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Strange children should smile at each other and say, 'Let's play.'

F. Scott Fitzgerald

To understand the place of communication in human society, let's start at the beginning. You could say that the whole story of humanity is wrapped up in the evolution of how we communicate. From wordless grunts to hieroglyphics, the first phonetic alphabets to today's eBooks, humans have developed remarkable inventions for a single purpose: the transmission of ideas. In the quest to more perfectly share an idea or a thought with others, our methods of communication change, and with it, so too does society.

When we interact with others, we are attempting to establish a visceral connection. When we engage with someone intellectually, emotionally, or physically, we create a spark, a bond — something more precious than gold. When we communicate, whether it's speaking or writing, we do our best in choosing among all possible words, expressions, and gestures to pick those that most accurately match our intent, the ones that capture the exact message we're trying to send with special care given to how that message will be received. Unfortunately, perfect matches rarely happen.

In particular, quantum physics, which essentially studies the relationship between energy and particles, may have a special relevance to the mechanics of our social world and how we relate to each other. Whether it's having a conversation with your mother, waging a hard-fought political campaign, or placing a to-go order, our interactions do not take place in a vacuum — they have significance that ripples through time and space. Somewhere in the esoteric equations of quantum physics, there may be an explanation for the unforeseen, yet inevitable consequences of our communications.

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Think of all the millions of words in all the languages of the world. Now think of the infinite combinations and permutations among them. Consider the countless ways that utterances can be modified by tone, facial expression, pitch, and volume. It's on the scale of the infinite combinations of notes and expressions of various arrangements of musical instruments.

Let us think, then, of each component of expression as a unit. Similar to a molecule or a living cell. The behavior of these units of expression, when combined, can be pat and predictable, perhaps like the valedictorian speech at a high school graduation. But these expressions can also be strange, mysterious, and even mystical.

When we combine words, gestures, and other signals, it all becomes greater than the sum of its parts. From here we can formulate a notion of *Quantum Communications*: the energy behind an act of communication is more important than the words, facial expressions, and gestures that comprise it. In physics, a "quantum leap" refers to the sudden transition a particle makes from one level of energy to another. It is abrupt, with no in-between state. Here or there. One or zero. This is what we're after in our communications: the energy that ignites us to *do something*. To believe. To care. To go from one state of being to another.

We have inherited communication from distant evolutionary ancestors, so we engage in it instinctively, not always understanding the logic. Communication is like particles of energy that we exchange. As we slide and swivel past each other, this exchange functions as currency for attraction and success.

In 1939, Dr. Adolf Butenandt was awarded a Nobel Prize for discovering and isolating human sex hormones. Later he pioneered investigations into what attracts insects to each other. It wasn't until 1959 that Dr. Butenandt finally discovered the secret ingredient of silkworm romance: the pheromone bombykol. In his extensive experiments, he harvested just 6.4 mg of bombykol, less than a thousandth of an ounce, from more than half a million silkworms. Even this minute amount was enough to arouse half the males of any sample.

Bombykol communicates the desire for sex; thus, it helps to perpetuate the silkworm species. But bombykol is just one pheromone in one species; how do pheromones work in general from silkworms to humans? Pheromones emanate from one animal and register with another, but neither may understand why they are experiencing attraction. Desire creates intention, which may inspire action and cause a reaction, but how

these intentions and actions and reactions all come together exactly is a mysterious alchemy.

Humans, like almost every other living organism, rely on pheromones for behavioral cues. We involuntarily give off and receive these complex chemical compounds through scent, taste, and other receptors. Sometimes referred to as *ecto-hormones* for the way they trigger reactions in others, pheromones constitute an entire communication system, a catalyst for species perpetuation. As fundamental as pheromones are in serving our most basic instinct — reproduction — communication, extrapolated to its broader applications, is just as elemental to any notion of success.

CARING

Let's take a look at human behavior from a different angle. On a basic level, all mental and physical activity can be attributed to synaptic transmission. Synapses essentially send messages that tell your body to do something. To feel. To move. To create. To care. The energy passing through synapses elicits an all-or-nothing response by neurons in the brain and is a massive undertaking. Scientists estimate we possess around 100 billion neurons, each in contact with approximately 10,000 others. An impulse reaches these neurons, either from within the brain or from elsewhere in the body, and it either triggers a response or fails to do so. With speed that puts even today's most advanced supercomputers to shame, a stimulus sets off a chain of micro-reactions that, when taken all together, offer us the basis of all decision-making: first impressions, hunches, and intuition.

Science is beginning to unravel these complex processes in the brain, which distill a potent mix — our personal story, our familial history, the culture we were raised in, the culture we currently operate in, our emotions, physical/geographical location, and so much else — into a single conclusion or concept. We come to a fork in the road: either invest in something or let it go. Our own personal quantum leap — here or there? Ultimately, there is one criterion that drives all our choices: *Do we care or not*? This question informs how we interact with others and profoundly impacts how we make decisions.

Despite its binary nature at the granular level, the decision-making process becomes much more complex in the aggregate. Caring is not a

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science, but an art — which is another way of saying it's tricky. Care too little and you relinquish the invaluable ability to tell your own story, to advocate for yourself and others. Ennui often results. Care too much, however, and you strangle your environment, which leads to micromanaging everyone and everything. This can lead to anxiety (for you and everyone in your orbit), distraction, loss of productivity and creativity, stress, and strained relationships.

There is caring in the sense of becoming personally invested in something, and then there is caring in the sense of looking out for others. Naturally, these two senses often overlap. In their book *The Art of Happiness: A Handbook for Living*, the Dalai Lama and Dr. Howard C. Cutler offer wisdom that straddles religion and science. Cutler, a psychiatrist, adds expertise in the science of human happiness to his co-writer's spiritual wisdom. They reflect,

Reaching out to others may be as fundamental to our nature as communication. One could draw an analogy with the development of language which, like the capacity for compassion and altruism, is one of the magnificent features of the human race.

The message to readers is to turn their focus outward instead of inward, to be more selfless and less selfish — in both word and deed. This turning outward is pertinent to our purposes because we're discussing communication. It is not enough that we are clear about what we wish to convey. We must also look out for our audience to ensure that our message is just as clear to them.

Scientists have now identified areas of the brain that are devoted to the *potential* for language, specifically Broca's and Wernicke's areas, which play a large role in production and processing. Even though humans may be hardwired for language and communication, this ability doesn't develop automatically. Language must be learned. The Dalai Lama claims that the human potential for compassion is similar — he even helped found a research center at Stanford University that investigates the development of compassion. He believes that, given the right circumstances and conditions, the seed of compassion will take root. With practice, we can develop the part of our brain responsible for compassion and caring — much in the same way our brain develops language proficiency. Fail to practice compassion and that part of the brain will stagnate. Here again, communication and compassion are directly linked since compassion gets lost if

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we are not able to express it to one other. Compassion ultimately depends on communication.

Cultivated by understanding others, compassion is a fundamental component of effective leadership. Recall the old adage about putting yourself in someone else's shoes: if you can connect with and understand people, you have an unquantifiable advantage. As we will demonstrate, this advantage is critical to being successful in a crisis situation. To build a house, raise children, feed the homeless, or run a Fortune 500 company, we must have compassion and empathy.

Of course, we should also consider whether compassion is relevant for someone in a position of managing a budget or the harsh realities of a business closing down. While a person may feel compassion, this emotion alone will not prevent layoffs and factories being shuttered. Let's shift the focus from others to ourselves for a moment. "The purpose of life is happiness," says the Dalai Lama unequivocally. "The turning-toward happiness as a valid goal and the conscious decision to seek happiness in a systematic manner can profoundly change the rest of our lives." We must ask ourselves, Do I want to be happy or not? If you do, you must do something about it: humans must express needs and desires. To be happy, we must communicate.

If compassion and happiness call for communication, communication calls for self-awareness. In Plato's Phaedrus, Socrates compares the tripartite soul to a charioteer and two winged steeds. The charioteer is our reason. One horse represents our rational, moral side, and the other represents our irrational, impulsive side. I simplify the analogy to illustrate our consciousness (or awareness). This version of the analogy grants us more agency by putting the reins directly in our hands. Let's say we're the chariot driver and as such, it's our duty (and our great challenge) to keep our two horses — one of reason, one of emotion — moving in unison. Too much emotion or too much reason and one of the horses runs off the road and our chariot winds up in a ditch.

So, what does all this have to do with communication? Everything. Communication is about the control of emotions and the management of reasoning. The very act of communicating begins with regulating emotional reactions and responses, matching them with what we care about the most (our most essential and meaningful priorities), balancing logic and desire, and finally determining how best to use language to share what we have distilled. Research shows us that self-management

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of emotions is the most important skill in determining achievement and success. This control, our chariot driver, is what regulates our communication with the outside world as well — a concept emphasized in the stories throughout this book.

People can usually sense when another person is happy or angry. Those who are particularly aware or know us well can sense our mood right away, even from a distance. My wife, for instance, can read me the moment she sees me and knows exactly how I'm feeling. Even if I say nothing, she knows when something is bothering me, because mostly I'm fairly jovial. Some may describe it as intuition. The field of organizational development calls it *emotional intelligence*. My friend, Michael Diettrich Chastain, who is a therapist and the author of *Changes: The Busy Professional's Guide to Reducing Stress, Accomplishing Goals and Mastering Adaptability*, believes people can build this capacity to interpret others' emotions and train for it in much the same way one trains for a marathon.

There is good reason to train. Happiness is a contagion. It begets more happiness. Regrettably, the same can be said for anger. If you show people anger, they'll respond with anger. Bad vibes breed more bad vibes. It's a law of human nature, appearing in the proverbs of Ancient Egypt, underpinning such maxims as "The Golden Rule," and drawing points of comparison among the teachings of Jesus, the Buddha, Confucius, Muhammad, Lao Tzu, and even the Existentialist philosopher, Jean-Paul Sartre. Social psychologists call it the "Law of Reciprocity." Neuroscience has even identified so-called "mirror neurons" in the brain, which account for certain responses, such as our tendency to smile back at someone who smiles at us.

ENERGY

If words are the warp and weft of communication, the energy behind them is the loom. Unfortunately, sometimes in spite of ourselves we send the listener in the wrong direction. We must continually *disambiguate* — or clarify — our communication. We often do so instantaneously. Considering the countless ways to convey a message — words, tone, and volume, for example — how can we be sure that what we have chosen is the most unadulterated expression of our intention? That we say what we

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really mean to say? That our words match our intention? That our words match our body language? The form of communication matters just as much. When we want a message to stick, circumstances will determine if having a face-to-face conversation will be more effective than placing a call or sending a note. Texts have the potential to be misinterpreted because they lack tone, pitch, and other qualities that capture the full extent of a message's complexity. To mitigate this misunderstanding, emoji designers have tapped into the nuance of emotion to convey sentiments that many would find difficult to express in words.

Verbal communication and written communication have different advantages and limitations. In one respect, verbal communication has the advantage of being enhanced by inflection — and, if we can see the person — facial expression, and gesture. Then again, spoken language can be ephemeral. As soon as speech stops ringing in our ears, it becomes a ghost, subject to distortion in our error-prone memory or lost to oblivion altogether. (Written communication, on the other hand, is more permanent by its nature as it can be referred back to repeatedly.) Though permanence is more difficult to achieve with spoken content, we tend to remember what someone said to us that triggered a particularly intense emotion. As dynamic speakers know, if they neglect to engage audience members emotionally, they soon will lose them.

Despite the different characteristics of the various forms, every communication is a form of energy released into the ether. Just as tiny pulses provide the necessary energy for all cellular function, so too does communication supply power to all human activity. Oratory, advertisements, songs, literature, and art transcend time and space and stir emotions in new audiences. Think of the great speeches throughout American history. Dr. King: "I have a dream..." President Kennedy: "Ask not what your country can do for you..." President Lincoln: "Four Score and seven years ago..." Or the great books that have influenced and inspired humanity. They encapsulate so much more than words. Even more than mere ideas. They illustrate the effect that the principles of quantum physics have on communication. A quantum communication. They live on through new generations because they continue to connect hearts and minds. These combinations of words influence lives and culture. They represent leaps in human progress and shared understanding. They are not just products of historical context; they make history, they create the future.

RELATIVITY

I have spent much of my career advising clients on communications strategies. I am not a physicist. So, to better understand my hypothesis that a combination of words and signals can become greater — or lesser — than the sum of its parts, I turned to fellow swimmer Dr. Jeff Bennett, who also happens to be a world-renowned astrophysicist. I admire Professor Bennett for his deep understanding of the universe and for his dedication to help others deepen their understanding as well. He is a pioneer in space education. His book *Max Goes to the Moon* was the first book ever to be read in space as a part of NASA's "Story Time from Space" program. In 2014, Dr. Bennett published a groundbreaking book revisiting Einstein's Theory of Relativity called *What is Relativity?: An Intuitive Introduction to Einstein's Theories, and Why They Matter.*

Our conversation made me think about applying the Theory of Relativity to the act of communication. Einstein's theory posits that our perspective depends upon where we stand at a particular point in time and space. In a nutshell, Einstein concluded that the laws of physics are the same for all observers. He discovered that space and time are interdependent, and that there is a continuum known as space-time. The implications of this discovery continue to astound us. Theoretically, at least, events that occur at one time for one observer could occur at different times for others.

In terms of communication, this corresponds to the idea that the same message will mean different things at different times and places. As the context of a message changes, so too does the message for each sender and recipient. Theoretical physicist Richard Feynman said that context is everything — even in physics. Nothing can exist without its context. A message might mean one thing the first time we see it and something completely different the fifth time. We will continue to explore this relationship (one that advertisers and marketers spend a lot of time thinking about) in Part 2.

My discussions with Professor Bennett also led me to investigate the antagonistic force of *Entropy*. The Second Law of Thermodynamics states that the universe has a general tendency toward disorder. The very essence of a biological organism, however, is to create order. Imagine a character out of an old Western trying to create a good life on the rugged and hostile plains or Elsa in *Frozen* seeking clarity about who she is and her

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powers. Such ambition in the face of adversity doesn't happen by accident. Neither in the movies nor in real life. Order requires intention, and it also requires energy. To create order, any organism or system must communicate, which happens through the exchange of energy. But where does this energy come from? Our heart? The sun? The universe? A god?

These questions got me thinking about schools of fish and the many other species of animals that move together in a self-organizing group. In the research paper, "The Self-Organizing Quantum Universe," published in *Scientific American*, authors Jan Ambjørn, Jerzy Jurkiewicz, and Renate Loll compare the flight of European starlings to a dynamic at work in quantum physics. Starlings simultaneously moving together in a form of small-scale organized chaos (a phenomenon called *murmuration*) nevertheless demonstrate order and trends. Each bird is only in proximity to a few other birds. No leader tells them what to do. Yet they move together as a whole. The many become one.

Human behavior and cultural movements operate similarly. We move according to a *zeitgeist*, a German term that means the "spirit of the times." Formed by our values and norms, the zeitgeist is essentially the collective mood that we come to associate with a particular historical era. The point being, we are self-organizing creatures. True, we have leaders, but while they may tell us what to do every now and then, ultimately we make our own decisions. The same principles underlying flocking behavior, schools of fish, and even the causal nature of the universe are also present in people. We are all starlings self-organizing into some greater whole. (I've learned that the concept of murmuration can also be neatly applied to the flocking behavior of teenagers.)

Most of us think of a system as having fixed dimensions. A profit-and-loss report or a cost/benefit analysis assumes a classical space, that which is used to describe a physical system, such as a box or a road. But after talking to Dr. Bennett I began to consider another view. I studied systems that function in a *Hilbert Space*, a space whose dimensions are limitless. The points within it, moving all around, are not fixed in time or space. A quantum particle, as opposed to a classical particle, doesn't have a precise position or precise momentum. This is explained by the Heisenberg Uncertainty Principle, which, simply put, states that the more certainty with which we know the location of an object, the less certain we can be of its velocity, and vice-versa. Essentially this means that classical concepts, such as position and momentum, can only be used in approximate ways

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when applied to a quantum system. They are impossible to predict with complete confidence because the laws of quantum dynamics are often "random" or probabilistic, not deterministic.

Unpredictability is intrinsic to the world itself. Consider weather, earth-quakes, the stock market, elections, and the whims of dictators. This is precisely what makes quantum theory so apt in describing communications. There are no deterministic laws. Quantum mechanics may as well be describing a political campaign or an elementary school classroom as particles. We are all creatures moving around with different moods and impulses at any given moment. The way we exchange signals varies based upon our context, our history, and the way we anticipate an audience receiving our message. There is no certainty.

But... and this may be the most important information I share with you: if we develop certain skills, we can zero in with greater accuracy on matching intent, articulation, and audience. We can never know exactly what someone *will* do, but we can determine what someone is *likely* to do. (Think public opinion polling.) This sharper focus becomes paramount when we're engaged in a crisis situation or running an advertising campaign or managing a big public policy issue.

We can develop the muscles of communication just as the Dalai Lama insists we can develop our compassion and caring. Our mission is not just to create something greater than the sum of its parts, but to develop the strength to communicate what we've done to the world. If we adopt a quantum perspective, anything is possible.



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