ways to preserve and strengthen your independence of thought, and your own resistance to company groupthink. Recall that the very small team that developed the Macintosh computer saw the project cancelled several times. Despite this, they continued to work underground, on weekends, to complete the project that ultimately was a huge success. The creative genius behind the Mac was an engineer named Burrell Smith.[61]

And, speaking of teams. We often speak of brainstorming as a useful way to generate creative ideas. Face-to-face brainstorming involves small or large groups of people who join together to propose creative ideas. Such group sessions are largely unstructured, and simply involve long lists of ideas written on flipchart pages. Like many topics within creativity, brainstorming has been extensively researched. The main finding? *"People in face-to-face brainstorming meetings are less efficient than when working alone*".[62] In such sessions, "fewer non-overlapping ideas per person" are generated. This contradicts our common belief that interaction and group discussion strengthen creativity, a notion even Alex Osborn (mentioned earlier) has strongly supported, noting "the average person in a brainstorming group could generate twice as many ideas as he could alone." Productivity loss in brainstorming is found in brainstorming groups with more than two members. Why is this true? Sutton and Hargadon suggest, citing research, there are several explanations: "What will others think" (reluctance to suggest ideas that may draw ridicule or laughter), free-riding (let others work and suggest), and blocking (waiting for others to finish, often for extended periods, hampers creativity).

There is a major exception to the rule that brainstorming hampers ideation, rather than strengthen it—the leading design firm IDEO based in Palo Alto, CA. IDEO uses a carefully-crafted structured process for its brainstorming. There are rules carefully observed (defer judgment, build on others' ideas, one conversation at a time, stay focused, encourage wild ideas), that tend to neutralize the three efficiency-killing aspects of brainstorming. There is a facilitator, who

defines the topic. In later stages, a responsible adult may organize the group into focused teams. Brainstorming may be a wrong word to describe the IDEO process, because a storm is a random often violent phenomenon, while the IDEO process is vigorous but highly organized—focused chaos, as IDEO founder Dave Kelly describes it. The IDEO methodology, known as The Deep Dive, has proven so effective that IDEO now teaches and transmits it to organizations, as one of its leading products, rather than simply design products.[63]

If creativity is a learned skill, then anything that can be learnt and can be taught. But how best to teach creativity, especially for children? There is a dilemma at the core of this difficult issue, which I call the *lamb and the wolf*. The prophet Isaiah said, according to the Bible, Isaiah 11.6, that "the wolf will live with the lamb, the leopard will lie down with the goat, the calf and the lion and the yearling together; and a little child will lead them." The wolf, leopard and lion are the fierce wild ideas of creativity. The lamb, the goat and the calf are the docile routine of discipline. How can these two conflicting qualities, the wolf of creativity and the lamb of discipline, be made to dwell together in harmony, before the coming of the Messiah?

First, recognize reader, that *a child will lead them.* Recall that a five-year-old child, of any nation, ethnic group, race or religion, is by definition highly creative and imaginative. Small children have not yet learned the rules. They have not yet learned what is feasible, what is possible, and what is utterly impossible. For them everything is possible. So they try everything. They break the rules, because they have not yet learned them. This child-like quality of imagining, dreaming, trying, and making everything possible, is a quality that adults can and should cherish and as much as possible, restore.

Design consultant Tom Wujec challenges groups of people to build a tall structure, using 20 sticks of spaghetti, a yard of tape, a yard of string, and a marshmallow, with the marshmallow on top.[64] He reports that in the more than 80 workshops of this sort that he has run, one group excels: Kindergarten kids!!

They start from the outset with the marshallow on top and experiment with different structures, until they find one that works. MBA graduates, in contrast, plan, strategic, organize, confer, discuss, debate

… and either run out of time, or discover that in fact marshmallows are exceedingly heavy. Kindergarten kids on average build better, taller structures than CEOs.

Marshallow

The question is, how can the lamb of discipline and the wolf of creativity lie down together? How can this be done, while retaining the qualities of discipline and order that adults have acquired? *How indeed can the wolf of creativity and the lamb of discipline dwell together, without one destroying the other?*

It is widely recognized that our public school systems, one of the great inventions of modern times, were designed to furnish factory workers for the Industrial Revolution, and many are now obsolete, having never adapted to today's knowledge-based society. Patrick Bateson summarizes research on school systems by observing that "an authoritarian approach to pre-school education thwarts children and, on the other side, an excessively permissive education leads to loss of direction."[65] This is probably true of primary and secondary education as well. Bateson goes on to observe that where pre-school teachers encourage children to play but help them plan what they're doing, the results are far better long term than when 3- to 4-year-olds are placed, prematurely, behind a desk.

One of the pioneers of structured creativity, Osborn worked to apply his CPS model to making American educational systems more creative. He condensed his seven-stage model down to only three: Fact-finding, Idea-finding and Solution-finding. These more or less correspond with our zin/zout/zi approach.

Currently, in the wake of America's NCLB Act of 2000, great emphasis has been placed in American schools on standards and on

testing. For many educators, this seems to have become a major retrogression. Owing to America's strong influence in social science and education, the testing approach has spread to other countries. The shift toward the *lamb, kid and calf* of discipline, rote learning, facts, and learning-to-take-a-test has greatly underemphasized the wild wolves of finding new ideas and new solutions. It is quite amazing that despite this system, a few young people emerge from it with their creativity still mostly intact.

CONCLUSION

There is overwhelming evidence that creativity is not inherited, that it is a skill that can be sharpened and strengthened, like a muscle, with appropriate exercise and practice, that effective creativity needs some sort of discipline or structure or process, and finally, that the vast majority of such frameworks or methods involve some variant of zoom in/zoom out, whether it is called divergent/convergent or fact-gathering and idea-gathering, or any such variation.

For those who have lost hope that the creativity of their youth can be restored, take heart! Like riding a bicycle, you never ever forget how to create ideas. The skill simply grows rusty from disuse. Scrape off the rust, and you, reader, will be astonished at what you can do.

NOTES

1. Sternberg, R. J. (2003). *Wisdom, intelligence, and creativity synthesized.* New York: Cambridge University Press.
2. Sternberg, R.J. (2006). The nature of creativity. *Creativity Research Journal*, *18*(1), 87–98.
3. Csikszentmihalyi, Mihaly. (1990). *Flow: The psychology of optimal experience*. New York: Harper and Row.
4. Torrance, E. Paul. (1972). Teaching for creativity. *Journal of Creative Behavior*, *6*(2), 114–143.
5. Kyung Hee Kim. (2006). Can we trust creativity tests? *Creativity Research Journal*, *18*(1), 3–14.
6. Bronson, Po & Merryman, Ashley. (2010). The creativity crisis. *The Daily Beast*, *Newsweek*, July. Retrieved from http://www.thedailybeast.com/newsweek/2010/07/10/the-creativity-crisis.html (accessed June 7, 2014)

7. Land, G. & Jarman, B. (1992). *Breakpoint and beyond: Mastering the futuretoday*. New York: Harper Business.
8. Zhao, Y. (2006). Creativity cannot be taught, but it can be killed. *Detroit Free Press, 10*. Retrieved from http://zhaolearning.com (accessed June 7, 2014)
9. Simonton, Dean Keith. (1999). Creativity as blind variation and selective retention: Is the creative process Darwinian? *Psychological Inquiry*, *10*(4), 309–328.
10. Guilford, J.P. (1950). Creativity. *American Psychologist*, *5*(9), 444–454.
11. Sternberg, R.J. and Dess, Nancy K. (2001). Creativity for the new millennium. *American Psychologist*, *56*(4), 332.
12. Kasof, J. (1997). Creativity and breadth of attention. *Creativity Research Journal*, *10*(4), 303–315.
13. Mumford, Michael. (2003). Where have we been, where are we going? Taking stock in creativity research. *Creativity Research Journal*, *15*(2–3), 107–120.
14. Isaksen, S.G. & Treffinger, D. (2004). Celebrating 50 years of reflective practice: Versions of creative problem solving. *Journal of Creative Behavior, 38*(2), 75–101.
15. Baer, John & Kaufman, James C. (2005). Bridging generality and specificity: The Amusement Park Theoretical (APT Model of Creativity). *Roeper Review, 27*(3), 158–163.
16. Feist, Gregory J. & Runco, Mark A. (1993). Trends in the creativity literature: An analysis of research in the Journal of Creative Behavior (1967–1989). *Creativity Research Journal, 6*(3), 271–283.
17. Feldhusen, John F. & Goh, Ban Eng. (1995). Assessing and accessing creativity: An integrative review of theory, research and development. *Creativity Research Journal*, *8*(3), 231–247.
18. Sternberg, Robert J. & Lubart, Todd J. (1996). Investing in creativity. *American Psychologist*, *51*(7), 677–688.
19. De Bono, Edward (1995). *Mind power: Discover the secrets of creative thinking*. New York: DK Publishing.
20. Urban, Klaus K. (1991).On the development of creativity in children. *Creativity Research Journal, 4*(2), 177–191.
21. Fasko, Daniel, Jr. (2000–2001). Education and creativity. *Creativity Research Journal, 13*(3–4), 317–327.
22. Torrance, E.P. (1972). Can we teach children to think creatively? *Journal of Creative Behavior,* (6), 114.
23. Osborn, Alex (1952). *Wake up your mind: 101 ways to develop creativeness*. New York: Scribners.
24. Ariely, Dan (2012). *The honest truth about dishonesty: How we lie to everyone—especially ourselves*. New York: HarperCollins.
25. Maital, S. & Seshadri, D.V.R. (2012). *Innovation management: Strategies, concepts and tools for growth and profit*. New Delhi: SAGE.
26. Simonton, Dean Keith (2003). Scientific creativity as constrained stochastic behavior: The integration of product, person and process perspectives. *Psychological Bulletin, 129*(4), 475–494.

27. Glück, Judith, Ernst, Roland, & Unger, Floortje. (2002). How creatives define creativity: Definitions reflect different types of creativity. *Creativity Research Journal*, *14*(1), 55–67.
28. Dorst, Kees & Cross, Nigel. (2001). Creativity in the design process: Co-evolution of problem-solution. *Design Studies*, *22*(5), 425–437.
29. Elsbach, Kimberly D. & Kramer, Roderick M. (2003). Assessing creativity in Hollywood Pitch Meetings: Evidence for a dual-process model of creativity judgments. *Academy of Management Journal*, *46*(3), 283–301.
30. Ibid.
31. Maital, S. (November 28, 2012). Pixar: What innovators can learn. Retrieved from http://timnovate.wordpress.com/2012/11/28/pixar-what-innovators-can-learn (accessed June 7, 2014)
32. Sawyer, Keith. (1992). Improvisational creativity: An analysis of jazz performance. *Creativity Research Journal*, *5*(3), 253–263.
33. Akin, Ömer & Akin, Cem. (1998). On the process of creativity in puzzles, inventions and designs. *Automation in Construction*, *7*(2), 123–138.
34. Behrens, R.R. (1974). On creativity and humor: An analysis of easy street. *Journal of Creative Behavior*, *8*(4), 227–238.
35. Scott, Ginamarie, Leritz, Lyle E., & Mumford, Michael D. (2004). The effectiveness of creativity training: A quantitative review. *Creativity Research Journal*, *16*(4), 361–388.
36. Oldham, Greg & Cummings, Anne. (1996). Employee creativity: Personal and contextual factors at work. *Academy of Management Journal*, *39*(3), 607–634.
37. Baas, Matthijs, De Dreu, Carsten K.W., & Nijstad, Bernard A. (2008). A meta-analysis of 25 years of mood-creativity research: Hedonic tone, activation or regulatory focus? *Psychological Bulletin*, *134*(6), 779–806.
38. Eisenberger, Robert & Shanock, Linda. (2003). Rewards, intrinsic motivation and creativity: A case study of conceptual and methodological isolation. *Creativity Research Journal*. *15*(2–3), 121–130.
39. Ibid.
40. Amabile, Teresa M. (1998). How to kill creativity. *Harvard Business Review*, September–October, 77–87.
41. Ekvall, Goran & Britz, Alexander. (2000–2001). Perceptions of the best and worst climates for creativity: Preliminary validation evidence for the situational outlook questionnaire. *Creativity Research Journal*, *13*(2), 171–184.
42. Shenk, David. (2010). *The Genius in all of us: Why everything you've been told about genetics, talent and IQ is wrong*. New York: Doubleday.
43. Ibid., p. 9.
44. Ibid., p. 21.
45. Ibid., p. 24.
46. Hayes, John R. (1990). Cognitive processes in creativity. Occasional Paper No. 18, Carnegie Mellon University, Pittsburgh, PA.
47. Kruse, Michael (March 25, 2011). Can a complete novice become a golf pro with 10,000 hours of practice? *Tamba Bay Times*.

48. Gladwell, Malcolm. (2008). *Outliers: The story of success*. New York: Little Brown.
49. Begley, Sharon. (2007). *Train your mind, change your brain: How a new science reveals our extraordinary potential to transform ourselves*. New York: Ballantine.
50. Doidge, Norman. (2007). *The brain that changes itself: Stories of personal triumph from the frontiers of brain science*. New York: Penguin.
51. Watters, Ethan. (2006). DNA is not destiny: The new science of epigenetics. *Discover Magazine*, *November*.
52. Isaksen, S.G. & Treffinger, D. (2004). *Journal of Creative Behavior, 38*(2), 75–101.
53. Osborn, Alex. (1952). *Wake up your mind: 101 ways to develop creativeness*.
54. Koberg, D. & Bagnall, J. (1974). *The universal traveler: A soft-systems guide to creativity, problem-solving, and the process of design*. Los Altos, CA: W. Kaufmann.
55. Fritz, Robert. (1993). *Creating: a practical guide to the creative process and how to use it to create anything— A work of art, a relationship, a career or a better life*. New York: Ballantine.
56. Barron, F. (1988). Putting creativity to work. In R.J. Sternberg (ed.), *The nature of creativity*. Cambridge, England: Cambridge University Press.
57. Rossman, J. (1931). *The Psychology of the inventor*. Washington DC: Inventor's Publishing.
58. American Society of Landscape Architects. Retrieved from http://www.asla.org/ContentDetail.aspx?id=30875 (accessed June 7, 2014)
59. Drucker, Peter. (1994). The theory of the business. *Harvard Business Review, 72*(5), 95–104.
60. Miller, Jay. (1995). *Lockheed Martin's Skunk works: The official history* (updated edition). Arlington, TX: Aerofax.
61. Hertzfeld, Andy. (2004). *Revolution in the valley: The insanely great story of how the Mac was made*. Sebastopol, CA: O'Reilly Media, Inc.
62. Sutton, Robert & Hargadon, Andrew. (1996). Brainstorming groups in context: Effectiveness in a product design firm. *Administrative Science Quarterly, 41*(4), 685–718.
63. ABC News (July 13, 1999). The Deep Dive IDEO's innovation approach. *Nightline*.Retrieved from http://www.abcnews.com (accessed June 7, 2014)
64. Wujec, Tom. (2010). Marshmallow Challenge. Retrieved from http://marshmallowchallenge.com/Welcome.html (accessed June 7, 2014)
65. Brockman, John. (2000). Design for life. *A Talk With Patrick Bateson*. Retrieved from http://edge.org/conversation/design-for-a-life (accessed June 7, 2014)

On Becoming Walter Mitty

The Fun of Imagining

For us, it is an article of faith that life is meant to be enjoyed. When we love life and live it to the full, we do good for the world and we do well for ourselves. This idea is very far from hedonism—the single-minded pursuit of pleasure as a sole goal. It is a world view, based on many years of life experience, our own and observations of others, that far more good things emerge from an environment of fun, joy, and laughter, than are created by pressure, tension, and stress, and the rigid boring adherence to "this is how it's done, because it's always been done so."

We believe that creativity not only does great things for others, it brightens our own lives and is in itself a good thing, because it is fun. And fun is good. The joy of imagining wild and wonderful new things is pleasurable, precisely because the boredom of doing, eating, and having the same old things is pervasive and brain-deadening. And as Warren Buffett noted, the chains of old habits are rarely felt, until they become so strong we are almost unable to liberate ourselves from them.

We ascribe to the wise observation of Nobel Physics Laureate Richard Feyneman: It is better to ask questions without answers than have answers that cannot be questioned. To paraphrase Feyneman: It is better to have new ideas, of which some may be impractical but potentially world-changing, than to stick to old ideas that simply maintain things as they are.[1] How can the sorry state of the world

ever be improved, if people believe they can only choose the same old choices that are being provided today?

We both deeply love and admire the wonderful 2,200-word short story by American author and humorist James Thurber, *The Secret Life of Walter Mitty*, first published in The New Yorker in March 1939. It captures our message beautifully.[2]

In his story, Thurber describes Walter Mitty, trapped by a habit-bound risk-averse henpecking wife. ("You're driving too fast! Why don't you wear your gloves? Did you get the puppy biscuit? Couldn't you have put [your overshoes] on in the store?") Mitty escapes in the imagination elevator. He becomes the heroic pilot of a Navy hydroplane ("Throw on the power lights! Rev her up to 8,500. We're going through!"), a brilliant surgeon ("They slipped a white gown on him; he adjusted a mask and drew on thin gloves; nurses handed him…"), a man accused of murder ("This is my Webley-Vickers 50-80", he said calmly"), and a bomber pilot ("We live only once, Sergeant, said Mitty with his faint fleeting smile, "Or do we?").

Indeed, we do live only once. Or—do we? Do we truly live to the fullest, enjoying the many opportunities and gifts and blessings given to us, allowing our imaginations full rein in the Imagination Elevator, and from time to time daring to implement one of our wild ideas and creative choices? Do we all allow full rein to the amazing imaginations given to us at birth, romping freely through the many Imagination Elevator floors at age five without bounds or constraints? Or do we chain them, repress them and extinguish them, because that is safe or because others (like Mrs Mitty) demand it? As adults, do we wrongly despair that the creativity of childhood has been lost forever and simply give up?

At the end of Thurber's wonderful story, Walter Mitty imagines declining a blindfold and faces a firing squad. "With that faint fleeting smile playing about his lips, he faced the firing squad, erect and motionless, proud and disdainful, Walter Mitty, the undefeated, inscrutable to the last."

Using our creative imaginations to the full is risky. It can feel at times like facing a firing squad. We often encounter this reaction to

our zoom in/zoom out prescription for widening our choices—how do you deal with the fear it entails?

"Creativity is risky," we are told. "Choosing and implementing new things can fail. Failure has a high price. How do we overcome the fear of failure, which is an essential element of creativity?" Creativity can sometimes feel like we are being led to a firing squad, without a blindfold.

Our response is this: The self-made Chinese billionaire Li Ka-Shing once ascribed his achievements to the fact that his desire for success was far stronger than his fear of failure. Fear of failure can be reduced by vividly imagining it, imagining worst-case outcomes, and undertaking creativity risks only when the worst-case outcome is endurable. This, in turn, can be managed by ensuring that sufficient resources are set aside to ensure survival, in the event of failure.

Desire for success is an appetite that grows with the eating. The more we imagine, the more it becomes a part of our daily lives. And unlike Walter Mitty, for whom wild imagination was an escape from a humdrum regimented existence, the Imagination Elevator can lead us to world-changing actions and innovations.

At the end of Thurber's story, we naturally wonder whatever became of Mitty and his marriage. We like to believe that he found a happy end. Perhaps, he used his soaring imagination to become a top advertising executive, founding a major global ad agency and forever silencing his carping wife. But whatever happened to him, above all we hope he never ever allowed his imagination to be shut down. New ideas are a source of joy, inspiration, and light, in a world where there is all too much darkness. This in itself justifies renewed efforts to become creative and to widen the choices available to humanity. Creativity brings both light—enjoyment—and fruit—all the good things that creative minds have brought the world, over the generations.

SUMMARY AND CONCLUSION

In the preceding eight chapters, we hope we have persuaded you of the truth of these two short words: Everyone can! Everybody can be creative—through practice and persistence. We hope that

our readers will find true value in our simple three-stage method for structured creativity. First, zoom in. Learn every single detail, down to the very smallest, of the issue, challenge or unmet want. Drench yourself in the facts, the context, the people involved. When you're satisfied, next, zoom out. Get on the imagination elevator and zoom up to a very high floor, above the clouds. Harvest wild ideas, gather a basketful of possible choices, including wild ideas, as wild as possible. Make sure your search takes you far and wide. Don't just look under the lamp post, simply because there is light there. Search in dark remote corners. Then, zoom in—come back down to earth, plant your feet solidly, and begin the hard work of choosing which idea to implement, which will prove most successful, most able to satisfy the unmet need. You may need help in either the zoom in or zoom out stages, depending on whether your main strength is discovery or delivery; But in any event, try your hand at both, because the more you do, the better you will become. You may find you need to implement Zi-Zo-Zi several times, until you get it just right. Listen to your intuition. When you have a *wow* idea, a truly disruptive innovation, one that breaks at least some of the existing rules, you will know it and so will those around you. The *wow* is necessary, if only because you will need to ignite the passion and interest of others; you can't do this all alone.

The long winding road of creativity is itself highly enjoyable. And very often, at the end of that road, wonderful things await you. So why not take the first step?

NOTES

1. Retrieved from http://www.quoteswave.com/picture-quotes/435668 (accessed June 7, 2014).
2. Thurber, James. (March 18, 1939). The secret life of Walter Mitty. *The New Yorker*. Retrieved from http://www.newyorker.com/archive/1939/03/18/390318fi_fiction_thurber?currentPage=all (accessed June 7, 2014).

Epilog

There Is Always More Than One (Right) Way…

Once, there was a young Cambridge University Physics student, named Nils.

An instructor set a one-question exam. "Show how it is possible to determine the height of a tall building with the aid of a barometer (an instrument that measures air pressure)?"

Young Nils gave an answer. The instructor failed him. Wrong!

Nils appealed. An impartial arbiter was selected to re-examine Nils' answer.

The arbiter read Nils' answer: "Take the barometer to the top of the building, attach a long rope to it, lower the barometer to the street, and then bring it up, measuring the length of the rope. The length of the rope is the height of the building."

The arbiter told Nils, your answer is quite correct. But it did not show competence in physics. Could you try answering the question again? Nils agreed gladly.

"Drop the barometer from the top of the building, time its fall with a stopwatch, then, use the formula $S = (1/2)\ at^2$ to calculate the height of the building." (a is 9.8 m/second, the force of gravity; t is time; and S is the distance the object falls).

The arbiter said this was a correct answer. But, just as Nils was leaving the room, the arbiter turned to him and asked, "do you have other ways to answer the problem?"

"Oh yes!" Nils said. "There are many ways to get the height of a tall building with a barometer. For example, on a sunny day, measure the height of the barometer, the length of its shadow, the length

of the shadow of the building—and by use of a simple proportion, get the height of the building."

"OK," the arbiter said. "And the others?"

"Take the barometer and walk up the stairs. As you climb, mark off the length of the barometer on the wall. Then count the number of marks. This will give you the height of the building in 'barometer' units."

"Any others?"

"Tie the barometer to the end of a string. Swing it as a pendulum, and determine the value of 'g', gravitational acceleration, at street level and again at the top of the building. From the difference of the two values, the height of the building can be calculated."

"Any others?"

"The best way," he said, "is to take the barometer to the basement and knock on the superintendent's door. When he answers, tell him, "Mr Superintendent, here I have a fine barometer! If you tell me the height of this building, I will give you this barometer."

"Nils," asked the arbiter, "do you know the RIGHT, or conventional, answer to the question?" ("The difference in air pressure between the top of the building and the bottom will give the height, when you know how air pressure changes with height.")

"Of course!" Nils said. "But I'm totally fed up with high school and college instructors trying to teach me the 'right' answers, trying to teach me how to think."

The young Nils was Nils Bohr, later, Nobel Laureate in Physics, 1922, for discovering the structure of atoms.[1]

NOTE

1. This story, though widely told, is apocryphal. It is based on a 1959 essay, Angels on a Pin, by Alexander Calandra, professor of physics at Washington University in St. Louis, Missouri. [Calandra, Alexander. (1995). Angels on the head of a pin. In Elizabeth Penfield and Theodora Hill (eds), *Quick takes: Short model essays for basic composition* (pp. 67–69). Watson-Guptill Publisher.] Our point is, though truth is an inviolable axiom for non-fiction books, this too is a rule that can be innovatively broken. The story *could* be true. And it

makes a vivid point, memorably. Jonah Lehrer's wonderful book *Imagination: How Creativity Works* (Houghton Mifflin Harcourt, 2012) was removed from shelves, and the author was vilified, because he was found to have invented some words of dialogue he claimed were spoken by Bob Dylan. The result has robbed thousands of people from reading a book that could change their lives. Dylan's dialogue were fictional, but Lehrer used them in a manner utterly faithful to truth, to the truth of creativity.

About the Authors

Arie, Shlomo, and Zi-Zo-Zi

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Shlomo Maital

About 40 years ago, at the beginning of the 1970s, when I was a student of economics and management at the Technion–Israel Institute of Technology, Haifa, Israel, a new lecturer arrived, a strange bird in the cold arid terrain of an institute of technology. At this time, a story was making rounds at Technion, in one of the faculties, a lecturer had asked students to calculate the diameter of a pipe needed to deliver so many thousands of cubic meters of blood, every day, from Haifa to Tel Aviv ... and not a single student asked, whose blood were we talking about?

In economics, too, the dominant approach at Technion was the mathematical approach, which aspired to represent every economic process as a series of equations, and to predict economic developments by mathematically manipulating those equations.

At the time, I was a student and did not allow myself to admit that my intuition rebelled against this approach, but then, Dr Shlomo Maital appeared and spoke a different language. He taught us macroeconomics and for the first time I heard from him about the powerful role that psychology plays in economic processes.

Today, this is widely accepted, and several economists have even won Nobel Prizes for their boldness and creativity in developing behavioral economics, but in those days this was all new, fresh, and won my heart.

One day, when we were discussing models of tax evasion under various economic circumstances, I suggested to Shlomo that we test the models with a psychological experiment. I proposed a game in which the participants got salary slips from which income tax was automatically deducted, according to the income that each participant reported. The winner of the game was the one who had the highest after-tax income, so everyone was motivated to declare less income than they actually received. From time to time, a surprise audit was conducted, on some of the participants, and those who evaded tax were punished by fines, or by ejection from the game. In this way, we examined the impact of the rate of income tax on evasion, and the effect of the size of fines and the frequency of the audits on evasion, along with other relevant topics.

Apparently, this was the first time that this subject (tax evasion) had been tackled in this innovative manner, through a simulated experiment, and the article that we published after the experiment was published in a major international economics journal, and attracted a great deal of attention.

Since then, Shlomo and I kept in touch, even after I finished my studies and helped co-found an advertising agency, and met from time to time.

At the time, Shlomo began to specialize in innovation, wrote books on the subject and consulted for leading high-tech innovation-intensive companies. He became very curious about the working methods and creativity approaches that generated advertising concepts. He perceived, rightly, that ad agencies were factories for creativity, and wondered what high-tech industry could learn from them.

At our meetings over the years, we discussed topics, some of which are addressed in our book, like the difference between analysts who study problems in depth, what we call in this book zoom in, and the creative people who try to find a new concept in a domain not yet studied, a process we call zoom out.

A year ago, at one of our meetings, Shlomo suggested that we write a book on creativity together, that would give expression to

the wisdom and experience we had accumulated on the subject. It was an exciting challenge, and we tackled the task with joy and enthusiasm.

Despite all the academic knowledge Shlomo possessed, (he had in the meantime become a chaired professor at Technion and lectured all over the world, in Holland, France, Singapore, and elsewhere), and despite all the experience I had accumulated, we had not found a clear methodology for creativity.

On one hand, there were *eureka* approaches, brainstorming, incubation, and so on, that assume that at a certain moment, suddenly a breakthrough idea will appear from nowhere. What that *nowhere* is, and how an idea suddenly appears from nowhere, nobody could explain.

On the other hand, there were approaches that tried to systematically squeeze innovation into improving existing concepts, by adding or subtracting certain elements, etc.

In our fascinating meetings, we examined the existing knowledge of creativity that had been published, and tried to reformulate a general approach, which would enable every person to think more creatively about every aspect of their lives. I hope we succeeded.

At one of our meetings, Shlomo said, so what? So, we'll publish yet another book? More words on paper? Where is our creativity?

Until that moment, we hadn't thought much about it, we just wrote words. It was an excellent question.

The simplistic solution, to publish a digital book, did not arouse our passion. Today's digital books are not really different from the first Bible printed by Johannes Gutenberg in 1439, some 574 years ago. The difference is solely the way the book is read, on a screen instead of on paper. Shlomo's question initiated a discussion about how a futuristic book should look, if we used our own creativity tools to reinvent it?

By the way, about three years before I set out to write a book with Shlomo, I wrote and published a book together with my friend Professor Carlo Strenger, of the Psychology Department at Tel Aviv University. The book, titled *Why Not Live Twice?*, deals with how we need to change our ways of thinking, for those who are 50 and older, in the wake of the dramatic increase in life expectancy. In the process of writing this book, the initial formulation of zoom

in/zoom out occurred to me, and I thank Carlo for his role in this. The zoom in/zoom out notion found wider and deeper expression in this book on creativity; How it was written is itself of interest and will be described in the next section.

THE BOOXITE PROJECT: HOW BOOKS WILL LOOK IN THE FUTURE

Because we wrote this book, we tried to write according to *the book*—zoom in on the essence of the book as it is today, zoom out in the imagination elevator to the distant horizon in which everything is possible for books, and then back to zoom in … to choose the best option of all at this point in time.

What is a book? How is it different from a letter? Newspaper? Magazine?

Here are a few characteristics of a book, as it is perceived today:

1. A book is a text that is reproduced in a large number of copies, unlike a personal letter.
2. The text contains content relevant for an extended period of time, unlike a magazine or newspaper.
3. The text includes at least several thousand words, and in general tens or hundreds or thousands of words.
4. The book is printed on paper or appears on a digital screen.
5. A book is bound with a cover that includes its title, the name of the author or authors, the publisher, and other details such as the date of printing and the edition.

    a. The process of producing an edition is done by the publisher, who takes care of the editing of the manuscript, employing a graphic designer, integration of photographs, illustrations, diagrams, indexes, etc. The publisher organizes all the materials and prepares a final version that is sent to the printer or to the digital shop. The interesting aspect of this characteristic of the book is this: Ever since Gutenberg, and to this day, a book is a static compilation that changes only from one edition to the next, and is not

dynamic, as is for instance a photograph that can change endlessly when various people work on it with editing software.

6. A book is a homogeneous product identical for all and is not individualized.
7. A book printed on paper provides visual content only separately; you can attach to books audio and video files, in which for instance the book is recorded in audio, or DVDs that include video clips. For digital books you can integrate video and audio files and, for instance, the possibility to translate words or to add explanations.
8. Digital books are generally sold for reading on dedicated devices, like Kindle and iPad.

From our point of view, the most interesting insight in this first stage, zoom in, is the fact that Gutenberg's printing press technology that printed the very first book, with which we are familiar today, requires that the book should be closed before printing, in order to prepare printing press plates, which cannot then be altered, until a new edition is prepared. Therefore, every book printed in a particular edition is the same. This important characteristic has not changed, even with the appearance of digital books. Every copy of the edition of a particular book is still the same.

The question we asked ourselves, at this stage is, Is this the ONLY way to prepare a book? Are there any other ways? Are there other options?

In the second phase, zoom out, we went up the imagination elevator to the 222nd floor, the floor on which all the never published books exist. On this floor, wild and wonderful publishing technologies were found, including books beamed up onto clouds with lasers enabling everyone to read them collectively at high quality.

After wandering about this area for a long time, we encountered something that we liked, because it answered the key question that preoccupied us in the zoom in stage—Do all the copies of a book have to be identical?

What we saw was that a computerized system makes it possible for an author to upload a manuscript to a web site, where it can be sold as is, the way things are done today through self-publishing, or—to our surprise, we discovered that an author can invite anyone who is interested to take the original manuscript and do what they like with it.

Various designers can suggest different designs for the book.

Translators can translate the book into various languages.

Whoever is interested can propose summaries and abstracts of the book, of any length.

Artists, illustrators, photographers can propose adding illustrations, pictures, and photographs. Others can propose a variety of appendices. Still others can suggest recording the books in various languages. And still others will suggest adding video clips and animation.

The resulting product derived from the original manuscript is a kind of decision tree, with many branches, each of which reflects an enrichment of the original version in a highly dynamic process.

A reader facing this wealth of choice can choose the language in which he or she is interested, the length of the book, its design, and any other element that interests him or her, and receive, on a digital screen, a personalized book customized to his or her wants and needs. The final price paid will be divided, of course, between the original author and the others who made various contributions, according to a formula.

Consider, for instance, a textbook; All students prepare or buy summaries of them. Why should not a student be able to legitimately choose among various summaries, along with the original book, summaries for which both, the original author and the person who prepared the index, are compensated monetarily? Why not make it possible to update the book, in real time, by other authors who will add paragraphs, chapters, or appendices?

Or consider travel books. Why should not travelers who experience a particular part of the world propose, in real time, a chapter of their own with photographs, stories, and up-to-date tips, and in return receive some payment? Think about a book on philosophy. Why not permit those who want to, to contribute an addition or a different perspective, and propose their own chapter, at the choice of the reader who can buy it together with the original book?

Consider even a whodunit book or an adventure novel. Why not let those who wish add a sequel, showing what happened to the original hero after the original book ends?

The idea that an original manuscript is not frozen, not set in concrete, but initiates additional creativity by other creative talents, whoever and wherever they are, greatly excited us. Therefore, we called the idea BooXite.

And then, while we were still gripped by excitement, we went down the imagination elevator to the ground floor of reality. At this stage of zoom in, we tried to decide what would be most practical to achieve.

We examined the various possibilities to launch a startup that would raise money and tried to implement our idea. A hardheaded examination taught us that this is not feasible. Shlomo continued to lecture at various places around the world, and I was busy with another venture, so the chance of succeeding with our idea at this stage was very small. Another possibility was to formulate our idea as a patent application. This had a number of advantages.

1. It forced us to formulate our idea more precisely.
2. It required us to examine it against other alternatives that had already been proposed.
3. If the patent were approved, we would receive validation that our idea is a value-creating invention.
4. If our patent request was rejected, we could propose our idea for free and wide use to anyone who wished to implement it, while advising not to infringe on existing patents.

In order to prepare the patent, we joined forces with a young computer expert, familiar with the intricacies of modern technology, named Yanir Shahak. Together we tackled the subject and implemented the idea with the help of a Tel Aviv patent lawyer.

At the early stages it was clear that gaining patent protection for our idea would be difficult, because of the fact that our innovation was conceptual and not technological, captured in some device or other.

It is important to understand that in principle, innovation in the world of patents is primarily technological. In a few countries you

can indeed request for patent protection for business processes, but it is very difficult to succeed in this.

This difficulty did not deter us, simply because we were not concerned about having the patent request declined. This too was positive, from our point of view.

So, in just a few months, a vague idea was transformed into patent request number and it showed how a concept created by zoom out becomes, at the zoom-in stage, something concrete and implementable.

The response of the patent examiner, given quite quickly, taught us a number of things.

First, it would indeed be difficult for us to persuade him that this is indeed a technological innovation.

Second, some of the components of our idea already appear, though in different form, in previous patents and patent requests.

In a personal conversation we had with the examiner, he praised our innovative concept but claimed that it cannot be patented.

We did not intend to appeal the decision and began a battle, as so often happens in such cases; It was sufficient for us that the way was paved for anyone who wanted to embrace our idea to do so, while taking due care in any event not to infringe, and while consulting an expert in patent law.

What we have not yet done at the moment is still a dream, to apply our idea to this book, when it is published. We do not yet know, as we write these lines, whether we will succeed; all those interested in our venture are invited to visit our web site http://booxite.net/landing/booxite-digital-book.html (accessed June 9, 2014) and examine where we stand.

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Arie Ruttenberg is currently the CEO of Club 50. He was born in Tel Aviv, on August 8, 1948, less than three months after the state of Israel achieved independence. His parents were Holocaust survivors who immigrated to Israel a year before his birth, from the European death camps. He was born at the height of Israel's War of Independence, and at the age of 8, experienced

another war, the Sinai Campaign (1956). At age 19, as a combat soldier in the Israel Defense Forces, he was seriously injured by an explosive device that damaged both his sight and his hearing, and was declared 100 percent disabled. He ascribes his creativity and innovative skills to the instability and the hardships in his life, which forced him constantly to search for original solutions in order to deal with reality.

Despite the physical challenges Ruttenberg began to study economics and management at the Technion, Haifa, in 1969. Technion is Israel's leading science and technology university, and among the best institutions of its kind in the world. At Technion, Ruttenberg met Shlomo Maital, one of his economics instructors, and with him researched and published an article that was to become a path-breaking paper in behavioral economics and experimental economics.[1] From that time, they have remained in close touch, stimulating each other with ideas on creativity, in the course of their careers.

On completing his Technion studies, Ruttenberg chose to enter an industry that gave full expression to his creativity, the world of advertising. After a meteoric career of only four years, during which he became a partner in an ad agency, he opened his own advertising agency, in 1979, at age 31, together with some partners. The ad agency Kesher Barel became the largest of its kind in Israel, and in 2005 was sold to the global ad agency McCann Erickson. Today, McCann Erickson Israel is the largest, and leading, ad agency in Israel and has one of the best global networks. With his retirement from the advertising industry in 2005, at age 57, Ruttenberg decided to contribute to a revolution in thinking that seemed especially vital to him at the time—adapting the modern lifestyle to the new reality of lengthening life expectancy. With his creative vision, that we are at the onset of a new era, *People Live Twice*, he wrote a book by that name, and then launched a company with several friends, to implement his vision. The company, Club 50, is successful and Ruttenberg continues to be active in implementing his vision of second careers for those over 50.

Ruttenberg continues his activities in Club 50, which supplies new social contacts, financial services, health services, leisure services, and

more through an advanced communications network that includes a web site, a wide span of newsletters, cell phone communications, and a new magazine. Ruttenberg published in 2008, together with Psychologist Carlo Strenger, the book *Why Not Live Twice*. A decade earlier, he published the book *It's OK Everything's Not OK*, an illustrated book for children, in Hebrew, now available in English as well.

Shlomo Maital is currently a Senior Research Associate, Science & Technology, Samuel Neaman Institute for Advanced Studies and also Professor (Emeritus) at Israel Institute of Technology, Technion. He was the academic director of TIM–Technion Institute of Management, Israel's leading executive leadership development institute and a pioneer in action-learning methods, from 1998 to 2009, working with over 200 high-tech companies and startups. He was summer Visiting Professor for 20 years at MIT Sloan School of Management for Management of Technology M.Sc. program, teaching over 1,000 research and development (R&D) engineers from 40 countries. He is the author, co-author and editor of 12 books, including *Technion Nation* (2012), *Global Risk/Global Opportunity* (SAGE, 2009), *Innovation Management* (SAGE, 2007; 2nd edition, 2012), and *Executive Economics* (The Free Press, 1994), translated into seven languages. He was co-founder of SABE–Society for Advancement of Behavioral Economics.

Shlomo Maital is married, with four children and 12 grandchildren. He completed the New York marathon in 1985 in 3 hours and 51 minutes, and in April 2007, completed the Boston marathon in about 5 hours. In February 2008 he climbed Mt. Kilimanjaro and reached Uhuru Summit. In 2010 he climbed Mt. Kazbek, Georgia. He celebrated his 70th birthday with his children and grandchildren by completing a 70 km hike in the Dead Sea Mountains.

NOTE

1. Friedland, N., Maital, S., & Ruttenberg, A. (1978). A simulation study of tax evasion. *Journal of Public Economics, 10*, 107–116.

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Yet to come