

# DON'T BE SUCH A SCIENTIST

Talking Substance in an Age of Style

by  
Randy Olson

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## Don't Be So Cerebral

*In 2000 Premiere magazine ran an article about the making of the movie The Perfect Storm. The actor Mark "Marky Mark" Wahlberg talked about filming scenes off the coast of Massachusetts and told of glancing over his shoulder and spotting gray whales passing nearby. Even though it had been six years since I had resigned from my professorship, the scientist's eye never fades, and I couldn't help but be tripped up by that detail. I wrote a letter to the editor of the magazine explaining that those whales were either something other than gray whales (long since extinct in the Atlantic Ocean) or stunt doubles flown in from the Pacific Ocean. They published it. A couple of months later I ended up at a Hollywood party, spotted the issue of Premiere with my letter, proudly said to the group, "Hey, everybody, listen to this," and then proceeded to read my letter to the editor aloud. When I finished I looked up, beaming, but instead of applause I saw expressions of "Huh?" My best friend from film school, Jason Ensler, finally broke the tension by saying, "You know, the thing about Randy is, half the time he's like the coolest guy any of us know in all of Hollywood. But the other half of the time . . . he's a total dork."*

**S**o we begin with the crazy acting teacher and some of the simple concepts she pounded into our heads night after night. There was one that emerged supreme seven years later, when I returned to working with

academics. It is so simple and yet so powerful that I choose to start this first chapter with it. Most of what I have to say descends from this notion.

Here it is . . .

### The Four Organs Theory of Connecting with the Mass Audience

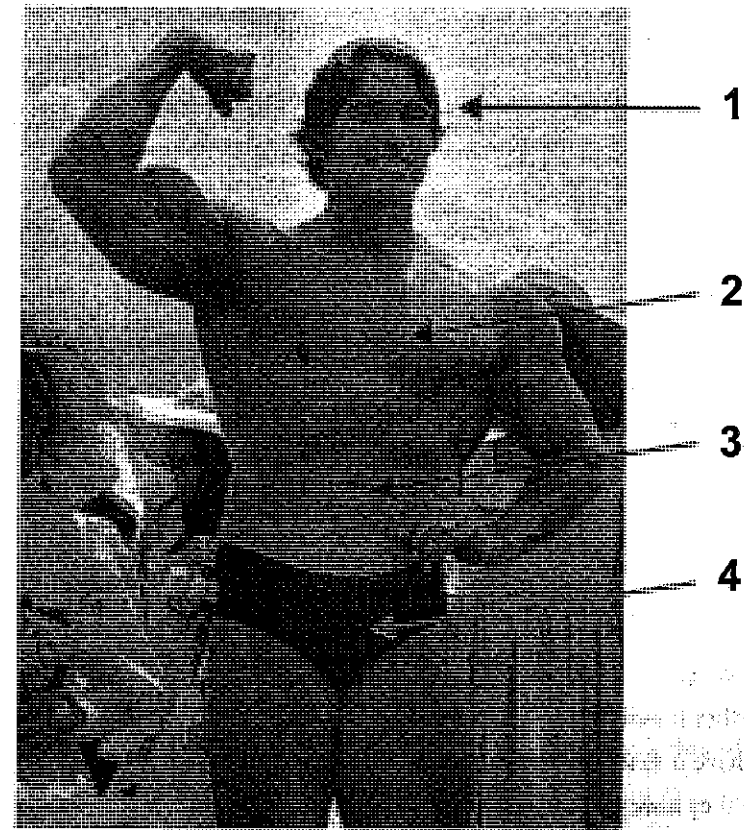
*When it comes to connecting with the entire audience, you have four bodily organs that are important: your head, your heart, your gut, and your sex organs. The object is to move the process down out of your head, into your heart with sincerity, into your gut with humor, and, ideally, if you're sexy enough, into your lower organs with sex appeal.*

That's it. Others have heard me mention this in talks and put their own spin on it—talking about the chakras and “mind body spirit” and other sorts of New Agey gobbledygook. Also, there's vast work in the field of psychology exploring these sorts of dynamics. Carl Jung talked about personality types, and the Myers-Briggs Type Indicator, developed during World War II, explores this vertical axis of powers in the body. But, for our purposes, let's keep it simple and free of psychobabble. If you've had lots of classes in psychology, you may find this annoyingly simplistic. If not, I hope you'll find it as useful as I have.

It's about the difference between having your driving force be your head and having it be your sex organs. There *is* a difference.

Let's begin by considering each of the four organs.

The *head* is the home for brainiacs. It is characterized (ideally) by large amounts of logic and analysis. When you're trying to reason your way out of something, that's all happening in your head. Things in the head tend to be more rational, more “thought out,” and thus less contradictory. Academics live their lives in their heads, even if it results in sitting at their desks and staring at the wall all day, as I used to at times. “Think before you act” are the words they live by. When they ask, “Are you sure you've thought this through?” they are reflecting a sacrosanct hallmark of their entire way of life.



**Figure 1-1.** The four organs of mass communication. To reach the broadest audience, you need to move the process out of the *head* (1) and into the *heart* (2) with sincerity, into the *gut* (3) with humor and intuition, and, ideally, if you're sexy enough, into the *lower organs* (4) with sex appeal. Photo courtesy of © Mirkine/Sygma/Corbis.

The *heart* is the home for the passionate ones. People driven by their hearts are very emotional, deeply connected with their feelings, prone to sentimentality, susceptible to melodrama, and crippled by love. Religion tends to pour out of the heart, and religious followers feel their beliefs in their hearts. Actors usually have a lot of heart. Sometimes annoyingly so. In an episode of *Iconoclasts* on Sundance Channel, you can see it when Renée Zellweger (heart-driven actress) and Christiane Amanpour (head-driven

reporter) visit the World Trade Center memorial in New York City. Renée is overflowing with emotion, crying for the people who died, agonizing over the tortured fate of humanity, practically throwing herself to the pavement in empathetic agony, while Christiane offers up analytical, dry-eyed, rational commentary on how sad it is that humans do terrible things like this (which she's seen firsthand all around the world in her reporting). It's a perfect side-by-side comparison of head versus heart.

The *gut* is home to both humor and the deeper levels of instinct (having a gut feeling about something). We're getting a long way away from the head now, and, as a result, things are characterized by much less logic and rationality. Humor tends to come from the gut, producing "belly laughs," but also is extremely variable and often hard to understand. There's nothing worse than someone trying to explain why a joke is funny.

People driven by their gut are more impulsive, spontaneous, and, most important, prone to contradiction. Where the cerebral types say, "Think before you act," the gut-level types say, "Just do it!" When things reside in the gut, they haven't yet been processed analytically. For that reason, when people have a first gut instinct about something, they generally can't explain why they have the instinct, where it comes from, or how exactly it works. As a result, if you quiz them about it, you're going to find they are full of contradictions. You'll end up saying, "But wait, you just said X is the cause, and now you're saying Y is the cause." And they will respond with crossed eyes and a look that says, "I know! Can you believe I'm so confused?" And yet they are still totally certain they understand what's going on.

We heard a lot about the gut-versus-head divide during the 2004 presidential race between George W. Bush and John F. Kerry. Bush even proudly spoke of how he based much of his decision making at the gut level. He told author Bob Woodward, "I'm a gut player. I rely on my instincts." Not surprisingly, Bush's presidency was characterized by a great deal of contradiction.

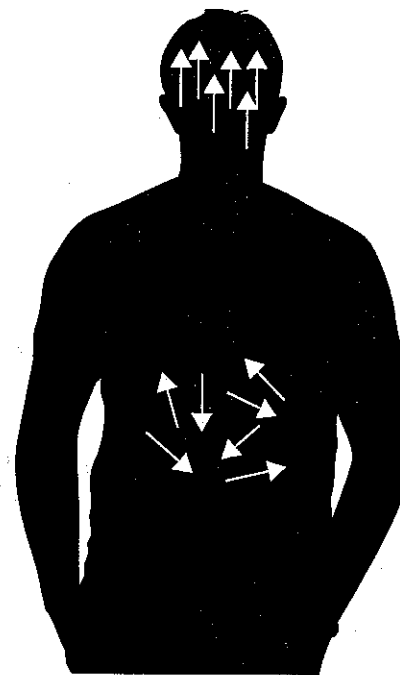


Figure 1-2. Intuition resides in the gut and tends to be full of contradiction. When the process is moved up to the head (intellectualized), the information is channeled, making it more consistent and logical.

At the bottom of our anatomical progression we have the naughty *sex organs*. As soon as you finished reading this sentence, you probably smiled for reasons you don't even begin to understand. All I have to say is "penis" and you're either physically smiling or internally smiling. Why is this? Well, let's ask Bill Clinton—remember him? He's the man who obliterated his entire historical legacy thanks to this region. Let's ask the countless men and women who, over the ages, have risked and destroyed everything in their lives out of sexual passion.

There is no logic to the sex organs. Look at those arrows in the gut in figure 1-2. Now picture them moved lower and spinning in circles. You're a

million miles away from logic in this region. And yet the power is enormous, and the dynamic is universal.

Not universal, you think? Some people have no sex drive? That is, of course, impossible to test, but one thing worth taking a look at is the life of the novelist and philosopher Ayn Rand. She was one of the most prominent popular figures to suggest it is possible not to be driven by such irrational forces. She authored the massively best-selling *Atlas Shrugged* in the 1950s and founded her "objectivist" school of thought and way of life on the principle of suppressing one's irrational side. And guess how her life turned out. She eventually got eaten alive by her sex organs.

Seriously. One of the greatest books I've ever read was Barbara Branden's biography of her, *The Passion of Ayn Rand*. In a nutshell, Barbara and her husband, Nathaniel, became followers of Rand, went to work for her, and believed and lived every word of her teaching about living an objectivist life—not allowing oneself to be controlled by pointless, frivolous, irrational thoughts and feelings. Rand's objectivist school of thought in the 1950s grew to enormous popularity; its followers even included former Federal Reserve chairman Alan Greenspan. And then . . .

Rand ended up secretly boinking Nathaniel for a couple of decades. When he dumped her, Rand turned vitriolic, and the public began to catch glimpses of the insanity she was living (proof that the story wasn't just Branden's fantasy). Total hypocrisy of the highest magnitude—telling the world to suppress its irrational side while viciously showing the man who had scorned her out of her institute. According to Branden, Rand went to her grave still simmering with rage over it.

So don't even begin to think that the lower organs are not a universal driving force, for everyone from the local FedEx delivery guy to the president of MIT. And once you've processed that thought, you can appreciate the age-old adage "Sex sells." It's the truth, mate. If you are fortunate enough to get your communication down into that region, you can connect with almost

every living human—even the most anti-intellectual NASCAR fan. Who doesn't like Brad Pitt and Angelina Jolie? They're sex-eeee.

### Too Heady: The Less Than One Campaign

Now, if we consider these organs, we start to see some fundamental differences in the members of the mass audience. The lower organs include everyone, but as we move upward, our audience narrows. There are people who pretty much respond only to sex and violence. Not much of a sense of humor, not much passion, and zero intellect. Once you move above the belt, you've lost them.

But you still have the attention of a lot of people through humor—most folks love humor. But then you move higher and lose that element. Well, with the heart you still have actors and the religious folks. But then you move up above that, into the head, and who do you have left? Just the academics. Which is okay, but the point is that you're communicating now with a very small audience. You've left most of the general public out of the story.

So this is the fundamental dynamic. And it began to resonate with me in 2001 as I drifted back from the Hollywood environment I had been immersed in since leaving academia in 1994. I started working with academics and science communicators in ocean conservation. And as I did, the words of that acting teacher began echoing back at me.

I learned of a large project called the *Less Than One* campaign. The idea was built around someone's revelation that less than 1 percent of America's coastal waters are protected by conservation laws. Someone thought, "If we can communicate this factoid to the general public, when people hear it they will think about how small 1 percent is and they'll be outraged."

Well. They should have called it the *Less Than Outraged* campaign, since that's what happened with the general public. The *Less Than One* campaign opened its Web site in July 2003. It had a number of ill-conceived media projects (I'll talk about one of them in chapter 4), and, to make its short

story short, by July 2004 the site was gone and not a trace of the project could be found on the Internet.

Suffice it to say, the masses simply do not connect with “a piece of data” (i.e., a number). Could you imagine a presidential candidate making his campaign slogan “More than 60 percent!” with the explanation that, if you elect him, eventually more than 60 percent of the public will earn more than \$30,000 a year? For some reason I just can’t see the crowd at campaign headquarters shouting, “More than 60 percent! More than 60 percent!” Sounds like something from a Kurt Vonnegut novel.

No, in fact groups connect with simple things from the heart—“A new tomorrow,” “We’ve only just begun,” “Yes we can.” You just don’t see a lot of facts and figures in mass slogans, unless they’ve been crafted by eggheads.

By now you may be thinking, “What’s this guy got against intellectuals? He’s calling them brainiacs and eggheads.” Well, I spent six wonderful years at Harvard University completing my doctorate, and I’ll take the intellectuals any day. But still, it would be nice if they could just take a little bit of the edge off their more extreme characteristics. It’s like asking football players not to wear their cleats in the house. You’re not asking them not to be football players, only to use their specific skills in the right places.

### Kicking Flowers: The Value of Not Thinking Things Through

I’m criticizing overly cerebral people here, yet we obviously know there is a value to working from the head most of the time. Educated people make great inventions, create important laws, run powerful financial institutions. Clearly it pays to think things through so that everything is logical, fair, and consistent. But what’s not so obvious is the value of sometimes *not* thinking things through.

Spontaneity and intuition reside down in those lower organs. They are the opposite end of the spectrum from cerebral actions. And while they bring with them a high degree of risk (from not being well thought through, obviously), they also offer the potential for something else, something mag-

ical, something that is often too elusive even to capture in words. And because they are so potentially effective, they are the focus of the rest of this chapter.

I learned about the power of spontaneity the hard way—by getting yelled at in that acting class. I eventually got to see it up close and personal as I began to realize I was a lousy actor. And the reason for my being a lousy actor was that I was . . . too cerebral. I thought too much.

Let me tell you specifically how I would get to see it. Night after night we would do acting exercises in which one person pretends to be at home and the other person comes home. On the edge of the stage was a fake wall with a door that the person coming home would enter. So, for example, I would be the guy at home, maybe working on balancing my checkbook, and my “wife” would come in after a long day of work. We would get into an argument over something, and then, right in the middle of the scene, I would accidentally do something that wasn’t in the plan—like, let’s say, knock over the vase of flowers on the table. The contents would spill all over the floor. I would look down. And then, being the highly cerebral former academic, I would start thinking.

I would think, “Wow, I just knocked over the flowers, that wasn’t supposed to happen, we’re supposed to be arguing over the wrecked car, how would this clumsy act I just did fit into my character’s tendency to—“*and then, blaaaaah*, the teacher lady is up and screaming in my face: “*Stop thinking! Do something! Nobody wants to watch you stand up here and think. You’re like a statue. Do you want to watch a play full of statues? Act!*”

Then a similar thing would happen with one of the younger, less cerebral guys. When he knocked over the vase, he would immediately kick it like a football and shout, “*I hate flowers!*” And the audience would burst out laughing and cheering, and the crazy acting teacher would scream at him, “*Why did you do that?*” and he would reply, “*I don’t know!*” and she would scream with joy, because *that* was a spontaneous moment in which you could feel the magic.

And *that's* what I was so bad with. I would just think too much. The fact is, if she let me go long enough, I would eventually look at the vase and say to my "wife," "Your bad driving upsets me so much I end up doing things like knocking over vases of flowers." And the audience would snore. I would have provided a well-thought-out and reasonable response to the spilled flowers; it just would have lacked that spark of energy that the other, more spontaneous performance provided.

That's the deal with spontaneity. It gives a wonderful energy that audiences love. And, by the way, it has become the core and backbone of a major shift in the entertainment world over the past decade.

### The Shift to Unscripted Entertainment

I finished that acting class in 1996. I never had any intention of becoming an actor (I did it to improve my directing skills), but all the other kids in class headed off to pursue acting careers.

By early 1999, though, they began showing up on my doorstep, depressed. In Hollywood, the month of February is generally known as "pilot season." That's when the networks cast the pilots they will shoot—whether half-hour sitcoms or hour-long dramas. For actors it's a frantic time in which they may have four or five auditions a day, causing them to drive wildly back and forth between Hollywood and Burbank. But suddenly in 1999 the number of auditions dropped significantly, and my aspiring actor friends felt the pinch.

They would come to my apartment in Beachwood Canyon, right beneath the Hollywood sign, for lunch. We would sit on my front porch, and I would commiserate with them. "There are hardly any parts this year," they would say.

So where do you think all these acting roles went? Were they lost to outsourcing? Shipped overseas? Displaced by computer-generated actors? Nope.

They were lost to a new trend—reality shows, which are part of a larger category known as "unscripted entertainment." A whole wave of these shows

hit the scene around the turn of the century, including *Survivor*, *Big Brother*, and all the other crazy shows you now know. But as quickly as my friends got depressed, they also heard a rumor that brought some relief—that it was only a fad—that within a couple of years reality shows would run their course, lose popularity, and never be heard of again.

Well . . . it's a decade later, and guess what? That rumor was way off the mark. Reality shows are as strong as ever, while sitcoms are officially a dying trend. Reality shows sounded the death knell for the sitcom; then another force, YouTube, came along and drove the spike deeper. Michael Hirschorn encapsulated this in an article in the *Atlantic* in November 2006 titled "Thank You, YouTube: DIY Video Is Making Merely Professional Television Seem Stodgy, Slow, and Hopelessly Last Century."

What do reality television and YouTube have that scripted sitcoms don't? Very simple—spontaneity. Or at least the feeling of spontaneity. Even though most reality shows do in fact have a very tight narrative structure, there is still something at the small scale, from one moment to the next, that feels uncontrolled, as if it has the potential to go anywhere.

Sitcoms, on the other hand, are controlled down to the very last detail. If a vase filled with flowers falls over, it's almost certainly because it was written into the script. Each show is broken into clearly delineated acts, with story arcs that follow standard patterns. The net result is an extremely predictable and formulaic style of storytelling. Having a strong, clear structure provides a level of comfort (we always knew Sam and Diane on *Cheers* would resolve their fight by the end of the episode), but eventually the predictability also leads to a loss of energy. The audience slowly absorbs all the major plotlines and standard setup/punch line jokes until the whole genre loses its impact.

Spontaneity is fun, plain and simple. Just take a look at the annual Academy Awards ceremony—the Oscars. What does the public most crave every year? It's not the opening monologue, the dreary montages, the lame jokes from presenters, or the tedious musical numbers. What the audience desperately and eagerly prays for is the *one* spontaneous moment that will live

forever. Whether it's Jack Palance dropping to the floor to do one-handed push-ups, Roberto Benigni hopping up on his chair as he calls to the stage, or Sally Field's "You like me, you really like me!"—that's what everyone lives for. It's the spark of magic that comes with spontaneity.

It's the same thing you can routinely see and hear at the Democratic and Republican National Conventions. The television commentators complain, over and over again, about the tightly scripted and controlled nature of the events. Every single moment, every speech, every presentation seems to be so tightly choreographed, down to the last detail. After a while, you get the feeling that the commentators are just hoping that someone, anyone, will trip on their way to the podium, interjecting at least one unpredictable, spontaneous moment.

If you want to see the truly blindingly brilliant charisma of a spontaneous moment, you should watch the original black-and-white film of President John F. Kennedy pinning a medal on astronaut Alan Shepard in the Rose Garden of the White House in 1961. Kennedy accidentally drops the medal, picks it up off the ground, and without missing a beat says, "I give you this medal that comes from the ground up," and the assembled crowd explodes with laughter. The scene has the sort of energy that political convention watchers dream of.

So what is it about spontaneity that is so powerful? It's the element of danger, the idea of performing without a net. These dynamics reach down into the lower organs—down to the gut with a twinge of fear.

And that brings excitement. It also brings an organic element that has a feeling of truthfulness to it. That was what the Meisner acting class was about—making the performance seem real. It's also what improv acting is about: trying to create those electric, totally authentic moments, even at the expense of a lot of rambling, unfocused, less precise moments. Here's how this relates to scientists.

Over the past decade the science community has begun to develop at least some awareness that scientists communicate poorly and need help.

Two major efforts to address this are the Aldo Leopold Leadership Program and the book *A Scientist's Guide to Talking with the Media: Practical Advice from the Union of Concerned Scientists*. Both are important projects, but both have their limitations in that they focus primarily on the first half of communication—substance—but don't yet reach much into the second—style. To explain this further, let me begin at the introductory level.

### The Basic Principles of Science Communication

Science, from the beginning of time, has always consisted of two parts. First is the obvious part, the *doing* of science: the collecting of data, the testing of hypotheses, the running of experiments—all the standard stuff.

But there is a second part that isn't so immediately obvious, and that is the *communicating* of science.

Over the ages, *all* scientists, from the highest Nobel laureate to the lowest laboratory technician, have *always* had to take part in both of these activities if they wanted to actually be scientists. Even the technician who sits in the corner of the lab writing down numbers from the DNA sequencer has to, at the end of the day, communicate the data to someone. Without performing both parts (which happens all the time), you have not performed science. You get people who do the science and then fail to communicate it, and you get people who don't do the science but go ahead and communicate (the latter are known as frauds).

There are countless famous stories of great scientists who did a great job of the first part—doing the research—but then totally fell down on the second part. For starters, there's Gregor Mendel, the father of genetics. He is the true icon of poor communication. In fact, someone should create a Gregor Mendel Award for the scientist doing the best research yet failing to communicate it effectively.

Mendel was a humble Austrian monk of the mid- to late nineteenth century. While Charles Darwin was basking in the glow of the celebrity he had gained by communicating directly to the public with his best-selling *Origin*



of *Species*, Mendel was toiling away in the Austrian Alps discovering the very genetics that would have given Darwin the mechanism of inheritance he needed to make his theory of evolution complete. But Mendel lacked the sort of self-promotional streak that is essential for scientific success in the United States today. He was a shrinking violet when it came to presenting his foundational work and instead published it in obscure journals, leaving this earth with little fanfare. His most important paper was cited only a handful of times over the next thirty-five years.

It wasn't until several decades later that a number of major evolutionists rediscovered Mendel's experiments and said to themselves, "Holy smokes, this guy worked it all out long ago." The rediscovery of Mendel led to what is known as the "modern synthesis," in which Darwin's ideas on evolution were brought together with Mendel's knowledge of genetics to create a robust theory of how evolution works. Had Mendel been a bit more of a communicator, the modern synthesis might have happened a few decades earlier and science would have advanced more rapidly.

A similar thing happened with Alexander Fleming, who in 1929 discovered penicillin but published his findings in a paper that drew little attention. Instead of going out on the road and communicating his discovery effectively, he left it alone and nothing happened for more than a decade. When Ernst Chain finally discovered his work in 1940 and heard that Fleming was coming to visit, he commented, "Good God, I thought he was dead."

Had Fleming's work been widely disseminated in 1929, it could have led to the development and application of penicillin a decade earlier, saving countless lives. Such are the costs of failed communication.

Effective communication is an essential part of science, for at least two reasons. First, if nobody hears about your work, you might as well have never done it. And second, especially in today's world, if you don't communicate your research effectively, there are many people around who will communicate it for you, and when they do, it will probably be skewed in order to support whatever agenda they have.

### The Objective/Subjective Divide

But if communication is so important, why don't scientists put more effort into it?

In my experience, it's because of the objective/subjective divide in science. The doing of science is the objective part. It's what scientists are most comfortable with. A scientist can sit in his or her laboratory all day long, talking to the microscopes and centrifuges, and they will never talk back. I have heard scientist friends of mine over the years rave about how much they enjoy field and laboratory research for exactly this reason—it's all so rational, so logical, so objective, and . . . alas, so nonhuman—a chance to get out in the field, away from people. No politics, no bureaucracy, no administrative duties, just pure rationality.

Unfortunately for them, there is that other part to science called communication, which involves dealing with those often irrational and illogical creatures called humans. And while Mr. Spock of *Star Trek* found humans to be fascinating, most scientists really don't.

In fact, in 1999 I did a video titled *Talking Science: The Elusive Art of the Science Talk*, in which I interviewed a variety of University of Southern California faculty members in the sciences, communication, theater, and cinema. One physicist told me about the whole syndrome in no uncertain terms. He said he had always, all his life, had a hard time speaking to people. So, when he went to graduate school to get his doctorate in physics, it was his

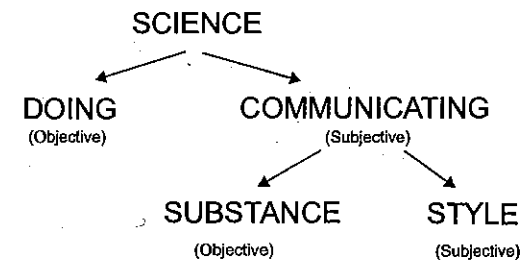


Figure 1-3. The dual nature of science. The objective/subjective divide for both science and the communication of science.

dream come true to be paid to lock himself in a laboratory and not talk to anyone day after day. But then they broke the bad news to him—he would eventually *have* to go to a scientific meeting, stand in front of an audience, and give a public talk about his research. He was furious the day he learned of this, and at first he refused to do it. But it wasn't an option—it was a requirement. So over the years he has reluctantly taken part in the communication of his science, but to this day he says it's the worst part of his career. And I can assure you he is not alone.

Why is science such an antisocial profession? Is it that the profession selects for these traits, or is it that it reinforces these traits? Probably a little of each.

I think my moment of truth on this topic came in my first year as a professor, when I attended a big scientific meeting in San Francisco, scored a poolside hotel suite, and organized a party in my room for the second night of the meeting. I invited about fifty scientist friends from the meeting, but when party time rolled around, about five showed up. All the rest either had evening sessions they wanted to attend or were getting ready for their own talks. I sat in my room that evening, staring out at the pool.

Scientists are wonderful people, but as a group they tend to be a little awkward when they get together. Going to the annual American Geophysical Union meeting just isn't quite the same as attending the Sundance Film Festival.

How can scientists overcome this? My theory is that they need to reach down into the lower organs. I begin by exploring the phenomenon of spontaneity.

### How to Find Spontaneity

Not very spontaneous? Feeling like you're that guy who stares at the knocked-over vase and tries to think of what to say? Feeling like Chris Farley interviewing Paul McCartney on *Saturday Night Live*, where he mostly just stares at him and can't think of anything to say other than "That was awe-

some"? There are ways to work on this problem, one of which is called improvisational acting, or improv.

During my years in Hollywood I had several encounters with improv acting. For starters, I took classes at a couple of the improv programs that are scattered across Hollywood. In particular, I went through several levels of training at Second City, the program that gave rise to John Belushi, Dan Aykroyd, Gilda Radner, and many other great comics.

But more important, early on I became a fan of the legendary Groundlings Improv Comedy Theater, located on Melrose Avenue in Hollywood. The Groundlings is one of the other prime training programs for the major comic actors that emerge on *Saturday Night Live*. It has its own suite of superstar alumni, including Will Ferrell, Chris Kattan, Phil Hartman, Paul Reubens, Jon Lovitz, Kevin Nealon, Maya Rudolph, Kristen Wiig, and many more.

After attending The Groundlings' Friday night shows for years, I finally broke the ice in 2002 by contacting one of the veteran performers, Jeremy Rowley, to see if he might be interested in helping out with my Shifting Baselines Ocean Media Project. I wanted to make a comic television commercial that talked about lowered standards for ocean quality by drawing comparisons to the idea of lowered standards for the arts. For one of the examples I wanted to have a scene of bad dancing. Jeremy had performed an incredibly funny scene in the Friday night show in which he ended up coming out totally naked holding a birthday party hat over his private parts and dancing to a frantic song from the Gipsy Kings. The scene produced screaming laughter from the audience—truly one of the funniest performances I've ever witnessed.

Jeremy helped me with the bad dancing scene, and then we put together a stand-up comedy contest for Shifting Baselines. We then cowrote and directed *Rotten Jellyfish Awards*, featuring Jennifer Coolidge (Stifler's mom in *American Pie*) and Daniele Gaither (of *MADtv*), followed by a series of comic short films using the main cast of The Groundlings. After that, I shot

my *Tiny Fish Public Service Announcement*, starring Tim Brennen of The Groundlings and Cedric Yarbrough of Comedy Central's *Reno 911!*, and used a number of Groundlings actors in my feature films. So, over the course of seven years, I spent a considerable amount of time around The Groundlings and absorbed what I could of improv technique.

The most important overall aspect of improv training is that it is based on the idea of affirmation and positivity. (I talk about this in chapter 4, where I discuss the negating aspects of scientists.) But it also draws on spontaneity and the hugely likeable qualities that come with it. The object of improv is to work not from the head but from the gut. To listen very closely and to not wait for your brain to process what you're hearing, but instead to be guided by your instincts. Basically, to *trust* your instincts. To have enough faith in yourself that you don't feel the need to slow things down and think them through, but rather to simply act—impulsively, immediately, spontaneously. It's back to that kid kicking the vase.

Improv actors are like explorers—they open up doors and go inside. They do an improv scene in which someone comes out with something silly and nonsensical, and, instead of the other actors frowning and “negating” it by saying something like “That could never happen,” they boldly move forward into uncharted waters.

For example, let's say the actors are pretending to be looking at a llama. One of them says, “Wow, look, it has seven legs.” Instead of negating it by saying, “What? A llama could never have seven legs,” another actor takes things in a positive, affirming direction by saying something like “Yeah, I wonder what happened to his eighth.” And maybe the next one says, “Yes, llamas always conform to the rule of fours—this one must be a rebel.” And onward toward increasing silliness, without a doubt, but also occasionally someone might nail a piece of logic. If there had been, for instance, a recent news story about a fast-food establishment having contaminated meat, one of the actors might say, in reference to the missing llama limb, “So that's what was in that fast-food meat.” It doesn't all have to be baseless silliness,

but it does all have to be affirmative because that helps the idea and the story get larger, and inevitably funnier.

In contrast, the scientist hears the “seven legs” statement and immediately says, “No, that's not possible,” and the whole fun exercise crashes to a halt. Yes, this enters into the realm of accuracy, which is part of the scientist's job, but we'll get into that later, in chapter 3. For now, just know that the spark of spontaneity comes from not being careful, and it can be hugely powerful, as I got to see in my work with students.

### No Joke: Improv Comedy for Scientists

In the same way that science splits into two parts—the objective (doing it) and the subjective (communicating it)—the communication of science has to divide. Looking back at figure 1-3, you see there is the objective part of communication (the *substance* of what is communicated) and the subjective part of communication (the *style*). Knowing that scientists are drawn to the objective side of science, I think we can easily predict that they are also drawn to the objective side of communicating. And this tends to be much of the focus in workshops that train scientists to communicate better.

The Union of Concerned Scientists' book *A Scientist's Guide to Talking with the Media* asks, in the title of the fourth chapter, “Do you hear what you're saying?” It doesn't ask, “Do you hear *how* you're saying it?” It sticks with the *what*.

That's the difference: what = substance; how = style. Most teachers of science communication are still at square one, working primarily on the substance. And the idea of asking scientists to take lessons in comedy sounds rather absurd. But we've been experimenting with it at Scripps Institution of Oceanography with the graduate students and learning some fascinating things.

Every summer for the past few years I have taught the second half of the communication week in Scripps' orientation course for new graduate students. For the first two days of the week, the course brings in major print

journalists from the *New York Times* and the *Los Angeles Times* to talk about communicating science from their perspective. They tell about how to do a good job when you are being interviewed about your research or science-related issues.

In the second half we focus on electronic media, including an intensive video-making workshop where the students make their own sixty-second video. But a couple of years ago I decided to do a little experiment.

Some of the instructors at The Groundlings, including Jeremy Rowley, occasionally run corporate training workshops in which they teach improv exercises to CEOs. They get them to work on lightening up and looking at their communication dynamics from a different perspective. So I managed to talk Jeremy into coming down to Scripps for a morning to do the same exercises with the students.

He ended up running two hours of improv games, which started out mostly silly, fun, and of questionable purpose—things like standing in a circle and taking turns saying the letters of the alphabet by having the person to your right look deep in your eyes and say his letter—“J”—then you turn to the person on your left, look deep in her eyes, and say, “K,” and so on. Really just an icebreaker game.

But, as time went on, the games began to get more complex, and Jeremy ended each game with a detailed explanation of how it related to the students and their highly cerebral world.

The best game of all, and the one that brought the whole purpose home, was called the “add-on story game.” Five students stood before the class. Jeremy chose one randomly. She began by making up a story—“Today my car broke down, so I had to take it to the shop.” He interrupted her and randomly pointed to another student, who had to pick up where she left off. The next student said, “The mechanic looked under the hood, opened the carburetor, and found a dead bird in it.” And then another student was chosen to pick up from there and keep the story going.

And *this* was where we got to see the true mind of the scientist at work. Some of the students kept their minds open, listened closely, followed the story. When called on, they instantly took their best shot at making up something that connected with what was said and kept the story going, even if their contribution sounded silly, like, “The bird woke up and flew out of the shop!”

But others—the more cerebral ones, the thinkers . . . ah, they were the ones who from the very start of the exercise went to work, thinking, “This is a story about a bird in a car motor. I’m eventually going to be called on at random. I don’t want to embarrass myself, so I’d better have something prepared for when I get called on.” Preparation, preparation, preparation—thinking, thinking, thinking. When they were finally called on, they would say something like “The bird had its wing stuck in the carburetor and couldn’t get loose,” even though the previous student (to whom they failed to listen) had just said the bird flew away.

And all of a sudden the story would stop dead.

The net result was very clear as the smiles vanished from everyone’s faces and some of the students would say, “Oh, boo! No, that doesn’t make any sense.”

Jeremy would then stop the exercise and explain what had just happened. He would point out that the purpose of improv is, first, to listen very closely and, second, to trust yourself—to know that even if your mind is blank at the moment, you’ll figure out something, even if it’s as pointless as kicking the vase as the young student had done. And, finally, to do all that you can to make your partner—the person who came before you—look as good as possible. Suddenly taking the story back to having the bird stuck under the hood makes the previous person look bad, as if he had been wrong in telling about the bird flying away.

You can see how this relates to being interviewed. In the one form of science communication training, you are told to arm yourself with a stack of

sound bites, metaphors, analogies, and message points. Then, regardless of what the interviewer is asking, you are to push your own agenda and get *your* message out.

This orientation leaves the scientist thinking, "Me, me, me—I need to make myself look good." Which seems logical. But consider this—what if there is actually something unique to be gained by taking the opposite approach—by thinking, "Him, him, him—I need to make the interviewer look good"? Yes, it's counterintuitive. And so are a lot of things when it comes to communication, since it's not always entirely rational. Sometimes you need to be a little less direct and literal minded (the subject of the next chapter).

With the improv approach, you try to make the interviewer look good. There is an upside and a potential downside. The upside is that you will have better chemistry in the interview, be more relaxed, a more enjoyable person. The downside is that you might not manage to "get in" everything you wanted to say or make certain everything is completely accurate.

Which is better? It's a question of substance or style. The former is better if you're in a setting where everyone is likely to hear and care about everything you have to say. But, if you're in a highly superficial medium like television, which is meant not for the academic audience but for the general public, and where people pick up much more on what they're seeing than on what they're hearing . . . then it's quite possible the improv approach will be more effective. It can result in the viewer saying, "I really liked that person who talked about global warming—she seemed really comfortable, knowledgeable, and . . . I didn't understand what she had to say, but just the fact that she seemed worried about global warming makes me think it's a serious issue."

That's in contrast to the scientist who spends the entire interview correcting the interviewer (i.e., negating), forcing the issues by giving answers that have nothing to do with the questions asked, and who seems to be pushing a story that the interviewer isn't asking for—something that happens every day on news shows.

For improv in general, the basic idea is saying, "Yes, and . . ." to everything that comes up.

Your partner says, "Look, there's Sasquatch, out in our front yard." You answer, "Yes, and . . . he looks really angry." Your partner says, "Yes, and . . . he just tossed your car over the house." And you say, "Yes, and . . ."

You just keep adding to the story, making it bigger and more interesting. You never halt the flow with anything negating—like "Sasquatch could never pick up a car."

It's a different way to communicate. It's not as precise as a scientist would like. But it is more likeable.

### More from the Gut: Intuition

And now it's back to the battle-ax acting teacher. It's time for another one of her basic principles. This one is very powerful and leads us to the thing known as intuition. The concept is "Great actors memorize the script, then forget it." (Always made me think of those old denture ads, "Fixodent and forget it!")

That principle was repeated night after night, and it became very important to me years later. What it means is that, in the early stages, the actor ends up very much "in" his or her head, having just freshly memorized the lines. But with repeated rehearsal, the material gets committed at a deeper and deeper level—as if it drifts downward from the brain and into the lower organs. And as it does, the actor is able to add sincerity to the material as it moves down to the heart, then have fun with it and add more humor as it gets into the gut, and finally add genuine sex appeal when it reaches the lower organs.

But something extra happens when the actor "forgets" the script. After weeks of rehearsal, the actor goes away for a few days and doesn't think about the material. Upon return, the performance is no longer coming from the head. The actor is no longer standing in the room trying to picture the lines on the pages of the script. Instead, he is standing in the room, looking

at the man pointing the gun. When he speaks, it comes not from memory but from what is seen and felt at the moment. It is alive and real. And—guess what—when he says, “Don’t shoot me! I’ve got three kids,” without even thinking about it, his words turn out to be very close, if not identical, to what the script said. When he “reaches” for the line, what he gets is what was in the script—available to him because the script was absorbed down at the level of intuition.

On a similar note, years ago I saw an interview with a British actor who was asked why his countrymen perform Shakespeare so much better than Americans. He said it’s because British actors go beyond intellectual respect for Shakespeare. They are raised with the Bard from a very early age. By the time they are adults, they have committed the material to such a deep level that they are able to add all the elements of the lower organs to it—passion, humor, and even sex appeal. In contrast, American actors tend to learn Shakespeare later in life, treat it with overwhelming reverence and dignity, and end up “caught up in their heads”—still thinking, “Oh, my goodness, I’m doing Shakespeare; I’d better do it right.”

Reaching into the lower organs is the ultimate goal of the Meisner technique, and it’s what produces the wonderful, incredibly likeable chemistry that is the essence of good acting. This is what overly cerebral scientists lack—but it’s an important part of interacting with the public. And it was a rule I tried to follow in making *Flock of Dodos*.

### Dodo Intuition

In the spring of 2005, after running the Shifting Baselines Ocean Media Project for three years, I read about the conflict over the teaching of evolution versus intelligent design in Kansas and immediately decided I wanted to make a documentary about it. More important, I also decided to put to work all I had learned in my Hollywood education. Instead of studying the subject for the next six months, figuring out exactly what I wanted to say, and then writing a script, I wanted to rely on my instincts and get to work quickly.

Within two weeks of reading H. Allen Orr’s article “Devolution: Why Intelligent Design Isn’t” in the *New Yorker*, I was in Kansas with a film crew conducting the week of interviews that provided the core of the movie. Instead of carefully preparing for each interview, I opted to trust my instincts, trust my twenty years of studying evolutionary biology, trust my knowledge of editing (for ensuring accuracy down the line), and focus on doing a good job as an actor in each interview. I felt as if I had memorized “the script” over the past two decades. The best thing I could do now would be to forget it.

The result was that I didn’t cover all sorts of important topics and questions that I probably should have in each interview. But the trade-off was that I was doing my best to listen to the person and respond, with as little thinking as possible, in an effort to generate good conversation.

This is an element of style that’s difficult to teach in workshops and can be elusive to scientists who feel they owe their first allegiance to accuracy and the facts.

*But there’s more to life than just accuracy.* Yes, that’s a very touchy subject for scientists. Some might even disagree with that statement—saying that accuracy is *all* that’s important. Suffice it to say, the topic is a major can of worms, which I will delve into in considerable detail in chapter 3. (Stay tuned!)

But for now, before moving on to the chapter’s final topic—not being so cerebral—let me go back to that improv acting exercise at Scripps. It was such a fascinating contrast with everything the print journalists had taught in the first half of the week, and the students said so.

What the print journalists were teaching was substance—get all your facts organized, shrink them down to sound bites, figure out your message, go into any interview with a clear agenda of what you want to convey, and then make sure you are in charge. In fact, the Union of Concerned Scientists produced a PowerPoint presentation to go with its book on how scientists should deal with the media. It offers the following nine tips on preparing for an interview:

1. Do your homework. Before every interview, ask the reporter what the topic of the story is, where it will appear, and when and where the interview will take place.
2. Interview when you're ready. Even if the reporter is on a deadline, ask if you can talk in ten minutes so you can prepare your main messages and sound bites.
3. Repeat, repeat, repeat. Unless you are on live radio or television, every interview is edited. Take control of how you are edited by driving home your main points.
4. If you stray off course, bridge back to your main message.
5. End the interview on your terms.
6. Never speak off the record.
7. Never guess.
8. Emphasize qualifications (meaning if you have to make a point that has limitations to it).
9. Never get angry.

Let's take a look at these pointers and consider what sort of advice it is the authors are giving. If there's one basic principle they are espousing, it's that the scientist should control, control, control the interview. The first point says to *assert* yourself by insisting on knowing all the details. The second point says to *assert* yourself by not letting the interviewer start before you're ready. The third point says to *assert* yourself by making the same points, over and over again. The fourth point says to *assert* yourself by bridging back to your main message. The fifth point says to . . . well, you get the idea.

It's nice that they're trying to instill self-confidence in scientists when dealing with the media, but take a look at it from the other side. If you were a journalist, would you want to be given a bunch of orders from the scientist you're trying to interview? "I'm not ready to start the interview. Let me make

this point again. I want to say this again. Let me get back to my main message."

Finally, there is a danger to being overly prepared for an interview. A major television news reporter told me recently about an interview he did with a woman who is a top climate scientist. She showed up so heavily prepped, with her head so full of sound bites and analogies and catchphrases, that halfway into the interview she seemed to lock up—having a hard time connecting to his questions, giving answers that were so full of her message that they hardly related to what he was asking, causing him to have to ask questions a second time. She finally called the interview off, with much apology, saying it just didn't feel right.

The reporter told me he ended up so frustrated, wishing that she, and many other scientists he interviews, would just relax, trust him, and let him guide the interview instead of turning it into a struggle.

This is the divide between the heavy preparation and showing up with an agenda versus the improv style of trusting yourself. The former guarantees accuracy, and the latter leads to a much greater chance of hitting that one golden moment when interviewer and interviewee connect—the moment that later, in postproduction, causes the editor to turn around in his chair and say, "Hey, everybody, come take a look at this."

Take your pick which you'd rather have. Given that for television your one-hour interview will probably get cut down to thirty seconds, you begin to see the value of scoring that one great moment versus a solid hour of boring (but accurate) details.

### Intuition

At the start of the chapter I mentioned the Myers-Briggs Type Indicator test. It is built around four "dichotomies," one of which is the divide between sensing and intuition. What this means is the split between people who want to base their decisions on information that is touchable, hearable, seeable,

and present in the here and now, and others who are open to less tangible, more abstract information that could even be from the past or the future.

In essence, it's the same "head versus lower organs" divide I've been talking about. So if the highly logical and analytical processes reside in the brain, what do we find at the other end of the spectrum?

Well, if we go way down to the far other end of the spectrum, we end up in the land of sex, and all hell breaks loose. This was Freud's undoing—trying to apply rationality to this realm. Good luck. He ended up with a career that was a mixed bag, which is why many scientists still despise him for coming up with nonscientific ideas—ideas that couldn't be tested or "falsified."

Basically, woe unto him or her who honestly thinks it possible to create rational and consistent theories of sexual forces. It's sort of like the observer effect, where you can never be certain whether what you're observing is the real state of nature or the state of nature that has been altered by your observing it. Same for sex. Those studying it have to deal with their own sex drives, which will probably drive them crazy.

Makes me crazy just to think about it. So let's stay away from this region. Use it at your own peril. Start off a speech with a sex joke at your own risk. Make a music video about the prodigious penis of the barnacle (barnacles have the longest penis relative to body size) and watch all sorts of weird things happen when you show it to groups of scientists (one male scientist accused me of being homophobic—how does that work?).

But there's another force, just above the belt, that is very important to science and scientists—intuition.

What is intuition? Start searching it on the Internet and you'll quickly find your way into wacky, far-out definitions like "the holistic merging of the cognitive senses," "the noncognitive experiences and memories," and "the body's bioelectrical sensitivities." Um, yeah. Right, dude.

Let's just say, in simpler terms, intuition is the act of knowing or sensing without the use of rational processes. Again, pretty much the opposite of what goes on in the brain.

Intuition is very important to the world of science because so much great science begins with it. There are countless famous examples. Descartes supposedly thought up the idea of Cartesian coordinates by lying on his back while sick, watching spiders spin their webs on the ceiling. Newton saw an apple fall from a tree. Kekulé dreamed of a snake biting its tail and came up with the circular molecular structure of the benzene ring.

These are all great discoveries that began as something that didn't look like science at all and lacked any data or rational thought. It's as if the gut is a great starting point for invention, innovation, or discovery. But once the idea begins to crystallize, it then must be transported northward to the brain so it can be subjected to the process of science.

James Watson described this interplay between intuition and science wonderfully in *The Double Helix*. In 1953 he and Francis Crick were getting close to discovering the structure of DNA and racing against a number

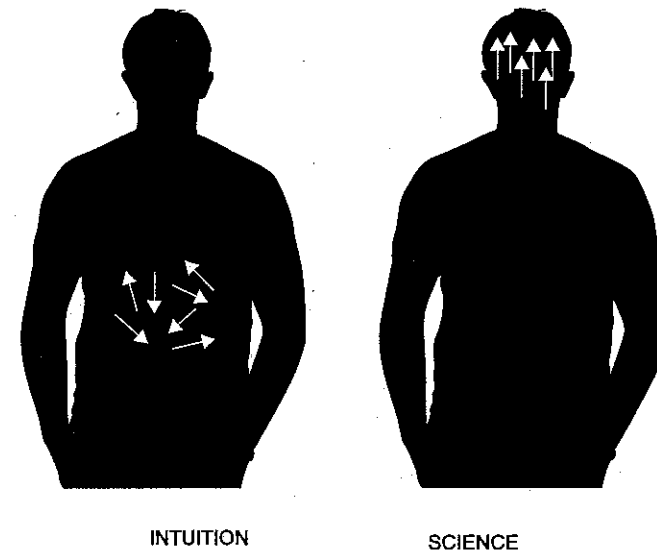


Figure 1-4. *Left*, intuition: when Watson and Crick knew Pauling's structure was wrong. *Right*, science: when Watson and Crick had figured out how Pauling's structure was wrong.



of other scientists. Suddenly Linus Pauling at the California Institute of Technology beat them to the punch and published a paper with his version of the structure. They were stunned to hear the news, but Watson says that the moment he and Crick looked at Pauling's paper they knew he had it wrong. They couldn't tell you exactly how or why in that first instant, but their intuition made them feel certain they were right. It would take them several weeks in the laboratory to move their intuition up to their brains, formulate a solid explanation of why Pauling was wrong, and eventually come up with the correct structure of DNA, which is what won them the Nobel Prize.

For a much more detailed examination of intuition and its basic properties in the real world, read Malcolm Gladwell's book *Blink*. He talks about art forgery detectives who can spot a forgery almost immediately, but try to get them to explain why they know it's a forgery and you'll probably hear them offer up a lot of contradictory thoughts until they've had a chance to really analyze the artwork, move the process to their brain, and smooth out the logic and thoughts.

Intuition is not science, yet it is a very important and powerful precursor to science. More science programs should spend time getting students to understand and appreciate the difference. One thing I tried to do with *Flock of Dodos* was show the relevance of this term to the issue of intelligent design. The science world did a good job of spewing all its bile and anger at the intelligent design movement in making it clear that intelligent design is not science, but what few, if any, bothered to do was go further and answer for the general public the question "Well, if it's not science, then what is it?"

The answer is intuition. It is a hunch—a gut instinct that much of what exists for biological diversity has been created not by nature but by a divine being, the designer. This, to many, is a beautiful and inspiring idea, but in the end that's all it is—an idea—a piece of intuition. And intuition is not science.

### Onward . . .

So now we have reviewed what I think is the most important dynamic in all of communication—the role of the four organs. And while we can plainly see that the brain is the epicenter for all that's permanent and lasting when it comes to information, I hope that you also now have an idea of what the lower organs can offer. They provide extra vitality, sparks of energy, an organic element—in general, they create the essence of what is meant by the word "human."

The tendency to be "too cerebral" leads to a preference to think rather than act (as in "doing something"). If you can manage to get past this and begin doing things, the next challenge is to find the creative energy to do the most effective things rather than just the most obvious. This requires that you not get too carried away with being literal minded, as I will explore in the next chapter.